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Model Year: 2013	Model: FR-S	Doc ID: RM0000010EX1UGX
Title: FOREWORD / CAUTION / SECTION: FOREWORD: CAUTION (2013 FR-S)		

CAUTION

This contents does not include all the necessary items about repair and service. This manual is made for the use of persons who have special techniques and certifications. If non-specialized or uncertified technicians perform repairs or service only using this manual or without proper equipment or tools, this may cause severe injury to you or other persons nearby and also cause damage to your customer's vehicle.

In order to prevent dangerous operation and damage to your customer's vehicle, be sure to follow the instructions shown below.

- This contents must be read thoroughly. It is especially important to have a good understanding of all the contents written in the PRECAUTION of "INTRODUCTION" section.
- The service method written in this manual is very effective to perform repair and service. When performing the operations following the procedures using this manual, be sure to use tools specified and recommended. If using non-specified or tools other than recommended tools and service methods, be sure to confirm the safety of the technicians and that there is no possibility of causing personal injury or damage to the customer's vehicle before starting the operation.
- If part replacement is necessary, the part must be replaced with the same part number or equivalent part. Do not replace it with an inferior quality part.
- It is important to note that this manual contains various "Cautions" and "Notices" that must be carefully observed in order to reduce the risk of personal injury during service or repair, or reduce the possibility that improper service or repair may damage the vehicle or render it unsafe. It is also important to understand that these "Cautions" and "Notices" are not exaggerations and are possible hazardous consequences that might result from failure to follow these instructions.



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FOREWORD

This is Volume 1 of the 2013 SCION FR-S manual. There are three volumes to this manual. The sections included in each volume are indicated by black type in the Section Index. Use the Section Index of each volume to find the volume with the section you need.

Applicable models	ZN6 series
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Please note that the publications below have also been prepared as relevant service manuals for the components and system in these vehicles.

MANUAL NAME	PUB. NO.
2013 SCION FR-S Electrical Wiring Diagram	EM20S0U
2013 SCION FR-S New Car Features	NM20S0U

All information in this manual is based on the latest product information at the time of publication. However, specifications and procedures are subject to change without notice. For the most current information available, refer to the Toyota Technical Information System (TIS) online at dealership locations or on the Internet at <http://techinfo.toyota.com>.

If you find any failures in this manual, you are kindly requested to inform us by using the report form on the next page.

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Repair Manual Quality Report

Att.) Service Manager, Your Distributor

Pub. No.	Issue Date
Name of Dealer	Name of Reporter
Subject	
Problem Description	
Correction Proposal	

Last Modified: 3-27-2012	6.4 F	From: 201203
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Title: INTRODUCTION: HOW TO USE THIS MANUAL: GENERAL INFORMATION (2013 FR-S)		

GENERAL INFORMATION

1. GENERAL DESCRIPTION

- (a) This manual is written in accordance with SAE J2008.
- (b) Repair operations can be separated mainly into the following 3 processes:
 - (1) Diagnosis
 - (2) Removing/Installing, Replacing, Disassembling/Reassembling, Checking and Adjusting
 - (3) Final Inspection
- (c) The following procedure is omitted from this manual. However, this procedure must be performed.
 - (1) Use a jack or lift to perform operations.
 - (2) Clean all removed parts.
 - (3) Perform a visual check before and after performing any work.

2. INDEX

- (a) An alphabetical INDEX section is provided at the end of the manual as a reference to help find the item to be repaired.

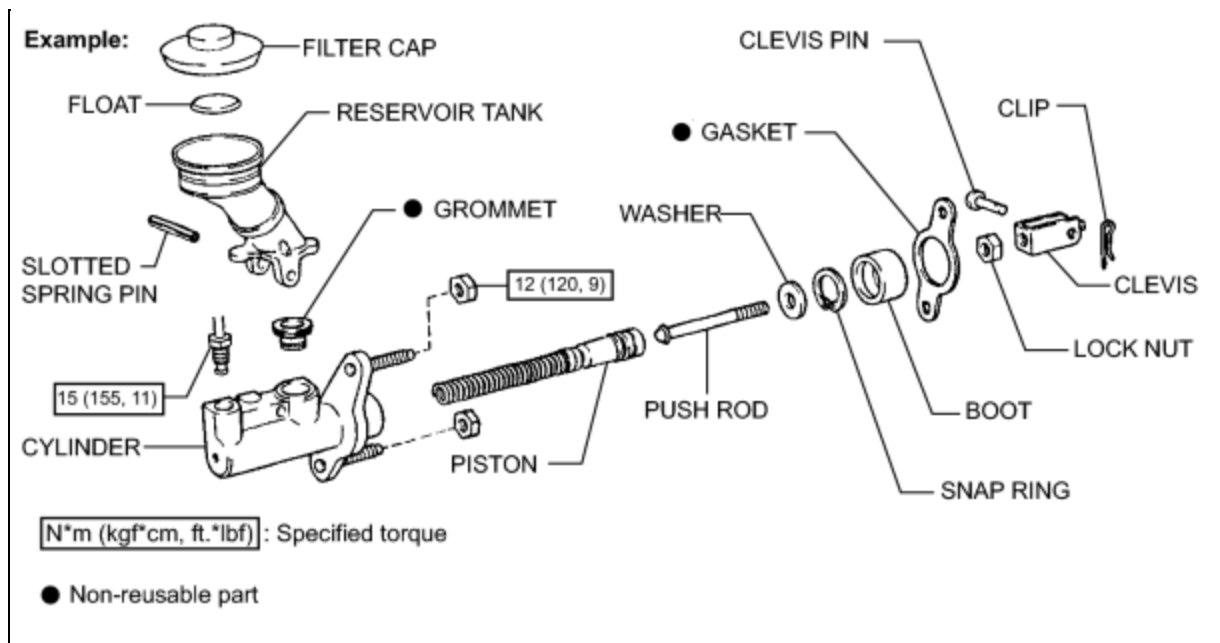
3. PREPARATION

- (a) Use of Special Service Tools (SST) and Special Service Materials (SSM) may be required, depending on the repair procedure. Be sure to use SST and SSM when they are required and follow the work procedure properly. A list of SST and SSM is in the "Preparation" section of this manual.

4. REPAIR PROCEDURES

- (a) A component illustration is placed under the title where necessary.
- (b) Non-reusable parts, grease application areas, precoated parts and torque specifications are noted in the component illustrations.

The following illustration is an example.



(c) Torque specifications, grease application areas and non-reusable parts are emphasized in the procedures.

HINT:

There are cases where such information can only be explained by using an illustration. In these cases, torque, oil and other information are described in the illustration.

(d) Only items with key points are described in the text. What to do and other details are explained using illustrations next to the text. Both the text and illustrations are accompanied by standard values and notices.

Illustration	What to do and where to do it
Task heading	What work will be performed
Explanation text	<ul style="list-style-type: none"> • How to perform the task • Information such as specifications and warnings, which are written in boldface text

(e) Illustrations of similar vehicle models are sometimes used. In these cases, minor details may be different from the actual vehicle.

(f) Procedures are presented in a step-by-step format.

5. SERVICE SPECIFICATIONS

(a) Specifications are presented in boldface text throughout the manual. The specifications are also found in the "Service Specifications" section for reference.

6. TERM DEFINITIONS

CAUTION	Possibility of injury to you or other people.
NOTICE	Possibility of damage to components being repaired.
HINT	Provides additional information to help you perform repairs.

7. INTERNATIONAL SYSTEM OF UNITS

- (a) The units used in this manual comply with the International System of Units (SI UNIT) standard. Other units from the metric system and the English systems are also provided.

Example:

Torque: 30 N·m (310 kgf·cm, 22ft·lbf)



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Title: INTRODUCTION: TERMS: ABBREVIATIONS USED IN MANUAL (2013 FR-S)		

ABBREVIATIONS USED IN MANUAL

ABBREVIATION	MEANING
ABS	Anti-Lock Brake System
A/C	Air Conditioner
AC	Alternating Current
ACC	Accessory
ACIS	Acoustic Control Induction System
ACM	Active Control Engine Mount
ACSD	Automatic Cold Start Device
ACT	Actuator
A.D.D	Automatic Disconnecting Differential
ADM	P.T. Astra Daihatsu Motor
A/F	Air-Fuel Ratio
AFS	Adaptive Front-Lighting System
AHC	Active Height Control Suspension
AID	Air Injection Control Driver
ALR	Automatic Locking Retractor
ALT	Alternator
AMP	Amplifier
ANT	Antenna
ASG	Automated Sequential Gearbox
ASL	Automatic Sound Levelizer
ASSB	Assembly Services Sdn. Bhd.
A/T, ATM	Automatic Transmission (Transaxle)
A-TRAC, A-TRC	Active Traction Control
ATDC	After Top Dead Center
ATF	Automatic Transmission Fluid
AUTO	Automatic
AUX	Auxiliary
AVG	Average
AVS	Adaptive Variable Suspension
AWD	All Wheel Drive
B+, +B	Battery Voltage

BA	Brake Assist
BACS	Boost Altitude Compensation System
BATT	Battery
BDC	Bottom Dead Center
B/L	Bi-Level
B/S	Bore-Stroke Ratio
BTDC	Before Top Dead Center
BVSV	Bimetallic Vacuum Switching Valve
Calif.	California
CAN	Controller Area Network
CB	Circuit Breaker
CCM	Carbon Ceramic Material
CCo	Catalytic Converter for Oxidation
CCV	Canister Closed Valve
CD	Compact Disc
CF	Cornering Force
CG	Center of Gravity
CH	Channel
CKD	Complete Knock Down
CNG	Compressed Natural Gas
COMB.	Combination
CPS	Combustion Pressure Sensor
CPU	Central Processing Unit
CRAWL	Crawl Control
CRS	Child Restraint System
CTR	Center
C/V	Check Valve
CV	Control Valve
CVT	Continuously Variable Transmission (Transaxle)
CW	Curb Weight
DC	Direct Current
DEF	Defogger
DFL	Deflector
DIFF.	Differential
DIFF. LOCK	Differential Lock
D/INJ	Direct Injection
DLC	Data Link Connector

DLI	Distributorless Ignition
DOHC	Double Overhead Camshaft
DP	Dash Pot
DS	Dead Soak
DSP	Digital Signal Processor
DTC	Diagnostic Trouble Code
DVD	Digital Versatile Disc
EBD	Electric Brake Force Distribution
EC	Electrochromic
ECAM	Engine Control And Measurement System
ECD	Electronically Controlled Diesel
ECDY	Eddy Current Dynamometer
ECT	Electronic Controlled Automatic Transmission
ECU	Electronic Control Unit
ED	Electro-Deposited
EDU	Electronic Driving Unit
EDIC	Electric Diesel Injection Control
EFI	Electronic Fuel Injection
E/G	Engine
EGR	Exhaust Gas Recirculation
ELR	Emergency Locking Retractor
EMPS	Electric Motor Power Steering
EPS	Electric Power Steering
ENG	Engine
ES	Easy & Smooth
ESA	Electronic Spark Advance
EVAP	Evaporative Emission Control
E-VRV	Electric Vacuum Regulating Valve
EX	Exhaust
FE	Fuel Economy
FF	Front-Engine-Front-Wheel-Drive
F/G	Fuel Gauge
FIPG	Formed In Place Gasket
FL	Fusible Link
	Front Left
F/P	Fuel Pump
FR	Front

	Front Right
F/W	Flywheel
FW/D	Flywheel Damper
FWD	Front Wheel Drive
GAS	Gasoline
GND	Ground
GPS	Global Positioning System
GSA	Gear Shift Actuator
GTMC	Gac Toyota Motor Co., Ltd.
GTS	Global TechStream
H/B	Hatchback
H-FUSE	High Current Fuse
HID	High Intensity Discharge (Headlight)
HPU	Hydraulic Power Unit
HSG	Housing
HT	Hard Top
HV	Hybrid Vehicle
HWS	Heated Windshield System
IC	Integrated Circuit
IDI	Indirect Diesel Injection
IFS	Independent Front Suspension
IG	Ignition
IIA	Integrated Ignition Assembly
IMC	INDUS Motor Company Ltd.
IN	Intake (Manifold, Valve)
INT	Intermittent
I/P	Instrument Panel
IRS	Independent Rear Suspension
ISC	Idle Speed Control
ISCV	Idle Speed Control Valve
KD	Kick-Down
KDSS	Kinetic Dynamic Suspension System
LAN	Local Area Network
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LEV	Low Emission Vehicle
LH	Left-Hand

LHD	Left-Hand Drive
LIN	Local Interconnect Network
L/H/W	Length, Height, Width
LLC	Long-Life Coolant
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LSD	Limited Slip Differential
LSP & BV	Load Sensing Proportioning and Bypass Valve
LSPV	Load Sensing Proportioning Valve
MAP	Manifold Absolute Pressure
MAX.	Maximum
MIC	Microphone
MIL	Malfunction Indicator Lamp
MIN.	Minimum
MG1	Motor Generator No. 1
MG2	Motor Generator No. 2
MMT	Multi-mode Manual Transmission
MP	Multipurpose
MPI	Multipoint Electronic Injection
MPX	Multiplex Communication System
M/T	Manual Transmission (Transaxle)
MT	Mount
MTG	Mounting
N	Neutral
NA	Natural Aspiration
NO.	Number
O2S	Oxygen Sensor
OC	Oxidation Catalyst
OCV	Oil Control Valve
O/D	Overdrive
OEM	Original Equipment Manufacturing
OPT	Option
ORVR	On-board Refilling Vapor Recovery
O/S	Oversize
P & BV	Proportioning and Bypass Valve
PBD	Power Back Door
PCS	Power Control System

	Pre-crash Safety System/Pre-collision System
PCV	Positive Crankcase Ventilation
PKB	Parking Brake
PPS	Progressive Power Steering
PROM	Programmable Read Only Memory
PS	Power Steering
PSD	Power Slide Door
PTC	Positive Temperature Coefficient
PTO	Power Take-Off
PZEV	Partial Zero Emission Vehicle
P/W	Power Window
R & P	Rack and Pinion
RAM	Random Access Memory
RBS	Recirculating Ball Type Steering
REAS	Relative Absorber System
R/F	Reinforcement
RFS	Rigid Front Suspension
RH	Right-Hand
RHD	Right-Hand Drive
RL	Rear Left
ROM	Read Only Memory
RR	Rear
	Rear Right
RRS	Rigid Rear Suspension
RSE	Rear Seat Entertainment
RWD	Rear Wheel Drive
SC	Supercharger
SCV	Swirl Control Valve (for gasoline engine)
	Suction Control Valve (for diesel engine)
SFTM	Sichuan Faw Toyota Motor Co., Ltd.
SIA	Subaru of Indiana Automotive, Inc.
SICS	Starting Injection Control System
SLLC	Super Long Life Coolant
SOC	State Of Charge
SOHC	Single Overhead Camshaft
SPEC	Specification
SPI	Single Point Injection

SPV	Spill Control Valve
SRS	Supplemental Restraint System
SSM	Special Service Materials
SST	Special Service Tools
STD	Standard
STJ	Cold-Start Fuel Injection
SULEV	Super Ultra Low Emission Vehicle
T/A	Transaxle
TACH	Tachometer
TASA	Toyota Argentina S.A.
TCAP	Toyota Caetano Portugal, S.A.
TCM	Transmission Control Module
TCV	Timing Control Valve (for diesel engine)
	Tumble Control Valve (for gasoline engine)
TDB	Toyota do Brasil Ltda.
TDC	Top Dead Center
TDV	Toyota de Venezuela, C.A.
TEMP.	Temperature
TFT	TOYOTA Free-Tronic
TFTM	Tianjin Faw Toyota Motor Co., Ltd.
THS II	TOYOTA Hybrid System II
TIS	Total Information System for Vehicle Development
T/M	Transmission
TMC	Toyota Motor Corporation
TMCA	Toyota Motor Corporation Australia Ltd.
TMMBC	Toyota Motor Manufacturing de Baja California, S. de R.L. de C.V.
TMMC	Toyota Motor Manufacturing Canada Inc.
TMMF	Toyota Motor Manufacturing France S.A.S.
TMMI	Toyota Motor Manufacturing, Indiana, Inc.
TMMIN	P.T. Toyota Motor Manufacturing Indonesia
TMMK	TOYOTA Motor Manufacturing Kentucky, Inc.
TMMR	Toyota Motor Manufacturing Russia
TMMT	Toyota Motor Manufacturing Turkey Inc.
TMMTX	Toyota Motor Manufacturing, Texas, Inc.
TMUK	Toyota Motor Manufacturing (UK) Ltd.
TMP	Toyota Motor Philippines Corp.
TMT	Toyota Motor Thailand Co. Ltd.

TMV	Toyota Motor Vietnam Co., Ltd.
TPCA	Toyota Peugeot Citroen Automobiles Czech, s.r.o.
TRAC/TRC	Traction Control System
TSAM	Toyota South Africa Motors (Pty) Ltd.
TVIP	TOYOTA Vehicle Intrusion Protection
TWC	Three-Way Catalyst
U/D	Underdrive
U/S	Undersize
VCV	Vacuum Control Valve
VDIM	Vehicle Dynamics Integrated Management
VENT	Ventilator
VGRS	Variable Gear Ratio Steering
VIM	Vehicle Interface Module
VIN	Vehicle Identification Number
VLC	Valve Lift Control
VPS	Variable Power Steering
VSC	Vehicle Stability Control
VSV	Vacuum Switching Valve
VTV	Vacuum Transmitting Valve
VVT-i	Variable Valve Timing-intelligent
W/, w/	With
WGN	Wagon
W/H	Wire Harness
W/O, w/o	Without
X-REAS	X-Relative Absorber System
1ST, 1st	First
2ND, 2nd	Second
2WD	Two Wheel Drive Vehicle (4 x 2)
3RD, 3rd	Third
4TH, 4th	Fourth
4WD	Four Wheel Drive Vehicle (4 x 4)
4WS	Four Wheel Steering System
5TH, 5th	Fifth
6TH, 6th	Sixth
7TH, 7th	Seventh
8TH, 8th	Eighth



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GLOSSARY OF SAE AND SCION TERMS

This glossary lists all SAE-J1930 terms and abbreviations used in this manual in compliance with SAE recommendations, as well as their SCION equivalents.

SAE ABBREVIATION	SAE TERM	SCION TERM ()-ABBREVIATION
A/C	Air Conditioning	Air Conditioner
ACL	Air Cleaner	Air Cleaner, A/CL
AIR	Secondary Air Injection	Air Injection (AI)
AP	Accelerator Pedal	-
B+	Battery Positive Voltage	+B, Battery Voltage
BARO	Barometric Pressure	-
CAC	Charge Air Cooler	Intercooler
CARB	Carburetor	Carburetor
CFI	Continuous Fuel Injection	-
CKP	Crankshaft Position	Crank Angle
CL	Closed Loop	Closed Loop
CMP	Camshaft Position	Cam Angle
CPP	Clutch Pedal Position	-
CTOX	Continuous Trap Oxidizer	-
CTP	Closed Throttle Position	LL ON, Idle ON
DFI	Direct Fuel Injection	Direct Injection (DI./INJ)
DI	Distributor Ignition	-
DLC3	Data Link Connector 3	OBD II Diagnostic Connector
DTC	Diagnostic Trouble Code	Diagnostic Trouble Code
DTM	Diagnostic Test Mode	-
ECL	Engine Coolant Level	-
ECM	Engine Control Module	Engine Electronic Control Unit (ECU)
ECT	Engine Coolant Temperature	Coolant Temperature, Water Temperature (THW)
EEPROM	Electrically Erasable Programmable Read Only Memory	Electrically Erasable Programmable Read Only Memory (EEPROM)
EFE	Early Fuel Evaporation	Cold Mixture Heater (CMH), Heat Control Valve (HCV)
EGR	Exhaust Gas Recirculation	Exhaust Gas Recirculation (EGR)

EI	Electronic Ignition	Distributorless Ignition (DLI)
EM	Engine Modification	Engine Modification (EM)
EPROM	Erasable Programmable Read Only Memory	Programmable Read Only Memory (PROM)
EVAP	Evaporative Emission	Evaporative Emission Control (EVAP)
FC	Fan Control	-
FEEPROM	Flash Electrically Erasable Programmable Read Only Memory	-
FEPRM	Flash Erasable Programmable Read Only Memory	-
FF	Flexible Fuel	-
FP	Fuel Pump	Fuel Pump
GEN	Generator	Alternator
GND	Ground	Ground (GND)
HO2S	Heated Oxygen Sensor	Heated Oxygen Sensor (HO ₂ S)
IAC	Idle Air Control	Idle Speed Control (ISC)
IAT	Intake Air Temperature	Intake or Inlet Air Temperature
ICM	Ignition Control Module	-
IFI	Indirect Fuel Injection	Indirect Injection (IDL)
IFS	Inertia Fuel-Shutoff	-
ISC	Idle Speed Control	-
KS	Knock Sensor	Knock Sensor
MAF	Mass Airflow	Air Flow Meter
MAP	Manifold Absolute Pressure	Manifold Pressure Intake Vacuum
MC	Mixture Control	Electric Bleed Air Control Valve (EBCV) Mixture Control Valve (MCV) Electric Air Control Valve (EACV)
MDP	Manifold Differential Pressure	-
MFI	Multiport Fuel Injection	Electronic Fuel Injection (EFI)
MIL	Malfunction Indicator Lamp	Check Engine Light
MST	Manifold Surface Temperature	-
MVZ	Manifold Vacuum Zone	-
NVRAM	Non-Volatile Random Access Memory	-
O2S	Oxygen Sensor	Oxygen Sensor, O ₂ Sensor (O ₂ S)
OBD	On-Board Diagnostic	On-Board Diagnostic System (OBD)
OC	Oxidation Catalytic Converter	Oxidation Catalytic Convert (OC), CCo
OL	Open Loop	Open Loop
PAIR	Pulsed Secondary Air Injection	Air Suction (AS)
PCM	Powertrain Control Module	-

PNP	Park/Neutral Position	-
PROM	Programmable Read Only Memory	-
PSP	Power Steering Pressure	-
PTOX	Periodic Trap Oxidizer	Diesel Particulate Filter (DPF) Diesel Particulate Trap (DPT)
RAM	Random Access Memory	Random Access Memory (RAM)
RM	Relay Module	-
ROM	Read Only Memory	Read Only Memory (ROM)
RPM	Engine Speed	Engine Speed
SC	Supercharger	Supercharger
SCB	Supercharger Bypass	E-ABV
SFI	Sequential Multiport Fuel Injection	Electronic Fuel Injection (EFI), Sequential Injection
SPL	Smoke Puff Limiter	-
SRI	Service Reminder Indicator	-
SRT	System Readiness Test	-
ST	Scan Tool	-
TB	Throttle Body	Throttle Body
TBI	Throttle Body Fuel Injection	Single Point Injection Central Fuel Injection (Ci)
TC	Turbocharger	Turbocharger
TCC	Torque Converter Clutch	Torque Converter
TCM	Transmission Control Module	Transmission ECU, ECT ECU
TP	Throttle Position	Throttle Position
TR	Transmission Range	-
TVV	Thermal Vacuum Valve	Bimetallic Vacuum Switching Valve (BVSV) Thermostatic Vacuum Switching Valve (TVSV)
TWC	Three-Way Catalytic Converter	Three-Way Catalytic (TWC) Manifold Converter CC _{RO}
TWC+OC	Three-Way + Oxidation Catalytic Converter	CC _R + CCo
VAF	Volume Airflow	Air Flow Meter
VR	Voltage Regulator	Voltage Regulator
VSS	Vehicle Speed Sensor	Vehicle Speed Sensor
WOT	Wide Open Throttle	Full Throttle
WU-OC	Warm Up Oxidation Catalytic Converter	-
WU-TWC	Warm Up Three-Way Catalytic Converter	-

3GR	Third Gear	-
4GR	Fourth Gear	-

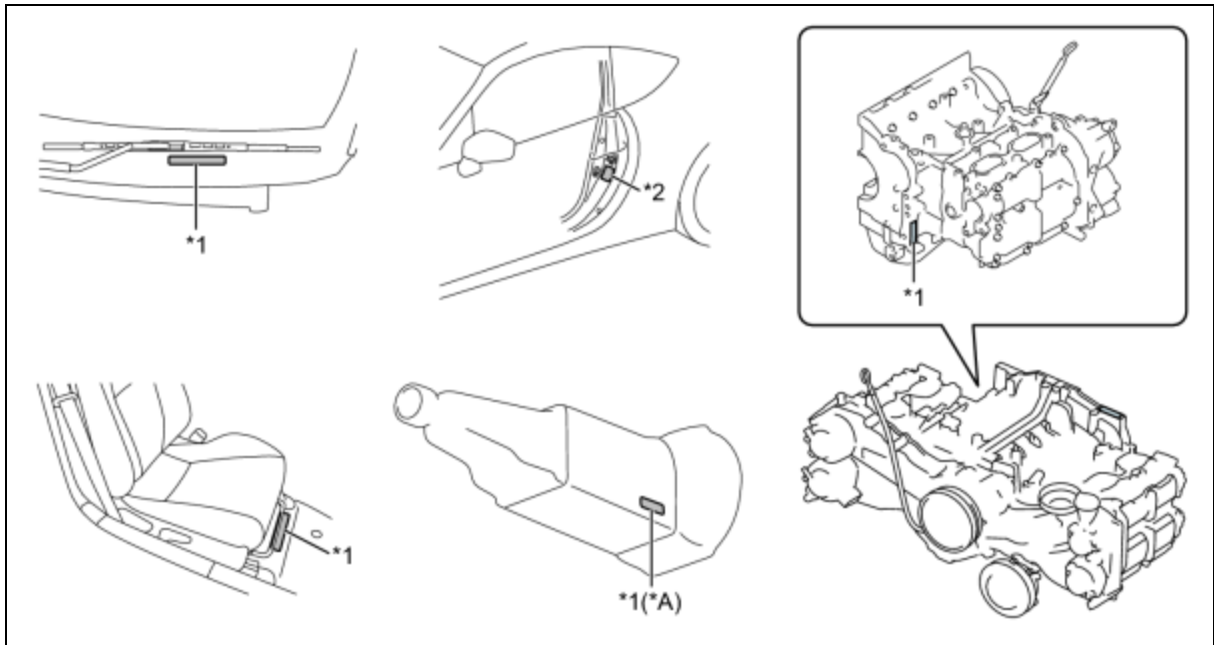


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Title: INTRODUCTION: IDENTIFICATION INFORMATION: VEHICLE IDENTIFICATION AND SERIAL NUMBERS (2013 FR-S)		

VEHICLE IDENTIFICATION AND SERIAL NUMBERS

1. VEHICLE IDENTIFICATION NUMBER

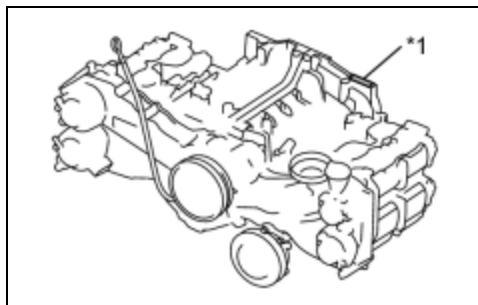
- (a) The vehicle identification number is stamped on the vehicle body and on the certification label as shown in the illustration.



Text in Illustration

*A	Manual transmission	-	-
*1	Vehicle Identification Number	*2	Certification Label

2. ENGINE SERIAL NUMBER AND TRANSMISSION SERIAL NUMBER

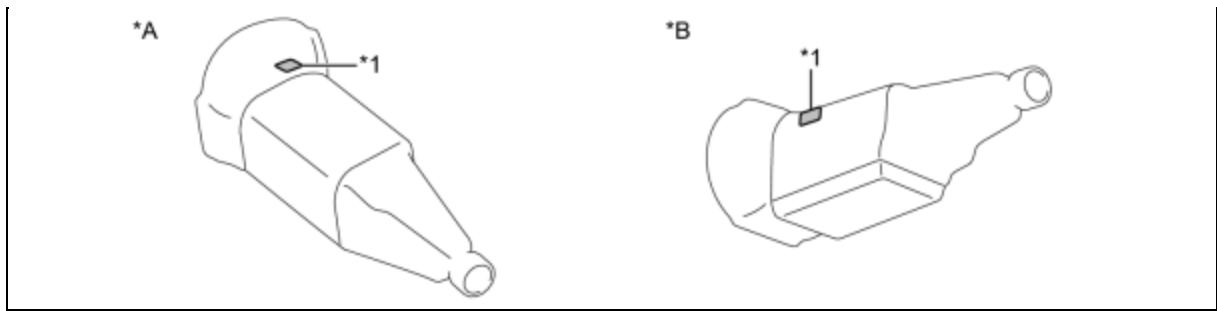


- (a) The engine serial number is stamped on the cylinder block of the engine as shown in the illustration.

Text in Illustration

*1	FA20 Engine Serial Number
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- (b) The transmission serial number is printed on the transmission number label.



Text in Illustration

*A	TL70	*B	TX6A
*1	Transmission Number Label	-	-

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Title: INTRODUCTION: HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS: ELECTRONIC CIRCUIT INSPECTION PROCEDURE (2013 FR-S)		

ELECTRONIC CIRCUIT INSPECTION PROCEDURE

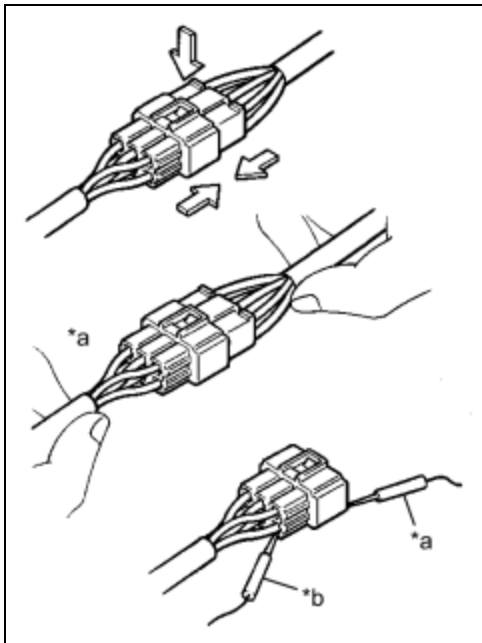
1. BASIC INSPECTION

(a) WHEN MEASURING RESISTANCE OF ELECTRONIC PARTS

- (1) Unless otherwise stated, all resistance measurements are standard values measured at an ambient temperature of 20°C (68°F). Resistance measurements may be inaccurate if measured at high temperatures, i.e. immediately after the vehicle has been running. Measurements should be made after the engine has cooled down.

(b) HANDLING CONNECTORS

Text in Illustration



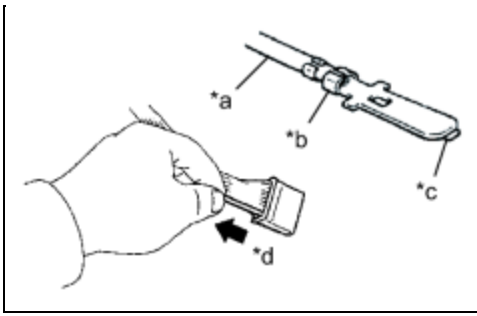
*a	INCORRECT
*b	CORRECT

- (1) When disconnecting a connector, first squeeze the mating connector housing halves tightly together to release the lock, and then press the lock claw and separate the connector.
- (2) When disconnecting a connector, do not pull on the harnesses. Grasp the connector directly and separate it.
- (3) Before connecting a connector, check that there are no deformations, damage, looseness or missing terminals.
- (4) When connecting a connector, press firmly until it locks with a "click" sound.
- (5) If checking a connector with a TOYOTA electrical tester, check the connector from the backside (harness side) using a mini test lead.

NOTICE:

- As a waterproof connector cannot be checked from the backside, check it by connecting a sub-harness.
- Do not damage the terminals by moving the inserted tester needle.

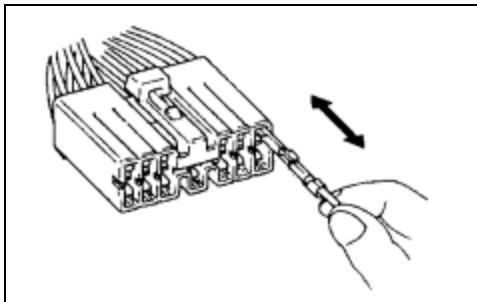
(c) CHECKING CONNECTORS



Text in Illustration

*a	Core Wire
*b	Looseness of Crimping
*c	Terminal Deformation
*d	Pull Lightly

- (1) Checking when a connector is connected: Squeeze the connectors together to confirm that they are fully connected and locked.
- (2) Checking when a connector is disconnected: Check by pulling the wire harness lightly from the backside of the connector. Look for unlatched terminals, missing terminals, loose crimps or broken conductor wires. Visually check for corrosion, metallic or foreign matter and water, and bent, rusted, overheated, contaminated or deformed terminals.



- (3) Checking the contact pressure of the terminal:
Prepare a spare male terminal. Insert it into a female terminal, and check for ample tension when inserting and after full engagement.

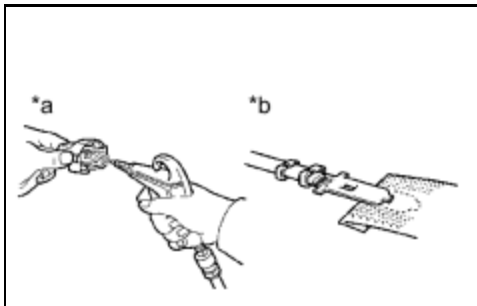
NOTICE:

When testing a gold-plated female terminal, always use a gold-plated male terminal.

(d) CONNECTOR TERMINAL REPAIR METHOD

Text in Illustration

*a	CORRECT
*b	INCORRECT

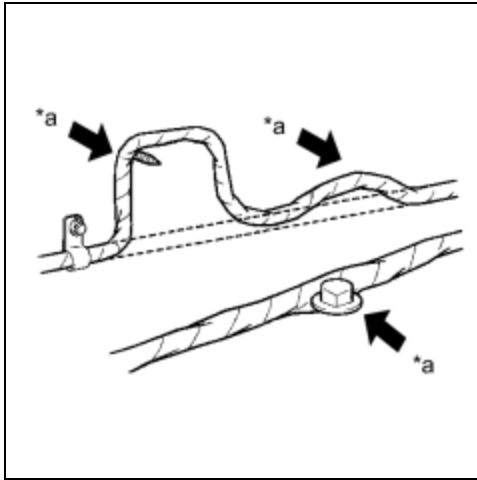


- (1) If there is any foreign matter on the terminal, clean the contact point with compressed air or a cloth. Never rub the contact point using sandpaper as the plating may come off.
- (2) If there is abnormal contact pressure, replace the female terminal. If the male terminal is gold-plated (gold color), use a gold-plated female terminal; if it is silver-plated (silver color), use a silver-plated female terminal.

- (3) Damaged, deformed or corroded terminals should be replaced. If the terminal does not lock into the housing, the housing may have to be replaced.

(e) WIRE HARNESS HANDLING

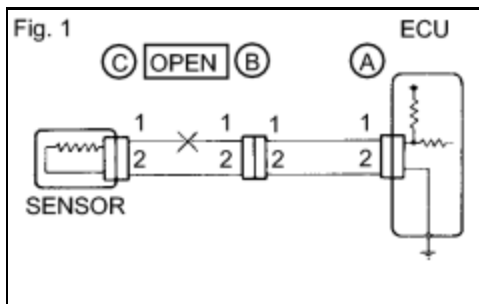
Text in Illustration



*a	INCORRECT
----	-----------

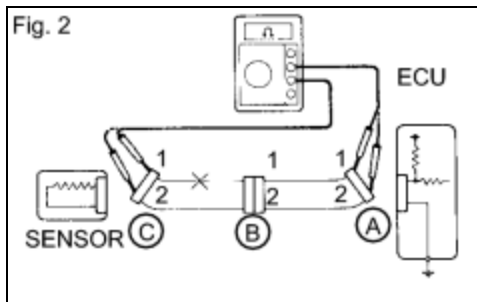
- (1) If removing a wire harness, check the wiring and clamps before proceeding so that it can be restored in the same way.
- (2) Never twist, pull or slacken the wire harness more than necessary.
- (3) The wire harness should never come into contact with any high temperature part, rotating, moving, vibrating or sharp-edged parts. Avoid contact with panel edges, screw tips and other sharp items.
- (4) When installing parts, never pinch the wire harness.
- (5) Never cut or break the cover of the wire harness. If it is cut or broken, repair it with insulating tape or replace the wire harness.

2. CHECK FOR OPEN CIRCUIT



- (a) For an open circuit in the wire harness in Fig. 1, measure the resistance and voltage as follows:

(b) Check the resistance.



- (1) Disconnect connectors A and C and measure the resistance between the terminals of the connectors.

Standard Resistance (Fig. 2):

TESTER CONNECTION	SPECIFIED CONDITION
Connector A terminal 1 - Connector C terminal 1	10 kΩ or higher
Connector A terminal 2 - Connector C terminal 2	Below 1 Ω

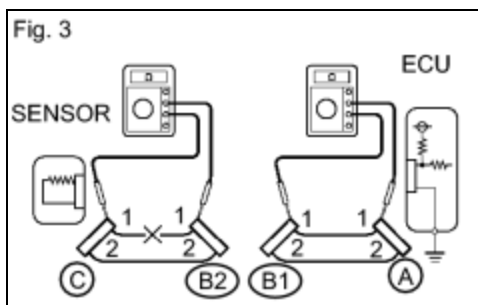
HINT:

Measure the resistance while lightly shaking the wire harness vertically and horizontally.

If the results match the values specified above, an open circuit exists between terminal 1 of connector A and terminal 1 of connector C.

- (2) Disconnect connector B and measure the resistance between the terminals of the connectors.

Standard Resistance (Fig. 3):



TESTER CONNECTION	SPECIFIED CONDITION
Connector A terminal 1 - Connector B1 terminal 1	Below 1 Ω
Connector B2 terminal 1 - Connector C terminal 1	10 kΩ or higher

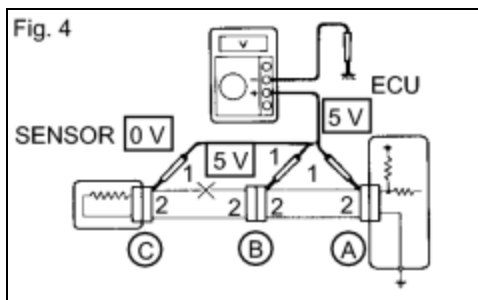
If the results match the values specified above, an open circuit exists between terminal 1 of connector B2 and terminal 1 of connector C.

- (c) Check the voltage.

- (1) In a circuit in which voltage is applied to the ECU connector terminal, an open circuit can be checked by conducting a voltage check.

With each connector still connected, measure the voltage between body ground and the following terminals (in this order): 1) terminal 1 of connector A, 2) terminal 1 of connector B, and 3) terminal 1 of connector C.

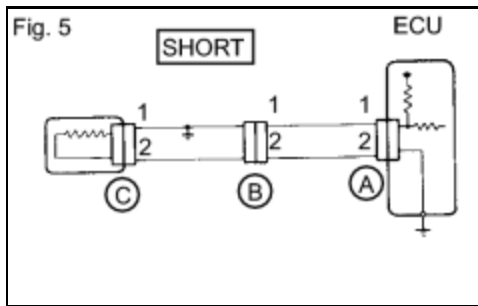
Standard Voltage (Fig. 4):



TESTER CONNECTION	SPECIFIED CONDITION
Connector A terminal 1 - Body ground	5 V
Connector B terminal 1 - Body ground	5 V
Connector C terminal 1 - Body ground	Below 1 V

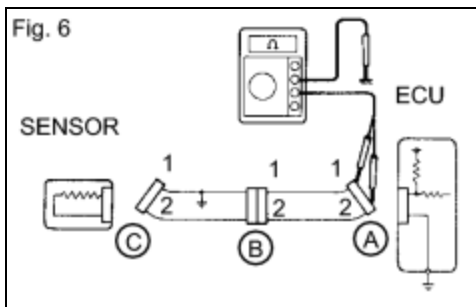
If the results match the values specified above, an open circuit exists in the wire harness between terminal 1 of connector B and terminal 1 of connector C.

3. CHECK FOR SHORT CIRCUIT



(a) If a wire in the harness is shorted to ground (Fig. 5), locate the shorted section by measuring the resistance as follows:

(b) Check the resistance to body ground.



(1) Disconnect connectors A and C and measure the resistance.

Standard Resistance (Fig. 6):

TESTER CONNECTION	SPECIFIED CONDITION
Connector A terminal 1 - Body ground	Below 1 Ω
Connector A terminal 2 - Body ground	10 k Ω or higher

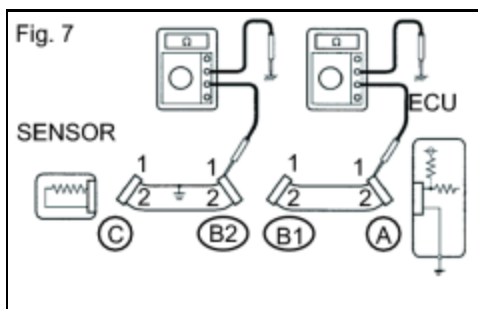
HINT:

Measure the resistance while lightly shaking the wire harness vertically and horizontally.

If the results match the values specified above, a short circuit exists between terminal 1 of connector A and terminal 1 of connector C.

(2) Disconnect connector B and measure the resistance.

Standard Resistance (Fig. 7):



TESTER CONNECTION	SPECIFIED CONDITION
Connector A terminal 1 - Body ground	10 k Ω or higher
Connector B2 terminal 1 - Body ground	Below 1 Ω

If the results match the values specified above, a

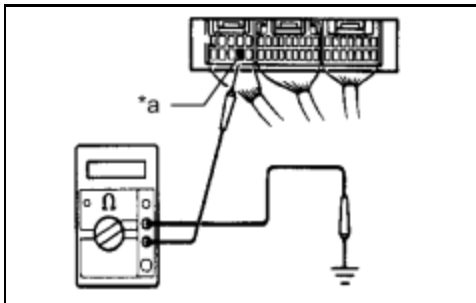
short circuit exists between terminal 1 of connector B2 and terminal 1 of connector C.

4. CHECK AND REPLACE ECU

NOTICE:

- The connector should not be disconnected from the ECU. Perform the inspection from the backside of the connector on the wire harness side.
- When no measuring condition is specified, perform the inspection with the engine stopped and the ignition switch ON.
- Check that the connectors are fully seated. Check for loose, corroded or broken wires.

(a) First, check the ECU ground circuit. If it is faulty, repair it. If it is normal, the ECU could be faulty. Temporarily replace the ECU with a normally functioning one and check if the symptoms occur. If the trouble symptoms disappear, replace the original ECU.



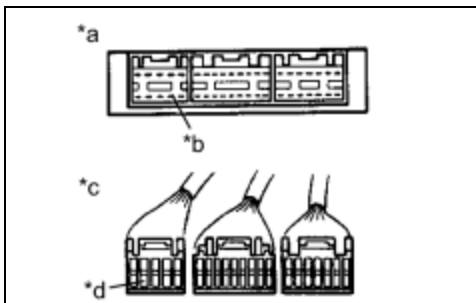
(1) Measure the resistance between the ECU ground terminal and body ground.

Text in Illustration

*a	Ground
----	--------

Standard resistance:
Below 1 Ω

(2) Disconnect the ECU connector. Check the ground terminals on the ECU side and wire harness side for bent terminals, corrosion or foreign matter. Lastly, check the contact pressure of the female terminals.



Text in Illustration

*a	Component without harness connected (ECU)
*b	Ground
*c	Front view of wire harness connector (to ECU)
*d	Ground

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Model Year: 2013	Model: FR-S	Doc ID: RM000000UZ20BWX
Title: INTRODUCTION: HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS: GENERAL INFORMATION (2013 FR-S)		

GENERAL INFORMATION

A large number of ECU controlled systems are used in this vehicle. In general, ECU controlled systems are considered to be very intricate, requiring a high level of technical knowledge to troubleshoot. However, most problem checking procedures only involve inspecting the ECU controlled system circuits one by one. An adequate understanding of the system and a basic knowledge of electricity is enough to perform effective troubleshooting, accurate diagnosis and necessary repairs.

(For using the Techstream*)

HINT:

***: The Techstream is the name for the diagnostic tester in North America.**

- o Before using the Techstream, read the operator's manual thoroughly.
- o If the Techstream cannot communicate with the ECU controlled systems when connected to the DLC3 with the ignition switch ON and the Techstream turned on, there is a problem on the vehicle side or the Techstream side.
 - i. If communication is possible when the Techstream is connected to another vehicle, inspect the diagnosis data link line (bus (+) line), CANH and CANL lines, and the power circuits for the vehicle ECUs.
 - ii. If communication is still not possible when the Techstream is connected to another vehicle, the problem is probably in the Techstream itself. Perform the Self Test procedure outlined in the Techstream operator's manual.

1. TROUBLESHOOTING PROCEDURES

- The troubleshooting procedures consist of diagnosis procedures for when a DTC is stored and diagnosis procedures for when no DTC is stored. The basic idea is explained in the following table.

PROCEDURE TYPE	DETAILS	TROUBLESHOOTING METHOD
DTC Based Diagnosis	The diagnosis procedure is based on the DTC that is stored.	The malfunctioning part is identified based on the DTC detection conditions using a process of elimination. The possible trouble areas are eliminated one-by-one by use of the Techstream and inspection of related parts.
Symptom Based Diagnosis (No DTCs stored)	The diagnosis procedure is based on problem symptoms.	The malfunctioning part is identified based on the problem symptoms using a process of elimination. The possible trouble areas are eliminated one-by-one by use of the Techstream and inspection of related parts.

- Vehicle systems are complex and use many ECUs that are difficult to inspect independently. Therefore, a process of elimination is used, where components that can be inspected

individually are inspected, and if no problems are found in these components, the related ECU is identified as the problem and replaced.

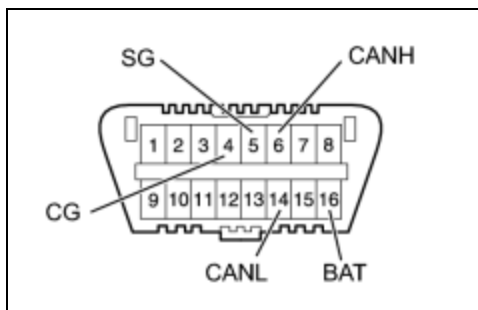
- It is extremely important to ask the customer about the environment and the conditions present when the problem occurred (Customer Problem Analysis). This makes it possible to simulate the conditions and confirm the symptom. If the symptom cannot be confirmed or the DTC does not recur, the malfunctioning part may not be identified using the troubleshooting procedure, and the ECU for the related system may be replaced even though it is not defective. If this happens, the original problem will not be solved.
- In order to prevent endless expansion of troubleshooting procedures, the troubleshooting procedures are written with the assumption that multiple malfunctions do not occur simultaneously for a single problem symptom.
- To identify the malfunctioning part, troubleshooting procedures narrow down the target by separating components, ECUs and wire harnesses during the inspection. If the wire harness is identified as the cause of the problem, it is necessary to inspect not only the connections to components and ECUs but also all of the wire harness connectors between the component and the ECU.

2. DESCRIPTION

- (a) The data of each system and Diagnostic Trouble Codes (DTCs) can be read from the Data Link Connector 3 (DLC3) of the vehicle. When the system seems to be malfunctioning, use the Techstream to check for malfunctions and perform repairs.

3. CHECK DLC3

- (a) The vehicle ECUs use ISO 15765-4 communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.



TERMINAL NO. (SYMBOL)	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
4 (CG) - Body ground	Chassis ground	Always	Below 1 Ω
5 (SG) - Body ground	Signal ground	Always	Below 1 Ω
16 (BAT) - Body ground	Battery positive	Always	11 to 14 V
6 (CANH) - 14 (CANL)	CAN bus line	Ignition switch off*	57 to 63 Ω
6 (CANH) - 4 (CG)	HIGH-level CAN bus line	Ignition switch off*	200 Ω or higher
14 (CANL) - 4 (CG)	LOW-level CAN bus line	Ignition switch off*	200 Ω or higher
6 (CANH) - 16 (BAT)	HIGH-level CAN bus line	Ignition switch off*	6 k Ω or higher
14 (CANL) - 16 (BAT)	LOW-level CAN bus line	Ignition switch off*	6 k Ω or higher

NOTICE:

*: Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches or the doors.

If the result is not as specified, the DLC3 may have a malfunction. Repair or replace the harness or connector.



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Title: INTRODUCTION: HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

1. OPERATION FLOW

HINT:

Perform troubleshooting in accordance with the procedure below. The following is an outline of basic troubleshooting procedure. Confirm the troubleshooting procedure for the circuit you are working on before beginning troubleshooting.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	CUSTOMER PROBLEM ANALYSIS
-----------	----------------------------------

(a) Ask the customer about the conditions and environment when the problem occurred.

NEXT



3.	INSPECT BATTERY VOLTAGE
-----------	--------------------------------

Standard voltage:

11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding to the next step.

NEXT



4.	SYMPTOM CONFIRMATION AND DTC (AND FREEZE FRAME DATA) CHECK
-----------	---

(a) Visually check the wire harnesses, connectors and fuses for open and short circuits.

(b) Warm up the engine to the normal operating temperature.

(c) Confirm the problem symptoms and conditions, and check for DTCs.

Result:

RESULT	PROCEED TO
DTC is output	A
DTC is not output	B

B  GO TO STEP 6

A



5.	DTC CHART
-----------	------------------

(a) Find the output DTC in the DTC chart. Look at the Trouble Area column for a list of potentially malfunctioning circuits and/or parts.

NEXT  GO TO STEP 7

6.	PROBLEM SYMPTOMS CHART
-----------	-------------------------------

(a) Find the problem symptoms in the problem symptoms table. Look at the Suspected Area column for a list of potentially malfunctioning circuits and/or parts.

NEXT



7.	CIRCUIT INSPECTION OR PARTS INSPECTION
-----------	---

(a) Identify the malfunctioning circuit or part.

NEXT



8.	ADJUST, REPAIR OR REPLACE
-----------	----------------------------------

(a) Adjust, repair or replace the malfunctioning circuit or parts.

NEXT



9.	CONFIRMATION TEST
-----------	--------------------------

(a) After the adjustment, repairs or replacement of components, confirm that the malfunction no longer exists. If the malfunction does not recur, perform a confirmation test under the same conditions and in the same environment as when the malfunction first occurred.

NEXT **END**

2. CUSTOMER PROBLEM ANALYSIS

HINT:

- When troubleshooting, confirm that the problem symptoms have been accurately identified. Preconceptions should be discarded in order to make an accurate judgment. To clearly understand what the problem symptoms are, it is extremely important to ask the customer about the problem and the conditions at the time the malfunction occurred.
- Gather as much information as possible for reference. Past problems that seem unrelated may also help in some cases.
- The following 5 items are important points for problem analysis:

What	Vehicle model, system name
When	Date, time, occurrence frequency
Where	Road conditions
Under what conditions?	Driving conditions, weather conditions
How did it happen?	Problem symptoms

3. SYMPTOM CONFIRMATION AND DIAGNOSTIC TROUBLE CODE

HINT:

The diagnostic system in this vehicle has various functions.

- The first function is the Diagnostic Trouble Code (DTC) check. A DTC is a code stored in the ECU memory whenever a malfunction in the signal circuits to the ECU occurs. In a DTC check, a previous malfunction's DTC can be checked by a technician during troubleshooting.
- Another function is the Input Signal Check, which checks if the signals from various switches are sent to the ECU correctly.

By using these functions, the problem areas can be narrowed down and troubleshooting can be more effective. Diagnostic functions are incorporated in the following systems of this vehicle.

SYSTEM	SYMPTOM CONFIRMATION AND DIAGNOSTIC TROUBLE CODE				
	DTC CHECK	DTC CHECK	SENSOR CHECK/TEST MODE (INPUT SIGNAL CHECK)	DATA LIST	ACTIVE TEST

	(NORMAL MODE)	(CHECK MODE)			
SFI System (FA20)	○	○	-	○	○
Ignition System (FA20)	-	-	-	-	-
Fuel System (FA20)	-	-	-	-	-
Emission Control System (FA20)	-	-	-	-	-
Intake System (FA20)	-	-	-	-	-
Cooling Fan System (FA20)	-	-	-	-	-
Starting System (FA20)	-	-	-	-	-
Key Inter Lock System (FA20)	-	-	-	-	-
Cruise Control System	○	-	-	○	○
Automatic Transmission System (TX6A)	○	○	-	○	○
Tire Pressure Warning System	○	-	○	○	○
Vehicle Stability Control System	○	-	○	○	○
Power Steering System	○	-	-	○	-
Audio and Visual System	-	-	-	-	-
Charging System (FA20)	○	○	-	○	○
Electric Power Control System	○	-	-	○	-
LIN Communication System	○	-	-	-	-
CAN Communication System	○	-	-	-	-
Power Door Lock Control System	-	-	-	○	○
Wireless Door Lock Control System	○	-	-	○	○
Key Reminder Warning System	-	-	-	○	-
Engine Immobiliser System	○	-	-	○	○
Lighting System (INT)	-	-	-	○	○
Meter / Gauge System	○	-	-	○	○
Clock System	-	-	-	-	-
Airbag System	○	○	-	○	-

Occupant Classification System	o	-	-	o	-
Seat Heater System	-	-	-	-	-
Seat Belt Warning System	-	-	-	o	o
Air Conditioning System	-	-	-	o	o
Power Window Control System	o	-	-	o	o
Window Defogger System	-	-	-	o	o
Luggage Compartment Door Opener System	-	-	-	o	o
Power Mirror Control System	-	-	-	-	-
Wiper and Washer System	-	-	-	-	-
Lighting System (EXT)	o	-	-	o	o
Horn System	-	-	-	-	-

- In the DTC check, it is very important to determine whether the problem indicated by the DTC either: 1) still occurs, or 2) occurred in the past but has returned to normal. In addition, the DTC should be compared to the problem symptom to see if they are related. For this reason, DTCs should be checked before and after confirmation of symptoms (i.e., whether or not problem symptoms exist) to determine current system conditions, as shown in the flowchart below.
- Never skip the DTC check. Failing to check for DTCs, depending on the case, may result in unnecessary troubleshooting for systems operating normally or lead to repairs not related to the problem. Follow the procedure listed in the flowchart in the correct order.
- The following flowchart shows how to proceed with troubleshooting using the DTC check. Directions from the flowchart will indicate how to proceed either to DTC troubleshooting or to the troubleshooting of each problem symptom.

1.	DTC CHECK
-----------	------------------

NEXT



2.	MAKE A NOTE OF DTC DISPLAYED AND THEN CLEAR DTCs
-----------	---

NEXT



3.	SYMPTOM CONFIRMATION
-----------	-----------------------------

Result:

RESULT	PROCEED TO
No symptoms exist	A
Symptoms exist	B

B ► GO TO STEP 5

A



4.	SIMULATION TEST USING SYMPTOM SIMULATION METHODS
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NEXT



5.	DTC CHECK
-----------	------------------

Result:

RESULT	PROCEED TO
DTC is not output	A
DTC is output	B

B ► TROUBLESHOOT FOR PROBLEM INDICATED BY DTC

A



6.	SYMPTOM CONFIRMATION
-----------	-----------------------------

Result:

RESULT	PROCEED TO
Symptoms exist	A

If a DTC was displayed in the initial DTC check, the problem may have occurred in a wire harness or connector in that circuit in the past. Check the wire harness and connectors.

B ▶ END

A ▶ TROUBLESHOOT FOR EACH PROBLEM SYMPTOM

If problem symptoms are present, but no DTCs were stored again after they were cleared, then the problem causing the symptom may be occurring for something that does not store DTCs (the DTC that was displayed in the initial DTC check may have been from a past problem or a secondary problem).

4. SYMPTOM SIMULATION

HINT:

The most difficult case in troubleshooting is when no problem symptoms occur. In such a case, a thorough problem analysis must be carried out. A simulation of the same or similar conditions and environment in which the problem occurred in the customer's vehicle should be carried out. No matter how much skill or experience a technician has, troubleshooting without confirming the problem symptoms will lead to important repairs being overlooked and mistakes or delays.

For example:

With a problem that only occurs when the engine is cold or as a result of vibration caused by the road during driving, the problem can never be determined if the symptoms are being checked on a stationary vehicle or a vehicle with a warmed-up engine. Vibration, heat or water penetration (moisture) is difficult to reproduce. The following symptom simulation tests are effective substitutes for the conditions and can be applied to a stationary vehicle. Important points in the symptom simulation test:

In the symptom simulation test, the problem symptoms as well as the problem area or parts must be confirmed. First, narrow down the possible problem circuits according to the symptoms. Then, connect the tester and carry out the symptom simulation test, judging whether the circuit being tested is defective or normal. Also, confirm the problem symptoms at the same time. Refer to Problem Symptoms Table for each system to narrow down the possible causes.

To reproduce DTCs, it is necessary to satisfy the respective DTC detection conditions.

- (a) VIBRATION METHOD: When a malfunction seems to occur as a result of vibration.

Text in Illustration

*a	Vibrate Slightly
*b	Shake Slightly

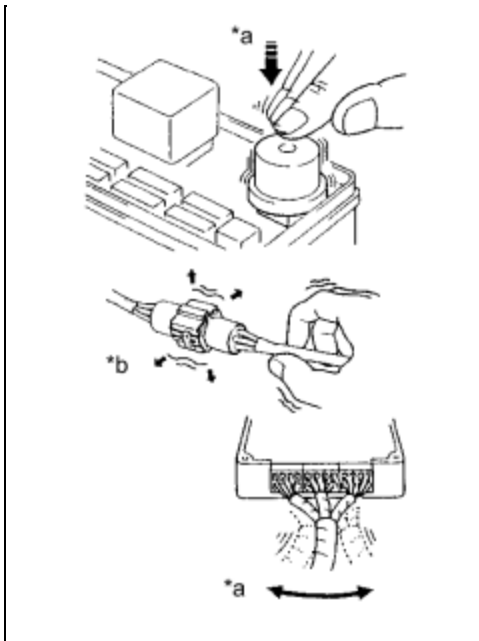
(1) PARTS OR SENSORS

Apply slight vibration with a finger to the part or sensor suspected to be the cause of the problem, and check whether the malfunction occurs.

NOTICE:

Applying strong vibration to relays may open the relays.

(2) CONNECTORS



Slightly shake the connector vertically and horizontally.

(3) WIRE HARNESS

Slightly shake the wire harness vertically and horizontally.

HINT:

The connector joint and fulcrum of the vibration are the major areas that should be checked thoroughly.

(b) HEAT METHOD: When a malfunction seems to occur when the area in question is heated.

(1) Heat the component that is the possible cause of the malfunction with a hair dryer or similar device. Check if the malfunction occurs.

NOTICE:

- Do not heat components to more than 60°C (140°F). Exceeding this temperature may damage the components.
- Do not apply heat directly to parts in an ECU.

(c) WATER SPRINKLING METHOD: When a malfunction seems to occur on a rainy day or in high-humidity.

(1) Sprinkle water onto the vehicle and check if the malfunction occurs.

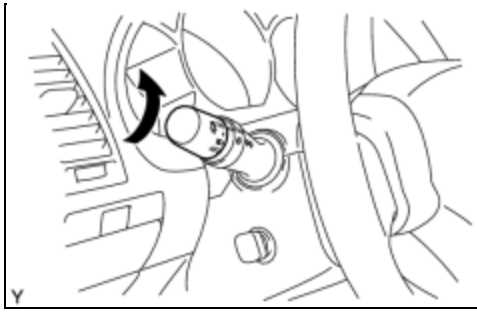


NOTICE:

- Never sprinkle water directly into the engine compartment. Indirectly change the temperature and humidity by spraying water onto the front of the radiator.
- Never apply water directly onto the electronic components.

HINT:

If the vehicle has or had a water leak problem, the leak may have damaged the ECU or connections. Look for evidence of corrosion or short circuits. Proceed with caution during water tests.



(d) HIGH ELECTRICAL LOAD METHOD: When a malfunction seems to occur when the electrical load is high.

- (1) Turn on the heater blower, headlights, rear window defogger and all other electrical loads. Check if the malfunction recurs.

5. DIAGNOSTIC TROUBLE CODE CHART

Look for output Diagnostic Trouble Codes (DTCs) (from the DTC checks) in the appropriate section's Diagnostic Trouble Code chart. Use the chart to determine the trouble area and the proper inspection procedure. A description of each of the chart's columns is shown in the table below.

ITEM	DESCRIPTION
DTC No.	Indicates the diagnostic trouble code.
Detection Item	Indicates the system or details of the problem.
Trouble Area	Indicates the suspected areas of the problem.
See page	Indicates the page where the inspection procedure for each circuit is to be found, or gives instruction for checking and repairs.

6. PROBLEM SYMPTOMS TABLE

When no DTC is output but the problem still occurs, use the Problem Symptoms Table. The suspected areas (circuits or parts) for each problem symptom are shown in the table. The suspected areas are listed in order of probability. A description of each of the table columns is shown in the following table.

HINT:

In some cases, the problem is not detected by the diagnostic system even though a problem symptom occurs. It is possible that the problem occurs outside the detection range of the diagnostic system, or that the problem occurs in a completely different system.

ITEM	DESCRIPTION
Symptom	-
Suspected Area	Indicates the circuit or part which needs to be checked.
See page	Indicates the page where the inspection procedure is located.

7. INSPECTION

A description of the main points for inspection of suspected areas is shown in the following table.

ITEM	DESCRIPTION
Description	The major role and operation of the circuit or system and its component parts are explained.
DTC No., DTC	

Detection Condition and Trouble Area	Indicates the diagnostic trouble codes, DTC detection conditions and suspected areas for a problem.
Wiring Diagram	<p>This is a wiring diagram for the circuit or system.</p> <p>This diagram can be used together with the Electrical Wiring Diagram to thoroughly understand the circuit.</p> <p>Wire colors are indicated by alphabetical codes. B = Black, L = Blue, R = Red, BR = Brown, LG = Light Green, V = Violet, G = Green, O = Orange, W = White, GR = Gray, P = Pink, Y = Yellow, SB = Sky Blue</p> <p>The first letter indicates the basic wire color and the second letter indicates the color of the stripe.</p>
Inspection Procedure	This shows the procedure not only to determine whether the circuit is normal or abnormal, but also to determine whether the problem is located in the sensors, actuators, wire harness or ECU.
Illustration of the ECU connector during the check	<p>The illustration shows whether the connector being checked is connected or disconnected.</p> <p>The connections for an electrical tester are indicated by (+) or (-) after the terminal name.</p> <p>For inspections between a connector and body ground, information about the ground is not shown in the illustration.</p>

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Title: INTRODUCTION: REPAIR INSTRUCTION: CUSTOMIZE PARAMETERS (2013 FR-S)		

[CUSTOMIZE PARAMETERS](#)

1. CUSTOMIZE WIRELESS DOOR LOCK CONTROL SYSTEM [INFO](#)
2. CUSTOMIZE KEY REMINDER WARNING SYSTEM [INFO](#)
3. CUSTOMIZE LIGHTING SYSTEM (INT) [INFO](#)
4. CUSTOMIZE METER / GAUGE SYSTEM [INFO](#)
5. CUSTOMIZE SEAT BELT WARNING SYSTEM [INFO](#)
6. CUSTOMIZE WINDOW DEFOGGER SYSTEM [INFO](#)
7. CUSTOMIZE LIGHTING SYSTEM (EXT) [INFO](#)

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Title: INTRODUCTION: REPAIR INSTRUCTION: INITIALIZATION (2013 FR-S)		

INITIALIZATION

1. PROCEDURES NECESSARY WHEN ECU OR OTHER PARTS ARE REPLACED

REPLACEMENT PART	NECESSARY PROCEDURE	EFFECT/INOPERATIVE FUNCTION WHEN NECESSARY PROCEDURES ARE NOT PERFORMED	SEE PAGE
ECM	Vehicle Identification Number (VIN) registration	MIL comes on	INFO
	ECU communication ID registration (Engine immobiliser system)	Engine start	INFO
<ul style="list-style-type: none"> • TCM • Automatic transmission assembly • Valve body assembly • Transmission wire • Shift solenoid valve S1, S2, S3, S4, SL1, SL2, SLT, SLU, and/or SR • Engine assembly 	Reset memory	<ul style="list-style-type: none"> • Large shift shock • The deterioration of fuel efficiency 	INFO
<ul style="list-style-type: none"> • Brake actuator assembly (Skid control ECU) • Steering sensor • Steering column assembly • Rack and pinion power steering gear assembly • Adjust front wheel alignment 	VSC sensor neutral memorization	VSC system does not operate normally (warning indicator light comes on).	INFO

Power steering ECU assembly	Rotation angle sensor initialization and torque sensor zero point calibration	<ul style="list-style-type: none"> • P/S warning light comes on • EPS control 	INFO
Steering column assembly	Rotation angle sensor initialization and torque sensor zero point calibration	Steering effort is different between turning steering wheel to left and right	
<ul style="list-style-type: none"> • Door control receiver • Tire pressure warning valve and transmitter 	<ul style="list-style-type: none"> • Transmitter ID registration • Initialization 	<ul style="list-style-type: none"> • When DTC detection conditions of "transmitter ID not received" DTC are met, TPWS indicator blinks for 1 minute, and then illuminates. • Tire pressure warning function 	INFO
<ul style="list-style-type: none"> • Key • Main body ECU (network gateway ECU) • Combination meter assembly 	Code registration (Engine immobiliser system)	Engine start	INFO
<ul style="list-style-type: none"> • Door control transmitter assembly • Door control receiver 	Code registration (Wireless door lock system)	Wireless door lock control system	INFO
<ul style="list-style-type: none"> • Power window regulator motor assembly • Door window regulator sub-assembly • Door glass • Front door frame sub-assembly rear lower • Front door sush • Front door opening trim weatherstrip 	Initialize power window control system	<ul style="list-style-type: none"> • Auto up/down function • Jam protection function • Operation function after ignition switch is turned off 	INFO

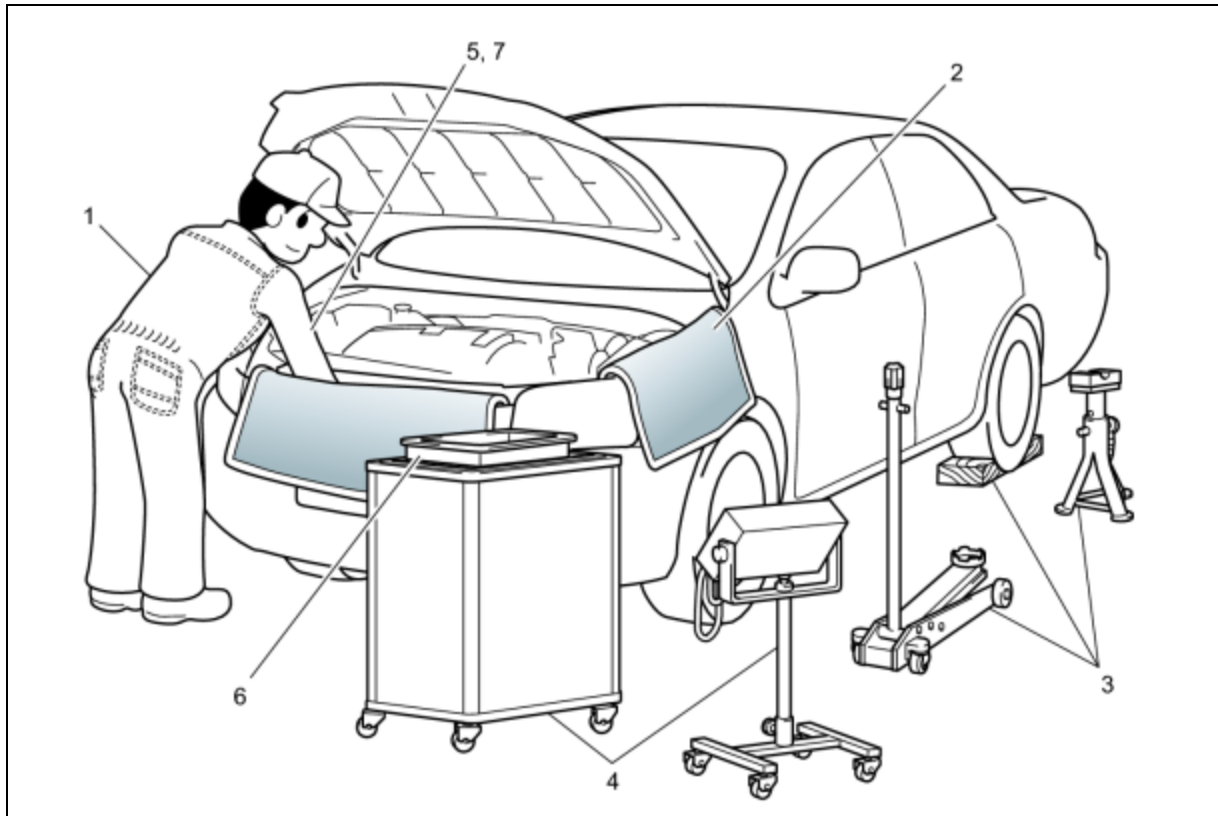


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Model Year: 2013	Model: FR-S	Doc ID: RM000000UYX0E9X
Title: INTRODUCTION: REPAIR INSTRUCTION: PRECAUTION (2013 FR-S)		

PRECAUTION

1. BASIC REPAIR HINT

(a) HINTS ON OPERATIONS



1	Attire	<ul style="list-style-type: none"> • Always wear a clean uniform. • A hat and safety shoes must be worn.
2	Vehicle protection	Prepare a grille cover, fender cover, seat cover and floor mat before starting work.
3	Safety procedures	<ul style="list-style-type: none"> • When working with 2 or more persons, be sure to check the safety of one another. • When working with the engine running, make sure to provide ventilation for exhaust fumes in the workshop. • If working on high temperature, high pressure, rotating, moving or vibrating parts, wear appropriate safety equipment and take extra care not to injure yourself or others. • When jacking up the vehicle, be sure to support the specified locations with safety stands. • When lifting up the vehicle, use appropriate safety equipment.
	Preparation of	

4	tools and measuring equipment	Before starting work, prepare a tool stand, SST, measuring equipment, oil, and any replacement parts required.
5	Removal and installation, disassembly and assembly operations	<ul style="list-style-type: none"> • Diagnose with a thorough understanding of proper procedures and of the reported problem. • Before removing any parts, check the general condition of the assembly and for deformation and damage. • If the procedure is complicated, take notes. For example, note the total number of electrical connections, bolts or hoses removed. Add matchmarks to ensure reassembly of components in the original positions. Temporarily mark hoses and their fittings if needed. • Clean and wash the removed parts if necessary and assemble them after a thorough check.
6	Removed parts	<ul style="list-style-type: none"> • Place the removed parts in a separate box to avoid mixing them up with new parts or contaminating the new parts. • For non-reusable parts such as gaskets, O-rings and self-locking nuts, replace them with new ones as instructed in this manual. • Retain the removed parts for customer inspection, if requested.
7*	Checks to perform after work is finished	<ul style="list-style-type: none"> • Make sure that removed and installed parts (oil filler cap, level dipstick, floor mat, etc.) are properly installed/tightened. • Make sure that none of the cloths or tools that were used have been left in the engine compartment or within the vehicle. • Check that there are no oil leaks.

CAUTION:

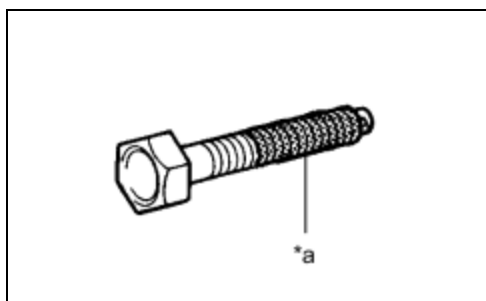
*: Be sure to perform these checks properly, Not performing these checks properly after finishing work can lead to serious accident or injury.

(b) JACKING UP AND SUPPORTING THE VEHICLE

- (1) Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations.

(c) PRECOATED PARTS

Text in Illustration



*a	Seal Lock Adhesive
----	--------------------

- (1) Precoated parts are bolts and nuts that are coated with seal lock adhesive at the factory.
- (2) If a precoated part is retightened, loosened or moved in any way, it must be recoated with the specified adhesive.
- (3) When reusing a precoated part, clean off the old adhesive and dry the part with compressed air. Then apply new seal lock adhesive appropriately to that part.
- (4) Some seal lock agents harden slowly. You may have to wait for the seal lock adhesive to harden.

(d) GASKETS

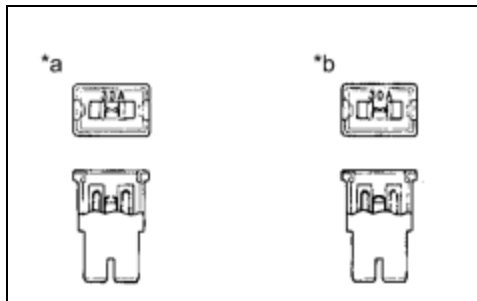
(1) When necessary, use a sealer on gaskets to prevent leaks.

(e) BOLTS, NUTS AND SCREWS

(1) Carefully follow all the specifications for tightening torque. Always use a torque wrench.

(2) Make sure that no foreign matter (burrs, paint, etc.) gets trapped under the heads of the bolts and nuts when tightening them.

(f) FUSES



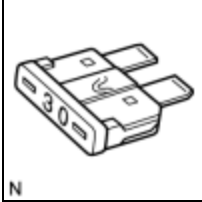
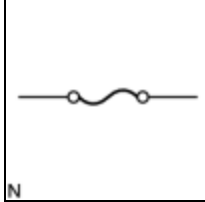
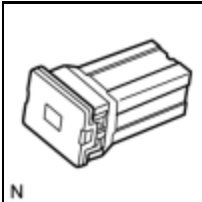
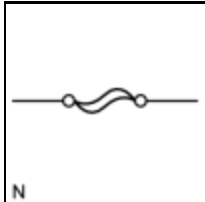
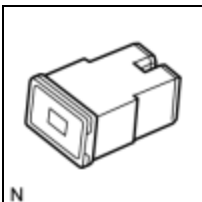
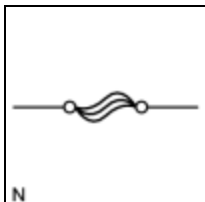
Text in Illustration

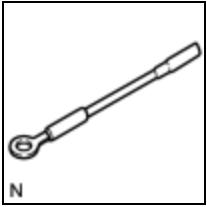
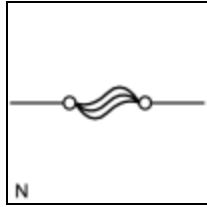
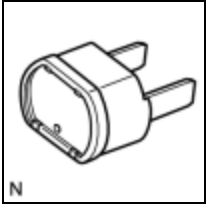
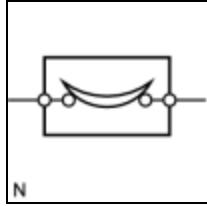
*a	INCORRECT
*b	CORRECT

(1) When inspecting a fuse, check that the wire of the fuse is not broken.

(2) If the wire of a fuse is broken, confirm that there are no shorts in its circuit.

(3) When a fuse is replaced, a fuse with the same amperage rating must be used.

ILLUSTRATION	SYMBOL	PART NAME	ABBREVIATION
		FUSE	FUSE
		MEDIUM CURRENT FUSE	M-FUSE
		HIGH CURRENT FUSE	H-FUSE

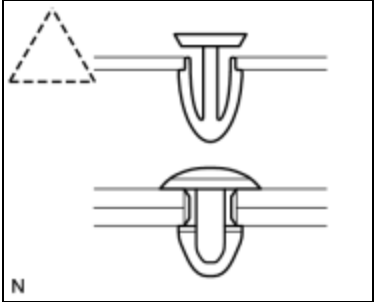
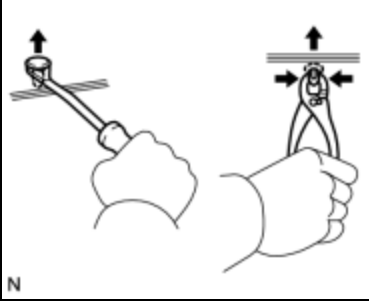
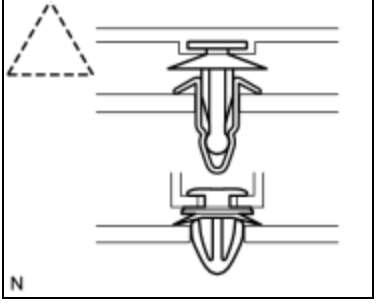
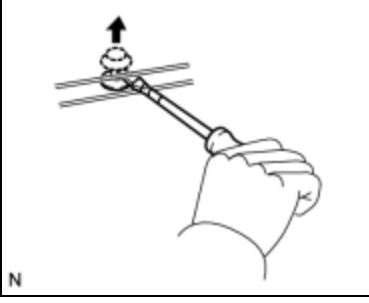
 <p>N</p>	 <p>N</p>	FUSIBLE LINK	FL
 <p>N</p>	 <p>N</p>	CIRCUIT BREAKER	CB

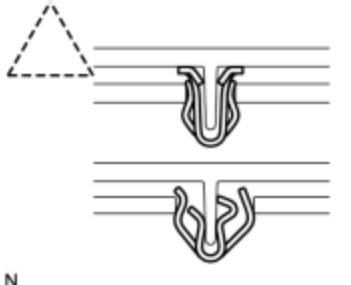
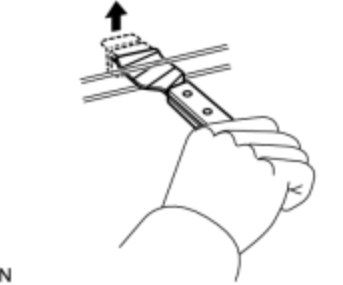
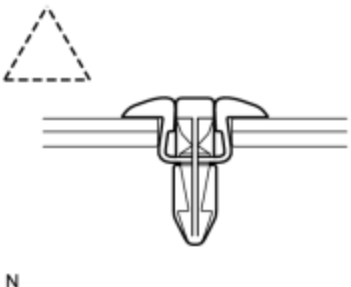
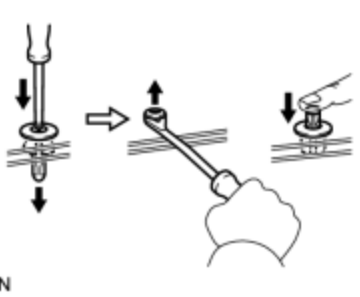
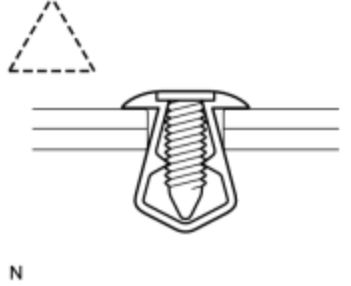
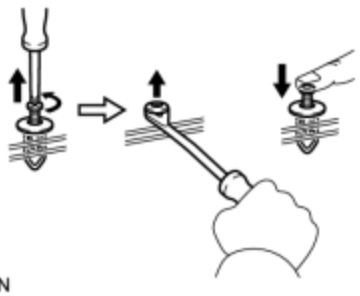
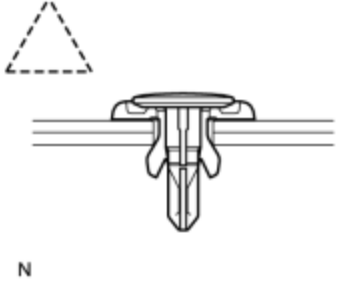
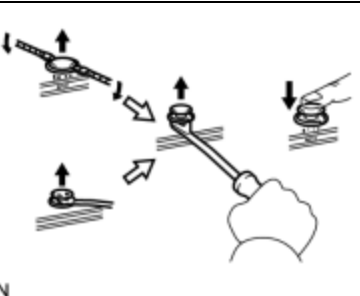
(g) CLIPS

(1) The removal and installation methods of typical clips used for vehicle body parts are shown in the table below.

HINT:

If clips are damaged during a procedure, always replace the damaged clips with new ones.

SHAPE (EXAMPLE)	REMOVAL/INSTALLATION
 <p>N</p>	 <p>N</p> <p>Remove the clips with a clip remover or pliers.</p>
 <p>N</p>	 <p>N</p> <p>Remove the clips with a clip remover or screwdriver.</p>

 <p>N</p>	 <p>N</p>
 <p>N</p>	 <p>N</p>
 <p>N</p>	 <p>N</p>
 <p>N</p>	 <p>N</p>

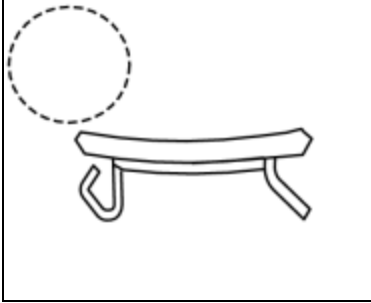
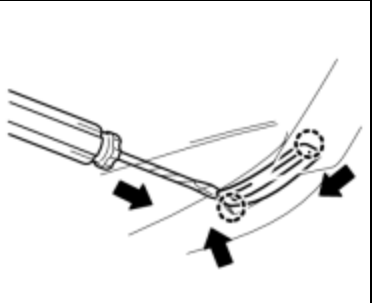
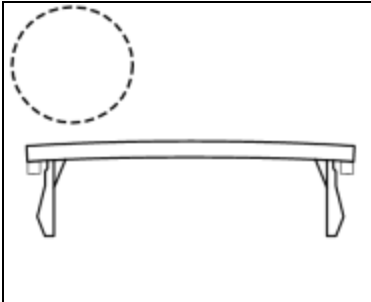
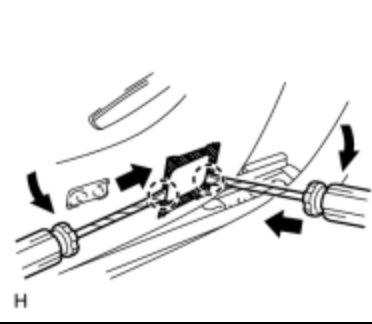
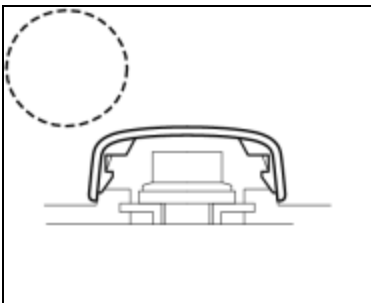
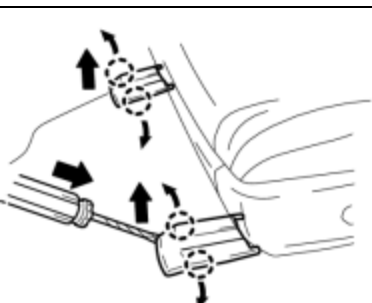
(h) CLAWS

(1) The removal and installation methods of typical claws used for vehicle body parts are shown in the table below.

HINT:

If claws are damaged during a procedure, always replace the cap or cover that has damaged claws

with a new one.

SHAPE (EXAMPLE)	ILLUSTRATION	PROCEDURE
		<p>Using a screwdriver, disengage the claws and remove the cap or cover.</p>
		<p>Using a screwdriver, disengage the claws and remove the cap or cover.</p>
		<p>Using a screwdriver, disengage the claws and remove the cap or cover.</p>

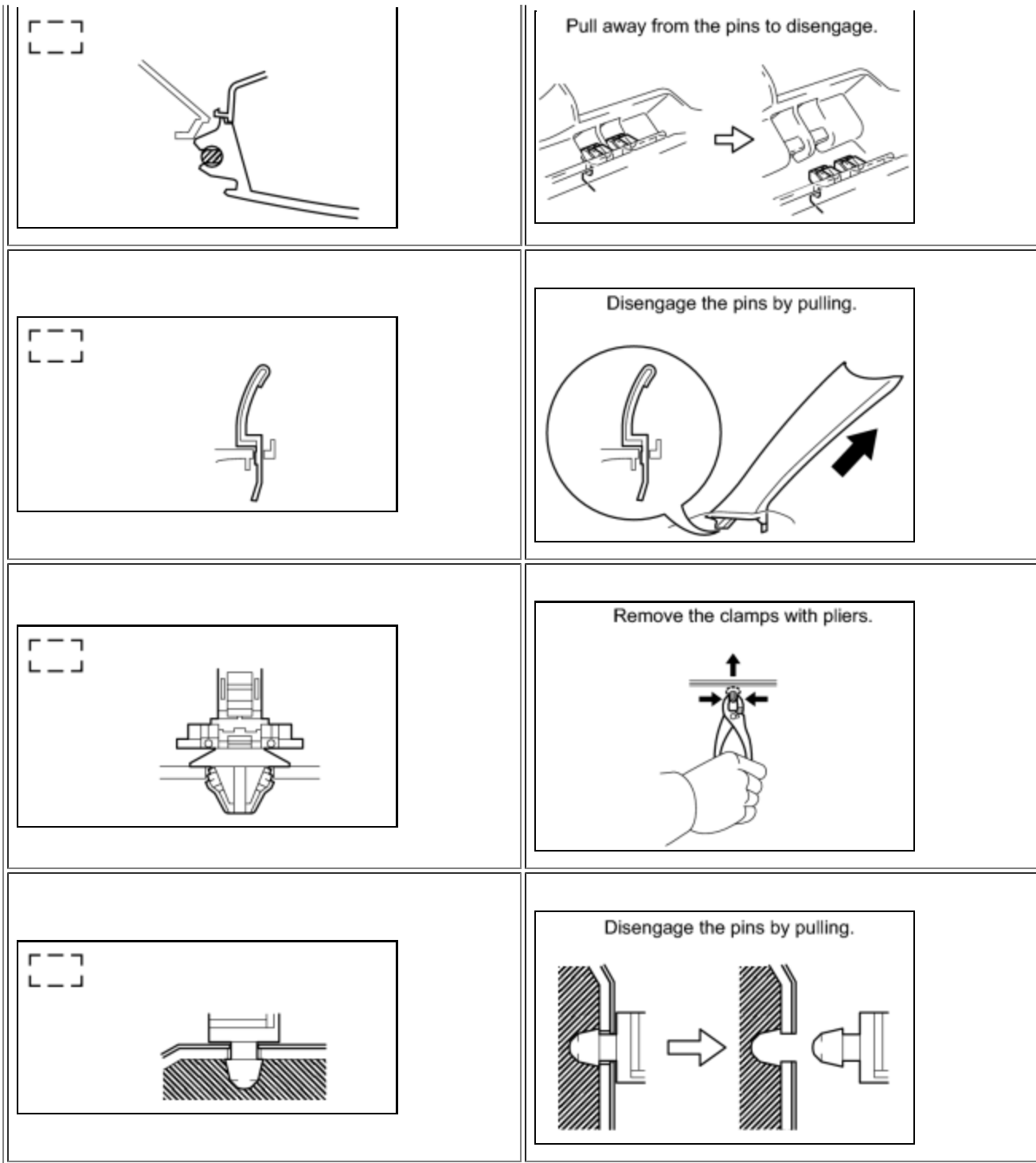
(i) HINGES, GUIDES, CLAMPS, PINS, ETC.

(1) The removal and installation methods of typical hinges, guides, clamps and pins used for vehicle body parts are shown in the table below.

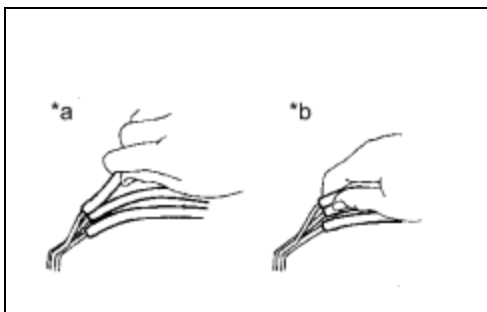
HINT:

If clamps are damaged during a procedure, always replace the cap or cover that has damaged clamps with a new one.

SHAPE (EXAMPLE)	REMOVAL/INSTALLATION



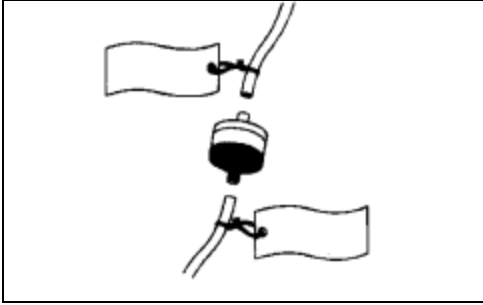
(j) REMOVAL AND INSTALLATION OF VACUUM HOSES



(1) To disconnect a vacuum hose, pull and twist it from the end of the hose. Do not pull it from the middle of the hose as this may damage the hose.

Text in Illustration

*a	INCORRECT
*b	CORRECT

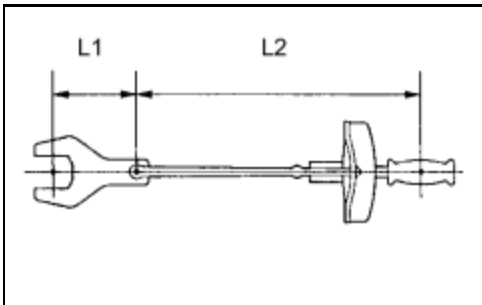


(2) When disconnecting vacuum hoses, use tags to identify where they should be reconnected.

(3) After completing any hose related repairs, double-check that the vacuum hoses are properly connected. The label under the hood shows the proper layout.

(4) When using a vacuum gauge, never force the hose onto a connector that is too large. If a hose has been stretched, air may leak. Use a step-down adapter if necessary.

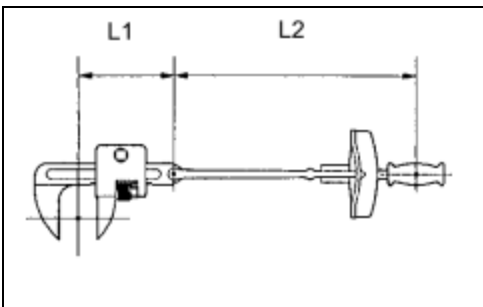
(k) TORQUE WHEN USING TORQUE WRENCH WITH EXTENSION TOOL



(1) Use the formula below to calculate special torque values for situations where SST or an extension tool is combined with a torque wrench.

Formula

$$T' = (L2 / (L1 + L2)) * T$$



T'	Reading of torque wrench {N*m (kgf*cm, ft.*lbf)}
T	Torque {N*m (kgf*cm, ft.*lbf)}
L1	Length of SST or extension tool {cm (in.)}
L2	Length of torque wrench {cm (in.)}

NOTICE:

If an extension tool or SST is combined with a torque wrench and used to tighten to a torque specification in this manual, the actual torque will be excessive and parts will be damaged.

2. FOR VEHICLES EQUIPPED WITH SRS AIRBAG AND SEAT BELT PRETENSIONER

This vehicle is equipped with a Supplemental Restraint System (SRS).

CAUTION:

- Before performing pre-disposal deployment of any SRS component, review and closely follow all applicable environmental and hazardous material regulations. Pre-disposal deployment may be considered hazardous material treatment.
- Failure to carry out the service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing and lead to serious injury. Furthermore, if a mistake is made when servicing the SRS, it is possible that the SRS may fail to operate properly. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the following section carefully.

(a) GENERAL NOTICE

- (1) The power window system utilizes a mechanism in which the door glass moves down slightly when the door is opened, and in which the glass moves up when the door closed in order to prevent the door molding from being damaged. When the negative (-) battery terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.
- (2) As malfunctions of the SRS are difficult to confirm, the Diagnostic Trouble Codes (DTCs) become the most important source of information when troubleshooting. When troubleshooting the SRS, always check for DTCs before disconnecting the battery.
- (3) Work must be started at least 90 seconds after the ignition switch is turned off and after the cable is disconnected from the negative (-) battery terminal.

The SRS is equipped with a back-up power source. If work is started within 90 seconds after turning the ignition switch off and disconnecting the cable from the negative (-) battery terminal, the SRS may deploy.

When the cable is disconnected from the negative (-) battery terminal, the clock and audio system memory will be cleared. Before starting work, make a note of the settings of each memory system. When work is finished, reset the clock and audio system as before.


CAUTION:

Never use a back-up power source (battery or other) to avoid clearing the system memory. The back-up power source may inadvertently power the SRS and cause it to deploy.


- (4) If the vehicle has been involved in a minor collision where the SRS does not deploy, the steering pad, front passenger airbag assembly, knee airbag assembly, front seat side airbag assembly, curtain shield airbag assembly and front seat outer belt assembly should be inspected before further use of the vehicle.
- (5) Never use SRS parts from another vehicle. When replacing parts, use new ones.
- (6) Before repairs, remove the airbag sensor assemblies if impacts are likely to be applied to the sensor during repairs.
- (7) Never disassemble and attempt to repair any airbag sensor assemblies or airbag assemblies.
 1. Steering pad
 2. Front passenger airbag assembly
 3. Front seat side airbag assembly
 4. Curtain shield airbag assembly
 5. Front seat outer belt assembly
- (8) Replace the airbag sensor assemblies and the airbag assemblies if: 1) damage has occurred from being dropped, or 2) cracks, dents or other defects in the case, bracket or connector are present.
- (9) Do not directly expose the airbag sensor assemblies or airbag assemblies to hot air or flames.
- (10) Use a voltmeter/ohmmeter with high impedance (minimum = 10 k Ω) for troubleshooting electrical circuits.

- (11) Information labels are attached to the SRS components. Follow the instructions on the labels.
- (12) After work on the SRS is completed, check the SRS warning light.


(b) SPIRAL CABLE

- (1) The steering wheel must be fitted correctly to the steering column with the spiral cable at the neutral position. Otherwise, cable damage and other problems may occur. Refer to the information about correct installation of the steering wheel  .

(c) STEERING PAD

- (1) Always place a removed or new steering pad with the surface facing upward. Placing the steering pad with the pad surface facing downward could cause a serious accident if the airbag deploys. Also, do not place anything on top of the steering pad.
- (2) Never measure the resistance of the airbag squib. This may cause the airbag to deploy, which could cause serious injury.
- (3) Grease or detergents of any kind should not be applied to the steering pad.
- (4) Store the steering pad in an area where the ambient temperature is below 93°C (199°F), the humidity is not high and there is no electrical noise.
- (5) Before using an electric welder anywhere on the vehicle, disconnect the airbag ECU assembly connectors. These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to current entering the squib wiring.
- (6) When disposing of the vehicle or the steering pad by itself, the airbag should be deployed using SST before disposal  . Deploy the airbag in a safe place away from electrical noise.

(d) FRONT PASSENGER AIRBAG ASSEMBLY

- (1) Always place a removed or new front passenger airbag assembly with the pad surface facing upward. Placing the airbag assembly with the airbag deployment direction facing downward could cause a serious accident if the airbag deploys.
- (2) Never measure the resistance of the airbag squib. This may cause the airbag to deploy, which could cause serious injury.
- (3) Grease or detergents of any kind should not be applied to the front passenger airbag assembly.
- (4) Store the airbag assembly in an area where the ambient temperature is below 93°C (199°F), the humidity is not high and there is no electrical noise.
- (5) Before using an electric welder anywhere on the vehicle, disconnect the airbag ECU assembly connectors. These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to current entering the squib wiring.
- (6) When disposing of the vehicle or the airbag assembly unit by itself, the airbag should be deployed using SST before disposal  . Deploy the airbag in a safe place away from electrical noise.

(e) FRONT SEAT SIDE AIRBAG ASSEMBLY

- (1) Always place a removed or new front seat side airbag assembly with the airbag deployment direction facing upward.
- (2) Never measure the resistance of the airbag squib. This may cause the airbag to deploy, which could cause serious injury.
- (3) Grease or detergents of any kind should not be applied to the front seat side airbag assembly.
- (4) Store the airbag assembly in an area where the ambient temperature is below 93°C (199°F), the humidity is not high and there is no electrical noise.
- (5) Before using an electric welder anywhere on the vehicle, disconnect the airbag ECU assembly connectors. These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to current entering the squib wiring.

- (6) When disposing of a vehicle or the airbag assembly unit by itself, the airbag should be deployed using SST before disposal **INFO** . Deploy the airbag in a safe place away from electrical noise.
- (f) CURTAIN SHIELD AIRBAG ASSEMBLY
- (1) Always place a removed or new curtain shield airbag assembly in a clear plastic bag, and keep it in a safe place.

CAUTION:

The plastic bag should be disposed of after use.

NOTICE:

Never disassemble the curtain shield airbag assembly.

- (2) Never measure the resistance of the airbag squib. This may cause the airbag to deploy, which could cause serious injury.
- (3) Grease or detergents of any kind should not be applied to the curtain shield airbag assembly.
- (4) Store the airbag assembly in an area where the ambient temperature is below 93°C (199°F), the humidity is not high and there is no electrical noise.
- (5) Before using an electric welder anywhere on the vehicle, disconnect the airbag ECU assembly connectors. These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to current entering the squib wiring.
- (6) When disposing of a vehicle or the airbag assembly unit by itself, the airbag should be deployed using SST before disposal **INFO** . Deploy the airbag in a safe place away from electrical noise.

(g) FRONT SEAT OUTER BELT ASSEMBLY (SEAT BELT PRETENSIONER)

- (1) Never measure the resistance of the front seat outer belt assembly. This may cause the pretensioner of the front seat outer belt assembly to activate, which could cause serious injury.
- (2) Never disassemble the front seat outer belt assembly.
- (3) Never install the front seat outer belt assembly on another vehicle.
- (4) Store the seat outer belt assembly in an area where the ambient temperature is below 80°C (176°F), the humidity is not high and there is no electrical noise.
- (5) Before using an electric welder anywhere on the vehicle, disconnect the airbag ECU assembly connectors. These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to current entering the squib wiring.
- (6) When disposing of a vehicle or the front seat outer belt assembly unit by itself, the front seat outer belt assembly should be activated before disposal **INFO** . Activate the front seat outer belt assembly in a safe place away from electrical noise.
- (7) As the front seat outer belt assembly is hot after being activated, allow some time for it to cool down sufficiently before disposal. Never apply water to cool down the front seat outer belt assembly.
- (8) Grease, detergents, oil or water should not be applied to the front seat outer belt assembly.

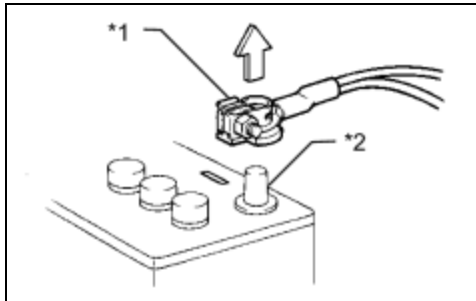
(h) AIRBAG ECU ASSEMBLY

- (1) Never reuse a airbag ECU assembly that has been involved in a collision where the SRS has deployed.
- (2) The connectors to the airbag ECU assembly should be connected or disconnected with the airbag ECU assembly installed to the vehicle. If the connectors are connected or disconnected while the airbag ECU assembly is not installed, the SRS may activate.
- (3) Work must be started at least 90 seconds after the ignition switch is turned off and the cable is disconnected from the negative (-) battery terminal, even if only loosening the bolts of the airbag ECU assembly.

(i) WIRE HARNESS AND CONNECTOR

- (1) All the connectors in the system are a standard yellow color. If an SRS wire harness has an open circuit or a connector is broken, replace it.

3. ELECTRONIC CONTROL



Text in Illustration

*1	Cable
*2	Negative (-) Battery Terminal

NOTICE:

- The power window system utilizes a mechanism in which the door glass moves down slightly when the door is opened, and in which the glass moves up when the door closed in order to prevent the door molding from being damaged. When the negative (-) battery terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.
- Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.
- After the ignition switch is turned off, the navigation receiver assembly (for Navigation Receiver Type) or radio and display receiver assembly (for Radio and Display Type with Intuitive Parking Assist System) records various types of memory and settings. As a result, after turning the ignition switch off, make sure to wait at least 60 seconds before disconnecting the cable from the negative (-) battery terminal.

(a) DISCONNECTING AND RECONNECTING NEGATIVE BATTERY CABLE

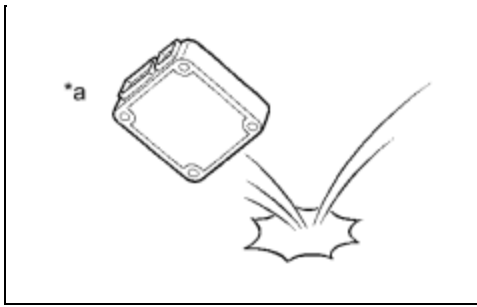
- (1) Before performing work on electronic components, disconnect the cable from the negative (-) battery terminal to prevent damage to the electrical system or components.
- (2) When disconnecting the cable, turn the ignition switch and headlight switch off and loosen the cable nut completely. Perform these operations without twisting or prying the cable. Then disconnect the cable.
- (3) Clock settings, radio settings, audio system memory, DTCs and other data will be cleared when the cable is disconnected from the negative (-) battery terminal. Write down any necessary data before disconnecting the cable.

(b) HANDLING OF ELECTRONIC PARTS

Text in Illustration

*a	INCORRECT
----	-----------

- (1) Do not open the cover or case of the ECU unless absolutely necessary. If the IC terminals are touched, the IC may be rendered inoperative by static



electricity.

- (2) Do not pull on the wires when disconnecting electronic connectors. Pull on the connector itself.
- (3) Do not drop electronic components, such as sensors or relays. If they are dropped on a hard surface, they should be replaced.
- (4) When cleaning the engine components with steam, protect the electronic components, air filter and emission-related components from water.
- (5) Never use an impact wrench to remove or install temperature switches or temperature sensors.
- (6) When measuring the resistance between terminals of a wire connector, insert the tester probe carefully to prevent the terminals from bending.

4. REMOVAL AND INSTALLATION OF FUEL CONTROL PARTS

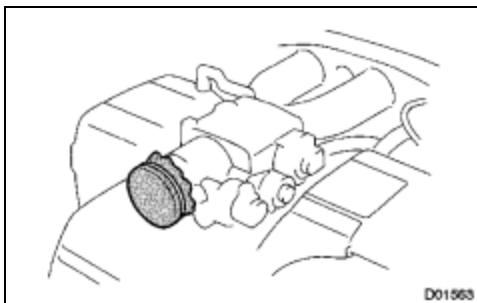
(a) PLACE FOR REMOVING AND INSTALLING FUEL SYSTEM PARTS

- (1) Work in a location with good air ventilation that does not have welders, grinders, drills, electric motors, stoves, or any other ignition sources nearby.
- (2) Never work in a pit or near a pit as fuel vapors will collect there.

(b) REMOVING AND INSTALLING FUEL SYSTEM PARTS

- (1) Prepare a fire extinguisher before starting work.
- (2) To prevent static electricity, install a ground wire between the fuel changer and vehicle, and do not spray the surrounding area with water. Be careful when performing work in this area, as the floor surface will become slippery. Do not clean up gasoline spills with water, as this may cause the gasoline to spread, and possibly create a fire hazard.
- (3) Avoid using electric motors, work lights and other electric equipment that can cause sparks or high temperatures.
- (4) Avoid using iron hammers as they may create sparks.
- (5) Dispose of fuel-contaminated cloth separately using a fire resistant container.

5. REMOVAL AND INSTALLATION OF ENGINE INTAKE PARTS



- (a) If any metal particles enter intake system parts, this may damage the engine.

- (b) When removing and installing intake system parts, cover the openings of the removed parts and engine openings. Use adhesive tape or other suitable materials.
- (c) When installing intake system parts, check that no metal particles have entered the engine or

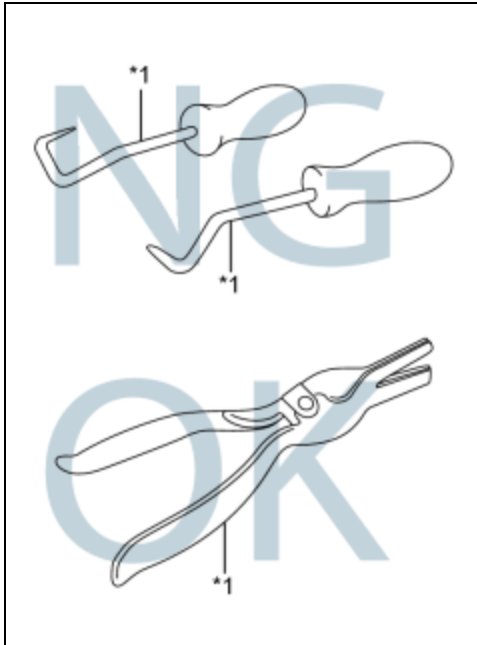
installed parts.

6. REMOVING AND INSTALLING HOSES

(a) Before removing and installing hoses

- Using hoses that are damaged or deformed may cause seeping, leaking, or coming off hoses, etc. Leaked oil may disperse into the exhaust pipe and ignite or cause fumes, so take sufficient care during inspection and maintenance.
- Neglecting to remove hoses when working on areas that require removal of hoses may damage the interior of the hoses. Be sure to remove such hoses when working.

(b) When removing, installing, and inspecting hoses

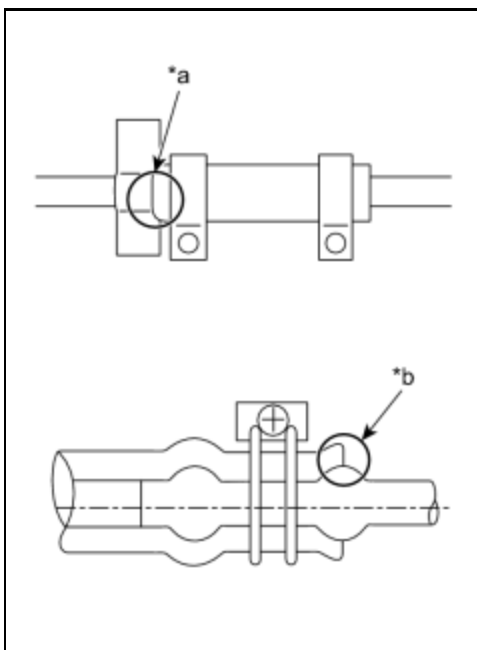


(1) Comply with the following when removing hoses.

- When using standard hose removers, do not use hose removers with pointed tips (hose pluckers) as pointed tips may damage the hose or the surface of the pipe.
- When using pliers, etc. to make hose removal process easier, be sure to protect the hose with a cloth, then pull it out by hand in a straight line while rotating it slightly.

Text in Illustration

*1	Hose Remover
----	--------------



(2) When continuing to use the same hose, perform the following inspection, and replace with a new hose if a fault is found.

- Replace hoses that have ridden up on the stay or spool.
- Bend hoses and check carefully to see whether they exhibit damage to their outer or inner surfaces, cracks, fractures, hardened or softened rubber, swelling, peeling interiors, or deformation due to foreign matter adhering to or penetrating the hose. Replace with a new hose if any of these problems are found.

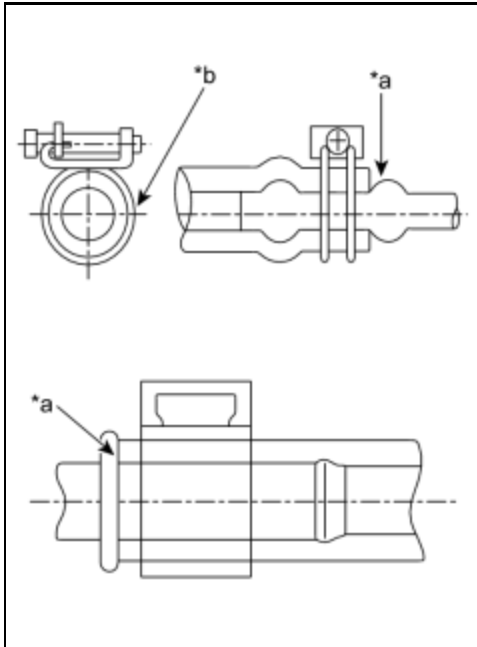
Text in Illustration

*a	Hose riding up on stay
----	------------------------

*b	Hose riding up on spool
----	-------------------------

(3) Comply with the following when installing hoses.

- Take sufficient care with regard to where the hose is installed.
- Do not use lubricant.
- Push in firmly up to the specified position (the seat or spool).
- Check whether the hose clamp position, orientation, and hose layout are correct (Check that the positioning and orientation are correct, that the hose is not too long or too short, that the hose is not different to before the procedure was done, and that sufficient space has been left between the hose and other parts in the area).
- After attaching the hoses, check that they are not leaking or losing fluid (Check that the hoses are firmly fixed in place with the clamps).



Text in Illustration

*a	Push the hose against the spool (Do not push the hose firmly enough to cause wrinkles on its tip).
*b	Apply clamping force evenly around the exterior of the hose.

(4) For hose clips and hose clamps, perform the following inspection and replace with new ones if a fault is found.

- Check for the presence of deformation, rust, damage, and foreign matter.
- For clips, check that the springs are performing properly, and that the clip has sufficient clamping force.
- For clamps, check that the clamp can be screw-tightened, that the clamp is not elliptical in shape, and that the screws are undamaged.

(5) For pipes, perform the following inspection, and replace with a new pipe if a fault is found.

Check that there is no damage, rust, peeling (including peeling plating), foreign matter, bending, breakage, or fracturing.

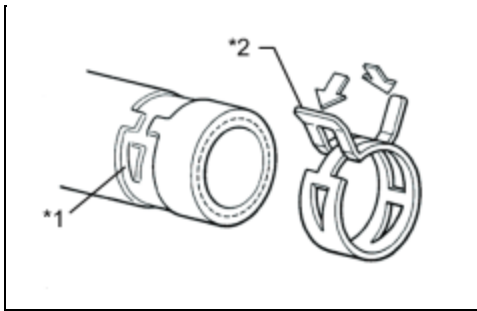
(6) Replace the following parts with new ones when removing or changing the attachment position of the hose.

Transmission oil cooler hose and fuel hose

7. HANDLING OF HOSE CLAMPS

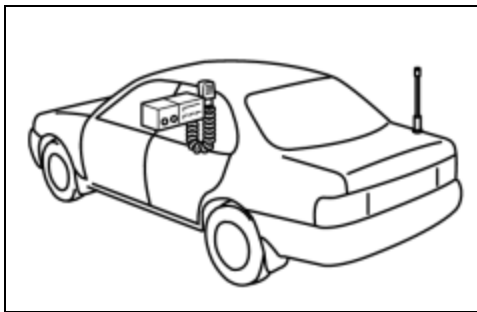
Text in Illustration

*1	Clamp Track
*2	Spring Type Clamp



- (a) Before removing a hose, check the clamp position so that it can be reinstalled in the same position.
- (b) Replace any deformed or dented clamps with new ones.
- (c) When reusing a hose, attach the clamp on the clamp track portion of the hose.
- (d) For a spring type clamp, it may be necessary to spread the tabs slightly after installation by pushing them in the direction of the arrows as shown in the illustration.

8. FOR VEHICLES EQUIPPED WITH MOBILE COMMUNICATION SYSTEMS



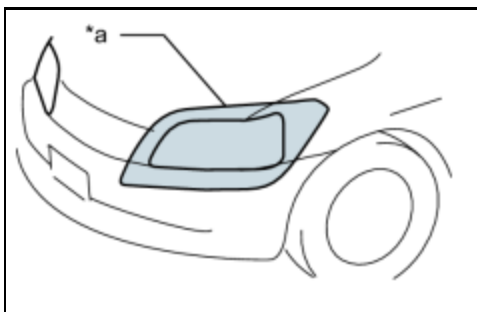
- (a) Install the antenna as far away from the ECU and sensors of the vehicle electronic systems as possible.
- (b) Install the antenna and feeder at least 20 cm (7.87 in.) away from the ECU and sensors of the vehicle electronic systems. For details about ECU and sensor locations, refer to the section on the applicable components.
- (c) Keep the antenna and feeder separate from other wiring as much as possible. This will prevent signals sent from the communication equipment from affecting vehicle equipment and vice versa.
- (d) Check that the antenna and feeder are correctly adjusted.
- (e) Do not install a high-powered mobile communication system.

9. HEADLIGHT INSPECTION OR MAINTENANCE

- (a) When the headlight dimmer switch assembly is set to head, do not touch the discharge headlight high-voltage socket area.

NOTICE:

When performing inspection or maintenance, the discharge headlight precautions must be followed.



- (b) When the headlights are illuminated, do not cover the headlights for 3 minutes or more.

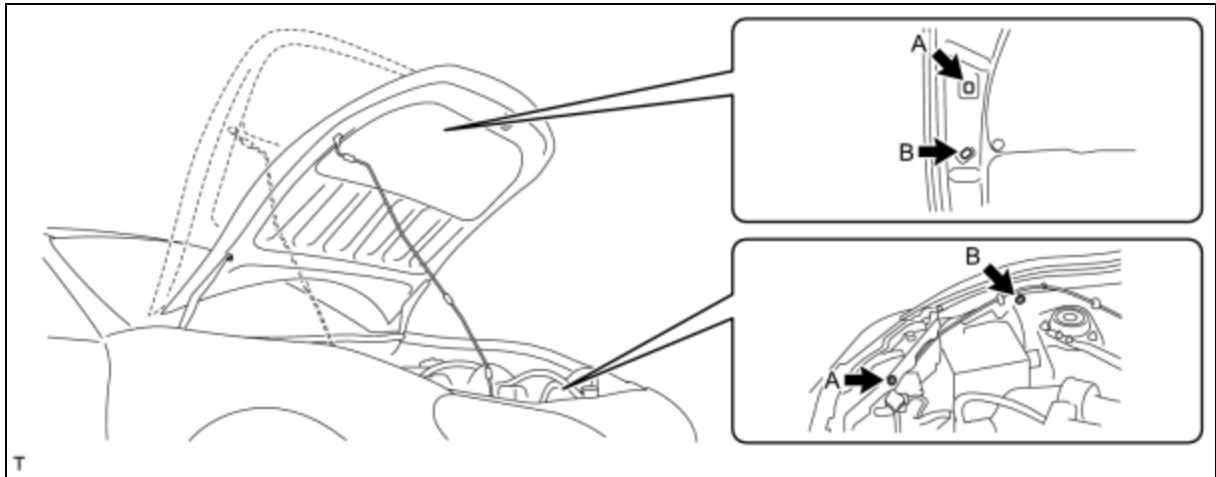
Text in Illustration

*a	Illumination for 3 minutes or more prohibited if covered
----	--

NOTICE:

As the headlight's outer lens is made of resin, the resulting heat created when covering the headlight for an extended period of time may deform the headlight.

10. SET FRONT HOOD STAY



(a) When performing inspections or general maintenance, use the front hood stay in its normal attachment position.

NOTICE:

When performing inspections or general maintenance, do not remove the front hood stay.

(b) When it is necessary to open the engine hood further to remove the engine, etc., set the front hood stay in attachment position B, as shown in the illustration.

11. FOR VEHICLES EQUIPPED WITH TRACTION CONTROL (TR(A)C) AND VEHICLE STABILITY CONTROL (VSC) SYSTEMS

When testing with a 2-wheel drum tester such as a speedometer tester, a combination speedometer and brake tester, or a chassis dynamometer, or when jacking up the front wheels and turning the wheels, perform the following procedure to enter inspection mode and disable the TR(A)C and VSC systems INFO

HINT:

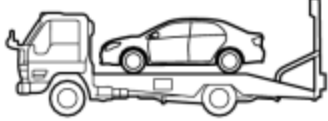


- The vehicle may slip unexpectedly out of the dynamometer because of TR(A)C and VSC operation.
- Pressing the VSC OFF switch does not disable TR(A)C and VSC operation completely.

NOTICE:

- Make sure that the VSC OFF indicator light will come on.
- Secure the vehicle with chains for safety.

12. PRECAUTIONS FOR TOWING REAR WHEEL DRIVE VEHICLES

- (a) Use one of the following methods to tow the vehicle.
- (b) If the vehicle has trouble with the chassis or drivetrain, use method 1 (flatbed truck).

Towing Method \ Conditions	Parking Brake	Shift Lever Position	
		Automatic transmission	Manual transmission
1. Flatbed Truck 	Applied	Neutral	Any
2. Wheel Lift Type Truck From Front (using dollies)  From Rear (using dollies) 	Applied	Neutral	Any

NOTICE:

Do not use any towing method other than those shown above.

- (c) If a tow truck is not available, in an emergency the vehicle may be temporarily towed using a cable or chain secured to the emergency towing eyelet(s).

This should only be attempted on hard surfaced roads for distances of less than 30 km, and at speeds below 30km/h (19 mph).

A driver must be in the vehicle to steer and operate the brakes. The vehicle's wheels, drivetrain, axles, steering and brakes must be in good condition.

NOTICE:

If the towing speed or distance exceeds the above limits, or the vehicle is towed in a backward direction with the wheels on the ground, the drivetrain or vehicle may be damaged.

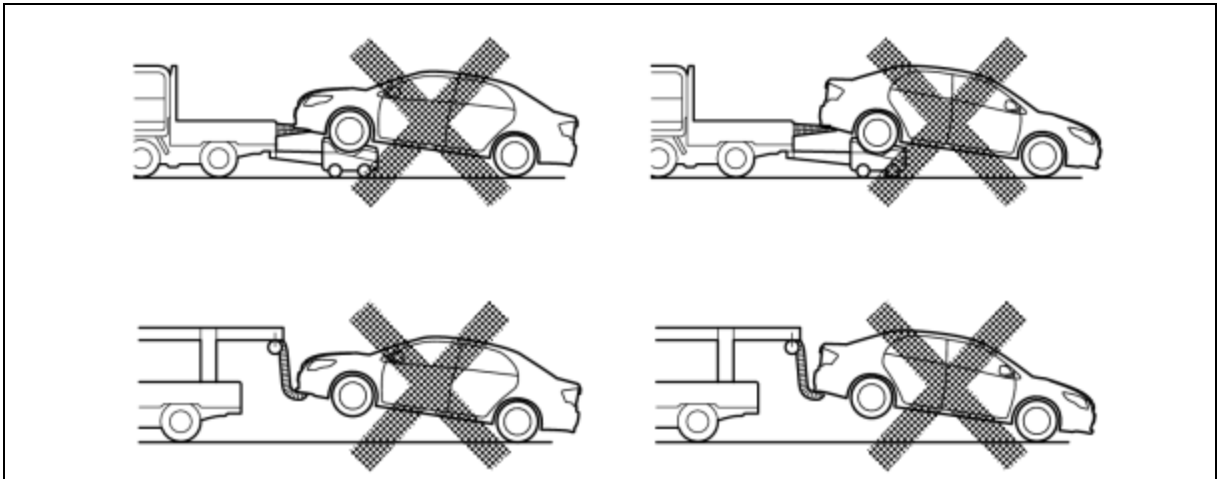
- (1) Emergency towing procedure

1. Turn the ignition switch ON.
2. Depress the brake pedal and move the shift lever to N.
3. Release the parking brake.
4. Release the brake pedal slowly.

NOTICE:

- Use extreme caution when towing the vehicle. Avoid sudden starts or erratic driving maneuvers which place excessive stress on the emergency towing eyelet and the cables or chains.
- Do not turn off the ignition switch. Turning off the ignition switch may result in engagement of the steering lock, resulting in a hazardous situation or accident.

- (d) The towing methods shown below are dangerous and can damage the vehicle, so do not use them.



(1) Do not tow the vehicle with only 2 wheels on the ground.

CAUTION:

If the vehicle is towed with only the front wheels on the ground, the steering may move, causing the vehicle to become unstable.

NOTICE:

If the vehicle is towed with only the rear wheels on the ground, the drivetrain may overheat and be damaged.

(2) Do not use a sling-type towing method either from the front or rear.

NOTICE:

If a sling-type tow truck is used, damage may occur to the vehicle body.

13. FOR VEHICLES EQUIPPED WITH CATALYTIC CONVERTER

CAUTION:

If a large amount of unburned gasoline or gasoline vapors flow into the converter, it may cause converter overheating and create a fire hazard. To prevent this, observe the following precautions:

- (a) Use only unleaded gasoline.
- (b) Avoid performing unnecessary spark tests.
 - (1) Perform a spark test only when absolutely necessary. Perform this test as rapidly as possible.
 - (2) While testing, never race the engine unless instructed.
- (c) Avoid a prolonged engine compression measurement. Engine compression measurements must be performed as rapidly as possible.
- (d) Do not run the engine when the fuel tank is nearly empty. This may cause the engine to misfire and create an extra load on the converter.

Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UYYOAOX
Title: INTRODUCTION: REPAIR INSTRUCTION: VEHICLE LIFT AND SUPPORT LOCATIONS (2013 FR-S)		

VEHICLE LIFT AND SUPPORT LOCATIONS

1. NOTICE ABOUT VEHICLE CONDITION WHEN RAISING VEHICLE

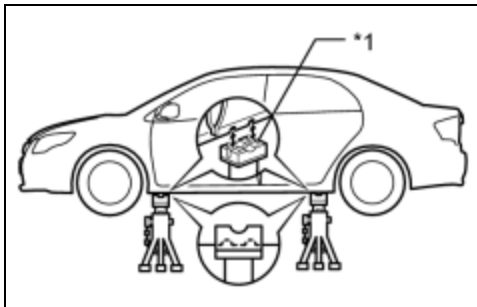
- (a) The vehicle must be unloaded before jacking up or raising the vehicle. Never jack up or raise a heavily loaded vehicle.
- (b) When removing any heavy components like the engine or transaxle, the vehicle center of gravity will shift. To stabilize the vehicle, place a balance weight in a location that will prevent the vehicle from rolling or shifting, or place a transmission jack under the appropriate jack position at the opposite end of the vehicle.

2. NOTICE FOR USING 4 POST LIFT

- (a) Follow the safety procedures outlined in the lift's instruction manual.
- (b) Do not damage the tires or wheels while driving onto the lift.
- (c) Use wheel chocks to secure the vehicle.

3. NOTICE FOR USING JACK AND SAFETY STANDS

- (a) Work on a level surface. Use wheel chocks at all times.

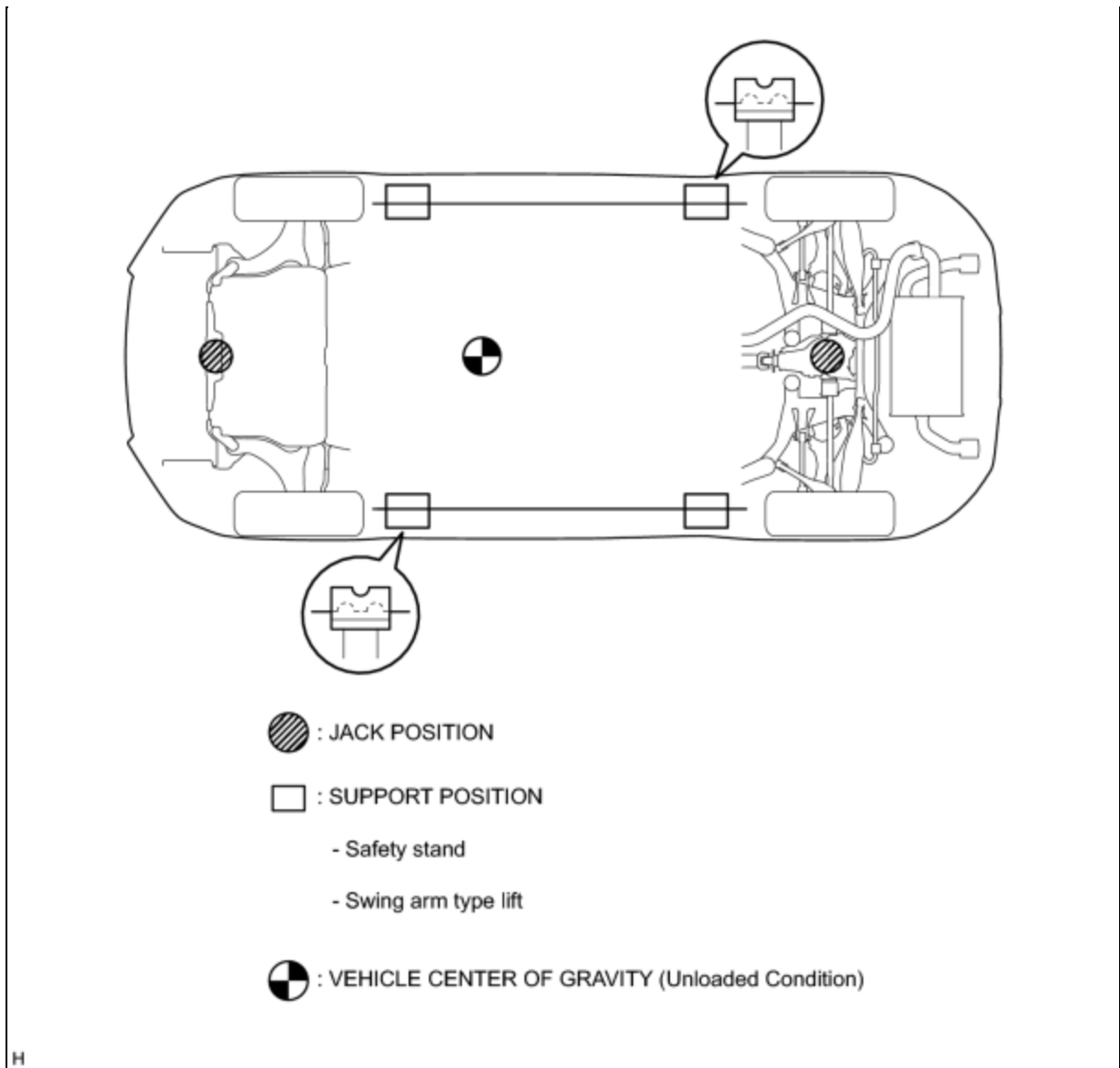


- (b) Use safety stands with rubber attachments as shown in the illustration.

Text in Illustration

*1	Rubber Attachment
----	-------------------

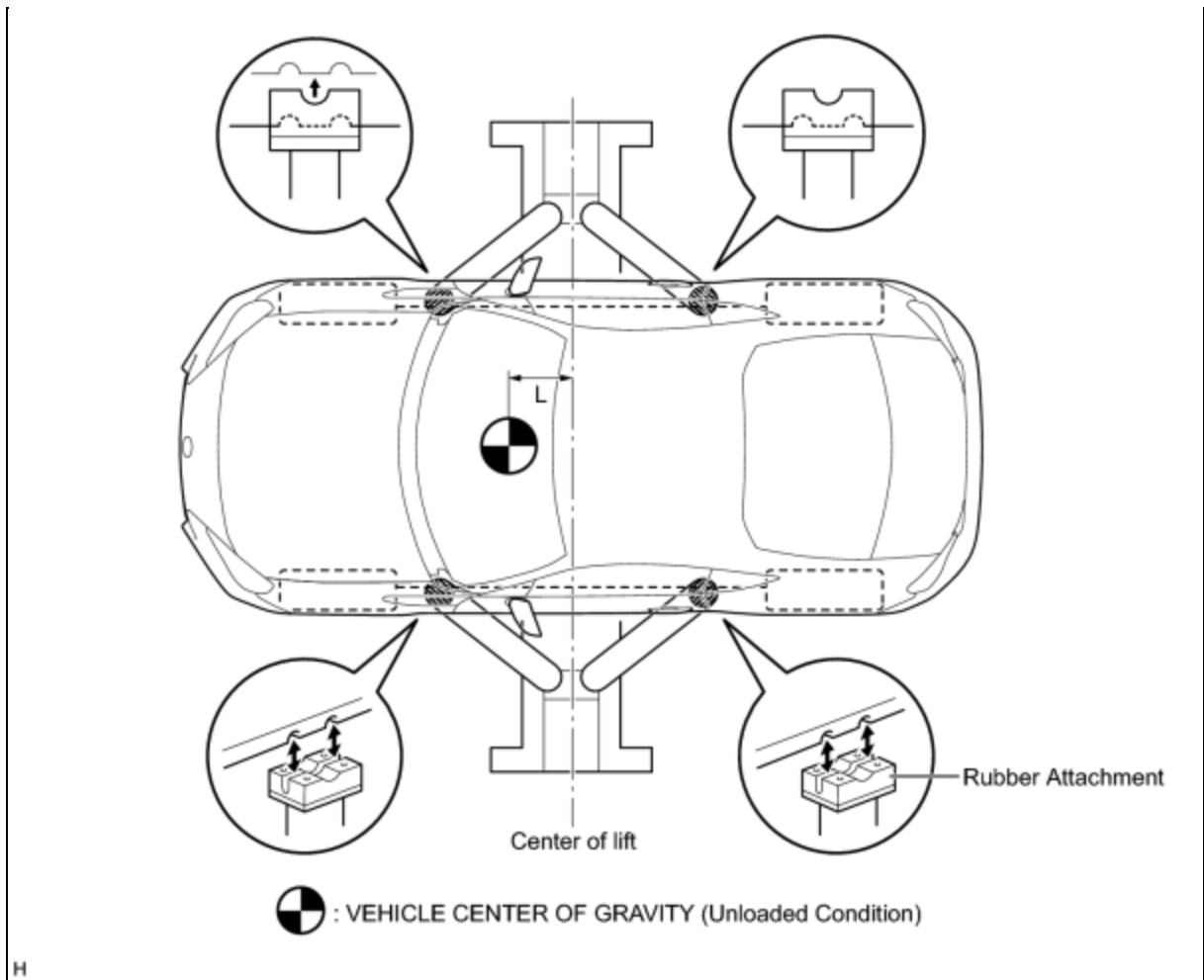
- (c) Set the jack and safety stands exactly under the specified locations on the vehicle.
- (d) Do not work on or leave the vehicle supported only by a jack. Be sure to support the vehicle with safety stands.
- (e) When jacking up the vehicle, first release the parking brake and move the shift lever to N.
- (f) When jacking up the entire vehicle:
 - (1) When jacking up the front wheels first, make sure wheel chocks are behind the rear wheels.
 - (2) When jacking up the rear wheels first, make sure wheel chocks are in front of the front wheels.
- (g) When jacking up only the front or rear wheels of the vehicle:
 - (1) Before jacking up the front wheels, place wheel chocks on both sides of the rear wheels.
 - (2) Before jacking up the rear wheels, place wheel chocks on both sides of the front wheels.
- (h) When lowering a vehicle that only has its front or rear wheels jacked up.



- (1) Before lowering the front wheels, make sure wheel chocks are in front of the rear wheels.
- (2) Before lowering the rear wheels, make sure wheel chocks are behind the front wheels.

4. NOTICE FOR USING A SWING ARM TYPE LIFT

- (a) Follow the safety procedures outlined in the lift's instruction manual.
- (b) Use swing arms equipped with rubber attachments as shown in the illustration.
- (c) Position the vehicle so that its center of gravity is centered on the lift (length of "L" in the illustration should be as short as possible).
- (d) Ensure that the rubber cushions or swing arms do not contact the body cladding or lower mouldings.
- (e) Be sure to lock the swing arms before raising the vehicle (if equipped with arm locks).
- (f) Use the lift to raise the vehicle until the tires are off the ground, then stop the lift and shake the front and rear of the vehicle to make sure that it is stable.

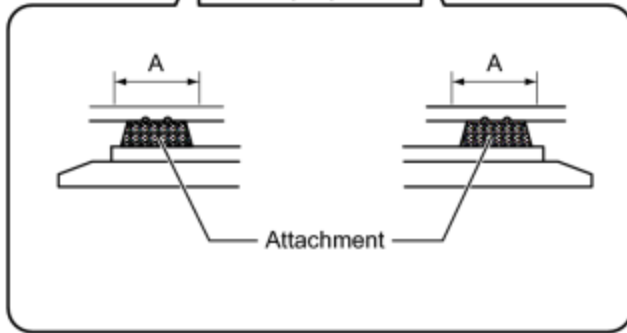
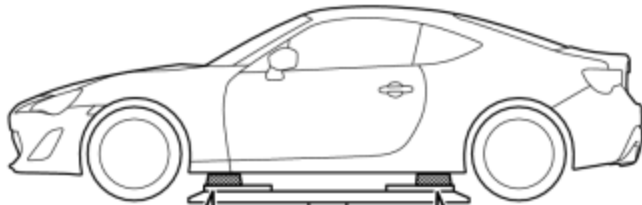


5. NOTICE FOR USING PLATE TYPE LIFT

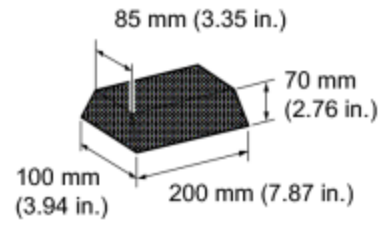
- (a) Follow the safety procedures outlined in the lift's instruction manual.
- (b) Use plate lift attachments (rubber lifting blocks) on top of the plates.
- (c) Be sure to set the vehicle to the specified position described in the following chart and shown in the following illustration.

Right and left set position	<ul style="list-style-type: none"> • Center the vehicle on the lift.
Front and rear set position	<ul style="list-style-type: none"> • Match the attachments to positions A in the illustration. • Do not use a plate lift with attachments that are unable to reach positions A in the illustration.

- (d) Ensure that the plate lift or rubber lifting blocks do not contact the body cladding or lower mouldings.
- (e) Use the lift to raise the vehicle until the tires are off the ground, then stop the lift and shake the front and rear of the vehicle to make sure that it is stable.



Attachment Dimensions



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Model Year: 2013	Model: FR-S	Doc ID: RM0000019FS055X
Title: MAINTENANCE: BODY: GENERAL MAINTENANCE (2013 FR-S)		


GENERAL MAINTENANCE

1. BODY INSPECTION

- (a) Check the body exterior for dents, scratches and rust.
- (b) Check the underbody for rust and damage.

If necessary, replace the damaged part or repair the damaged area.

2. REPLACE AIR CONDITIONING FILTER

- (a) Remove the air conditioning filter  .
- (b) Visually inspect the surface of the air conditioning filter.
- (c) If the air conditioning filter is contaminated with foreign matter, replace it.

3. ROAD TEST

- (a) Check the engine and chassis for abnormal noises.
- (b) Check that the vehicle does not wander or pull to one side.
- (c) Check that the brakes work properly and do not drag.
- (d) Set the parking brake shoes and drums.

4. TIGHTEN BOLTS AND NUTS ON CHASSIS AND BODY

- (a) If necessary, tighten the bolts and nuts on the chassis parts listed below.
 - Front axle and suspension
 - Drivetrain
 - Rear axle and suspension
 - Brake system
 - Engine mounts
 - Other chassis parts
- (b) If necessary, tighten the bolts and nuts on the body parts listed below.
 - Seat belt system
 - Seats
 - Doors and hood
 - Body mounts
 - Fuel tank
 - Exhaust system
 - Other body parts

5. FINAL INSPECTION

- (a) Check the operation of the body parts.
 - (1) Hood
 - Auxiliary catch operates properly.
 - Hood locks securely when closed.
 - (2) Front doors

- Door locks operate properly.
- Doors close properly.

(3) Luggage compartment door

- Luggage compartment door opens and closes properly.

(4) Seats

- Seats adjust easily and lock securely in any position.
- Front seatbacks lock securely in any position.
- Fold-down rear seatbacks lock securely.

(5) Be sure to deliver a clean car. Make sure to check the following:

- Steering wheel
- Shift lever knob
- All switches and knobs
- Door handles
- Seats



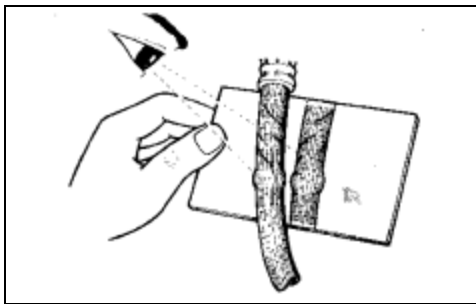
Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001AQU061X
Title: MAINTENANCE: BRAKE: GENERAL MAINTENANCE (2013 FR-S)		

GENERAL MAINTENANCE

1. INSPECT BRAKE LINE PIPES AND HOSES

HINT:

Work in a well-lighted area. Turn the front wheels fully to the right or left before beginning the inspection.



(a) Using a mirror, check the entire circumference and length of the brake lines and hoses for:

- Damage
- Wear
- Deformation
- Cracks
- Bends
- Corrosion
- Leaks
- Twists

(b) Check all the clamps for tightness and connections for leakage.

(c) Check that the hoses and lines are not near sharp edges, moving parts or the exhaust system.

(d) Check that the lines are installed properly and pass through the center of the grommets.

2. INSPECT BRAKE PEDAL

(a) Check the brake pedal **INFO** for Automatic Transmission, **INFO** for Manual Transmission).

3. INSPECT PARKING BRAKE

(a) Check the parking brake shoe clearance and parking brake lever travel **INFO** .

(b) Check the parking brake cables to ensure that they are not deformed or binding.

4. INSPECT BRAKE LININGS AND DRUMS

(a) Check the parking brake linings and drums.

5. INSPECT FRONT BRAKE

(a) Check the front brake pads and discs **INFO** .

6. INSPECT REAR BRAKE

(a) Check the rear brake pads and discs **INFO** .

7. INSPECT OR CHANGE BRAKE FLUID

(a) Inspect or change the brake fluid INFO .



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Model Year: 2013	Model: FR-S	Doc ID: RM000001AQV066X
Title: MAINTENANCE: CHASSIS: GENERAL MAINTENANCE (2013 FR-S)		

GENERAL MAINTENANCE

1. INSPECT STEERING LINKAGE AND GEAR HOUSING

- (a) Check the steering wheel free play INFO .
- (b) Check the steering linkage for looseness or damage.
 - (1) Check that the tie rod ends do not have excessive play.
 - (2) Check that the dust seals and boots are not damaged.
 - (3) Check that the boot clamps are not loose.
 - (4) Check that the steering gear box is not damaged.
 - (5) Check that the connectors are properly connected to the steering gear box.

2. INSPECT SUSPENSION BALL JOINT AND DUST COVER

- (a) Inspect the ball joints for excessive looseness.
 - (1) Jack up the front of the vehicle and place wooden blocks with a height of 180 to 200 mm (7.09 to 7.87 in.) under the front tires.
 - (2) Jack up the lower suspension arm until there is about half a load on the front suspension.
 - (3) Check that the front wheels are pointing straight ahead. Use wheel chocks on all 4 wheels.
 - (4) Using a lever, pry up the end of the lower arm. Check the amount of play.

Maximum ball joint vertical play:
0 mm (0 in.)

If there is any play, replace the ball joint.

- (b) Check the dust cover for damage.

3. INSPECT CLUTCH FLUID LEVEL AND SYSTEM OPERATION

- (a) Check the clutch fluid level INFO .

4. INSPECT DRIVE SHAFT BOOTS

- (a) Check the drive shaft boots for loose clamps, cracks, grease leaks, kinks or damage.

5. INSPECT AUTOMATIC TRANSMISSION FLUID

- (a) Visually check the automatic transmission for fluid leakage. If fluid is leaking, find the cause and repair it.
- (b) Inspect the automatic transmission fluid INFO .

6. REPLACE AUTOMATIC TRANSMISSION FLUID

- (a) Replace the automatic transmission fluid INFO .

7. INSPECT MANUAL TRANSMISSION OIL

- (a) Visually check the manual transmission for oil leakage. If fluid is leaking, find the cause and repair it.

(b) Inspect the manual transmission oil [INFO](#) .

8. INSPECT REAR DIFFERENTIAL OIL

(a) Visually check the rear differential for oil leakage. If fluid is leaking, find the cause and repair it.

(b) Inspect the rear differential oil [INFO](#) .

9. PERFORM TIRE ROTATION [INFO](#)

10. INSPECT FRONT AND REAR SUSPENSION

(a) Check the front and rear suspension.

SUSPENSION TYPE	SEE PROCEDURE
Front Suspension	INFO
Rear Suspension	INFO



Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001AQT066X
Title: MAINTENANCE: ENGINE: GENERAL MAINTENANCE (2013 FR-S)		

GENERAL MAINTENANCE

HINT:

Perform these procedures after the engine has cooled down.

1. INSPECT DRIVE BELT

- (a) Inspect the drive belt **INFO** .

2. INSPECT ENGINE OIL

- (a) Inspect the engine oil **INFO** .

3. REPLACE ENGINE OIL AND OIL FILTER

- (a) Replace the engine oil and oil filter **INFO** .

4. INSPECT ENGINE COOLANT

- (a) Inspect the engine coolant **INFO** .

5. REPLACE ENGINE COOLANT

- (a) Replace the engine coolant **INFO** .

6. REPLACE SPARK PLUGS

- (a) Replace the spark plugs **INFO** .

7. REPLACE FUEL FILTER

- (a) Replace the fuel filter **INFO** .

8. INSPECT BATTERY

- (a) Check the battery **INFO** .

9. INSPECT AIR CLEANER FILTER ELEMENT

- (a) Remove the air cleaner filter element.
- (b) Check that the air cleaner filter element is not excessively dirty. If the air cleaner filter element is excessively dirty, replace the air cleaner filter element.
- (c) Clean the air cleaner filter element with compressed air.
- (d) Reinstall the air cleaner filter element.

10. INSPECT EXHAUST PIPES AND MOUNTINGS

- (a) Visually check the pipes, hangers and connections for severe corrosion, leaks or damage.

11. INSPECT FUEL TANK CAP ASSEMBLY

- (a) Inspect the fuel tank cap gasket **INFO** .

12. INSPECT FUEL LINES, CONNECTIONS, FUEL TANK VAPOR VENT SYSTEM HOSES AND FUEL TANK BANDS

- (a) Visually check the fuel lines and hoses for cracks, leakage, loose connections, or deformation.
- (b) Check for tank band looseness or deformation.



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Model Year: 2013	Model: FR-S	Doc ID: RM000000UZE09JX
Title: MAINTENANCE: INSIDE VEHICLE: GENERAL MAINTENANCE (2013 FR-S)		

GENERAL MAINTENANCE

These are maintenance and inspection items that are considered to be the owner's responsibility.

The owner can do them or they can have them done at a service center.

These items include those that should be checked on a daily basis, those that in most cases do not require special tools, and those that are considered to be reasonable for the owner to do.

General maintenance items and procedures are as follows:

1. GENERAL NOTES

- Maintenance requirements vary depending on the country.
- Check the maintenance schedule in the owner's manual supplement.
- Determine the appropriate time to service the vehicle using either miles driven or time (months) elapsed, whichever reaches the specification first.
- Maintain similar intervals between periodic maintenance unless noted.
- Failing to check each vehicle part could lead to poor engine performance and increase exhaust emissions.

2. LIGHTS

- (a) Check that the headlights, stop lights, taillights, turn signal lights, and other lights illuminate or blink properly. Also, check if they have enough brightness.
- (b) Check that the headlights are aimed properly.

3. WARNING LIGHTS AND BUZZERS

- (a) Check that all the warning lights and buzzers are working.

4. HORNS

- (a) Check if the horns are working correctly.

5. WINDSHIELD GLASS

- (a) Check for scratches, pits or abrasions.

6. WINDSHIELD WIPER AND WASHER

- (a) Check that the washers are aimed properly. Also, check that the washer fluid hits the center of the operating range of each wiper on the windshield.
- (b) Check if the wipers streak. Replace them if necessary.

7. WINDSHIELD DEFROSTER

- (a) When the air conditioning is on the defroster setting, check that air comes out of the defroster outlets.


8. REAR VIEW MIRROR

- (a) Check that the rear view mirror is securely mounted.

9. SUN VISORS

- (a) Check that the sun visors move freely and are securely mounted.

10. STEERING WHEEL

- (a) Check that the steering wheel has the proper amount of free play. Also check for steering difficulty and unusual noises  .

11. SEATS

- (a) Check that the seat adjusters, seatback recliner and other seat controls operate smoothly.
- (b) Check that all the latches lock securely in all positions.
- (c) Check that the locks hold securely in all positions.
- (d) Check that the headrests move up and down smoothly and that the locks hold securely in all latched positions.
- (e) When the rear seatbacks are folded down, check that the latches lock securely.



12. SEAT BELTS

- (a) Check that the seat belt components, such as the buckles, retractors and anchors, operate properly and smoothly.
- (b) Check that the belt webbing is not cut, frayed, worn or damaged.

13. ACCELERATOR PEDAL

- (a) Check that the pedal operates smoothly. Check that the pedal does not have uneven resistance or stick in certain positions.


14. BRAKE PEDAL

- (a) Check that the brake pedal operates smoothly.
- (b) Check that the pedal has the proper reserve distance and free play  for Automatic Transmission,  for Manual Transmission).
- (c) Start the engine and check the brake booster function.
- (d) Start the engine and check the brake system indicator.

15. BRAKES

- (a) In a safe place, check that the vehicle does not pull or lead to the side when applying the brakes.

16. PARKING BRAKE

- (a) Check that the parking brake lever has the proper amount of travel  .
- (b) On a slight grade, check that the parking brake alone can hold the vehicle in place.

17. AUTOMATIC TRANSMISSION "PARK" MECHANISM

- (a) Check the shift lever for proper and smooth operation.
- (b) When the shift lever is in P and all brakes are released in an area that has a slight grade, check that the vehicle is stable.

18. FLOOR MATS

- (a) Check that the correct floor mats are used, and that they are properly installed.

Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UZD08YX
Title: MAINTENANCE: OUTSIDE VEHICLE: GENERAL MAINTENANCE (2013 FR-S)		

GENERAL MAINTENANCE

These are maintenance and inspection items that are considered to be the owner's responsibility.

The owner can do them or they can have them done at a service center.

These items include those that should be checked on a daily basis, those that in most cases do not require special tools, and those that are considered to be reasonable for the owner to do.

General maintenance items and procedures are as follows:

1. GENERAL NOTES

- Maintenance requirements vary depending on the country.
- Check the maintenance schedule in the owner's manual supplement.
- Following the maintenance schedule is mandatory.
- Determine the appropriate time to service the vehicle using either miles driven or time (months) elapsed, whichever reaches the specification first.
- Failing to check each vehicle part could lead to poor engine performance and increase exhaust emissions.

2. TIRES

- (a) Check the tire inflation pressure with a gauge. Make adjustments if necessary.
- (b) Check the surfaces of the tires for cuts, damage or excessive wear.

3. WHEEL NUTS

- (a) Check for nuts that are loose or missing. Tighten them if necessary.

4. TIRE ROTATION

- (a) Check the maintenance schedule in the owner's manual supplement.

5. WINDSHIELD WIPER BLADES

- (a) Check the blades for wear or cracks whenever they are unable to wipe the windshield clean. Replace them if necessary.

6. FLUID LEAKS

- (a) Check under the vehicle for leaking fuel, oil, water and other fluids.

NOTICE:

If you smell fuel or notice any leaks, locate the cause and correct it.

7. DOORS AND ENGINE HOOD

- (a) Check that all of the doors and the hood operate smoothly, and that all the latches lock securely.
- (b) When the primary latch is released, check that the engine hood secondary latch prevents the hood from opening.

Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UZFO91X
Title: MAINTENANCE: UNDER HOOD: GENERAL MAINTENANCE (2013 FR-S)		

GENERAL MAINTENANCE

1. GENERAL NOTES

- Maintenance requirements vary depending on the country.
- Check the maintenance schedule in the owner's manual supplement.
- Following the maintenance schedule is mandatory.
- Determine the appropriate time to service the vehicle using either miles driven or time (months) elapsed, whichever reaches the specification first.
- Maintain similar intervals between periodic maintenance unless noted.
- Failing to check each maintenance item could lead to poor engine performance and increase exhaust emissions.

2. WINDSHIELD WASHER FLUID

- (a) Check that there is sufficient fluid in the tank.

3. ENGINE COOLANT LEVEL

- (a) Check that the coolant level is between the "FULL" and "LOW" lines on the see-through reservoir.

4. RADIATOR AND HOSES

- (a) Check that the front of the radiator is clean and not blocked by leaves, dirt and bugs.
(b) Check the radiator and hoses for:

- Damage
- Cracks
- Kinks
- Corrosion
- Rot
- Clogging
- Leaks

5. BATTERY ELECTROLYTE LEVEL

- (a) Check that the electrolyte level of all the battery cells is between the upper and lower level lines on the case.

HINT:

If the electrolyte level is difficult to see, lightly shake the vehicle.

6. BRAKE FLUID LEVEL

- (a) Check that the brake fluid level is near the upper level line on the see-through reservoirs.

7. ENGINE DRIVE BELT

- (a) Check the drive belt for fraying, cracks, wear or oil.

8. ENGINE OIL LEVEL

- (a) Check that the engine oil level is between the full level and low level marks on the dipstick with the engine turned off.

9. EXHAUST SYSTEM

- (a) Visually inspect for severe corrosion, cracks, holes or loose supports.

HINT:

If any change in the sound of the exhaust or smell of the exhaust fumes is noticed, inspect and repair the exhaust system.



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KES00HX
Title: PREPARATION: ALIGNMENT / HANDLING DIAGNOSIS: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Torque wrench	-
Vernier caliper	-
Alignment tester	-
Toe-in gauge	-
Camber-caster-kingpin gauge	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020C700RX
Title: PREPARATION: AUDIO / VIDEO: EQUIPMENT (2013 FR-S)		



EQUIPMENT

Torque wrench	-
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020FO00IX
Title: PREPARATION: AUDIO / VIDEO: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002H7Q010X
Title: PREPARATION: AXLE AND DIFFERENTIAL: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Axle

Torque wrench	-
Dial indicator with magnetic base	-
Non-residue solvent	-

Differential

Torque wrench	-
Micrometer	-
Dial indicator with magnetic base	-
Non-residue solvent	-
Prussian blue	-
MP grease	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002H7R00ZX
Title: PREPARATION: AXLE AND DIFFERENTIAL: LUBRICANT (2013 FR-S)		


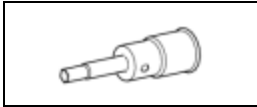

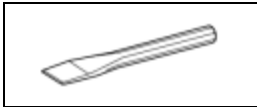
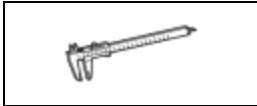
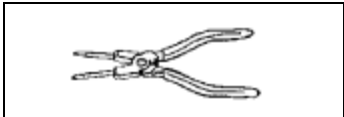
LUBRICANT

Differential

ITEM	CAPACITY	OIL GRADE
Rear differential oil (except LSD)	1.10 to 1.20 liters (1.17 to 1.27 US qts, 0.97 to 1.05 Imp. qts)	Toyota genuine differential gear oil LT 75W-85 GL-5 or equivalent
Rear differential oil (for LSD)	1.10 to 1.20 liters (1.17 to 1.27 US qts, 0.97 to 1.05 Imp. qts)	Toyota genuine differential gear oil LX 75W-85 GL-5 or equivalent

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002ZWC00VX
Title: PREPARATION: AXLE AND DIFFERENTIAL: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09010-3C110	Set, Hexagon Socket Wrench	-
	(09013-6C130)	Socket Hexagon 10mm	-
	09051-1C110	Plastic Hammer	-
	09051-1C300	Chisel	-
	09072-1C200	Vernier Calipers 150mm	-
	09905-00013	Snap Ring Pliers	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002H7P00ZX
Title: PREPARATION: AXLE AND DIFFERENTIAL: SSM (2013 FR-S)		


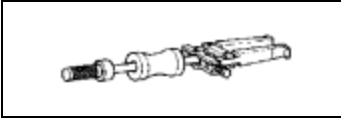
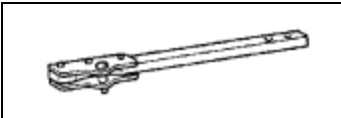
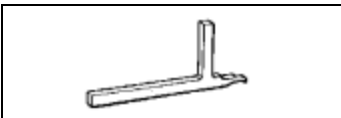
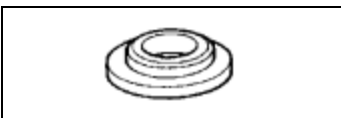
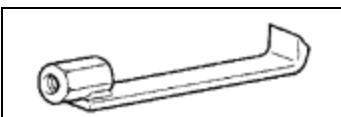
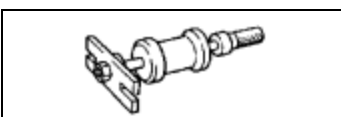
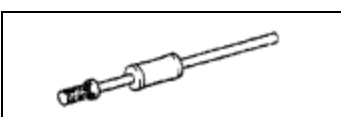
SSM





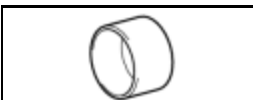
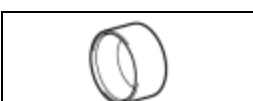
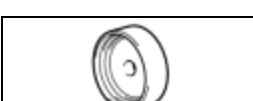


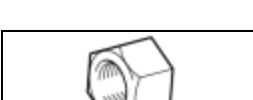

Toyota Genuine Seal Packing 1281, Three Bond 1281 or equivalent	-
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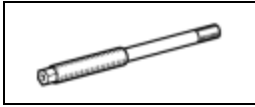
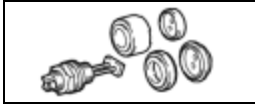





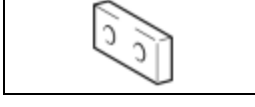
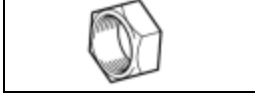

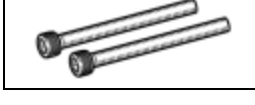


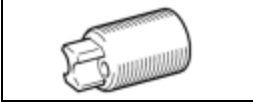






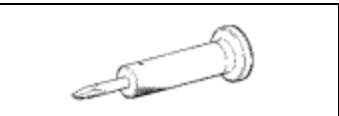
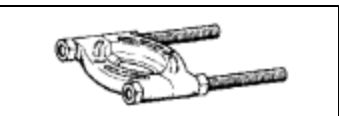
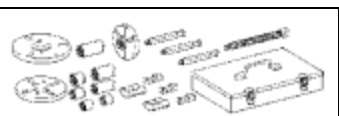
Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KC800HX
Title: PREPARATION: AXLE AND DIFFERENTIAL: SST (2013 FR-S)		











SST

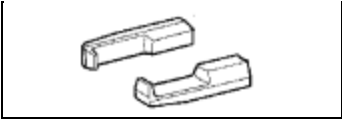

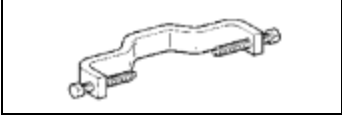
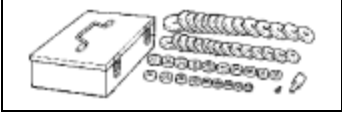






	09213-70011	Crankshaft Pulley Holding Tool	-
	09308-00010	Oil Seal Puller	-
	09330-00021	Companion Flange Holding Tool	-
	09504-22011	Differential Side Bearing Replacer	-
	09506-30012	Differential Drive Pinion Rear Bearing Cone Replacer	-
	09520-01010	Drive Shaft Remover Attachment	-
	09520-24010	Differential Side Gear Shaft Puller	-
	(09520-32040)	Shocker Set	-
	09554-22010	Differential Oil Seal Replacer	-

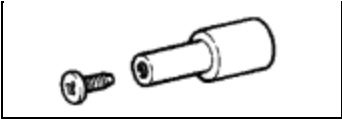
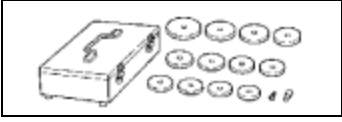
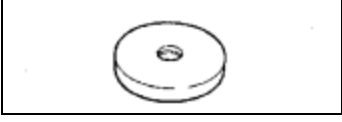
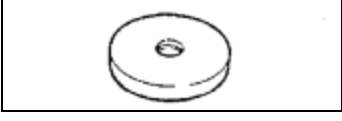
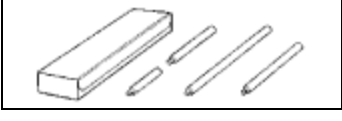


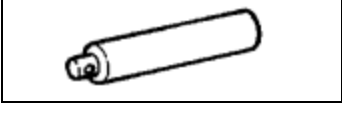
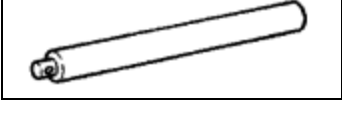
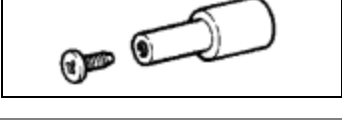
			
	09556-22010	Drive Pinion Front Bearing Remover	-
	09570-18010	Rear Differential Mount Cushion Remover and Replacer	-
	(09571-01010)	Remover	-
	(09571-01020)	Base No.1	-
	(09571-01030)	Base No.2	-
	(09571-01040)	Replacer	-
	(09571-01050)	Sleeve	-
	(09571-01060)	Ring	-
	(09571-01070)	Nut	-
	(09571-01080)	Bearing	-




	(09571-01090)	Shaft	-
	09570-18020	Rear Differential Mount Cushion Remover and Replacer	-
	(09571-01100)	Remover	-
	(09571-01110)	Base No.1	-
	(09571-01120)	Base No.2	-
	(09571-01130)	Replacer	-
	(09571-01140)	Sleeve	-
	(09571-01150)	Plate	-
	(09571-01160)	Nut	-
	(09571-01170)	Bearing	-
	(09571-01180)	Bolt	-

	(09571-01190)	Shaft	-
	09636-20010	Upper Ball Joint Dust Cover Replacer	-
	09710-18030	Rear Suspension Bush Tool Set	-
	09710-30012	Rear Suspension Bush Tool Set	-
	(09710-04081)	Base	-
	09716-18010	Rear Suspension Bush Remover and Replacer	-
	09922-10010	Variable Open Wrench	-
	09930-00010	Drive Shaft Nut Chisel	-
	09950-00020	Bearing Remover	-
	09950-30012	Puller A Set	-
	(09951-03010)	Upper Plate	-

			
	(09953-03010)	Center Bolt	-
	(09954-03010)	Arm	-
	(09955-03030)	Lower Plate 130	-
	(09956-03030)	Adaptor 20	-
	09950-40011	Puller B Set	-
	(09951-04020)	Hanger 200	-
	(09952-04010)	Slide Arm	-
	(09953-04030)	Center Bolt 200	-
	(09954-04010)	Arm 25	-
	(09955-04061)	Claw No. 6	-

			
	(09957-04010)	Attachment	-
	(09958-04011)	Holder	-
	09950-60010	Replacer Set	-
	(09951-00350)	Replacer 35	-
	(09951-00380)	Replacer 38	-
	(09951-00430)	Replacer 43	-
	(09951-00480)	Replacer 48	-
	(09951-00580)	Replacer 58	-
	(09951-00590)	Replacer 59	-
	(09952-06010)	Adapter	-

			
	09950-60020	Replacer Set No. 2	-
	(09951-00720)	Replacer 72	-
	(09951-00890)	Replacer 89	-
	09950-70010	Handle Set	-
	(09951-00410)	Replacer 41	-
	(09951-00620)	Replacer 62	-
	(09951-07100)	Handle 100	-
	(09951-07200)	Handle 200	-
	(09952-06010)	Adapter	-
	09960-20010	Ball Joint Puller Set	-

			
	(09961-02010)	Assy Ball Joint Puller	-
	(09961-02060)	Spacer B	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000039YI07PX
Title: PREPARATION: BRAKE (FRONT): EQUIPMENT (2013 FR-S)		

EQUIPMENT

Vinyl tape	-
Ruler	-
Dial indicator with magnetic base	-
Micrometer	-
Torque wrench	-
Wooden Plate	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000039YJ04TX
Title: PREPARATION: BRAKE (FRONT): LUBRICANT (2013 FR-S)		


LUBRICANT

ITEM	CAPACITY	CLASSIFICATION
Brake fluid	-	SAE J1703 or FMVSS No. 116 DOT3



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000039YH070X
Title: PREPARATION: BRAKE (FRONT): RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09017-1C100	Union Nut Wrench 10 mm	-
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000039YI07QX
Title: PREPARATION: BRAKE (REAR): EQUIPMENT (2013 FR-S)		

EQUIPMENT

Vinyl tape	-
Ruler	-
Dial indicator with magnetic base	-
Micrometer	-
Wooden block	-
Torque wrench	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000039YJ04UX
Title: PREPARATION: BRAKE (REAR): LUBRICANT (2013 FR-S)		


LUBRICANT

ITEM	CAPACITY	CLASSIFICATION
Brake fluid	-	SAE J1703 or FMVSS No. 116 DOT3



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000039YH07PX
Title: PREPARATION: BRAKE (REAR): RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09017-1C100	Union Nut Wrench 10 mm	-
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000043ET003X
Title: PREPARATION: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: EQUIPMENT (2013 FR-S)		





EQUIPMENT

Torque wrench	-
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000043ES003X
Title: PREPARATION: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09017-1C100	Union Nut Wrench 10mm	-
	09017-1C110	Union Nut Wrench 12mm	-
	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000039YI07OX
Title: PREPARATION: BRAKE SYSTEM (OTHER): EQUIPMENT (2013 FR-S)		

EQUIPMENT

Torque wrench	-
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000039YJ04SX
Title: PREPARATION: BRAKE SYSTEM (OTHER): LUBRICANT (2013 FR-S)		



LUBRICANT

ITEM	CAPACITY	CLASSIFICATION
Brake fluid	-	SAE J1703 or FMVSS No. 116 DOT3



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000039YH07NX
Title: PREPARATION: BRAKE SYSTEM (OTHER): RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09017-1C100	Union Nut Wrench 10mm	-
	09017-1C110	Union Nut Wrench 12mm	-
	99999-90022	Hand-held vacuum pump	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001ZTT00CX
Title: PREPARATION: CLUTCH: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Vernier calipers	-
Dial indicator with magnetic base	-
Torque wrench	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001ZTU00CX
Title: PREPARATION: CLUTCH: LUBRICANT (2013 FR-S)		

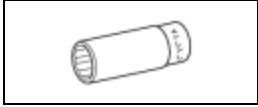


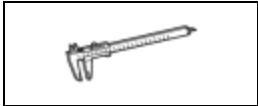


LUBRICANT

ITEM	CAPACITY	CLASSIFICATION
Brake fluid	-	SAE J1703 or FMVSS NO. 116 DOT3



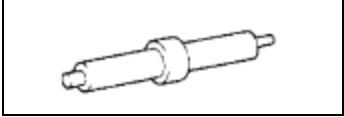
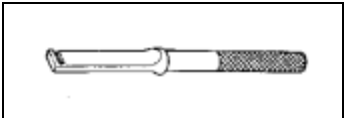
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Model Year: 2013	Model: FR-S	Doc ID: RM000001ZTW00CX
Title: PREPARATION: CLUTCH: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09012-2C510	Deep Socket Wrench 19mm	-
	09017-1C100	Union Nut Wrench 10mm	-
	09051-1C400	Pin Punch 3	-
	09072-1C200	Vernier Calipers 150mm	-
	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001ZTS00CX
Title: PREPARATION: CLUTCH: SST (2013 FR-S)		

SST

	09301-00110	Clutch Guide Tool	-
	09333-00013	Clutch Diaphragm Spring Aligner	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001VAO00CX
Title: PREPARATION: CRUISE CONTROL: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000312203NX
Title: PREPARATION: DOOR / HATCH: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Torque wrench	
Protective tape	
Protective goggle	
Metal saw	
Cutter or other similar tool	
Plastic-faced hammer	



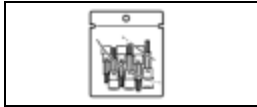
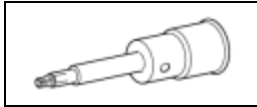
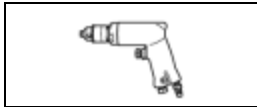
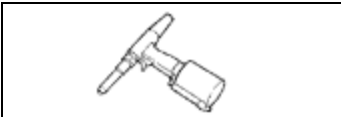


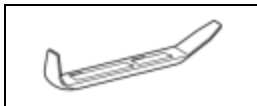
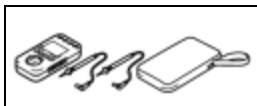
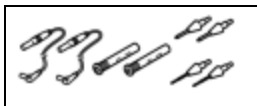
Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002ZNO076X
Title: PREPARATION: DOOR / HATCH: LUBRICANT (2013 FR-S)		

LUBRICANT

MP grease	-
Toyota genuine adhesive 1324, Three bond 1324 or equivalent	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003120030X
Title: PREPARATION: DOOR / HATCH: RECOMMENDED TOOLS (2013 FR-S)		


RECOMMENDED TOOLS

	09010-3C120	Set, "TORX" Socket Wrench	-
	(09013-1C120)	"TORX" Socket Wrench T-type T30	-
	09050-00032	Air Drill	-
	09050-20010	Air Riveter	-
	09061-1C100	Clip Remover 6mm	-
	09061-1C300	Set, Moulding Remover	-
	(09061-1C310)	Remover A, Moulding	-
	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-





Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000367203QX
Title: PREPARATION: DOOR / HATCH: SSM (2013 FR-S)		

SSM

	08850-00065	Butyl Tape Set
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000043Y4003X
Title: PREPARATION: DOOR / HATCH: SST (2013 FR-S)		

SST

	09812-18010	Front Door Glass Adjusting Tool	-
	09812-18020	Front Door Fix Window Glass Adjusting Tool	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001Z4E00CX
Title: PREPARATION: DOOR LOCK: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Torque wrench	-
Protective tape	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002ZNQ077X
Title: PREPARATION: DOOR LOCK: LUBRICANT (2013 FR-S)		


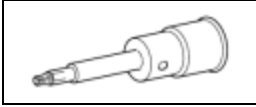
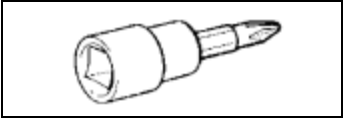
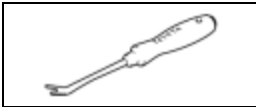
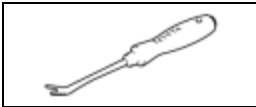
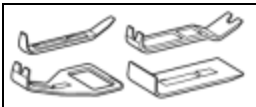
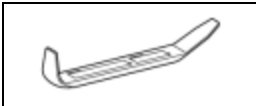


LUBRICANT

MP grease	-
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001Z4D00CX
Title: PREPARATION: DOOR LOCK: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09010-3C120	Set, "TORX" Socket Wrench	-
	(09013-1C120)	"TORX" Socket Wrench T-type T30	-
	09011-3C400	Socket Wrench	-
	09061-1C100	Clip Remover 6mm	-
	09061-1C110	Clip Remover 10mm	-
	09061-1C300	Set, Moulding Remover	-
	(09061-1C310)	Remover A, Moulding	-
	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-




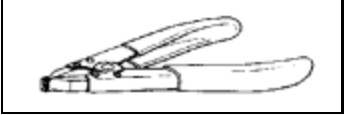
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Model Year: 2013	Model: FR-S	Doc ID: RM000003JAQ00HX
Title: PREPARATION: DRIVE SHAFT / PROPELLER SHAFT: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Torque wrench	-
Dial indicator with magnetic base	-


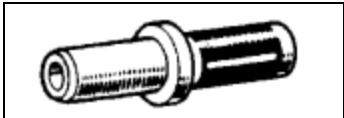
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Model Year: 2013	Model: FR-S	Doc ID: RM000003KCI00HX
Title: PREPARATION: DRIVE SHAFT / PROPELLER SHAFT: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09051-1C110	Plastic Hammer	-
	09905-00012	Snap Ring No. 1 Expander	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003JAP00GX
Title: PREPARATION: DRIVE SHAFT / PROPELLER SHAFT: SST (2013 FR-S)		

SST

	09325-20010	Transmission Oil Plug	-
	09325-40010	Transmission Oil Plug	-


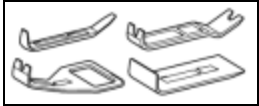
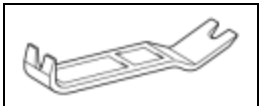
Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000208P00JX
Title: PREPARATION: EXTERIOR PANELS / TRIM: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Protective tape	
Heat light	
Piano wire	
Wooden block or similar object	For tying both piano wire ends
Cutter or other similar tool	
Torque wrench	
Double-sided tape	
Adhesive	3M DP-105 or equivalent
Infrared light	
Non-residue solvent	

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000208000JX
Title: PREPARATION: EXTERIOR PANELS / TRIM: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09061-1C100	Clip Remover 6mm	-
	09061-1C300	Set, Moulding Remover	-
	(09061-1C320)	Remover B, Moulding	-

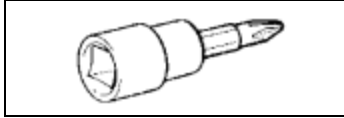


Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000205L00FX
Title: PREPARATION: FA20 BATTERY / CHARGING: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Torque wrench	-
Vernier calipers	-
Pin (ϕ 1mm)	-
Vise	-
Ohmmeter	-
Ammeter	-
Aluminium plate	-
Soldering iron	-
Solder	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000205K00FX
Title: PREPARATION: FA20 BATTERY / CHARGING: RECOMMENDED TOOLS (2013 FR-S)		

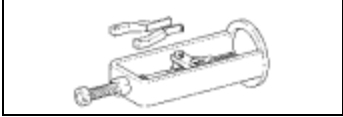
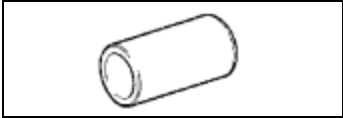
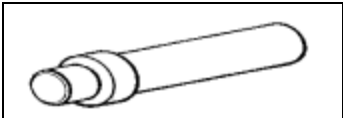
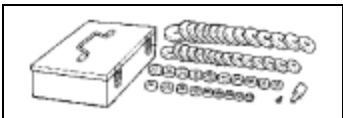


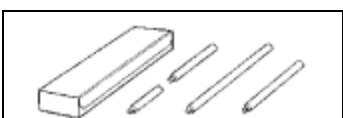
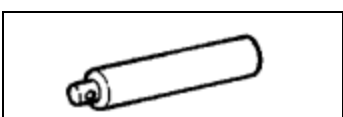
RECOMMENDED TOOLS

	09011-3C400	Socket Wrench	-
	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000205J00FX
Title: PREPARATION: FA20 BATTERY / CHARGING: SST (2013 FR-S)		

SST

	09387-00041	Bearing Puller Assembly	-
	09632-36010	Steering Vane Pump Bearing Replacer	-
	09820-36010	Starter Amateur Bearing Remover & Replacer	-
	09950-60010	Replacer Set	-
	(09951-00250)	Replacer 25	-
	(09951-00520)	Replacer 52	-
	09950-70010	Handle Set	-
	(09951-07100)	Handle 100	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001ZAU00KX
Title: PREPARATION: FA20 COOLING: EQUIPMENT (2013 FR-S)		



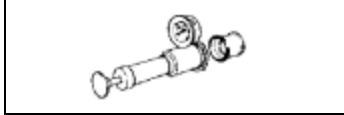

EQUIPMENT

Thermometer	-
Torque wrench	-
Vernier caliper	-






Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001ZAT00KX
Title: PREPARATION: FA20 COOLING: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-
	09230-40010	Radiator Cap Tester	-
	09231-40010	Radiator Cap Tester Adapter Set A	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001ZAS00KX
Title: PREPARATION: FA20 COOLING: SST (2013 FR-S)		

SST

	09960-10010	Variable Pin Wrench Set	-
	(09962-01000)	Variable Pin Wrench Arm Assembly	-
	(09963-00700)	Pin 7	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KD402GX
Title: PREPARATION: FA20 EMISSION CONTROL: EQUIPMENT (2013 FR-S)		

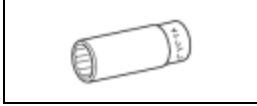


EQUIPMENT

Torque wrench	-
Battery	-
Pressure Gauge	-
Sound scope	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004B3Y006X
Title: PREPARATION: FA20 EMISSION CONTROL: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09012-2C510	Deep Socket Wrench 19mm	-
	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004B6C007X
Title: PREPARATION: FA20 EMISSION CONTROL: SSM (2013 FR-S)		

SSM

Three Bond 1141G or equivalent	-
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020IF00EX
Title: PREPARATION: FA20 ENGINE CONTROL: EQUIPMENT (2013 FR-S)		

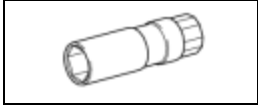


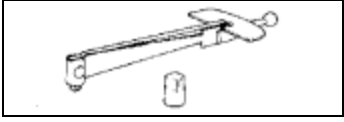


EQUIPMENT

Voltmeter	-
Ohmmeter	-
Battery	-
Thermometer	-
Torque wrench	-
Spark plug cleaner	-
Megohmmeter	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020IE00EX
Title: PREPARATION: FA20 ENGINE CONTROL: RECOMMENDED TOOLS (2013 FR-S)		




RECOMMENDED TOOLS

	09011-3C220	Wrench, Spark Plug 14mm	-
	09017-1C140	Union Nut Wrench 19mm	-
	09022-1C500	Tilt Extension Bar 35mm	-
	09022-3C200	Joint, Universal 54mm	-
	09025-00010	Torque Wrench (30 kgf-cm)	-
	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-
		Torque Wrench	-
	99999-70027	Torque wrench	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004312006X
Title: PREPARATION: FA20 ENGINE CONTROL: SST (2013 FR-S)		

SST

	09224-00010	O2 Sensor Wrench	-
	09240-00020	Wire Gauge Set	-
	09250-53010	Engine Mount Spacer	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001UYQ00GX
Title: PREPARATION: FA20 ENGINE MECHANICAL: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Abrasive compound	-
Angle gauge	-
Caliper gauge	-
Carbide cutter (30°)	-
Carbide cutter (45°)	-
Carbide cutter (60°)	-
Carbide cutter (75°)	-
CO/HC meter	-
Compression gauge	-
Connecting rod aligner	-
Cylinder gauge	-
Dial indicator	-
Dye penetrant	-
Engine tune-up tester	-
Engine Stand	-
Feeler gauge	-
Marker	-
Micrometer	-
Piston ring compressor	-
Piston ring expander	-
Plastigage	-
Precision straightedge	-
Reamer (5.5 mm)	-
Steel square	-
Torque wrench	-
Valve seat cutter	-
V-block	-
Vernier caliper	-
Wooden block	-
Wire (1.0 mm)	-
Hexagonal wrench (2.5 mm)	-
Prussian blue	-

Plastic-faced hammer	-
400-grit sandpaper	-


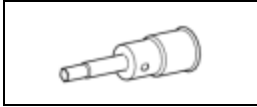
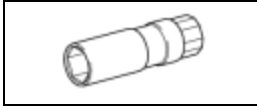
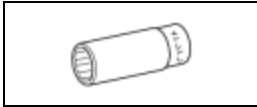
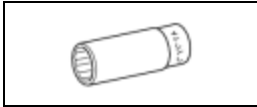




HINT:




Torx is registered trademark of Textron Inc.



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001UYO00GX
Title: PREPARATION: FA20 ENGINE MECHANICAL: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09010-3C110	Set, Hexagon Socket Wrench
	(09013-6C100)	Socket Hexagon 5mm
	09011-3C220	Wrench, Spark Plug 14mm
	09012-2C510	Deep Socket Wrench 19mm
	09012-2C520	Deep Socket Wrench 24mm
	09013-1C551	"TORX" Socket Wrench E-type E14
	09013-1C560	"TORX" Socket Wrench E-type E16
	09017-1C140	Union Nut Wrench 19mm
	09061-1C110	Clip Remover 10mm

	<p>09072-1C200</p>	<p>Vernier Calipers 150mm</p>
	<p>09090-04020</p>	<p>Engine Sling Device</p>
	<p>09091-1C100</p>	<p>Oil Pan Seal Cutter</p>

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001UYPO0GX
Title: PREPARATION: FA20 ENGINE MECHANICAL: SSM (2013 FR-S)		

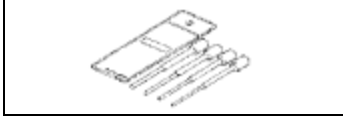

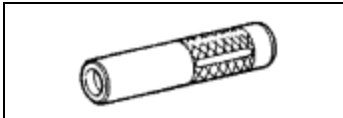
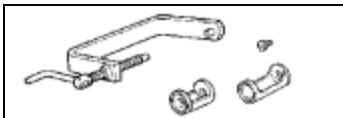
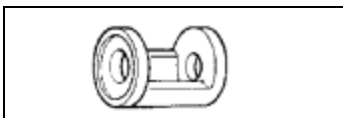
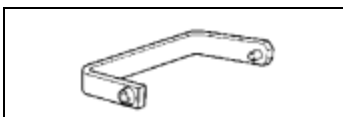
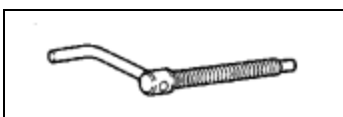

SSM

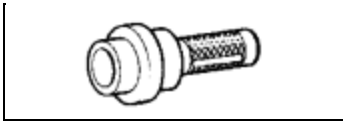

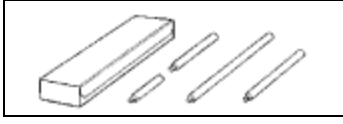
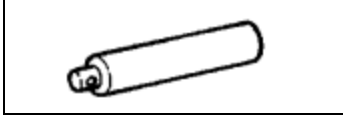
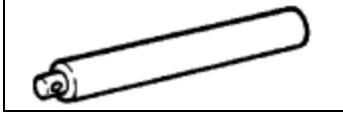



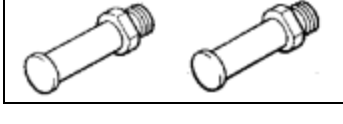

Three Bond 1217G or equivalent	-
Toyota Genuine Adhesive 1324, Three Bond 1324 or equivalent	-
Three Bond 1141G or equivalent	-
Three Bond 1105 or equivalent	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000206N00GX
Title: PREPARATION: FA20 ENGINE MECHANICAL: SST (2013 FR-S)		

SST

	09201-10000	Valve Guide Bushing Remover & Replacer Set	-
	(09201-01050)	Valve Guide Bushing Remover & Replacer 5	-
	09201-41020	Valve Stem Oil Seal Replacer	-
	09202-70020	Valve Spring Compressor	-
	(09202-00010)	Attachment	-
	(09202-01010)	Arm	-
	(09202-01020)	Set Bolt	-
	09223-15030	Oil Seal & Bearing Replacer	-
	09223-22010	Crankshaft Front Oil Seal Replacer	-

			
	09228-22020	Oil Filter Wrench	-
	09950-70010	Handle Set	-
	(09951-07100)	Handle 100	-
	(09951-07150)	Handle 150	-
	09960-10010	Variable Pin Wrench Set	-
	(09962-01000)	Variable Pin Wrench Arm Assembly	-
	(09963-00700)	Pin 7	-
	(09963-01000)	Pin 10	-
	SU003-03936	Fuel Hose Puller	-


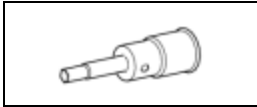
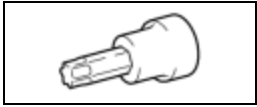



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000201K001X
Title: PREPARATION: FA20 FUEL: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Stop watch	-
Sound scope	-
Measuring flask	-
Ohmmeter	-
Volt meter	-
Torque wrench	-
Needle nose pliers	-
Engine lifter	-
Vernier calipers	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000201J001X
Title: PREPARATION: FA20 FUEL: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09010-3C110	Set, Hexagon Socket Wrench	-
	(09013-6C110)	Socket Hexagon 6mm	-
	09013-1C160	"TORX" Plus Socket Wrench	-
	09017-1C130	Union Nut Wrench 17mm	-
	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-




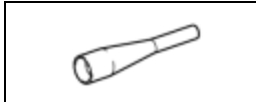

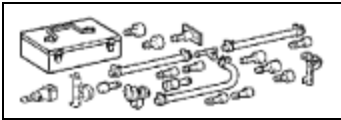
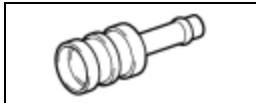



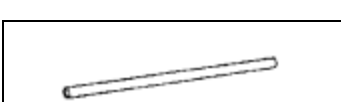
Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001U0T03YX
Title: PREPARATION: FA20 FUEL: SSM (2013 FR-S)		

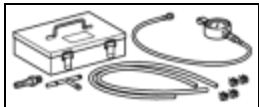
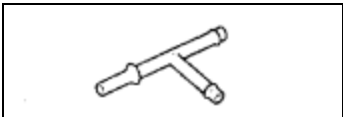
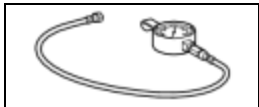
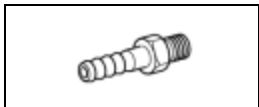
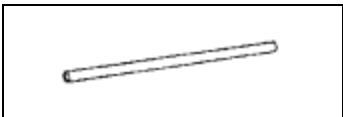




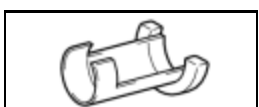
SSM

Three Bond 1217G or equivalent	-
Butyl Tape Set	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000201100GX
Title: PREPARATION: FA20 FUEL: SST (2013 FR-S)		

SST

	09260-39020	Injector Seal Toolset	-
	(09261-03010)	Injector Seal Holder	-
	(09261-03020)	Injector Seal Guide	-
	09268-31014	Injection Measuring Tool Set	-
	(09268-41141)	Adapter	-
	(09268-41410)	Clamp	-
	(09268-41700)	Hose Band	-
	(09268-41800)	Tie Band	-
	(95336-08070)	Hose	-
	09268-45100	EFI Fuel Pressure Gauge Set	-

			
	(09268-41250)	T Joint	-
	(09268-41260)	Gauge Assy	-
	(09268-41270)	Straight Joint	-
	(95336-08070)	Hose	-
	(96135-51300)	Clip	-
	09808-18010	Fuel Pump Retainer Tool	-
	09842-30090	EFI Inspection Wire I	-
	09922-10010	Variable Open Wrench	-
	SU003-03936	Fuel Hose Puller	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KD602OX
Title: PREPARATION: FA20 INTAKE / EXHAUST: EQUIPMENT (2013 FR-S)		


EQUIPMENT

Torque wrench	-
Vernier calipers	-
Wooden block	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004ICT008X
Title: PREPARATION: FA20 INTAKE / EXHAUST: SST (2013 FR-S)		

SST

	09250-53010	Engine Mount Spacer	-
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020DH00LX
Title: PREPARATION: FA20 LUBRICATION: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Oil pressure gauge	-
Torque wrench	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020DI00NX
Title: PREPARATION: FA20 LUBRICATION: LUBRICANT (2013 FR-S)		

LUBRICANT

Standard Oil Grade

OIL GRADE	OIL VISCOSITY (SAE)
API grade SL "energy-conserving", SM "energy-conserving", SN "resource-conserving" or ILSAC multigrade engine oil	0W-20 5W-30
API grade SL, SM or SN multigrade engine oil	5W-20

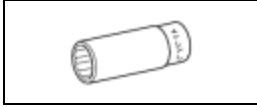
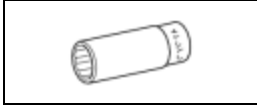


Standard Capacity

ITEM	CAPACITY
Drain and refill with oil filter change	5.4 liters (5.7 US qts, 4.8 Imp. qts)
Drain and refill without oil filter change	5.2 liters (5.5 US qts, 4.6 Imp. qts)
Dry fill	6.3 liters (6.7 US qts, 5.5 Imp. qts)



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000005B3V000X
Title: PREPARATION: FA20 LUBRICATION: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09012-2C510	Deep Socket Wrench 19mm	-
	09012-2C520	Deep Socket Wrench 24mm	-
	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C110	AC/DC400A Probe	-


Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020DG00LX
Title: PREPARATION: FA20 LUBRICATION: SSM (2013 FR-S)		

SSM

Toyota Genuine Adhesive 1324, Three Bond 1324 or equivalent	-
Toyota Genuine Seal Packing Black, Three Bond 1217G or equivalent	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020DF00JX
Title: PREPARATION: FA20 LUBRICATION: SST (2013 FR-S)		

SST

	09228-22020	Oil Filter Wrench	-
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000205100CX
Title: PREPARATION: FA20 STARTING: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Battery	-
Torque wrench	-
Service Wire Harness	-
Vernier calipers	-
Vise	-
Sandpaper (No. 400)	-
Ohmmeter	-
Ammeter	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002ZNO078X
Title: PREPARATION: FA20 STARTING: LUBRICANT (2013 FR-S)		

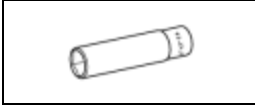
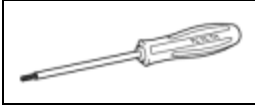


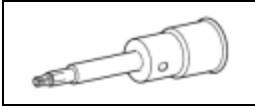
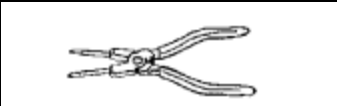
LUBRICANT

High-temperature grease	-
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000205H00CX
Title: PREPARATION: FA20 STARTING: RECOMMENDED TOOLS (2013 FR-S)		

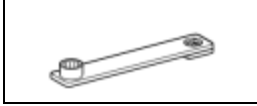
RECOMMENDED TOOLS

	09012-1C130	Deep Socket Wrench 14mm	-
	09041-2C220	"TORX" Driver T25H	-
	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-
	(09013-1C110)	"TORX" Socket Wrench T-type T25	-
	09905-00013	Snap Ring Pliers	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000005BOX000X
Title: PREPARATION: FA20 STARTING: SST (2013 FR-S)		

SST

	09249-37010	Wrench VVT Set Bolt	-
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020E500QX
Title: PREPARATION: FRONT SUSPENSION: EQUIPMENT (2013 FR-S)		


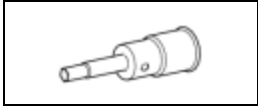
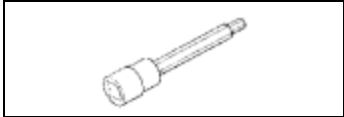
EQUIPMENT

Torque wrench	
Wooden block	
metal saw	Shock absorber disposal






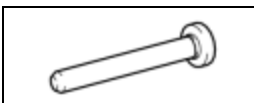


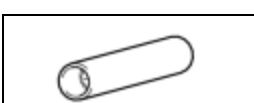
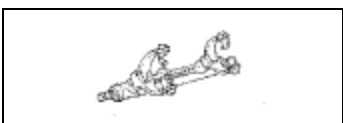
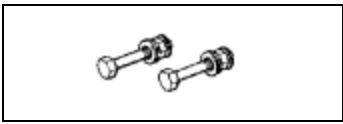
Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003GGB021X
Title: PREPARATION: FRONT SUSPENSION: RECOMMENDED TOOLS (2013 FR-S)		







RECOMMENDED TOOLS

	09010-3C110	Set, Hexagon Socket Wrench	-
	(09013-6C110)	Socket Hexagon 6mm	-
	09013-6C510	Long Socket Hexagon 6mm	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KEP001X
Title: PREPARATION: FRONT SUSPENSION: SST (2013 FR-S)		

SST

	09710-18040	Front Suspension Bush Tool Set	-
	(09711-01010)	Remover and Replacer	-
	(09711-01020)	Guide Pin	-
	(09711-01030)	Base	-
	09716-18020	Front Suspension Bush Remover and Replacer	-
	09716-18030	Front Suspension Bush Remover and Replacer	-
	09726-18010	Stud Bolt Socket Wrench	-
	09727-30021	Coil Spring Compressor	-
	(09727-00010)	Bolt Set	-
	(09727-00021)	Arm Set	-

			
	(09727-00031)	Compressor	-
	09729-97202	Socket,Lock Nut17	-
	09960-20010	Ball Joint Puller Set	-
	(09961-02010)	Assy Ball Joint Puller	-
	(09961-02060)	Spacer B	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020FZ001X
Title: PREPARATION: HEATING / AIR CONDITIONING: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Vinyl tape	
Torque wrench	
Clip remover	



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020G000IX
Title: PREPARATION: HEATING / AIR CONDITIONING: LUBRICANT (2013 FR-S)		



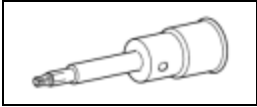

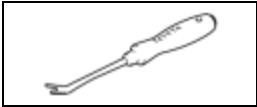


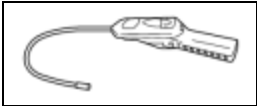
LUBRICANT

ITEM	CAPACITY	CLASSIFICATION
Compressor oil	-	ND-OIL 8 or equivalent



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020FY001X
Title: PREPARATION: HEATING / AIR CONDITIONING: RECOMMENDED TOOLS (2013 FR-S)		








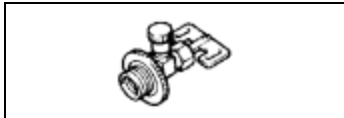
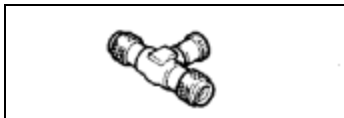
RECOMMENDED TOOLS

	09010-3C120	Set, "TORX" Socket Wrench
	09013-6C090	Hexagon Socket Wrench 4
	(09013-1C100)	"TORX" Socket Wrench T-type T20
	09013-7C400	Wrench Set
	09061-1C110	Clip Remover 10mm
	09080-1C110	Toyota Electrical Tester Set
	09080-2C100	Test Lead Set
	95146-00180	Halogen Leak Detector DENSO Part No.



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000440W003X
Title: PREPARATION: HEATING / AIR CONDITIONING: SST (2013 FR-S)		

SST

	09985-20010	Set,Air Conditioner Service Tool
	(09985-02010)	Gauge,Refrigerant Charging
	(09985-02050)	Hose,Refrigerant Charging
	(09985-02060)	Hose,Refrigerant Charging
	(09985-02070)	Hose,Refrigerant Charging
	(09985-02090)	Coupler,Quick
	(09985-02110)	Coupler,Quick
	(09985-02130)	Valve,Refrigerant Drum Service
	(09985-02150)	Joint,T



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020EE027X
Title: PREPARATION: HORN: EQUIPMENT (2013 FR-S)		



EQUIPMENT

Torque wrench	
Battery	



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002PN003TX
Title: PREPARATION: HORN: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09080-1C110	Toyota Electrical Tester Set	
	09080-2C100	Test Lead Set	





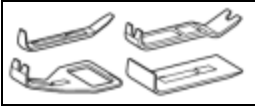
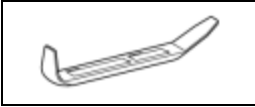
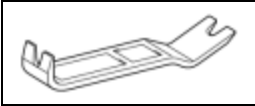

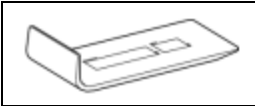
Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020FJ001X
Title: PREPARATION: INTERIOR PANELS / TRIM: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Torque wrench	
Double-sided tape	
Protective tape	
Clip remover	
Adhesive Tape	

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KCS00AX
Title: PREPARATION: INTERIOR PANELS / TRIM: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09061-1C100	Clip Remover 6mm
	09061-1C110	Clip Remover 10mm
	09061-1C300	Set, Moulding Remover
	(09061-1C310)	Remover A, Moulding
	(09061-1C320)	Remover B, Moulding
	(09061-1C330)	Remover C, Moulding
	(09061-1C340)	Remover D, Moulding






Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KCO009X
Title: PREPARATION: LIGHTING (EXT): EQUIPMENT (2013 FR-S)		

EQUIPMENT

Torque wrench	
White paper	
Tire pressure gauge	
Protective tape	
Battery	
Dry cell battery	

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KCN009X
Title: PREPARATION: LIGHTING (EXT): RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09042-1C200	Plier 150mm	-
	09061-1C100	Clip Remover 6mm	-
	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-
		Oscilloscope	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KCK009X
Title: PREPARATION: LIGHTING (INT): EQUIPMENT (2013 FR-S)		


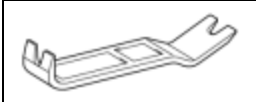


EQUIPMENT

Torque wrench	-
Protective tape	-
Battery	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KCJ009X
Title: PREPARATION: LIGHTING (INT): RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09061-1C300	Set, Moulding Remover	-
	(09061-1C320)	Remover B, Moulding	-
	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-





Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020LK00GX
Title: PREPARATION: METER / GAUGE / DISPLAY: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Protective tape	-
Adhesive tape	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000021LE00HX
Title: PREPARATION: METER / GAUGE / DISPLAY: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09061-1C100	Clip Remover 6mm	-
	09061-1C110	Clip Remover 10mm	-
	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-


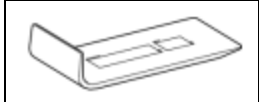


Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020LM043X
Title: PREPARATION: MIRROR (EXT): EQUIPMENT (2013 FR-S)		

EQUIPMENT

Torque wrench	-
Protective tape	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020LLO43X
Title: PREPARATION: MIRROR (EXT): RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09061-1C300	Set, Moulding Remover
	(09061-1C340)	Remover D, Moulding
	09080-1C110	Toyota Electrical Tester Set
	09080-2C100	Test Lead Set

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003K6A01KX
Title: PREPARATION: NETWORKING: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003J9D00AX
Title: PREPARATION: PARKING BRAKE: EQUIPMENT (2013 FR-S)		



EQUIPMENT

Ruler	-
Drum gauge	-
Torque wrench	-
Ohmmeter	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004ZQY001X
Title: PREPARATION: PARKING BRAKE: RECOMMENDED TOOLS (2013 FR-S)		

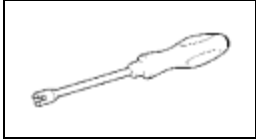
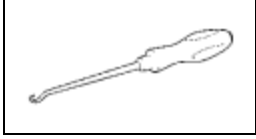
RECOMMENDED TOOLS

	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003J9C00AX
Title: PREPARATION: PARKING BRAKE: SST (2013 FR-S)		

SST

	09718-00011	Shoe Hold Down Spring Driver	-
	09921-00011	Spring Tension Tool	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KCD00AX
Title: PREPARATION: POWER ASSIST SYSTEMS: EQUIPMENT (2013 FR-S)		



EQUIPMENT

Torque wrench	-
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KCC00AX
Title: PREPARATION: POWER ASSIST SYSTEMS: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002Z9203SX
Title: PREPARATION: POWER DISTRIBUTION: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Torque wrench	-
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000314A051X
Title: PREPARATION: REAR SUSPENSION: EQUIPMENT (2013 FR-S)		


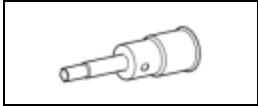

EQUIPMENT

Torque wrench	-
Wooden block	-
Jack	-
metal saw	Shock absorber disposal



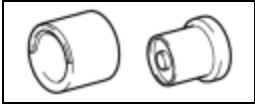

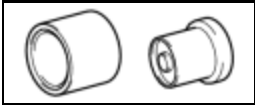
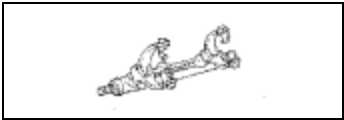
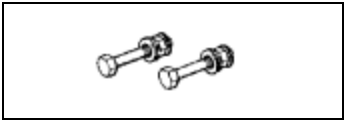
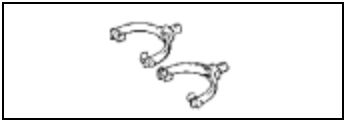
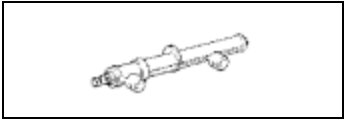
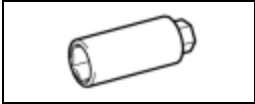

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KCW013X
Title: PREPARATION: REAR SUSPENSION: RECOMMENDED TOOLS (2013 FR-S)		



RECOMMENDED TOOLS

	09010-3C110	Set, Hexagon Socket Wrench	-
	(09013-6C100)	Socket Hexagon 5mm	-
	09017-1C120	Union Nut Wrench 14mm	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KCV00XX
Title: PREPARATION: REAR SUSPENSION: SST (2013 FR-S)		

SST

	09710-18010	Rear Suspension Bush Tool Set	-
	09710-18020	Rear Suspension Bush Tool Set	-
	09710-18030	Rear Suspension Bush Tool Set	-
	09727-30021	Coil Spring Compressor	-
	((09727-00010))	Bolt Set	-
	((09727-00021))	Arm Set	-
	((09727-00031))	Compressor	-
	09729-18010	Lock Nut Socket Wrench	-
	09960-20010	Ball Joint Puller Set	-

	(09961-02010)	Assy Ball Joint Puller	-
	(09961-02060)	Spacer B	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020G2052X
Title: PREPARATION: SEAT: EQUIPMENT (2013 FR-S)		


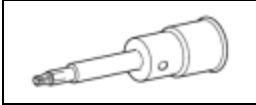


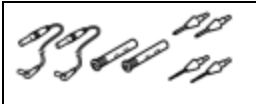
EQUIPMENT

Hog ring	-
Hog ring pliers	-
Tape	To avoid surface damage
Torque wrench	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020G1015X
Title: PREPARATION: SEAT: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09010-3C120	Set, "TORX" Socket Wrench	-
	(09013-1C130)	"TORX" Socket Wrench T-type T40	-
	09013-1C540	"TORX" Socket Wrench E-type E10	-
	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-

HINT:

"TORX" is a registered trademark of Textron Inc.

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003ZXQ01GX
Title: PREPARATION: SEAT BELT: EQUIPMENT (2013 FR-S)		



EQUIPMENT

Torque wrench	
Battery	
Plastic bag	
Hog ring pliers	
Hog ring	
Protective tape	



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003ZXP01GX
Title: PREPARATION: SEAT BELT: RECOMMENDED TOOLS (2013 FR-S)		



RECOMMENDED TOOLS

	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003ZXO00RX
Title: PREPARATION: SEAT BELT: SST (2013 FR-S)		

SST

	09082-18010	Airbag Deployment Wire	-
	09082-18020	Airbag Deployment Wire Sub-Harness No.11	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003JBG01ZX
Title: PREPARATION: STEERING COLUMN: EQUIPMENT (2013 FR-S)		

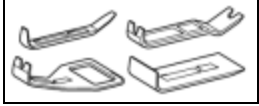
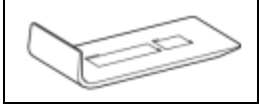
EQUIPMENT

Torque wrench	
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000005B87000X
Title: PREPARATION: STEERING COLUMN: RECOMMENDED TOOLS (2013 FR-S)		

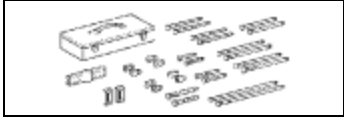
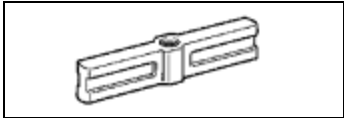
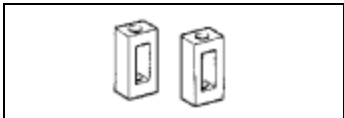
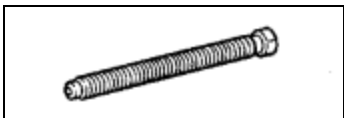
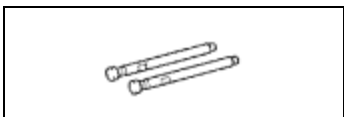
RECOMMENDED TOOLS

	09061-1C300	Set, Moulding Remover	-
	(09061-1C340)	Remover D, Moulding	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000043ZP003X
Title: PREPARATION: STEERING COLUMN: SST (2013 FR-S)		

SST

	09950-50013	Puller C Set	-
	(09951-05010)	Hanger 150	-
	(09952-05010)	Slide Arm	-
	(09953-05020)	Center Bolt 150	-
	(09954-05031)	Claw No.3	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KCB00AX
Title: PREPARATION: STEERING GEAR / LINKAGE: EQUIPMENT (2013 FR-S)		


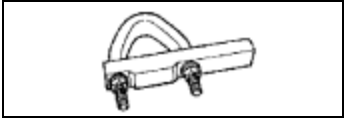
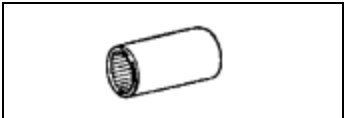
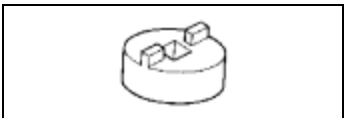




EQUIPMENT

Torque wrench	-
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KC900AX
Title: PREPARATION: STEERING GEAR / LINKAGE: SST (2013 FR-S)		

SST

	09521-24010	Drive Shaft Boot Clamping Tool	-
	09612-00012	Rack & Pinion Steering Rack Housing Stand	-
	09616-00011	Steering Worm Bearing Adjusting Socket	-
	09631-10021	Rack Stopper Wrench	-
	09922-10010	Variable Open Wrench	-
	09960-20010	Ball Joint Puller Set	-
	(09961-02010)	Assy Ball Joint Puller	-
	(09961-02060)	Spacer B	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003NB601RX
Title: PREPARATION: SUPPLEMENTAL RESTRAINT SYSTEMS: EQUIPMENT (2013 FR-S)		



EQUIPMENT

Torque wrench	-
Battery	-
Protective tape	-
Tire Width: 185 mm (7.28 in.) or more Inner diameter: 360 mm (1.18 ft.) or more	Airbag disposal
Tire with disc wheel Width: 185 mm (7.28 in.) or more Inner diameter: 360 mm (1.18 ft.) or more	Airbag disposal
Wire harness Stripped wire section: 1.25 mm ² (0.0019 in. ²) or more	Airbag disposal
Cardboard Box	Airbag disposal
Plastic bag	Airbag disposal



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003NB501RX
Title: PREPARATION: SUPPLEMENTAL RESTRAINT SYSTEMS: RECOMMENDED TOOLS (2013 FR-S)		






RECOMMENDED TOOLS

	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003NB4010X
Title: PREPARATION: SUPPLEMENTAL RESTRAINT SYSTEMS: SST (2013 FR-S)		

SST

	09082-18010	Airbag Deployment Wire	-
	09082-18020	Airbag Deployment Wire Sub-Harness No.11	-
	09082-18030	Airbag Deployment Wire Sub-Harness No.12	-
	09082-18040	Airbag Deployment Wire Sub-Harness No.13	-
	09843-18061	SRS Check Wire	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003K5Q020X
Title: PREPARATION: THEFT DETERRENT / KEYLESS ENTRY: EQUIPMENT (2013 FR-S)		


EQUIPMENT

Protective tape	-
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000043F8004X
Title: PREPARATION: THEFT DETERRENT / KEYLESS ENTRY: SST (2013 FR-S)		

SST

	09843-18040	Diagnosis Check Wire No. 2	-
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003ERZ02DX
Title: PREPARATION: TIRE / WHEEL: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Tire pressure gauge	-
Dial indicator with magnetic base	-
Wheel balancer	-
Torque wrench	-





Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003JBC01BX
Title: PREPARATION: TIRE PRESSURE MONITORING: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Tire pressure gauge	-
Torque wrench	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003JBB01BX
Title: PREPARATION: TIRE PRESSURE MONITORING: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001YXN00CX
Title: PREPARATION: TL70 MANUAL TRANSMISSION / TRANSAXLE: EQUIPMENT (2013 FR-S)		

EQUIPMENT

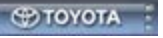
Cylinder gauge	-
Dial indicator	-
Feeler gauge	-
Magnetic base	-
Micrometer	-
Torque wrench	-
Press	-
V-block	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001YXO00CX
Title: PREPARATION: TL70 MANUAL TRANSMISSION / TRANSAXLE: LUBRICANT (2013 FR-S)		


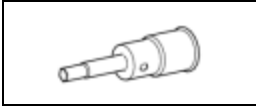

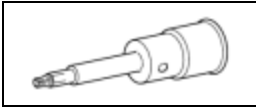
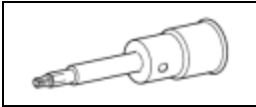
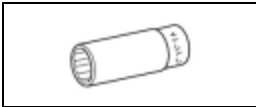
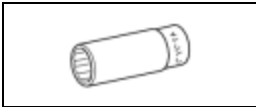

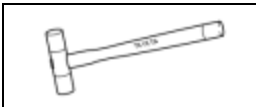
LUBRICANT





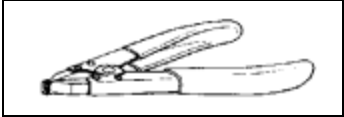
ITEM	CAPACITY	CLASSIFICATION
Manual transmission gear oil	2.2 liters (2.3 US qts, 1.9 Imp. qts)	API GL-3 SAE 75W-90



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001YXL00CX
Title: PREPARATION: TL70 MANUAL TRANSMISSION / TRANSAXLE: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09010-3C110	Set, Hexagon Socket Wrench	-
	(09013-6C130)	Socket Hexagon 10mm	-
	09010-3C120	Set, "TORX" Socket Wrench	-
	(09013-1C130)	"TORX" Socket Wrench T-type T40	-
	(09013-1C140)	"TORX" Socket Wrench T-type T45	-
	09012-2C510	Deep Socket Wrench 19mm	-
	09012-2C530	Deep Socket Wrench 27mm	-
	09017-1C140	Union Nut Wrench 19mm	-
	09051-1C110	Plastic Hammer	-
	09051-1C200	Bar, Brass	-

	09051-1C410	Pin Punch 5	-
	09053-1C100	Magnet,Hand	-
	09072-1C200	Vernier Calipers 150mm	-
	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-
	09905-00012	Snap Ring No. 1 Expander	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001YXM00CX
Title: PREPARATION: TL70 MANUAL TRANSMISSION / TRANSAXLE: SSM (2013 FR-S)		

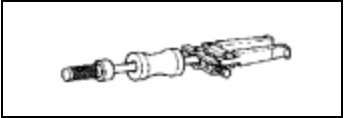
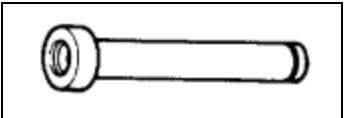
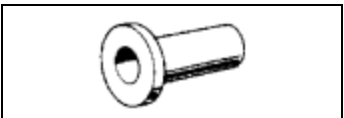


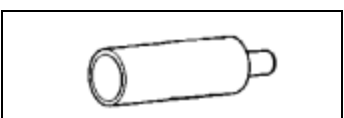


SSM

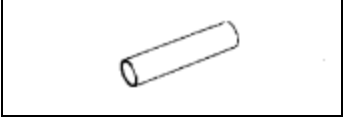


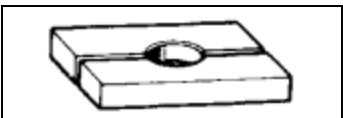
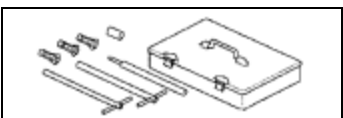
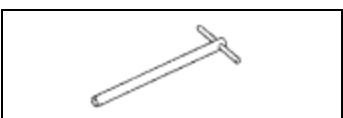

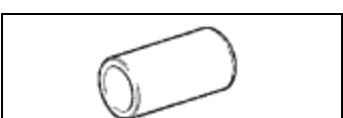
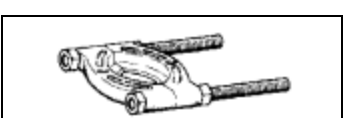
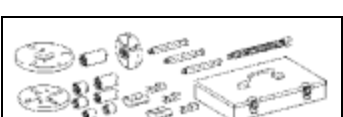
Toyota Genuine Adhesive 1324, Three Bond 1324 or equivalent	-
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent	-
Toyota Genuine Seal Packing 1281, Three Bond 1281 or equivalent	-













Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001YXK00CX
Title: PREPARATION: TL70 MANUAL TRANSMISSION / TRANSAXLE: SST (2013 FR-S)		

SST

	09308-00010	Oil Seal Puller	-
	09309-35010	Transmission Rear Bearing Replacer	-
	09309-36010	Transmission Rear Bearing Replacer	-
	09309-37010	Transmission Bearing Replacer	-
	09316-60011	Transmission & Transfer Bearing Replacer	-
	(09316-00011)	Replacer Pipe	-
	(09316-00021)	Replacer A	-
	09325-20010	Transmission Oil Plug	-
	09330-50010	Propeller Shaft Center Bearing Replacer	-

			
	09350-20015	TOYOTA Automatic Transmission Tool Set	-
	(09350-06120)	No. 2 Measure Terminal	-
	09527-20011	Rear Axle Shaft Bearing Remover	-
	09612-70100	Power Steering Oil Seal Remover Set	-
	(09612-07210)	Collet Setting Pipe No.1	-
	09631-12090	Seal Ring Tool	-
	09632-36010	Steering Vane Pump Bearing Replacer	-
	09950-00020	Bearing Remover	-
	09950-30012	Puller A Set	-
	(09951-03010)	Upper Plate	-

			
	(09953-03010)	Center Bolt	-
	(09956-03010)	Adaptor 16	-
	09950-60010	Replacer Set	-
	(09951-00230)	Replacer 23	-
	(09951-00420)	Replacer 42	-
	(09951-00560)	Replacer 56	-
	09950-60020	Replacer Set No. 2	-
	(09951-00750)	Replacer 75	-
	09950-70010	Handle Set	-
	(09951-07100)	Handle 100	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PM600CX
Title: PREPARATION: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Torque wrench	
Protective tape	
Vernier caliper	
Straightedge	
Feeler gauge	
Caliper gauge	
Dial indicator or dial indicator with magnetic base	
V block	
Micrometer	
Cylinder gauge	



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PM700CX
Title: PREPARATION: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: LUBRICANT (2013 FR-S)		


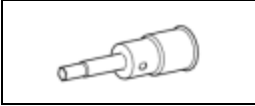
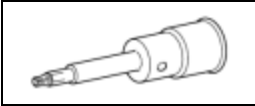



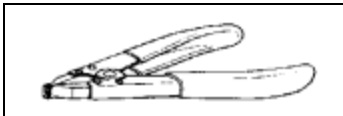
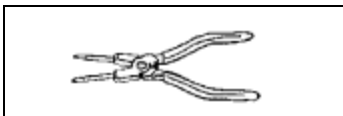
LUBRICANT

ITEM	CAPACITY (REFERENCE)		CLASSIFICATION
Automatic transmission fluid	Dry fill	7.5 liters (7.9 US qts, 6.6 Imp. qts)	Toyota Genuine ATF WS
	Drain and refill	2.0 liters (2.1 US qts, 1.8 Imp. qts)	



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PM400CX
Title: PREPARATION: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09010-3C110	Set, Hexagon Socket Wrench	-
	(09013-6C100)	Socket Hexagon 5mm	-
	09013-2C120	Wrench Torx For Tamper Resistant T55H	-
	09051-1C400	Pin Punch 3	-
	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-
	09905-00012	Snap Ring No. 1 Expander	-
	09905-00013	Snap Ring Pliers	-



Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PM500CX
Title: PREPARATION: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SSM (2013 FR-S)		

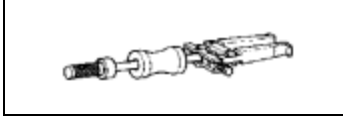




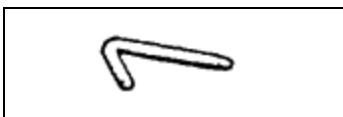

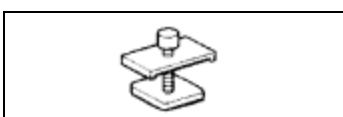
SSM

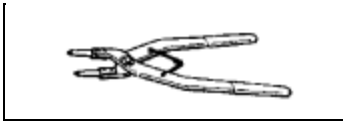
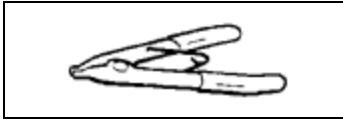


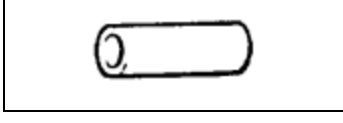

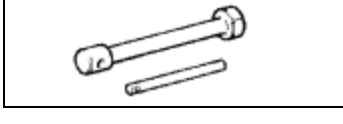


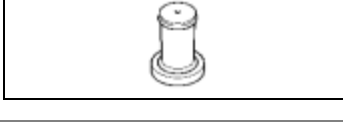
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent	-
Toyota Genuine Seal Packing 1281, Three Bond 1281 or equivalent	-


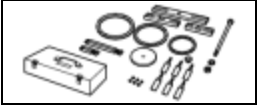
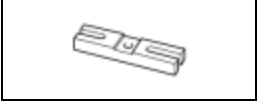
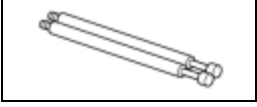





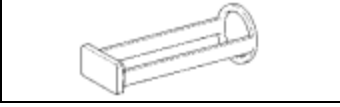



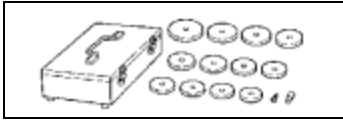
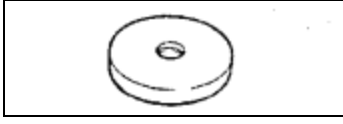

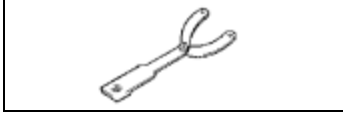
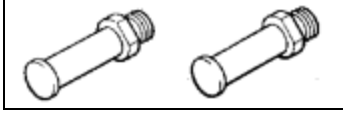
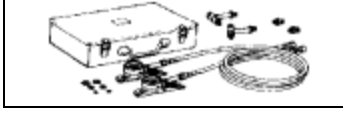
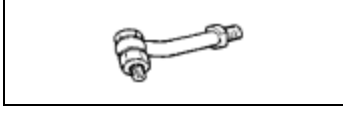

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PM300CX
Title: PREPARATION: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SST (2013 FR-S)		

SST

	09308-00010	Oil Seal Puller	-
	09309-37010	Transmission Bearing Replacer	-
	09320-89010	Transfer Clutch Spring Compressor	-
	09325-40010	Transmission Oil Plug	-
	09350-30020	TOYOTA Automatic Transmission Tool Set	-
	(09350-06120)	No. 2 Measure Terminal	-
	(09350-07020)	Oil Pump Puller	-
	(09350-07050)	No. 3 Piston Spring Compressor	-
	(09350-07060)	No. 1 Snap Ring Expander	-

			
	(09350-07070)	No. 2 Snap Ring Expander	-
	(09350-07080)	Brake Reaction Sleeve Puller	-
	(09350-07090)	Brake No.1 Piston Puller	-
	(09350-07110)	Oil Seal Replacer	-
	09350-32014	TOYOTA Automatic Transmission Tool Set	-
	(09351-32010)	One-way Clutch Test Tool	-
	(09351-32020)	Stator Stopper	-
	09351-40010	TOYOTA Automatic Transmission Tool Set	-
	(09351-04010)	Pipe	-
	(09351-04020)	Spring Compressor No. 1	-

			
	09380-60010	Automatic Transmission Brake Spring Compressor Set	-
	(09381-06030)	Hanger C	-
	(09381-06050)	Arm B	-
	(09381-06080)	Ring C	-
	(09381-06090)	Attachment	-
	(09381-06100)	Crow	-
	(09381-06110)	Nut	-
	09387-00070	First & Reverse Brake Wrench	-
	09387-00110	Clutch Compression Wrench	-
	09843-18040	Diagnosis Check Wire No. 2	-

			
	09950-60020	Replacer Set No. 2	-
	(09951-01030)	Replacer 103	-
	09960-10010	Variable Pin Wrench Set	-
	(09962-01000)	Variable Pin Wrench Arm Assembly	-
	(09963-01000)	Pin 10	-
	09992-00095	Automatic Transmission Oil Pressure Gauge Set	-
	(09992-00231)	Adaptor C	-
	(09992-00271)	Gauge Assy	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001XDT001X
Title: PREPARATION: WINDOW / GLASS: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Torque wrench	
Heat light	
Protective Tape	
Knife	
Suction cup	
Piano wire	
Wooden block or similar object	
Plastic sheet	
Scraper	
Brush or sponge	
Sealer gun	
Battery	




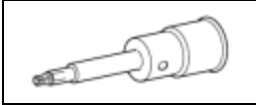


Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002ZNO079X
Title: PREPARATION: WINDOW / GLASS: LUBRICANT (2013 FR-S)		

LUBRICANT

MP grease	-
Primer (Sunstar #435-40)	-
Adhesive (Sunstar #560)	-
Primer (Sunstar #435-70)	-
Primer (Sunstar GP402)	-
Primer Enclosed with penguin seal #580 super	-
Primer (Yokohama M-300 or equivalent)	-
Adhesive (Toyota Genuine Windshield Glass Adhesive or equivalent)	-
Primer (3M N-200)	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001XDR00KX
Title: PREPARATION: WINDOW / GLASS: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09010-3C120	Set, "TORX" Socket Wrench	-
	(09013-1C110)	"TORX" Socket Wrench T-type T25	-
	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020LI02HX
Title: PREPARATION: WIPER / WASHER: EQUIPMENT (2013 FR-S)		

EQUIPMENT

Torque wrench	-
Wire brush	-
Protective tape	-
Battery	-
Windshield washer fluid	-
Thin-bladed screwdriver	-

Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002ZNO07LX
Title: PREPARATION: WIPER / WASHER: LUBRICANT (2013 FR-S)		

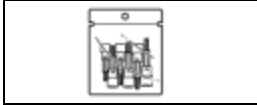
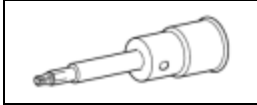



LUBRICANT

Multemp SA grease	-
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Last Modified: 3-27-2012	6.4 B	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020LH02HX
Title: PREPARATION: WIPER / WASHER: RECOMMENDED TOOLS (2013 FR-S)		

RECOMMENDED TOOLS

	09010-3C120	Set, "TORX" Socket Wrench	-
	(09013-1C120)	"TORX" Socket Wrench T-type T30	-
	09061-1C100	Clip Remover 6mm	-
	09080-1C110	Toyota Electrical Tester Set	-
	09080-2C100	Test Lead Set	-

Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000312N05WX
Title: SPECIFICATIONS: ALIGNMENT / HANDLING DIAGNOSIS: SERVICE DATA (2013 FR-S)		

SERVICE DATA

Vehicle Height (Unloaded Vehicle)

FRONT B - A	REAR C	REAR D	REAR E
146 mm (5.75 in.)	225 mm (8.86 in.)	375 mm (14.76 in.)	372 mm (14.65 in.)

Measurement points:

- A: Ground clearance of front lower suspension arm set front bolt center
- B: Ground clearance of front wheel center
- C: Ground clearance of lower control arm set bolt center
- D: Front wheel arch height of front wheel center
- E: Rear wheel arch height of rear wheel center

Camber (Unloaded Vehicle)

-	CAMBER INCLINATION	RIGHT-LEFT DIFFERENCE
Front	0 +/- 45' (0 +/- 0.75°)	30' (0.50°) or less
Rear	-1°12' +/- 45' (-1.20° +/- 0.75°)	45' (0.75°) or less

Caster (Unloaded Vehicle)

-	CASTER INCLINATION (REFERENCE)	RIGHT-LEFT DIFFERENCE
Front	5°54' (5.90°)	30' (0.50°) or less

Wheel Turning Angle (Unloaded Vehicle)

-	INSIDE WHEEL (REFERENCE)	OUTSIDE WHEEL (REFERENCE)
Front	36°54' (43.90°)	31°12' (31.20°)

Toe-in (Unloaded Vehicle)

-	SPECIFIED CONDITION
Front	C + D: 0°00' +/- 0°11' (0.00° +/- 0.19°)
	B - A: 0 +/- 3.0 mm (0 +/- 0.1181 in.)
Rear	C + D: 0°10' +/- 0°15' (0.16° +/- 0.24°)
	B - A: 2.0 +/- 3.0 mm (0.0787 +/- 0.1181 in.)

Wheel Turning Angle (Unloaded Vehicle)

-	INSIDE WHEEL	OUTSIDE WHEEL REFERENCE
Front	41°48' +/- 2° (41.8° +/- 2°)	36°20' (36.33°)

Distance between the centers of the 2 installation bolts of the rear No. 2 suspension arm assembly LH and RH

-	STANDARD DISTANCE
Rear	443.8 to 447.8 mm (17.47 to 17.63 in.)

Distance between the centers of the 2 installation bolts of the rear No. 2 suspension arm assembly

-	STANDARD DISTANCE
Rear	448.9 to 450.9 mm (17.67 to 17.75 in.)

Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003NRN020X
Title: SPECIFICATIONS: ALIGNMENT / HANDLING DIAGNOSIS: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

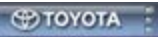
PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Front shock absorber assembly x steering knuckle	155	1581	114
Hub nut	120	1224	89
Tie rod end lock nut	85	867	63
Toe adjust cam nut	100	1020	74



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001ZZA022X
Title: SPECIFICATIONS: AUDIO / VIDEO: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Stereo component amplifier assembly x Body	7.5	77	66 in.*lbf
Front No. 3 speaker assembly x Upper instrument panel assembly	7.5	77	66 in.*lbf
Amplifier antenna assembly x Body	4.5	46	40 in.*lbf



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002G6J012X
Title: SPECIFICATIONS: AXLE AND DIFFERENTIAL: SERVICE DATA (2013 FR-S)		

SERVICE DATA

Axle

Front axle hub bearing looseness	Maximum: 0.05 mm (0.00196 in.)
Front axle hub runout	Maximum: 0.05 mm (0.00196 in.)
Rear axle hub bearing looseness	Maximum: 0.05 mm (0.00196 in.)
Rear axle hub runout	Maximum: 0.05 mm (0.00196 in.)

Differential

Rear differential carrier oil seal drive in depth	1.55 to 2.45 mm (0.0610 to 0.0964 in.)
Rear differential side gear shaft oil seal drive in depth	-0.5 to 0.5 mm (-0.0197 to 0.0197 in.)
Differential ring gear runout	Maximum: 0.07 mm (0.00275 in.)
Rear differential case sub-assembly runout	Maximum: 0.07 mm (0.00275 in.)
Differential ring gear backlash	0.13 to 0.18 mm (0.00512 to 0.00708 in.)
Differential side gear backlash	0 mm (0 in.)
Rear drive pinion companion flange runout	Maximum: 0.09 mm (0.00354 in.)
Differential drive pinion preload (at starting)	New bearing: 1.49 to 2.59 N*m (15.2 to 26.4 kgf*cm, 13.2 to 22.9 in.*lbf) Reused bearing: 1.11 to 1.91 N*m (11.3 to 19.5 kgf*cm, 9.8 to 16.9 in.*lbf)
Total preload (Drive pinion preload plus)	New differential case bearing x New rear drive pinion tapered roller bearing: 2.57 to 4.26 N*m (26.2 to 43.4 kgf*cm, 22.7 to 37.7 in.*lbf) New differential case bearing x Reused rear drive pinion tapered roller bearing: 2.19 to 3.58 N*m (22.3 to 36.5 kgf*cm, 19.4 to 31.7 in.*lbf) Reused differential case bearing x New rear drive pinion tapered roller bearing: 1.98 to 3.37 N*m (20.2 to 34.4 kgf*cm, 17.5 to 29.8 in.*lbf) Reused differential case bearing x Reused rear drive pinion tapered roller bearing: 1.60 to 2.69 N*m (16.3 to 27.4 kgf*cm, 14.2 to 23.8 in.*lbf)
	2.57 to 2.59 (0.1012 to 0.1020) 2.59 to 2.61 (0.1020 to 0.1028) 2.61 to 2.63 (0.1028 to 0.1035)

Rear differential side gear shaft plate washer
thickness mm (in.)

2.63 to 2.65 (0.1035 to 0.1043)
2.65 to 2.67 (0.1043 to 0.1051)
2.67 to 2.69 (0.1051 to 0.1059)
2.69 to 2.71 (0.1059 to 0.1067)
2.71 to 2.73 (0.1067 to 0.1075)
2.73 to 2.75 (0.1075 to 0.1083)
2.75 to 2.77 (0.1083 to 0.1091)
2.77 to 2.79 (0.1091 to 0.1098)
2.79 to 2.81 (0.1098 to 0.1106)
2.81 to 2.83 (0.1106 to 0.1114)
2.83 to 2.85 (0.1114 to 0.1122)
2.85 to 2.87 (0.1122 to 0.1130)
2.87 to 2.89 (0.1130 to 0.1138)
2.89 to 2.91 (0.1138 to 0.1146)
2.91 to 2.93 (0.1146 to 0.1154)
2.93 to 2.95 (0.1154 to 0.1161)
2.95 to 2.97 (0.1161 to 0.1169)
2.97 to 2.99 (0.1169 to 0.1177)
2.99 to 3.01 (0.1177 to 0.1185)
3.01 to 3.03 (0.1185 to 0.1193)
3.03 to 3.05 (0.1193 to 0.1201)
3.05 to 3.07 (0.1201 to 0.1209)
3.07 to 3.09 (0.1209 to 0.1217)
3.09 to 3.11 (0.1217 to 0.1224)
3.11 to 3.13 (0.1224 to 0.1232)
3.13 to 3.15 (0.1232 to 0.1240)
3.15 to 3.17 (0.1240 to 0.1248)
3.17 to 3.19 (0.1248 to 0.1256)
3.19 to 3.21 (0.1256 to 0.1264)
3.21 to 3.23 (0.1264 to 0.1271)
3.23 to 3.25 (0.1271 to 0.1280)
3.25 to 3.27 (0.1280 to 0.1287)
3.27 to 3.29 (0.1287 to 0.1295)
3.29 to 3.31 (0.1295 to 0.1303)
3.31 to 3.33 (0.1303 to 0.1311)
3.33 to 3.35 (0.1311 to 0.1319)
3.35 to 3.37 (0.1319 to 0.1327)
3.37 to 3.39 (0.1327 to 0.1335)
3.39 to 3.41 (0.1335 to 0.1343)
3.41 to 3.43 (0.1343 to 0.1350)
3.43 to 3.45 (0.1350 to 0.1358)
3.45 to 3.47 (0.1358 to 0.1366)
3.47 to 3.49 (0.1366 to 0.1374)

1.69 to 1.71 (0.0665 to 0.0673)
1.72 to 1.74 (0.0677 to 0.0685)
1.75 to 1.77 (0.0688 to 0.0697)
1.78 to 1.80 (0.0701 to 0.0709)
1.81 to 1.83 (0.0713 to 0.0720)
1.84 to 1.86 (0.0724 to 0.0732)
1.87 to 1.89 (0.0736 to 0.0744)
1.90 to 1.92 (0.0748 to 0.0756)

Rear differential drive pinion plate washer
thickness mm (in.)

1.93 to 1.95 (0.0760 to 0.0768)
1.96 to 1.98 (0.0772 to 0.0780)
1.99 to 2.01 (0.0783 to 0.0791)
2.02 to 2.04 (0.0795 to 0.0803)
2.05 to 2.07 (0.0807 to 0.0815)
2.08 to 2.10 (0.0819 to 0.0827)
2.11 to 2.13 (0.0831 to 0.0839)
2.14 to 2.16 (0.0843 to 0.0850)
2.17 to 2.19 (0.0854 to 0.0862)
2.20 to 2.22 (0.0866 to 0.0874)
2.23 to 2.25 (0.0878 to 0.0886)
2.26 to 2.28 (0.0890 to 0.0898)
2.29 to 2.31 (0.0902 to 0.0909)
2.32 to 2.34 (0.0913 to 0.0921)

Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002G6K012X
Title: SPECIFICATIONS: AXLE AND DIFFERENTIAL: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

Axle

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Front disc brake caliper assembly x Steering knuckle	80	816	59
Hub nut	120	1224	89
Steering knuckle x Front axle hub sub-assembly	65	663	48
Front speed sensor x Steering knuckle	7.5	77	66 in.*lbf
Steering knuckle x Front shock absorber with coil spring	155	1581	114
Front disc brake dust cover x Steering knuckle	18	184	13
Steering knuckle x Front lower suspension arm assembly	51	520	38
Steering knuckle x Tie rod sub-assembly	27	275	20
Rear axle hub and bearing assembly x Rear axle carrier sub-assembly	65	663	48
Rear speed sensor x Rear axle carrier sub-assembly	7.5	77	66 in.*lbf
Rear axle shaft nut x Rear drive shaft assembly	190	1938	140
Toe control link sub-assembly x Rear axle carrier sub-assembly	60	612	44
Rear upper control arm assembly x Rear axle carrier sub-assembly	80	816	59
Rear No. 1 suspension arm assembly x Rear axle carrier sub-assembly	110	1122	81
Rear No. 2 suspension arm assembly x Rear axle carrier sub-assembly	80	816	59
Rear stabilizer Link assembly x Rear No. 2 suspension arm assembly	38	388	28

Differential

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Rear differential filler plug x Rear differential carrier assembly	49	500	36
Rear differential drain plug x Rear differential carrier assembly	49	500	36
Bearing cap x Rear differential carrier	85	870	63
Differential ring gear x Rear differential case sub-assembly	97	984	71
Rear drive pinion nut x Differential drive pinion	338 or less	3445 or less	249 or less
Rear differential breather plug oil deflector x Rear differential carrier cover	8.0	82	71 in.*lbf
Rear differential carrier cover x Rear differential carrier	47	475	35
Rear differential breather plug x Rear differential carrier cover	21	210	15
Rear differential carrier assembly x Rear suspension member sub-assembly (Rear)	103	1050	76

Rear differential carrier assembly x Rear suspension member sub-assembly (Front)	95	970	70
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Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003EFG01VX
Title: SPECIFICATIONS: BRAKE (FRONT): SERVICE DATA (2013 FR-S)		

SERVICE DATA

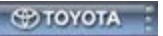
Pad lining thickness	Standard	1.5 mm (0.0591 in.)
	Minimum	11.0 mm (0.433 in.)
Disc thickness	Standard	24.0 mm (0.945 in.)
	Minimum	22.0 mm (0.866 in.)
Disc runout	Maximum	0.05 mm (0.0020 in.)



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003EFH01VX
Title: SPECIFICATIONS: BRAKE (FRONT): TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Hub nut	120	1224	89
Carrier x Steering knuckle	80	816	59
Disc brake cylinder assembly x Carrier	26	270	19
No. 1 front flexible hose x Disc brake cylinder assembly	18	184	13
No. 1 front flexible hose x brake tube	18	184	13
No. 1 front flexible hose x front shock absorber assembly	33	337	24



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003ED3024X
Title: SPECIFICATIONS: BRAKE (REAR): SERVICE DATA (2013 FR-S)		

SERVICE DATA

for for Solid Disc Brake

Pad lining thickness	Standard	9.0 mm (0.354 in.)
	Minimum	1.5 mm (0.059 in.)
Disc thickness	Standard	10.0 mm (0.3937 in.)
	Minimum	8.5 mm (0.3346 in.)
Disc runout	Maximum	0.05 mm (0.0020 in.)

for Ventilated Disc Brake

Pad lining thickness	Standard	11.0 mm (0.433 in.)
	Minimum	1.5 mm (0.059 in.)
Disc thickness	Standard	18.0 mm (0.7087 in.)
	Minimum	16.5 mm (0.6496 in.)
Disc runout	Maximum	0.05 mm (0.0020 in.)



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003ED4028X
Title: SPECIFICATIONS: BRAKE (REAR): TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Rear disc brake bleeder plug x Rear disc brake cylinder assembly LH	8.0	82	71 in.*lbf
Hub nut	120	1224	89
Caliper support bracket x Rear axle carrier	66	673	49
Rear disc brake cylinder assembly x Caliper support bracket	26	265	19
Rear brake flexible hose x Rear disc brake cylinder assembly	18	184	13
Brake line union nut	15	155	11
Rear brake flexible hose x Rear axle carrier	33	337	24



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000043EU003X
Title: SPECIFICATIONS: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: SERVICE DATA (2013 FR-S)		

SERVICE DATA

VSC OFF switch	5 - 8	Switch not pushed in	10 k Ω or higher
		Switch pushed in	Below 1 Ω
VSC SPORT switch	1 - 8	Switch not pushed in	10 k Ω or higher
		Switch pushed in	Below 1 Ω



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000043EV003X
Title: SPECIFICATIONS: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Front fender liner x Body	7.5	76	66 in.*lbf
Brake actuator bracket assembly x Body	33	337	24
Brake actuator assembly x Brake actuator bracket assembly	7.5	77	66 in.*lbf
Brake actuator assembly x Brake line	15	155	11
Front speed sensor set bolt	7.5	77	66 in.*lbf
Rear speed sensor set bolt	7.5	77	66 in.*lbf
Hub nut	120	1224	89
Battery negative terminal set bolt	6.0	61	53 in.*lbf



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002Z3V011X
Title: SPECIFICATIONS: BRAKE SYSTEM (OTHER): SERVICE DATA (2013 FR-S)		

SERVICE DATA

Brake pedal height from floor mat	for Manual Transmission	145mm (5.709in.)
	for Automatic Transmission	150mm (5.906in.)
Brake pedal free play		2mm (0.079in.) or less
Brake pedal reserve distance from asphalt sheet at 490 N (50 kgf, 110 lbf)	for Manual Transmission	More than 55 mm (2.165 in.)
	for Automatic Transmission	More than 55 mm (2.165 in.)
Vacuum of the vacuum pump assembly	With the engine idling	More than 93 kPa (698 mmHg, 27 in.Hg) of vacuum

Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002Z3W01NX
Title: SPECIFICATIONS: BRAKE SYSTEM (OTHER): TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Disc brake cylinder bleeder plug	8.0	82	71 in.*lbf
Brake master cylinder sub-assembly x Brake tube	19	194	14
Brake pedal support x Brake booster assembly	18	184	13
Brake pedal support x Body	18	184	13
Brake pedal support x Brake pedal	30	306	22
Brake master cylinder sub-assembly x Brake booster assembly	14	143	10
Hub nut	120	1224	86
Brake master cylinder push rod clevis lock nut	19	194	14
Vacuum pump assembly set bolt	16	163	12

Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001YXR00CX
Title: SPECIFICATIONS: CLUTCH: SERVICE DATA (2013 FR-S)		

SERVICE DATA

Clutch Pedal

Pedal play	4.0 (0.158 in.)
Pedal stroke (Reference)	105 to 115 mm (4.134 to 4.528 in.)

Clutch Unit

Clutch disc rivet depth	Minimum	0.3 mm (0.0118 in.)
Clutch disc runout	Maximum	0.8 mm (0.0315 in.)
Clutch cover diaphragm spring wear	Maximum depth	0.5 mm (0.0197 in.)
	Maximum width	6.0 mm (0.236 in.)
Flywheel runout	Maximum	0.1 mm (0.00394 in.)
Clutch cover diaphragm spring tip non-alignment	Maximum	0.5 mm (0.0197 in.)

Clutch Pedal Switch

Clutch start switch assembly		
Standard resistance 1 - 2	ON (Pushed in)	Below 1 Ω
	OFF (Released)	10 k Ω or higher
Clutch switch assembly		
Standard resistance 1 - 2	ON (Pushed in)	Below 1 Ω
	OFF (Released)	10 k Ω or higher

Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001YXS00CX
Title: SPECIFICATIONS: CLUTCH: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Clutch release cylinder bleeder plug x Clutch release cylinder assembly	7.8	80	69 in.*lbf
Clutch switch assembly x Clutch pedal support sub-assembly	8.0	82	71 in.*lbf
Clutch pedal support sub-assembly x Body	18	184	13
Steering intermediate shaft assembly x Steering column assembly	35	357	26
Clutch master cylinder to flexible hose tube x Master cylinder to release cylinder hose	15	153	11
Clutch master cylinder to flexible hose tube x Clutch master cylinder assembly	15	153	11
Clutch master cylinder assembly x Body	18	184	13
Clutch release cylinder assembly x Clutch housing	37	377	27
Master cylinder to release cylinder hose x Clutch release cylinder assembly	18	184	13
Clutch cover assembly x Flywheel sub-assembly	16	163	12
Release fork support x Manual transmission assembly.	16	163	12
Clutch start switch assembly x Clutch pedal support sub-assembly	8.0	82	71 in.*lbf
Clutch switch assembly x Clutch pedal support sub-assembly	8.0	82	71 in.*lbf



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004909015X
Title: SPECIFICATIONS: CRUISE CONTROL: SERVICE DATA (2013 FR-S)		

SERVICE DATA

CRUISE CONTROL MAIN SWITCH

Resistance	1 - 3	Cruise control Main switch Assembly (ON-OFF button) released	1 M Ω or higher
		Cruise control Main switch Assembly (ON-OFF button) pushed	Below 2.5 Ω
		+ /RES switch ON	235 to 245 Ω
		- /SET switch ON	617 to 643 Ω
		CANCEL switch ON	1509 to 1571 Ω



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000203C00IX
Title: SPECIFICATIONS: DOOR / HATCH: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
HOOD			
Hood hinge x Hood panel	25	255	18
HOOD LOCK CONTROL CABLE ASSEMBLY			
Hood lock x Body	33	337	24
Hood lock control lever sub-assembly x Body	7.5	77	66 in.*lbf
FRONT DOOR			
Door hinge x Body	30	306	22
Door hinge x Door panel	25	255	18
Door striker x Body	18	184	13
Door check x Body	33	337	24
Door check x Door panel	7.5	77	66 in.*lbf
Front door sash x Door panel (Under)	14	143	10
Front door sash x Door panel (Upper)	7.5	77	66 in.*lbf
Front door rear lower frame sub-assembly x Door panel	14	143	10
Front door glass sub-assembly x Front door window regulator sub-assembly	7.5	77	66 in.*lbf
Front door window regulator sub-assembly (nut) x Door panel	7.5	77	66 in.*lbf
Front door window regulator sub-assembly (bolt) x Door panel	7.5	77	66 in.*lbf
Front door outside handle frame sub-assembly x Front door lock cylinder assembly	7.5	77	66 in.*lbf
Front door outside handle frame sub-assembly x Door panel	7.5	77	66 in.*lbf
Front door sush stopper x Door panel	7.5	77	66 in.*lbf
Door glass inner stabilizer x Door panel	7.5	77	66 in.*lbf
LUGGAGE DOOR			
Luggage door hinge x Luggage compartment door panel	18	184	13
Luggage compartment door lock assembly x Luggage compartment door panel	5.5	56	49

			in.*lbf
FUEL LID LOCK CONTROL CABLE ASSEMBLY			
Fuel lid lock open lever sub-assembly x Body	7.5	77	66 in.*lbf
Handle cover x Fuel lid lock open lever sub-assembly	4.5	46	40 in.*lbf



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001Z4F00IX
Title: SPECIFICATIONS: DOOR LOCK: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

FRONT DOOR LOCK

PART TIGHTENED	N*M	KGF*CM	FT*LBF
Front Door lock assembly x Door panel	5.5	56	49 in.*lbf

LUGGAGE COMPARTMENT DOOR LOCK

PART TIGHTENED	N*M	KGF*CM	FT*LBF
Luggage compartment door lock assembly x Luggage compartment door panel	7.5	77	66 in.*lbf
Luggage compartment door lock cylinder assembly x Luggage compartment door panel	4.5	46	40 in.*lbf

DOOR CONTROL RECEIVER

PART TIGHTENED	N*M	KGF*CM	FT*LBF
Door control receiver x Body	13	133	10



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003JAN00GX
Title: SPECIFICATIONS: DRIVE SHAFT / PROPELLER SHAFT: SERVICE DATA (2013 FR-S)		

SERVICE DATA

Propeller Shaft

Propeller shaft with center bearing shaft assembly runout	Maximum runout: 0.6 mm (0.0236 in.)
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Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003JAO00GX
Title: SPECIFICATIONS: DRIVE SHAFT / PROPELLER SHAFT: TORQUE SPECIFICATIONS (2013 FR-S)		

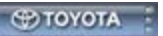
TORQUE SPECIFICATIONS

Rear Drive Shaft

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Rear axle shaft set nuts	290	2957	214
Rear wheel set nuts	103	1050	76

Propeller Shaft

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Center support bearing assembly x Body	52	530	38
Propeller shaft assembly x Rear Differential companion flange	74	755	55



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000208R00JX
Title: SPECIFICATIONS: EXTERIOR PANELS / TRIM: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

	PART TIGHTENED	N*M	KGF*CM	FT.*LBF
FRONT BUMPER				
Front bumper cover x Fender liner		7.5	76	66 in.*lbf
Front bumper cover x Body		7.5	76	66 in.*lbf
Front bumper cover x Front lower bumper cover		7.5	76	66 in.*lbf
Front bumper reinforcement sub-assembly x Body		32	326	24
Front bumper stay bracket x Body		7.5	76	66 in.*lbf
Front lower bumper cover x Front bumper stay bracket		7.5	76	66 in.*lbf
Front bumper cover x Front bumper hole cover RH		2.0	20	18 in.*lbf
Front bumper cover x Front bumper hole cover LH		2.0	20	18 in.*lbf
REAR BUMPER				
Rear bumper reinforcement x Body (nut)		45	459	33
Rear bumper reinforcement x Body (bolt)		45	459	33
Rear bumper cover x Body		2.0	20	18 in.*lbf
Rear bumper side retainer LH x Body		2.0	20	18 in.*lbf
Rear bumper side retainer RH x Body		2.0	20	18 in.*lbf
Rear bumper side bracket RH x Body		2.0	20	18 in.*lbf
Rear bumper side bracket LH x Body		2.0	20	18 in.*lbf
REAR SPOILER (for Sport Package)				
Rear spoiler x Luggage compartment door		10	102	7
Rear spoiler x No.1 rear spoiler bracket RH		10	102	7
Rear spoiler x No.1 rear spoiler bracket LH		10	102	7
No.1 rear spoiler bracket RH x Luggage compartment door		10	102	7
No.1 rear spoiler bracket LH x Luggage compartment door		10	102	7
REAR SPOILER				
Rear spoiler x Luggage compartment door		4.5	46	40 in.*lbf
LUGGAGE COMPARTMENT DOOR GARNISH				
Luggage compartment door outside garnish x Luggage compartment door		4.5	46	40 in.*lbf



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000205S00GX
Title: SPECIFICATIONS: FA20 BATTERY / CHARGING: SERVICE DATA (2013 FR-S)		

SERVICE DATA

Charging circuit without load	Standard amperage: 10 A or less Standard voltage: 11.3 to 15.6 V
Charging circuit with load	Standard amperage: 30 A or higher
Brush length	Standard length: 22.5 mm (0.885 in.) Minimum exposed length: 5.0 mm (0.196 in.)
Generator rotor assembly	Slip ring resistance: 2.0 to 2.4 k Ω at 20°C (68°F) Standard slip ring diameter: 22.7 mm (0.893 in.) Minimum slip ring diameter: 22.1 mm (0.870 in.)



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000205T00GX
Title: SPECIFICATIONS: FA20 BATTERY / CHARGING: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT. *LBF
Terminal x Generator rear end cover	8.9	91	79 in.*lbf
Generator regulator x Generator rear end cover	Bolt A 2.0	20	18 in.*lbf
	Bolt B 3.9	40	35 in.*lbf
Stator coil x Generator rear end cover	2.0	20	18 in.*lbf
Bearing retainer x Generator drive end frame	3.9	40	35 in.*lbf
Generator pulley x Generator rotor assembly	108	1101	80
Generator rear end cover x Generator drive end frame	4.4	45	39 in.*lbf
Generator assembly x V-ribbed belt tensioner assembly	25	255	18
Generator wire x Terminal	16	163	12

Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001ZB800KX
Title: SPECIFICATIONS: FA20 COOLING: SERVICE DATA (2013 FR-S)		

SERVICE DATA

Radiator Cap	Pumping speed: 1 pump per second Standard valve (for brand-new cap): 93 to 123 kPa (0.95 to 1.25 kgf*cm ² , 14 to 18 psi) Minimum standard valve (after suing cap): 83 kPa (0.85 kgf*cm ² , 12 psi)
Thermostat (for Engine Coolant)	Valve opening temperature: 86 to 90°C (187 to 194°F)
	Valve lift: 8.0 mm (0.315 in.) or more at 95°C (203°F)
Thermostat (for Automatic Transmission)	Valve opening temperature: 48 to 52°C (118 to 126°F)
	Valve lift: 6.0 mm (0.236 in.) or more at 63°C (145°F)
Cooling fan motor	Standard current: 7.4 to 11.4 A at 20°C (68°F) (when the battery is connected to the fan motor connector)
No. 2 cooling fan motor	Standard current: 7.4 to 11.4 A at 20°C (68°F) (when the battery is connected to the fan motor connector)
Fan No. 1 relay	Standard resistance (3 - 5): 10 kΩ or higher (Battery voltage is not applied between terminals 1 and 2) Standard resistance (3 - 5): Below 1 Ω (Battery voltage is applied between terminals 1 and 2)
Fan No. 2 relay	Standard resistance (3 - 4): Below 1 Ω (Battery voltage is not applied between terminals 1 and 2) Standard resistance (3 - 5): 10 kΩ or higher (Battery voltage is not applied between terminals 1 and 2) Standard resistance (3 - 4): 10 kΩ or higher (Battery voltage is applied between terminals 1 and 2) Standard resistance (3 - 5): Below 1 Ω (Battery voltage is applied between terminals 1 and 2)
Fan No. 3 relay	Standard resistance (3 - 5): 10 kΩ or higher (Battery voltage is not applied between terminals 1 and 2) Standard resistance (3 - 5): Below 1 Ω ((Battery voltage is not applied between terminals 1 and 2)

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Model Year: 2013	Model: FR-S	Doc ID: RM000001ZB900KX
Title: SPECIFICATIONS: FA20 COOLING: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Water pump assembly x Chain cover	6.4	65	57 in.*lbf
Water pump pulley x Water pump assembly	14	143	10
Water outlet x Cylinder block assembly (for Engine Coolant)	6.4	65	57 in.*lbf
Water outlet x Water pipe (for Automatic Transmission)	6.4	65	57 in.*lbf
Radiator assembly x Cooler condenser assembly	6.0	61	53 in.*lbf
Radiator support x Body	7.5	77	66 in.*lbf
Radiator support sub-assembly x Body	18	184	13
Cooling fan motor x Fan shroud	3.9	40	35 in.*lbf
No. 2 cooling fan motor x Fan shroud	3.9	40	35 in.*lbf
Fan x Cooling fan motor	6.3	64	56 in.*lbf
No. 2 fan x No. 2 cooling fan motor	6.3	64	56 in.*lbf
Water filler sub-assembly x Body	7.5	77	66 in.*lbf
Air cleaner duct x Body	6.0	61	53 in.*lbf
Air cleaner duct x Air cleaner case	3.0	31	27 in.*lbf
Radiator reserve tank assembly x Body	7.5	77	66 in.*lbf



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Model Year: 2013	Model: FR-S	Doc ID: RM000004B6K003X
Title: SPECIFICATIONS: FA20 EMISSION CONTROL: SERVICE DATA (2013 FR-S)		

SERVICE DATA

FUEL CUT-OFF RPM

ITEM	SPECIFIED CONDITION
Fuel cut off rpm	2500 rpm or more
Fuel injection restart rpm	1400 rpm

CANISTER

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Standard resistance	1 - 5	25 to 30 Ω at 20°C (68°F)
		27 to 35 Ω at 60°C (140°F)
Standard voltage	7 - 8	3.5 V at 25°C (77°F)

PURGE VALVE

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	21 to 27 Ω



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Model Year: 2013	Model: FR-S	Doc ID: RM000003KD802UX
Title: SPECIFICATIONS: FA20 EMISSION CONTROL: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

CANISTER

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Canister base bracket x Charcoal canister assembly	18	184	13
Charcoal canister assembly x Body (Bolt)	7.5	77	66 in.*lbf
Charcoal canister assembly x Body (Nut)	18	184	13
Bracket A x Canister pump module	18	184	13
Bracket B x Canister pump module	18	184	13
Canister pump module x Body	7.5	77	66 in.*lbf

PURGE VALVE

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Purge valve x Intake manifold	6.4	65	57 in.*lbf

PCV VALVE

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
PCV valve sub-assembly x Cylinder head cover sub-assembly	23	235	17



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020HH00NX
Title: SPECIFICATIONS: FA20 ENGINE CONTROL: SERVICE DATA (2013 FR-S)		

SERVICE DATA

Spark plug		
Resistance Spark plug (terminal part) - Body ground	Always	6.85 to 7.65 Ω
Camshaft timing oil control valve assembly		
Resistance	20°C (68°F)	6.85 to 7.65 Ω
Throttle with motor body assembly		
Resistance 2 (M+) - 1 (M-)	20°C (68°F)	0.3 to 100 Ω
Accelerator pedal assembly		
Voltage Accel sensor out No. 1	Released	0.5 to 0.8 V
	Depressed	2.4 to 3.5 V
Voltage Accsel sensor out No. 2	Released	0.5 to 0.8 V
	Depressed	2.4 to 3.5 V
Mass air flow meter		
Resistance 1 (THA) - 2 (E2)	-20°C (-4°F)	13.6 to 18.4 k Ω
	20°C (68°F)	2.21 to 2.69 k Ω
	60°C (140°F)	0.49 to 0.67 k Ω
Crankshaft position sensor		
1 - 2	Always	1836 to 2244 Ω
Engine coolant temperature sensor		
Resistance	Approx. 20°C (68°F)	2.35 to 2.65 k Ω
	Approx. 80°C (176°F)	0.305 to 0.331 k Ω
Engine oil temperature sensor		
Resistance	Approx. 20°C (68°F)	2.25 to 2.65 k Ω
	Approx. 80°C (176°F)	0.305 to 0.331 k Ω
Knock sensor		
Resistance	20°C (68°F)	532 to 588 k Ω
Air fuel ratio sensor		
Resistance 1 - 2	20°C (68°F)	1.98 to 2.64 Ω
Resistance		

1 - 4	Always	10 k Ω or higher
Heated oxygen sensor		
Resistance 1 - 2	20°C (68°F)	5.0 to 6.4 Ω
Resistance 1 - 4	Always	10 k Ω or higher
EFI MAIN 1 RELAY		
Resistance 3 - 5	Battery voltage not applied to 1 and 2 terminals	10 k Ω or higher
	Battery voltage applied to 1 and 2 terminals	Below 1 Ω
EFI MAIN 2 RELAY		
Resistance 3 - 5	Battery voltage not applied to 1 and 2 terminals	10 k Ω or higher
	Battery voltage applied to 1 and 2 terminals	Below 1 Ω
EFI MAIN 3 RELAY		
Resistance 3 - 5	Battery voltage not applied to 1 and 2 terminals	10 k Ω or higher
	Battery voltage applied to 1 and 2 terminals	Below 1 Ω
IG2 RELAY		
Resistance 3 - 5	Battery voltage not applied to 1 and 2 terminals	10 k Ω or higher
	Battery voltage applied to 1 and 2 terminals	Below 1 Ω
INJ RELAY		
Resistance 3 - 5	Battery voltage not applied to 1 and 2 terminals	10 k Ω or higher
	Battery voltage applied to 1 and 2 terminals	Below 1 Ω
ETCS RELAY		
Resistance 3 - 5	Battery voltage not applied to 1 and 2 terminals	10 k Ω or higher
	Battery voltage applied to 1 and 2 terminals	Below 1 Ω
C/OPEN RELAY		
Resistance 3 - 5	Battery voltage not applied to 1 and 2 terminals	10 k Ω or higher
	Battery voltage applied to 1 and 2 terminals	Below 1 Ω

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Model Year: 2013	Model: FR-S	Doc ID: RM0000020HIOONX
Title: SPECIFICATIONS: FA20 ENGINE CONTROL: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

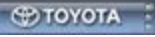
PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Engine mount assembly x Front suspension cross member	45	459	33
Cylinder head cover sub-assembly x Injector driver	6.4	65	57 in.*lbf
Cylinder head cover sub-assembly x Injector cover	19	194	14
Timing chain or belt cover sub-assembly x Camshaft timing oil control valve (OCV)	6.4	65	57 in.*lbf
Throttle with motor body assembly x Intake manifold	8.0	82	71 in.*lbf
ECM x Body	7.5	77	66 in.*lbf
Accelerator pedal assembly x Body	7.5	77	66 in.*lbf
MASS air flow meter x Air cleaner case sub-assembly	1.0	10	9.0 in.*lbf
VVT sensor x Cylinder block sub-assembly	6.4	65	57 in.*lbf
Crankshaft position sensor x Cylinder block sub-assembly	6.4	65	57 in.*lbf
Spark plug x Cylinder head sub-assembly	17	173	13
Ignition coil x Cylinder head cover sub-assembly	8.5	87	75 in.*lbf
Clutch flexible hose bracket x Body	7.5	77	66 in.*lbf
Engine wire x Injector cover	11	112	8
Engine coolant temperature sensor x Cylinder head sub-assembly	18	184	13
Engine oil temperature sensor x Timing chain or belt cover sub-assembly	18	184	13
Knock sensor x Cylinder block sub-assembly	24	245	18
Manifold absolute pressure sensor x Intake manifold	4.0	41	35 in.*lbf
Air fuel ratio sensor x Exhaust manifold (without SST)	21	214	16
Air fuel ratio sensor x Exhaust manifold (with SST)	18	184	13
Heated oxygen sensor x Exhaust manifold (without SST)	21	214	16

Heated oxygen sensor x Exhaust manifold
(with SST)

18

184

13



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001UZ700FX
Title: SPECIFICATIONS: FA20 ENGINE MECHANICAL: SERVICE DATA (2013 FR-S)		

SERVICE DATA

Ignition timing	-5 to 10° BTDC at idle (Transmission in neutral)		
Idle speed	Automatic transmission (in neutral)	600 to 800 rpm	
	Manual transmission	550 to 750 rpm	
Compression	Compression pressure	1750 kPa (17.8 kgf/cm, 254 psi)	
	Minimum pressure	1150 kPa (11.7 kgf/cm ² , 167 psi)	
	Difference between each cylinder	200 kPa (2.0 kgf/cm ² , 29 psi) or less	
Valve clearance	Standard (Cold)	Intake	0.10 to 0.16 mm (0.0039 to 0.0063 in.)
		Exhaust	0.21 to 0.27 mm (0.0083 to 0.0106 in.)
Camshaft	Circle runout	Maximum	0.020 mm (0.00079 in.)
	Cam lobe height	Intake	40.82 to 40.92 mm (1.6083 to 1.6110 in.)
		Exhaust	40.72 to 40.82 mm (1.6031 to 1.6071 in.)
		For fuel pump	40.6 mm (1.5984 in.)
	Cam base circle	Intake	34.0 mm (1.3386 in.)
		Exhaust	34.0 mm (1.3386 in.)
	Journal diameter	25.946 to 25.963 mm (1.02149 to 1.02216 in.)	
	Thrust clearance	0.0068 to 0.1160 mm (0.00027 to 0.00457 in.)	
Oil clearance	0.037 to 0.072 mm (0.00146 to 0.00283 in.)		
Cylinder head sub-assembly	Warpage	Maximum	0.035 mm (0.00138 in.)
	Cylinder head height	Standard	98.5 mm (3.878 in.)
		Minimum	98.4 mm (3.874 in.)
Intake valve	Overall length	103.3 mm (4.067 in.)	
	Margin thickness	0.8 to 1.2 mm (0.0315 to 0.0472 in.)	
	Valve stem diameter	5.455 to 5.470 mm (0.2148 to 0.2154 in.)	
	Valve seat width	0.8 to 1.6 mm (0.032 to 0.063 in.)	

Exhaust valve	Overall length		95.1 mm (3.744 in.)
	Margin thickness		1.0 to 1.4 mm (0.039 to 0.055 in.)
	Valve stem diameter		5.445 to 5.460 mm (0.21437 to 0.21496 in.)
	Valve seat width		1.1 to 1.7 mm (0.043 to 0.067 in.)
Intake valve guide bush	Inside diameter		5.500 to 5.512 mm (0.21654 to 0.21701 in.)
	Oil clearance		0.030 to 0.057 mm (0.00118 to 0.00224 in.)
	Protrusion height		11.4 to 11.8 mm (0.449 to 0.466 in.)
Exhaust valve guide bush	Inside diameter		5.500 to 5.512 mm (0.21654 to 0.21701 in.)
	Oil clearance		0.040 to 0.067 mm (0.00157 to 0.00264 in.)
	Protrusion height		11.4 to 11.8 mm (0.449 to 0.466 in.)
Valve adjusting shim	Valve stem end diameter	Intake	5.455 to 5.470 mm (0.21476 to 0.21535 in.)
		Exhaust	5.445 to 5.460 mm (0.21437 to 0.21496 in.)
	Valve adjusting shim inside diameter		5.500 to 5.560 mm (0.21654 to 0.21890 in.)
	Oil clearance		0.030 to 0.115 mm (0.00118 to 0.00453 in.)
Valve spring	Free length		41.06 mm (1.617 in.)
	Deviation	Maximum	Less than 1.8 mm (0.0710 in.)
	Angle	Maximum	2.5°
Cylinder block	Warpage	Maximum	0.025 mm (0.00098 in.)
	Cylinder block height	Standard	205.0 mm (8.071 in.)
		Minimum	204.9 mm (8.067 in.)
	Cylinder bore diameter	Thrust	86.005 to 86.015 mm (3.38602 to 3.38641 in.)
		lateral	85.995 to 86.005 mm (3.38562 to 3.38602 in.)
		Maximum (When boring)	86.505 mm (3.40570 in.)
Cylinder bore	Taper		0.030 mm (0.00118 in.)
	Out-of-runout		0.010 mm (0.00039 in.)
		Distance from piston head	39.4 mm (1.551 in.)

Piston	Piston diameter	A grade	85.985 to 85.995 mm (3.38523 to 3.38562 in.)	
		B grade	85.975 to 85.985 mm (3.38484 to 3.38523 in.)	
		0.25 mm (0.0098 in.) over size	86.225 to 86.245 mm (3.39468 to 3.39547 in.)	
		0.50 mm (0.0197 in.) over size	86.475 to 86.495 mm (3.40452 to 3.40531 in.)	
	Oil clearance		0.010 to 0.030 mm (0.00039 to 0.00118 in.)	
Piston pin	Piston pin oil clearance		0.004 to 0.008 mm (0.00016 to 0.00031 in.)	
	Connecting rod bushing oil clearance		0.006 to 0.026 mm (0.00024 to 0.00102 in.)	
Piston ring	Piston ring end gap	No. 1	0.25 to 0.30 mm (0.00984 to 0.01181 in.)	
		No. 2	0.60 to 0.70 mm (0.02362 to 0.02756 in.)	
		Oil ring	0.10 to 0.35 mm (0.00394 to 0.01378 in.)	
	Groove clearance	No. 1	0.030 to 0.080 mm (0.00118 to 0.00315 in.)	
		No. 2	0.030 to 0.070 mm (0.00118 to 0.00276 in.)	
Connecting rod	Bend	Maximum	0.10 mm (0.0039 in.) per 100 mm (3.937 in.) in length	
	Twist	Maximum	0.10 mm (0.0039 in.) per 100 mm (3.937 in.) in length	
	Thrust clearance		0.070 to 0.330 mm (0.00276 to 0.01299 in.)	
	Oil clearance		0.025 to 0.055 mm (0.00098 to 0.00217 in.)	
	Bearing size (Thickness at center)	Standard	1.492 to 1.508 mm (0.05874 to 0.05937 in.)	
		0.03 mm (0.0012 in.) Undersize	1.511 to 1.515 mm (0.05949 to 0.05965 in.)	
		0.05 mm (0.0020 in.) Undersize	1.521 to 1.525 mm (0.05988 to 0.06004 in.)	
		0.25 mm (0.0098 in.) Undersize	1.621 to 1.625 mm (0.06382 to 0.06398 in.)	
		Standard	49.976 to 50.000 mm (1.96756 to 1.96850 in.)	
		0.03 mm (0.0012 in.) Undersize	49.946 to 49.970 mm (1.96637 to 1.96732 in.)	

	Crank pin diameter			
		0.05 mm (0.0020 in.) Undersize	49.926 to 49.950 mm (1.96559 to 1.96653 in.)	
		0.25 mm (0.0098 in.) Undersize	49.726 to 49.750 mm (1.95771 to 1.95866 in.)	
Crankshaft	Circle runout	Maximum	0.035 mm (0.00138 in.)	
	Crank pin taper	Maximum	0.006 mm (0.00024 in.)	
	Crank pin out-of-runout	Maximum	0.005 mm (0.00020 in.)	
	Crankshaft journal taper	Maximum	0.006 mm (0.00024 in.)	
	Crankshaft journal out-of-runout	Maximum	0.005 mm (0.00020 in.)	
	Crank pin diameter	Minimum	47.726 mm (1.87897 in.)	
	Crankshaft journal diameter	Minimum	67.735 mm (2.66673 in.)	
	Connecting rod bearing thickness (at center)	Standard		1.492 to 1.508 mm (0.05874 to 0.05937 in.)
		0.03 mm (0.0012 in.) Undersize		1.511 to 1.515 mm (0.05949 to 0.05965 in.)
		0.05 mm (0.0020 in.) Undersize		1.521 to 1.525 mm (0.05988 to 0.06004 in.)
		0.25 mm (0.0098 in.) Undersize		1.621 to 1.625 mm (0.06382 to 0.06398 in.)
	No. 1 to No. 4 crank bearing thickness (at center)	Standard		2.495 to 2.513 mm (0.09823 to 0.09894 in.)
		0.03 mm (0.0012 in.) Undersize		2.519 to 2.522 mm (0.09917 to 0.09929 in.)
		0.05 mm (0.0020 in.) Undersize		2.529 to 2.532 mm (0.09957 to 0.09968 in.)
		0.25 mm (0.0098 in.) Undersize		2.629 to 2.632 mm (0.10350 to 0.10362 in.)
	No. 5 crank bearing thickness (at center)	Standard		2.493 to 2.511 mm (0.09815 to 0.09886 in.)
		0.03 mm (0.0012 in.) Undersize		2.517 to 2.520 mm (0.09909 to 0.09921 in.)
		0.05 mm (0.0020 in.) Undersize		2.527 to 2.530 mm (0.09949 to 0.09961 in.)
		0.25 mm (0.0098 in.) Undersize		2.627 to 2.630 mm (0.10342 to 0.10354 in.)
	Crank pin outer diameter	Standard		49.976 to 50.000 mm (1.96756 to 1.96850 in.)
		0.03 mm (0.0012 in.) Undersize		49.946 to 49.970 mm (1.96637 to 1.96734 in.)
0.05 mm (0.0020 in.) Undersize			49.926 to 49.950 mm (1.96559 to 1.96653 in.)	

	0.25 mm (0.0098 in.) Undersize	49.726 to 49.750 mm (1.95771 to 1.95866 in.)
Crankshaft journal diameter	Standard	67.985 to 68.009 mm (2.67657 to 2.67751 in.)
	0.03 mm (0.0012 in.) Undersize	67.955 to 67.979 mm (2.67539 to 2.67633 in.)
	0.05 mm (0.0020 in.) Undersize	67.935 to 67.959 mm (2.67460 to 2.67555 in.)
	0.25 mm (0.0098 in.) Undersize	67.735 to 67.759 mm (2.66673 to 2.66767 in.)
Thrust clearance		0.130 to 0.308 mm (0.00512 to 0.01213 in.)
Oil clearance		0.013 to 0.031 mm (0.00051 to 0.00122 in.)



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Model Year: 2013	Model: FR-S	Doc ID: RM000001UZ800FX
Title: SPECIFICATIONS: FA20 ENGINE MECHANICAL: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED		N*M	KGF*CM	FT.*LBF
Belt generator cover x Compressor with magnet clutch		6.4	65	57 in.*lbf
Generator cover x Generator assembly		6.4	65	57 in.*lbf
Air cleaner cap with air cleaner hose x Body	for Bolt	6.0	61	53 in.*lbf
	for Clamp	2.0	20	18 in.*lbf
No. 1 chain vibration damper x Cylinder head sub-assembly		6.4	65	57 in.*lbf
No. 1 chain tensioner assembly x Cylinder head sub-assembly		6.4	65	57 in.*lbf
No. 2 chain tensioner assembly x Cylinder head sub-assembly		6.4	65	57 in.*lbf
Camshaft cap x Camshaft housing sub-assembly LH		18	184	13
Camshaft cap x Camshaft housing sub-assembly RH		18	184	13
Camshaft timing exhaust gear assembly LH x Exhaust camshaft LH		18	184	13
Camshaft timing intake gear assembly LH x Intake camshaft LH		18	184	13
Camshaft timing exhaust gear assembly RH x Exhaust camshaft RH		18	184	13
Camshaft timing intake gear assembly RH x Intake camshaft RH		18	184	13
Cylinder head sub-assembly LH x Cylinder block LH	1st	20	204	15
	2nd	100	1020	74
	3rd	loosen 360°		
	4th	20	204	15
	5th	42	428	31
	6th	Turn 100°		
	7st	turn 100° (2 central bolts) turn 50° (except 2 central bolts)		
Cylinder head sub-assembly RH x Cylinder block RH	1st	20	204	15
	2nd	100	1020	74
	3rd	loosen 360°		
	4th	20	204	15
	5th	42	428	31
	6th	Turn 100°		
	7th	turn 100° (2 central bolts) turn 50° (except 2 central bolts)		
Crankshaft pulley x Crankshaft		20	204	15

	2nd	Turn 90°		
Flywheel sub-assembly x Crankshaft		85	867	63
Drive plate and ring gear sub-assembly x Crankshaft		95	969	70
No. 1 Engine Hanger x Engine assembly		43	439	32
Front engine mounting bracket x Engine assembly		45	459	33
Transmission assembly x Engine assembly		50	510	37
Fuel hose x Fuel pipe		1.3	13	12 in.*lbf
Front engine mounting bracket x Front suspension crossmember sub-assembly		45	459	33
Manual transmission assembly x Engine assembly		50	510	37
Automatic transmission assembly x Engine assembly		50	510	37
Rear engine under cover LH x Body		7.5	77	66 in.*lbf
Grounded cable x Engine assembly		7.5	77	66 in.*lbf
Suction hose sub-assembly x Compressor assembly		10	102	7
Suction hose sub-assembly x Body		7.5	77	66 in.*lbf
Vacuum tube connector hose x Engine assembly		18	184	13
Generator wire x Generator assembly		16	163	12
Wire harness clamp bracket x Body		11	112	8
Wire harness clamp bracket x Engine assembly		11	112	8
Wire harness clamp bracket x No. 2 engine hanger		10	102	7
Water filler sub-assembly x Body		7.5	77	66 in.*lbf
Stay x Body		35	357	26
Air cleaner assembly with hose x Body		6.0	61	53 in.*lbf
Air cleaner assembly with hose x Throttle body with motor assembly		2.0	20	18 in.*lbf
Oil spacer x Camshaft housing sub-assembly LH		6.4	65	57 in.*lbf
Hole plug x Camshaft housing sub-assembly RH		25	255	18
Camshaft oil feed pipe sub-assembly x Camshaft housing sub-assembly RH	for Union bolt	31	316	23
	for Bolt	6.4	65	57 in.*lbf
Oil spacer x Camshaft housing sub-assembly RH		6.4	65	57 in.*lbf
Stud bolt x Oil pan sub-assembly		10	102	7
Baffle plate x Oil pan sub-assembly		6.4	65	57 in.*lbf
Oil strainer sub-assembly x Oil pan sub-assembly		6.4	65	57 in.*lbf
No. 2 oil pan sub-assembly x Oil pan sub-assembly		6.4	65	57 in.*lbf
drain plug x No. 2 oil pan sub		39	400	29
No. 2 engine hanger x Engine assembly		21	214	16
Camshaft housing sub-assembly LH x Cylinder head sub-assembly LH	1st	18	184	13
	2nd	loosen 180°		

	3rd	18	184	13
Cylinder head cover sub-assembly LH x Camshaft housing sub-assembly LH		6.4	65	57 in.*lbf
Camshaft housing sub-assembly RH x Cylinder head sub-assembly RH	1st	18	184	13
	2nd	loosen 180°		
	3rd	18	184	13
Cylinder head cover sub-assembly RH x Camshaft housing sub-assembly RH		6.4	65	57 in.*lbf
Camshaft housing sub-assembly RH x Injector driver bracket		6.4	65	57 in.*lbf
Spark plug x Cylinder head sub-assembly		17	174	13
Timing chain or belt cover sub-assembly	Bolt A and B	10	102	7
	Bolt C and D	25	255	18
Water outlet x Cylinder block sub-assembly		6.4	65	57 in.*lbf
Engine water pump assembly x Cylinder block sub-assembly		6.4	65	57 in.*lbf
Water pump pulley x Engine water pump assembly		14	143	10
No. 1 idler pulley sub-assembly x Timing chain or belt cover sub-assembly		36	367	27
PCV valve sub-assembly x Cylinder block sub-assembly		23	235	17
Water inlet pipe x Cylinder block sub-assembly		6.4	65	57 in.*lbf
Rear cylinder head plate x Camshaft housing sub-assembly RH		16	163	12
PCV hose connector x Cylinder block sub-assembly		6.4	65	57 in.*lbf
Engine oil pressure switch assembly x Timing chain or belt cover sub-assembly		18	184	13
Engine oil temperature sensor x Timing chain or belt cover sub-assembly		18	184	13
Camshaft timing oil control valve x Timing chain or belt cover sub-assembly		6.4	65	57 in.*lbf
VVT sensor x Timing chain or belt cover sub-assembly		6.4	65	57 in.*lbf
Crank position sensor x Cylinder block sub-assembly		6.4	65	57 in.*lbf
Knock control sensor x Cylinder block sub-assembly		24	245	18
E.F.I. water temperature sensor x Water inlet pipe		18	184	13
Oil filter union x Timing chain or belt cover sub-assembly		45	459	33
Oil filter sub-assembly x Timing chain or belt cover sub-assembly		14	143	10
Ignition coil x Cylinder block sub-assembly		8.5	87	75 in.*lbf
No. 1 water by-pass x Engine assembly		6.4	65	57 in.*lbf
Intake manifold x Cylinder head cover sub-assembly		25	255	18
Fuel delivery pipe sub-assembly x Fuel pump assembly		31	316	23
Fuel delivery pipe sub-assembly x Intake manifold		6.4	65	57 in.*lbf
Injector cover x Intake manifold		19	194	14
Generator assembly x Engine assembly		25	255	18
Stud bolt x Cylinder head		18	184	13

Chain cover mount bolt x Cylinder head LH		6.4	65	57 in.*lbf
No. 1 cylinder block tight plug x Cylinder block		37	377	27
Crankshaft sensor holder assembly x cylinder block LH		6.4	65	57 in.*lbf
Cylinder block plate x cylinder block LH		6.4	65	57 in.*lbf
Oil separator cover x cylinder block RH		6.4	65	57 in.*lbf
Connecting rod x Connecting rod cap	1st	10	102	7
	2nd	25	255	18
	3rd	turn 92.5°		
Cylinder block sub-assembly	1st	35	357	26
	2nd	loosen 180°		
	3rd	35	357	26
	4st	loosen 180°		
	5st	17	173	13
	6st	turn 60°		
Cylinder block sub-assembly		25	255	18



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Model Year: 2013	Model: FR-S	Doc ID: RM00000201W00GX
Title: SPECIFICATIONS: FA20 FUEL: SERVICE DATA (2013 FR-S)		

SERVICE DATA

Fuel pressure		350 to 500 kPa (4.0 to 5.0 kgf/cm ² , 51 to 73 psi)
Fuel pressure : at fuel pressure remains for 5 minutes after engine has stopped		147 kPa (1.5 kgf/cm ² , 21 psi) or more
Fuel pressure (for high pressure) : at engine warm up and idle		3000 to 5000 kPa (30.6 to 51.0 kgf/cm ² , 435 to 725 psi)
Fuel injector (for port injection)		
Resistance	at 20°C (68°F)	12 Ω
Injection volume		84 to 103 cc(5.1 to 6.3 cu.in.) per 15 seconds
Difference between each injector		19 cc(1.2 cu.in.) or less
Fuel drop		1 drop or less per 22 minutes
Fuel Injector (for direct injection)		
Resistance	at 20°C (68°F)	1.9 Ω
Fuel pressure sensor		
voltage	Terminal 2 (VOUT) and 1 (GND) : Apply 5 V between terminals 3 (VCC) and 1 (GND)	Approximately 0.5 V
Fuel pump		
Resistance	at 20°C (68°F)	0.2 to 3.0 Ω
Fuel pump (for high pressure)		
Resistance	at 20°C (68°F)	1.19 to 1.39 Ω
Fuel sender gauge assembly (Main)		
Resistance	Float Level F	6.5 to 8.5 Ω
	Float Level E	168 to 172 Ω
Fuel sender gauge assembly (Sub)		
Resistance	Float Level F	5.5 to 9.5 Ω
	Float Level E	236 to 244 Ω

Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000201X00GX
Title: SPECIFICATIONS: FA20 FUEL: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Fuel delivery pipe x Intake manifold	19	194	14
Fuel delivery pipe sub-assembly x Intake manifold	6.4	65	57 in.*lbf
Injector cover x Intake manifold	19	194	14
Wire harness clamp bracket x Intake manifold protector	11	112	8
Fuel delivery pipe LH x Cylinder head	19	194	14
Fuel delivery pipe RH x Cylinder head	19	194	14
Fuel delivery pipe LH x Fuel delivery pipe (Union nut)	25	255	18
Fuel delivery pipe RH x Fuel delivery pipe (Union nut)	25	255	18
Fuel delivery pipe x Water pipe	6.4	65	57 in.*lbf
Fuel delivery pipe LH x No. 2 fuel delivery pipe (Union nut)	25	255	18
No. 2 fuel delivery pipe (Union nut) x Fuel pump (High-pressure)	25	255	18
Fuel pressure sensor x No. 1 fuel delivery pipe	36	367	27
Injector driver x Engine assembly	6.4	65	57 in.*lbf
Fuel pump gauge retainer x Fuel tank	85	867	63
Pump drive case assembly x Cylinder head	19	194	14
Fuel pump (for high pressure) x Pump drive case assembly	21	214	16
Fuel delivery pipe sub-assembly x Fuel pump (for high pressure) (Union bolt)	31	316	23
Fuel pump ECU x Body	5.0	51	44 in.*lbf
Fuel tank to filler pipe hose x Fuel tank assembly (Hose clamp)	2.0	20	18 in.*lbf
Fuel tank assembly x Body	33	337	24
No. 1 fuel tank protector x Body	9.0	92	80 in.*lbf
No. 2 fuel tank protector x Body	9.0	92	80 in.*lbf

Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KDA034X
Title: SPECIFICATIONS: FA20 INTAKE / EXHAUST: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

INTAKE MANIFOLD

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Fuel delivery pipe x Intake manifold	19	194	14
Purge valve x Intake manifold	6.4	65	57 in.*lbf
Manifold absolute pressure sensor x Intake manifold	4.0	41	35 in.*lbf
Intake manifold x Cylinder head	25	255	18
Fuel delivery pipe sub-assembly x Intake manifold	6.4	65	57 in.*lbf
Throttle with motor body assembly x Intake manifold	8.0	82	71 in.*lbf

CHAMBER

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Air cleaner duct with chamber x Intake manifold	6.0	61	53 in.*lbf
Chamber duct x Air cleaner case sub-assembly (Hose clamp)	2.0	20	18 in.*lbf
Chamber duct x Chamber (Hose clamp)	2.0	20	18 in.*lbf

EXHAUST MANIFOLD

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Exhaust manifold x Cylinder head	30	306	22
Exhaust manifold x Front exhaust pipe sub-assembly	35	357	26

EXHAUST PIPE

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Tail pipe baffle x Tail exhaust pipe assembly	7.5	77	66 in.*lbf
Tail exhaust pipe assembly x Center exhaust pipe assembly	48	490	35
Center exhaust pipe assembly x Front exhaust pipe assembly	18	184	13
Front exhaust pipe assembly x Front exhaust pipe sub-assembly	43	439	32
Front exhaust pipe assembly x Exhaust pipe bracket	50	510	37
Front exhaust pipe sub-assembly x Exhaust manifold	35	357	26
No. 1 engine under cover x Body (Bolt A)	30	306	22
No. 1 engine under cover x Body (Bolt B)	7.5	77	66 in.*lbf
No. 2 engine under cover x Body	7.5	77	66 in.*lbf



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000208G00MX
Title: SPECIFICATIONS: FA20 LUBRICATION: SERVICE DATA (2013 FR-S)		

SERVICE DATA

Oil pressure	Idle: 50 kPa (0.5 kgf/cm ² , 7.3 psi) or more
	6000 rpm: 500 kPa (5.1 kgf/cm ² , 73 psi) or more



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000208H00MX
Title: SPECIFICATIONS: FA20 LUBRICATION: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED		N*M	KGF*CM	FT.*LBF
Oil pan drain plug x No. 2 oil pan sub-assembly		39	400	29
Oil filter union x Timing chain or belt cover sub-assembly		45	459	33
Oil filter sub-assembly x Timing chain or belt cover sub-assembly		14	143	10
Engine oil pressure switch assembly x Timing chain or belt cover sub-assembly		18	184	13
Cam timing oil control valve x Timing chain or belt cover sub-assembly		6.4	65	57 in.*lbf
Camshaft position sensor x Timing chain or belt cover sub-assembly		6.4	65	57 in.*lbf
Engine oil temperature sensor x Timing chain or belt cover sub-assembly		18	184	13
Engine oil pressure switch assembly x Timing chain or belt cover sub-assembly		18	184	13
Timing chain or belt cover sub-assembly	Bolt A and B	10	102	7
	Bolt C and D	25	255	18
No. 1 idler pulley sub-assembly x Timing chain or belt cover sub-assembly		36	367	27
Idler pulley bracket x Engine assembly		36	367	27
No. 2 idler pulley sub-assembly x Timing chain or belt cover sub-assembly		36	367	27
Oil level dipstick guide x Timing chain or belt cover sub-assembly		6.4	65	57 in.*lbf
Wire harness bracket x Timing chain or belt cover sub-assembly		6.4	65	57 in.*lbf



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000205Q00CX
Title: SPECIFICATIONS: FA20 STARTING: SERVICE DATA (2013 FR-S)		

SERVICE DATA

Starter assembly	Standard current		Below 90 A at 11.5 V	
Starter armature assembly	Standard runout	for Manual Transmission	0.05 mm (0.002 in.)	
		for Automatic Transmission	0.02 mm (0.0008 in.)	
	Maximum runout	for Manual Transmission	0.10 mm (0.004 in.)	
		for Automatic Transmission	0.05 mm (0.002 in.)	
	Standard depth Segment - Mold	for Manual Transmission	0.50 mm (0.020 in.)	
		for Automatic Transmission	0.7 mm (0.0276 in.)	
	Minimum depth Segment - Mold	for Automatic Transmission	0.20 mm (0.0079 in.)	
	Standard resistance	Segment - Segment for Automatic Transmission		Below 1 Ω
		Commutator - Armature coil core for Automatic Transmission		10 k Ω or higher
	Standard diameter	for Automatic Transmission		29 mm (1.1417 in.)
Minimum diameter	for Automatic Transmission		28 mm (1.1024 in.)	
Brush length	Standard length	for Manual Transmission	12.3 mm (0.484 in.)	
		for Automatic Transmission	14.4 mm (0.5669 in.)	
	Minimum length	for Manual Transmission	7.0 mm (0.276 in.)	
		for Automatic Transmission	9.0 mm (0.3543 in.)	
	Standard brush spring force	for Manual Transmission	15.9 to 19.5 N (1.6 to 2.0 kgf, 3.6 to 4.4 lbf)	
	Minimum brush spring force	for Manual Transmission	2.5 N (0.3 kgf, 0.6 lbf)	
	Standard resistance for Automatic Transmission	A - B A - C B - D C - D		10 k Ω or higher
		A - D B - C		Below 1 Ω
Starter magnetic switch assembly	Standard resistance Terminal 50 - Terminal C	for Manual Transmission	Below 1 Ω	
		for Automatic Transmission	Below 1 Ω	
	Standard resistance Terminal 50 -	for Manual Transmission	Below 1 Ω	
		for Automatic Transmission	Below 2 Ω	

	Switch body		
	Standard resistance Terminal 30 - Terminal C	for Manual Transmission	1 M Ω or higher
Ignition switch assembly	Standard resistance All combinations of all terminals	LOCK	10 k Ω or higher
	Standard resistance 2 (AM1) - 3 (ACC)	ACC	Below 1 Ω
	Standard resistance 2 (AM1) - 3 (ACC) - 4 (IG1) 6 (IG2) - 7 (AM2)	ON	Below 1 Ω
	Standard resistance 1 (ST1) - 2 (AM1) -- 4 (IG1) 6 (IG2) - 7 (AM2) - 8 (ST2)	START	Below 1 Ω
Starter relay	Specified condition	1 - 2 (Battery voltage not applied to terminals 1 and 2) (Measured temperature : 20 °C (68 °F))	93.8 to 136.4 k Ω
		3 - 5 (Battery voltage is applied between terminals 1 and 2)	Below 1 Ω
		3 - 5 (Battery voltage is not applied between terminals 1 and 2)	10 k Ω or higher
Inhibitor relay	Specified condition	1 - 2 (Battery voltage not applied to terminals 1 and 2) (Measured temperature : 20 °C (68 °F))	93.8 to 136.4 k Ω
		3 - 5 (Battery voltage is applied between terminals 1 and 2)	Below 1 Ω
		3 - 5 (Battery voltage is not applied between terminals 1 and 2)	10 k Ω or higher

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Model Year: 2013	Model: FR-S	Doc ID: RM00000205R00CX
Title: SPECIFICATIONS: FA20 STARTING: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED		N*M	KGF*CM	FT*LBF
Starter x Engine	Lower side bolt	50	510	37
	Upper side bolt (without SST)	50	510	37
	Upper side bolt (with SST)	40	408	30
	Terminal 30	10	102	7
	Terminal C	10	102	7
Starter magnetic switch assembly x Starter drive housing		7.5	77	66 in. *lbf
Starter cover x Starter brush holder assembly	for Manual transmission	1.5	15	13 in. *lbf
	for Automatic transmission	1.4	14	12 in. *lbf
Starter yoke assembly x Starter drive housing		6.0	61	53 in. *lbf
Key lock unit		6.0	61	53 in. *lbf



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KDE00KX
Title: SPECIFICATIONS: FRONT SUSPENSION: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

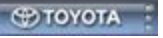
PART TIGHTENED	N*M	KGF*CM	FT.*LBF
front suspension upper to cowl brace sub-assembly x Body	16	163	12
Front suspension support sub-assembly x Front shock absorber assembly (without SST)	55	561	41
Front suspension support sub-assembly x Front shock absorber assembly (with SST)	49	495	36
Front shock absorber with coil spring x Body	23	235	17
Front shock absorber with coil spring x Steering knuckle	155	1581	114
Front stabilizer link assembly x Front shock absorber assembly	46	469	34
Front flexible hose x Front shock absorber assembly	33	337	24
Hub nut	120	1224	89
Front lower suspension arm bolt x Body	110	1122	81
Front lower arm suspension arm assembly x Steering knuckle	51	520	38
Lower arm support plate x Body	110	1122	81
Front lower suspension arm assembly x Body	85	867	63
No. 1 engine under cover bolt	30	306	22
No. 2 engine under cover bolt	7.5	77	66 in.*lbf.
Front No. 2 stabilizer bracket bolt	75	765	55
Front No. 2 stabilizer bracket nut	25	255	18
Rear body mounting cushion sub-assembly x Body	60	612	44
Front stabilizer link assembly x Front stabilizer bar	46	469	34
Front cross member sub-assembly x Body	95	969	70



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020EM001X
Title: SPECIFICATIONS: HEATING / AIR CONDITIONING: SERVICE DATA (2013 FR-S)		

SERVICE DATA

Refrigerant charge volume	Standard: 390 +/-50 g(13.8 +/-1.8 oz)
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Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020EN00JX
Title: SPECIFICATIONS: HEATING / AIR CONDITIONING: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

AIR CONDITIONING UNIT

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Instrument panel reinforcement assembly x Body	25	255	18
Lower instrument panel reinforcement sub-assembly x Instrument panel reinforcement assembly	7.5	77	66 in.*lbf
Air conditioning tube assembly x Cooler expansion valve	7.5	77	66 in.*lbf
Air conditioning unit assembly x Body	7.5	77	66 in.*lbf
Cooler expansion valve x Air conditioner tube assembly	3.5	36	31 in.*lbf
Air conditioner tube assembly x No. 1 cooler evaporator sub-assembly	3.5	36	31 in.*lbf

COOLER EXPANSION VALVE

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Suction hose sub-assembly x Cooler expansion valve	7.5	77	66 in.*lbf

COMPRESSOR

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Compressor with magnet clutch x Engine	36	367	27
Suction hose sub-assembly x Compressor with magnet clutch	10	102	7
No. 1 cooler refrigerant discharge hose x Compressor with magnet clutch	10	102	7

CONDENSER

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Cooler condenser assembly x Radiator assembly	6.0	61	53 in.*lbf
No. 1 cooler refrigerant discharge hose x Cooler condenser assembly	10	102	7
Air conditioner tube and accessory assembly x Cooler condenser assembly	10	102	7
No. 1 cooler condenser bracket x Cooler condenser assembly	6.0	61	53 in.*lbf
No. 2 cooler condenser bracket x Cooler condenser assembly	6.0	61	53 in.*lbf



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020ED001X
Title: SPECIFICATIONS: HORN: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Low pitched horn assembly x Body	18	184	13
High pitched horn assembly x Hone bracket sub-assembly	18	184	13
Horn bracket sub-assembly x Front bumper reinforcement sub-assembly	13	133	10



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000200K00NX
Title: SPECIFICATIONS: INTERIOR PANELS / TRIM: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

INSTRUMENT PANEL SAFETY PAD

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Instrument panel reinforcement x Passenger airbag	7.5	77	66 in.*lbf

FRONT CONSOLE BOX

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Console box assembly x Body	6.5	66	58 in.*lbf

ROOF HEADLINING

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Center pillar garnish LH x Body	7.5	77	66 in.*lbf
Center pillar garnish RH x Body	7.5	77	66 in.*lbf
Front seat outer belt assembly LH x Body	30	306	22
Front seat outer belt assembly RH x Body	30	306	22
Rear window side garnish LH x Body	7.5	77	66 in.*lbf
Rear window side garnish RH x Body	7.5	77	66 in.*lbf
Rear quarter trim front garnish LH x Body	7.5	77	66 in.*lbf
Rear quarter trim front garnish RH x Body	7.5	77	66 in.*lbf



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KCQ00AX
Title: SPECIFICATIONS: LIGHTING (EXT): TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
HEADLIGHT ASSEMBLY (for Halogen Headlight)			
Headlight assembly x Body	7.5	77	66 in.*lbf
Front bumper side support RH x Body	7.5	77	66 in.*lbf
Front bumper side support LH x Body	7.5	77	66 in.*lbf
HEADLIGHT ASSEMBLY (for HID Headlight)			
Headlight assembly x Body	7.5	77	66 in.*lbf
Front bumper side support RH x Body	7.5	77	66 in.*lbf
Front bumper side support LH x Body	7.5	77	66 in.*lbf
FOG LIGHT ASSEMBLY			
Fog light assembly x Front bumper cover	2.0	20	18 in.*lbf
DAYTIME RUNNING LIGHT RESISTOR			
Daytime running light resistor x Body	7.5	77	66 in.*lbf
FRONT TURN SIGNAL LIGHT ASSEMBLY			
Front turn signal light assembly x Front bumper cover	7.5	77	66 in.*lbf
REAR COMBINATION LIGHT ASSEMBLY			
Rear combination light assembly x Body	4.5	46	40 in.*lbf
REAR LIGHT ASSEMBLY			
Rear light assembly x Rear bumper cover	7.5	77	66 in.*lbf
HEIGHT CONTROL SENSOR			
Rear height control sensor sub-assembly LH x Body	7.5	77	66 in.*lbf
HEADLIGHT LEVELING ECU			
Headlight leveling ECU assembly x Body	7.5	77	66 in.*lbf



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KCP009X
Title: SPECIFICATIONS: LIGHTING (INT): TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Front door courtesy switch assembly x Body	7.5	77	66 in.*lbf



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020LN03QX
Title: SPECIFICATIONS: MIRROR (EXT): TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Outer rear view mirror sub-assembly x Door panel	7.5	77	66 in.*lbf



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020CK00MX
Title: SPECIFICATIONS: PARKING BRAKE: SERVICE DATA (2013 FR-S)		

SERVICE DATA

Parking brake switch assembly resistance (Switch connector - Switch body)	ON (When switch shaft is not pressed)	Below 1 Ω
	OFF (When switch shaft is pressed)	10 k Ω or higher
Parking brake lever travel at 200 N (20 kgf, 45.0 lbf)		7 to 8 notches
Brake disc inside diameter	Standard	190 mm (7.48 in.)
	Maximum	191 mm (7.52 in.)
Parking brake shoe lining thickness	Standard	3.5 mm (0.1378 in.)
	Minimum	1.5 mm (0.0591 in.)



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020CLOOMX
Title: SPECIFICATIONS: PARKING BRAKE: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Hub nut	120	1224	89
Parking brake switch assembly set screw	1.5	15	13 in.*lbf
Parking brake lever sub-assembly set bolt	18	184	13
No. 1 fuel tank Protector set bolt	9.0	92	80 in.*lbf
No. 2 fuel tank Protector set bolt	9.0	92	80 in.*lbf
No. 2/No. 3 parking brake cable assembly x Body	18	184	13
Center exhaust pipe assembly x Tail exhaust pipe assembly	48	490	35
Center exhaust pipe assembly x Front exhaust pipe assembly	18	184	13
Lower casing bracket set bolt	18	184	13
Clamp H/B x Casing lower bracket	18	184	13
Rear disc brake caliper assembly set bolt	66	673	49



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KCF00FX
Title: SPECIFICATIONS: POWER ASSIST SYSTEMS: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KG*CM	FT.*LBF
Power steering ECU set bolts	10	102	7



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002KJF014X
Title: SPECIFICATIONS: POWER DISTRIBUTION: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED		N*M	KG*CM	FT.*LBF
Battery x Battery current sensor assembly		6.0	61	53 in.*lbf
Engine wire x Battery current sensor assembly		7.5	77	66 in.*lbf
Instrument panel junction block assembly x Instrument panel reinforcement assembly	Nut	7.5	77	66 in.*lbf
	Bolt	7.5	77	66 in.*lbf



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020E700SX
Title: SPECIFICATIONS: REAR SUSPENSION: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Rear support to rear shock absorber nut without SST	25	255	18
Rear support to rear shock absorber nut with SST	23	235	17
Rear shock absorber with coil spring x Body	30	306	22
Rear No. 1 upper control arm assembly x Rear axle carrier sub-assembly	161	1642	119
Rear No. 2 suspension arm assembly x Rear axle carrier sub-assembly	80	816	59
Rear No. 2 suspension arm assembly x Rear shock absorber with coil spring	80	816	59
Rear stabilizer link sub-assembly x Rear No. 2 suspension arm assembly	38	388	28
Rear height control sensor sub-assembly x Rear No. 2 suspension arm assembly	7.5	77	66 in.*lbf
Hub nut	120	1224	89
Upper control arm assembly x Rear axle carrier sub-assembly	80	816	59
Upper control arm assembly x Rear suspension member assembly	90	918	66
Rear NO. 1 suspension arm assembly x Rear axle carrier sub-assembly	110	1122	81
Rear NO. 1 suspension arm assembly x Rear suspension member assembly	110	1122	81
NO. 1 parking brake cable support bracket x Rear NO. 1 suspension arm assembly	18	184	13
Wheel nut	120	1224	89
Toe control link sub-assembly x Rear axle carrier sub-assembly	60	612	44
Toe control link sub-assembly x Rear suspension member assembly	100	1020	74
Rear stabilizer bracket x Body	30	306	22
Rear stabilizer link sub-assembly x Rear stabilizer bar	38	388	28
NO. 1 fuel tank protector x Body	9.0	92	80 in.*lbf
NO. 2 fuel tank protector x Body	9.0	92	80 in.*lbf
Rear suspension member assembly x Body (Bolt A)	145	1479	107
Rear suspension member assembly x Body (Bolt B)	70	714	52
No. 3 parking brake cable assembly x Rear suspension member assembly	18	184	13



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002Z9308ZX
Title: SPECIFICATIONS: SEAT: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

FRONT SEAT ASSEMBLY

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Front seat assembly x Body	53	540	39
Separate type front seatback assembly x Separate type front seat cushion assembly	42	428	31
Front seat inner belt assembly x Front seat assembly	42	428	31
Separate type front seatback cover bracket x Separate type front seatback frame assembly	5.5	56	49 in.*lbf
Front seat airbag assembly x Separate type front seatback frame assembly	5.5	56	49 in.*lbf

REAR SEAT ASSEMBLY

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Bench type seatback assembly x Rear seat hinge sub-assembly	33	337	24
Separate type rear seat cushion assembly x Body	13	133	10
Rear rear window side garnish x Body	7.5	77	66 in.*lbf
Rear seatback lock striker x Body	33	337	24
Rear seatback lock assembly x Rear seatback frame assembly	25	250	18



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003UWV00QX
Title: SPECIFICATIONS: SEAT BELT: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

FRONT SEAT INNER BELT ASSEMBLY

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Front seat inner belt assembly x Front seat assembly	42	428	31

FRONT SEAT OUTER BELT ASSEMBLY

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Rear window side garnish x Body	7.5	77	66 in.*lbf
Rear quarter trim front garnish x Body	7.5	77	66 in.*lbf
Center pillar garnish x Body	7.5	77	66 in.*lbf
Front seat outer belt assembly (shoulder anchor) x Body	30	306	22
Front seat outer belt assembly (floor anchor) x Body	30	306	22
Front seat outer belt assembly (Upper bolt) x Body	7.5	77	66 in.*lbf
Front seat outer belt assembly (Lower bolt) x Body	30	306	22

REAR SEAT INNER BELT ASSEMBLY

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Rear seat inner belt assembly x Body	30	306	22

REAR SEAT OUTER BELT ASSEMBLY

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Separate type rear seat cushion assembly x Body	13	133	10
Rear window side garnish x Body	7.5	77	66 in.*lbf
Rear seat outer belt assembly (floor anchor) x Body	30	306	22
Rear seat outer belt assembly x Body	30	306	22

CHILD RESTRAINT SEAT TETHER ANCHOR

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Separate type rear seat cushion assembly x Body	13	133	10
Bench type rear seatback assembly x Body	33	337	24
Rear window side garnish x Body	7.5	77	66 in.*lbf
Child restraint seat tether anchor bracket x Body	25	255	18

CHILD RESTRAINT SEAT ANCHOR BRACKET




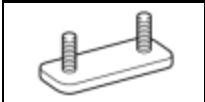















PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Separate type rear seat cushion assembly x Body	13	133	10
Bench type rear seatback assembly x Body	33	337	24
Rear seat hinge sub-assembly x Body	33	337	24
Child restraint seat anchor bracket sub-assembly x Body	25	255	18



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000118VOC8X
Title: SPECIFICATIONS: STANDARD BOLT: HOW TO DETERMINE BOLT STRENGTH (2013 FR-S)		

HOW TO DETERMINE BOLT STRENGTH

Bolt Type

HEXAGON HEAD BOLT		STUD BOLT	WELD BOLT	CLASS
NORMAL RECESS BOLT	DEEP RECESS BOLT			
	 No Mark	 No Mark		4T
				5T
	 w/ Washer	 w/ Washer		6T
				7T
				8T
				9T
				10T
				11T




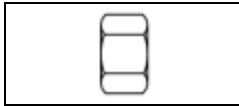
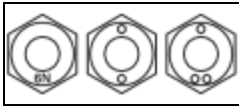
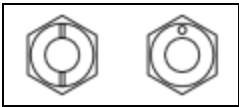
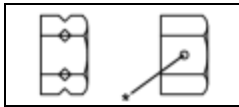
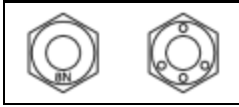

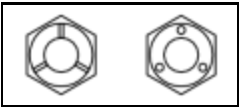

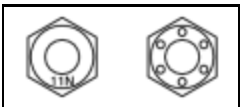


TOYOTA

Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000118X0C8X
Title: SPECIFICATIONS: STANDARD BOLT: HOW TO DETERMINE NUT STRENGTH (2013 FR-S)		

HOW TO DETERMINE NUT STRENGTH

Nut Type

PRESENT STANDARD HEXAGON NUT	OLD STANDARD HEXAGON NUT		CLASS
	COLD FORGING NUT	CUTTING PROCESSED NUT	
 No Mark	-	-	4N
 No Mark (w/ Washer)	 No Mark (w/ Washer)	 No Mark	5N (4T)
	-	-	6N
-			7N (5T)
	-	-	8N
		 No Mark	10N (7T)
	-	-	11N
-	-	-	12N



HINT:

- *: Nut with 1 or more marks on one side surface of the nut.
- Use a nut with the same nut strength classification number (or more) as the bolt strength classification number when tightening parts with a bolt and nut.

Example:

- Bolt = 4T
- Nut = 4N or more

Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000118WOC8X
Title: SPECIFICATIONS: STANDARD BOLT: SPECIFIED TORQUE FOR STANDARD BOLTS (2013 FR-S)		

SPECIFIED TORQUE FOR STANDARD BOLTS

CLASS	DIAMETER (MM)	PITCH (MM)	SPECIFIED TORQUE					
			HEXAGON HEAD BOLT			HEXAGON FLANGE BOLT		
			N*M	KG*CM	FT.*LBF	N*M	KG*CM	FT.*LBF
4T	6	1	5	55	48 in.*lbf	6	60	52 in.*lbf
	8	1.25	12.5	130	9	14	145	10
	10	1.25	26	260	19	29	290	21
	12	1.25	47	480	35	53	540	39
	14	1.5	74	760	55	84	850	61
	16	1.5	115	1,150	83	-	-	-
5T	6	1	6.5	65	56 in.*lbf	7.5	75	65 in.*lbf
	8	1.25	15.5	160	12	17.5	175	13
	10	1.25	32	330	24	36	360	26
	12	1.25	59	600	43	65	670	48
	14	1.5	91	930	67	100	1,050	76
	16	1.5	140	1,400	101	-	-	-
6T	6	1	8	80	69 in.*lbf	9	90	78 in.*lbf
	8	1.25	19	195	14	21	210	15
	10	1.25	39	400	29	44	440	32
	12	1.25	71	730	53	80	810	59
	14	1.5	110	1,100	80	125	1,250	90
	16	1.5	170	1,750	127	-	-	-
7T	6	1	10.5	110	8	12	120	9
	8	1.25	25	260	19	28	290	21
	10	1.25	52	530	38	58	590	43
	12	1.25	95	970	70	105	1,050	76
	14	1.5	145	1,500	108	165	1,700	123
	16	1.5	230	2,300	166	-	-	-
8T	8	1.25	29	300	22	33	330	24
	10	1.25	61	620	45	68	690	50
	12	1.25	110	1,100	80	120	1,250	90
9T	8	1.25	34	340	25	37	380	27
	10	1.25	70	710	51	78	790	57

	12	1.25	125	1,300	94	140	1,450	105
10T	8	1.25	38	390	28	42	430	31
	10	1.25	78	800	58	88	890	64
	12	1.25	140	1,450	105	155	1,600	116
11T	8	1.25	42	430	31	47	480	35
	10	1.25	87	890	64	97	990	72
	12	1.25	155	1,600	116	175	1,800	130

Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003JBJ01SX
Title: SPECIFICATIONS: STEERING COLUMN: SERVICE DATA (2013 FR-S)		

SERVICE DATA

Maximum steering free play	30 mm (1.18 in.)
Steering column assembly preload	1.6 to 2.1 N*m (16.3 to 21.4 kgf*cm, 14.2 to 18.6 in.*lbf)
Steering intermediate shaft assembly turn torque (rack and pinion power steering gear assembly side)	6.6 N*m (66 kgf*cm, 58 in.*lbf) or less
Steering intermediate shaft assembly turn torque (steering column assembly side)	6.0 N*m (61 kgf*cm, 53 in.*lbf) or less

Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003JBK01XX
Title: SPECIFICATIONS: STEERING COLUMN: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
No. 1 engine under cover set bolt	30	306	22
No. 2 engine under cover set bolt	7.5	77	66 in.*lbf.
Steering intermediate shaft assembly x Steering column assembly	35	357	26
Steering intermediate shaft assembly x Rack and pinion steering gear assembly	35	357	26
Steering column assembly set nuts	40	408	30
Steering column assembly set bolt	40	408	30
Steering wheel assembly set nut	39	398	29



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KCH00AX
Title: SPECIFICATIONS: STEERING GEAR / LINKAGE: SERVICE DATA (2013 FR-S)		

SERVICE DATA

Rack and pinion power steering gear assembly total preload (turning)	0.9 to 1.6 N*m (9.2 to 16.3 kgf*cm, 8.0 to 14.2 in.*lbf)
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Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KCG00AX
Title: SPECIFICATIONS: STEERING GEAR / LINKAGE: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
No. 1 engine under cover set bolt	30	306	22
No. 2 engine under cover set bolt	7.5	77	66 in.*lbf.
Front stabilizer link assembly x Front stabilizer bar	46	469	34
Front stabilizer bar set bolts	60	612	44
Tie rod end sub-assembly x Steering knuckle	27	275	20
Steering intermediate shaft assembly x Rack and pinion power steering gear assembly	35	357	26
Rack and pinion power steering gear assembly set bolts	120	1220	89
Tie rod end sub-assembly x Steering rack end sub-assembly	85	869	63
Steering rack end sub-assembly	103	1050	76
Lock nut x Steering rack housing	60	612	44



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KFQ00AX
Title: SPECIFICATIONS: SUPPLEMENTAL RESTRAINT SYSTEMS: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KG*CM	FT.*LBF
Curtain shield airbag assembly x Body	7.5	77	66 in.*lbf
Separate type front seatback assembly x Separate type front seat cushion assembly	42	428	31
Separate type front seatback cover bracket x Separate type front seatback frame assembly	5.5	55	49 in.*lbf
Front seat airbag assembly x Separate type front seatback frame assembly	5.5	55	49 in.*lbf
Airbag sensor assembly x Body	25	255	18
Front airbag sensor x Body	13	133	10
Door side airbag sensor x Front door	7.5	77	66 in.*lbf
No. 2 side airbag sensor assembly x Body	7.5	77	66 in.*lbf
Rear airbag sensor assembly x Body	7.5	77	66 in.*lbf
No. 2 airbag sensor assembly x Body	7.5	77	66 in.*lbf



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003K5R00AX
Title: SPECIFICATIONS: THEFT DETERRENT / KEYLESS ENTRY: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Transponder key ECU x Body	7.5	77	66 in.*lbf



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003JBI02HX
Title: SPECIFICATIONS: TIRE / WHEEL: SERVICE DATA (2013 FR-S)		

SERVICE DATA

Cold Tire Inflation Pressure:

TIRE SIZE	COLD TIRE INFLATION PRESSURE	
	KPA (KGF/CM ² , PSI)	
P205/55R16 91V	240 (2.4, 35)	240 (2.4, 35)
215/45R17 87W	240 (2.4, 35)	240 (2.4, 35)
T135/80D16 101M	420 (4.2, 60)	420 (4.2, 60)

Maximum wheel runout	Steel wheel	1.5 mm (0.0591 in.) (Vertical and lateral)
	Aluminum wheel	1.0 mm (0.0394 in.) (Vertical and lateral)

Maximum wheel imbalance after adjustment	10.0 g (0.0220 lb)
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Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003JBH009X
Title: SPECIFICATIONS: TIRE PRESSURE MONITORING: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KG*CM	FT.*LBF
TIRE PRESSURE WARNING VALVE AND TRANSMITTER SET NUT	4.0	41	35 IN.*LBF
HUB NUT	120	1224	89
Door control receiver set bolt	13	133	10



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001YXP00CX
Title: SPECIFICATIONS: TL70 MANUAL TRANSMISSION / TRANSAXLE: SERVICE DATA (2013 FR-S)		

SERVICE DATA

Neutral position switch assembly	1 - 2	Pushed: Below 1 Ω
		Released: 10 k Ω or higher
Back-up light switch assembly	1 - 2	Pushed: Below 1 Ω
		Released: 10 k Ω or higher
Manual transmission extension housing oil seal installation depth	-	0.1 to 1.1 mm (0.00394 to 0.0433 in.)
Reverse idler gear radial clearance	Standard Maximum	0.040 to 0.082 mm (0.00157 to 0.00323 in.) 0.082 mm (0.00323 in.)
No. 4 gear shift fork slotted spring pin drive in depth	-	0 mm (0 in.) (from the end surface of the No. 4 gear shift fork)
No. 1 gear shift head slotted spring pin drive in depth	-	0 mm (0 in.) (from the end surface of the No. 1 gear shift head)
No. 2 gear shift head slotted spring pin drive in depth	-	0 mm (0 in.) (from the end surface of the No. 2 gear shift head)
No. 3 gear shift head slotted spring pin drive in depth	-	0 mm (0 in.) (from the end surface of the No. 3 gear shift head)
Transmission front bearing retainer oil seal installation depth	-	11.1 to 11.9 mm (0.437 to 0.469 in.)
Extension housing rear oil seal installation depth	-	1.0 to 2.0 mm (0.0394 to 0.0787 in.)
Counter shaft 6th gear thrust clearance	Standard Maximum	0.10 to 0.40 mm (0.00394 to 0.0157 in.) 0.40 mm (0.0157 in.)
Counter shaft 6th gear radial clearance	Standard Maximum	0.015 to 0.068 mm (0.000590 to 0.00268 in.) 0.068 mm (0.00268 in.)
Input shaft radial clearance	Standard Maximum	0.029 to 0.072 mm (0.00114 to 0.00283 in.) 0.072 mm (0.00283 in.)
1st gear thrust clearance	Standard Maximum	0.15 to 0.40 (0.00590 to 0.0157 in.) 0.40 (0.0157 in.)
1st gear radial clearance	Standard Maximum	0.015 to 0.066 (0.000590 to 0.00260 in.) 0.066 (0.00260 in.)
2nd gear thrust clearance	Standard Maximum	0.10 to 0.45 (0.000394 to 0.0177 in.) 0.45 (0.0177 in.)
2nd gear radial clearance	Standard	0.015 to 0.066 (0.000590 to 0.00260 in.)

	Maximum	0.066 (0.00260 in.)
Reverse gear thrust clearance	Standard Maximum	0.10 to 0.45 (0.000394 to 0.0177 in.) 0.45 (0.0177 in.)
Reverse gear radial clearance	Standard Maximum	0.015 to 0.066 (0.000590 to 0.00260 in.) 0.066 (0.00260 in.)
Counter shaft 3rd gear thrust clearance	Standard Maximum	0.10 to 0.35 (0.00393 to 0.0138 in.) 0.35 (0.0138 in.)
Counter shaft 3rd gear radial clearance	Standard Maximum	0.015 to 0.068 (0.000590 to 0.00268 in.) 0.068 (0.00268 in.)
Counter shaft 4th gear thrust clearance	Standard Maximum	0.10 to 0.35 (0.00393 to 0.0138 in.) 0.35 (0.0138 in.)
Counter shaft 4th gear radial clearance	Standard Maximum	0.065 to 0.115 (0.002559 to 0.00453 in.) 0.115 (0.00453 in.)
No. 1 gear shift head clearance	Standard Maximum	15.2 to 15.4 mm (0.59843 to 0.60630 in.) 15.4 mm (0.60630 in.)
No. 2 gear shift head clearance	Standard Maximum	15.2 to 15.4 mm (0.59843 to 0.60630 in.) 15.4 mm (0.60630 in.)
No. 3 gear shift head clearance	Standard Maximum	15.2 to 15.4 mm (0.59843 to 0.60630 in.) 15.4 mm (0.60630 in.)
Shift shaft	Standard width Minimum width	14.8 to 15.0 mm (0.583 to 0.591 in.) 14.8 mm (0.583 in.)
No. 1 shift inter lock block	Standard width Minimum width	14.8 to 15.0 mm (0.583 to 0.591 in.) 14.8 mm (0.583 in.)
No. 4 gear shift fork	Standard Maximum	15.2 to 15.4 mm (0.59843 to 0.60630 in.) 15.4 mm (0.60630 in.)
5th shift head	Standard Maximum	15.2 to 15.4 mm (0.59843 to 0.60630 in.) 15.4 mm (0.60630 in.)
No. 2 synchronizer ring and counter shaft 6th gear clearance	Standard Minimum	0.88 to 1.52 mm (0.0346 to 0.0598 in.) 0.88 mm (0.0346 in.)
Counter shaft 6th gear inside diameter	Standard Maximum	34.015 to 34.040 mm (1.33917 to 1.34016 in.) 34.040 mm (1.34016 in.)
No. 4 gear shift fork claw	Standard	7.9 to 8.0 mm (0.311 to 0.315 in.)

	Minimum	7.9 mm (0.311 in.)
No. 4 gear shift fork claw and glove of the No. 4 transmission hub sleeve clearance	Standard Maximum	0.15 to 0.35 mm (0.00590 to 0.0138 in.) 0.35 mm (0.0138 in.)
Reverse idler gear inside diameter	Standard Maximum	22.040 to 22.061mm (0.86771 to 0.86854 in.) 22.061mm (0.86854 in.)
Reverse idler gear shaft outer diameter	Standard Minimum	21.979 to 22.000 mm (0.86531 to 0.86614 in.) 21.979 mm (0.86531 in.)
Front input shaft bearing shaft snap ring thickness	Standard	0 to 0.1 mm (0 to 0.00394 in.)
No. 4 transmission clutch hub shaft snap ring	Mark A	2.80 mm (0.11023 in.)
	B	2.85 mm (0.11220 in.)
	C	2.90 mm (0.11417 in.)
	D	2.95 mm (0.11614 in.)
	E	3.00 mm (0.11811 in.)
	F	3.05 mm (0.12007 in.)
No. 2 synchronizer ring and 3rd gear clearance	Standard Minimum	0.8 to 1.6 mm (0.0315 to 0.0630 in.) 0.8 mm (0.0315 in.)
Front input shaft bearing shaft snap ring thickness	Standard Maximum	0 mm (0 in.) 0.1 mm (0.00394 in.)
Front input shaft bearing shaft snap ring	Mark 0	1.95 mm (0.07677 in.)
	2	2.00 mm (0.07874 in.)
	3	2.05 mm (0.08070 in.)
	4	2.10 mm (0.08267 in.)
	5	2.15 mm (0.08464 in.)
	6	2.20 mm (0.08661 in.)
Output shaft outer diameter	Standard A	31.984 to 32.000 mm (1.25921 to 1.25984 in.)
	B	42.984 to 43.000 mm (1.69228 to 1.69291 in.)
	C	40.984 to 41.000 mm (1.61354 to 1.61417 in.)
	Minimum A	31.984 mm (1.25921 in.)
	B	42.9849 mm (1.69228 in.)
	C	40.984 mm (1.61354 in.)
Output shaft runout	Standard	0.03 mm (0.00118 in.) or less
Reverse gear inside diameter	Standard Maximum	47.015 to 47.040 mm (1.85098 to 1.85197 in.) 47.040 mm (1.85197 in.)

1st gear inside diameter	Standard Maximum	46.315 to 46.340 mm (1.82343 to 1.82441 in.) 46.340 mm (1.82441 in.)
2nd gear inside diameter	Standard Maximum	49.015 to 49.040 mm (1.92972 to 1.93071 in.) 49.040 mm (1.93071 in.)
1st gear bearing inner race outer diameter	Standard Minimum	40.284 to 40.300 mm (1.58598 to 1.58661 in.) 40.284 mm (1.58598 in.)
No. 1 gear shift fork claw	Standard Minimum	7.9 to 8.0 mm (0.311 to 0.315 in.) 7.9 mm (0.311 in.)
No. 1 gear shift fork claw and glove of the No. 1 transmission hub sleeve clearance	Standard Maximum	0.15 to 0.35 mm (0.00590 to 0.0138 in.) 0.35 mm (0.0138 in.)
No. 3 gear shift fork claw	Standard Minimum	7.9 to 8.0 mm (0.311 to 0.315 in.) 7.9 mm (0.311 in.)
No. 3 gear shift fork claw and glove of the No. 3 transmission hub sleeve clearance	Standard Maximum	0.15 to 0.35 mm (0.00590 to 0.0138 in.) 0.35 mm (0.0138 in.)
No. 1 synchronizer ring set and 1st gear clearance	Standard inner	0.48 to 1.12 mm (0.0189 to 0.0441 in.)
	Middle	0.38 to 1.22 mm (0.0150 to 0.0480 in.)
	Outer	0.8 to 1.8 mm (0.0315 to 0.0709 in.)
No. 1 synchronizer ring set and 2nd gear clearance	Standard inner	0.48 to 1.12 mm (0.0189 to 0.0441 in.)
	Middle	0.38 to 1.22 mm (0.0150 to 0.0480 in.)
	Outer	0.8 to 1.8 mm (0.0315 to 0.0709 in.)
No. 3 transmission clutch hub shaft snap ring thickness	Standard	0 to 0.1 mm (0 to 0.00394 in.)
No. 3 transmission clutch hub shaft snap ring	Mark A	1.80 mm (0.07086 in.)
	B	1.85 mm (0.07283 in.)
	C	1.90 mm (0.07480 in.)
	D	1.95 mm (0.07677 in.)
	E	2.00 mm (0.07874 in.)
	F	2.05 mm (0.08070 in.)
6th gear shaft snap ring thickness	Standard	0 to 0.11 mm (0 to 0.00433 in.)
6th gear shaft snap ring	Mark A	2.67 mm (0.10511 in.)
	B	2.73 mm (0.10748 in.)
	C	2.79 mm (0.10984 in.)
	D	2.85 mm (0.11220 in.)
	E	2.91 mm (0.11456 in.)
	F	2.97 mm (0.11692 in.)

	G	3.03 mm (0.11929 in.)
	H	3.09 mm (0.12165 in.)
	J	3.15 mm (0.12401 in.)
	K	3.21 mm (0.01053 in.)
	L	3.27 mm (0.12874 in.)
No. 2 gear shift fork claw	Standard Minimum	7.9 to 8.0 mm (0.311 to 0.315 in.) 7.9 mm (0.311 in.)
No. 2 gear shift fork claw and glove of the No. 2 transmission hub sleeve clearance	Standard Maximum	0.15 to 0.35 mm (0.00590 to 0.0138 in.) 0.35 mm (0.0138 in.)
No. 2 synchronizer ring and 3rd gear clearance	Standard Maximum	0.8 to 1.6 mm (0.0314 to 0.0629 in.) 1.6 mm (0.0629 in.)
No. 3 synchronizer ring set and counter shaft 3rd gear clearance	Standard inner	0.4 to 1.2 mm (0.0157 to 0.0472 in.)
	Middle	0.3 to 1.3 mm (0.0118 to 0.0512 in.)
	Outer	0.8 to 1.8 mm (0.0315 to 0.0709 in.)
Counter shaft outer diameter	Standard A	39.284 to 39.300 mm (1.54661 to 1.54721 in.)
	B	37.984 to 38.000 mm (1.49543 to 1.49606 in.)
	C	24.987 to 25.000 mm (0.98374 to 0.98425 in.)
	Minimum A	39.284 mm (1.54661 in.)
	B	37.984 mm (1.49543 in.)
	C	24.987 mm (0.98374 in.)
Counter shaft runout	Standard	0.03 mm (0.00118 in.) or less
Counter shaft 3rd gear inside diameter	Standard Maximum	43.015 to 43.040 mm (1.69350 to 1.69448 in.) 43.040 mm (1.69448 in.)
Counter shaft 4th gear inside diameter	Standard Maximum	46.315 to 46.340 mm (1.82425 to 1.82441 in.) 46.340 mm (1.82441 in.)
4th gear bearing inner race outer diameter	Standard Minimum	46.225 to 46.250 mm (1.81988 to 1.82087 in.) 46.225 mm (1.81988 in.)
4th inner race thrust washer thickness	Standard	0 to 0.1 mm (0 to 0.00394 in.)
4th inner race thrust washer	Mark A	3.75 mm (0.14763 in.)
	B	3.80 mm (0.14960 in.)
	C	3.85 mm (0.15157 in.)
	D	3.90 mm (0.15354 in.)
	E	3.95 mm (0.15551 in.)

	F	4.00 mm (0.15748 in.)
	G	4.05 mm (0.15944 in.)
	H	4.10 mm (0.16141 in.)
Counter drive gear shaft snap ring thickness	Standard	0 to 0.1 mm (0 to 0.00394 in.)
Counter drive gear shaft snap ring	Mark A	1.80 mm (0.07086 in.)
	B	1.85 mm (0.07283 in.)
	C	1.90 mm (0.07480 in.)
	D	1.95 mm (0.07677 in.)
	E	2.00 mm (0.07874 in.)
	F	2.05 mm (0.08070 in.)
Front counter gear bearing shaft snap ring thickness	Standard	0 to 0.1 mm (0 to 0.00394 in.)
Front counter gear bearing shaft snap ring	Mark 1	2.05 mm (0.08070 in.)
	2	2.10 mm (0.08267 in.)
	3	2.15 mm (0.08464 in.)
	4	2.20 mm (0.08661 in.)
	5	2.25 mm (0.08858 in.)
	6	2.30 mm (0.09055 in.)



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001YXQ00EX
Title: SPECIFICATIONS: TL70 MANUAL TRANSMISSION / TRANSAXLE: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Manual transmission assembly filler plug x Manual transmission assembly	37	377	27
Manual transmission assembly drain plug x Manual transmission assembly	37	377	27
Neutral position switch assembly x Manual transmission assembly	32	329	24
Back-up light switch assembly x Manual transmission assembly	32	329	24
Manual transmission assembly x Rear No. 1 engine mounting insulator	40	408	30
Manual transmission assembly x Engine for bolt	50	510	37
Manual transmission assembly x Engine for nut	50	510	37
Rear No. 2 engine mounting insulator x Body for bolt	65	663	48
Rear No. 2 engine mounting insulator x Body for nut	40	408	30
Exhaust pipe bracket x Manual transmission assembly	23	235	17
Floor shift control shift lever retainer sub-assembly x Body	18	184	13
Clutch release cylinder assembly x Manual transmission assembly	37	377	27
Wire harness clamp bracket x Manual transmission assembly	10	102	7
Ground cable x Manual transmission assembly	13	133	10
Shift lever cap x floor shift control shift lever retainer	7.5	77	66 in.*lbf
Shift lever boot x Body	18	184	13
No. 3 gear shift fork shaft x No. 3 gear shift fork	20	199	14
No. 1 gear shift fork shaft x No. 1 gear shift fork	20	199	14
No. 2 gear shift fork shaft x No. 2 gear shift fork	20	199	14
Front bearing retainer x Clutch housing	17	173	13
Transmission case x Clutch housing	29	296	21
Transmission case x Reverse idler gear shaft	28	286	21
Clutch housing x Reverse idler gear shaft	28	286	21
Rear bearing retainer x Transmission case	30	306	22
Head straight screw plug x Transmission case	19	194	14
Front shift inner lever x Shift shaft	33	340	25
No. 1 extension housing oil receiver pipe x Transmission extension housing sub-assembly	8.5	87	75 in.*lbf
Transmission extension housing sub-assembly x Transmission case	29	296	21
Bolt x Transmission extension housing sub-assembly	31	316	23

Holder x Transmission extension housing sub-assembly	39	400	29
Head straight screw plug x Transmission extension housing sub-assembly	25	250	18
Wire harness clamp bracket x Clutch housing	7.0	71	62 in.*lbf
Release fork support x Clutch housing	16	163	12



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PMD00GX
Title: SPECIFICATIONS: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SERVICE DATA (2013 FR-S)		

SERVICE DATA

Line pressure (Fluid temperature): 50 to 80°C (122 to 176°F) Engine idling	D position	350 to 430 kPa (3.6 to 4.4 kgf/cm ² , 51 to 62 psi)
	R position	760 to 950 kPa (7.7 to 9.7 kgf/cm ² , 110 to 138 psi)
Line pressure (Fluid temperature): 50 to 80°C (122 to 176°F) At stall speed (Throttle valve fully open)	D position	1200 to 1380 kPa (12.5 to 14.0 kgf/cm ² , 174 to 200 psi)
	R position	1410 to 1630 kPa (14.4 to 16.6 kgf/cm ² , 204 to 236 psi)
Engine stall speed	D position	2350 +/- 250 rpm
Time lag	N → D position	Less than 1.2 seconds
	N → R position	Less than 1.5 seconds
Engine idle speed (A/C OFF)	N position	600 to 800 r/min
Drive plate runout	Maximum	0.30 mm (0.0118 in.)
Shift schedule		
D, 6 position		
Throttle valve fully open	1 → 2	47 km/h (29 mph)
	2 → 3	96 km/h (59 mph)
	3 → 4	142 km/h (88 mph)
	4 → 5	201 km/h (125 mph)
	5 → 6	282 km/h (175 mph)
Throttle valve opening 6 %	1 → 2	12 km/h (7 mph)
	2 → 3	20 km/h (12 mph)
	3 → 4	30 km/h (19 mph)
	4 → 5	48 km/h (30 mph)
	5 → 6	59 km/h (37 mph)
Manual downshift speed		
5, 4, 3, 2, 1 gear range	→ 5	264 km/h (164 mph)
	→ 4	186 km/h (116 mph)
	→ 3	129 km/h (80 mph)
	→ 2	80 km/h (50 mph)

NOTICE:

- All shift point values indicated in the above tables are actual values. Therefore, if checking a shift point with a chassis dynamometer, keep in mind that there is a range of error in the chassis dynamometer indication.
- If checking a shift point against the speed indicated on the speedometer, remember to consider the speedometer correction rate and range of error in the tester indication.

Transmission Revolution Sensor

ITEM	TESTER CONNECTION CONDITION	SPECIFIED CONDITION
Transmission revolution sensor NT	1 - 2 20°C (68°F)	560 to 680 Ω
Transmission revolution sensor SP2	1 - 2 20°C (68°F)	560 to 680 Ω

Transmission Wire

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (E2) - 9 (OIL)	10°C (50°F)	5 to 8 kΩ
1 (E2) - 9 (OIL)	25°C (77°F)	2.5 to 4.5 kΩ
1 (E2) - 9 (OIL)	110°C (230°F)	0.22 to 0.28 kΩ
1 (E2) - 9 (OIL)	Always	79 Ω to 156 kΩ
1 (E2) - Body ground	Always	10 kΩ or higher
9 (OIL) - Body ground	Always	10 kΩ or higher

Shift Solenoid Valve

ITEM	TESTER CONNECTION CONDITION	SPECIFIED CONDITION
Shift solenoid valve SL1	1 - 2 20°C (68°F)	5.0 to 5.6 Ω
Shift solenoid valve S1	Solenoid Connector (S1) - Solenoid Body (S1) 20°C (68°F)	11 to 15 Ω
Shift solenoid valve S2	Solenoid Connector (S2) - Solenoid Body (S2) 20°C (68°F)	11 to 15 Ω
Shift solenoid valve S3	Solenoid Connector (S3) - Solenoid Body (S3) 20°C (68°F)	11 to 15 Ω
Shift solenoid valve S4	Solenoid Connector (S4) - Solenoid Body (S4) 20°C (68°F)	11 to 15 Ω
Shift solenoid valve SL2	1 - 2 20°C (68°F)	5.0 to 5.6 Ω
Shift solenoid valve SR	Solenoid Connector (SR) - Solenoid Body (SR) 20°C (68°F)	11 to 15 Ω

Shift solenoid valve SLT	1 - 2 20°C (68°F)	5.0 to 5.6 Ω
Shift solenoid valve SLU	1 - 2 20°C (68°F)	5.0 to 5.6 Ω

Park/Neutral Position Switch

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
2 (RB) - 6 (PL) 4 (B) - 5 (L)	Shift lever in P	Below 1 Ω
	Shift lever not in P	10 kΩ or higher
2 (RB) - 1 (RL)	Shift lever in R	Below 1 Ω
	Shift lever not in R	10 kΩ or higher
2 (RB) - 9 (NL) 4 (B) - 5 (L)	Shift lever in N	Below 1 Ω
	Shift lever not in N	10 kΩ or higher
2 (RB) - 7 (DL)	Shift lever in D, M, "+" or "-"	Below 1 Ω
	Shift lever not in D, M, "+" or "-"	10 kΩ or higher

Shift Lever Assembly

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 3	Shift lever not in P	Below 1 Ω
2 - 3	Shift lever in P	
8 - 9	Shift lever in M	
	Shift lever held in "+" (Up shift)	
10 - 11	Shift lever in M	
12 - 13	Shift lever in M	
	Shift lever held in "-" (Down shift)	
1 - 3	Shift lever in P	10 kΩ or higher
2 - 3	Shift lever not in P	
8 - 9	Shift lever in M	
	Shift lever not in "+"	
10 - 11	Shift lever not in M	
12 - 13	Shift lever in M	
	Shift lever not in "-"	

Shift Lock Solenoid

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 - 5	20°C (68°F)	27.6 to 30.5 Ω

Shift Paddle Switch

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
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1 - 3	Pull continuously "+" (Up shift)	Below 1 Ω
	Release "+"	10 k Ω or higher
1 - 4	Pull continuously "-" (Down shift)	Below 1 Ω
	Release "-"	10 k Ω or higher

Pattern Select Switch

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
6 - 8	Pattern select (SNOW) switch on	Below 1 Ω
	Pattern select (SNOW) switch off	10 k Ω or higher
4 - 8	Pattern select (SPORT) switch on	Below 1 Ω
	Pattern select (SPORT) switch off	10 k Ω or higher

Automatic Transmission Unit:

1st and reverse return spring free length	Standard: 23.74 mm (0.934 in.)
Rear planetary gear pinion thrust clearance	Standard: 0.2 to 0.6 mm (0.00788 to 0.0236 in.)
Rear planetary gear bushing inside diameter	Standard: 18.025 mm (0.710 in.)
1st and reverse brake pack clearance	0.5 to 0.8 mm (0.0197 to 0.0315 in.)
Flange thickness (1st and reverse brake)	Mark 0: 0 mm (0 in.) Mark 2: 0.2 mm (0.00787 in.) Mark 4: 0.4 mm (0.01575 in.) Mark 6: 0.6 mm (0.02362 in.) Mark 8: 0.8 mm (0.03150 in.) Mark 10: 1.0 mm (0.03937 in.) Mark 12: 1.2 mm (0.04724 in.) Mark 14: 1.4 mm (0.05512 in.)
Intermediate shaft runout	Standard: 0.03 mm (0.00118 in.)
Intermediate shaft diameter	Standard A: 22.962 to 22.975 mm (0.9041 to 0.9045 in.) Standard B: 27.759 to 27.775 mm (1.0929 to 1.0935 in.)
Center planetary gear pinion thrust clearance	Standard: 0.12 to 0.68 mm (0.00473 to 0.0267 in.)
No. 2 brake pinion return spring free length	Standard: 22.66 mm (0.892 in.)
No. 2 brake piston piston stroke	0.6 to 0.9 mm (0.0237 to 0.0354 in.)
Flange thickness (No. 2 brake piston)	Mark 0: 2.0 mm (0.0787 in.) Mark 1: 2.1 mm (0.0826 in.) Mark 2: 2.2 mm (0.0866 in.) Mark 3: 2.3 mm (0.0905 in.) Mark 4: 2.4 mm (0.0944 in.) Mark 5: 2.5 mm (0.0984 in.) Mark 6: 2.6 mm (0.102 in.) Mark 7: 2.7 mm (0.106 in.)
Brake piston return spring free length	Standard: 17.05 mm (0.671 in.)
Front planetary gear pinion thrust clearance	Standard: 0.20 to 0.60 mm (0.00788 to 0.0236 in.)

Front planetary gear bushing inside diameter	Standard: 48.78 mm (1.92 in.)
No. 1 brake piston piston stroke	0.42 to 0.72 mm (0.0166 to 0.0283 in.)
No. 3 brake piston return spring free length	Standard: 15.72 mm (0.619 in.)
Flange thickness (No. 1 brake piston)	Mark 0: 2.0 mm (0.0787 in.) Mark 1: 2.2 mm (0.0866 in.) Mark 2: 2.4 mm (0.0944 in.) Mark 3: 2.6 mm (0.102 in.)

Oil Pump:

Oil pump body bushing inside diameter	Standard: 38.138 mm (1.5015 in.)
Stator shaft bushing inside diameter	Standard: 21.527 mm (0.8475 in.)
Body clearance	Standard: 0.10 to 0.17 mm (0.00394 to 0.00669 in.)
Tip clearance	Standard: 0.070 to 0.150 mm (0.00276 to 0.00590 in.)
Side clearance	Standard: 0.02 to 0.04 mm (0.000787 to 0.00157 in.)
Drive and driven gear thickness	Mark 0: 9.946 to 9.952 mm (0.39157 to 0.39181 in.) Mark 1: 9.953 to 9.959 mm (0.39185 to 0.39209 in.) Mark 2: 9.960 to 9.966 mm (0.39213 to 0.39236 in.) Mark 3: 9.967 to 9.973 mm (0.39240 to 0.39264 in.) Mark 4: 9.974 to 9.980 mm (0.39268 to 0.39291 in.) Mark 5: 9.981 to 9.987 mm (0.39295 to 0.39319 in.) Mark 6: 9.988 to 9.994 mm (0.39323 to 0.39346 in.)

Clutch Drum And Input Shaft:

Direct clutch return spring free length	Standard: 20.02 mm (0.788 in.)
Reverse clutch return spring free length	Standard: 21.03 mm (0.828 in.)
Direct clutch pack clearance	0.5 to 0.8 mm (0.0197 to 0.0314 in.)
Flange thickness (Direct clutch)	Mark 0: 3.0 mm (0.118 in.) Mark 1: 3.1 mm (0.122 in.) Mark 2: 3.2 mm (0.126 in.) Mark 3: 3.3 mm (0.130 in.) Mark 4: 3.4 mm (0.134 in.) Mark 5: 3.5 mm (0.138 in.) Mark 6: 3.6 mm (0.142 in.) Mark 7: 3.7 mm (0.146 in.) Mark 8: 3.8 mm (0.150 in.)
Reverse clutch pack clearance	0.4 to 0.7 mm (0.0158 to 0.0275 in.)
Flange thickness (Reverse clutch)	Mark 0: 2.4 mm (0.0945 in.) Mark 1: 2.5 mm (0.0984 in.) Mark 2: 2.6 mm (0.102 in.) Mark 3: 2.7 mm (0.106 in.) Mark 4: 2.8 mm (0.110 in.) Mark 5: 2.9 mm (0.114 in.) Mark 6: 3.0 mm (0.118 in.) Mark 7: 3.1 mm (0.122 in.)

	Mark 8: 3.2 mm (0.126 in.) Mark 9: 3.3 mm (0.130 in.) Mark A: 3.4 mm (0.134 in.) Mark B: 3.5 mm (0.138 in.)
Forward clutch return spring free length	Standard: 26.29 mm (1.04 in.)
Forward clutch pack clearance	0.56 to 0.86 mm (0.0221 to 0.0338 in.)
Flange thickness (Forward clutch)	Mark 0: 3.0 mm (0.118 in.) Mark 1: 3.1 mm (0.122 in.) Mark 2: 3.2 mm (0.126 in.) Mark 3: 3.3 mm (0.130 in.) Mark 4: 3.4 mm (0.134 in.) Mark 5: 3.5 mm (0.138 in.) Mark 6: 3.6 mm (0.142 in.) Mark 7: 3.7 mm (0.146 in.) Mark 8: 3.8 mm (0.150 in.) Mark 9: 3.9 mm (0.154 in.)
Coast clutch pack clearance	0.4 to 0.7 mm (0.0158 to 0.0275 in.)
Flange thickness (Coast clutch)	Mark 0: 3.0 mm (0.118 in.) Mark 1: 3.1 mm (0.122 in.) Mark 2: 3.2 mm (0.126 in.) Mark 3: 3.3 mm (0.130 in.) Mark 4: 3.4 mm (0.134 in.) Mark 5: 3.5 mm (0.138 in.) Mark 6: 3.6 mm (0.142 in.) Mark 7: 3.7 mm (0.146 in.) Mark 8: 3.8 mm (0.150 in.) Mark 9: 3.9 mm (0.154 in.)
Forward clutch hub inside diameter	Standard: 23.037 to 23.062 mm (0.9070 to 0.9079 in.)
Reverse clutch hub inside diameter	Standard: 33.312 to 33.337 mm (1.3115 to 1.3125 in.)

Accumulator:

SPRING	FREE LENGTH/OUTER DIAMETER MM (IN.)	COLOR
B ₁ (Outer)	46.36 (1.8252)/17.10 (0.6732)	Natural
C ₂	65.07 (2.5618)/16.2 (0.6378)	Pink
B ₃	64.5 (2.539)/19.5 (0.768)	Orange
C ₃ (Inner)	44.0 (1.732)/14.0 (0.551)	Yellow
C ₃ (Outer)	76.65 (3.0178)/20.10 (0.7913)	White

Output Shaft Bearing:

Clearance	0.02 to 0.12 mm (0.000787 to 0.00472 in.)
	No. 1: 3.80 mm (0.150 in.) No. 2: 3.85 mm (0.152 in.) No. 3: 3.90 mm (0.154 in.)

Flange thickness

- No. 4: 3.95 mm (0.156 in.)
- No. 5: 4.00 mm (0.157 in.)
- No. 6: 4.05 mm (0.159 in.)
- No. 7: 4.10 mm (0.161 in.)
- No. 8: 4.15 mm (0.163 in.)
- No. 9: 4.20 mm (0.165 in.)
- No. 10: 4.25 mm (0.167 in.)
- No. 11: 4.30 mm (0.169 in.)
- No. 12: 4.35 mm (0.171 in.)



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PME00GX
Title: SPECIFICATIONS: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KGF*CM	FT.*LBF
Overflow plug x Automatic transmission assembly	20	204	15
Refill plug x Automatic transmission assembly	39	400	29
Transmission revolution sensor x Automatic transmission assembly	5.4	55	48 in.*lbf
ATF temperature sensor x Transmission valve body assembly	10	102	7
Valve body wire harness clamp x Transmission valve body assembly	6.4	65	57 in.*lbf
Valve body oil strainer assembly x Transmission valve body assembly	10	102	7
Automatic transmission oil pan sub-assembly x Automatic transmission assembly	7.0	71	62 in.*lbf
Shift solenoid valve (S2) x Transmission valve body assembly	10	102	7
Shift solenoid valve (S3) x Transmission valve body assembly	10	102	7
Shift solenoid valve (S4) x Transmission valve body assembly	10	102	7
Shift solenoid valve (SR) x Transmission valve body assembly	10	102	7
Lock plate x Transmission valve body assembly	6.4	65	57 in.*lbf
Transmission valve body assembly x Automatic transmission assembly	11	112	8
Detent spring x Transmission valve body assembly	10	102	7
Lock nut x Park/neutral position switch assembly	6.9	70	61 in.*lbf
Park/neutral position switch assembly x Automatic transmission assembly	13	130	9
Transmission control shaft lever RH x Park/neutral position switch assembly	16	163	12
Transmission oil cooler bracket x Transmission oil cooler	23	235	17
Transmission oil cooler x Body	23	235	17
Floor shift gear shifting rod sub-assembly x Shift lever assembly	18	184	13
Floor shift assembly x Body	18	184	13
Shift Paddle Switch (Transmission Shift Switch Assembly) x Steering wheel assembly	1.7	18	15 in.*lbf
Oil cooler tube x Automatic transmission assembly	21	214	16
Automatic transmission assembly x Engine	50	510	37
Rear No. 1 engine mounting insulator x Automatic transmission assembly	40	408	30
Rear No. 2 engine mounting insulator x Rear No. 1 engine mounting insulator	40	408	30

Rear No. 2 engine mounting insulator x Body	65	663	48
Exhaust pipe bracket x Automatic transmission assembly	23	235	17
Torque converter assembly x Drive plate	25	255	18
Vacuum tube connector hose x Engine	18	184	13
No. 2 engine hanger x Engine	21	214	16
Wire harness clamp bracket x No. 2 engine hanger	10	102	7
Ground cable x Automatic transmission assembly	13	133	10
Oil pump assembly x Automatic transmission case sub-assembly	21	214	16
Parking lock pawl bracket x Automatic transmission case sub-assembly	7.3	74	65 in.*lbf
Extension housing sub-assembly x Automatic transmission case sub-assembly	34	345	25
Automatic transmission housing x Automatic transmission case sub-assembly (for Bolts A and B)	34	347	25
Automatic transmission housing x Automatic transmission case sub-assembly (for Bolt C)	57	581	42
Automatic transmission case plug (TORX) x Automatic transmission case sub-assembly	39	400	29
Automatic transmission case plug (Hexagon) x Automatic transmission case sub-assembly	7.4	75	65 in.*lbf
Automatic transaxle breather tube x Automatic transmission case sub-assembly	5.4	55	48 in.*lbf
Oil cooler tube union x Automatic transmission case sub-assembly	39	393	28
TCM bracket x TCM	7.5	77	66 in.*lbf
TCM x Body	7.5	77	66 in.*lbf
Stator shaft assembly x Front oil pump body sub-assembly	11	112	8



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002E8X03DX
Title: SPECIFICATIONS: WINDOW / GLASS: TORQUE SPECIFICATIONS (2013 FR-S)		

TORQUE SPECIFICATIONS

POWER WINDOW REGULATOR MOTOR

PART TIGHTENED	N*M	KGF*CM	FT. *LBF
Power window regulator motor assembly x Front door window regulator sub-assembly	6.0	61	53 in.*lbf



Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000313803JX
Title: SPECIFICATIONS: WIPER / WASHER: TORQUE SPECIFICATIONS (2013 FR-S)		

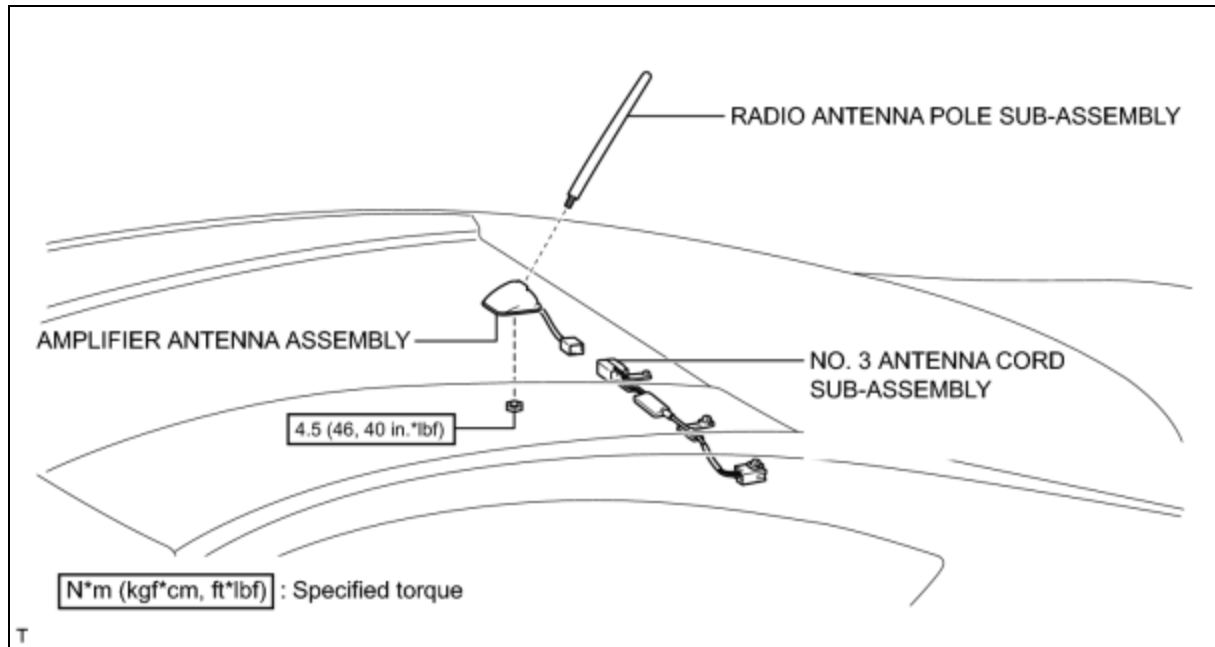
TORQUE SPECIFICATIONS

PART TIGHTENED	N*M	KG*CM	FT.*LBF
FRONT WIPER MOTOR			
Windshield wiper arm and blade assembly LH x Front wiper motor and link assembly	22	224	16
Windshield wiper arm and blade assembly RH x Front wiper motor and link assembly	22	224	16
Front wiper motor and link assembly x Body	6.0	61	53 in.*lbf
Windshield wiper link assembly x Windshield wiper motor assembly	7.5	77	66 in.*lbf
Windshield wiper motor assembly x Front wiper crank sub-assembly	8.5	87	75 in.*lbf
WASHER MOTOR			
Front fender liner LH x Front bumper cover	7.5	77	66 in.*lbf
HEADLIGHT CLEANER ACTUATOR			
Headlight washer actuator sub-assembly LH x Front bumper side support LH	##	##	## in.*lbf
Headlight washer actuator sub-assembly RH x Front bumper side support RH	##	##	## in.*lbf
Clamp x Washer jar	##	##	## in.*lbf
Headlight cleaner control relay x Washer jar	4.0	41	35 in.*lbf

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PZR01CX
Title: AUDIO / VIDEO: AMPLIFIER ANTENNA: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PZQ01TX
Title: AUDIO / VIDEO: AMPLIFIER ANTENNA: INSTALLATION (2013 FR-S)		

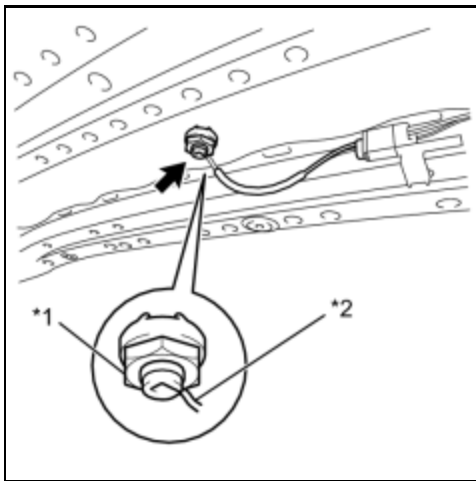
INSTALLATION

1. INSTALL NO. 3 ANTENNA CORD SUB-ASSEMBLY

(a) Engage the 3 clamps and install the No. 3 antenna cord sub-assembly.

2. INSTALL AMPLIFIER ANTENNA ASSEMBLY

(a) Engage the 2 claws to install the amplifier antenna assembly.



(b) Place the amplifier antenna cord in the amplifier antenna cutout.

(c) Install the amplifier antenna assembly with the nut.

Torque: 4.5 N·m (46 kgf·cm, 40in·lbf)

Text in Illustration

*1	Nut
*2	Amplifier Antenna Cord

3. INSTALL RADIO ANTENNA POLE SUB-ASSEMBLY INFO

4. INSTALL ROOF HEADLINING ASSEMBLY

INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PZS01UX
Title: AUDIO / VIDEO: AMPLIFIER ANTENNA: REMOVAL (2013 FR-S)		

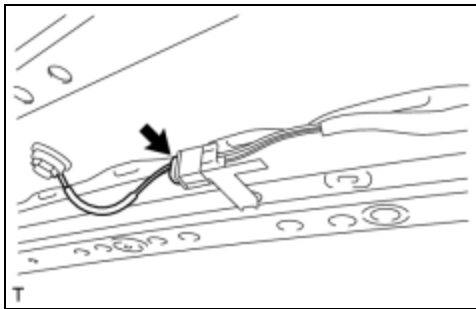
REMOVAL

1. REMOVE ROOF HEADLINING ASSEMBLY

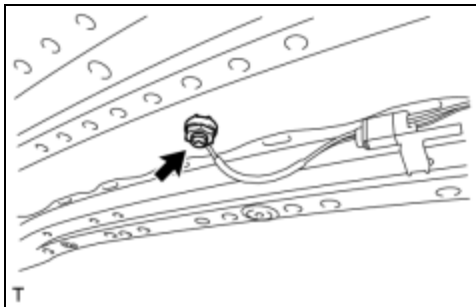
INFO

2. REMOVE RADIO ANTENNA POLE SUB-ASSEMBLY INFO

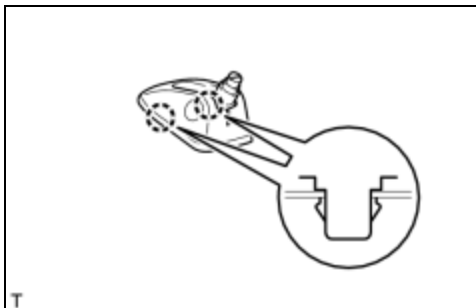
3. REMOVE AMPLIFIER ANTENNA ASSEMBLY



(a) Disconnect the connector.

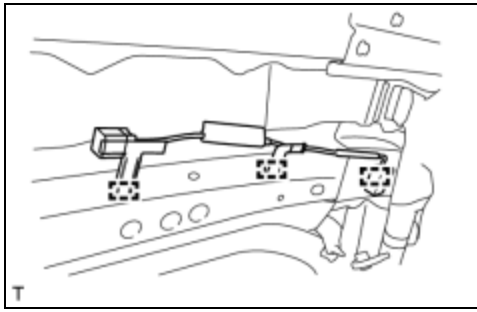


(b) Remove the nut.



(c) Disengage the 2 claws and remove the amplifier antenna assembly.

4. REMOVE NO. 3 ANTENNA CORD SUB-ASSEMBLY

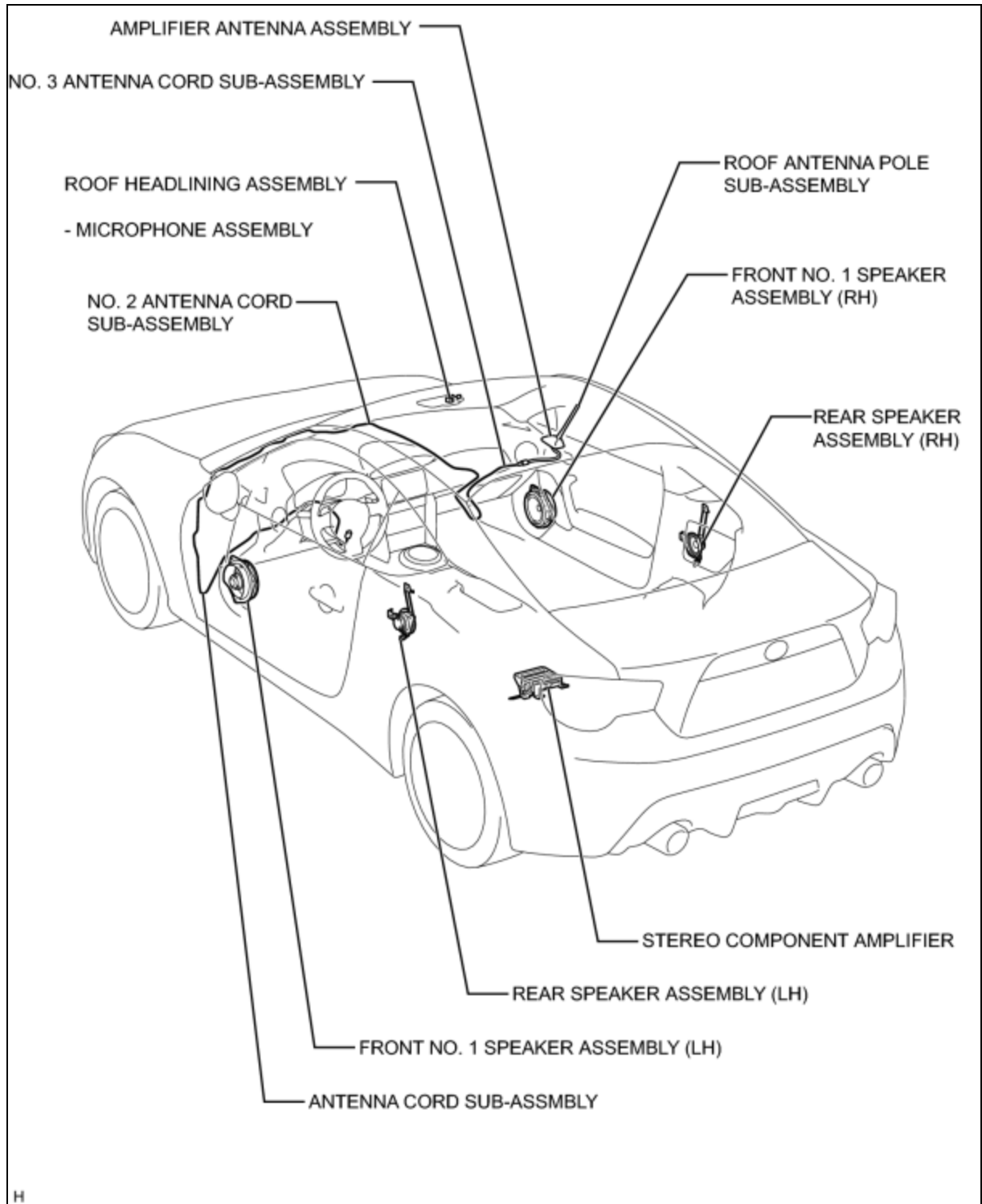


(a) Disengage the 3 clamps and remove the No. 3 antenna cord sub-assembly.

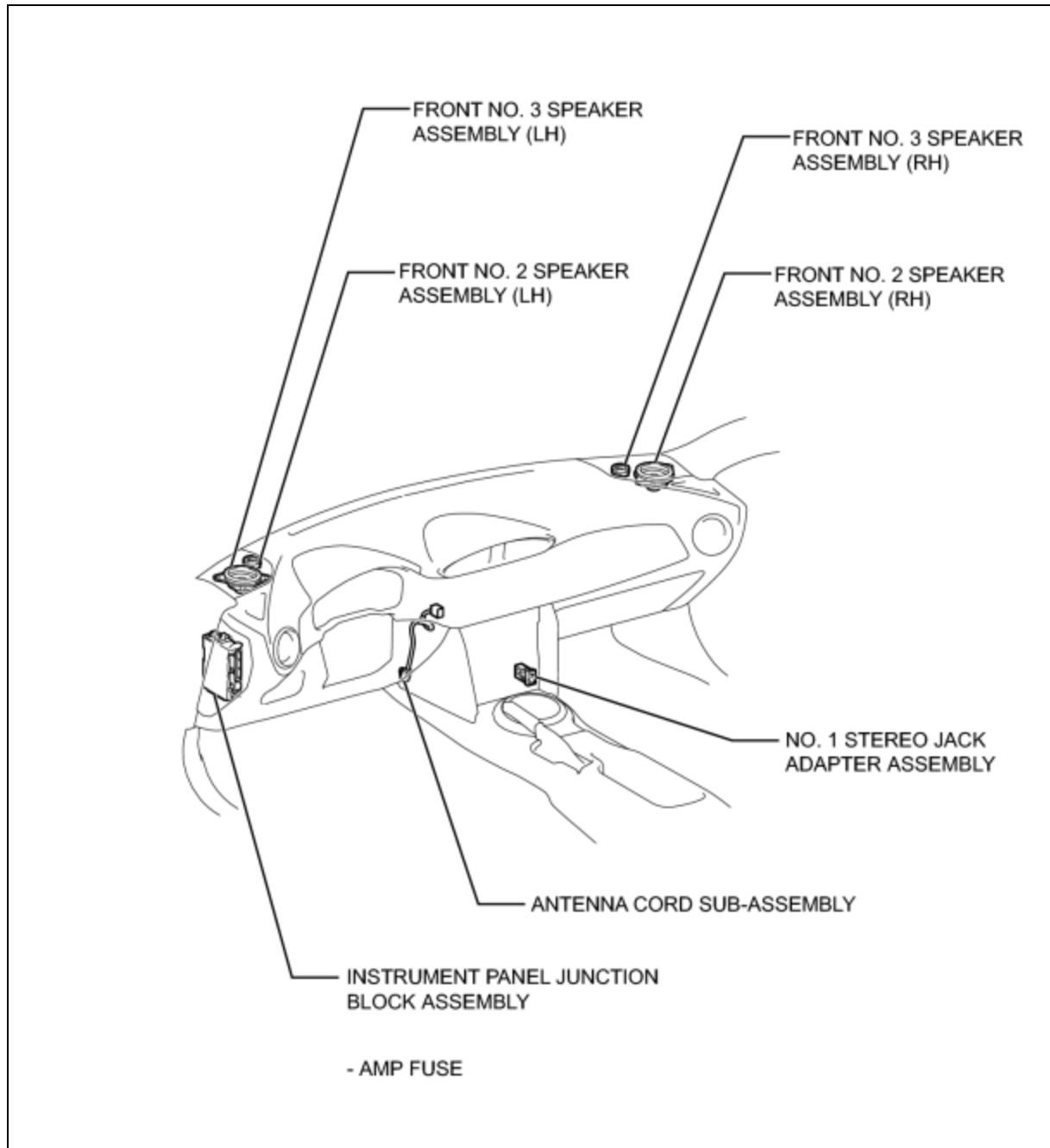
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000012A606KX
Title: AUDIO / VIDEO: AUDIO AND VISUAL SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION

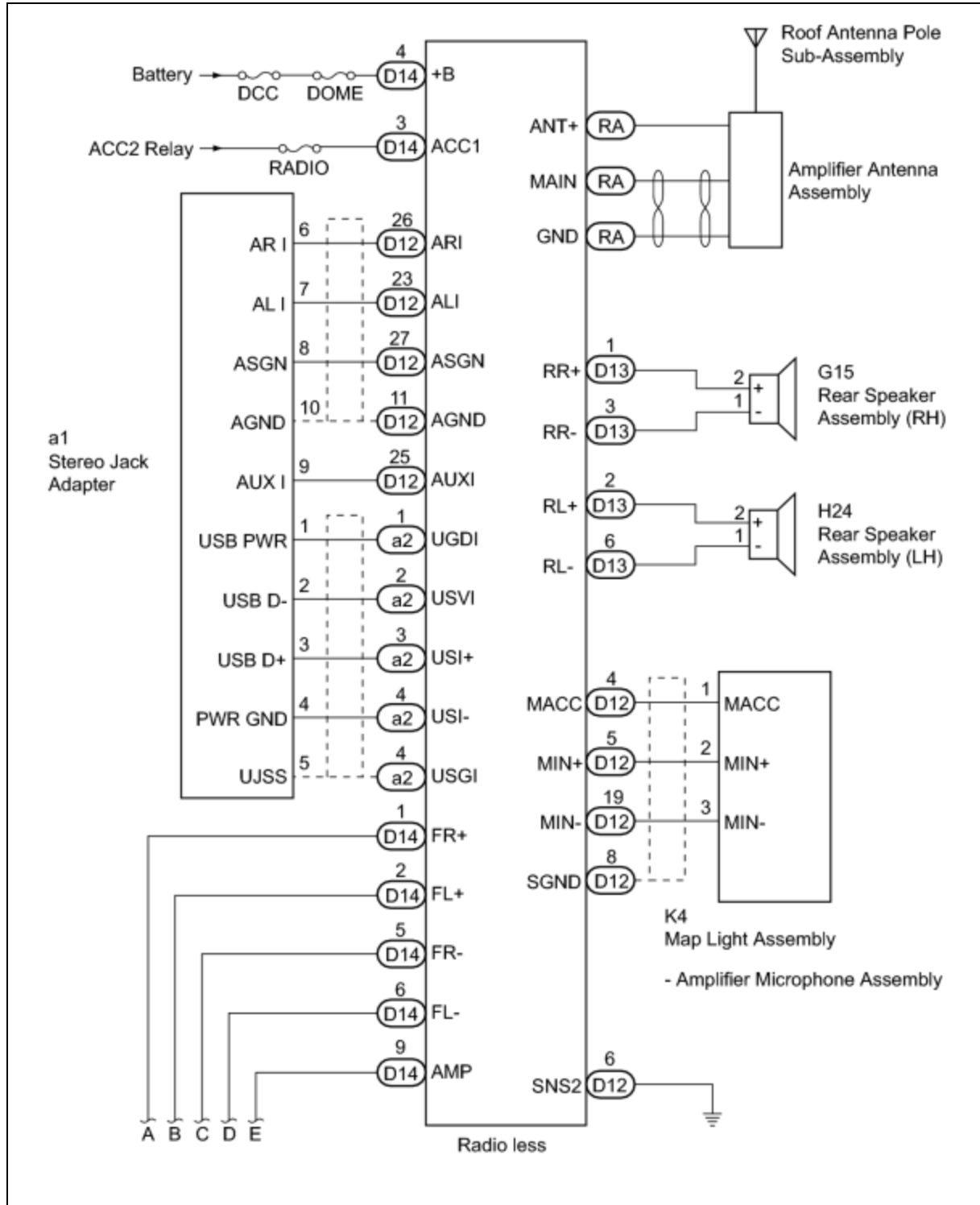


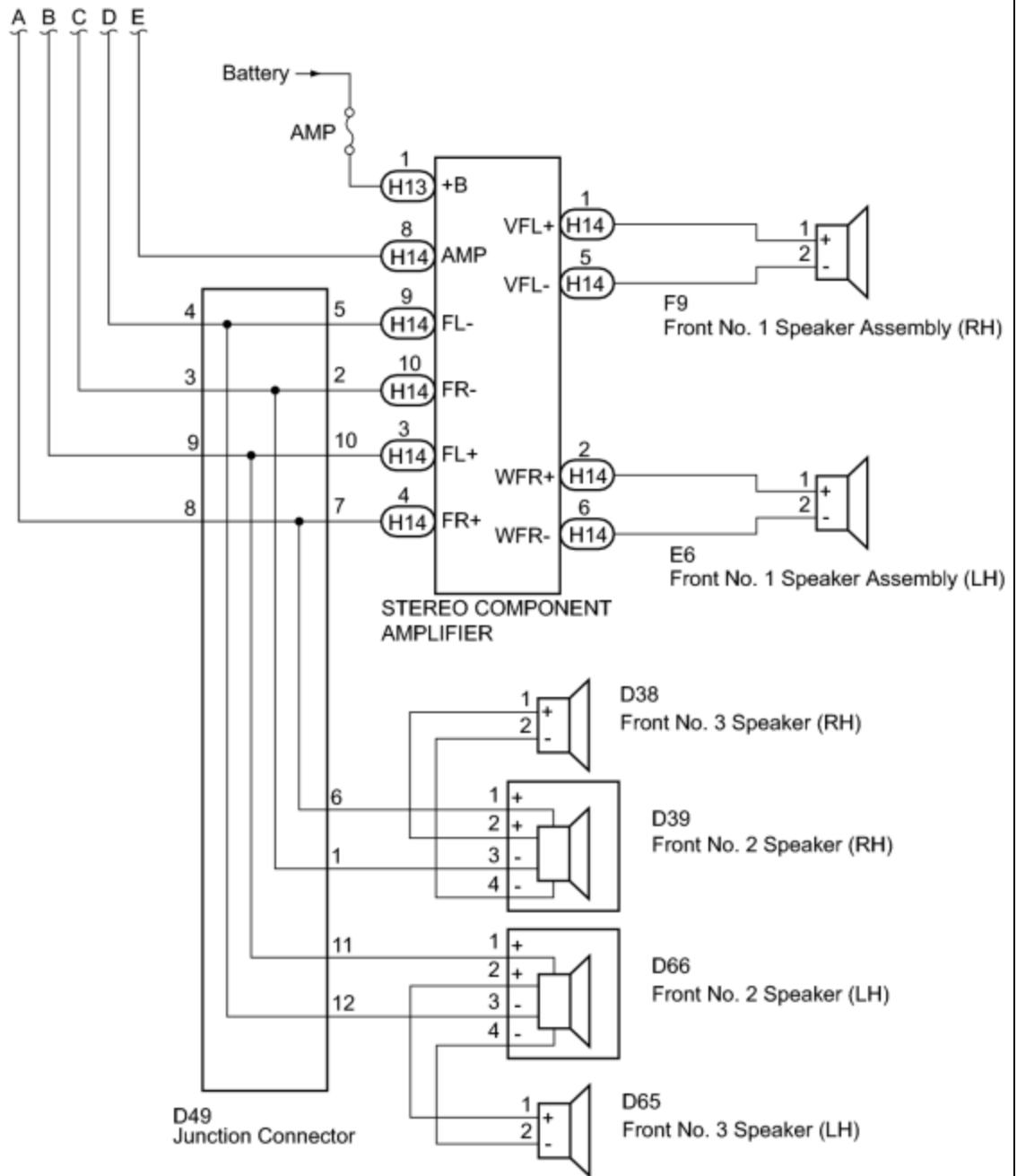
ILLUSTRATION



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000012AB0ADX
Title: AUDIO / VIDEO: AUDIO AND VISUAL SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM

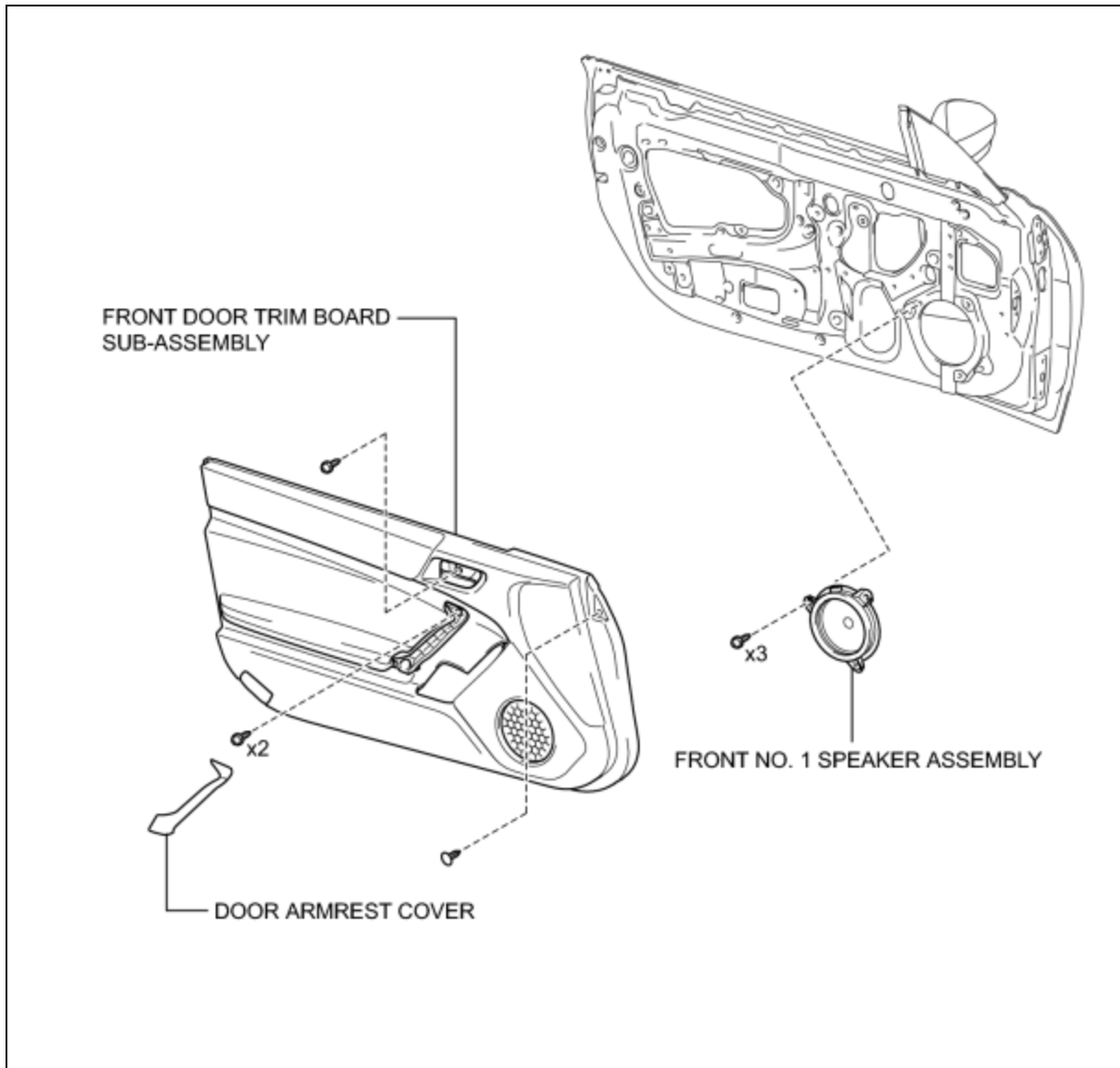




Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PZ301FX
Title: AUDIO / VIDEO: FRONT DOOR SPEAKER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020Q204DX
Title: AUDIO / VIDEO: FRONT DOOR SPEAKER: INSPECTION (2013 FR-S)		

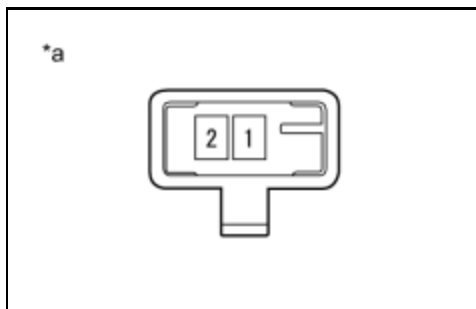
INSPECTION

1. INSPECT FRONT NO. 1 SPEAKER ASSEMBLY

- (a) With the speaker installed, check that there is no looseness or other abnormalities.
- (b) Check that there is no foreign matter in the speaker, no tears on the speaker cone or other abnormalities.

- (c) Measure the resistance of the speaker.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	Always	3.4 to 4.6 Ω

If the result is not as specified, replace the speaker.

Text in Illustration

*a	Component without harness connected (Front No. 1 Speaker Assembly)
----	---

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PZ201QX
Title: AUDIO / VIDEO: FRONT DOOR SPEAKER: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. INSTALL FRONT NO. 1 SPEAKER ASSEMBLY

- (a) Install the front No. 1 speaker assembly with the 3 screws.

NOTICE:

Do not touch the speaker cone.

- (b) Connect the connector.

2. INSTALL FRONT DOOR TRIM BOARD SUB-ASSEMBLY INFO

3. INSTALL DOOR ARMREST COVER INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PZ401QX
Title: AUDIO / VIDEO: FRONT DOOR SPEAKER: REMOVAL (2013 FR-S)		

REMOVAL

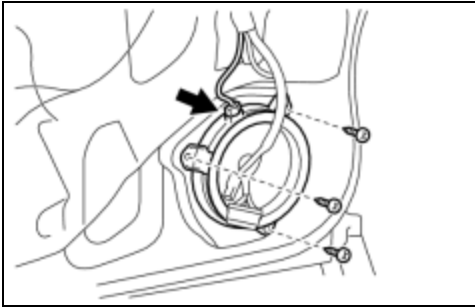
HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. REMOVE DOOR ARMREST COVER [INFO](#)

2. REMOVE FRONT DOOR TRIM BOARD SUB-ASSEMBLY [INFO](#)

3. REMOVE FRONT NO. 1 SPEAKER ASSEMBLY



(a) Disconnect the connector.

(b) Remove the 3 screws and front No. 1 speaker assembly.

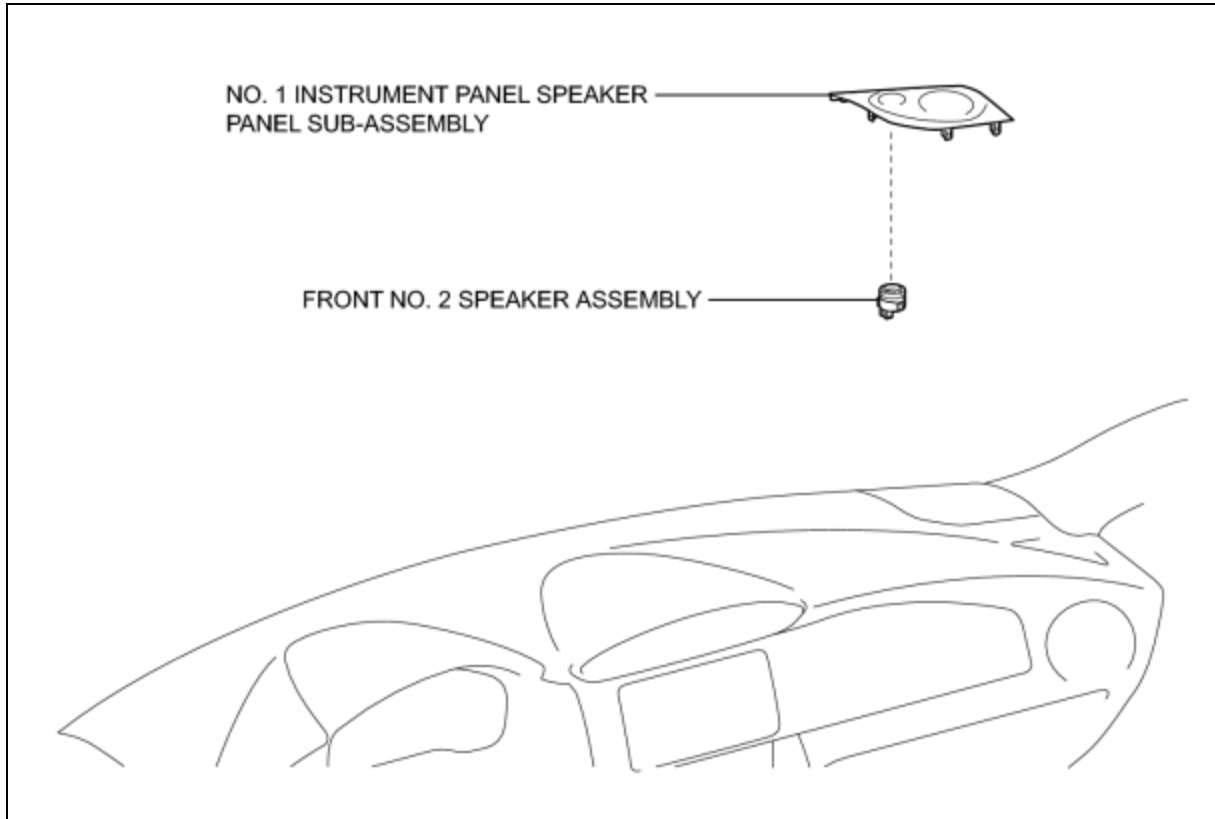
NOTICE:

Do not touch the speaker cone.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003AW400VX
Title: AUDIO / VIDEO: INSTRUMENT PANEL SPEAKER (for 6 Speakers): COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VEM01UX
Title: AUDIO / VIDEO: INSTRUMENT PANEL SPEAKER (for 6 Speakers): INSPECTION (2013 FR-S)		

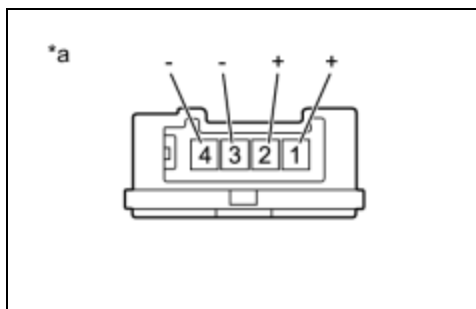
INSPECTION

1. INSPECT FRONT NO. 2 SPEAKER ASSEMBLY

(a) Check that there is no foreign matter in the front No. 2 speaker assembly, no tears on the front No. 4 speaker assembly cone or other abnormalities.

(b) Measure the resistance of the front No. 2 speaker assembly.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (+) - 2 (+)	Always	3.4 to 4.6 Ω
3 (-) - 4 (-)	Always	3.4 to 4.6 Ω

If the result is not as specified, replace the front No. 2 speaker assembly.

Text in Illustration

*a	Component without harness connected (Front No. 2 speaker assembly)
----	---

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VEL02GX
Title: AUDIO / VIDEO: INSTRUMENT PANEL SPEAKER (for 6 Speakers): INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the RH side.

1. INSTALL FRONT NO. 2 SPEAKER ASSEMBLY

- (a) Engage the 3 claws to install the front No. 2 speaker assembly.

NOTICE:

Do not touch the cone part of the speaker.

2. INSTALL NO. 1 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VEO02CX
Title: AUDIO / VIDEO: INSTRUMENT PANEL SPEAKER (for 6 Speakers): REMOVAL (2013 FR-S)		

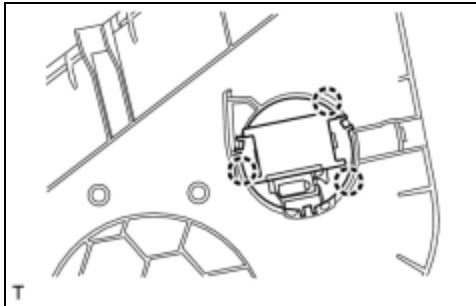
REMOVAL

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the RH side.

1. REMOVE NO. 1 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY INFO

2. REMOVE FRONT NO. 2 SPEAKER ASSEMBLY



- (a) Disengage the 3 claws and remove the front No. 2 speaker assembly from the No. 2 instrument speaker panel sub-assembly.

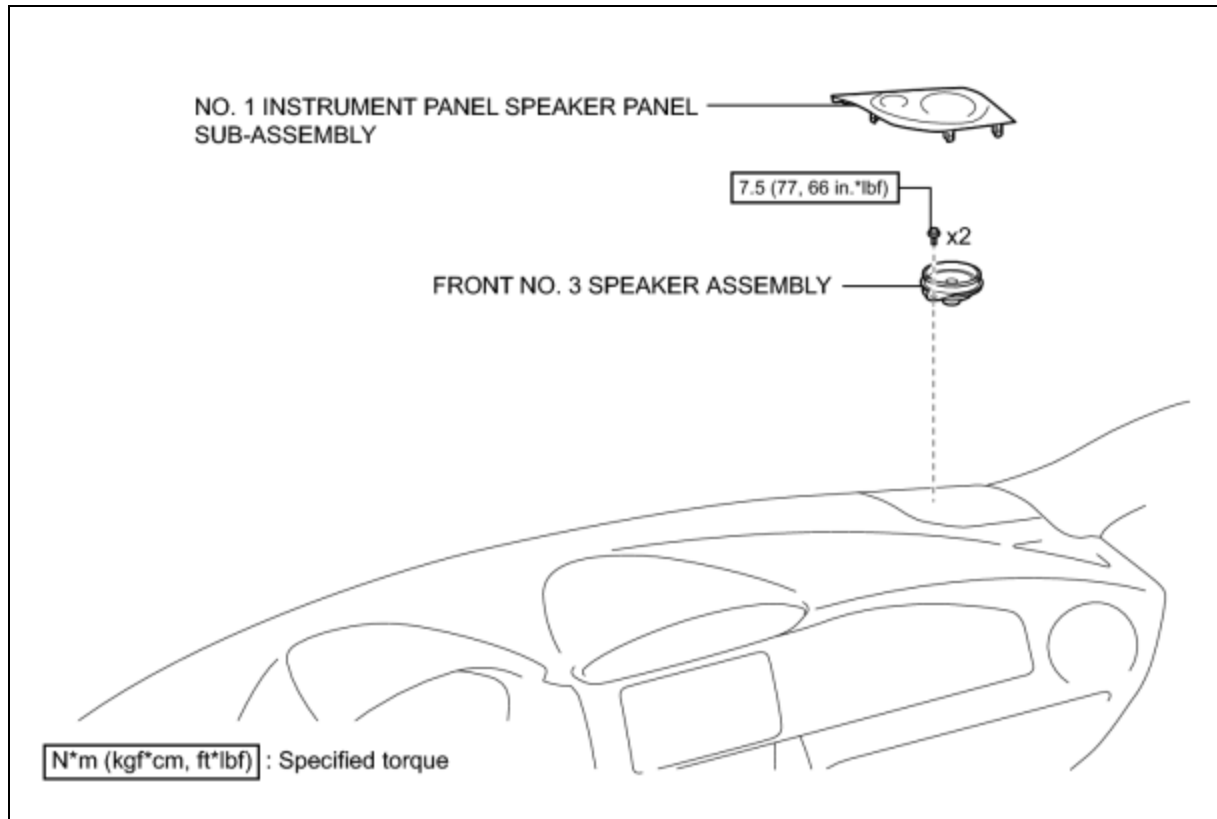
NOTICE:

Do not touch the cone part of the speaker.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003AW400WX
Title: AUDIO / VIDEO: INSTRUMENT PANEL SPEAKER (for 8 Speakers): COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VEM01VX
Title: AUDIO / VIDEO: INSTRUMENT PANEL SPEAKER (for 8 Speakers): INSPECTION (2013 FR-S)		

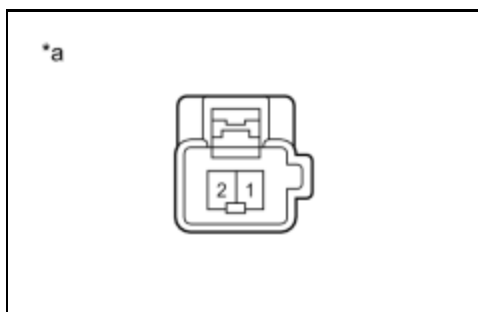
INSPECTION

1. INSPECT FRONT NO. 3 SPEAKER ASSEMBLY

(a) Check that there is no foreign matter in the front No. 3 speaker assembly, no tears on the front No. 3 speaker assembly cone or other abnormalities.

(b) Measure the resistance of the front No. 3 speaker assembly.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	Always	3.7 to 4.7 Ω

If the result is not as specified, replace the front No. 3 speaker assembly.

Text in Illustration

*a	Component without harness connected (Front No. 3 speaker assembly)
----	---

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VEL02HX
Title: AUDIO / VIDEO: INSTRUMENT PANEL SPEAKER (for 8 Speakers): INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the RH side.

1. INSTALL FRONT NO. 3 SPEAKER ASSEMBLY

- (a) Connect the connector.
- (b) Install the front No. 3 speaker assembly with the 2 bolts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

NOTICE:

Do not touch the cone part of the speaker.

2. INSTALL NO. 1 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VEO02DX
Title: AUDIO / VIDEO: INSTRUMENT PANEL SPEAKER (for 8 Speakers): REMOVAL (2013 FR-S)		

REMOVAL

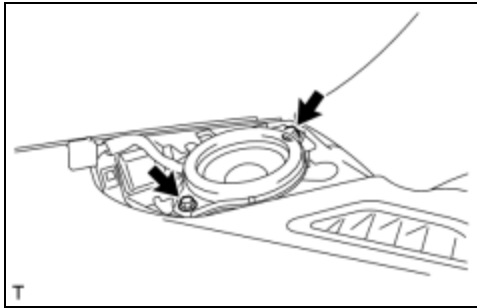
HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the RH side.

1. REMOVE NO. 1 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY INFO

2. REMOVE FRONT NO. 3 SPEAKER ASSEMBLY

(a) Disconnect the connector.



(b) Remove the 2 bolts and the front No. 3 speaker assembly.

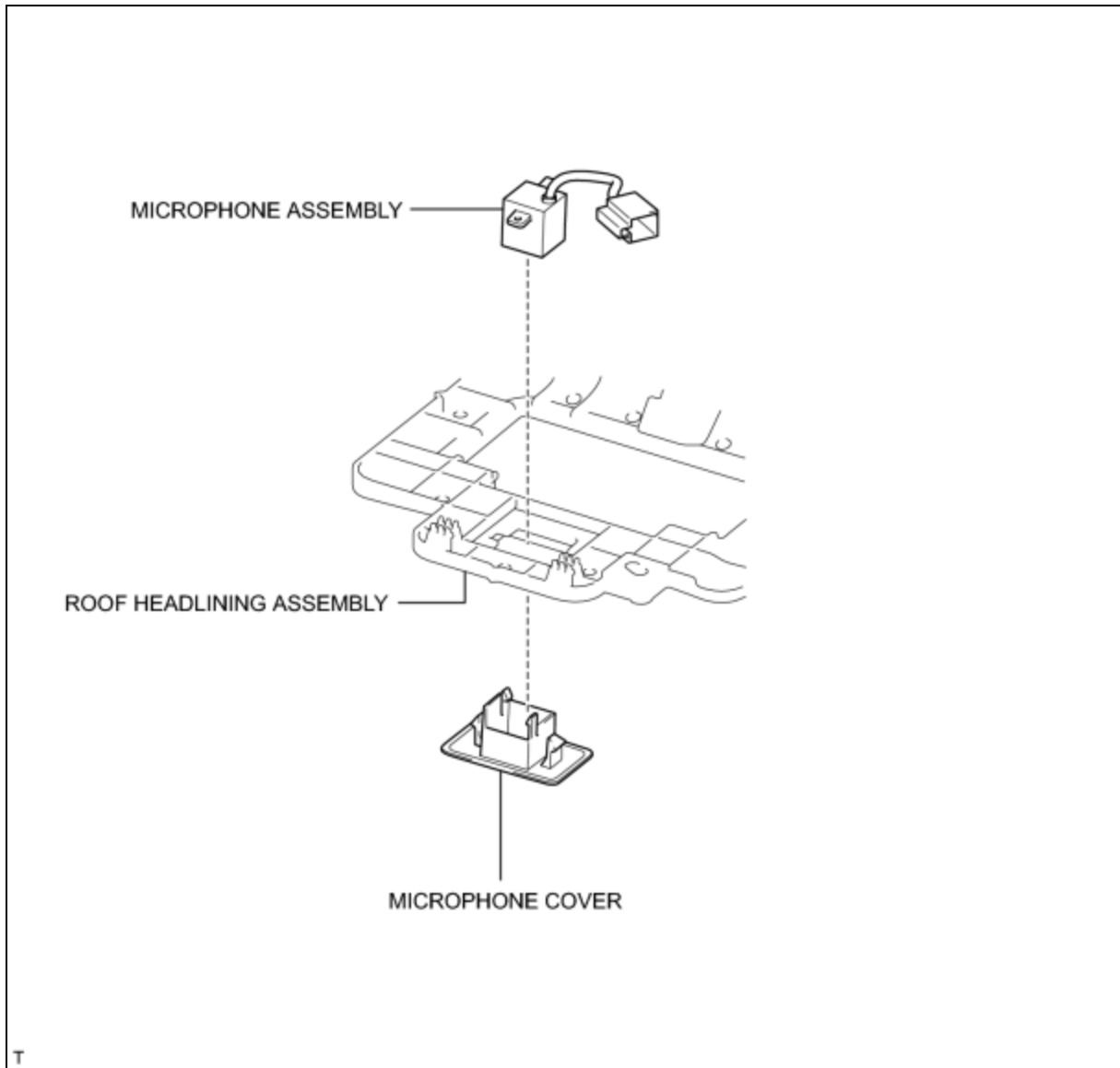
NOTICE:

Do not touch the cone part of the speaker.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001Q0002AX
Title: AUDIO / VIDEO: MICROPHONE: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



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Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PZZ03CX
Title: AUDIO / VIDEO: MICROPHONE: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL MICROPHONE COVER

- (a) Engage the 2 claws to install the microphone cover.

2. INSTALL MICROPHONE ASSEMBLY

- (a) Engage the 2 claws to install the microphone assembly.
- (b) Connect the connector.

3. INSTALL ROOF HEADLINING ASSEMBLY



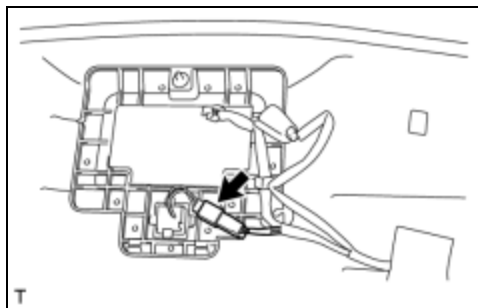
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001Q0103CX
Title: AUDIO / VIDEO: MICROPHONE: REMOVAL (2013 FR-S)		

REMOVAL

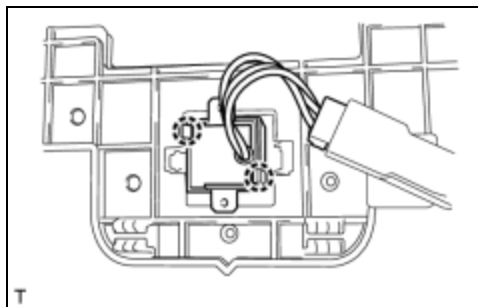
1. REMOVE ROOF HEADLINING ASSEMBLY

INFO

2. REMOVE MICROPHONE ASSEMBLY

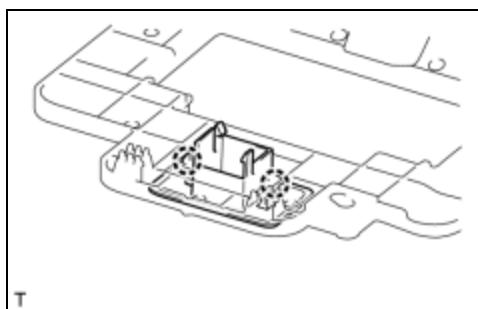


(a) Disconnect the connector.



(b) Disengage the 2 claws to remove the microphone assembly.

3. REMOVE MICROPHONE COVER

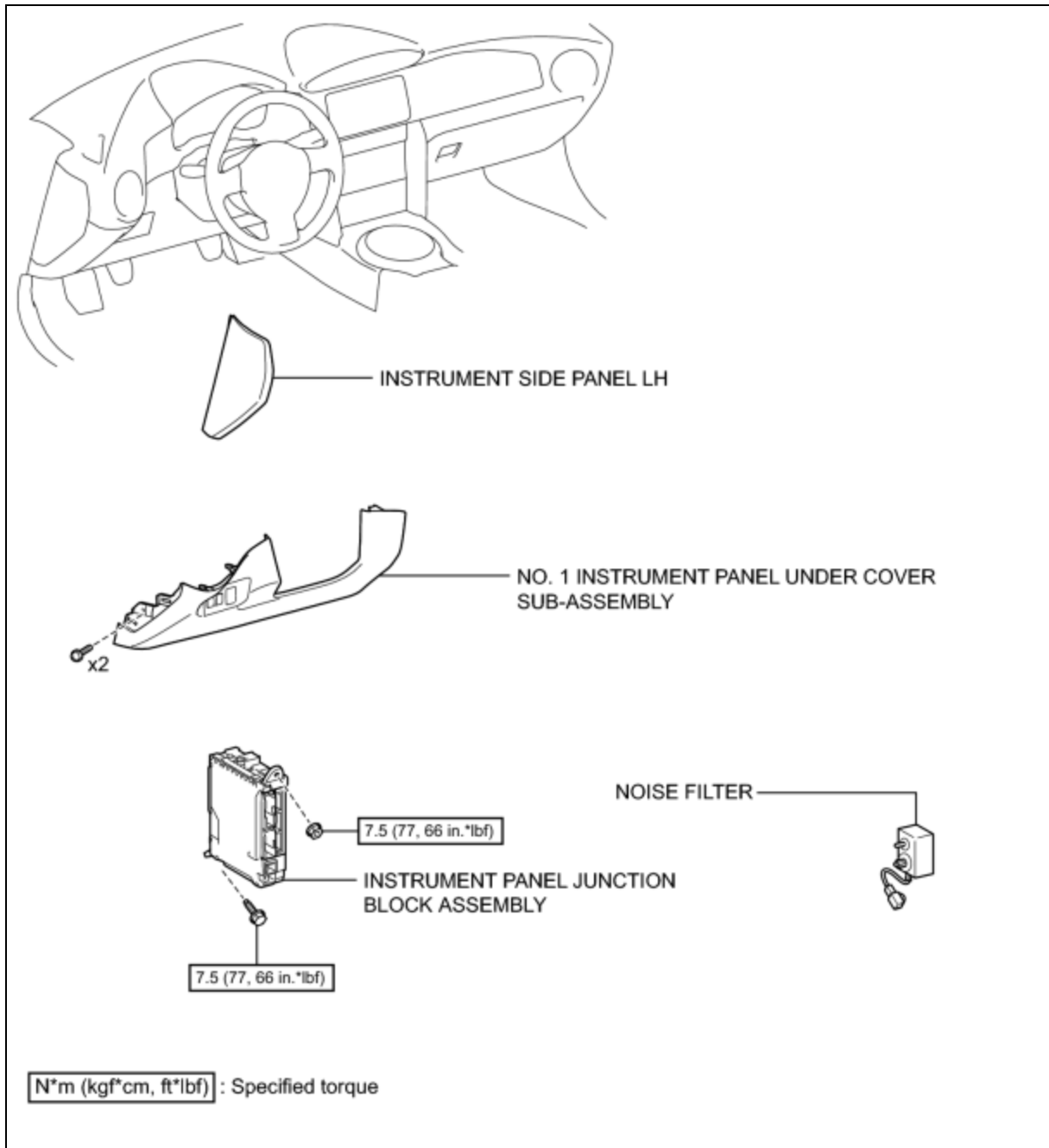


(a) Disengage the 2 claws to remove the microphone cover.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000400U001X
Title: AUDIO / VIDEO: NOISE FILTER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



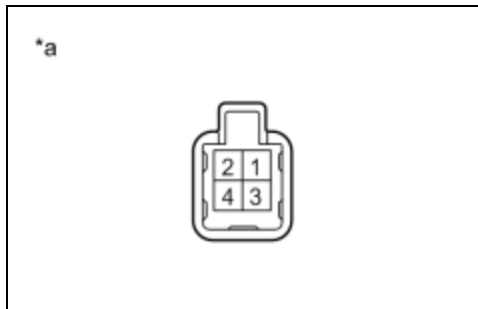
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003ZDZ019X
Title: AUDIO / VIDEO: NOISE FILTER: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT NOISE FILTER

(a) Measure the resistance of the noise filter according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	Always	10 k Ω or higher
1 - 4	Always	Below 1 Ω

Text in Illustration

*a	Component without harness connected (Noise Filter)
----	---

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000421C00MX
Title: AUDIO / VIDEO: NOISE FILTER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL NOISE FILTER

- (a) Engage the guide and install the radio setting condenser.
- (b) Engage the 2 clamps.
- (c) Connect the connector.

2. INSTALL INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY [INFO](#)

3. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)

4. INSTALL INSTRUMENT SIDE PANEL LH [INFO](#)



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000421E00LX
Title: AUDIO / VIDEO: NOISE FILTER: REMOVAL (2013 FR-S)		

REMOVAL

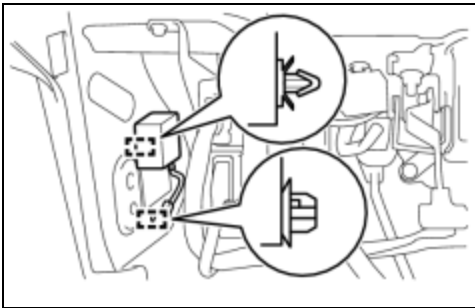
1. REMOVE INSTRUMENT SIDE PANEL LH INFO

2. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY INFO

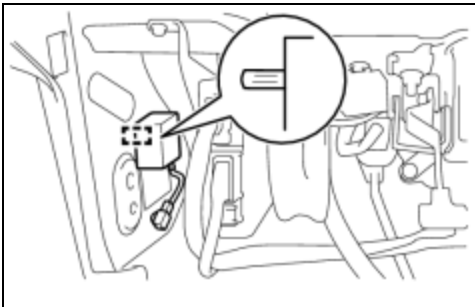
3. REMOVE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY INFO

4. REMOVE NOISE FILTER

(a) Disconnect the connector.



(b) Disengage the 2 clamps.

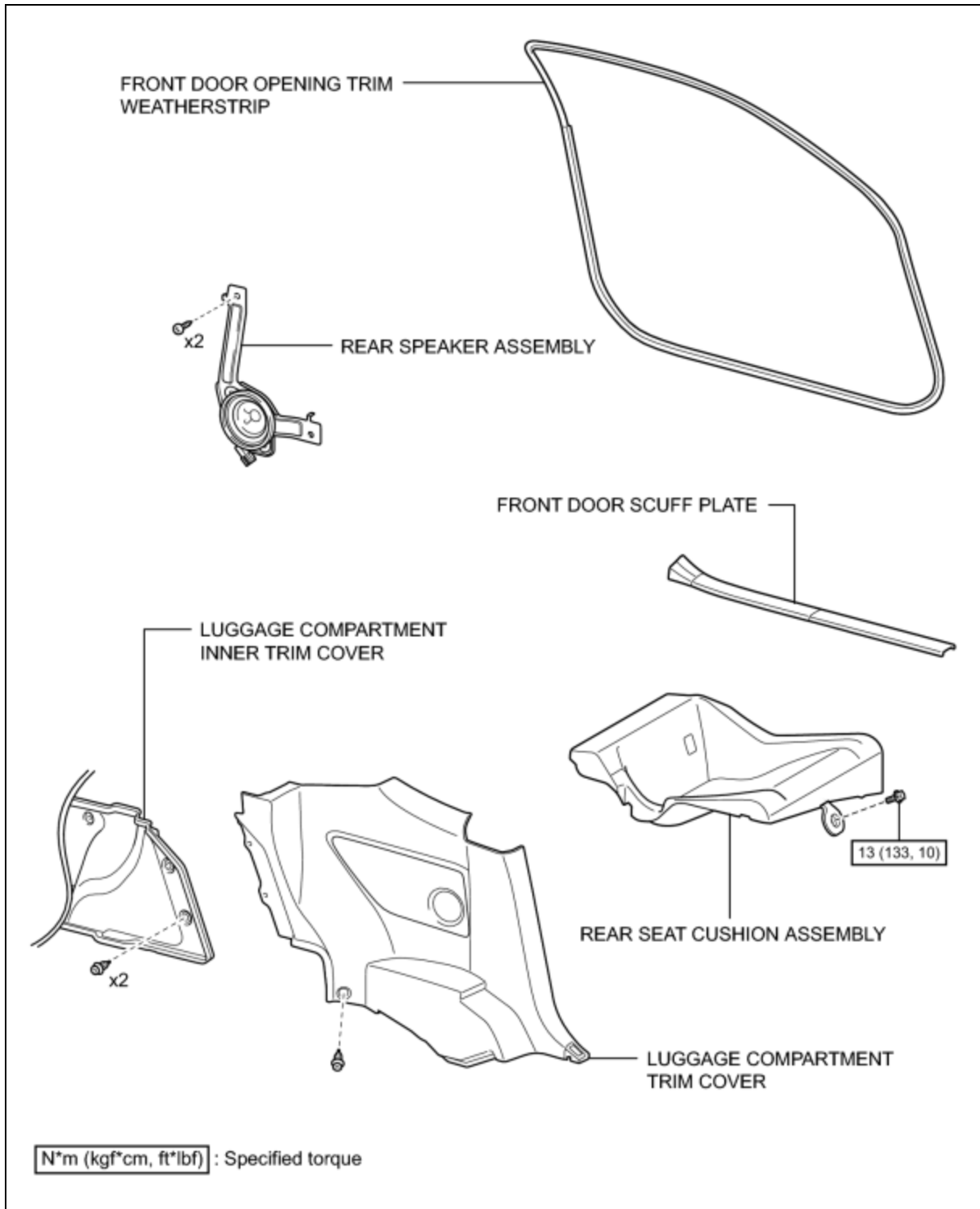


(c) Disengage the guide and remove the noise filter.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004MZ8007X
Title: AUDIO / VIDEO: QUARTER TRIM SPEAKER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000409Y003X
Title: AUDIO / VIDEO: QUARTER TRIM SPEAKER: INSPECTION (2013 FR-S)		

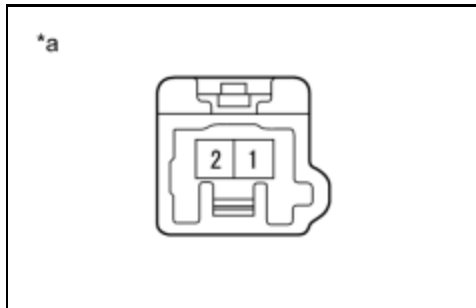
INSPECTION

1. INSPECT REAR SPEAKER ASSEMBLY

- (a) With the rear speaker assembly installed, check that there is no looseness or other abnormalities.
- (b) Check that there is no foreign matter in the rear speaker assembly, no tears on the rear speaker assembly cone or other abnormalities.

- (c) Measure the resistance of the rear speaker assembly.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	Always	5.1 to 6.9 Ω

If the result is not as specified, replace the rear speaker assembly.

Text in Illustration

*a	Component without harness connected (Rear speaker assembly)
----	--

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004MZ700AX
Title: AUDIO / VIDEO: QUARTER TRIM SPEAKER: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. INSTALL REAR SPEAKER ASSEMBLY

- (a) Install the rear speaker assembly with the 2 screws.

NOTICE:

Do not touch the speaker cone.

- (b) Connect the connector.

2. INSTALL LUGGAGE COMPARTMENT TRIM COVER [INFO](#)

3. CONNECT LUGGAGE COMPARTMENT INNER TRIM COVER [INFO](#)

4. INSTALL REAR SEAT CUSHION ASSEMBLY [INFO](#)

5. INSTALL FRONT DOOR SCUFF PLATE [INFO](#)

6. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP [INFO](#)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004MZ900AX
Title: AUDIO / VIDEO: QUARTER TRIM SPEAKER: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. DISCONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP

HINT:

Disconnect the front door opening trim weatherstrip to the extent that allows the removal of the luggage compartment trim cover.

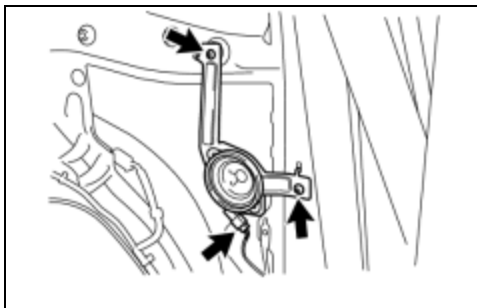
2. REMOVE FRONT DOOR SCUFF PLATE [INFO](#)

3. REMOVE REAR SEAT CUSHION ASSEMBLY [INFO](#)

4. SEPARATE LUGGAGE COMPARTMENT INNER TRIM COVER [INFO](#)

5. REMOVE LUGGAGE COMPARTMENT TRIM COVER [INFO](#)

6. REMOVE REAR SPEAKER ASSEMBLY



(a) Disconnect the connector.

(b) Remove the 2 screws and the rear speaker assembly.

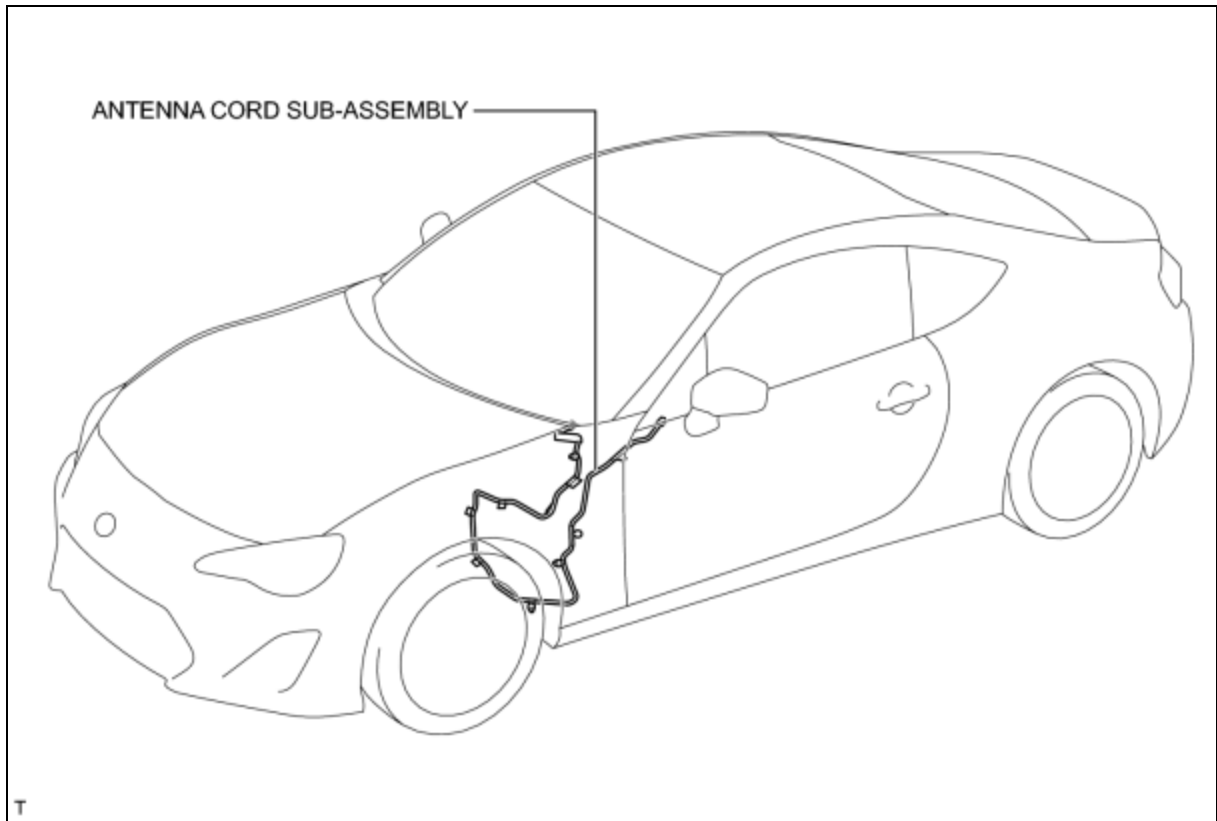
NOTICE:

Do not touch the speaker cone.

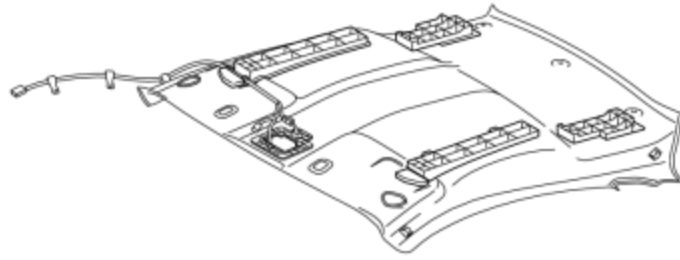
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PZU02AX
Title: AUDIO / VIDEO: RADIO ANTENNA CORD: COMPONENTS (2013 FR-S)		


COMPONENTS

ILLUSTRATION



ILLUSTRATION



● TAPE —  x2

NO. 2 ANTENNA CORD SUB-ASSEMBLY — 

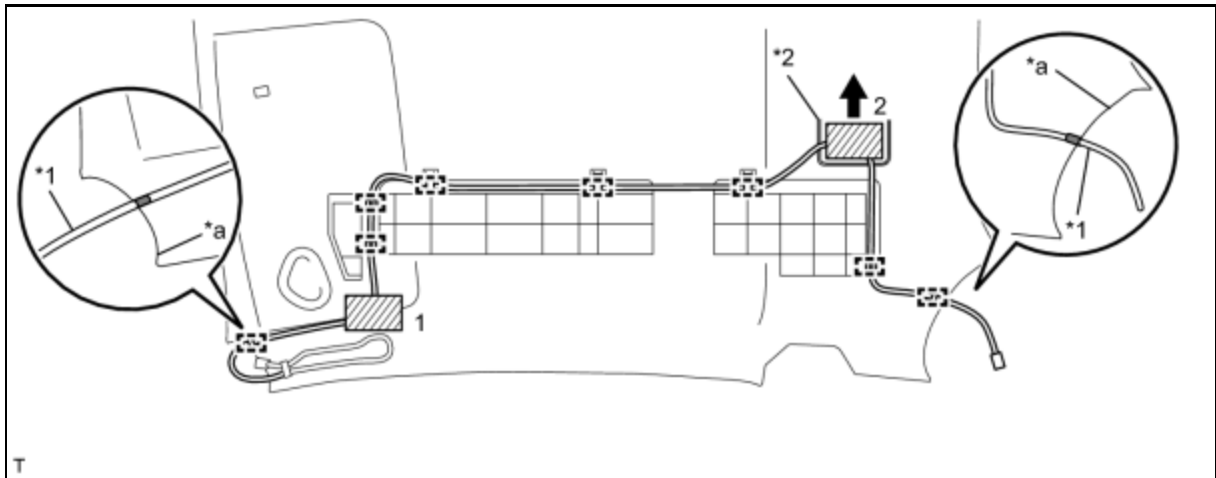
● Non-reusable part

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000024DA09GX
Title: AUDIO / VIDEO: RADIO ANTENNA CORD: INSTALLATION (2013 FR-S)		



INSTALLATION

1. INSTALL NO. 2 ANTENNA CORD SUB-ASSEMBLY

- (a) Align the locating tape of the No. 2 antenna cord sub-assembly as shown in the illustration, and then engage the 8 clamps.



Text in Illustration

*1	No. 2 Antenna Cord Sub-assembly	*2	Marking Line
*a	End of Roof Headlining Assembly	-	-
	Adhesive Tape		Locating Tape

- (b) Fix the No. 2 antenna cord sub-assembly on the roof headlining assembly with adhesive tape as shown in the illustration.

HINT:

- Fix the No. 2 antenna cord sub-assembly in the order shown in the illustration.
- When applying the 2nd tape, remove the looseness of the No. 2 antenna cord sub-assembly by pulling it in the direction indicated by the arrow in the illustration.

2. INSTALL ROOF HEADLINING ASSEMBLY

INFO

3. INSTALL ANTENNA CORD SUB-ASSEMBLY

- (a) Engage the 9 clamps and install the antenna cord sub-assembly.
(b) Install the floor mat.

4. INSTALL AIR CONDITIONING RADIATOR ASSEMBLY

INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001OGD05KX
Title: AUDIO / VIDEO: RADIO ANTENNA CORD: REMOVAL (2013 FR-S)		

REMOVAL

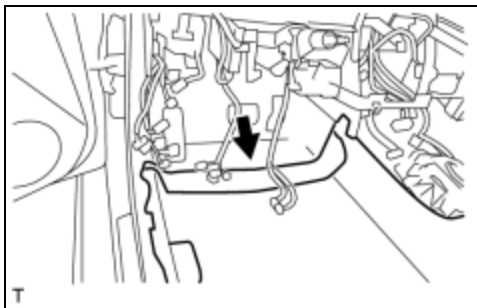
1. REMOVE AIR CONDITIONING RADIATOR ASSEMBLY

INFO

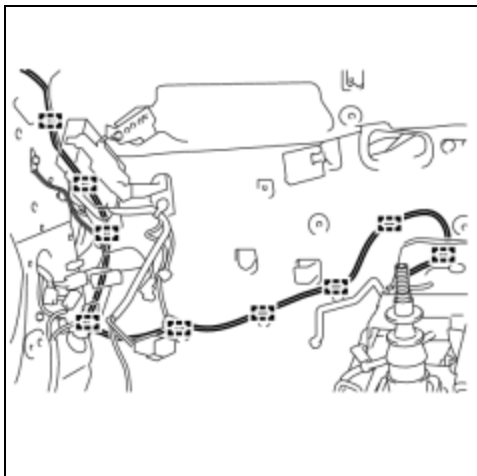
2. REMOVE ROOF HEADLINING ASSEMBLY

INFO

3. REMOVE ANTENNA CORD SUB-ASSEMBLY



(a) Peel back the floor carpet LH side.

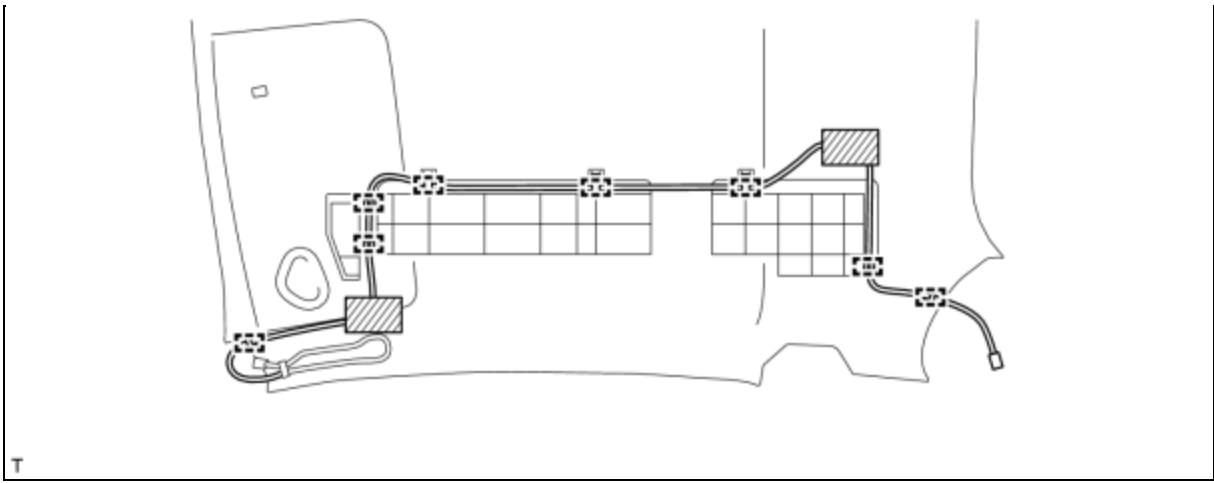


(b) Disengage the 9 clamps and remove the antenna cord sub-assembly.

4. REMOVE NO. 2 ANTENNA CORD SUB-ASSEMBLY

(a) Remove the 2 adhesive tapes.

(b) Disengage the 8 clamps and remove the No. 2 antenna cord sub-assembly from the roof headlining.



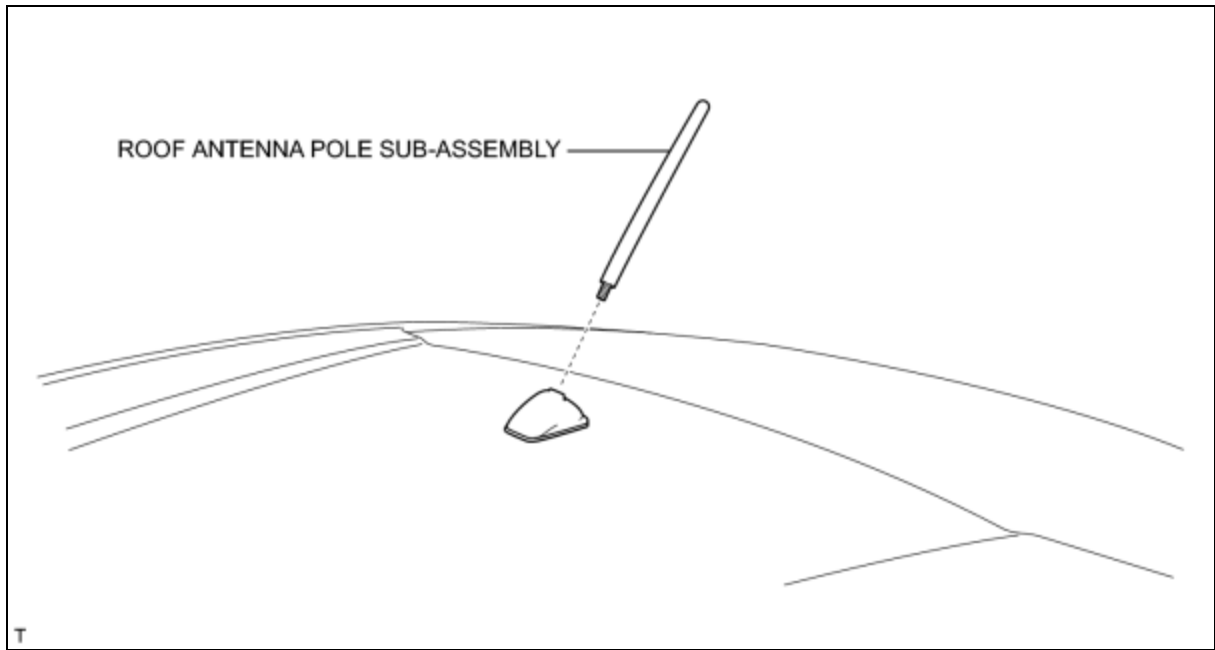
Text in Illustration

	<p>Adhesive Tape</p>	<p>-</p>	<p>-</p>
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Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004MZB002X
Title: AUDIO / VIDEO: RADIO ANTENNA POLE: COMPONENTS (2013 FR-S)		

COMPONENTS

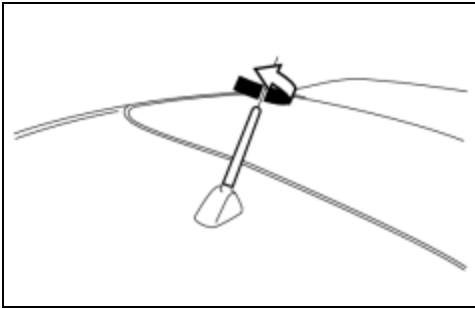
ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004MZA008X
Title: AUDIO / VIDEO: RADIO ANTENNA POLE: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL ROOF ANTENNA POLE SUB-ASSEMBLY

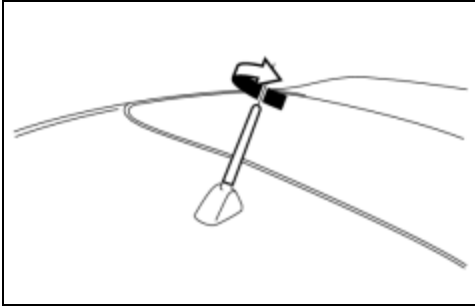


- (a) Turn the roof antenna pole sub-assembly in the direction indicated by the arrow in the illustration to install it.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004MZC008X
Title: AUDIO / VIDEO: RADIO ANTENNA POLE: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE ROOF ANTENNA POLE SUB-ASSEMBLY

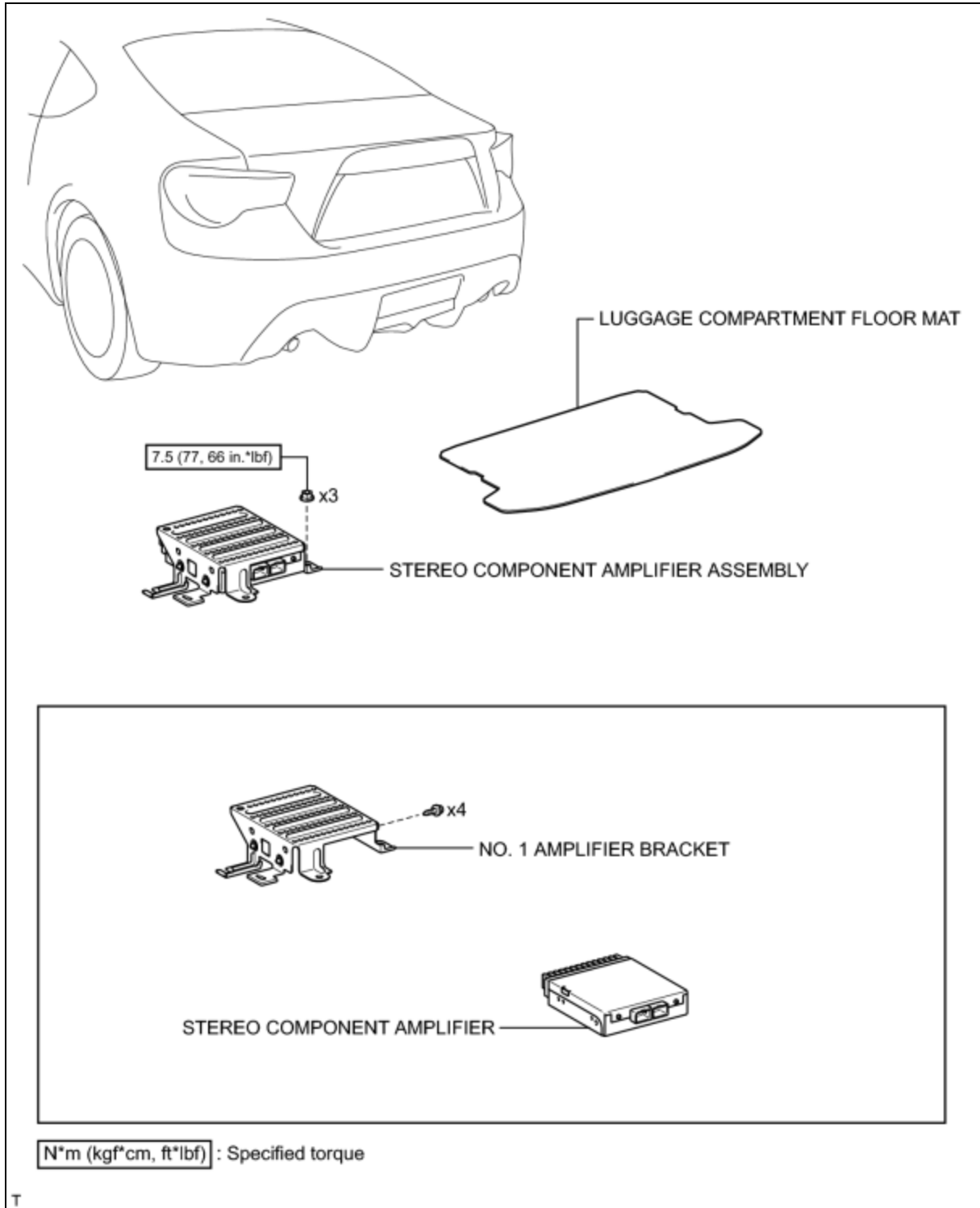


- (a) Turn the roof antenna pole sub-assembly in the direction indicated by the arrow in the illustration to remove it.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PZF01DX
Title: AUDIO / VIDEO: STEREO COMPONENT AMPLIFIER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PZE01OX
Title: AUDIO / VIDEO: STEREO COMPONENT AMPLIFIER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL STEREO COMPONENT AMPLIFIER ASSEMBLY

- (a) Install the No. 1 amplifier bracket with the 4 screws.
- (b) Install the stereo component amplifier assembly with bracket with the 3 nuts.
Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)
- (c) Connect the 2 connectors to the stereo component amplifier assembly with bracket.
- (d) Engage the clamp and connect the wire harness to the stereo component amplifier cover.
- (e) Install the clip and connect the rear seat back cover.

2. INSTALL LUGGAGE COMPARTMENT FLOOR MAT

- (a) Install the luggage compartment floor mat.



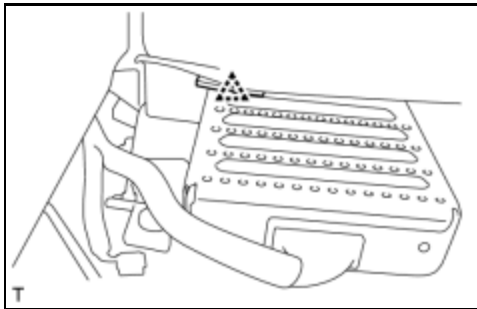
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PZG010X
Title: AUDIO / VIDEO: STEREO COMPONENT AMPLIFIER: REMOVAL (2013 FR-S)		

REMOVAL

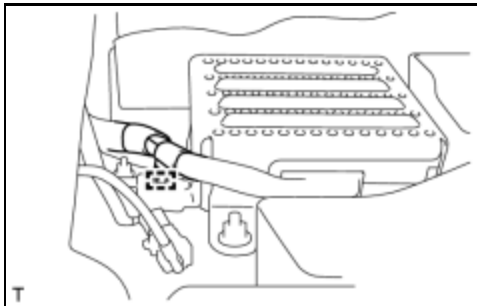
1. REMOVE LUGGAGE COMPARTMENT FLOOR MAT

- (a) Remove the luggage compartment floor mat.

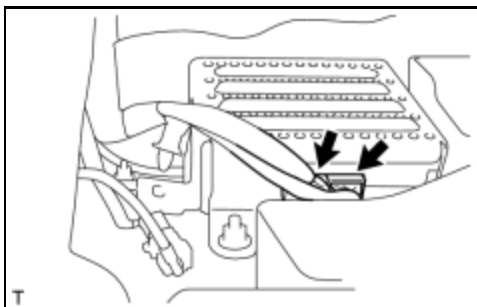
2. REMOVE STEREO COMPONENT AMPLIFIER ASSEMBLY



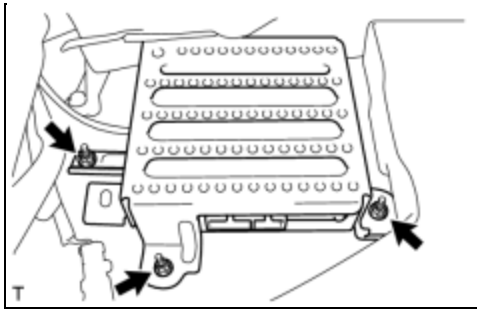
- (a) Remove the clip and separate the rear seat back cover.



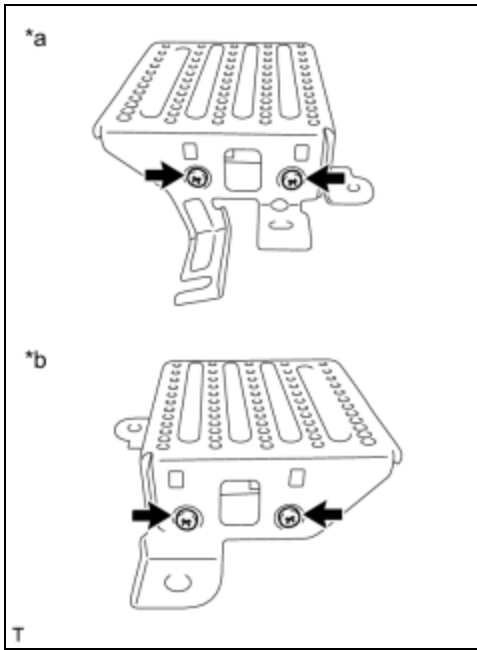
- (b) Disconnect the clamp and the wire harness from the stereo component amplifier cover.



- (c) Disconnect the 2 connectors from the stereo component amplifier.



(d) Remove the 3 nuts and the stereo component amplifier.



(e) Remove the 4 screws and No. 1 amplifier bracket.

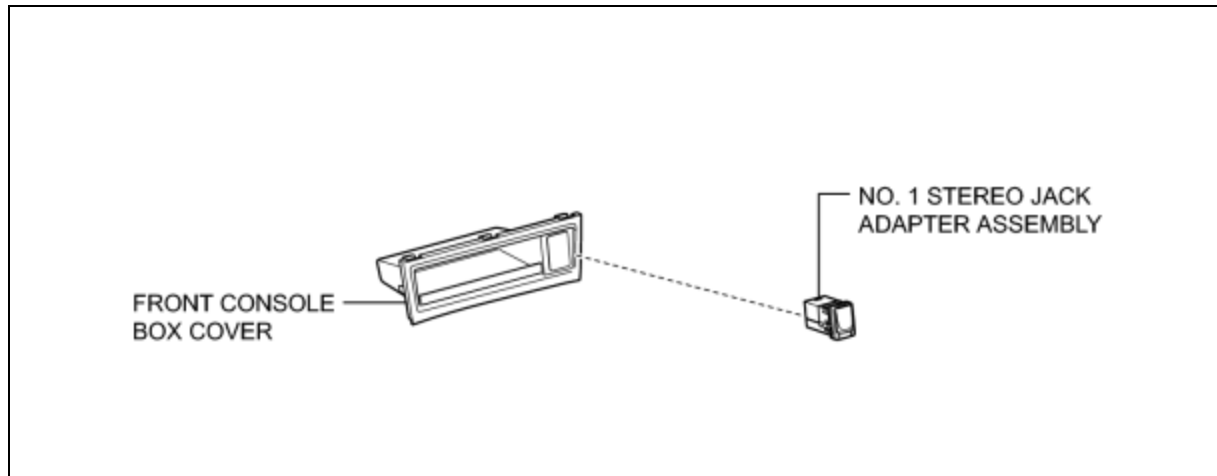
Text in Illustration

*a	LH Side
*b	RH Side

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001TAC01LX
Title: AUDIO / VIDEO: STEREO JACK ADAPTER ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001TAB01YX
Title: AUDIO / VIDEO: STEREO JACK ADAPTER ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL NO. 1 STEREO JACK ADAPTER ASSEMBLY

(a) Engage the 2 claws to install the No. 1 stereo jack adapter assembly.

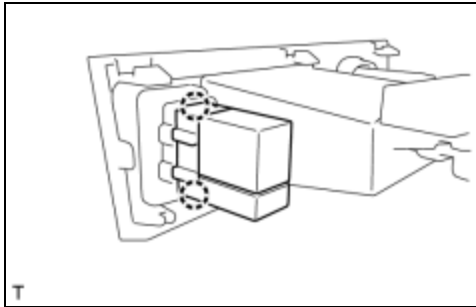
2. INSTALL FRONT CONSOLE BOX COVER [INFO](#)



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001TAD01YX
Title: AUDIO / VIDEO: STEREO JACK ADAPTER ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

- 1. REMOVE FRONT CONSOLE BOX COVER** [INFO](#)
- 2. REMOVE NO. 1 STEREO JACK ADAPTER ASSEMBLY**

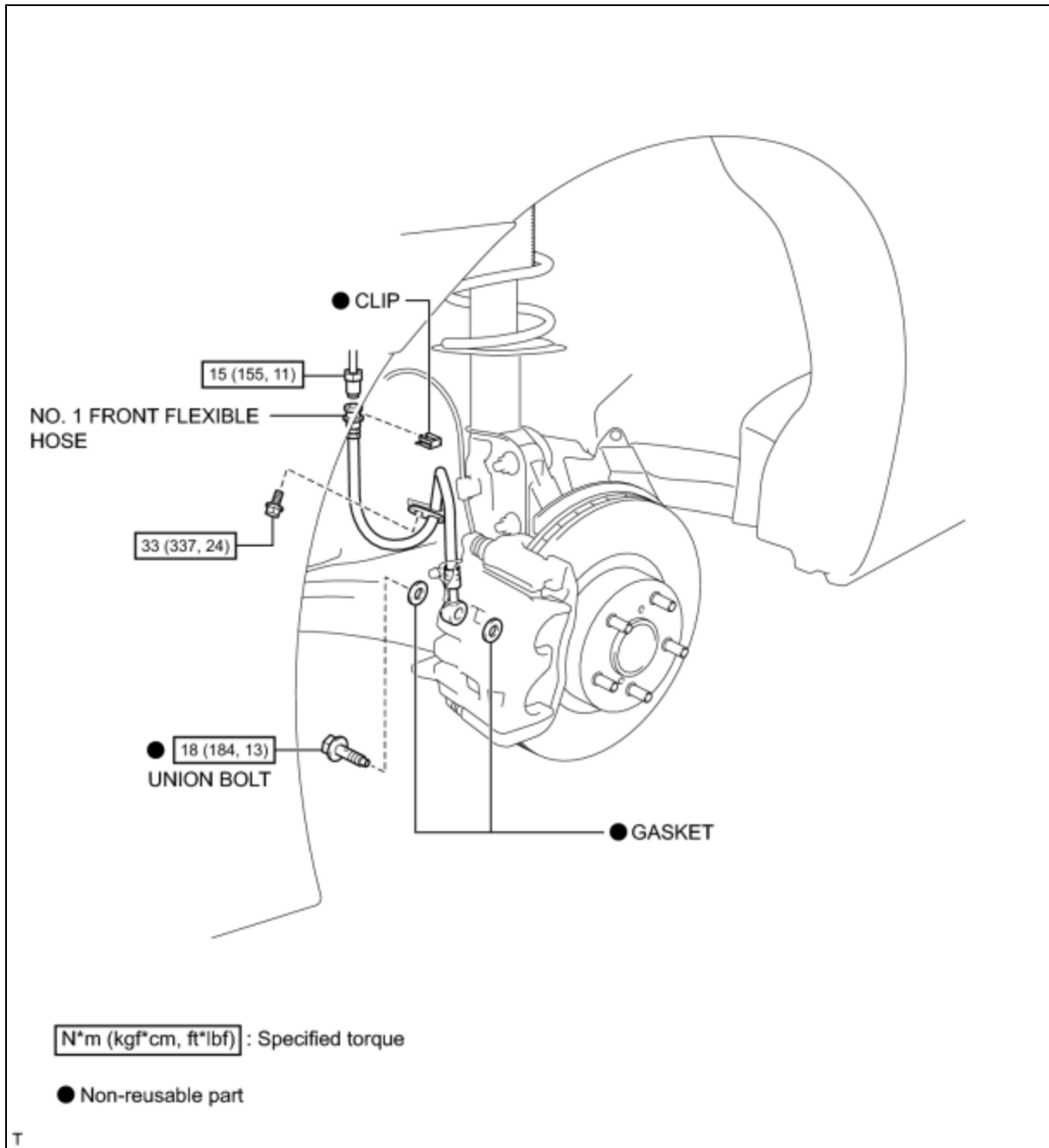


- (a) Disengage the 2 claws and remove the No. 1 stereo jack adapter assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000CIT023X
Title: BRAKE (FRONT): FRONT BRAKE FLEXIBLE HOSE: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000CIS021X
Title: BRAKE (FRONT): FRONT BRAKE FLEXIBLE HOSE: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for RH and LH sides.
- The procedure listed below is for LH side.

1. INSTALL NO. 1 FRONT FLEXIBLE HOSE

(a) Temporarily install the NO. 1 front flexible hose with a new clip.

NOTICE:

Securely install the clip.

(b) Hold the NO. 1 front flexible hose with a wrench using a union nut wrench.

Torque: 15 N·m (155 kgf·cm, 11ft·lbf)

NOTICE:

- Do not bend or damage the brake tube.
- Do not allow any foreign matter such as dirt and dust to enter the brake tube from the connecting point.
- Use the formula to calculate special torque values for situations where a union nut wrench is combined with a torque wrench **INFO** .

(c) Connect the No. 1 front flexible hose to the front shock absorber assembly with the bolt.

Torque: 33 N·m (337 kgf·cm, 24ft·lbf)

(d) Install the No. 1 flexible hose to the disc brake cylinder assembly with 2 new gaskets and the new union bolt.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

2. ADD BRAKE FLUID **INFO**

3. BLEED BRAKE LINE **INFO**

4. INSPECT BRAKE FLUID LEAK

5. INSPECT FLUID LEVEL **INFO**

6. INSTALL FRONT WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000CIU01XX
Title: BRAKE (FRONT): FRONT BRAKE FLEXIBLE HOSE: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

- Use the same procedure for RH and LH sides.
- The procedure listed below is for LH side.

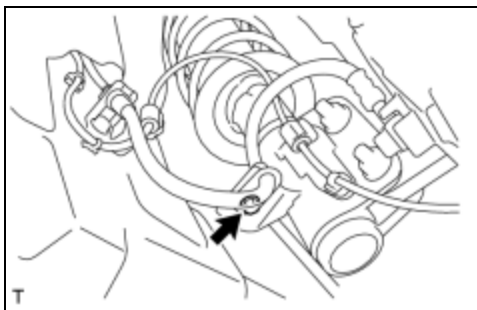
1. REMOVE FRONT WHEEL

2. DRAIN BRAKE FLUID

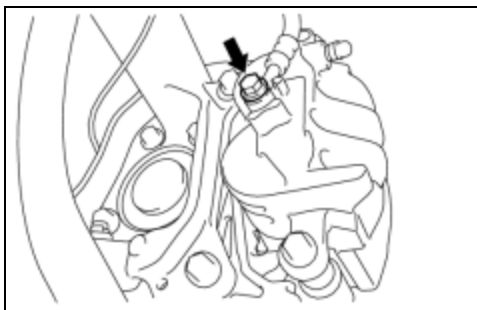
NOTICE:

Immediately wash off any brake fluid that comes into contact with any painted surfaces.

3. REMOVE NO. 1 FRONT FLEXIBLE HOSE



- (a) Remove the bolt and separate the No. 1 front flexible hose from the front shock absorber assembly.

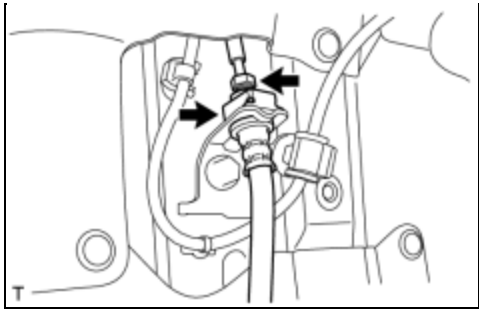


- (b) Remove the union bolt, 2 gaskets and No. 1 front flexible hose.

- (c) Hold the No. 1 flexible hose with a wrench and disconnect the brake tube using a union nut wrench.

NOTICE:

- Do not bend or damage the brake tube.
- Do not allow any foreign matter such as dirt and dust



to enter the brake tube from the connecting position.

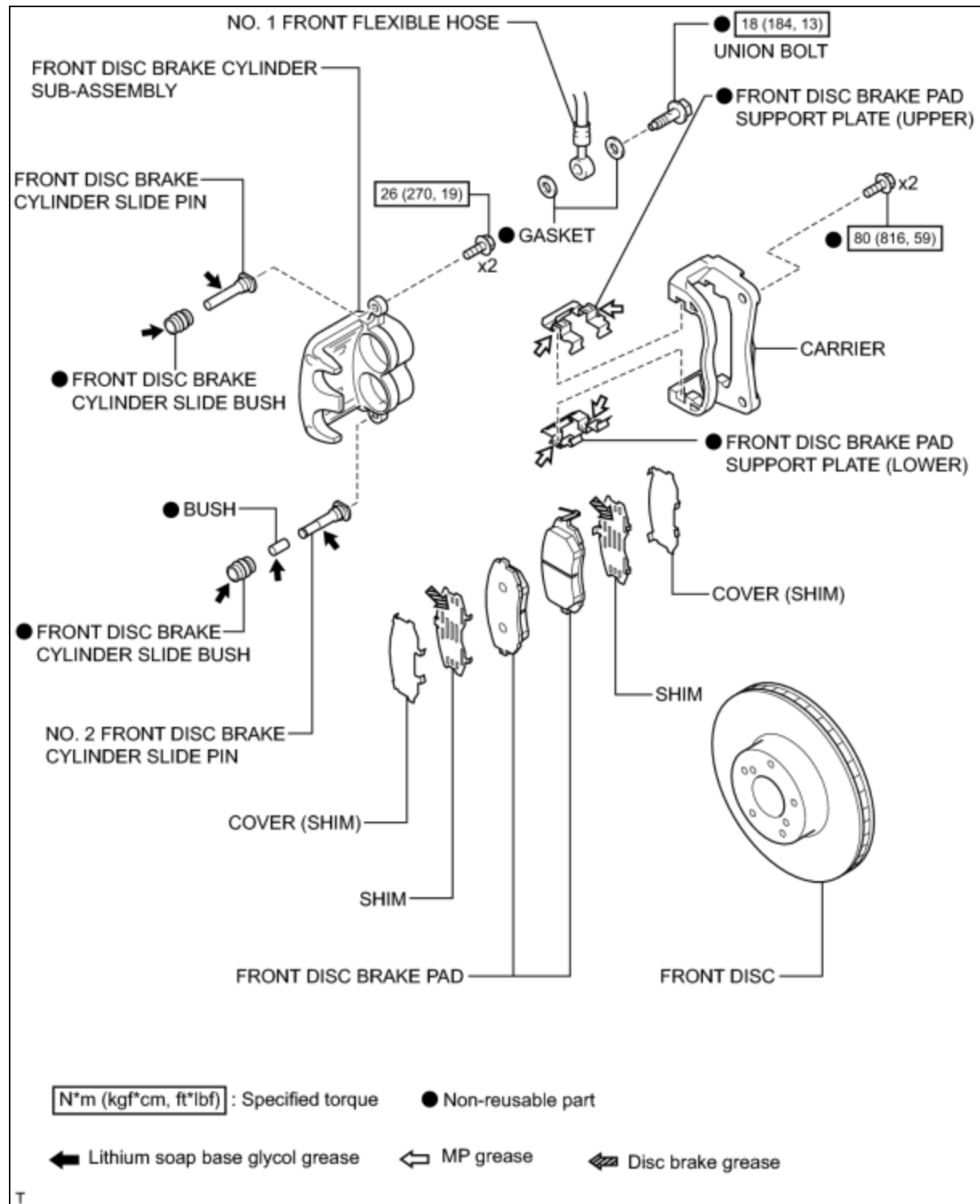
(d) Remove the clip.

(e) Remove the No. 1 front flexible hose.

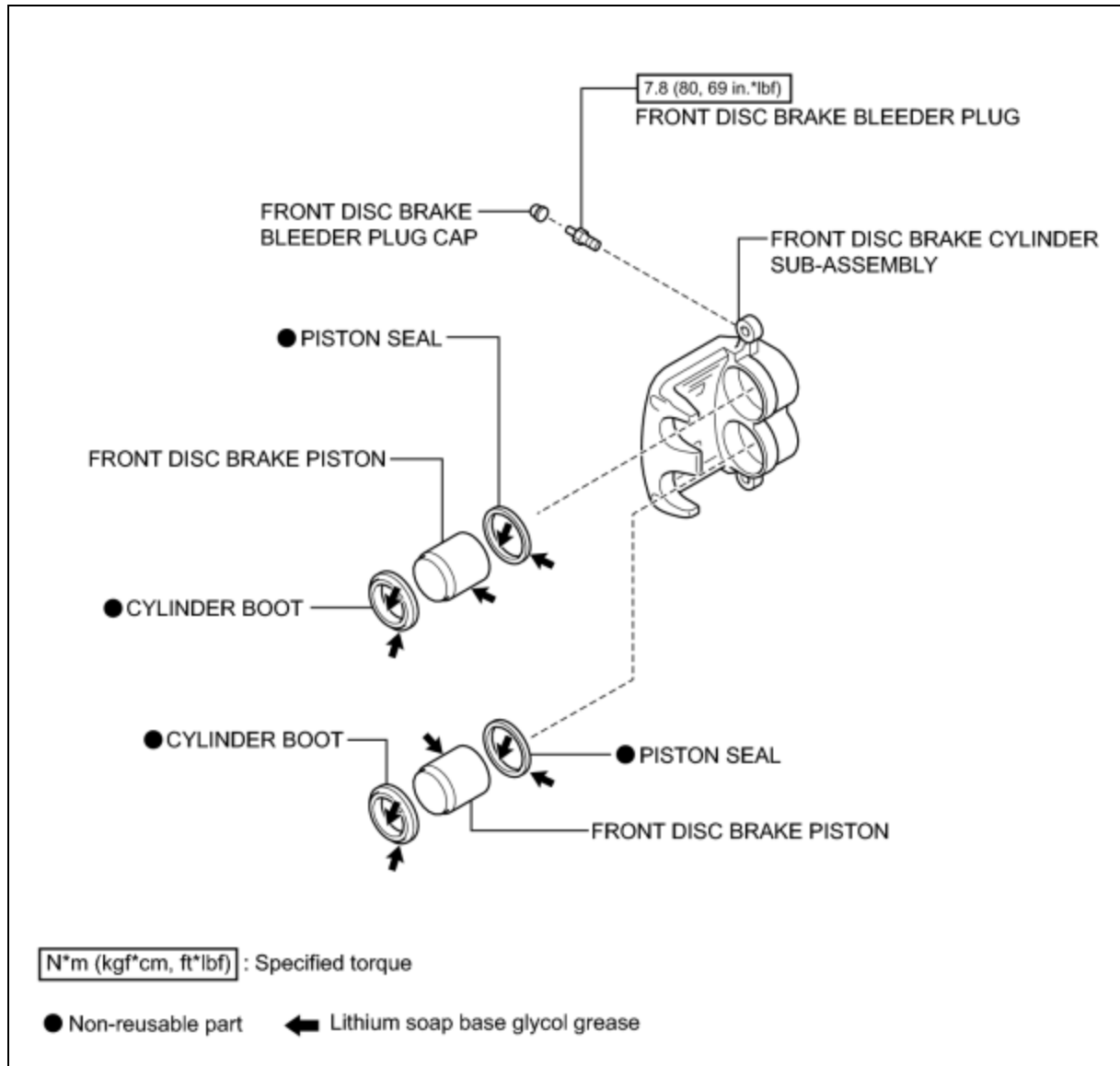
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000C1F02EX
Title: BRAKE (FRONT): FRONT BRAKE: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



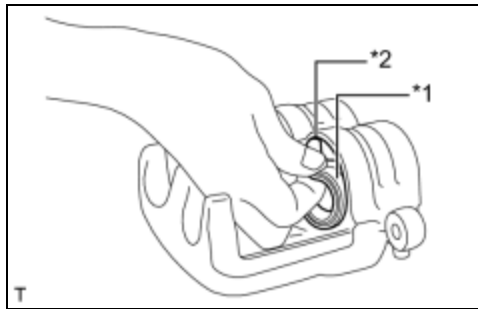
ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000C1H02BX
Title: BRAKE (FRONT): FRONT BRAKE: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. REMOVE CYLINDER BOOT



(a) Remove the 2 cylinder boots.

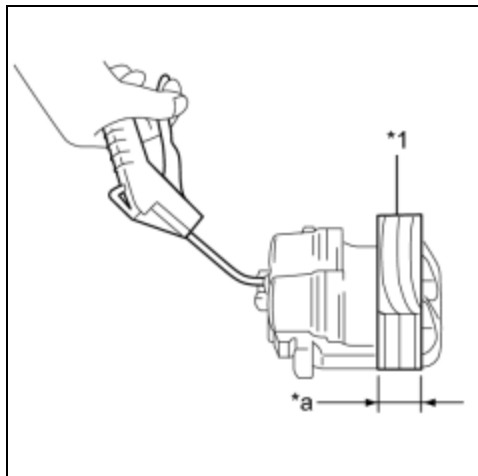
NOTICE:

To prevent damage to the front disc brake piston, remove the boot by hand, and not using a screwdriver or the like.

Text in Illustration

*1	Cylinder Boot
*2	Front Disc Brake Piston

2. REMOVE FRONT DISC BRAKE PISTON



(a) Place a wooden block between the front disc brake piston and disc cylinder.

Text in Illustration

*1	Wooden Block
*a	30 mm (1.811 in.)

(b) Slowly apply compressed air to remove the 2 front disc brake pistons from the cylinder.

CAUTION:

Do not place your fingers in front of the front disc brake piston when applying compressed air.

NOTICE:

Do not spatter the brake fluid.

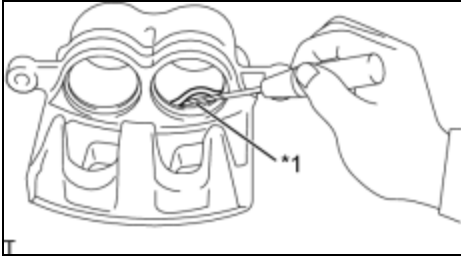
HINT:

If the front disc brake piston has been damaged, replace it with a new one.

(c) Remove the wooden block.

3. REMOVE PISTON SEAL

- (a) Using a screwdriver with its tip wrapped in protective tape, remove the 2 piston seals from the disc brake cylinder.



Text in Illustration

*1

Protective Tape

NOTICE:

Do not damage the inner surface or piston seal groove of the cylinder.

4. REMOVE FRONT DISC BRAKE BLEEDER PLUG CAP

- (a) Remove the front disc brake bleeder plug cap from the front disc brake bleeder plug.

5. REMOVE FRONT DISC BRAKE BLEEDER PLUG

- (a) Remove the front disc brake bleeder plug.

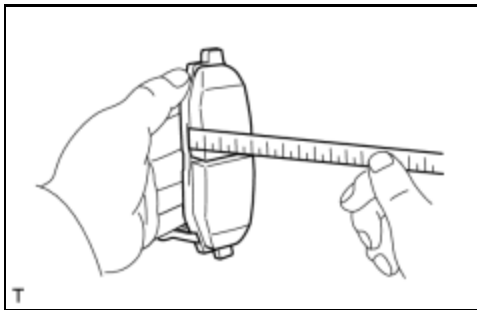
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010KR014X
Title: BRAKE (FRONT): FRONT BRAKE: INSPECTION (2013 FR-S)		

INSPECTION

1. CHECK BRAKE CYLINDER AND PISTON

- (a) Check the cylinder bore and piston for rust and scoring. If necessary, replace the disc brake cylinder and piston.

2. CHECK PAD LINING THICKNESS



- (a) Using a ruler, measure the pad lining thickness.

Standard thickness:

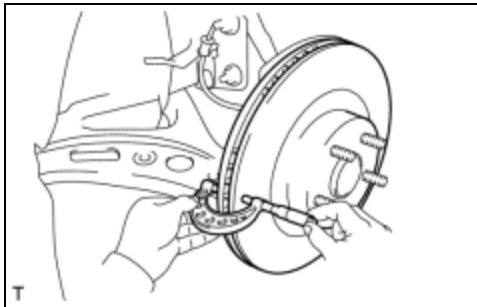
1.5 mm (0.0591 in.)

Minimum thickness:

11.0 mm (0.4331 in.)

If the pad lining thickness is lower/under the minimum, replace the pad.

3. CHECK DISC THICKNESS



- (a) Using a micrometer, measure the disc thickness.

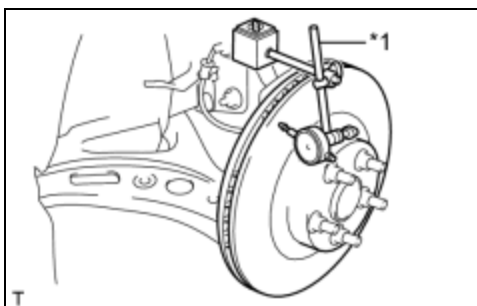
Standard Thickness:

24.0 mm (0.945 in.)

Minimum Thickness:

22.0 mm (0.866 in.)

4. CHECK DISC RUNOUT



- (a) Check the bearing play in the axial direction and check the axle hub runout [INFO](#) .

(b) Tighten the disc with the 5 nuts.

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

(c) Using a dial indicator, measure the disc runout 10 mm (0.394 in.) away from the outer edge of the front disc.

Text in Illustration

*1	Dial Indicator
----	----------------

Maximum disc runout:

0.05 mm (0.0020 in.)

NOTICE:

- Do not bring the magnetic base near the axle hub and speed sensor.
- Set the magnetic base on the shock absorber.
- If the runout exceeds the maximum value, change the installation positions of the disc and axle to make the minimum runout. If the runout exceeds the maximum even when the installation positions are changed, replace the front disc.

(d) Remove the 5 hub nuts and front disc.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000C1E02MX
Title: BRAKE (FRONT): FRONT BRAKE: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for RH and LH sides.
- The procedure listed below is for LH side.

1. INSTALL FRONT DISC

(a) When reusing the disc

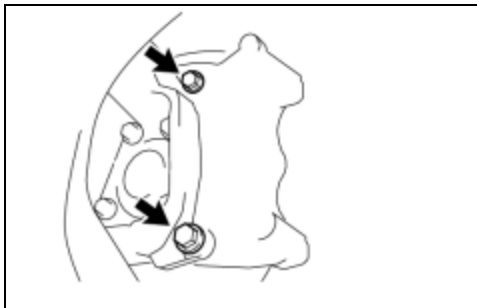
(1) Align the matchmarks placed when removing, and install the front disc to the axle hub.

(b) When replacing the front disc

(1) Install a new front disc to the axle hub and measure the disc runout INFO.

(c) Temporarily tighten the hub nut and fix the front disc to the axle hub.

2. INSTALL CARRIER

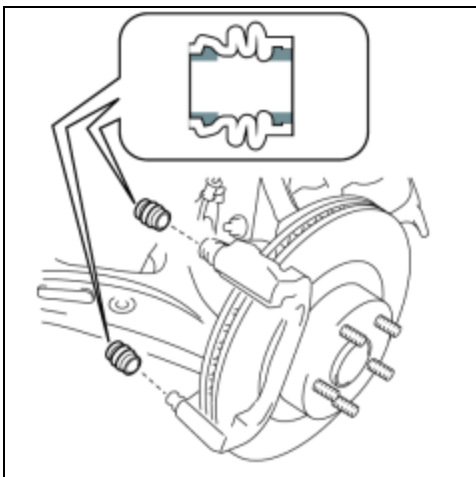


(a) Install the carrier with the 2 new bolts.


Torque: 80 N·m (816 kgf·cm, 59ft·lbf)

3. INSTALL FRONT DISC BRAKE CYLINDER SLIDE BUSH

(a) Apply a light layer of lithium soap base glycol grease to the inner face of the 2 new front disc brake cylinder slide bushes as shown in the illustration.

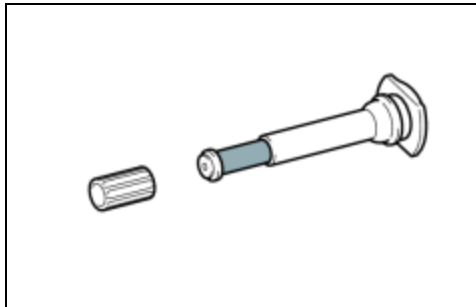


Text in Illustration


	Lithium Soap Base Glycol Grease
---	---------------------------------

4. INSTALL BUSH

- (a) Apply a light layer of lithium soap base glycol grease to the contact surface of the No. 2 front disc brake cylinder slide pin with a new bush.



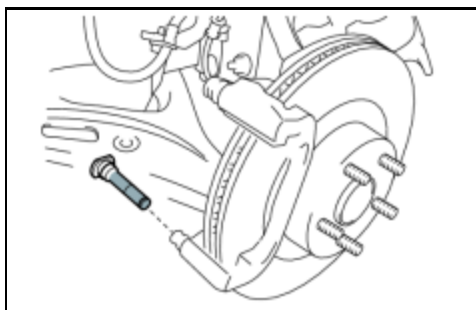
Text in Illustration

	Lithium Soap Base Glycol Grease
--	---------------------------------


- (b) Install the bush to the No. 2 front disc brake cylinder slide pin.

5. INSTALL NO. 2 FRONT DISC BRAKE CYLINDER SLIDE PIN

- (a) Apply a light layer of lithium soap base glycol grease to the entire circumference of the No. 2 front disc brake cylinder slide pin, as shown in the illustration.



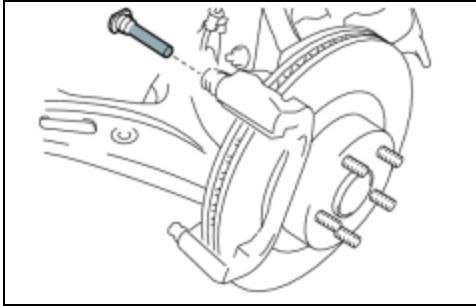
Text in Illustration

	Lithium Soap Base Glycol Grease
---	---------------------------------


- (b) Install the No. 2 front disc brake cylinder slide pin to the carrier.

6. INSTALL FRONT DISC BRAKE CYLINDER SLIDE PIN

- (a) Apply a light layer of lithium soap base glycol grease to the entire circumference of the front disc brake cylinder slide pin, as shown in the illustration.



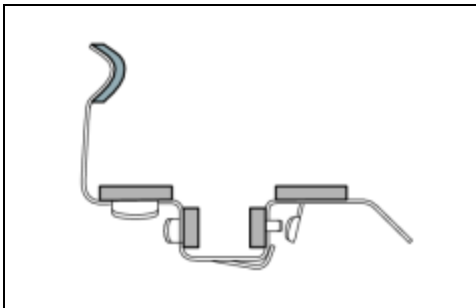
Text in Illustration

	Lithium Soap Base Glycol Grease
---	---------------------------------

- (b) Install the front disc brake cylinder slide pin to the carrier.

7. INSTALL FRONT DISC BRAKE PAD SUPPORT PLATE (LOWER)

- (a) Apply MP grease to the front disc brake pad support plate (lower) as shown in the illustration.



Text in Illustration

	MP grease
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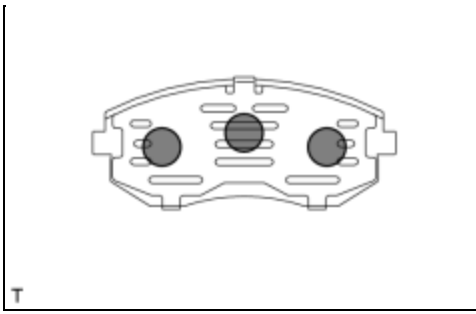
8. INSTALL FRONT DISC BRAKE PAD SUPPORT PLATE (UPPER)

HINT:


Use the same procedure as for the front disc brake pad support plate (lower).

9. INSTALL FRONT DISC BRAKE CYLINDER SUB-ASSEMBLY

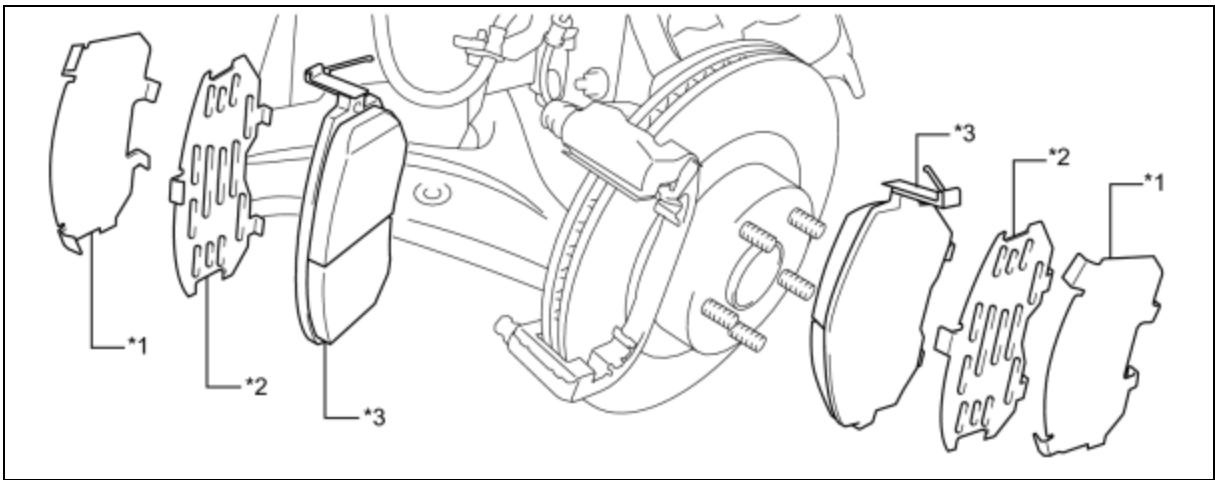
- (a) Apply disc brake grease to both sides of the shim.



Text in Illustration

	Disc Brake Grease
---	-------------------

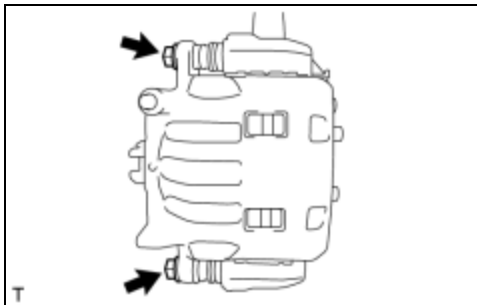
- (b) Install the covers (shim) to each front disc brake pad.
- (c) Install the disc brake pads, covers (shim) and shims to the carrier.



Text in Illustration

*1	Cover (Shim)	*2	Shim
*3	Disc Brake Pad	-	-

10. INSTALL FRONT DISC BRAKE CYLINDER SUB-ASSEMBLY



- (a) Install the front disc brake cylinder assembly LH to the carrier with the 2 bolts.

Torque: 26 N·m (270 kgf·cm, 19ft·lbf)

11. CONNECT NO. 1 FRONT FLEXIBLE HOSE

- (a) Install the No. 1 front flexible hose to the disc brake cylinder assembly with 2 new gaskets and the new union bolt.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

12. ADD BRAKE FLUID INFO

13. BLEED BRAKE LINE INFO

14. INSPECT FLUID LEAK

15. INSPECT FLUID LEVEL INFO

16. INSTALL FRONT WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000CIJ02DX
Title: BRAKE (FRONT): FRONT BRAKE: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. TEMPORARILY INSTALL FRONT DISC BRAKE BLEEDER PLUG

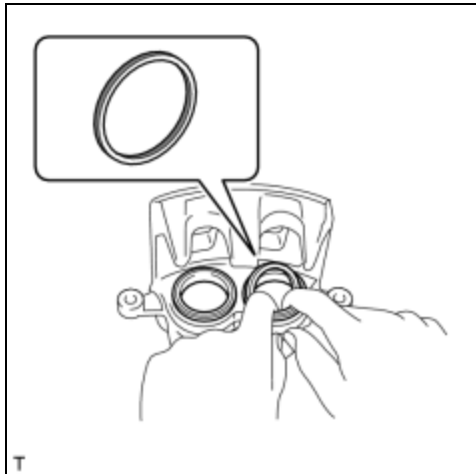
- (a) Temporarily install the front disc brake bleeder plug to the front disc brake cylinder assembly LH.

2. INSTALL FRONT DISC BRAKE BLEEDER PLUG CAP


- (a) Install the front disc brake bleeder plug cap on the front disc brake bleeder plug.

3. INSTALL PISTON SEAL

- (a) Apply a light layer of lithium soap base glycol grease to the entire circumference of 2 new piston seals.



Text in Illustration

	Lithium Soap Base Glycol Grease
---	---------------------------------

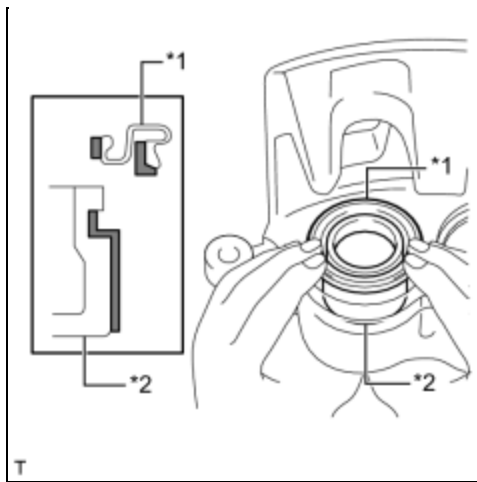
- (b) Securely install the 2 piston seals into the grooves of the disc brake cylinder.

NOTICE:


Securely install the piston seal into the groove of the disc brake cylinder.

4. INSTALL FRONT DISC BRAKE PISTON

- (a) Apply a light layer of lithium soap base glycol grease to the entire circumference of a new cylinder boot as shown in the illustration.



Text in Illustration

*1	Cylinder Boot
*2	Front Disc Brake Piston
	Lithium Soap Base Glycol Grease

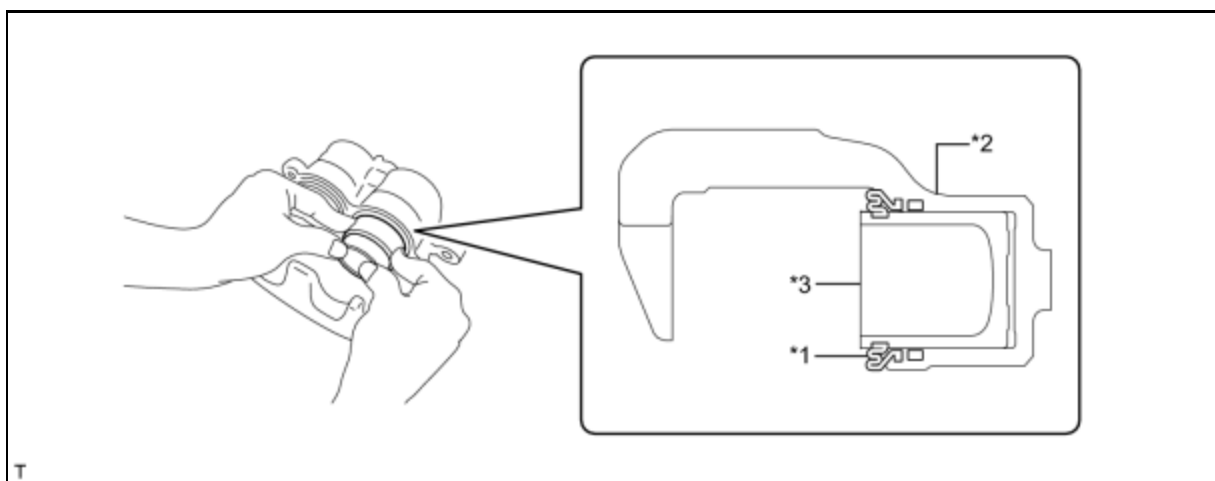
- (b) Securely install the cylinder boot into the grooves of the front disc brake piston.
- (c) Apply a light of lithium soap base glycol grease to the entire circumference of the 2 front disc brake pistons and install them to the front disc brake cylinder LH.

NOTICE:

Do not install the piston forcibly in the disc brake cylinder.

5. INSTALL CYLINDER BOOT

- (a) Securely install the cylinder boot into the groove of the front disc brake cylinder LH.



Text in Illustration

*1	Cylinder Boot	*2	Front Disc Brake Cylinder Assembly LH
*3	Front Disc Brake Piston	-	-



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000CIG02JX
Title: BRAKE (FRONT): FRONT BRAKE: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

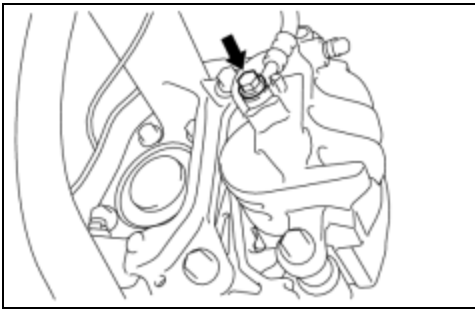
1. REMOVE FRONT WHEEL

2. DRAIN BRAKE FLUID

NOTICE:

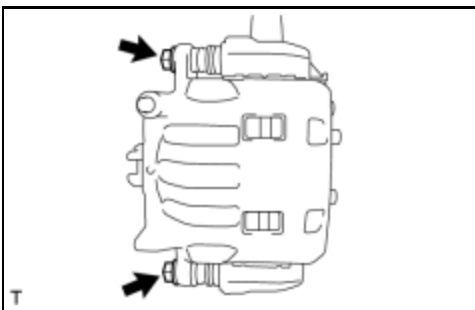
Immediately wash off any brake fluid that comes into contact with any painted surfaces.

3. DISCONNECT NO. 1 FRONT FLEXIBLE HOSE



- (a) Remove the union bolt, 2 gaskets and disconnect the No. 1 front flexible hose from the disc brake cylinder assembly LH.

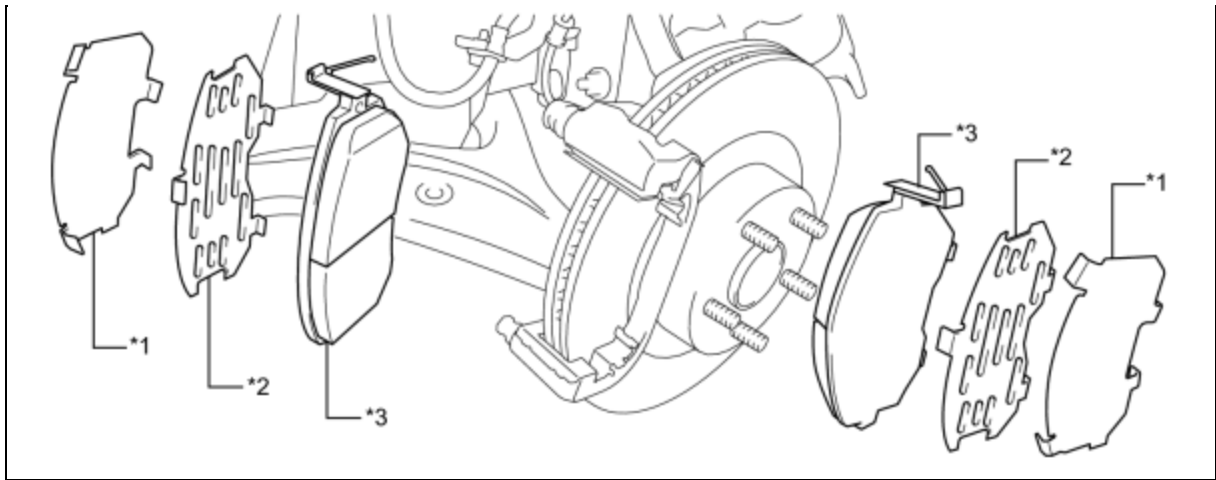
4. REMOVE FRONT DISC BRAKE CYLINDER SUB-ASSEMBLY



- (a) Remove the 2 bolts and front disc brake cylinder sub-assembly.

5. REMOVE FRONT DISC BRAKE PAD

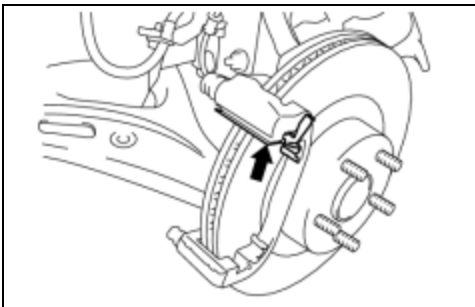
- (a) Remove the disc brake pads from the carrier.
- (b) Remove the covers (shims) and shims from each pad.



Text in Illustration

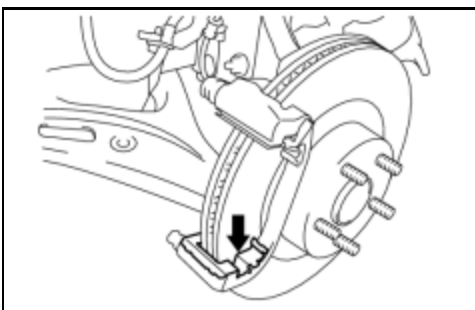
*1	Cover (shim)	*2	Shim
*3	Disc Brake Pad	-	-

6. REMOVE FRONT DISC BRAKE PAD SUPPORT PLATE (UPPER)



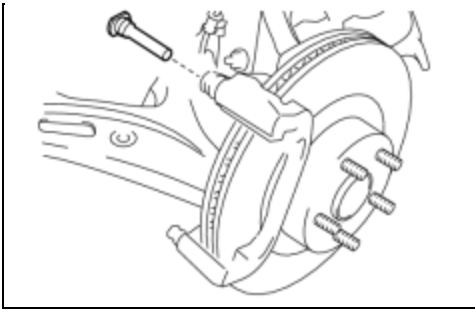
(a) Remove the front disc brake pad support plate (upper) from the carrier.

7. REMOVE FRONT DISC BRAKE PAD SUPPORT PLATE (LOWER)



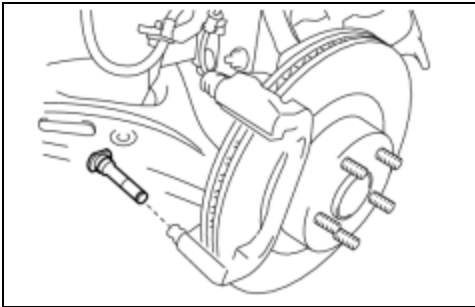
(a) Remove the front disc brake pad support plate (lower) from the carrier.

8. REMOVE FRONT DISC BRAKE CYLINDER SLIDE PIN



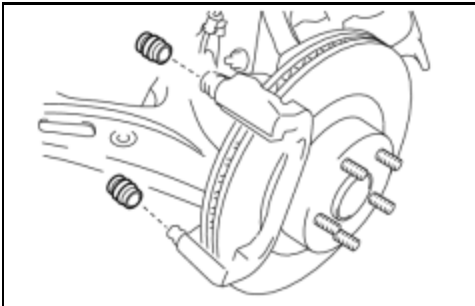
- (a) Remove the front disc brake cylinder slide pin from the carrier.

9. REMOVE NO. 2 FRONT DISC BRAKE CYLINDER SLIDE PIN



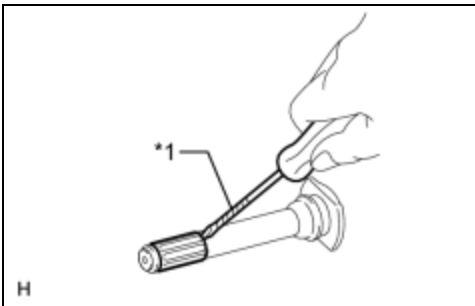
- (a) Remove the No. 2 front disc brake cylinder slide pin from the carrier.

10. REMOVE FRONT DISC BRAKE CYLINDER SLIDE BUSH



- (a) Remove the 2 front disc brake cylinder slide bushes from the carrier.

11. REMOVE BUSH

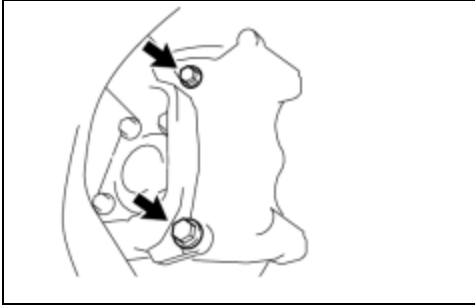


- (a) Using a screwdriver with its tip wrapped in protective tape, remove the bush from the pin (B).

Text in Illustration

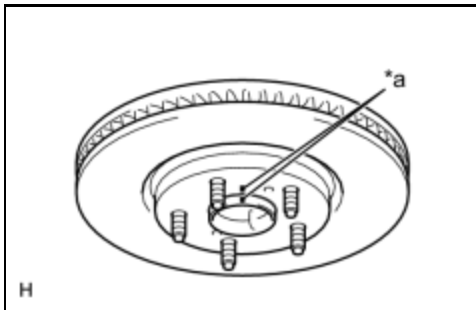
*1	Protective Tape
----	-----------------

12. REMOVE CARRIER



(a) Remove the 2 bolts and carrier.

13. REMOVE FRONT DISC



(a) Place matchmarks on the front disc and front axle hub.

HINT:

It is not necessary when replacing the disc.

Text in Illustration

*a

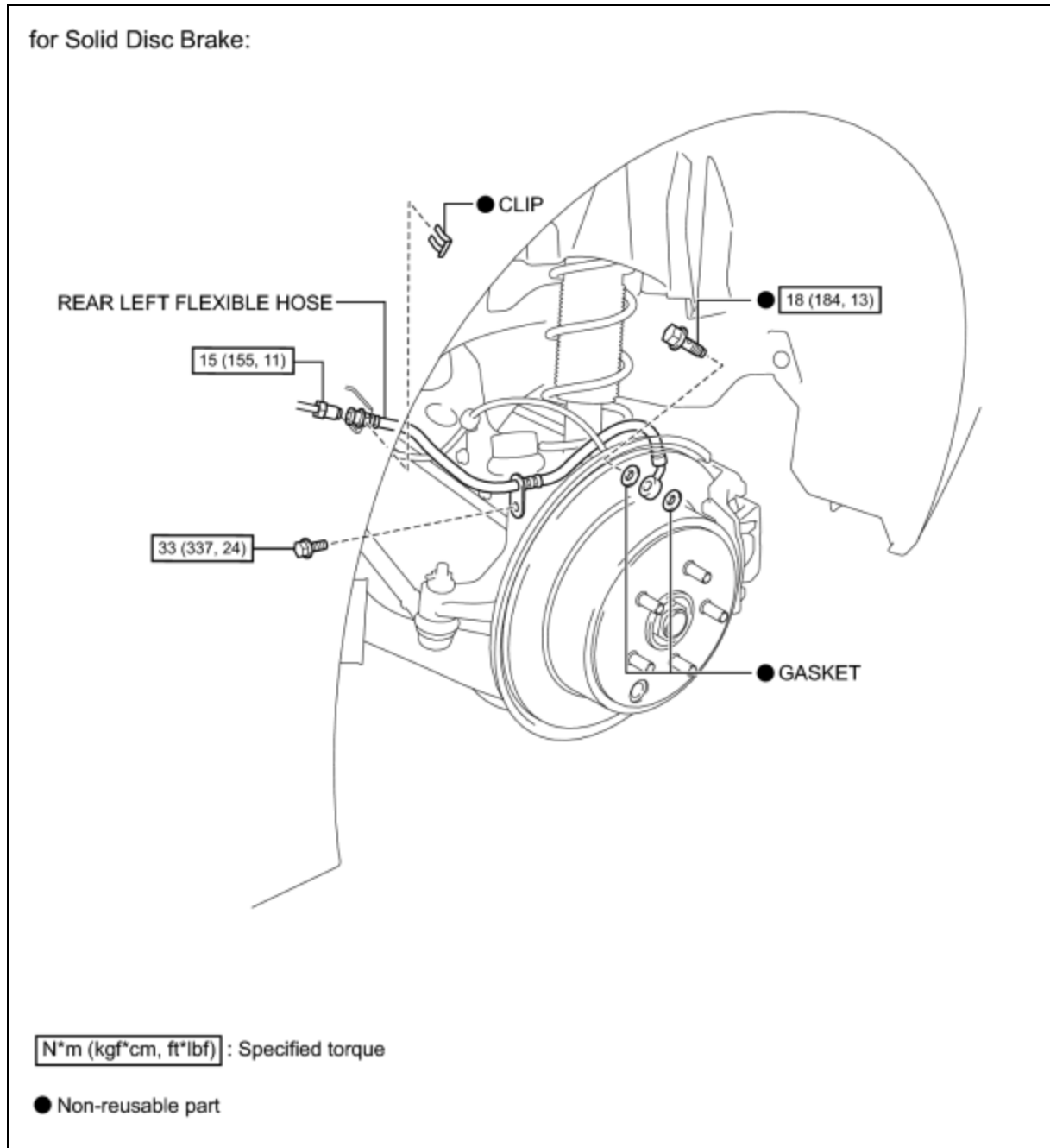
Matchmark

(b) Remove the front disc.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000CIW01CX
Title: BRAKE (REAR): REAR BRAKE FLEXIBLE HOSE: COMPONENTS (2013 FR-S)		

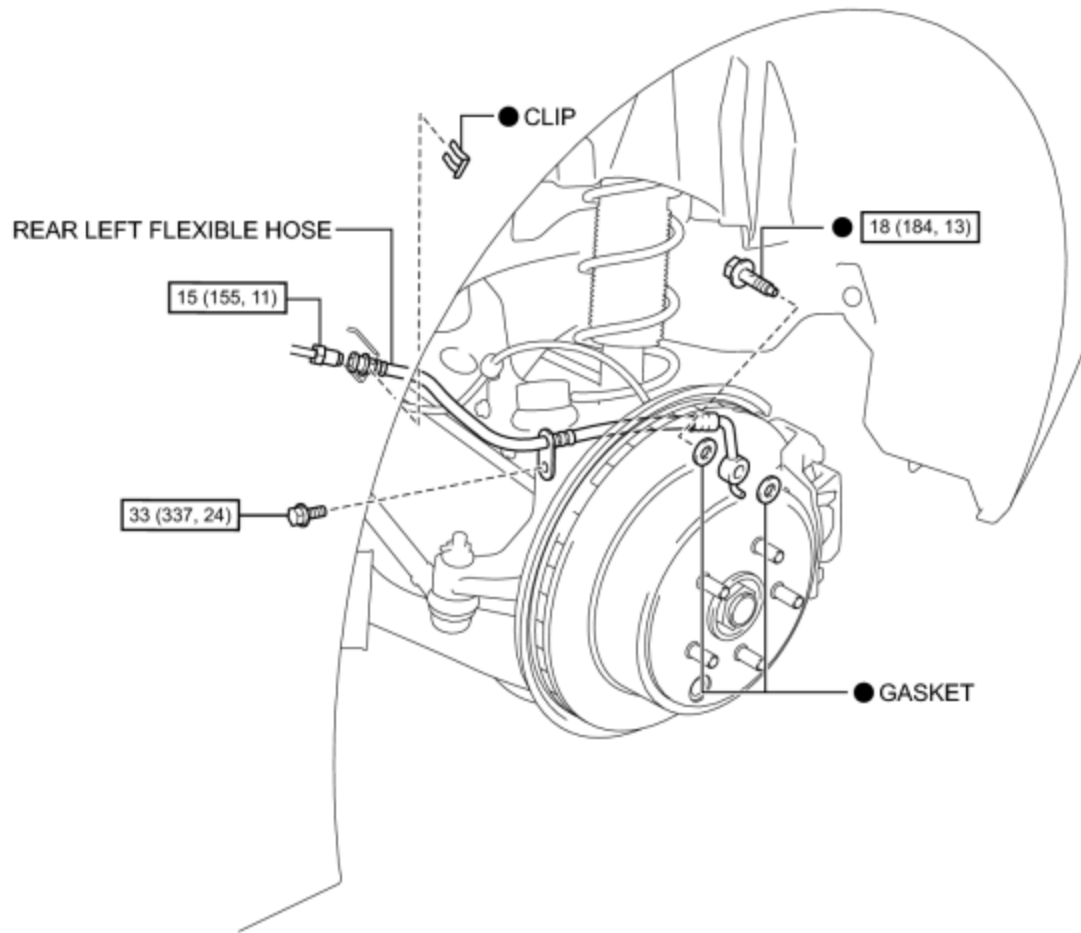
COMPONENTS

ILLUSTRATION



ILLUSTRATION

for Ventilated Disc Brake:



$\boxed{\text{N}^*\text{m (kgf}^*\text{cm, ft}^*\text{lbf)}}$: Specified torque

● Non-reusable part

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000CIV017X
Title: BRAKE (REAR): REAR BRAKE FLEXIBLE HOSE: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for RH and LH sides.
- The procedure listed below is for LH side.

1. INSTALL REAR LEFT FLEXIBLE HOSE

(a) Connect the rear left flexible hose with a new clip.


NOTICE:

Securely install the clip.

(b) Hold the rear left flexible hose with a wrench and connect the brake tube to the rear left flexible hose using a union nut wrench.

Torque: 15 N·m (155 kgf·cm, 11ft·lbf)

NOTICE:

- Do not bend or damage the brake tube.
- Do not allow any foreign matter such as dirt and dust to enter the brake tube from the connecting position.
- Use the formula to calculate special torque wrench is combined with a torque wrench  .

(c) Connect the rear left flexible hose to the rear carrier LH with the bolt.

Torque: 33 N·m (337 kgf·cm, 24ft·lbf)

(d) Connect the rear left flexible hose to the rear disc brake cylinder assembly LH with a new 2 gaskets and the new union bolt.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

2. ADD BRAKE FLUID

3. BLEED BRAKE LINE

4. INSPECT BRAKE FLUID LEAK

5. INSPECT FLUID LEVEL

6. INSTALL REAR WHEEL

Torque: 120 N·m (1224 kgf·cm, 88ft·lbf)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000CIX015X
Title: BRAKE (REAR): REAR BRAKE FLEXIBLE HOSE: REMOVAL (2013 FR-S)		

REMOVAL

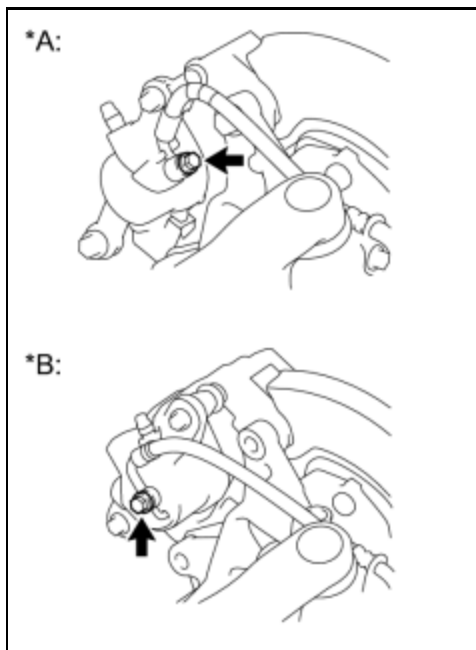
HINT:

- Use the same procedure for RH and LH sides.
- The procedure listed below is for LH side.

1. REMOVE REAR WHEEL

2. DRAIN BRAKE FLUID

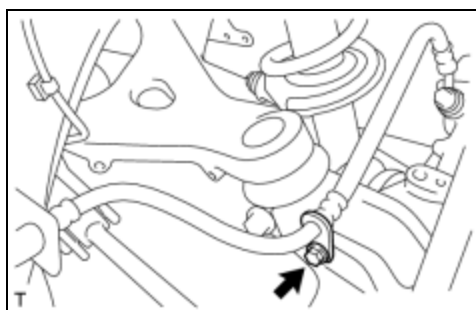
3. REMOVE REAR LEFT FLEXIBLE HOSE



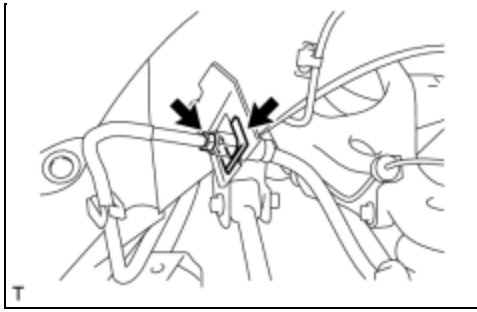
- (a) Remove the union bolt and 2 gaskets, and disconnect the rear left flexible hose from the rear disc brake cylinder LH.

Text in Illustration

*A	Solid Disc Brake
*B	Ventilated Disc Brake



- (b) Remove the bolt and separate the rear left flexible hose from the rear carrier LH.



(c) Hold the rear left flexible hose with a wrench and disconnect the brake tube using a union nut wrench.

NOTICE:

- Do not bend or damage the brake tube.
- Do not allow any foreign matter such as dirt and dust to enter the brake tube from the connecting position.

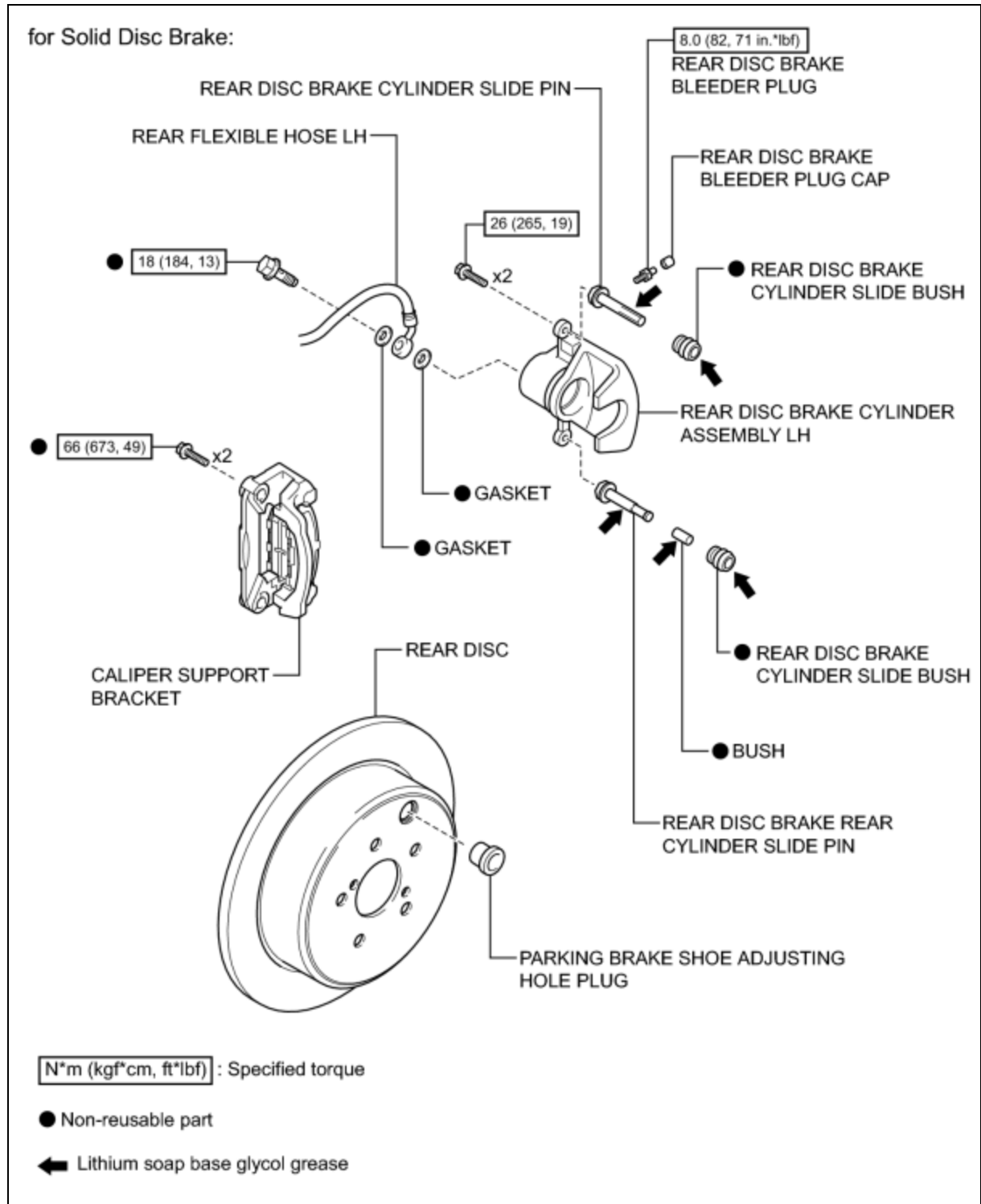
(d) Remove the clip.

(e) Remove the rear left flexible hose.

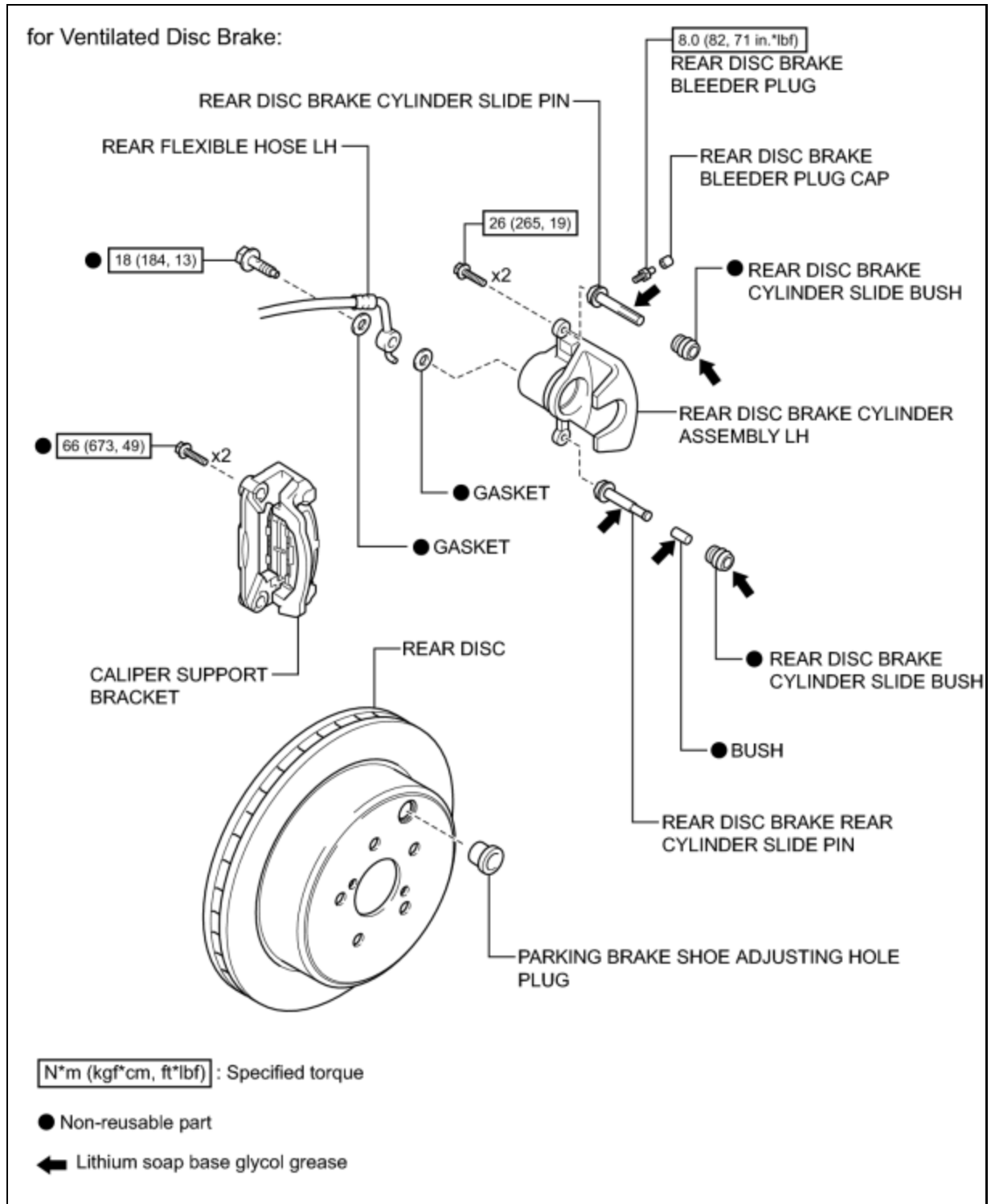
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000CIL015X
Title: BRAKE (REAR): REAR BRAKE: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION

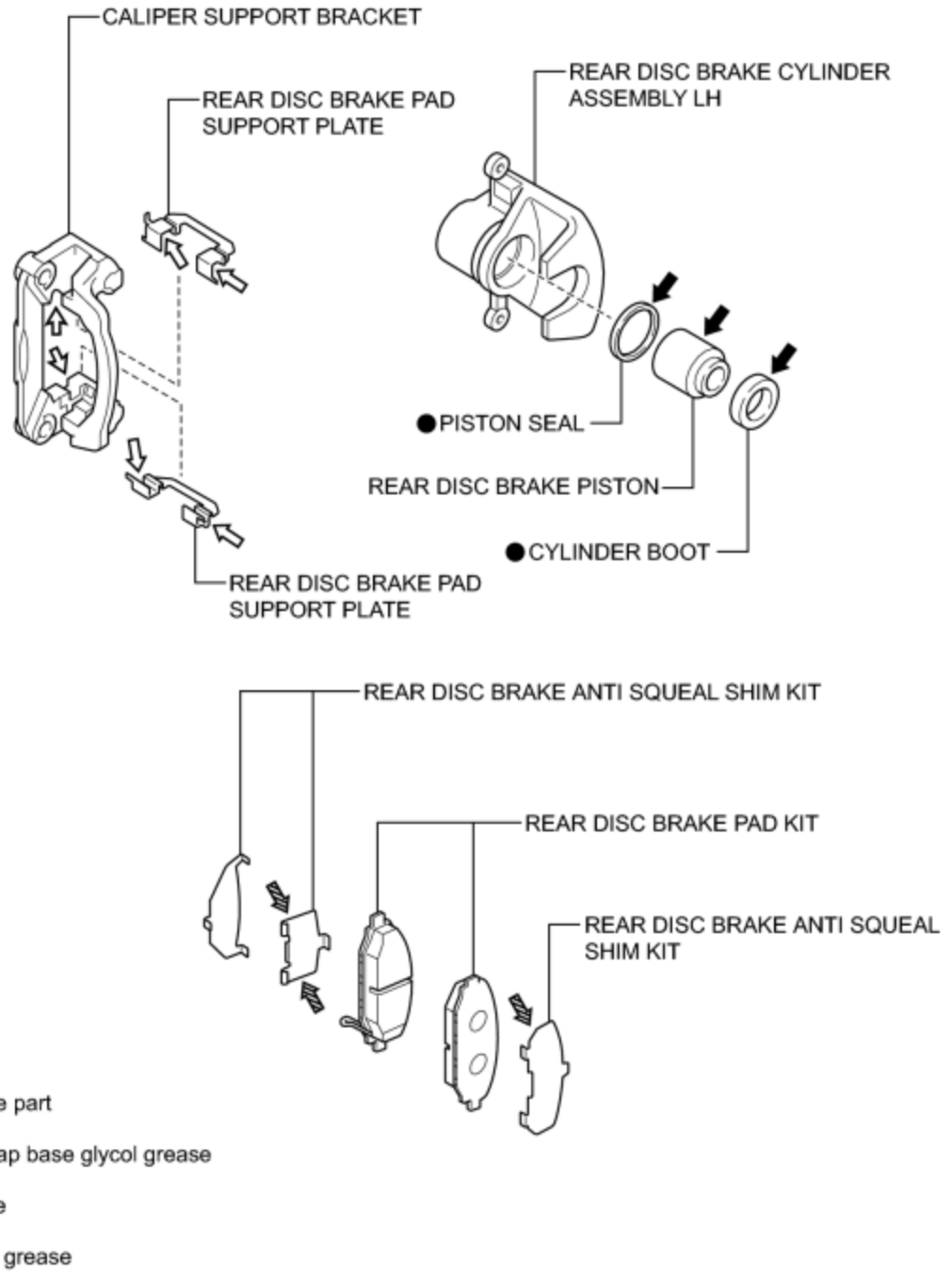


ILLUSTRATION



ILLUSTRATION

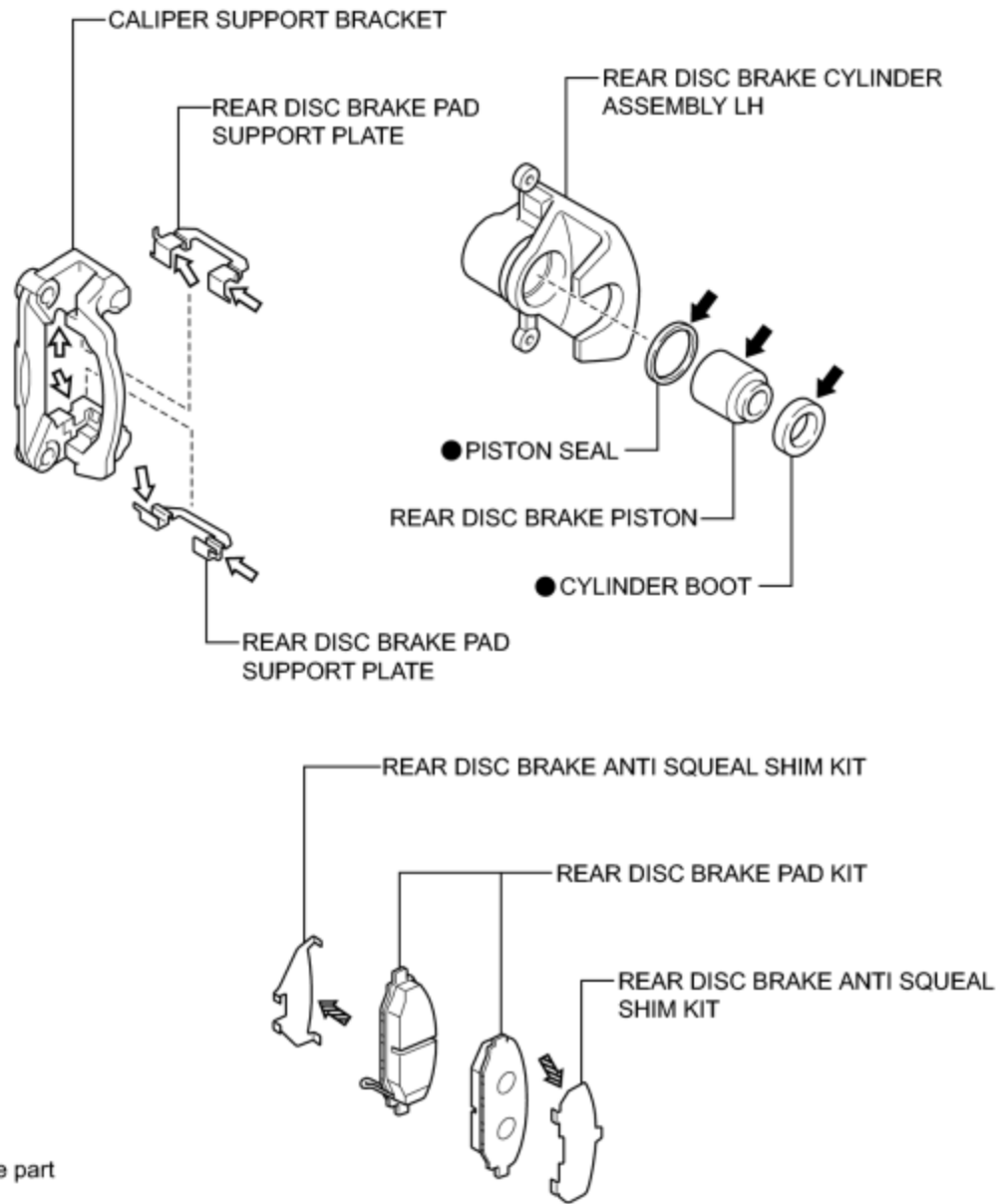
for Solid Disc Brake:



T

ILLUSTRATION

for Ventilated Disc Brake:



● Non-reusable part

← Lithium soap base glycol grease

⇐ MP Grease

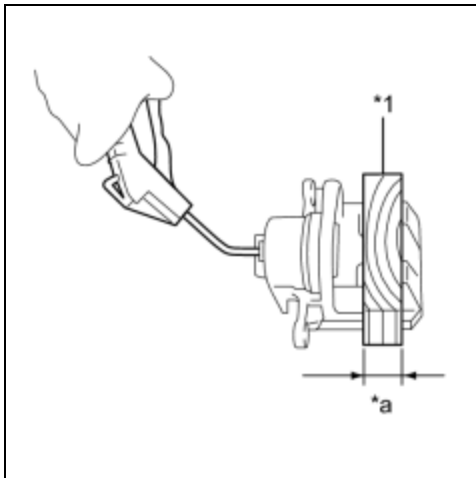
⇐ Disc brake grease

T

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000C1N00YX
Title: BRAKE (REAR): REAR BRAKE: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. REMOVE REAR DISC BRAKE PISTON



- (a) Place a wooden block between the rear disc brake piston and disc brake cylinder.

Text in Illustration

*1	Wooden Block
*a	30 mm (1.1811 in.)

- (b) Slowly apply compressed air to remove the disc brake piston.

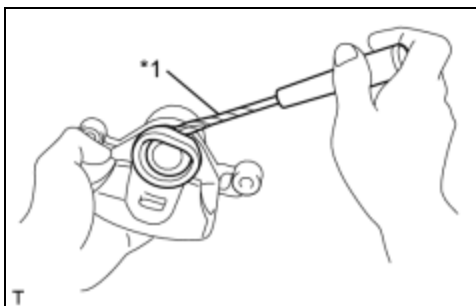
CAUTION:

Do not place your fingers in front of the piston when using compressed air.

NOTICE:

Do not spatter brake fluid.

2. REMOVE CYLINDER BOOT



- (a) Using a screwdriver with its tip wrapped in protective tape, remove the cylinder boot from the disc brake cylinder.

NOTICE:

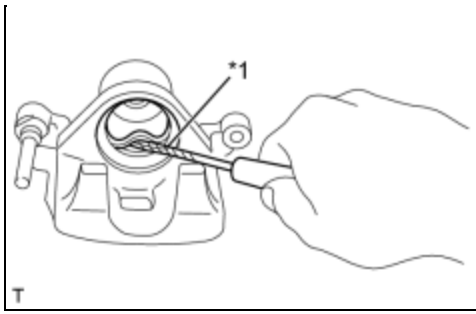
Do not damage the inner surface or groove of the cylinder.

Text in Illustration

*1	Protective Tape
----	-----------------

3. REMOVE PISTON SEAL

- (a) Using a screwdriver with its tip wrapped in protective tape, remove the piston seal.



Text in Illustration

*1

Protective Tape

NOTICE:

Do not damage the inner surface or piston seal groove of the cylinder.

4. REMOVE REAR DISC BRAKE BLEEDER PLUG CAP

- (a) Remove the rear disc brake bleeder plug cap from the rear disc brake bleeder plug.

5. REMOVE REAR DISC BRAKE BLEEDER PLUG

- (a) Remove the rear disc brake bleeder plug from the rear disc brake cylinder assembly LH.

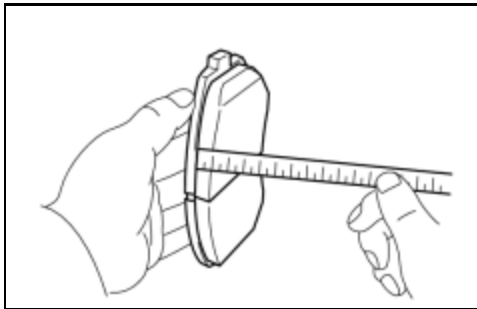
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001ED100LX
Title: BRAKE (REAR): REAR BRAKE: INSPECTION (2013 FR-S)		

INSPECTION

1. CHECK BRAKE CYLINDER AND PISTON

- (a) Check the cylinder bore and piston for rust and scoring.

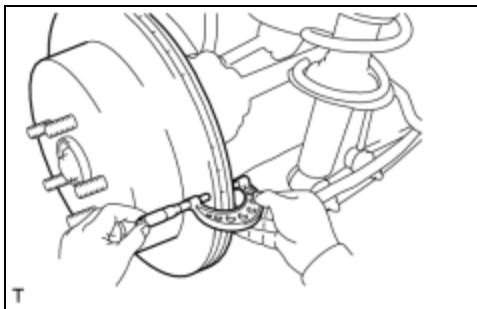
2. INSPECT PAD LINING THICKNESS



- (a) Using a ruler, measure the pad lining thickness.

SPECIFICATION	MINIMUM THICKNESS	STANDARD THICKNESS
Solid Type	1.5 mm (0.059 in.)	9.0 mm (0.354 in.)
Ventilated Type	1.5 mm (0.059 in.)	11.0 mm (0.433 in.)

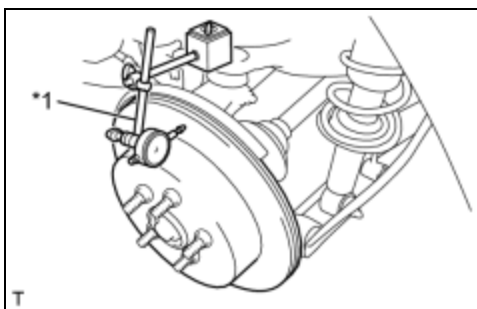
3. INSPECT DISC THICKNESS



- (a) Using a micrometer, measure the disc thickness.

SPECIFICATION	MINIMUM THICKNESS	STANDARD THICKNESS
Solid Type	8.5 mm (0.3346 in.)	10.0 mm (0.3937 in.)
Ventilated Type	16.5 mm (0.6496 in.)	18.0 mm (0.7087 in.)

4. INSPECT DISC RUNOUT



- (a) Check the bearing play in the axial direction and check for the axle hub runout [INFO](#) .

(b) Tighten the disc with the 5 nuts.

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

(c) Using a dial indicator, measure the disc runout 10 mm (0.394 in.) away from the outer edge of the rear disc.

Text in Illustration

*1	Dial Indicator
----	----------------

Maximum disc runout:

0.05 mm (0.0020 in.)

NOTICE:

- If the runout exceeds the maximum value, change the installation positions of the disc and axle to make the minimum runout. If the runout exceeds the maximum even when the installation positions are changed, replace the front disc.

(d) Remove the 5 hub nuts and rear disc.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000C1K011X
Title: BRAKE (REAR): REAR BRAKE: INSTALLATION (2013 FR-S)		

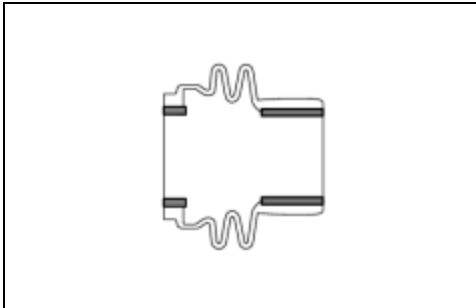
INSTALLATION

HINT:


- Use the same procedure for RH and LH sides.
- The procedure listed below is for LH side.

1. INSTALL REAR DISC BRAKE CYLINDER SLIDE BUSH

- (a) Apply a light layer of lithium soap base glycol grease to the inner face of a new rear disc brake cylinder slide bush.



Text in Illustration

	Lithium Soap Base Glycol Grease
---	---------------------------------

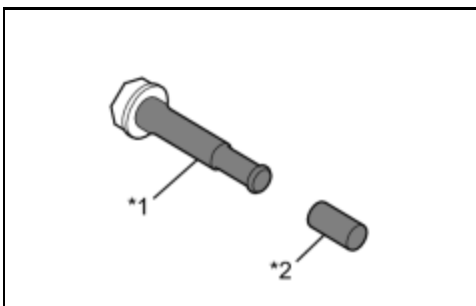
HINT:

Apply at least 0.3 g (0.01 oz.) of lithium soap base glycol grease to each rear disc brake cylinder slide bush.


- (b) Install the 2 rear disc brake cylinder slide bushes to the caliper support bracket.

2. INSTALL REAR DISC BRAKE REAR CYLINDER SLIDE PIN

- (a) Apply a light layer of lithium soap base glycol grease to the contact face between a new bush and rear disc brake rear cylinder rear disc brake cylinder slide pin.



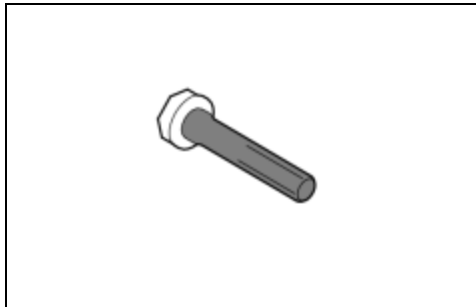
Text in Illustration

*1	rear disc brake rear cylinder rear disc brake cylinder slide pin
*2	Bush
	Lithium Soap Base Glycol Grease


- (b) Install the new bush to the rear disc brake rear cylinder rear disc brake cylinder slide pin.
- (c) Apply a light layer of lithium soap base glycol grease to entire circumference of the rear disc brake rear cylinder rear disc brake cylinder slide pin and fitting part.
- (d) Install the rear disc brake rear cylinder rear disc brake cylinder slide pin to the caliper support bracket.

3. INSTALL REAR DISC BRAKE CYLINDER SLIDE PIN

- (a) Apply a light layer of lithium soap base glycol grease to entire circumference of the rear disc brake cylinder slide pin and fitting part.



Text in Illustration

	Lithium Soap Base Glycol Grease
---	---------------------------------

- (b) Install the rear disc brake cylinder slide pin to the caliper support bracket.

4. INSTALL REAR DISC

- (a) Align the matchmarks placed when removing, install the rear disc to the axle hub.

HINT:

When using a new rear disc, install it so that rear disc runout is minimum.

5. ADJUST PARKING BRAKE

6. INSTALL PARKING BRAKE SHOE ADJUSTING HOLE PLUG

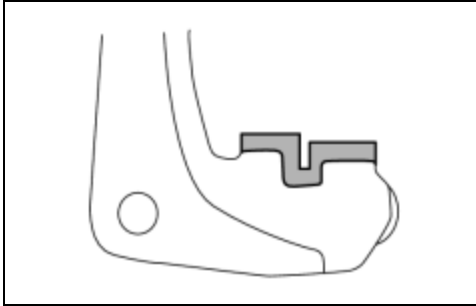
- (a) Install the parking brake shoe adjusting hole plug to the rear disc.

7. INSTALL CALIPER SUPPORT BRACKET


- (a) Install the caliper support bracket with the 2 new bolts.

Torque: 66 N·m (673 kgf·cm, 49ft·lbf)

- (b) Apply a light of lithium soap base glycol grease to contact section of the rear disc brake pad support plate with the rear disc brake pad.

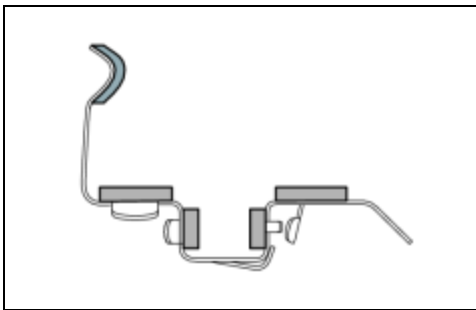


Text in Illustration

	Lithium Soap Base Glycol Grease
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8. INSTALL REAR DISC BRAKE PAD SUPPORT PLATE

- (a) Apply a light of lithium soap base glycol grease to contact section of the rear disc brake pad support plate with the rear disc brake pad.



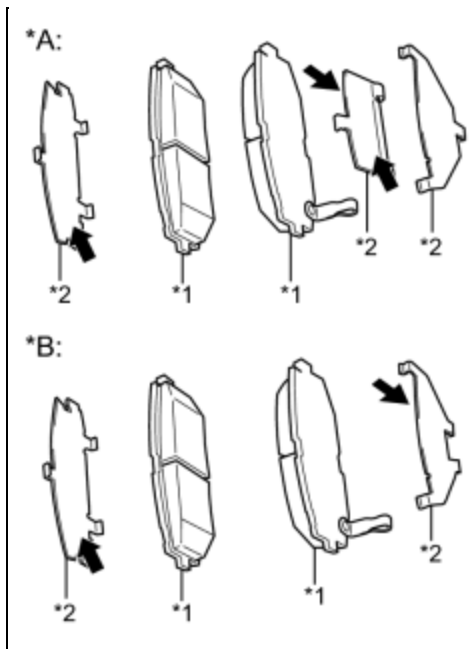
Text in Illustration

	Lithium Soap Base Glycol Grease
---	---------------------------------


- (b) Install the rear disc brake pad support plate to the caliper support bracket.

9. INSTALL REAR DISC BRAKE ANTI SQUEAL SHIM KIT

- (a) Apply disc brake grease to the rear disc brake anti squeal shim kit.



Text in Illustration

*A	Solid Disc Brake
*B	Ventilated Disc Brake
*1	Rear Disc Brake Pad Kit
*2	Rear Disc Brake Anti Squeal Shim Kit
	Disc Brake Grease

(b) Put the rear disc anti squeal shim kit to each rear disc brake pad.

10. INSTALL REAR DISC BRAKE PAD KIT

(a) Install the rear disc brake pad kit to the caliper support bracket.

11. INSTALL REAR DISC BRAKE CYLINDER ASSEMBLY LH

(a) Apply the rear disc brake cylinder assembly LH to the caliper support bracket.

Torque: 26 N·m (265 kgf·cm, 19ft·lbf)

12. CONNECT REAR FLEXIBLE HOSE LH

(a) Connect the rear left flexible hose with 2 new gaskets and the new union bolt.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

13. ADD BRAKE FLUID INFO

14. BLEED BRAKE LINE INFO

15. INSPECT BRAKE FLUID LEAK

16. INSPECT FLUID LEVEL INFO

17. INSTALL REAR WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000CIP00YX
Title: BRAKE (REAR): REAR BRAKE: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. TEMPORARILY INSTALL REAR DISC BRAKE BLEEDER PLUG

- (a) Temporarily install the rear disc brake bleeder plug to the rear disc brake cylinder LH.

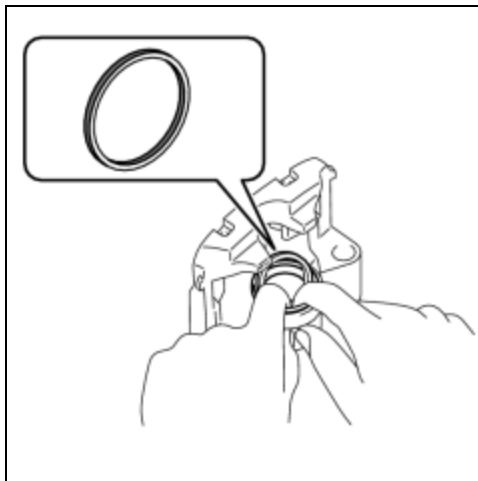
Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)

2. INSTALL REAR DISC BRAKE BLEEDER PLUG CAP


- (a) Install the rear disc brake bleeder plug cap to the rear disc brake bleeder plug.

3. INSTALL PISTON SEAL

- (a) Apply a light layer of lithium soap base glycol grease to the entire circumference of a new piston seal and install it into the groove of the disc brake cylinder.

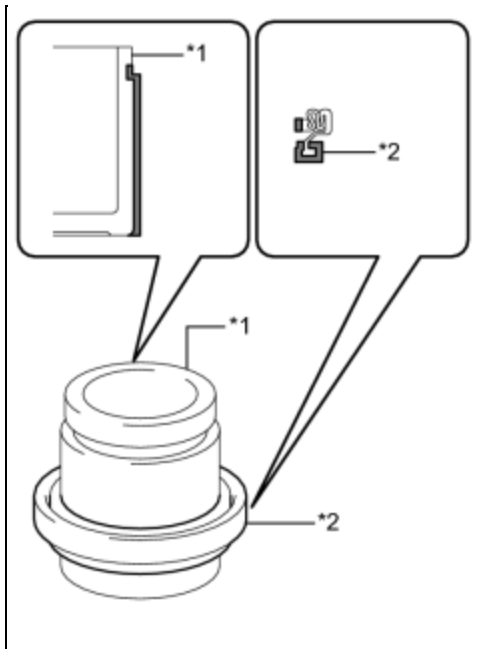


Text in Illustration


	Lithium Soap Base Glycol Grease
---	---------------------------------

4. INSTALL CYLINDER BOOT

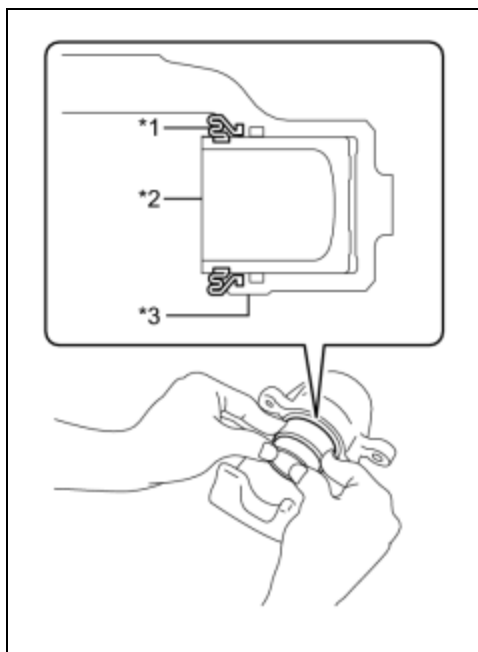
- (a) Apply a light layer of lithium soap base glycol grease to a new cylinder boot, and put it on the disc brake piston as shown in the illustration.



Text in Illustration

*1	Piston
*2	Cylinder Boot
	Lithium soap base glycol grease

5. INSTALL REAR DISC BRAKE PISTON



- (a) Fit the seal section of the cylinder boot into the groove of the rear disc brake cylinder assembly LH.

Text in Illustration

*1	Cylinder Boot
*2	Rear disc Brake Piston
*3	Rear disc Brake Cylinder Assembly LH

NOTICE:

Securely fit the seal section of the cylinder boot.

- (b) Push in the piston by hand and fit the seal section of the boot into the groove of the rear disc brake piston.

NOTICE:

Securely fit the seal section of the cylinder boot.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000CIM01AX
Title: BRAKE (REAR): REAR BRAKE: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

- Use the same procedure for RH and LH sides.
- The procedure listed below is for LH side.

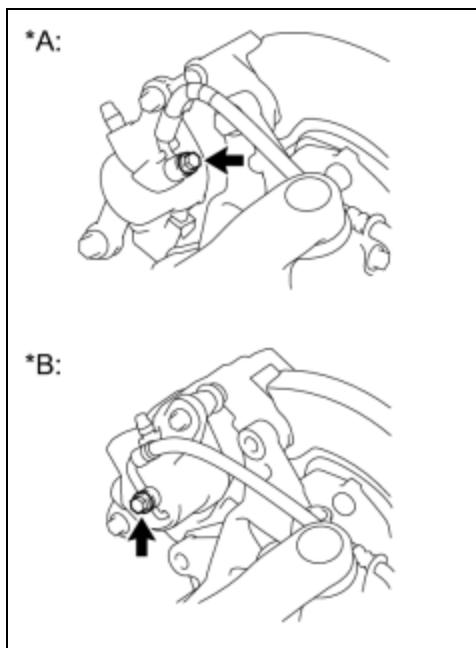
1. REMOVE REAR WHEEL

2. DRAIN BRAKE FLUID

NOTICE:

Immediately wash off any brake fluid that comes into contact with any painted surfaces.

3. DISCONNECT REAR FLEXIBLE HOSE LH



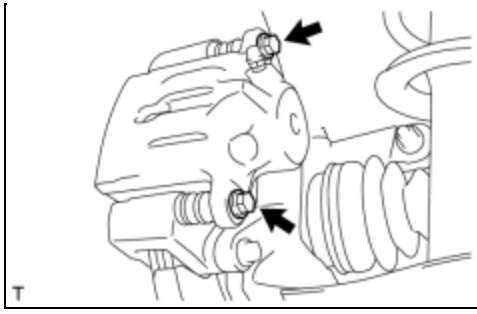
- (a) Remove the union bolt and 2 gaskets and disconnect the rear left flexible hose from the rear disc brake cylinder assembly LH.

Text in Illustration

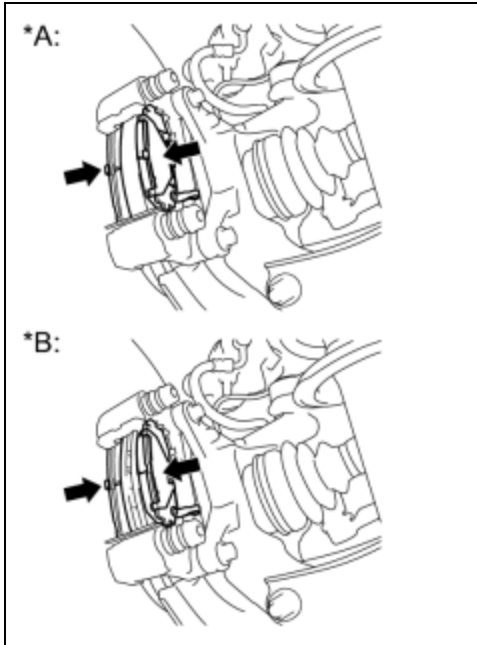
*A	Solid Disc Brake
*B	Ventilated Disc Brake

4. REMOVE REAR DISC BRAKE CYLINDER ASSEMBLY LH

- (a) Remove the 2 bolts and rear disc brake cylinder LH.



5. REMOVE REAR DISC BRAKE PAD KIT



(a) Remove the rear disc brake pad kit from the caliper support bracket.

Text in Illustration

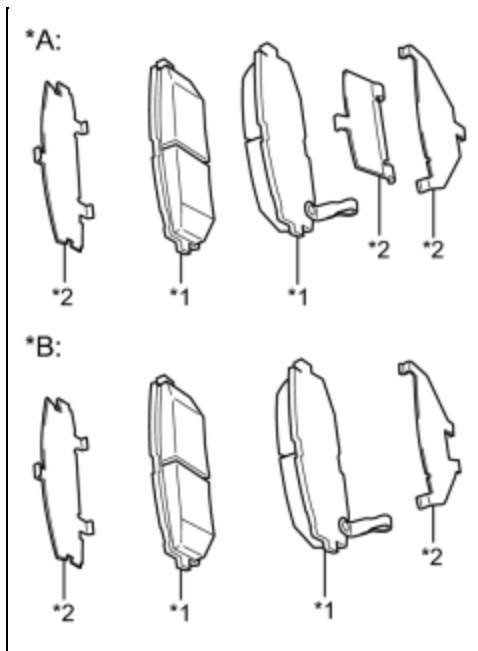
*A	Solid Disc Brake
*B	Ventilated Disc Brake

6. REMOVE REAR DISC BRAKE ANTI SQUEAL SHIM KIT

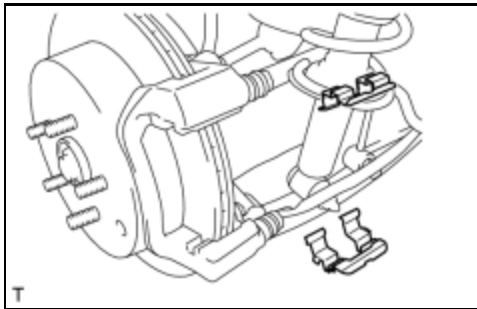
(a) Remove the rear disc brake anti squeal shim kit from each rear disc brake pad.

Text in Illustration

*A	Solid Disc Brake
*B	Ventilated Disc Brake
*1	Rear Disc Brake Pad
*2	Rear Disc Brake Anti Squeal Shim Kit

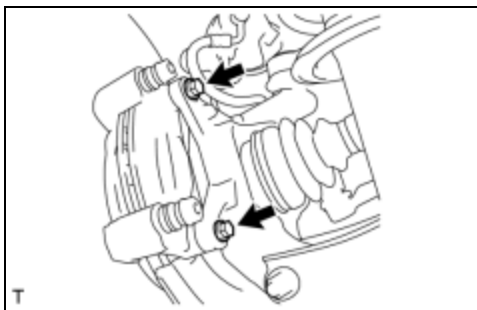


7. REMOVE REAR DISC BRAKE PAD SUPPORT PLATE



(a) Remove the 2 rear disc brake pad support plates.

8. REMOVE CALIPER SUPPORT BRACKET



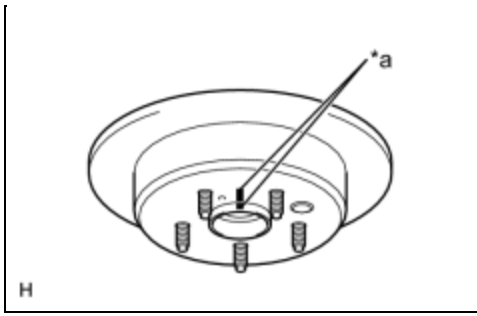
(a) Remove the 2 bolts and caliper support bracket.

9. REMOVE REAR DISC

(a) Place matchmarks on the rear disc and rear axle hub.

Text in Illustration

*a	Matchmark
----	-----------

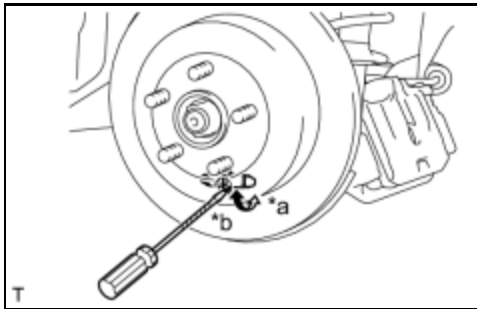


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HINT:

It is not necessary when replacing the rear disc.

(b) Release the parking brake and remove the rear disc.



HINT:

If it is difficult to remove the rear disc, insert a screwdriver through the hole of rear disc and turn the adjusting screw to contract it.

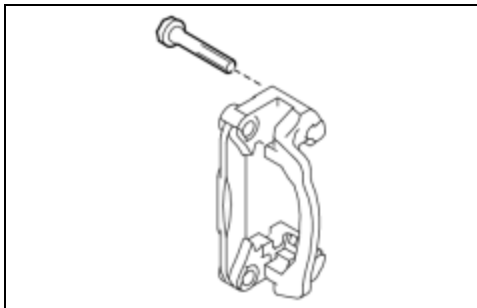
Text in Illustration

*a	Contract
*b	Expand

10. REMOVE PARKING BRAKE SHOE ADJUSTING HOLE PLUG

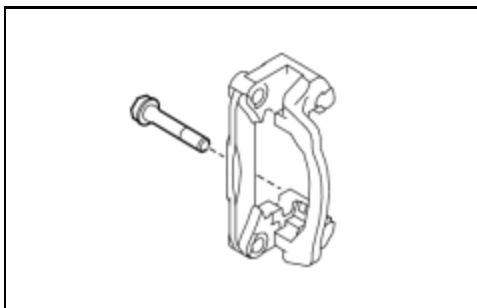
(a) Remove the parking brake shoe adjusting hole plug from the rear from the rear disc.

11. REMOVE REAR DISC BRAKE CYLINDER SLIDE PIN

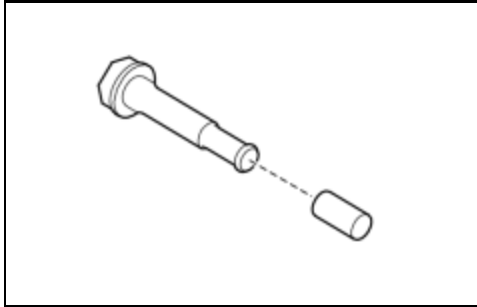


(a) Remove the rear disc brake cylinder slide pin from the caliper support bracket.

12. REMOVE REAR DISC BRAKE REAR CYLINDER SLIDE PIN

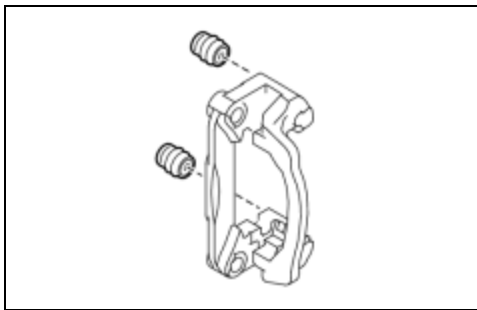


(a) Remove the rear disc brake rear cylinder slide pin from the caliper support bracket.



(b) Remove the bush from the rear disc brake rear cylinder slide pin.

13. REMOVE REAR DISC BRAKE CYLINDER SLIDE BUSH

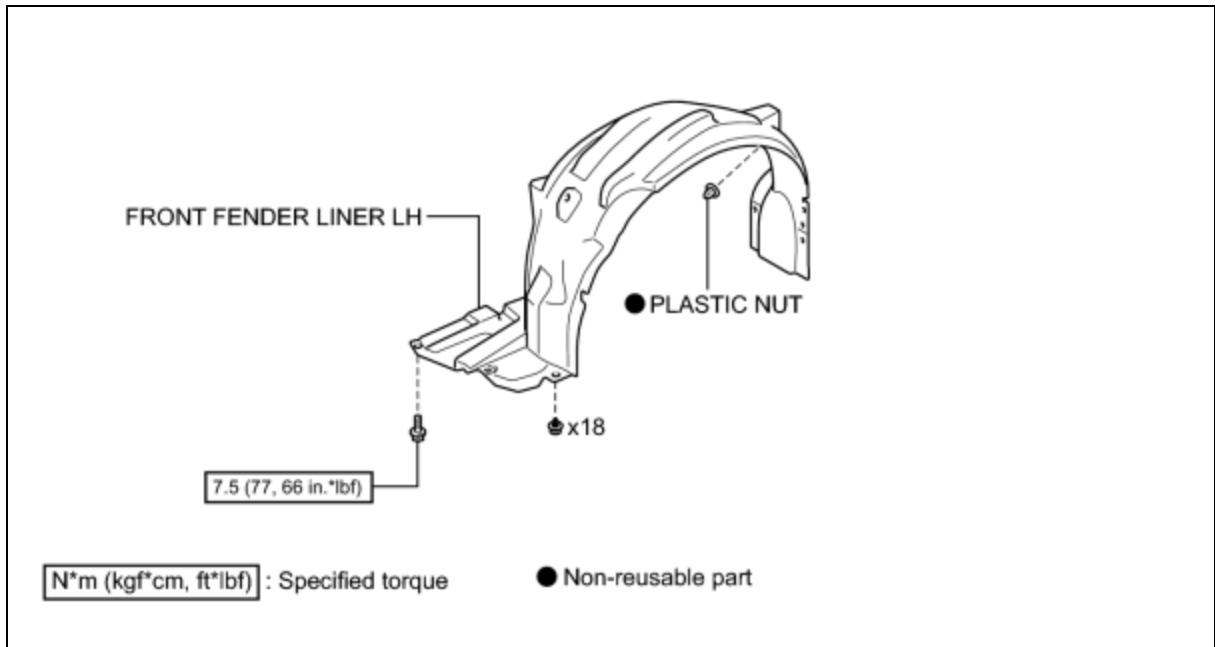


(a) Remove the 2 rear disc brake cylinder slide bushes from the caliper support bracket.

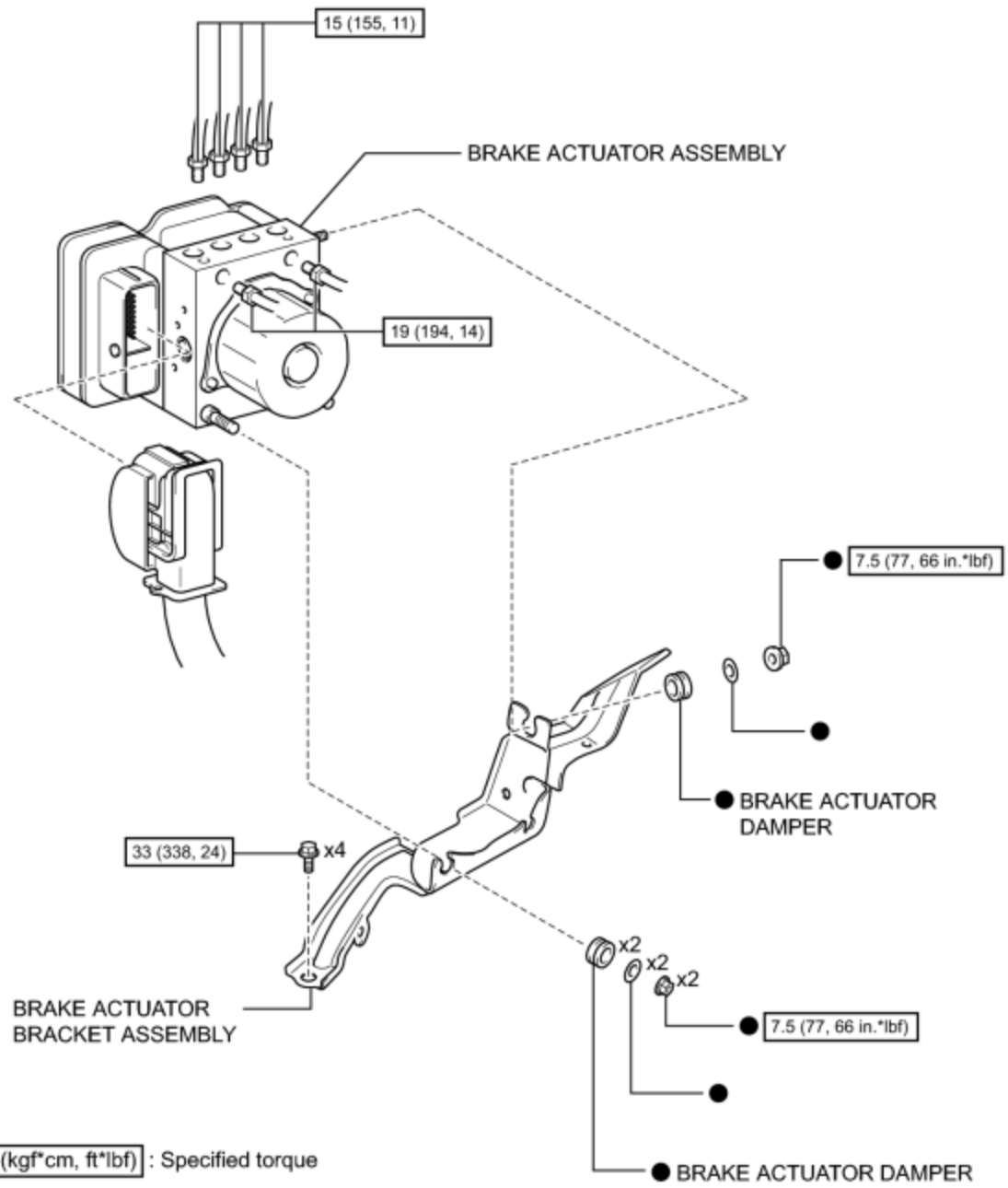
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000034UW00EX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: BRAKE ACTUATOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



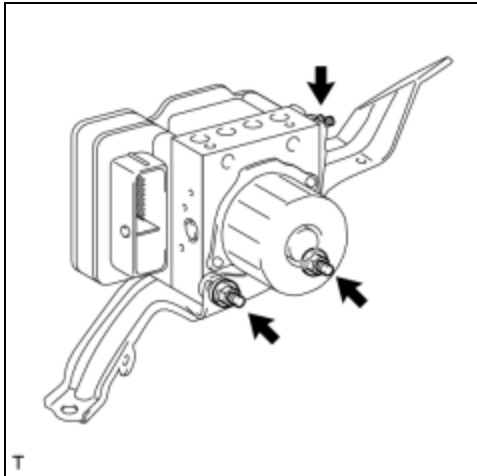
N*m (kg*cm, ft*lbf) : Specified torque

● Non-reusable part

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058JE000X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: BRAKE ACTUATOR: DISASSEMBLY (2013 FR-S)		

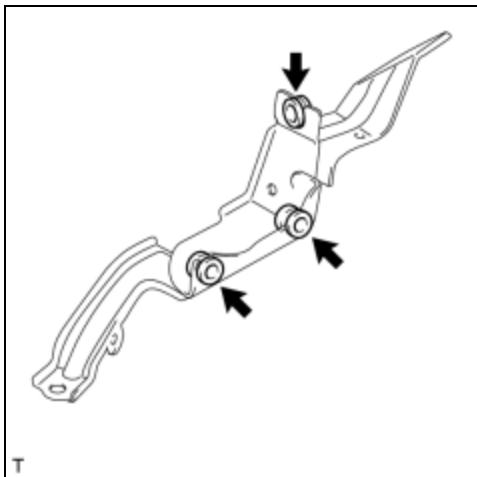
DISASSEMBLY

1. REMOVE BRAKE ACTUATOR BRACKET ASSEMBLY



- (a) Remove the 3 nuts and remove the brake actuator assembly from the brake actuator bracket assembly.

2. REMOVE BRAKE ACTUATOR DAMPER



- (a) Remove the 3 brake actuator damper from the brake actuator bracket assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000034UV01BX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: BRAKE ACTUATOR: INSTALLATION (2013 FR-S)		

INSTALLATION

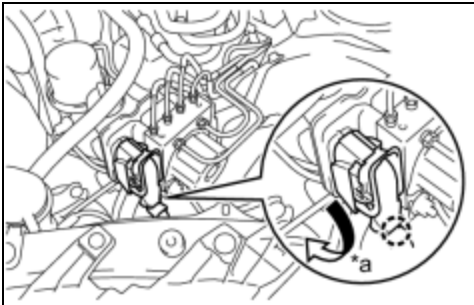
1. INSTALL BRAKE ACTUATOR ASSEMBLY WITH BRAKE ACTUATOR BRACKET

(a) Install the brake actuator assembly with brake actuator bracket using the 4 bolts.

Torque: 33 N·m (338 kgf·cm, 24ft·lbf)

(b) Connect the brake actuator connector to the brake actuator.

(c) Turn the locking lever downwards, and engage the wire harness connector locking claw to lock the connector.

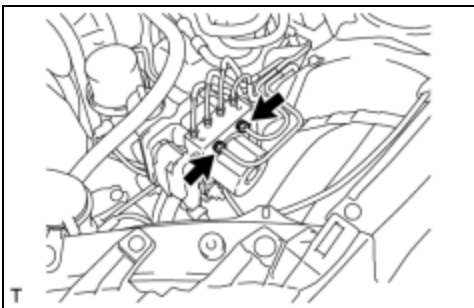


Text in Illustration

*a	Turn
----	------

NOTICE:

- Make sure that the actuator connector can be connected smoothly. Do not allow water, oil or dirt to enter.
- Make sure that the connector is locked securely.

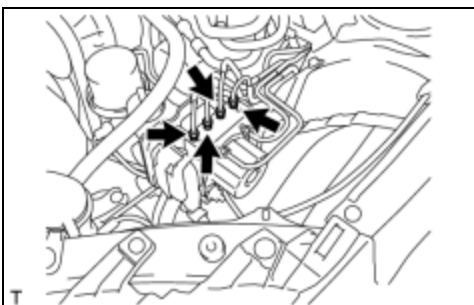


(d) Using a union nut wrench 12 mm, tighten 2 brake tubes.

Torque: 19 N·m (194 kgf·cm, 14ft·lbf)

NOTICE:

Use the formula to calculate the special torque values for situations where the union nut wrench is combined with a torque wrench [INFO](#) .



(e) Using a union nut wrench 10 mm, tighten the 4 brake tubes.

Torque: 15 N·m (155 kgf·cm, 11ft·lbf)

NOTICE:

Use the formula to calculate the special torque values for situations where the union nut wrench is combined with a torque wrench [INFO](#) .

- (f) Connect the front speed sensor LH harness clamp to the brake actuator bracket assembly.
- (g) Connect the cooler pipe to the clamp.
- (h) Connect the 2 harness clamp to the brake actuator bracket.

2. ADD BRAKE FLUID INFO

3. BLEED BRAKE SYSTEM

INFO

4. INSPECT FLUID LEAK

5. INSPECT BRAKE FLUID LEVEL INFO

6. INSTALL FRONT FENDER LINER LH INFO

7. INSTALL FRONT WHEEL LH

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

8. VSC SENSOR NEUTRAL MEMORIZATION

INFO

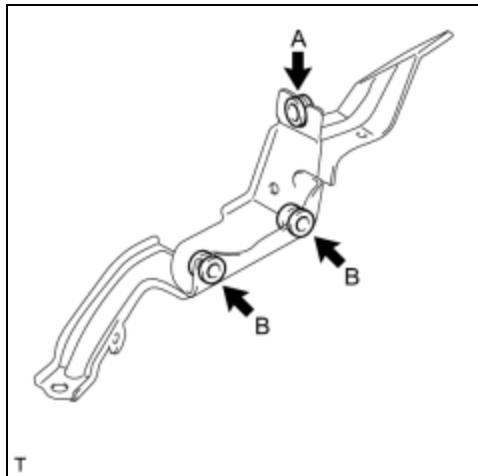
9. INSPECT SPEED SENSOR

INFO

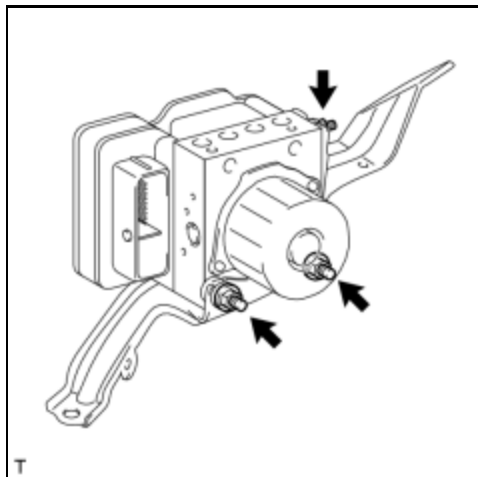
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058JF000X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: BRAKE ACTUATOR: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL BRAKE ACTUATOR DAMPER



- (a) Install the 3 new brake actuator dampers (A and B) to the brake actuator bracket assembly.



2. INSTALL BRAKE ACTUATOR BRACKET ASSEMBLY

- (a) Install the brake actuator bracket assembly to the brake actuator assembly with the 3 new nuts and 3 new washers.

NOTICE:

Do not remove the hole plugs of a new brake actuator assembly before connecting the brake lines because the brake actuator assembly is filled with brake fluid.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000034UX01BX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: BRAKE ACTUATOR: REMOVAL (2013 FR-S)		

REMOVAL

NOTICE:

Before removing the brake actuator assembly, refer to the "Brake line precaution". INFO

1. REMOVE FRONT WHEEL LH

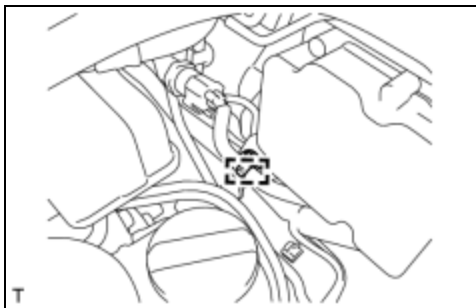
2. DRAIN BRAKE FLUID

NOTICE:

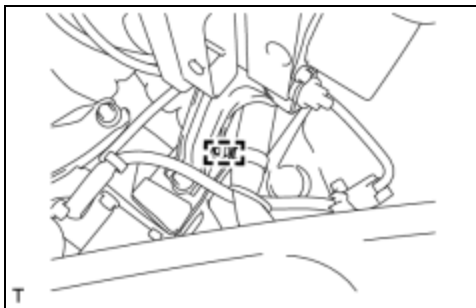
Wash off the brake fluid immediately if it comes into contact with a painted surface.

3. REMOVE FRONT FENDER LINER LH INFO

4. REMOVE BRAKE ACTUATOR ASSEMBLY WITH BRAKE ACTUATOR BRACKET

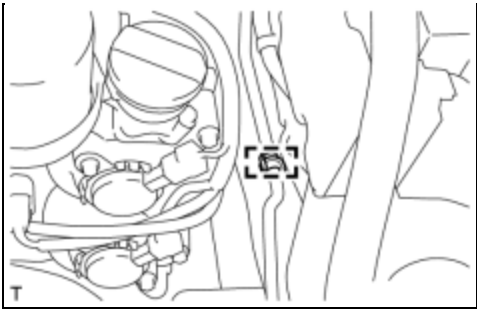


(a) Disconnect the harness clamp from the brake actuator bracket.

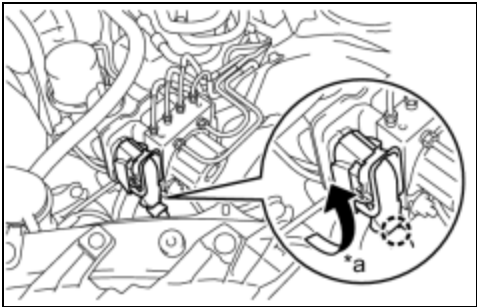


(b) Disconnect the harness clamp from the brake actuator bracket.

(c) Disconnect the cooler pipe from the clamp.



(d) Disconnect the front speed sensor LH harness clamp from the brake actuator bracket.

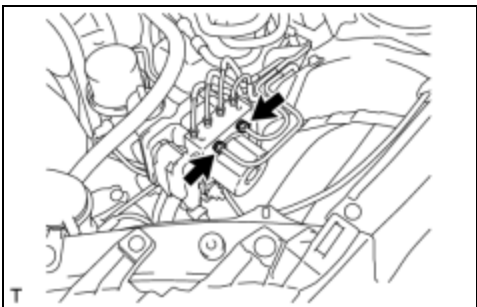


(e) Press the wire harness connector locking claw to disengage the locking lever, and turn the locking lever upwards to unlock the connector.

Text in Illustration

*a	Turn
----	------

(f) Disconnect the connector from the brake actuator assembly.

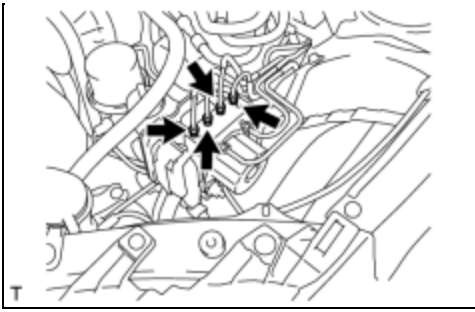


(g) Using a union nut wrench 12 mm, disconnect the 2 brake lines from the brake actuator assembly.

NOTICE:

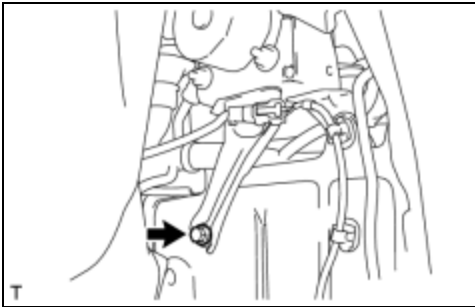
Be careful not to allow the brake fluid to enter the removed connector.

(h) Using a union nut wrench 10 mm, disconnect the 4 brake lines from the brake actuator assembly.

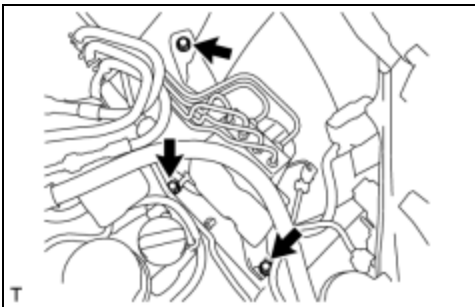


NOTICE:

Be careful not to allow the brake fluid to enter the removed connector.



(i) Remove the brake actuator bracket installation bolt.



(j) Remove the 3 bolts from the brake actuator with bracket.

(k) Remove the brake actuator with bracket from the vehicle body.

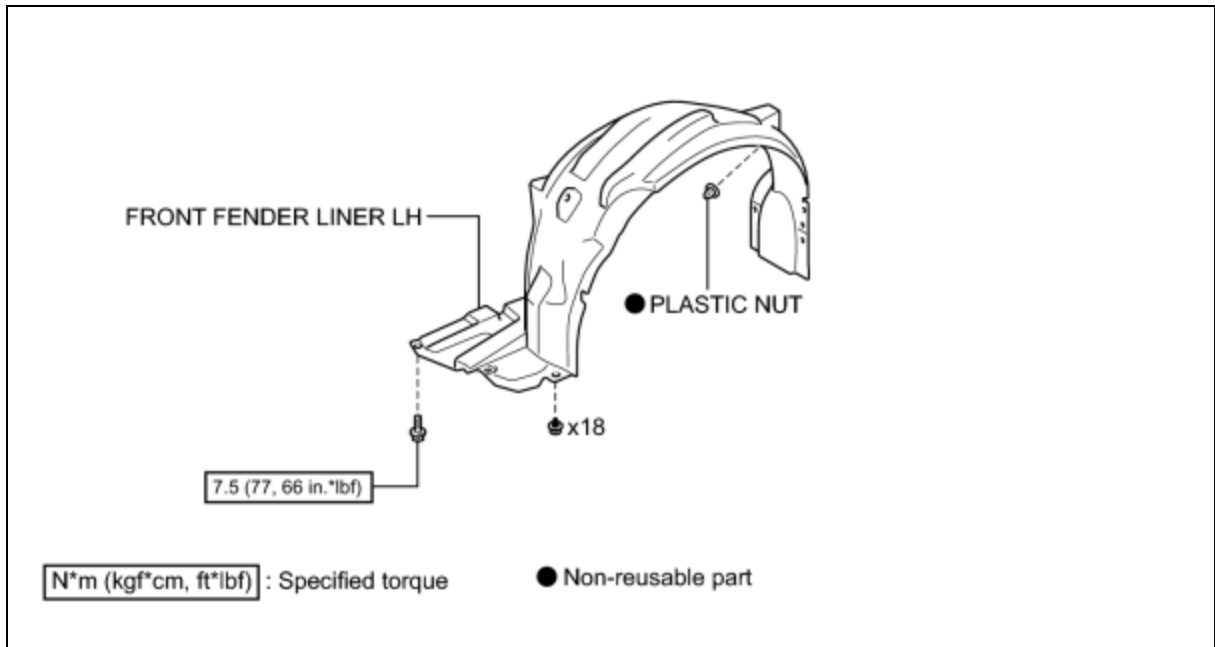
NOTICE:

Do not damage the brake tubes.

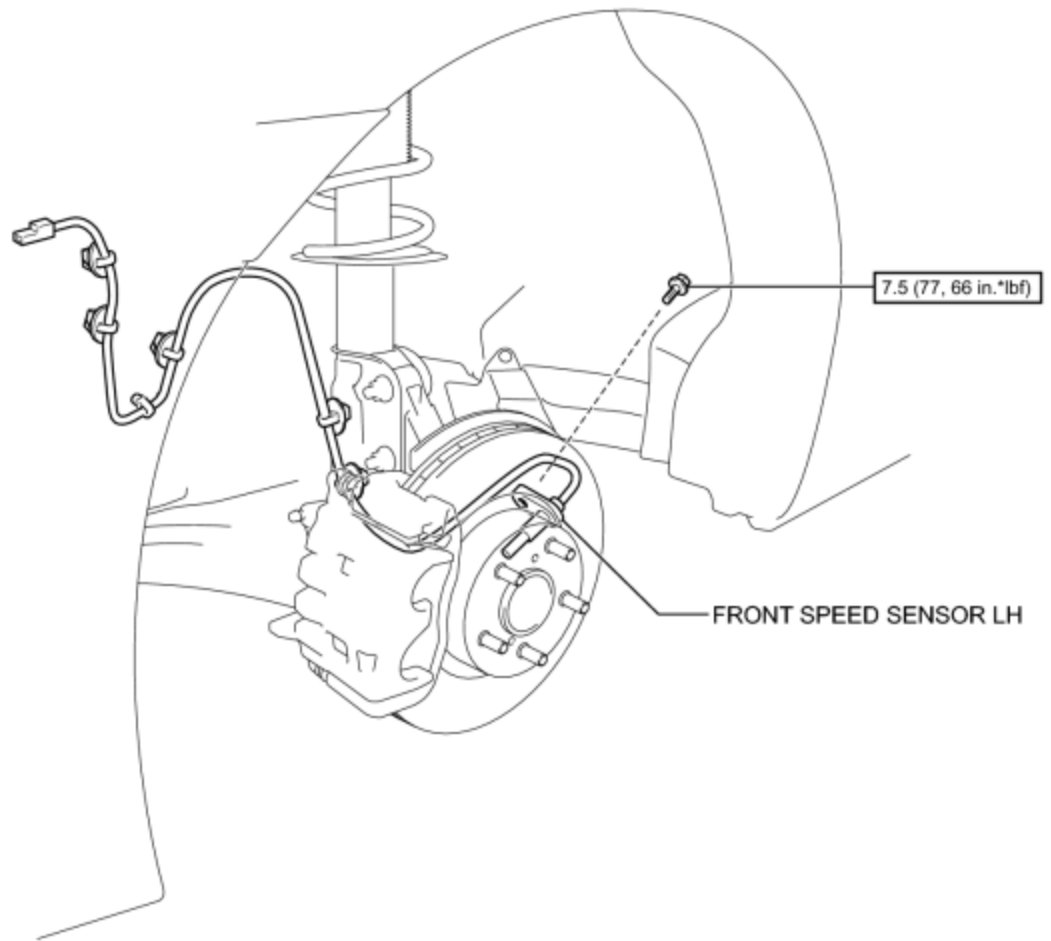
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VKW00YX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: FRONT SPEED SENSOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



N*m (kgf*cm, ft*lbf) : Specified torque

T

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WET03BX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: FRONT SPEED SENSOR: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- The procedures listed below are for the LH side.
- Use the same procedures for the RH and LH sides.

1. INSTALL FRONT SPEED SENSOR LH

(a) Install the front speed sensor LH with the bolt.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

NOTICE:

Do not allow any foreign matter such as dirt or dust to enter between the steering knuckle and the front disc brake dust cover.

(b) Connect the 6 front speed sensor clamps.

NOTICE:

Securely connect the connector.

2. INSTALL FRONT FENDER LINER LH INFO

3. INSTALL FRONT WHEEL LH

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

4. INSPECT SPEED SENSOR SIGNAL

INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WEU02RX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: FRONT SPEED SENSOR: REMOVAL (2013 FR-S)		

REMOVAL

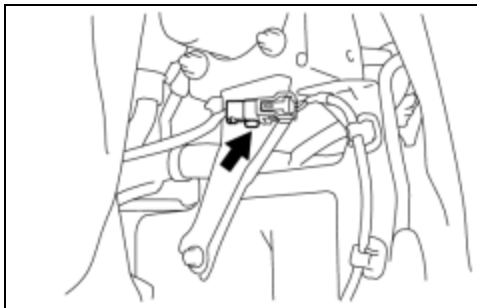
HINT:

- The procedures listed below are for the LH side.
- Use the same procedures for the RH and LH sides.

1. REMOVE FRONT WHEEL LH

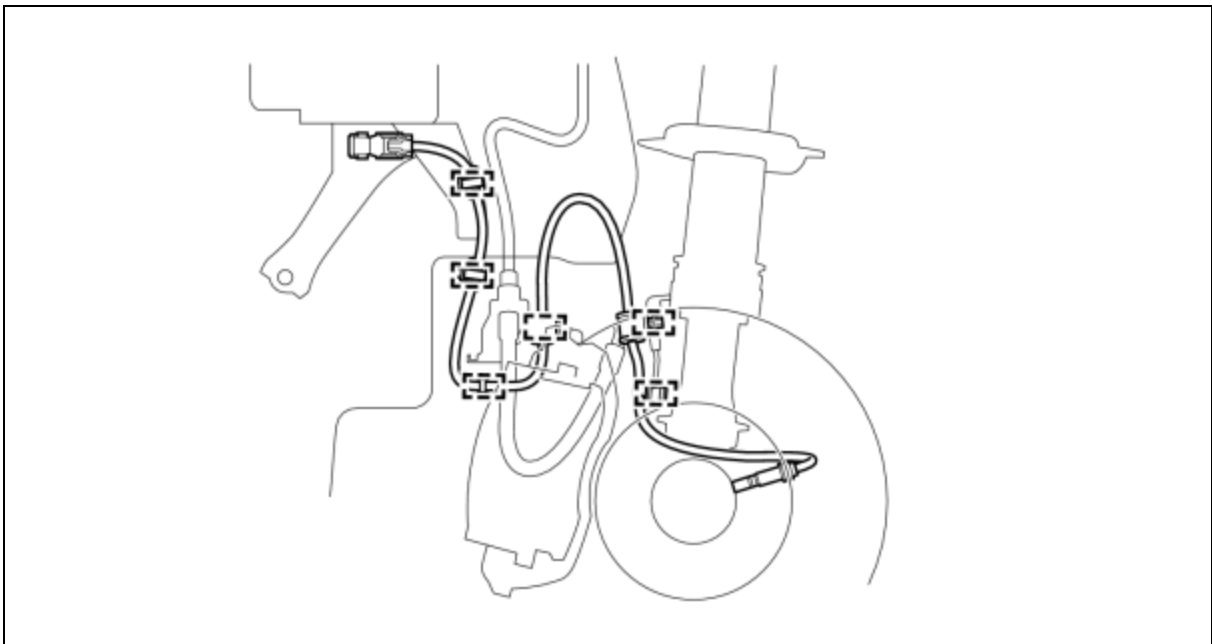
2. REMOVE FRONT FENDER LINER LH INFO

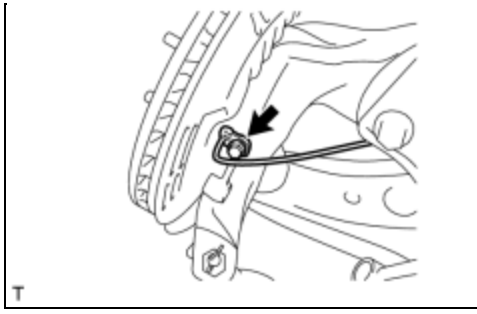
3. REMOVE FRONT SPEED SENSOR LH



(a) Disconnect the front speed sensor connector.

(b) Disconnect the 6 clamps.





(c) Remove the bolt and front speed sensor LH from the steering knuckle.

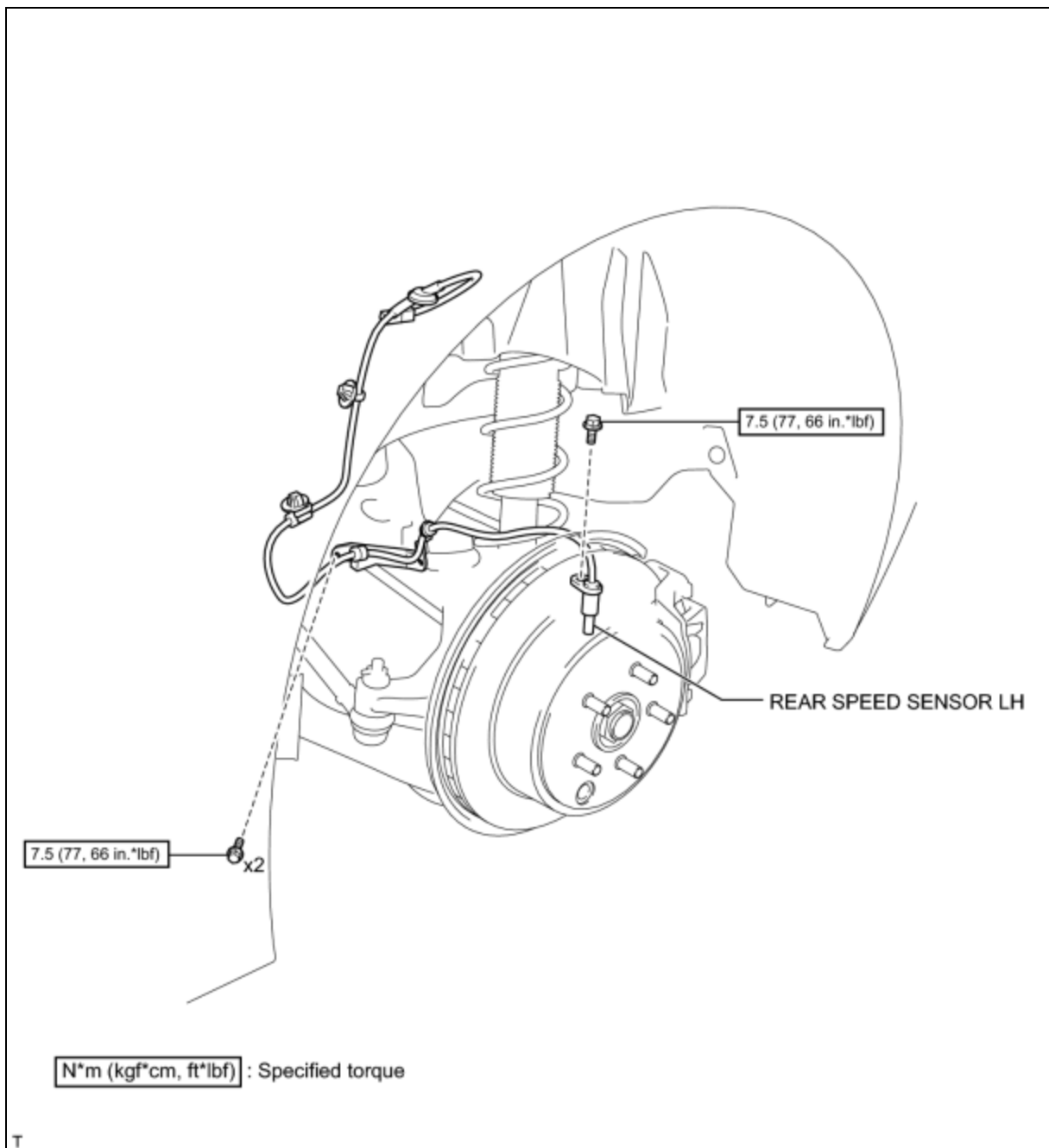
NOTICE:

Clean the speed sensor installation hole and the contact surfaces every time the front speed sensor is removed.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000SS0011X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: REAR SPEED SENSOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000SRY02NX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: REAR SPEED SENSOR: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- The procedures listed below are for the LH side.
- Use the same procedures for the RH and LH sides.

1. INSTALL REAR SPEED SENSOR LH

- (a) Install the rear speed sensor LH with the 3 bolts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

NOTICE:

Prevent foreign matter from attaching to the rear speed sensor LH tip, installation surface and sensor body.

- (b) Connect the 2 clamps.

NOTICE:

Do not twist the wire harness for the rear speed sensor LH when installing it.

- (c) Pull the rear speed sensor LH grommet out from vehicle interior.

NOTICE:

- Do not pull the rear speed sensor LH wire harness.
- Do not fix the pass-through grommet at an angle.

- (d) Connect the rear speed sensor LH connector.

- (e) Remove the luggage compartment floor mat.

2. INSTALL REAR WHEEL LH

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

3. INSPECT SPEED SENSOR SIGNAL

INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000SS1028X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: REAR SPEED SENSOR: REMOVAL (2013 FR-S)		

REMOVAL

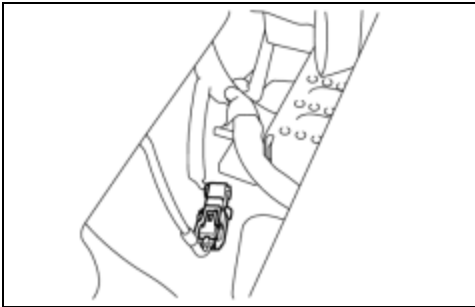
HINT:

- Use the same procedures for the RH and LH sides.
- The procedures listed below are for the LH side.

1. REMOVE REAR WHEEL LH

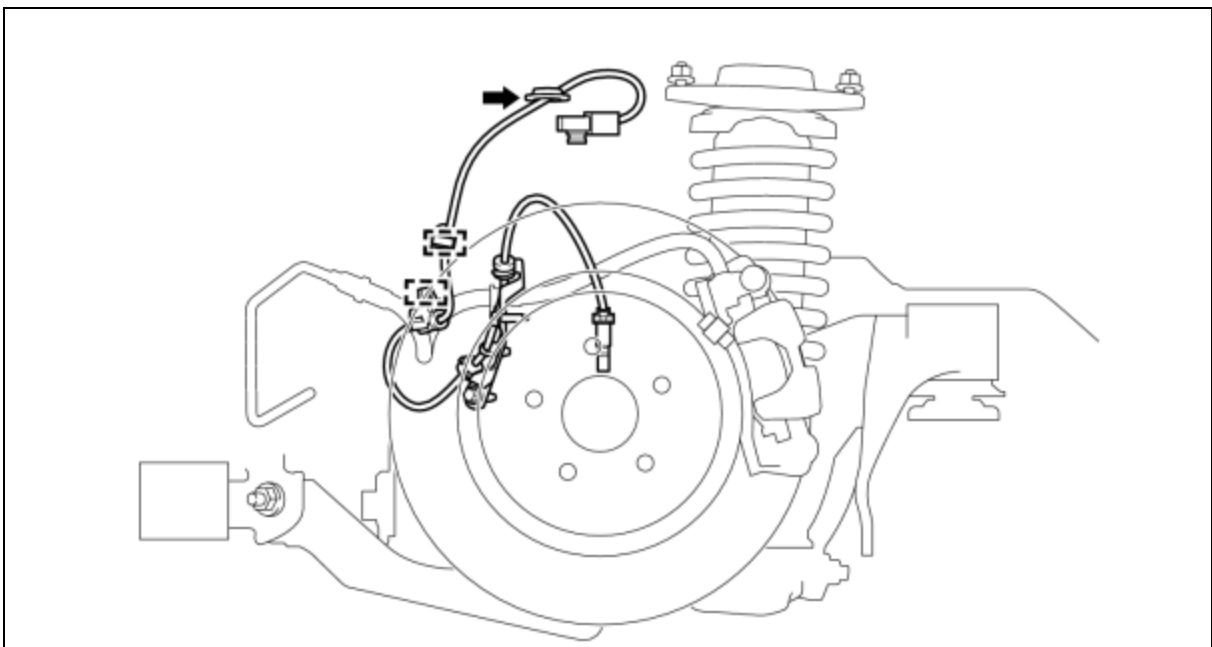
2. REMOVE REAR SPEED SENSOR LH

(a) Remove the luggage compartment floor mat.



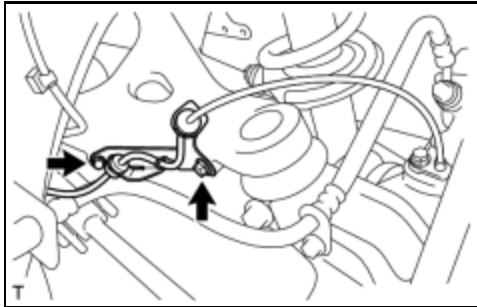
(b) Disconnect the rear speed sensor LH connector.

(c) Disconnect the rear speed sensor LH grommet and 2 harness clamps from the rear wheel house.

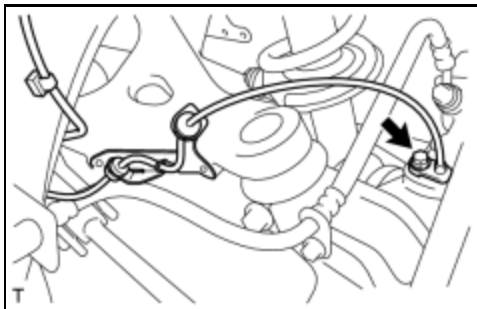


Text in illustration

	Grommet	-	-
---	---------	---	---



(d) Remove the 2 bolts from the bracket.



(e) Remove the bolt and the rear speed sensor LH.

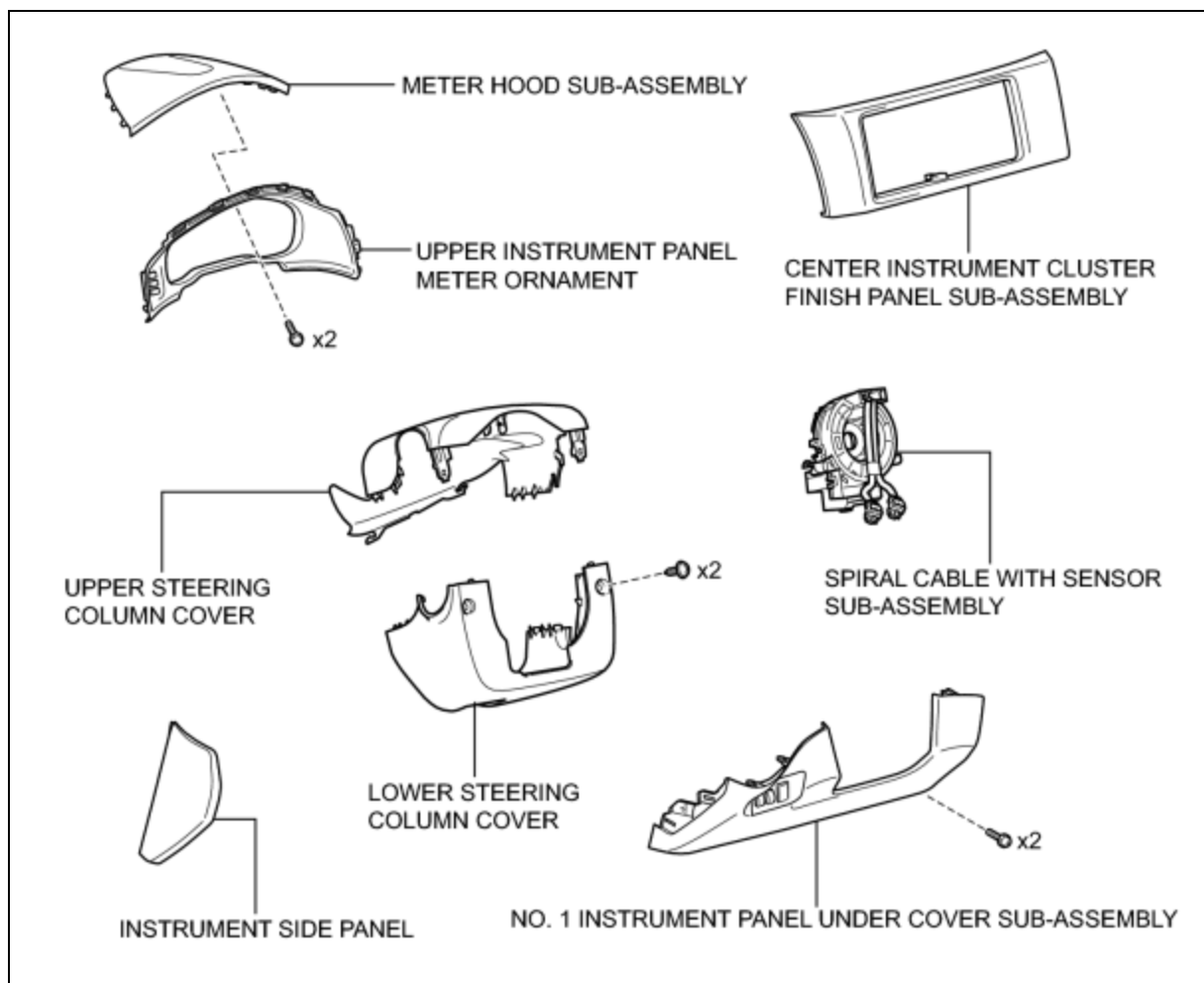
NOTICE:

Clean the speed sensor installation hole and the contact surfaces every time the rear speed sensor is removed.

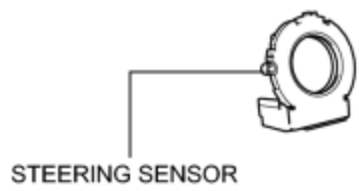
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWC064X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: STEERING ANGLE SENSOR: COMPONENTS (2013 FR-S)		

COMPONENTS

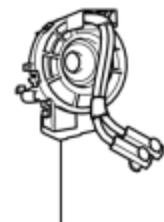
ILLUSTRATION



ILLUSTRATION



STEERING SENSOR



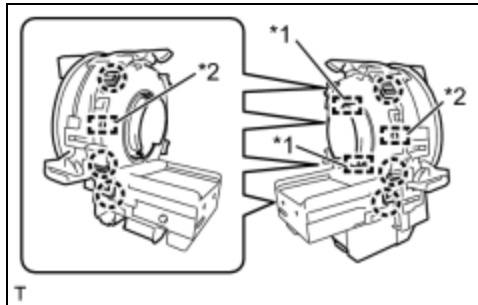
SPIRAL CABLE SUB-ASSEMBLY

T

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWA09MX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: STEERING ANGLE SENSOR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL STEERING SENSOR



- (a) Align the 2 pins and 2 guides, and engage the 6 claws to install the steering sensor to the spiral cable sub-assembly.

Text in Illustration

*1	Guide
*2	Pin

NOTICE:

Do not rotate the spiral cable until the steering sensor has been attached to it.

2. ALIGN FRONT WHEELS TO FACEING STRAIGHT AHEAD

3. INSTALL SPIRAL CABLE WITH SENSOR SUB-ASSEMBLY

NOTICE:

- Do not replace the spiral cable sub-assembly with the battery connected and the ignition switch on (IG).
- Do not rotate the spiral cable sub-assembly without the steering wheel with the battery connected and the ignition switch on (IG).
- Ensure that the steering wheel is installed and aligned straight when inspecting the steering sensor.

(a) Check that the ignition switch is off.

(b) Check that the cable is disconnected from the negative (-) battery terminal.

CAUTION:

Wait at least for 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check that the front wheels are facing straight ahead.

(d) Set the turn signal switch to the neutral position.

NOTICE:

If it is not in the neutral position, the turn signal switch pin may snap.

(e) Engage the 3 claws to install the spiral cable with sensor sub-assembly.

(f) Connect the each connector.

4. INSTALL UPPER STEERING COLUMN COVER INFO

5. INSTALL LOWER STEERING COLUMN COVER INFO

6. INSPECT AND ADJUST SPIRAL CABLE WITH SENSOR SUB-ASSEMBLY [INFO](#)

7. INSTALL NO.1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)

8. INSTALL UPPER INSTRUMENT PANEL METER ORNAMENT [INFO](#)

9. INSTALL METER HOOD SUB-ASSEMBLY [INFO](#)

10. INSTALL CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY [INFO](#)

11. INSTALL INSTRUMENT SIDE PANEL LH [INFO](#)

12. INSTALL STEERING WHEEL ASSEMBLY

[INFO](#)

13. INSPECT SRS WARNING LIGHT

[INFO](#)

14. VSC SENSOR NEUTRAL MEMORIZATION

[INFO](#)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWD09LX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: STEERING ANGLE SENSOR: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE STEERING WHEEL ASSEMBLY

INFO

2. ALIGN FRONT WHEELS FACING STRAIGHT AHEAD

3. REMOVE INSTRUMENT SIDE PANEL LH

INFO

4. REMOVE CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY

INFO

5. REMOVE METER HOOD SUB-ASSEMBLY

INFO

6. REMOVE UPPER INSTRUMENT PANEL METER ORNAMENT

INFO

7. REMOVE NO.1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

INFO

8. INSPECT SPIRAL CABLE SUB-ASSEMBLY

INFO

9. REMOVE LOWER STEERING COLUMN COVER

INFO

10. REMOVE UPPER STEERING COLUMN COVER

INFO

11. REMOVE SPIRAL CABLE WITH SENSOR SUB-ASSEMBLY

INFO

12. REMOVE STEERING SENSOR

NOTICE:

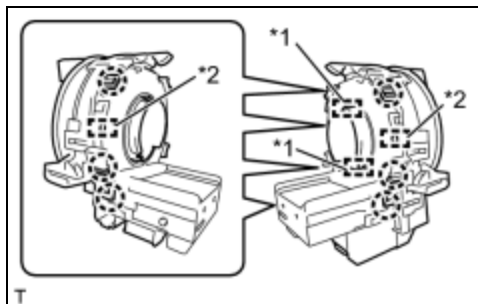
- Remove the steering sensor from the spiral cable sub-assembly only when replacing it or the steering sensor.
- Do not rotate the center section of the steering sensor, as it may deviate from the steering sensor neutral point.
- When replacing the spiral cable sub-assembly: INFO

(a) Disengage the 6 claws, 2 pins and 2 guides to remove the steering sensor from the spiral cable sub-assembly.

NOTICE:

Do not damage the guide and claw.

Text in Illustration



*1	Guide
*2	Pin



Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XIQ0E2X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: ABS Warning Light does not Come ON (2013 FR-S)		

[ABS Warning Light does not Come ON](#)

DESCRIPTION

The skid control ECU (brake actuator assembly) is connected to the combination meter assembly via CAN communication.

INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization  .

PROCEDURE

1.	CHECK CAN COMMUNICATION SYSTEM
-----------	---------------------------------------

(a) Check if a CAN communication system DTC is output  .

Result:

RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B

B  **INSPECT CAN COMMUNICATION SYSTEM**

A



2.	CHECK ABS WARNING LIGHT
-----------	--------------------------------

(a) Disconnect the skid control ECU (brake actuator assembly) connector.


(b) Turn the ignition switch to ON.

(c) Check that the ABS warning light comes on.

OK:

The ABS warning light comes on.


HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

NG ► **INSPECT COMBINATION METER ASSEMBLY**

OK ► **REPLACE BRAKE ACTUATOR ASSEMBLY**

3.	INSPECT COMBINATION METER ASSEMBLY
-----------	---

- (a) Turn the ignition switch off.
- (b) Reconnect the skid control ECU (brake actuator assembly) connector.
- (c) Perform an Active Test of the combination meter assembly (meter CPU) using the Techstream  .
- (d) Check the combination meter assembly.

OK:

The ABS warning light turns on or off in accordance with the Active Test operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

NG ► **REPLACE COMBINATION METER ASSEMBLY**

OK ► **REPLACE BRAKE ACTUATOR ASSEMBLY**

Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XIH0E3X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: ABS Warning Light Remains ON (2013 FR-S)		

ABS Warning Light Remains ON

DESCRIPTION

The skid control ECU (brake actuator assembly) is connected to the combination meter assembly via CAN communication.

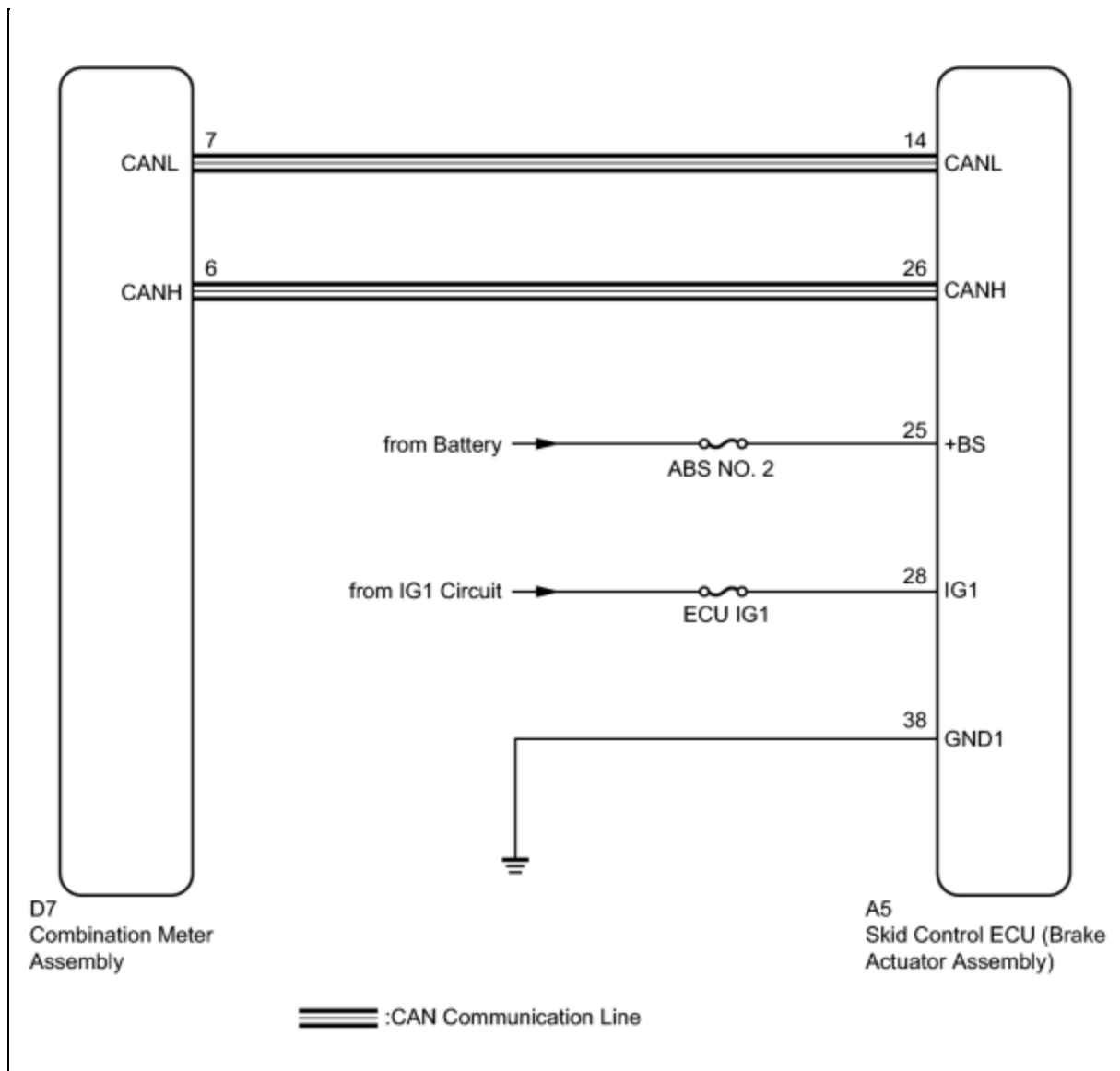
If any of the following is detected, the ABS warning light remains on:

- The skid control ECU (brake actuator assembly) connector is disconnected from the skid control ECU (brake actuator assembly).
- There is a malfunction in the skid control ECU (brake actuator assembly) internal circuit.
- There is an open in the harness between the combination meter assembly and the skid control ECU (brake actuator assembly).
- The ABS control system is defective.

HINT:

In some cases, the Techstream cannot be used when the skid control ECU (brake actuator assembly) is abnormal.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CHECK CAN COMMUNICATION SYSTEM
-----------	---------------------------------------

(a) Check if a CAN communication system DTC is output .

Result:

RESULT	PROCEED TO
DTC is not output.	A

B ▶ INSPECT CAN COMMUNICATION SYSTEM**A****2. CHECK IF BRAKE ACTUATOR ASSEMBLY CONNECTOR IS SECURELY CONNECTED**

(a) Check if the skid control ECU (brake actuator assembly) connector is securely connected.

OK:

The connector is securely connected.

NG ▶ CONNECT CONNECTOR TO ECU CORRECTLY**OK****3. CHECK BATTERY**

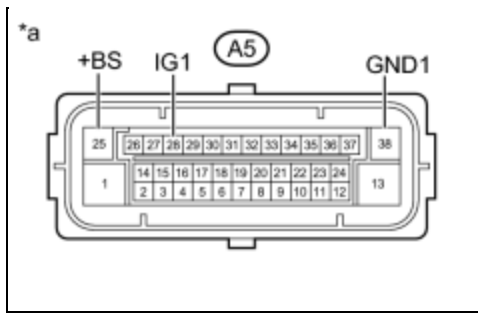
(a) Check the battery voltage.

Standard Voltage:

11 to 14 V

NG ▶ CHECK OR REPLACE CHARGING SYSTEM COMPONENT OR BATTERY**OK****4. CHECK HARNESS AND CONNECTOR (POWER SOURCE TERMINAL)**

(a) Disconnect the skid control ECU (brake actuator assembly) connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-25 (+BS) - Body ground	Always	11 to 14 V
A5-25 (+BS) - A5-38 (GND1)	Always	11 to 14 V
A5-28 (IG1) - Body ground	Ignition switch ON	11 to 14 V
A5-28 (IG1) - A5-38 (GND1)	Ignition switch ON	11 to 14 V

Text in Illustration

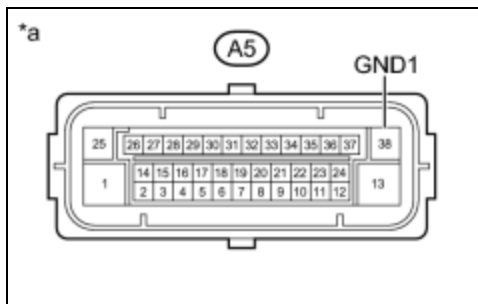
*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
----	---

**REPAIR OR REPLACE HARNESS OR
NG ► CONNECTOR (POWER SOURCE CIRCUIT)**

OK



5. CHECK HARNESS AND CONNECTOR (GND1 TERMINAL)



(a) Turn the ignition switch off.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-38 (GND1) - Body ground	Always	Below 1 Ω

Text in Illustration


*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
----	---

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR (GND1 CIRCUIT)**

OK



6.	INSPECT COMBINATION METER ASSEMBLY
-----------	---

- (a) Reconnect the skid control ECU (brake actuator assembly) connector.
- (b) Perform an Active Test of the combination meter assembly (meter CPU) using the Techstream  .
- (c) Check the combination meter assembly.

OK:

The ABS warning light turns on or off in accordance with the Active Test operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

NG  **REPLACE COMBINATION METER ASSEMBLY**

OK  **REPLACE BRAKE ACTUATOR ASSEMBLY**

Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000YHH0E5X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: Brake Warning Light does not Come ON (2013 FR-S)		

Brake Warning Light does not Come ON

DESCRIPTION

The skid control ECU (brake actuator assembly) is connected to the combination meter assembly via CAN communication.

INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization  .

PROCEDURE

1.	CHECK CAN COMMUNICATION SYSTEM
-----------	---------------------------------------

(a) Check if a CAN communication system DTC is output  .

Result:

RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B

B ▶ INSPECT CAN COMMUNICATION SYSTEM

A



2.	CHECK BRAKE WARNING LIGHT
-----------	----------------------------------

(a) Disconnect the skid control ECU (brake actuator assembly) connector.

(b) Turn the ignition switch to ON.

(c) Check that the brake warning light comes on.

OK:

The brake warning light comes on.


HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

NG ► **INSPECT COMBINATION METER ASSEMBLY**

OK ► **REPLACE BRAKE ACTUATOR ASSEMBLY**

3.	INSPECT COMBINATION METER ASSEMBLY
-----------	---

- (a) Turn the ignition switch off.
- (b) Reconnect the skid control ECU (brake actuator assembly) connector.
- (c) Perform an Active Test of the combination meter assembly (meter CPU) using the Techstream  .
- (d) Check the combination meter assembly.

OK:

The brake warning light turns on or off in accordance with the Active Test operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

NG ► **REPLACE COMBINATION METER ASSEMBLY**

OK ► **REPLACE BRAKE ACTUATOR ASSEMBLY**

Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000YHG0E5X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: Brake Warning Light Remains ON (2013 FR-S)		

Brake Warning Light Remains ON

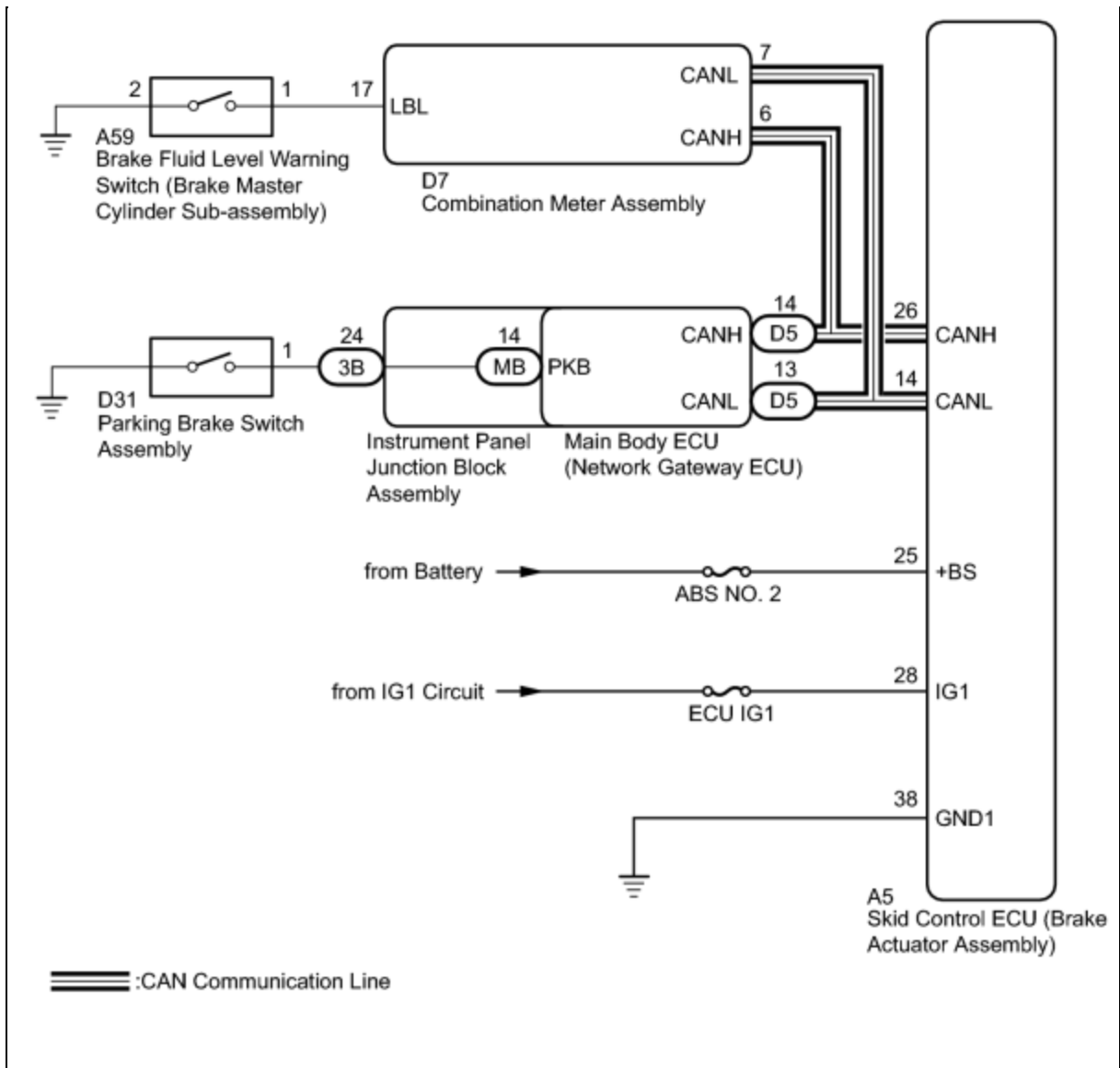
DESCRIPTION

The skid control ECU (brake actuator assembly) is connected to the combination meter assembly via CAN communication.

If any of the following is detected, the brake warning light remains on:

- The skid control ECU (brake actuator assembly) connector is disconnected from the skid control ECU (brake actuator assembly).
- The brake fluid level is insufficient.
- The parking brake is applied.
- EBD operation is not possible.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization **INFO** .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CHECK CAN COMMUNICATION SYSTEM
-----------	---------------------------------------

(a) Check if a CAN communication system DTC is output **INFO** .

Result:

RESULT	PROCEED TO
DTC is not output.	A

B ▶ INSPECT CAN COMMUNICATION SYSTEM**A****2. CHECK IF BRAKE ACTUATOR ASSEMBLY CONNECTOR IS SECURELY CONNECTED**

(a) Check if the skid control ECU (brake actuator assembly) connector is securely connected.

OK:

The connector is securely connected.

NG ▶ CONNECT CONNECTOR TO ECU CORRECTLY**OK****3. CHECK BATTERY**

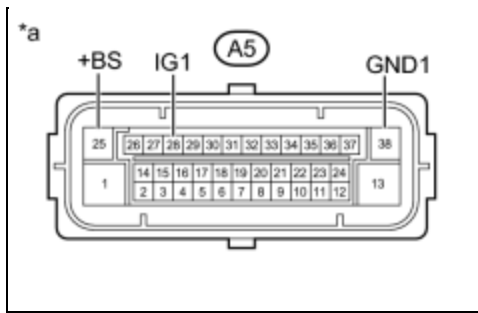
(a) Check the battery voltage.

Standard Voltage:

11 to 14 V

NG ▶ CHECK OR REPLACE CHARGING SYSTEM COMPONENT OR BATTERY**OK****4. CHECK HARNESS AND CONNECTOR (POWER SOURCE TERMINAL)**

(a) Disconnect the skid control ECU (brake actuator assembly) connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-25 (+BS) - Body ground	Always	11 to 14 V
A5-25 (+BS) - A5-38 (GND1)	Always	11 to 14 V
A5-28 (IG1) - Body ground	Ignition switch ON	11 to 14 V
A5-28 (IG1) - A5-38 (GND1)	Ignition switch ON	11 to 14 V

Text in Illustration

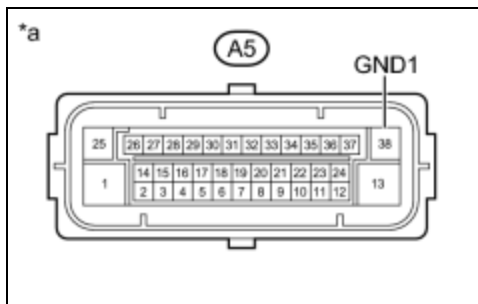
*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
----	---

**REPAIR OR REPLACE HARNESS OR
NG ► CONNECTOR (POWER SOURCE CIRCUIT)**

OK



5. CHECK HARNESS AND CONNECTOR (GND1 TERMINAL)



(a) Turn the ignition switch off.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-38 (GND1) - Body ground	Always	Below 1 Ω

Text in Illustration


*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
----	---

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR (GND1 CIRCUIT)**

OK



6.	READ VALUE USING TECHSTREAM (PARKING BRAKE SWITCH)
-----------	---

- (a) Reconnect the skid control ECU (brake actuator assembly) connector.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Select the Data List using the Techstream .

ABS/VSC/TRAC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Parking Brake SW	Parking brake switch / ON or OFF	ON: Parking brake applied OFF: Parking brake released	-

- (e) Using the Techstream, check the switch operation signal received when the parking brake is operated.

OK:

When the parking brake is operated, the display changes as shown above.

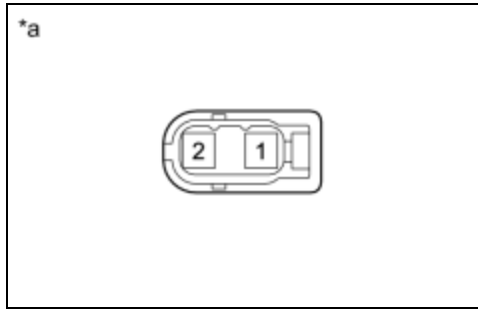
NG  **INSPECT PARKING BRAKE SWITCH ASSEMBLY**

OK



--	--

7. INSPECT BRAKE FLUID LEVEL WARNING SWITCH



(a) Turn the ignition switch off.

- (b) Remove the reservoir filler cap and the strainer.
- (c) Disconnect the brake fluid level warning switch connector.
- (d) Measure the resistance according to the value(s) in the table below.

HINT:

A float is located inside the reservoir. Its position changes according to the brake fluid level.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	Switch OFF (Float up)	1.9 to 2.1 k Ω
1 - 2	Switch ON (Float down)	Below 1 Ω

Text in Illustration

*a	Component without harness connected (Brake Fluid Level Warning Switch (Brake Master Cylinder Sub-assembly))
----	--

HINT:

If there is no problem after finishing the above check, adjust the brake fluid level to the MAX level.

NG ▶ **REPLACE BRAKE MASTER CYLINDER SUB-ASSEMBLY**

OK



8.	CHECK HARNESS AND CONNECTOR (COMBINATION METER ASSEMBLY - BRAKE FLUID LEVEL WARNING SWITCH)
----	--

- (a) Disconnect the combination meter assembly connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D7-17 (LBL) - A59-1	Always	Below 1 Ω
D7-17 (LBL) - Body ground	Always	10 k Ω or higher
A59-2 - Body ground	Always	Below 1 Ω


NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



9.	INSPECT COMBINATION METER ASSEMBLY
-----------	---

(a) Reconnect the combination meter assembly connector and the brake fluid level warning switch connector.

(b) Perform an Active Test of the combination meter assembly (meter CPU) using the Techstream .

(c) Check the combination meter assembly.

OK:

The brake warning light turns on or off in accordance with the Active Test operation.

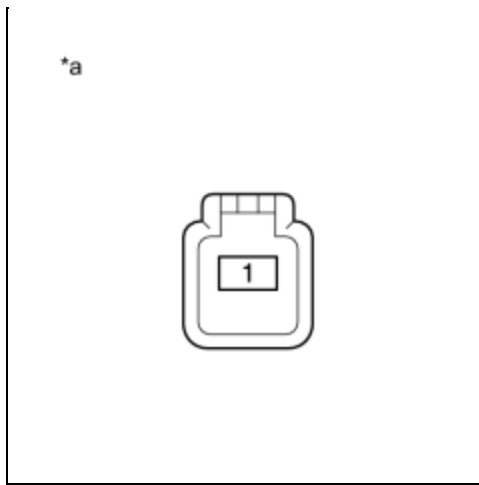
HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts .

NG  **REPLACE COMBINATION METER ASSEMBLY**

OK  **REPLACE BRAKE ACTUATOR ASSEMBLY**

10.	INSPECT PARKING BRAKE SWITCH ASSEMBLY
------------	--



(a) Turn the ignition switch off.

(b) Disconnect the parking brake switch assembly connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - Body ground	Parking brake switch ON (Switch pin free)	Below 1 Ω
1 - Body ground	Parking brake switch OFF (Switch pin pushed in)	10 k Ω or higher

Text in Illustration

*a	Component without harness connected (Parking Brake Switch Assembly)
----	--

NG ► **REPLACE PARKING BRAKE SWITCH ASSEMBLY**

OK



11.	CHECK HARNESS AND CONNECTOR (INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY - PARKING BRAKE SWITCH ASSEMBLY)
------------	---

(a) Disconnect the instrument panel junction block assembly connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3B-24 - D31-1	Always	Below 1 Ω

3B-24 - Body ground	Always	10 kΩ or higher
---------------------	--------	-----------------

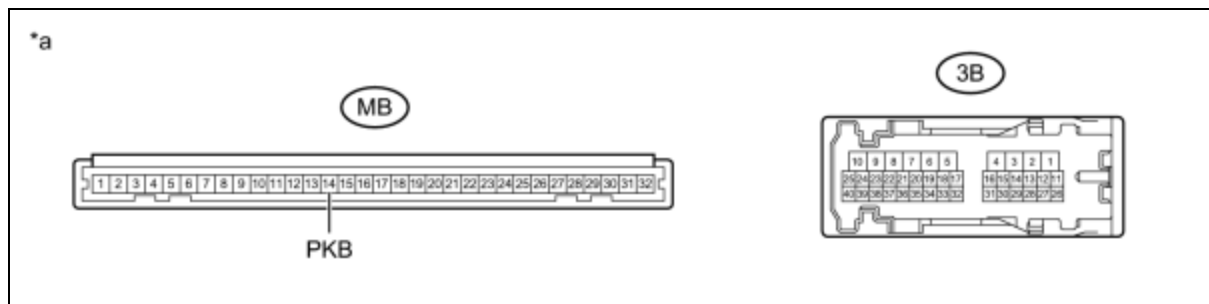
NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK



12. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

- (a) Remove the instrument panel junction block assembly **INFO** .
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly **INFO** .
- (c) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	---	---	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
MB-14 (PKB) - 3B-24	Always	Below 1 Ω
MB-14 (PKB) - Body ground	Always	10 kΩ or higher

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts **INFO** .

NG ▶ REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

OK ► REPLACE MAIN BODY ECU (NETWORK
GATEWAY ECU)



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001JD60BOX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: C146C: Open in ABS Motor Relay Circuit (2013 FR-S)		

DTC	C146C	Open in ABS Motor Relay Circuit
------------	--------------	--

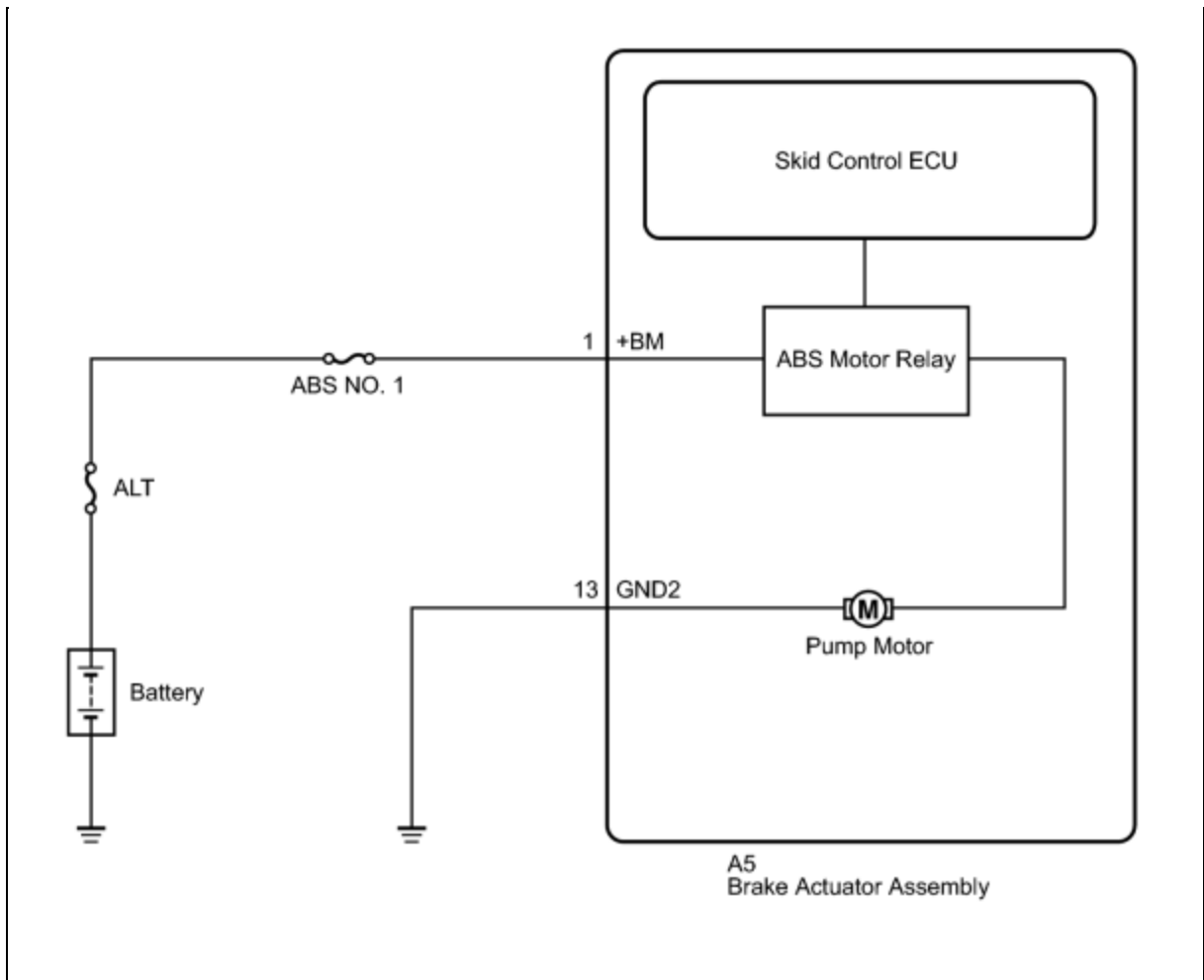
DESCRIPTION

The ABS motor relay supplies power to the pump motor. While the ABS is activated, the skid control ECU turns the ABS motor relay on to operate the pump motor.

If the voltage supplied to the ABS motor relay (+BM) is too low due to low voltage from the battery or alternator, the DTC may be stored.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C146C	Any of the following is detected: <ol style="list-style-type: none"> 1. When the ABS motor relay is actuated, voltage is not supplied to the pump motor. 2. When the ABS motor relay is not actuated, voltage in the pump motor is high. 3. The skid control ECU judges that pump motor operation is abnormal. 	<ul style="list-style-type: none"> • ABS NO. 1 fuse (Fusible link block assembly) • ABS motor relay circuit • ABS motor relay (Brake actuator assembly)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization INFO.
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

When C1241 is output together with C146C, inspect and repair the trouble areas indicated by C1241 first INFO.

PROCEDURE

1.	PERFORM ACTIVE TEST USING TECHSTREAM (ABS MOTOR RELAY)
-----------	---

- Connect the Techstream to the DLC3.
- Start the engine.
- Select the Active Test using the Techstream INFO.

ABS/VSC/TRAC

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Motor Relay	ABS motor relay	Relay ON/OFF	Operating sound of motor can be heard

(d) Check the operating sound of the pump motor when operating it using the Techstream.

Result:

RESULT	PROCEED TO
Operating sound is heard.	A
Operating sound is not heard.	B

B ▶ **CHECK HARNESS AND CONNECTOR (+BM TERMINAL)**

A



2.	RECONFIRM DTC
-----------	----------------------

HINT:

This DTC is stored when a problem is identified in the brake actuator assembly.

The ABS motor relay is in the brake actuator assembly.

Therefore, motor relay inspection and motor relay unit inspection cannot be performed. Be sure to check if the DTC is output again before replacing the skid control ECU (brake actuator assembly).

- (a) Clear the DTCs INFO.
- (b) Turn the ignition switch off.
- (c) Start the engine.
- (d) Drive the vehicle at a speed of 40 km/h (25 mph) or more for 30 seconds or more.
- (e) Check if the same DTC is output INFO.

Result:

RESULT	PROCEED TO
DTC C146C is not output.	A
DTC C146C is output.	B

HINT:

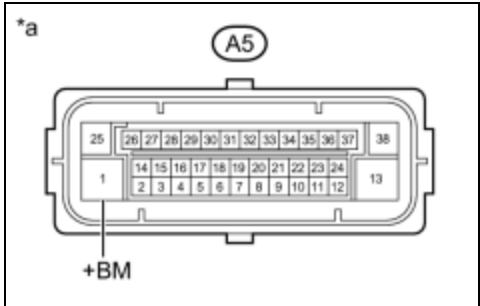
- If a speed signal of 40 km/h (25 mph) or more is received by the skid control ECU (brake actuator assembly) with the ignition switch ON, the skid control ECU (brake actuator assembly) performs self diagnosis of the motor circuit.

- If the normal system code is output (No DTCs are output), slightly jiggle the connectors, wire harness, and fuses of the skid control ECU (brake actuator assembly).
- If any DTCs are output while jiggling a connector or wire harness of the skid control ECU (brake actuator assembly), inspect and repair the connector or wire harness.
 - If no DTCs were output when reconfirming DTCs, checking for intermittent problems is necessary because it is suspected that the original DTCs were stored due to the poor connection of a connector terminal.

B ▶ REPLACE BRAKE ACTUATOR ASSEMBLY

A ▶ CHECK FOR INTERMITTENT PROBLEMS

3. CHECK HARNESS AND CONNECTOR (+BM TERMINAL)



(a) Make sure that there is no looseness at the locking part and the connecting part of the connector.

(b) Disconnect the skid control ECU (brake actuator assembly) connector.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-1 (+BM) - Body ground	Always	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
----	---

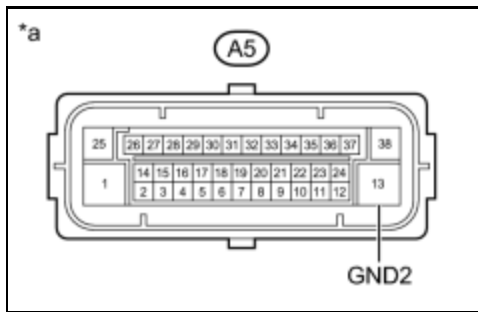
NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (+BM CIRCUIT)

OK
▼

4. CHECK HARNESS AND CONNECTOR (GND2 TERMINAL)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-13 (GND2) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
----	---

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR (GND2 CIRCUIT)

OK ► REPLACE BRAKE ACTUATOR ASSEMBLY



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001NJY01TX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: C146E: Open in ABS Solenoid Relay Circuit (2013 FR-S)		

DTC	C146E	Open in ABS Solenoid Relay Circuit
------------	--------------	---

DESCRIPTION

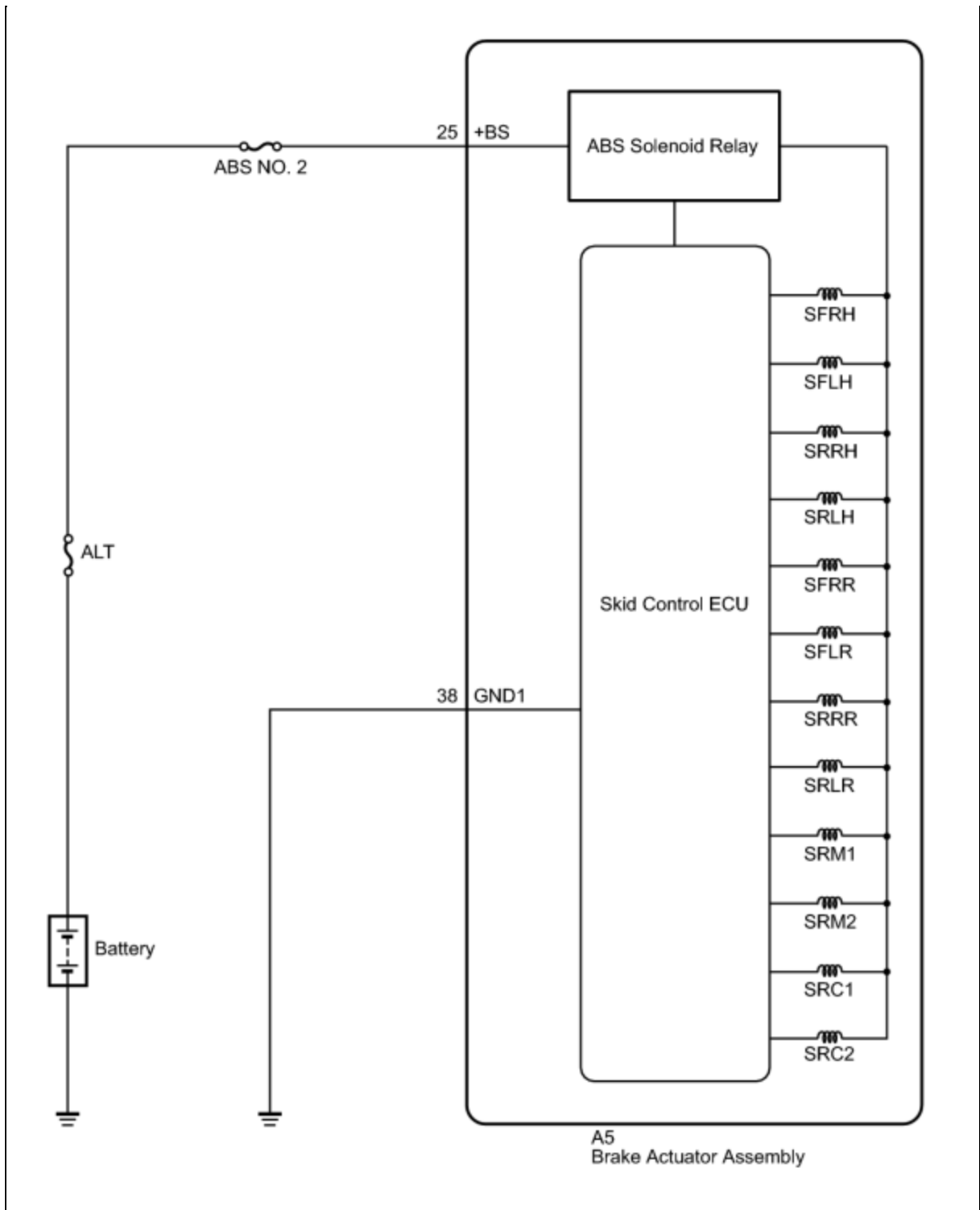
The ABS solenoid relay is built into the skid control ECU in the brake actuator assembly.

The ABS solenoid relay supplies power to the ABS and TR(A)C solenoids.

The skid control ECU detects a solenoid relay malfunction by performing a self check and relay operation check.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C146E	Either of the following is detected: <ol style="list-style-type: none"> 1. A solenoid relay drive circuit in the skid control ECU is malfunctioning. 2. The solenoid relay cannot be switched between on and off. 	<ul style="list-style-type: none"> • ABS NO. 2 fuse (Fusible link block assembly) • ABS solenoid relay circuit • ABS solenoid relay (Brake actuator assembly)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

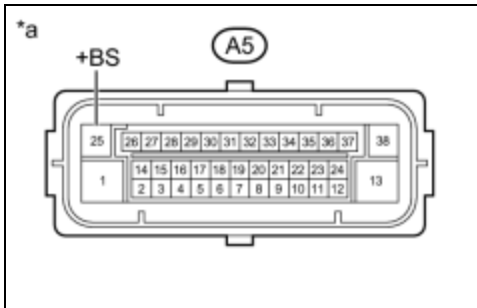
- When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization INFO.
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

When C1241 is output together with C146E, inspect and repair the trouble areas indicated by C1241

PROCEDURE

1. CHECK HARNESS AND CONNECTOR (+BS TERMINAL)



(a) Make sure that there is no looseness at the locking part and the connecting part of the connector.

(b) Disconnect the skid control ECU (brake actuator assembly) connector.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-25 (+BS) - Body ground	Always	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
----	---

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR (+BS CIRCUIT)**

OK

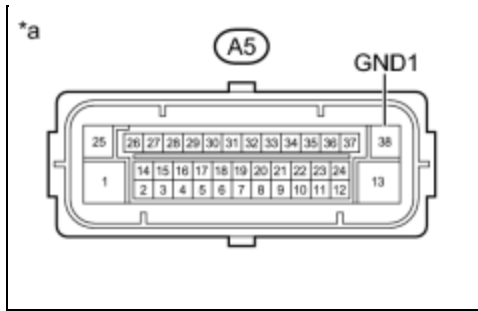


2. CHECK HARNESS AND CONNECTOR (GND1 TERMINAL)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

--	--	--



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-38 (GND1) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
----	--

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR (GND1 CIRCUIT)

OK
▼

3.	RECONFIRM DTC
-----------	----------------------

HINT:

This DTC is stored when a problem is identified in the skid control ECU (brake actuator assembly).

The solenoid circuits are located in the brake actuator assembly.

Therefore, solenoid circuit inspection and solenoid unit inspection cannot be performed. Be sure to check if the DTC is output again before replacing the skid control ECU (brake actuator assembly).

- (a) Reconnect the skid control ECU (brake actuator assembly) connector.
- (b) Clear the DTCs INFO.
- (c) Turn the ignition switch off.
- (d) Start the engine.
- (e) Drive the vehicle at a speed of 40 km/h (25 mph) or more for 30 seconds or more.
- (f) Check if the same DTC is output INFO.

Result:

RESULT	PROCEED TO
DTC C146E is not output.	A
DTC C146E is output.	B

HINT:

If a speed signal of 15 km/h (9 mph) or more is received by the skid control ECU (brake actuator assembly) with the ignition switch ON, the skid control ECU (brake actuator assembly) performs self diagnosis of the solenoid circuit.

- If the normal system code is output (No DTCs are output), slightly jiggle the connectors, wire harnesses, and fuses of the skid control ECU (brake actuator assembly).
- If any DTCs are output while jiggling a connector or wire harness of the skid control ECU (brake actuator assembly), inspect and repair the connector or wire harness.
- If no DTCs were output when reconfirming DTCs, checking for intermittent problems is necessary because it is suspected that the original DTCs were stored due to the poor connection of a connector terminal.

B ▶ REPLACE BRAKE ACTUATOR ASSEMBLY

A ▶ CHECK FOR INTERMITTENT PROBLEMS



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000X11080X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: C1201: Engine Control System Malfunction (2013 FR-S)		

DTC	C1201	Engine Control System Malfunction
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DESCRIPTION

If a malfunction in the SFI system is detected, the operation of VSC and TR(A)C is prohibited by the fail-safe function. When the signals from the engine are received normally, fail-safe control is canceled.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C1201	Engine control system malfunction signal continues for 5 seconds while the vehicle is being driven.	SFI system

INSPECTION PROCEDURE

PROCEDURE

1.	CHECK SFI SYSTEM
-----------	-------------------------

(a) Check if an SFI system DTC is output  .

Result:

RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

B ▶ **INSPECT SFI SYSTEM**

A ▶ **REPLACE ECM**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XI80DAX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: C1225-C1228,C1468,C1469,C146A,C146B: SA1 Solenoid Circuit (2013 FR-S)		

DTC	C1225	SA1 Solenoid Circuit
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DTC	C1226	SA2 Solenoid Circuit
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DTC	C1227	SA3 Solenoid Circuit
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DTC	C1228	STR Solenoid Circuit
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DTC	C1468	SFR Solenoid Circuit
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DTC	C1469	SFL Solenoid Circuit
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DTC	C146A	SRR Solenoid Circuit
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DTC	C146B	SRL Solenoid Circuit
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DESCRIPTION

These solenoids turn on when signals are received from the skid control ECU and they control the pressure acting on the wheel cylinders to control the braking force.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C1225 C1226 C1227 C1228 C1468 C1469 C146A C146B	Solenoid valve signal does not match the check result.	<ul style="list-style-type: none"> • Solenoid circuit • Solenoid valve (Brake actuator assembly)

WIRING DIAGRAM

Refer to DTC C146E INFO.

INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization INFO.

PROCEDURE

1.	RECONFIRM DTC
-----------	----------------------

HINT:

These codes are detected when a problem is determined in the brake actuator assembly.

The solenoid circuits are in the brake actuator assembly.

Therefore, solenoid circuit inspection and solenoid unit inspection cannot be performed. Be sure to check if any DTC is output before replacing the brake actuator assembly.

- (a) Clear the DTCs INFO.
- (b) Turn the ignition switch off.
- (c) Start the engine.
- (d) Drive the vehicle at a speed of 20 km/h (12 mph) or more.
- (e) Check if the same DTC is output INFO.

Result:

RESULT	PROCEED TO
DTCs C1225, C1226, C1227, C1228, C1468, C1469, C146A and C146B are not output.	A
DTCs C1225, C1226, C1227, C1228, C1468, C1469, C146A and/or C146B are output.	B

HINT:

- The skid control ECU performs self diagnosis of the solenoid circuit after the ignition switch turned to ON.
- If the normal system code is output (No DTCs are output), slightly jiggle the connectors, wire harness, and fuses of the brake actuator assembly.
- If any DTCs are output while jiggling a connector or wire harness of the skid control ECU (brake actuator assembly), inspect and repair the connector or wire harness.
- If no DTCs were output when reconfirming DTCs, checking for intermittent problems is necessary because it is suspected that the original DTCs were stored due to the poor connection of a connector terminal.

B ► REPLACE BRAKE ACTUATOR ASSEMBLY

A ► CHECK FOR INTERMITTENT PROBLEMS



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XIM0L6X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: C1231: Steering Angle Sensor (2013 FR-S)		

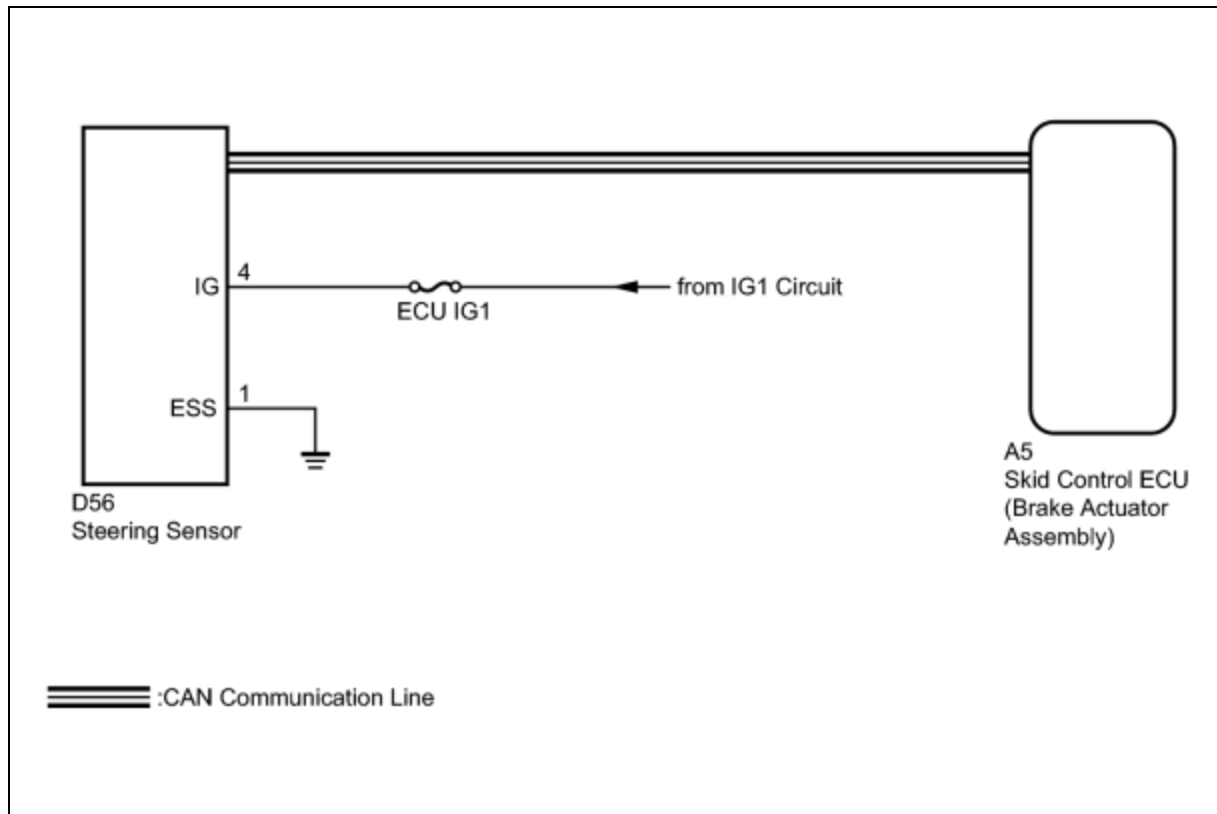
DTC	C1231	Steering Angle Sensor
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DESCRIPTION

The steering sensor signal is sent to the skid control ECU (brake actuator assembly) via the CAN communication system. When there is a malfunction in the CAN communication system, it will be detected by the steering sensor zero point malfunction diagnostic function.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
C1231	When the +BS terminal voltage is between 9.6 and 16.5 V, the steering sensor malfunction signal is received.	<ul style="list-style-type: none"> Steering sensor Steering sensor circuit Steering sensor power supply

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- When replacing the steering sensor, perform VSC sensor neutral memorization **INFO** .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

- When DTC U0073 and/or U0126 is output together with DTC C1231, inspect and repair the trouble areas indicated by DTC U0073 and/or U0126 first **INFO** .
- When the speed sensor or the yaw rate sensor has trouble, DTCs for the steering sensor may be output even when the steering sensor is normal. When DTCs for the speed sensor or yaw rate sensor assembly are output together with this steering sensor DTC, inspect and repair the speed sensor and yaw rate sensor assembly first, and then inspect and repair the steering sensor.

PROCEDURE

1.	CHECK DTC
-----------	------------------

- (a) Clear the DTCs **INFO** .
- (b) Turn the ignition switch off.
- (c) Turn the ignition switch to ON again and check that no CAN communication system DTC is output.
- (d) Drive the vehicle at a speed of 35 km/h (22 mph), turn the steering wheel to the right and left, and check that no speed sensor and yaw rate sensor DTCs are output **INFO** .

Result

RESULT	PROCEED TO
No CAN communication system, speed sensor or yaw rate sensor DTC is output.	A
CAN communication system DTC is output.	B
Speed sensor or yaw rate sensor DTC is output.	C

HINT:

- If there is a malfunction in the speed sensor or yaw rate sensor, an abnormal value may be output although the steering sensor is normal.
- If speed sensor and yaw rate sensor assembly DTCs are output together with this steering sensor DTC, inspect and repair the speed and yaw rate sensors first, and then inspect and repair the steering sensor.

B ► **GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING)**

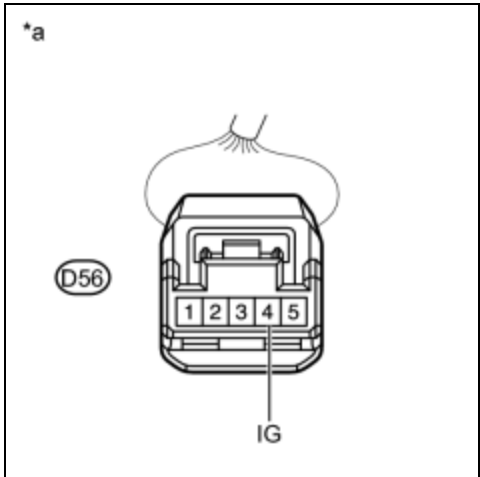
C ► **REPAIR CIRCUIT INDICATED BY OUTPUT DTC**

A



2. CHECK HARNESS AND CONNECTOR (POWER SOURCE TERMINAL)

- (a) Turn the ignition switch off.
- (b) Disconnect the steering sensor connector.



(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D56-4 (IG) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Steering Sensor)
----	---

REPAIR OR REPLACE HARNESS OR NG  **CONNECTOR (POWER SOURCE CIRCUIT)**

OK



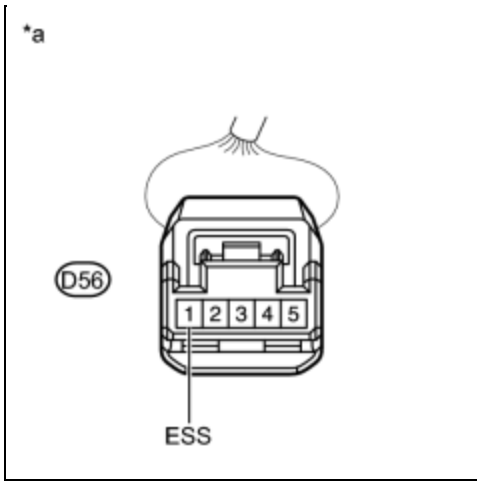
3. CHECK HARNESS AND CONNECTOR (GROUND TERMINAL)

- (a) Turn the ignition switch off.
- (b) Disconnect the steering sensor connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION



D56-1 (ESS) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Steering Sensor)
----	---

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR (GROUND CIRCUIT)

OK ► REPLACE STEERING SENSOR

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000025HJ01NX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: C1234,C1419,C1472,C1474: Yaw Rate Sensor (2013 FR-S)		

DTC	C1234	Yaw Rate Sensor
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DTC	C1419	Acceleration Sensor Internal Circuit
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DTC	C1472	Acceleration Sensor
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DTC	C1474	Forward and Rearward G Sensor
------------	--------------	--------------------------------------

DESCRIPTION

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C1234	Internal failure of the skid control ECU (Yaw rate sensor).	Skid control ECU (Brake actuator assembly)
C1419	Internal failure of the skid control ECU (Acceleration sensor).	
C1472	Internal failure of the skid control ECU (Lateral G sensor).	
C1474	Internal failure of the skid control ECU (Forward and backward G sensor).	

INSPECTION PROCEDURE


NOTICE:

When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization  .

PROCEDURE

1.	CHECK BRAKE ACTUATOR ASSEMBLY INSTALLATION
-----------	---

(a) Turn the ignition switch off.

(b) Check that the skid control ECU (brake actuator assembly) has been installed properly  .

OK:

The skid control ECU (brake actuator assembly) should be tightened to the specified torque.

The skid control ECU (brake actuator assembly) should not be tilted.

INSTALL BRAKE ACTUATOR ASSEMBLY

NG  CORRECTLY

OK  REPLACE BRAKE ACTUATOR ASSEMBLY



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002N5F02QX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: C1237,C1275-C1278: Speed Sensor Rotor Faulty (2013 FR-S)		

DTC	C1237	Speed Sensor Rotor Faulty
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DTC	C1275	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)
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DTC	C1276	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)
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DTC	C1277	Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)
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DTC	C1278	Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)
------------	--------------	---

DESCRIPTION

The skid control ECU (brake actuator assembly) measures the speed of each wheel by receiving signals from the speed sensor.

These signals are used for recognizing that all four wheels are operating properly.

Therefore, all wheel signals must be equal.

DTCs C1275 to C1278 are cleared when the speed sensor sends a vehicle speed signal or when Test Mode ends. DTCs C1275 to C1278 are output only in Test Mode.



DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C1237	Any of the following is detected: <ol style="list-style-type: none"> 1. Discrepancy among four wheel speed sensor output. 2. Abnormal pulse signals from 3 or more sensors. 3. Continuous ABS control is performed for 60 seconds or more. 4. VSC control is performed for 5 seconds or more. 	<ul style="list-style-type: none"> • Tire and wheel size • Tire deformation • Speed sensor rotor • Speed sensor • Speed sensor circuit • Skid control ECU (Brake actuator assembly)
C1275	Detected only during Test Mode.	Front speed sensor rotor RH/LH (Front axle

C1276		hub sub-assembly RH/LH)
C1277 C1278	Detected only during Test Mode.	Rear speed sensor rotor RH/LH (Rear axle hub sub-assembly RH/LH)

HINT:

- DTC C1275 is for the front speed sensor RH.
- DTC C1276 is for the front speed sensor LH.
- DTC C1277 is for the rear speed sensor RH.
- DTC C1278 is for the rear speed sensor LH.

WIRING DIAGRAM

Refer to DTCs C1330, C1331, C1332, C1333, C1464, C1465, C1466 and C1467  for front, and  for rear).

INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization .

HINT:

When C1330, C1331, C1332, C1333, C1464, C1465, C1466 and/or C1467 is output together with C1237, inspect and repair the trouble areas indicated by C1330, C1331, C1332, C1333, C1464, C1465, C1466 and/or C1467 first  for front, and/or  for rear).

PROCEDURE

1.	CHECK TIRES
-----------	--------------------

(a) Check the size and condition of all four wheels .

HINT:

The DTC is output when tire deformation or a difference in tire size is detected.

OK:


The diameter of all four tires and the tire pressure are the same.

NG  **REPLACE TIRES SO THAT ALL FOUR TIRES ARE THE SAME SIZE**

OK



2.	READ VALUE USING TECHSTREAM (SPEED SENSOR)
-----------	---


- (a) Connect the Techstream to the DLC3.
- (b) Start the engine.
- (c) Select the Data List using the Techstream  .

ABS/VSC/TRAC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
FR Wheel Speed	Front wheel speed sensor RH reading / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
FL Wheel Speed	Front wheel speed sensor LH reading / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
RR Wheel Speed	Rear wheel speed sensor RH reading / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
RL Wheel Speed	Rear wheel speed sensor LH reading / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations

- (d) Check the speed value output from the speed sensor displayed on the Techstream.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire pressure, and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart  .

OK:

The speed value output from the speed sensor displayed on the Techstream is similar to the speed indicated on the speedometer.

Result:

RESULT	PROCEED TO
OK	A
NG (for front)	B
NG (for rear)	C


B  CHECK FRONT SPEED SENSOR INSTALLATION

C  CHECK REAR SPEED SENSOR INSTALLATION

A



3. PERFORM TEST MODE INSPECTION (SIGNAL CHECK)

- (a) Turn the ignition switch off.
- (b) Perform the sensor check using the Test Mode procedure  .

OK:

All Test Mode DTCs are not output.

Result:

RESULT	PROCEED TO
OK	A
NG (for front)	B
NG (for rear)	C



B ► CHECK FRONT SPEED SENSOR INSTALLATION

C ► CHECK REAR SPEED SENSOR INSTALLATION

A



4. RECONFIRM DTC

- (a) Clear the DTCs  .
- (b) Turn the ignition switch off.
- (c) Start the engine.
- (d) Drive the vehicle at a speed of 45 km/h (28 mph) or more for at least 120 seconds.
- (e) Check if the same DTC is output  .

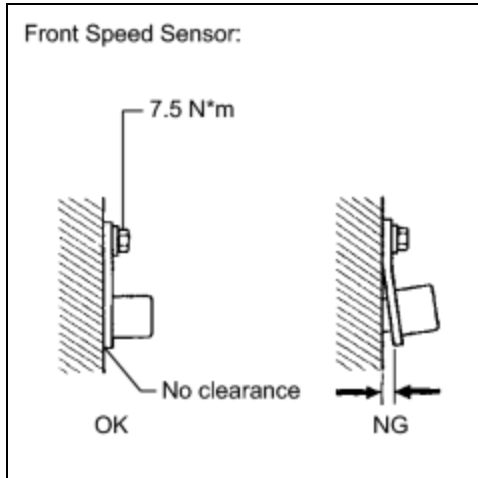
Result:

RESULT	PROCEED TO
DTC C1237 is not output.	A
DTC C1237 is output (for front).	B
DTC C1237 is output (for rear).	C

B ► REPLACE FRONT SPEED SENSOR

C ► REPLACE REAR SPEED SENSOR

5. CHECK FRONT SPEED SENSOR INSTALLATION



(a) Turn the ignition switch off.

(b) Check the speed sensor installation.

OK:

There is no clearance between the sensor and the front axle hub sub-assembly.

The installation bolt is tightened properly.

Torque

7.5 N*m (77 kgf*cm, 66 in.*lbf)

NG ► INSTALL FRONT SPEED SENSOR CORRECTLY

OK



6. CHECK FRONT SPEED SENSOR TIP

(a) Remove the front speed sensor **INFO** .

(b) Check the speed sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:


Check the speed sensor signal after cleaning or replacement **INFO** .

NG ► CLEAN OR REPLACE FRONT SPEED SENSOR

OK



7.	CHECK HARNESS AND CONNECTOR (BRAKE ACTUATOR ASSEMBLY - FRONT SPEED SENSOR)
-----------	---

- (a) Install the front speed sensor  .
- (b) Make sure that there is no looseness at the locking part and the connecting part of the connectors.
- (c) Disconnect the skid control ECU (brake actuator assembly) connector and the front speed sensor connector.
- (d) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

for RH

for LH

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-16 (FR+) - A42-2 (FR+)	Always	Below 1 Ω
A5-16 (FR+) - Body ground	Always	10 kΩ or higher
A5-4 (FR-) - A42-1 (FR-)	Always	Below 1 Ω
A5-4 (FR-) - Body ground	Always	10 kΩ or higher



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-19 (FL+) - A12-2 (FL+)	Always	Below 1 Ω
A5-19 (FL+) - Body ground	Always	10 kΩ or higher
A5-32 (FL-) - A12-1 (FL-)	Always	Below 1 Ω
A5-32 (FL-) - Body ground	Always	10 kΩ or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



8.	RECONFIRM DTC
-----------	----------------------

- (a) Reconnect the skid control ECU (brake actuator assembly) connector and the front speed sensor connector.
- (b) Clear the DTCs  .
- (c) Turn the ignition switch off.
- (d) Start the engine.
- (e) Drive the vehicle at a speed of 45 km/h (28 mph) or more for at least 120 seconds.
- (f) Check if the same DTC is output  .

Result:


RESULT	PROCEED TO
DTC C1237 is output.	A
DTC C1237 is not output.	B

B CHECK FOR INTERMITTENT PROBLEMS

A



9. REPLACE FRONT SPEED SENSOR

- (a) Turn the ignition switch off.
- (b) Replace the front speed sensor  .



NOTICE:

Check the speed sensor signal after replacement  .

NEXT



10. RECONFIRM DTC

- (a) Clear the DTCs  .
- (b) Turn the ignition switch off.
- (c) Start the engine.
- (d) Drive the vehicle at a speed of 45 km/h (28 mph) or more for at least 120 seconds.
- (e) Check if the same DTC is output  .

Result:


RESULT	PROCEED TO
DTC C1237 is output.	A
DTC C1237 is not output.	B

B  END

A



11.	REPLACE FRONT SPEED SENSOR ROTOR
------------	---

- (a) Turn the ignition switch off.
- (b) Replace the front speed sensor rotor  .

HINT:

If the front speed sensor rotor needs to be replaced, replace the front axle hub sub-assembly.



NOTICE:

Check the speed sensor signal after replacement  .

NEXT



12.	RECONFIRM DTC
------------	----------------------

- (a) Clear the DTCs  .
- (b) Turn the ignition switch off.
- (c) Start the engine.
- (d) Drive the vehicle at a speed of 45 km/h (28 mph) or more for at least 120 seconds.
- (e) Check if the same DTC is output  .

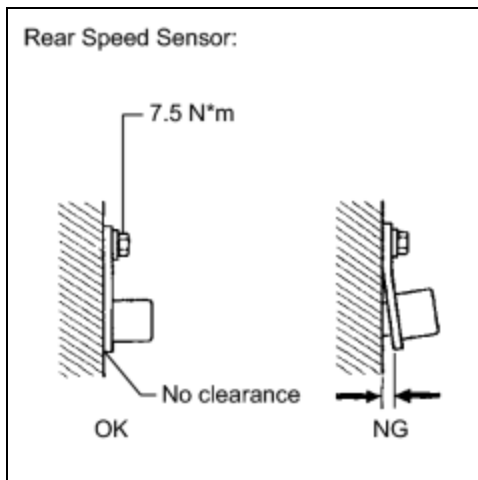
Result:

RESULT	PROCEED TO
DTC C1237 is output.	A
DTC C1237 is not output.	B

B ▶ END

A ▶ REPLACE BRAKE ACTUATOR ASSEMBLY

13. CHECK REAR SPEED SENSOR INSTALLATION



(a) Turn the ignition switch off.

(b) Check the speed sensor installation.

OK:

There is no clearance between the sensor and the rear axle hub sub-assembly.

The installation bolt is tightened properly.

Torque

7.5 N*m (77 kgf*cm, 66 in.*lbf)

NG ▶ INSTALL REAR SPEED SENSOR CORRECTLY

OK



14. CHECK REAR SPEED SENSOR TIP

(a) Remove the rear speed sensor **INFO** .

(b) Check the speed sensor tip.

OK:


No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning or replacement **INFO** .

OK


15.	CHECK HARNESS AND CONNECTOR (BRAKE ACTUATOR ASSEMBLY - REAR SPEED SENSOR)
-----	--

- (a) Install the rear speed sensor  .
- (b) Make sure that there is no looseness at the locking part and the connecting part of the connector.
- (c) Disconnect the skid control ECU (brake actuator assembly) connector and the rear speed sensor connector.
- (d) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

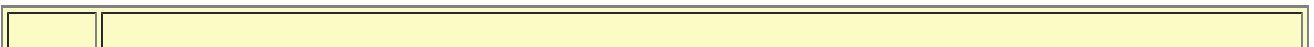
for RH

for LH



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-17 (RR+) - G9-2 (RR+)	Always	Below 1 Ω
A5-17 (RR+) - Body ground	Always	10 kΩ or higher
A5-29 (RR-) - G9-1 (RR-)	Always	Below 1 Ω
A5-29 (RR-) - Body ground	Always	10 kΩ or higher

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-31 (RL+) - H12-2 (RL+)	Always	Below 1 Ω
A5-31 (RL+) - Body ground	Always	10 kΩ or higher
A5-18 (RL-) - H12-1 (RL-)	Always	Below 1 Ω
A5-18 (RL-) - Body ground	Always	10 kΩ or higher

OK

16. RECONFIRM DTC

- (a) Reconnect the skid control ECU (brake actuator assembly) connector and the rear speed sensor connector.
- (b) Clear the DTCs  .
- (c) Turn the ignition switch off.
- (d) Start the engine.
- (e) Drive the vehicle at a speed of 45 km/h (28 mph) or more for at least 120 seconds.
- (f) Check if the same DTC is output  .

Result:


RESULT	PROCEED TO
DTC C1237 is output.	A
DTC C1237 is not output.	B

B  **CHECK FOR INTERMITTENT PROBLEMS**

A



17. REPLACE REAR SPEED SENSOR

- (a) Turn the ignition switch off.
- (b) Replace the rear speed sensor  .


NOTICE:

Check the speed sensor signal after replacement  .

NEXT



18. RECONFIRM DTC

- (a) Clear the DTCs  .
- (b) Turn the ignition switch off.
- (c) Start the engine.

(d) Drive the vehicle at a speed of 45 km/h (28 mph) or more for at least 120 seconds.

(e) Check if the same DTC is output **INFO** .

Result:

RESULT	PROCEED TO
DTC C1237 is output.	A
DTC C1237 is not output.	B

B  **END**

A



19.	REPLACE REAR SPEED SENSOR ROTOR
------------	--

(a) Turn the ignition switch off.

(b) Replace the rear speed sensor rotor **INFO** .

HINT:

If the rear speed sensor rotor needs to be replaced, replace the rear axle hub and bearing assembly.

NOTICE:

Check the speed sensor signal after replacement **INFO** .

NEXT



20.	RECONFIRM DTC
------------	----------------------

(a) Clear the DTCs **INFO** .

(b) Turn the ignition switch off.

(c) Start the engine.

(d) Drive the vehicle at a speed of 45 km/h (28 mph) or more for at least 120 seconds.

(e) Check if the same DTC is output **INFO** .

Result:

RESULT	PROCEED TO
--------	------------

DTC C1237 is output.	A
DTC C1237 is not output.	B

B ▶ END

A ▶ REPLACE BRAKE ACTUATOR ASSEMBLY



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XW60DXX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: C1241: Low or High Power Supply Voltage (2013 FR-S)		

DTC	C1241	Low or High Power Supply Voltage
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DESCRIPTION

If a malfunction is detected in the power supply circuit, the skid control ECU (brake actuator assembly) stores this DTC and the fail-safe function prohibits ABS operation.

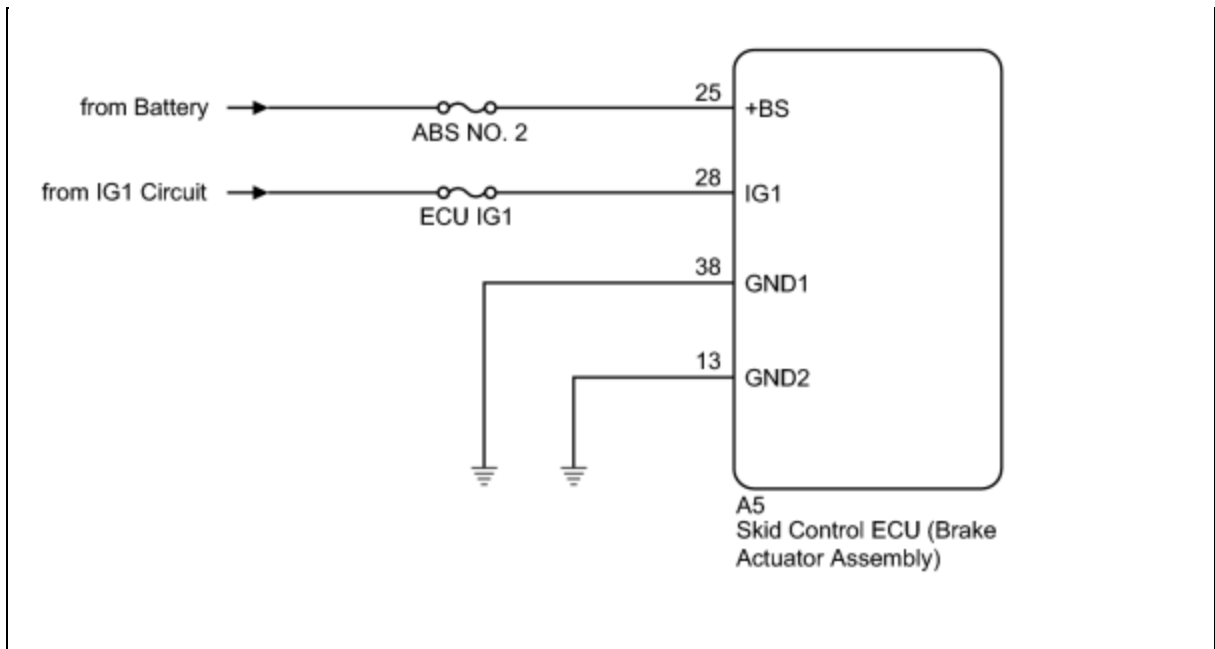
This DTC is stored when the +BS terminal voltage meets one of the DTC detection conditions due to a malfunction in the power supply or charging circuit such as the battery or alternator circuit, etc.

The DTC is canceled when the +BS terminal voltage returns to normal.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C1241	<p>Any of the following is detected:</p> <ol style="list-style-type: none"> 1. The vehicle speed is 6 km/h (4 mph) or more and the +BS terminal voltage (soft low voltage) is 9.6 V or less for 1 second or more. 2. The vehicle speed is 6 km/h (4 mph) or more and the +BS terminal voltage (hard low voltage) is 6.9 V or less for 1 second or more. 3. The vehicle speed is 15 km/h (9 mph) or more, the +BS terminal voltage is 9.6 V or more, the skid control ECU (brake actuator assembly) turns on more than one valve at the same time within a short period of time and the valve relay supply voltage drop exceeds the threshold.* 	<ul style="list-style-type: none"> • ABS NO. 2 fuse • ECU IG1 fuse • Battery • Charging system • Power source circuit • Ground circuit • Internal power supply circuit of the skid control ECU (brake actuator assembly)

*: The skid control ECU (brake actuator assembly) monitors the resistance of the power source line at the +BS terminal. A malfunction is detected when an abnormality occurs in the +BS terminal wire harness or its connection and the skid control ECU (brake actuator assembly) determines that the wiring resistance at the +BS terminal exceeds the standard resistance.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization **INFO**.
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CHECK BATTERY
-----------	----------------------

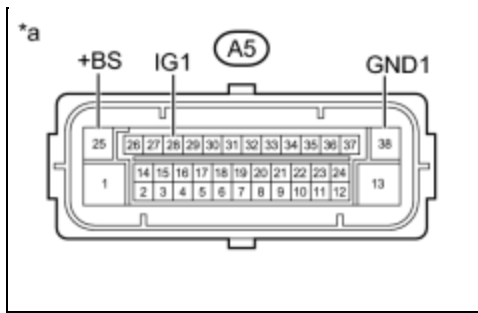
(a) Check the battery voltage.

Standard Voltage:
11 to 14 V

NG ► **CHECK OR REPLACE CHARGING SYSTEM COMPONENT OR BATTERY**

OK
▼

2.	CHECK HARNESS AND CONNECTOR (POWER SOURCE TERMINAL)
-----------	--



(a) Make sure that there is no looseness at the locking part and the connecting part of the connector.

(b) Disconnect the skid control ECU (brake actuator assembly) connector.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-25 (+BS) - Body ground	Always	11 to 14 V
A5-25 (+BS) - A5-38 (GND1)	Always	11 to 14 V
A5-28 (IG1) - Body ground	Ignition switch ON	11 to 14 V
A5-28 (IG1) - A5-38 (GND1)	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
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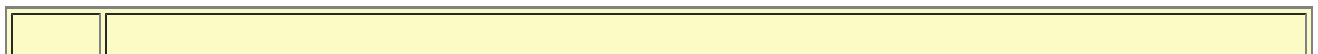
Result:

RESULT	PROCEED TO
OK	A
NG (for +BS circuit)	B
NG (for IG1 circuit)	C

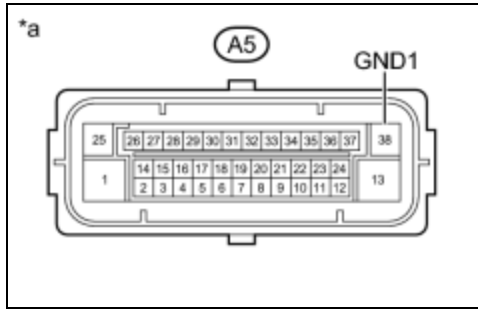
B ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (+BS CIRCUIT)

C ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 CIRCUIT)

A
▼



3. CHECK HARNESS AND CONNECTOR (GND1 TERMINAL)



(a) Turn the ignition switch off.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-38 (GND1) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
----	---

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR (GND1 CIRCUIT)**

OK



4. RECONFIRM DTC

(a) Reconnect the skid control ECU (brake actuator assembly) connector.

(b) Clear the DTCs .

(c) Turn the ignition switch off.

(d) Start the engine.

(e) Perform a road test.

(f) Check if the same DTC is output .

Result:

RESULT	PROCEED TO
--------	------------

DTC C1241 is not output.	A
DTC C1241 is output.	B

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts INFO .

B ▶ REPLACE BRAKE ACTUATOR ASSEMBLY

A ▶ CHECK FOR INTERMITTENT PROBLEMS

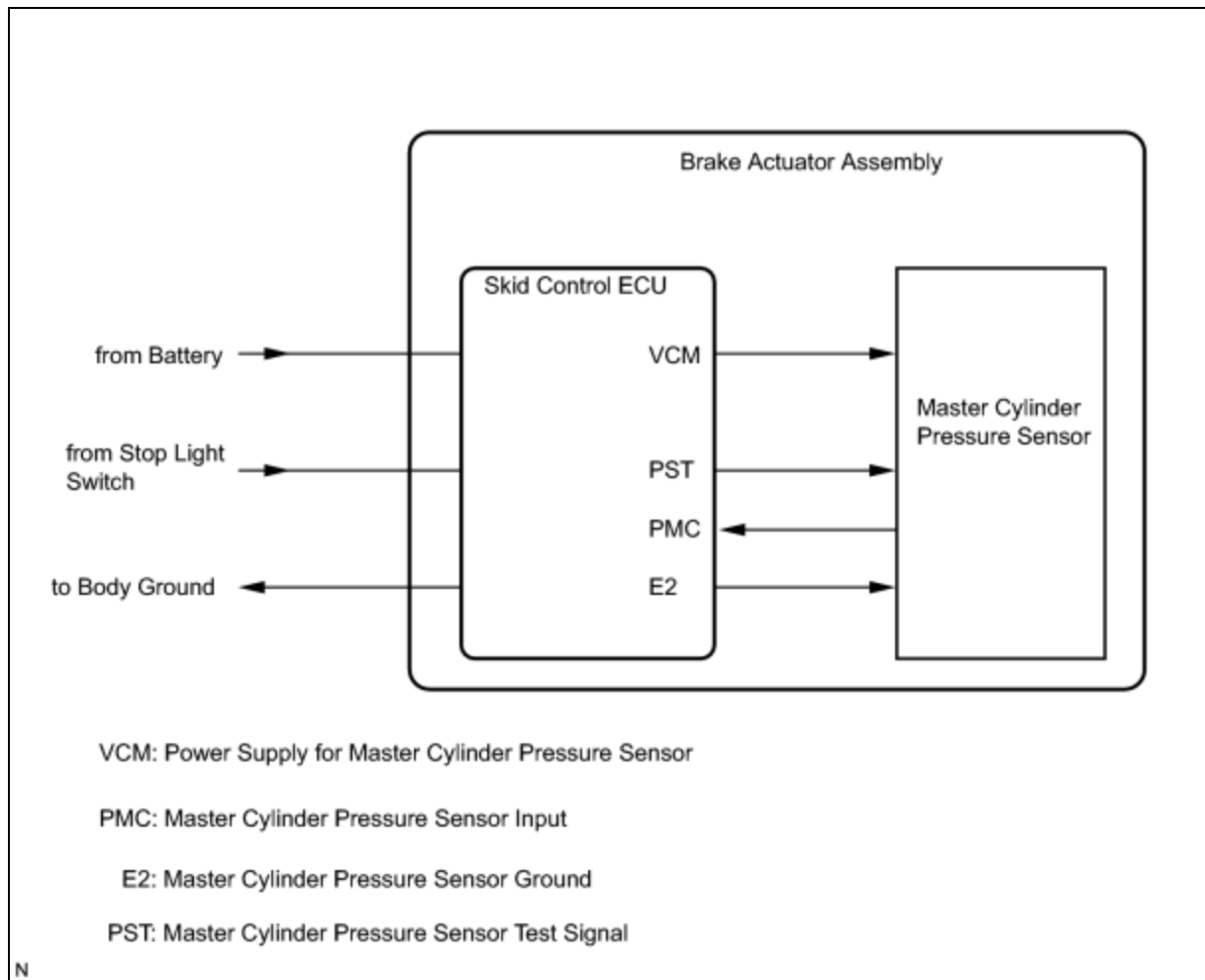


Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XIGOH7X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: C1246: Master Cylinder Pressure Sensor Malfunction (2013 FR-S)		

DTC	C1246	Master Cylinder Pressure Sensor Malfunction
------------	--------------	--

DESCRIPTION

The master cylinder pressure sensor is connected to the skid control ECU in the brake actuator assembly.



DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C1246	<p>Any of the following is detected:</p> <ol style="list-style-type: none"> 1. The voltage of the sensor signal is out of range (below 0.129 V, above 3.29 V). 2. An abnormality is detected in the skid control ECU internal sensor test. 3. The sensor signal offset value is out of range. 	<ul style="list-style-type: none"> • STOP fuse • Stop light switch circuit • Master cylinder pressure sensor circuit • Master cylinder pressure sensor (Brake actuator assembly)

WIRING DIAGRAM

Refer to DTCs C1249 INFO.

INSPECTION PROCEDURE

NOTICE:

- When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization INFO.
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CHECK STOP LIGHT OPERATION
-----------	-----------------------------------

(a) Check that the stop lights come on when the brake pedal is depressed, and go off when the brake pedal is released.

OK:

CONDITION	ILLUMINATION CONDITION
Brake pedal depressed.	ON
Brake pedal released.	OFF

NG ▶ **INSPECT LIGHTING SYSTEM (STOP LIGHT CIRCUIT)**

OK



2.	READ VALUE USING TECHSTREAM (MASTER CYLINDER PRESSURE SENSOR)
-----------	--

(a) Connect the Techstream to the DLC3.

(b) Start the engine.

(c) Select the Data List using the Techstream INFO.

ABS/VSC/TRAC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Master Cylinder	Master cylinder pressure sensor reading / Min.: 0.00 V, Max.: 5.00 V	Brake pedal released: 0.20 to	Reading increases when brake pedal is depressed

Sensor	0.40 V
--------	--------

(d) Check that the brake fluid pressure value of the master cylinder pressure sensor observed on the Techstream changes when the brake pedal is depressed.

OK:

When the pedal is depressed, the voltage displayed on the Techstream increases.

NG ▶ **REPLACE BRAKE ACTUATOR ASSEMBLY**

OK



3.	READ VALUE USING TECHSTREAM (STOP LIGHT SWITCH)
-----------	--

(a) Select the Data List using the Techstream .

ABS/VSC/TRAC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Stop Light SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

(b) Check that the stop light switch display observed on the Techstream change according to brake pedal operation.

OK:

The Techstream displays on or off according to brake pedal operation.

NG ▶ **CHECK HARNESS AND CONNECTOR (POWER SOURCE TERMINAL)**

OK




4.	RECONFIRM DTC
-----------	----------------------

(a) Clear the DTCs .

(b) Turn the ignition switch off.

(c) Start the engine.

(d) Drive the vehicle and depress the brake pedal several times to test the stop light circuit.

(e) Check if the same DTC is output .

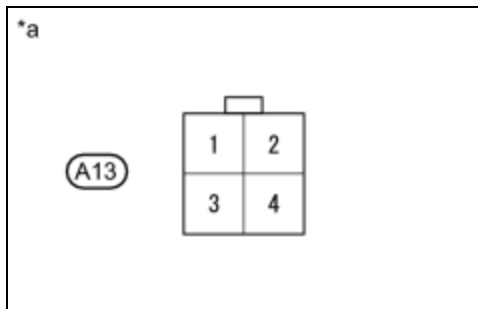
Result:

RESULT	PROCEED TO
DTC C1246 is not output.	A
DTC C1246 is output.	B

B ▶ REPLACE BRAKE ACTUATOR ASSEMBLY

A ▶ CHECK FOR INTERMITTENT PROBLEMS

5. CHECK HARNESS AND CONNECTOR (POWER SOURCE TERMINAL)



(a) Make sure that there is no looseness at the locking part and the connecting part of the connector.

(b) Disconnect the noise filter connector.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A13-3 - Body ground	Always	11 to 14 V


Text in Illustration


*a	Front view of wire harness connector (to Noise Filter)
----	--

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)

OK
▼

6. INSPECT NOISE FILTER

(a) Remove the noise filter  .

(b) Inspect the noise filter  .

NG  **REPLACE NOISE FILTER**

OK



7.	CHECK HARNESS AND CONNECTOR (NOISE FILTER - STOP LIGHT SWITCH ASSEMBLY)
-----------	--

(a) Make sure that there is no looseness at the locking part and the connecting part of the connector.

(b) Disconnect the stop light switch assembly connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A13-2 - A22-1	Always	Below 1 Ω
A13-1 - A22-2	Always	Below 1 Ω


NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



8.	INSPECT STOP LIGHT SWITCH ASSEMBLY
-----------	---

(a) Remove the stop light switch assembly  .

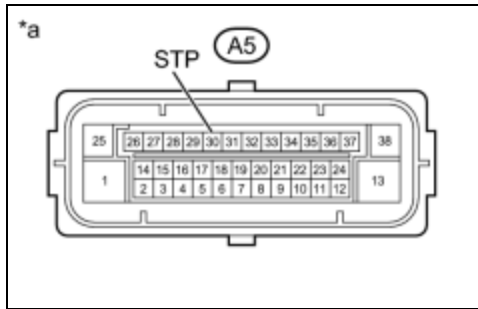
(b) Inspect the stop light switch assembly  .

NG  **REPLACE STOP LIGHT SWITCH ASSEMBLY**

OK



9. CHECK HARNESS AND CONNECTOR (STP TERMINAL)



(a) Turn the ignition switch off.

(b) Make sure that there is no looseness at the locking part and the connecting part of the connector.

(c) Disconnect the skid control ECU (brake actuator assembly) connector.

(d) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-30 (STP) - Body ground	Stop light switch ON (Brake pedal depressed)	11 to 14 V*
	Stop light switch OFF (Brake pedal released)	Below 1.5 V

HINT:

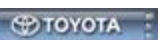
*: The standard voltage value varies depending on the +BS terminal voltage value. The standard voltage is 85% of the +BS terminal voltage.

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
----	---

NG ► REPAIR OR REPLACE HARNESS OR
CONNECTOR (STP CIRCUIT)

OK ► REPLACE BRAKE ACTUATOR ASSEMBLY



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XIEOK1X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: C1249: Open in Stop Light Switch Circuit (2013 FR-S)		

DTC	C1249	Open in Stop Light Switch Circuit
------------	--------------	--

DESCRIPTION

The skid control ECU (brake actuator assembly) receives stop light switch signals and uses them to determine whether or not the brakes are applied.

DTCs may be stored if one of the following occurs:

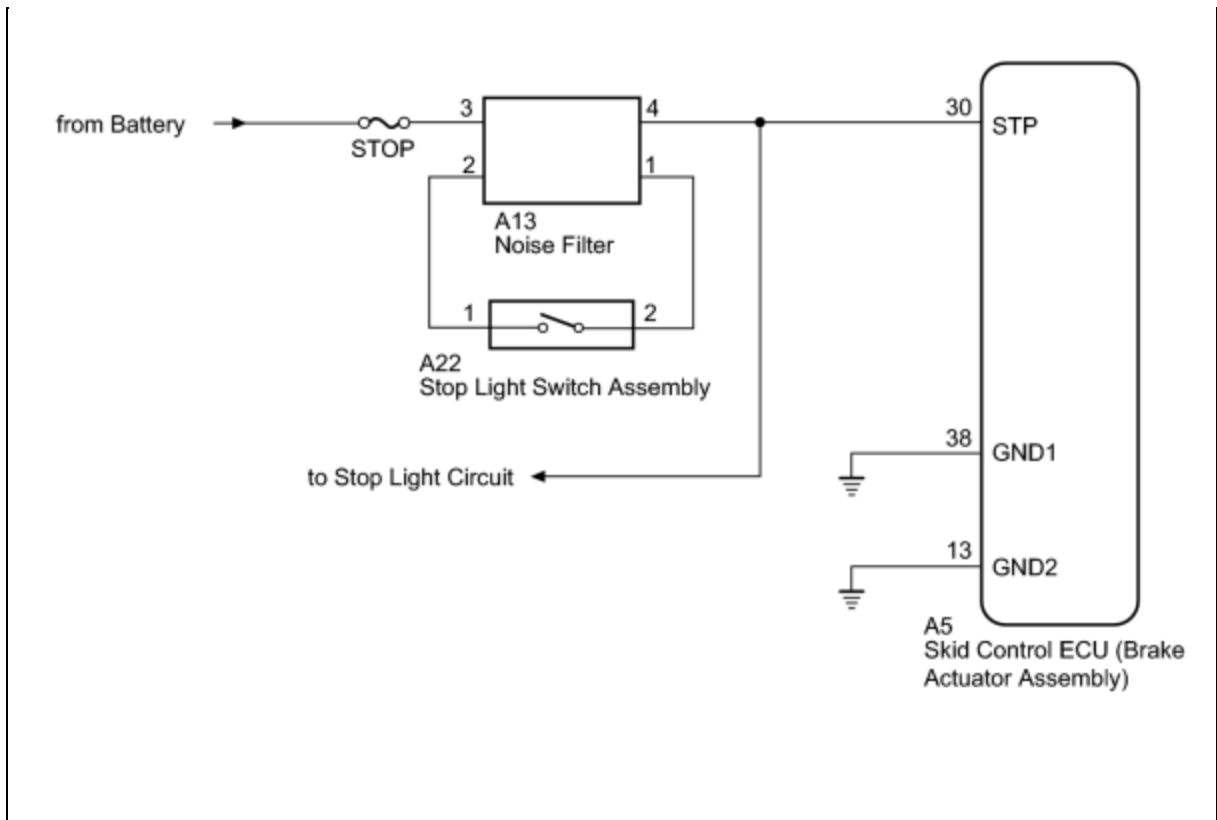
- Stop light switch stuck on/off malfunction.
- Accelerator pedal and brake pedal depressed simultaneously.*

HINT:

*: The skid control ECU (brake actuator assembly) may store this DTC upon judging that a stuck on malfunction has occurred when the accelerator pedal and brake pedal are depressed simultaneously. However, this does not indicate a malfunction.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C1249	<p>Any of the following is detected:</p> <ul style="list-style-type: none"> • The vehicle speed is 10 km/h (6 mph) or more, the accelerator pedal is depressed, the master cylinder pressure is 0.5 MPa (5.09 kgf/cm², 72 psi) or less, and the stop light switch is on for 60 seconds or more. • When the stop light switch is OFF, the master cylinder pressure is increased. 	<ul style="list-style-type: none"> • STOP fuse • Stop light switch assembly • Noise filter • Stop light switch circuit • Skid control ECU (Brake actuator assembly)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization **INFO** .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CHECK ACCELERATOR PEDAL AND BRAKE PEDAL OPERATION
-----------	--

(a) Interview the customer to check if the pedals were depressed simultaneously while driving or braking.

OK:

The pedals were not depressed simultaneously.

HINT:

The skid control ECU (brake actuator assembly) may store this DTC upon judging that a stuck on malfunction has occurred when the accelerator pedal and brake pedal are depressed simultaneously.

If the pedals were depressed simultaneously, clear the DTC because it is not a malfunction.

OK



2.	CHECK STOP LIGHT OPERATION
-----------	-----------------------------------

(a) Check that the stop lights come on when the brake pedal is depressed, and go off when the brake pedal is released.

OK:

CONDITION	ILLUMINATION CONDITION
Brake pedal depressed.	ON
Brake pedal released.	OFF

NG ► **CHECK HARNESS AND CONNECTOR (POWER SOURCE TERMINAL)**


OK



3.	READ VALUE USING TECHSTREAM (STOP LIGHT SWITCH)
-----------	--

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Select the Data List using the Techstream .

ABS/VSC/TRAC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Stop Light SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

(d) Check that the stop light switch display observed on the Techstream changes according to brake pedal operation.

OK:

The Techstream displays on or off according to brake pedal operation.

NG ► **CHECK HARNESS AND CONNECTOR (STP TERMINAL)**

OK



4.	RECONFIRM DTC
-----------	----------------------

- (a) Turn the ignition switch off.
- (b) Clear the DTCs INFO.
- (c) Turn the ignition switch off.
- (d) Start the engine.
- (e) Drive the vehicle and depress the brake pedal several times to test the stop light circuit.
- (f) Check if the same DTC is output INFO.

Result:

RESULT	PROCEED TO
DTC C1249 is not output.	A
DTC C1249 is output.	B

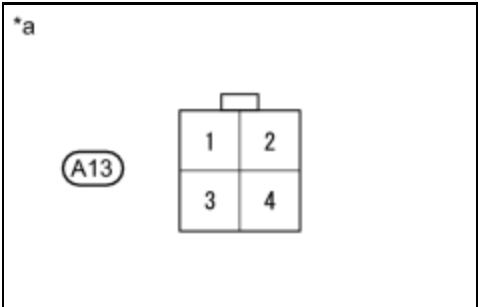
HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts INFO.

B ▶ REPLACE BRAKE ACTUATOR ASSEMBLY

A ▶ CHECK FOR INTERMITTENT PROBLEMS

5.	CHECK HARNESS AND CONNECTOR (POWER SOURCE TERMINAL)
-----------	--



(a) Make sure that there is no looseness at the locking part and the connecting part of the connector.

- (b) Disconnect the noise filter connector.
- (c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

--	--	--

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A13-3 - Body ground	Always	11 to 14 V

Text in Illustration



*a	Front view of wire harness connector (to Noise Filter)
----	---

NG ► REPAIR OR REPLACE HARNESS OR
CONNECTOR (POWER SOURCE CIRCUIT)

OK



6.	INSPECT NOISE FILTER
-----------	-----------------------------

- (a) Remove the noise filter  .
- (b) Inspect the noise filter  .

NG ► REPLACE NOISE FILTER

OK



7.	CHECK HARNESS AND CONNECTOR (NOISE FILTER - STOP LIGHT SWITCH ASSEMBLY)
-----------	--

- (a) Make sure that there is no looseness at the locking part and the connecting part of the connector.
- (b) Disconnect the stop light switch assembly connector.
- (c) Measure the resistance according to the value(s) in the table below.



Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A13-2 - A22-1	Always	Below 1 Ω
A13-1 - A22-2	Always	Below 1 Ω

REPAIR OR REPLACE HARNESS OR

OK
▼

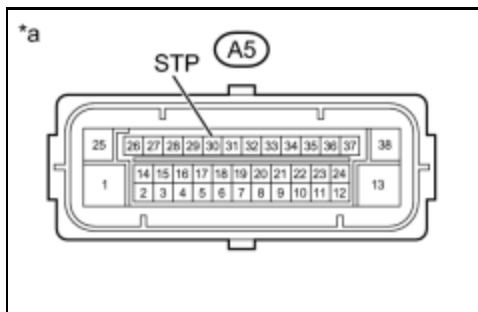
8. INSPECT STOP LIGHT SWITCH ASSEMBLY

- (a) Remove the stop light switch assembly  .
- (b) Inspect the stop light switch assembly  .

NG  REPLACE STOP LIGHT SWITCH ASSEMBLY

OK
▼

9. CHECK HARNESS AND CONNECTOR (STP TERMINAL)



- (a) Reconnect the stop light switch assembly connector.

- (b) Make sure that there is no looseness at the locking part and the connecting part of the connector.
- (c) Disconnect the skid control ECU (brake actuator assembly) connector.
- (d) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-30 (STP) - Body ground	Stop light switch ON (Brake pedal depressed)	11 to 14 V*
	Stop light switch OFF (Brake pedal released)	Below 1.5 V

HINT:

*: The standard voltage value varies depending on the +BS terminal voltage value. The standard voltage is 85% of the +BS terminal voltage.

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
----	---

NG ► REPAIR OR REPLACE HARNESS OR
CONNECTOR (STP CIRCUIT)

OK



10.	RECONFIRM DTC
------------	----------------------

- (a) Reconnect the skid control ECU (brake actuator assembly) connector.
- (b) Clear the DTCs **INFO** .
- (c) Turn the ignition switch off.
- (d) Start the engine.
- (e) Drive the vehicle and depress the brake pedal several times to test the stop light circuit.
- (f) Check if the same DTC is output **INFO** .

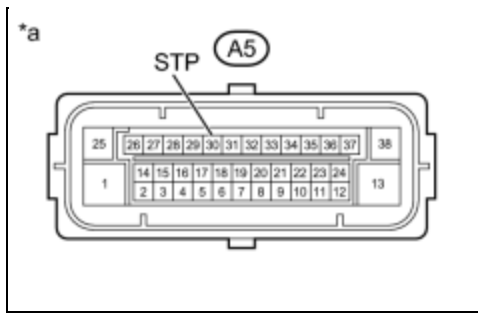
Result:

RESULT	PROCEED TO
DTC C1249 is not output.	A
DTC C1249 is output.	B

B ► CHECK FOR INTERMITTENT PROBLEMS

A ► INSPECT LIGHTING SYSTEM (STOP LIGHT
CIRCUIT)

11.	CHECK HARNESS AND CONNECTOR (STP TERMINAL)
------------	---



(a) Turn the ignition switch off.

(b) Make sure that there is no looseness at the locking part and the connecting part of the connector.

(c) Disconnect the skid control ECU (brake actuator assembly) connector.

(d) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-30 (STP) - Body ground	Stop light switch ON (Brake pedal depressed)	11 to 14 V*
	Stop light switch OFF (Brake pedal released)	Below 1.5 V

HINT:

*: The standard voltage value varies depending on the +BS terminal voltage value. The standard voltage is 85% of the +BS terminal voltage.

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
----	---

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts INFO.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (STP CIRCUIT)

OK ▶ REPLACE BRAKE ACTUATOR ASSEMBLY

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XI9004X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: C1271,C1272,C1330,C1331,C1464,C1465: Low Output Signal of Front Speed Sensor RH (Test Mode DTC) (2013 FR-S)		

DTC	C1271	Low Output Signal of Front Speed Sensor RH (Test Mode DTC)
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DTC	C1272	Low Output Signal of Front Speed Sensor LH (Test Mode DTC)
------------	--------------	---

DTC	C1330	Open in Front Speed Sensor RH
------------	--------------	--------------------------------------

DTC	C1331	Open in Front Speed Sensor LH
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DTC	C1464	Front Speed Sensor RH
------------	--------------	------------------------------

DTC	C1465	Front Speed Sensor LH
------------	--------------	------------------------------

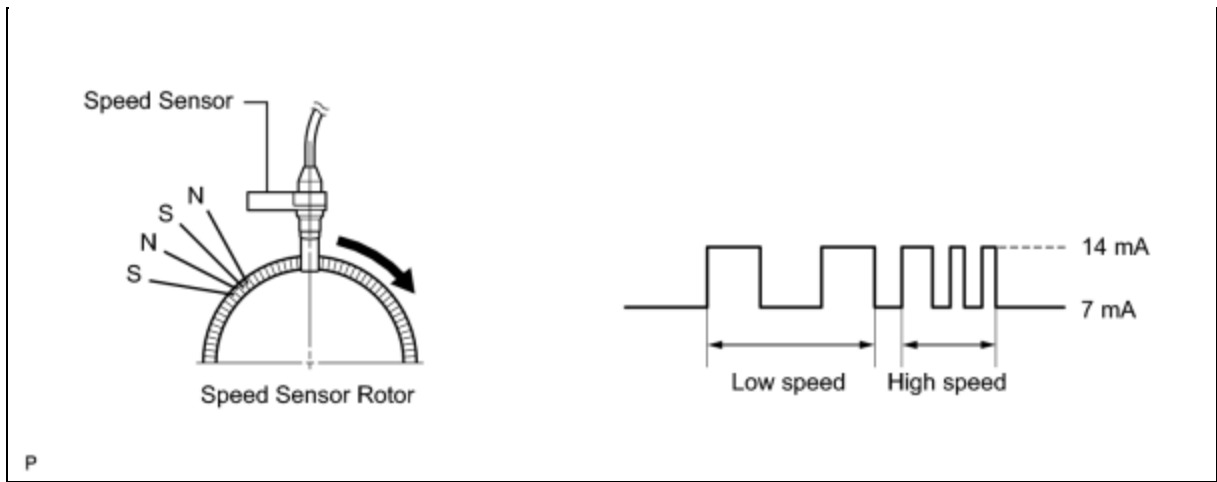
DESCRIPTION

Each speed sensor detects wheel speed and sends the appropriate signals to the skid control ECU (brake actuator assembly). These signals are used by the brake control system.

Speed sensor rotors have row of alternating N and S magnetic poles, and their magnetic fields change when the rotors turn.

Each speed sensor detects that magnetic field change and sends a pulse signal to the skid control ECU (brake actuator assembly).

DTCs C1271 and C1272 are cleared when the speed sensor sends a vehicle speed signal or when Test Mode ends. DTCs C1271 and C1272 are output only in Test Mode.

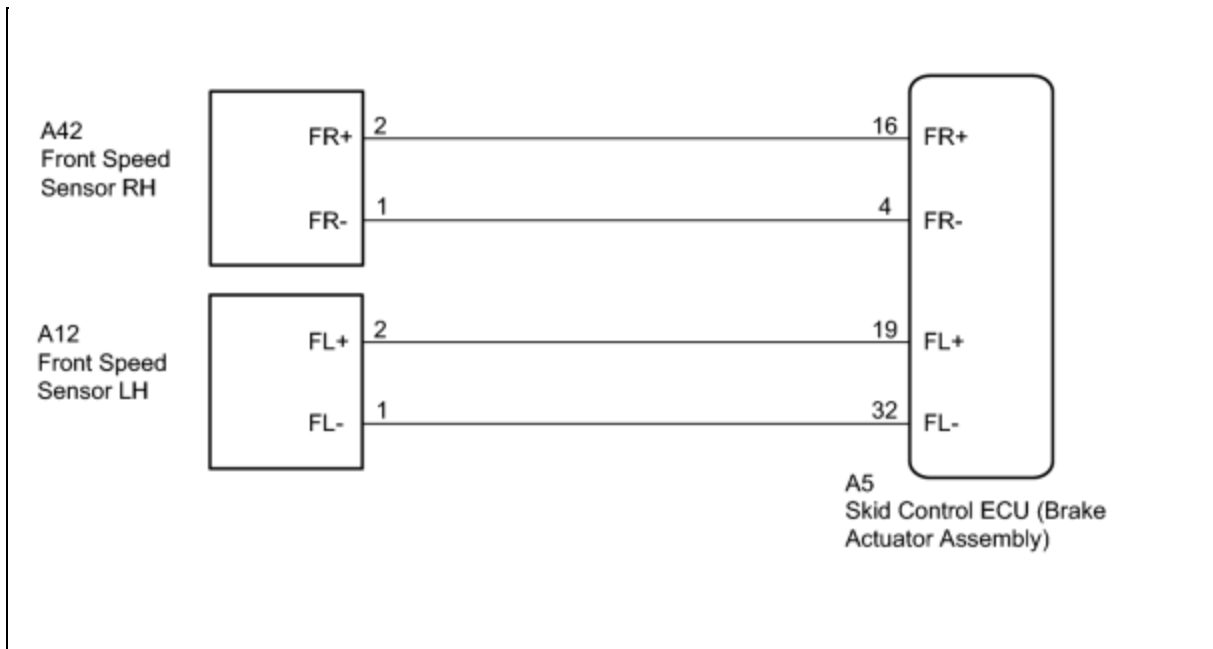


DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C1330 C1331	An open or short in the speed sensor signal circuit.	<ul style="list-style-type: none"> • Front speed sensor RH/LH • Speed sensor circuit • Sensor installation • Skid control ECU (Brake actuator assembly)
C1464 C1465	An abnormal signal is received from a wheel speed sensor.	<ul style="list-style-type: none"> • Front speed sensor RH/LH • Speed sensor circuit • Front speed sensor rotor RH/LH (Front axle hub sub-assembly RH/LH) • Sensor installation • Skid control ECU (Brake actuator assembly)
C1271 C1272	Detected only during Test Mode.	<ul style="list-style-type: none"> • Front speed sensor RH/LH • Sensor installation • Front speed sensor rotor RH/LH (Front axle hub sub-assembly RH/LH)

HINT:

- DTCs C1271, C1330 and C1464 are for the front speed sensor RH.
- DTCs C1272, C1331 and C1465 are for the front speed sensor LH.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization INFO.

PROCEDURE

1.	READ VALUE USING TECHSTREAM (FRONT SPEED SENSOR)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Start the engine.
- (c) Select the Data List using the Techstream INFO.

ABS/VSC/TRAC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
FR Wheel Speed	Front wheel speed sensor RH reading / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
FL Wheel Speed	Front wheel speed sensor LH reading / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations

- (d) Check the speed value output from the speed sensor displayed on the Techstream.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire pressure, and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of

error, see the reference chart  .

OK:

The speed value output from the speed sensor displayed on the Techstream is similar to the speed indicated on the speedometer.

NG  **CHECK FRONT SPEED SENSOR INSTALLATION**

OK


2.	PERFORM TEST MODE INSPECTION (SIGNAL CHECK)
-----------	--

(a) Turn the ignition switch off.

(b) Perform the sensor check using the Test Mode procedure  .


OK:

All Test Mode DTCs are not output.

NG  **CHECK FRONT SPEED SENSOR INSTALLATION**

OK


3.	RECONFIRM DTC
-----------	----------------------

(a) Clear the DTCs  .

(b) Turn the ignition switch off.

(c) Start the engine.

(d) Drive the vehicle at a speed of 45 km/h (28 mph) or more for at least 120 seconds.

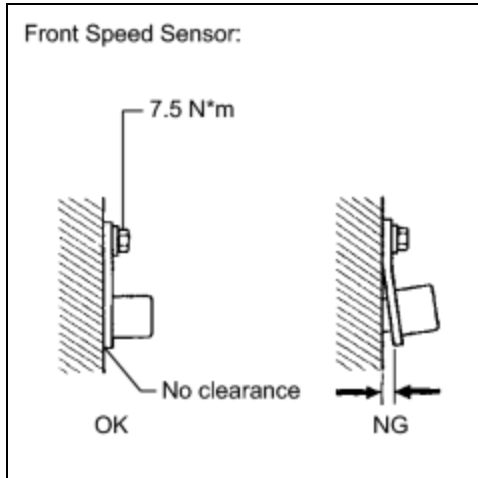
(e) Check if the same DTC is output  .

Result:

RESULT	PROCEED TO
DTCs C1330, C1331, C1464 and C1465 are not output.	A
DTCs C1330, C1331, C1464 and/or C1465 are output.	B

B  **REPLACE FRONT SPEED SENSOR**

4. CHECK FRONT SPEED SENSOR INSTALLATION



(a) Turn the ignition switch off.

(b) Check the speed sensor installation.

OK:

There is no clearance between the sensor and the front axle hub sub-assembly.

The installation bolt is tightened properly.

Torque

7.5 N*m (77 kgf*cm, 66 in.*lbf)

NG ► INSTALL FRONT SPEED SENSOR CORRECTLY

OK



5. CHECK FRONT SPEED SENSOR TIP

(a) Remove the front speed sensor **INFO**.

(b) Check the speed sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:


Check the speed sensor signal after cleaning or replacement **INFO**.

NG ► CLEAN OR REPLACE FRONT SPEED SENSOR

OK



6.	CHECK HARNESS AND CONNECTOR (BRAKE ACTUATOR ASSEMBLY - FRONT SPEED SENSOR)
-----------	---

- (a) Install the front speed sensor  .
- (b) Make sure that there is no looseness at the locking part and the connecting part of the connectors.
- (c) Disconnect the skid control ECU (brake actuator assembly) connector and the front speed sensor connector.
- (d) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

for RH

for LH

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-16 (FR+) - A42-2 (FR+)	Always	Below 1 Ω
A5-16 (FR+) - Body ground	Always	10 k Ω or higher
A5-4 (FR-) - A42-1 (FR-)	Always	Below 1 Ω
A5-4 (FR-) - Body ground	Always	10 k Ω or higher

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-19 (FL+) - A12-2 (FL+)	Always	Below 1 Ω
A5-19 (FL+) - Body ground	Always	10 k Ω or higher
A5-32 (FL-) - A12-1 (FL-)	Always	Below 1 Ω
A5-32 (FL-) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



7.	INSPECT BRAKE ACTUATOR ASSEMBLY (FRONT SPEED SENSOR POWER SOURCE TERMINAL)
-----------	---

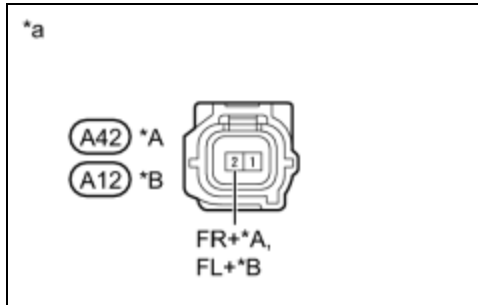
(a) Reconnect the skid control ECU (brake actuator assembly) connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

for RH

for LH



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A42-2 (FR+) - Body ground	Ignition switch ON	8 to 14 V

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A12-2 (FL+) - Body ground	Ignition switch ON	8 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Front Speed Sensor)

NG **REPLACE BRAKE ACTUATOR ASSEMBLY**

OK



8.	RECONFIRM DTC
-----------	----------------------

(a) Reconnect the front speed sensor connector.

(b) Clear the DTCs .

(c) Turn the ignition switch off.

(d) Start the engine.

(e) Drive the vehicle at a speed of 45 km/h (28 mph) or more for at least 120 seconds.

(f) Check if the same DTC is output .

Result:

RESULT	PROCEED TO
--------	------------

DTCs C1330, C1331, C1464 and/or C1465 are output.	A
DTCs C1330, C1331, C1464 and C1465 are not output.	B


B  CHECK FOR INTERMITTENT PROBLEMS

A



9.	REPLACE FRONT SPEED SENSOR
-----------	-----------------------------------

(a) Turn the ignition switch off.

(b) Replace the front speed sensor  .


NOTICE:

Check the speed sensor signal after replacement  .

NEXT




10.	RECONFIRM DTC
------------	----------------------

(a) Clear the DTCs  .

(b) Turn the ignition switch off.

(c) Start the engine.

(d) Drive the vehicle at a speed of 45 km/h (28 mph) or more for at least 120 seconds.

(e) Check if the same DTC is output  .

Result:


RESULT	PROCEED TO
DTCs C1330, C1331, C1464 and/or C1465 are output.	A
DTCs C1330, C1331, C1464 and C1465 are not output.	B

B  END

A



11. REPLACE FRONT SPEED SENSOR ROTOR

- (a) Turn the ignition switch off.
- (b) Replace the front speed sensor rotor  .

HINT:

If the front speed sensor rotor needs to be replaced, replace the front axle hub sub-assembly.



NOTICE:

Check the speed sensor signal after replacement  .

NEXT



12. RECONFIRM DTC

- (a) Clear the DTCs  .
- (b) Turn the ignition switch off.
- (c) Start the engine.
- (d) Drive the vehicle at a speed of 45 km/h (28 mph) or more for at least 120 seconds.
- (e) Check if the same DTC is output  .

Result:

RESULT	PROCEED TO
DTCs C1330, C1331, C1464 and/or C1465 are output.	A
DTCs C1330, C1331, C1464 and C1465 are not output.	B

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

B  END

A  REPLACE BRAKE ACTUATOR ASSEMBLY



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XIAOHBX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: C1273,C1274,C1332,C1333,C1466,C1467: Low Output Signal of Rear Speed Sensor RH (Test Mode DTC) (2013 FR-S)		

DTC	C1273	Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)
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DTC	C1274	Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)
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DTC	C1332	Open in Rear Speed Sensor RH
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DTC	C1333	Open in Rear Speed Sensor LH
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DTC	C1466	Rear Speed Sensor RH
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DTC	C1467	Rear Speed Sensor LH
------------	--------------	-----------------------------

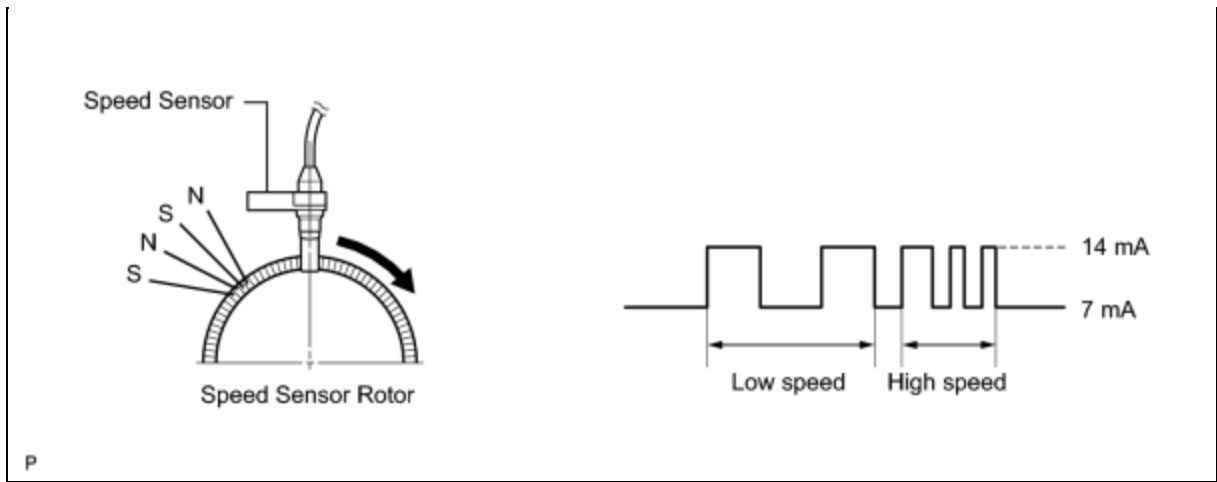
DESCRIPTION

Each speed sensor detects the wheel speed and sends the appropriate signals to the skid control ECU (brake actuator assembly). These signals are used by the brake control system.

Speed sensor rotors have row of alternating N and S magnetic poles, and their magnetic fields change when the rotors turn.

Each speed sensor detects that magnetic field change and sends a pulse signal to the skid control ECU (brake actuator assembly).

DTCs C1273 and C1274 are cleared when the speed sensor sends a vehicle speed signal or when Test Mode ends. DTCs C1273 and C1274 are output only in Test Mode.

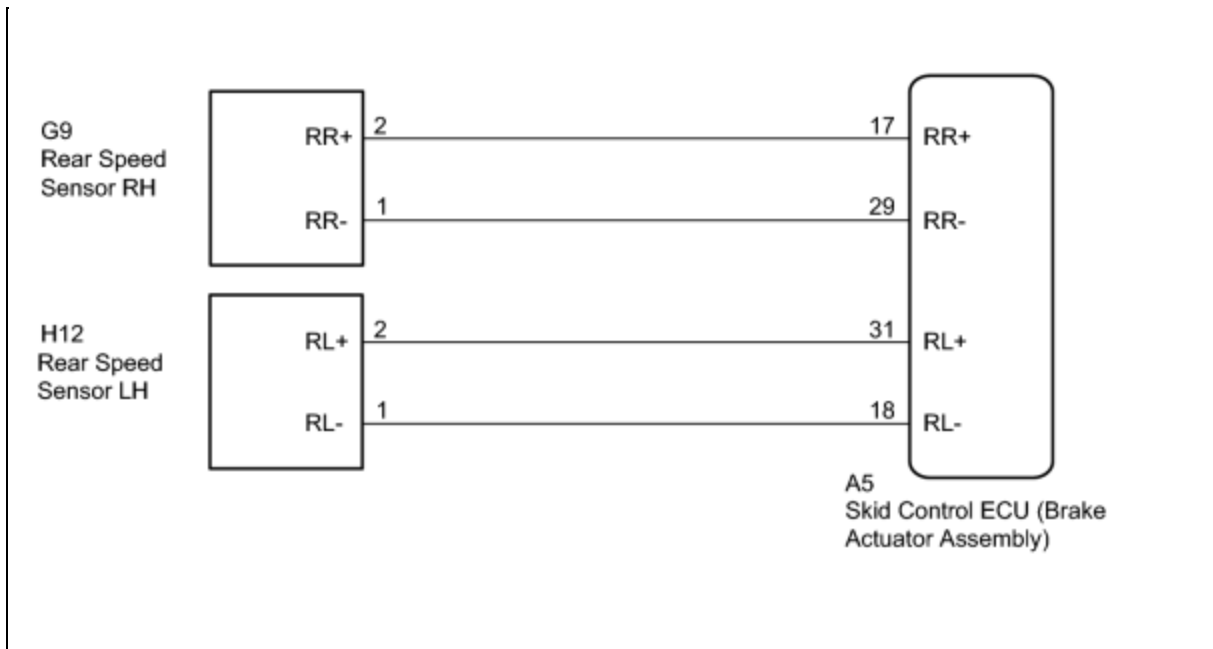


DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C1332 C1333	An open or short in the speed sensor signal circuit.	<ul style="list-style-type: none"> • Rear speed sensor RH/LH • Speed sensor circuit • Sensor installation • Skid control ECU (Brake actuator assembly)
C1466 C1467	An abnormal signal is received from a wheel speed sensor.	<ul style="list-style-type: none"> • Rear speed sensor RH/LH • Speed sensor circuit • Rear speed sensor rotor RH/LH (Rear axle hub sub-assembly RH/LH) • Sensor installation • Skid control ECU (Brake actuator assembly)
C1273 C1274	Detected only during Test Mode.	<ul style="list-style-type: none"> • Rear speed sensor RH/LH • Sensor installation • Rear speed sensor rotor RH/LH (Rear axle hub sub-assembly RH/LH)

HINT:

- DTCs C1273, C1332 and C1466 are for the rear speed sensor RH.
- DTCs C1274, C1333 and C1467 are for the rear speed sensor LH.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization INFO.

PROCEDURE

1.	READ VALUE USING TECHSTREAM (REAR SPEED SENSOR)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Start the engine.
- (c) Select the Data List using the Techstream INFO.

ABS/VSC/TRAC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
RR Wheel Speed	Rear wheel speed sensor RH reading / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
RL Wheel Speed	Rear wheel speed sensor LH reading / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations

- (d) Check the speed value output from the speed sensor displayed on the Techstream.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire pressure, and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of

error, see the reference chart  .

OK:

The speed value output from the speed sensor displayed on the Techstream is similar to the speed indicated on the speedometer.

NG  **CHECK REAR SPEED SENSOR INSTALLATION**

OK



2.	PERFORM TEST MODE INSPECTION (SIGNAL CHECK)
-----------	--

(a) Turn the ignition switch off.

(b) Perform the sensor check using the Test Mode procedure  .

OK:

All Test Mode DTCs are not output.

NG  **CHECK REAR SPEED SENSOR INSTALLATION**

OK



3.	RECONFIRM DTC
-----------	----------------------

(a) Clear the DTCs  .

(b) Turn the ignition switch off.

(c) Start the engine.

(d) Drive the vehicle at a speed of 45 km/h (28 mph) or more for at least 120 seconds.

(e) Check if the same DTC is output  .

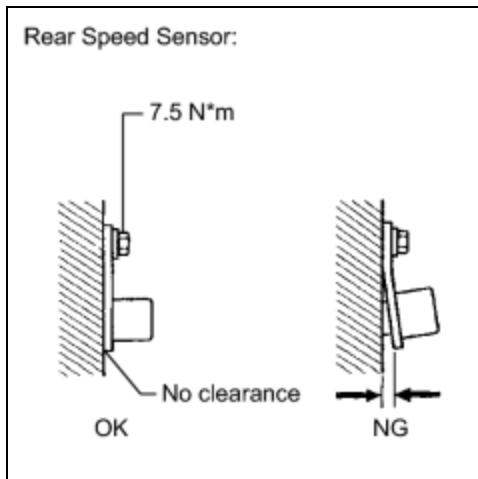
Result:

RESULT	PROCEED TO
DTCs C1332, C1333, C1466 and C1467 are not output.	A
DTCs C1332, C1333, C1466 and/or C1467 are output.	B

B  **REPLACE REAR SPEED SENSOR**

A  **CHECK FOR INTERMITTENT PROBLEMS**

4. CHECK REAR SPEED SENSOR INSTALLATION



(a) Turn the ignition switch off.

(b) Check the speed sensor installation.

OK:

There is no clearance between the sensor and the rear axle hub sub-assembly.

The installation bolt is tightened properly.

Torque

7.5 N*m (77 kgf*cm, 66 in.*lbf)

NG ► **INSTALL REAR SPEED SENSOR CORRECTLY**

OK



5. CHECK REAR SPEED SENSOR TIP

(a) Remove the rear speed sensor **INFO** .

(b) Check the speed sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:


Check the speed sensor signal after cleaning or replacement **INFO** .

NG ► **CLEAN OR REPLACE REAR SPEED SENSOR**

OK



6.	CHECK HARNESS AND CONNECTOR (BRAKE ACTUATOR ASSEMBLY - REAR SPEED SENSOR)
-----------	--

- (a) Install the rear speed sensor  .
- (b) Make sure that there is no looseness at the locking part and the connecting part of the connector.
- (c) Disconnect the skid control ECU (brake actuator assembly) connector and the rear speed sensor connector.
- (d) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

for RH

for LH

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-17 (RR+) - G9-2 (RR+)	Always	Below 1 Ω
A5-17 (RR+) - Body ground	Always	10 kΩ or higher
A5-29 (RR-) - G9-1 (RR-)	Always	Below 1 Ω
A5-29 (RR-) - Body ground	Always	10 kΩ or higher

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-31 (RL+) - H12-2 (RL+)	Always	Below 1 Ω
A5-31 (RL+) - Body ground	Always	10 kΩ or higher
A5-18 (RL-) - H12-1 (RL-)	Always	Below 1 Ω
A5-18 (RL-) - Body ground	Always	10 kΩ or higher

**REPAIR OR REPLACE HARNESS OR
NG  CONNECTOR**

OK



7.	INSPECT BRAKE ACTUATOR ASSEMBLY (REAR SPEED SENSOR POWER SOURCE TERMINAL)
-----------	--

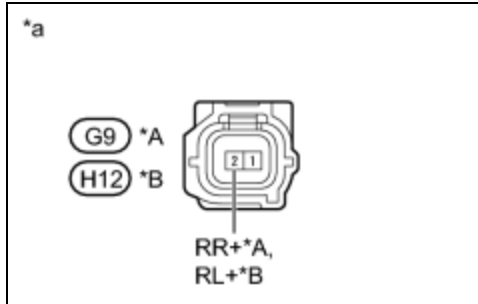
- (a) Reconnect the skid control ECU (brake actuator assembly) connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

for RH

for LH



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G9-2 (RR+) - Body ground	Ignition switch ON	8 to 14 V

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H12-2 (RL+) - Body ground	Ignition switch ON	8 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Rear Speed Sensor)

NG ▶ REPLACE BRAKE ACTUATOR ASSEMBLY

OK




8. RECONFIRM DTC

- (a) Reconnect the rear speed sensor connector.
- (b) Clear the DTCs INFO.
- (c) Turn the ignition switch off.
- (d) Start the engine.
- (e) Drive the vehicle at a speed of 45 km/h (28 mph) or more for at least 120 seconds.
- (f) Check if the same DTC is output INFO.

Result:

RESULT	PROCEED TO
DTCs C1332, C1333, C1466 and/or C1467 are output.	A



B ► CHECK FOR INTERMITTENT PROBLEMS**A****9. REPLACE REAR SPEED SENSOR**

- (a) Turn the ignition switch off.
- (b) Replace the rear speed sensor .

NOTICE:

Check the speed sensor signal after replacement .

NEXT**10. RECONFIRM DTC**


- (a) Clear the DTCs .
- (b) Turn the ignition switch off.
- (c) Start the engine.
- (d) Drive the vehicle at a speed of 45 km/h (28 mph) or more for at least 120 seconds.
- (e) Check if the same DTC is output .

Result:

RESULT	PROCEED TO
DTCs C1332, C1333, C1466 and/or C1467 are output.	A
DTCs C1332, C1333, C1466 and C1467 are not output.	B

B ► END**A**

11. REPLACE REAR SPEED SENSOR ROTOR

- (a) Turn the ignition switch off.
- (b) Replace the rear speed sensor rotor  .

HINT:

If the rear speed sensor rotor needs to be replaced, replace the rear axle hub and bearing assembly.



NOTICE:

Check the speed sensor signal after replacement  .

NEXT



12. RECONFIRM DTC

- (a) Clear the DTCs  .
- (b) Turn the ignition switch off.
- (c) Start the engine.
- (d) Drive the vehicle at a speed of 45 km/h (28 mph) or more for at least 120 seconds.
- (e) Check if the same DTC is output  .

Result:

RESULT	PROCEED TO
DTCs C1332, C1333, C1466 and/or C1467 are output.	A
DTCs C1332, C1333, C1466 and C1467 are not output.	B

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

B  END

A  REPLACE BRAKE ACTUATOR ASSEMBLY



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000027RM01HX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: C1288: Error in Matching of ECUs (2013 FR-S)		

DTC	C1288	Error in Matching of ECUs
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DESCRIPTION

The skid control ECU stores this DTC when the previously learned values in the VSC system and the engine information sent from the ECM are inconsistent, or when the learning has not completed after the skid control ECU (brake actuator assembly) is replaced with a new one.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C1288	ECM does not match.	ECM

INSPECTION PROCEDURE

PROCEDURE

1.	CHECK CAN COMMUNICATION SYSTEM
-----------	---------------------------------------

(a) Check if a CAN communication system DTC is output  .

Result:

RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B

B  **INSPECT CAN COMMUNICATION SYSTEM**

A



2.	RECONFIRM DTC
-----------	----------------------

(a) Turn the ignition switch off.

(b) Clear the DTCs  .

(c) Turn the ignition switch off.

(d) Start the engine.

(e) Check if the same DTC is output **INFO** .

Result:

RESULT	PROCEED TO
DTC C1288 is not output.	A
DTC C1288 is output.	B

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts **INFO** .

B ▶ REPLACE ECM

A ▶ END



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000X1107ZX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: C1294: ECT System Malfunction (2013 FR-S)		

DTC	C1294	ECT System Malfunction
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DESCRIPTION

If a malfunction in the automatic transmission system is detected, the operation of VSC and TR(A)C is prohibited by the fail-safe function. When the signals from the automatic transmission are received normally, fail-safe control is canceled.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C1201	Automatic transmission system malfunction signal continues for 0.5 seconds.	Automatic transmission system

INSPECTION PROCEDURE

PROCEDURE

1.	CHECK AUTOMATIC TRANSMISSION SYSTEM
-----------	--

(a) Check if the automatic transmission system DTC is output  .

Result:

RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

B ▶ **INSPECT AUTOMATIC TRANSMISSION SYSTEM**

A ▶ **REPLACE TCM**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001JHK02TX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: C1300: Skid Control ECU Malfunction (2013 FR-S)		

DTC	C1300	Skid Control ECU Malfunction
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DESCRIPTION

The skid control ECU stores this DTC if malfunctions are found in the circuit inside the ECU by self diagnosis.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C1300	Internal failure of the skid control ECU.	Skid control ECU (Brake actuator assembly)


INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization  .

PROCEDURE

1.	REPLACE BRAKE ACTUATOR ASSEMBLY
-----------	--

(a) Replace the skid control ECU (brake actuator assembly)  .

HINT:

This DTC is output when the skid control ECU (brake actuator assembly) detects a malfunction in the internal circuit.

(b) Perform the sensor check using the Test Mode procedure  .

NEXT  **END**

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003U2400AX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: CALIBRATION (2013 FR-S)		

CALIBRATION

1. DESCRIPTION

- (a) Refer to the table below and then perform the necessary operation according to the part to be replaced in order to perform calibration.

PARTS TO BE REPLACED	NECESSARY OPERATION
Skid control ECU (Brake actuator assembly)	1. Perform VSC sensor neutral memorization
Steering sensor	
Steering column assembly	
Rack and pinion power steering gear assembly	
Wheel alignment adjustment	

2. VSC SENSOR NEUTRAL MEMORIZATION

- (a) Perform VSC Sensor Neutral Memorization.

NOTICE:

- While obtaining the zero point, keep the vehicle stationary and do not vibrate, tilt, move, or shake it. (Do not start the engine.)
- Be sure to perform this procedure on a level surface (with an inclination of less than 1 degree).

HINT:

When VSC sensor neutral memorization is performed, the yaw rate and acceleration sensor and the steering sensor zero point calibration are performed at the same time.

- (1) Turn the ignition switch off.
- (2) Check that the steering wheel is centered.
- (3) Check that the shift lever is in neutral.
- (4) Apply the parking brake by pulling up the parking brake lever.
- (5) Connect the Techstream to the DLC3.
- (6) Turn the ignition switch on.
- (7) Turn the Techstream on.
- (8) Enter the following menus: Chassis / ABS/VSC/TRAC / Utility / VSC Sensor Neutral Memorization.
- (9) According to the display on the Techstream, perform VSC sensor neutral memorization.
- (10) Turn the ignition switch off and disconnect the Techstream.

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XHS0C2X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: CHECK FOR INTERMITTENT PROBLEMS (2013 FR-S)		

CHECK FOR INTERMITTENT PROBLEMS

1. CHECK FOR INTERMITTENT PROBLEMS

HINT:

A momentary interruption (open circuit) in the connectors and/or wire harness can be detected using the Data List function of the Techstream.

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Follow the directions on the Techstream to display the Data List and select areas where momentary interruption should be monitored.

HINT:

- A momentary interruption (open circuit) cannot be detected for 3 seconds after the ignition switch is turned to ON (initial check).
- If Error remains displayed for one of the items on the Techstream, check for continuity between the ECU and the item for which Error is displayed.
- If a momentary interruption occurs and Error is displayed on the Techstream, Error will remain displayed on the Techstream for 1 second after the circuit returns to normal.

ABS/VSC/TRAC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
IG Voltage Value Decreased	IG voltage value decrease detection / Error or Normal	Error: Voltage low Normal: Normal	-
IG Voltage Value Increased	IG voltage value increase detection / Error or Normal	Error: Voltage high Normal: Normal	-

- (f) While observing the screen, gently jiggle the connector or wire harness.

OK:

Normal is displayed.

HINT:

If the display changes, this indicates that there has been a momentary interruption (open circuit) in the connector and/or wire harness. In this case, repair or replace the connectors and/or wire harnesses as one of them is faulty.



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XHWOBIX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch to ON.
- (e) Turn the Techstream on.
- (f) Enter the following menus: Chassis / ABS/VSC/TRAC / Data List.
- (g) According to the display on the tester, read the Data List.

ABS/VSC/TRAC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
ABS Warning Light	ABS warning light / ON or OFF	ON: Warning light on OFF: Warning light off	-
Brake Warning Light	Brake warning light / ON or OFF	ON: Warning light on OFF: Warning light off	-
Stop Light SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
Parking Brake SW	Parking brake switch / ON or OFF	ON: Parking brake applied OFF: Parking brake released	-
Gear Position*	Gear position information / "P,N", R, 1st-6th or Fail	Actual gear position	-

Shift Lever Position*	Shift lever position information / "P,N", R, D/M or Fail	Actual shift lever position	-
Shift Information*	Shift information / ON or OFF	ON: During gear change	-
Inspection Mode	Inspection mode / Other or Inspect	Other: Normal mode Inspect: Inspection mode	-
Number of IG ON(Inspection)	Number of times ignition switch turned to ON after entering inspection mode / Min.: 0, Max.: 255	-	-
Master Cylinder Sensor	Master cylinder pressure sensor reading / Min.: 0.00 V, Max.: 5.00 V	Brake pedal released: 0.20 to 0.40 V	Reading increases when brake pedal is depressed
Deceleration Sensor	Acceleration sensor reading / Min.: -18.30 m/s ² , Max.: 18.21 m/s ²	-	During deceleration/acceleration: Changes continuously
Deceleration Sensor2	Acceleration sensor 2 reading / Min.: -18.30 m/s ² , Max.: 18.21 m/s ²	-	During deceleration/acceleration: Changes continuously
Yaw Rate Sensor	Yaw rate sensor / Min.: -128 °/s, Max.: 127 °/s	Vehicle stopped: 0 °/s Turning right: -128 to 0 °/s Turning left: 0 to 127 °/s	-
Steering Angle Sensor	Steering angle sensor / Min.: -3276.8°, Max.: 3276.7°	Turning left: Increases Turning right: Decreases	-
Lateral G	Lateral G / Min.: -25.10 m/s ² , Max.: 24.90 m/s ²	-	During turning: Changes in proportion with acceleration
Forward and Rearward G	Forward and backward G / Min.: -25.10 m/s ² , Max.: 24.90 m/s ²	-	During acceleration/deceleration: Changes in proportion with acceleration
Yaw Rate Value	Yaw rate value / Min.: -128 °/s, Max.: 127 °/s	-	During turning: Changes in proportion with yaw
Steering Angle Value	Steering angle value / Min.: -3276.8°, Max.: 3276.7°	-	During steering operation: Changes in proportion with steering wheel rotation
Slip Indicator Light	Slip indicator light / ON or OFF	ON: Indicator light on OFF: Indicator light off	-

FR Wheel Speed	Front wheel speed sensor RH reading / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
FL Wheel Speed	Front wheel speed sensor LH reading / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
RR Wheel Speed	Rear wheel speed sensor RH reading / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
RL Wheel Speed	Rear wheel speed sensor LH reading / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
Vehicle Speed	Maximum wheel speed sensor reading / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
FR Wheel Acceleration	Front wheel RH acceleration / Min.: -200.84 m/s ² , Max.: 199.27 m/s ²	-	During deceleration/acceleration: Changes continuously
FL Wheel Acceleration	Front wheel LH acceleration / Min.: -200.84 m/s ² , Max.: 199.27 m/s ²	-	During deceleration/acceleration: Changes continuously
RR Wheel Acceleration	Rear wheel RH acceleration / Min.: -200.84 m/s ² , Max.: 199.27 m/s ²	-	During deceleration/acceleration: Changes continuously
RL Wheel Acceleration	Rear wheel LH acceleration / Min.: -200.84 m/s ² , Max.: 199.27 m/s ²	-	During deceleration/acceleration: Changes continuously
FR Wheel ABS Ctrl Status	Front wheel RH ABS control status / ON or OFF	ON: During control	-
FL Wheel ABS Ctrl Status	Front wheel LH ABS control status / ON or OFF	ON: During control	-
RR Wheel ABS Ctrl Status	Rear wheel RH ABS control status / ON or OFF	ON: During control	-
RL Wheel ABS Ctrl Status	Rear wheel LH ABS control status / ON or OFF	ON: During control	-
FR Wheel EBD Ctrl Status	Front wheel RH EBD control status / ON or OFF	ON: During control	-
FL Wheel EBD Ctrl Status	Front wheel LH EBD control status / ON or OFF	ON: During control	-
RR Wheel EBD Ctrl Status	Rear wheel RH EBD control status / ON or OFF	ON: During control	-
RL Wheel EBD Ctrl Status	Rear wheel LH EBD control status / ON or OFF	ON: During control	-
TRC(TRAC) Ctrl Status	TR(A)C control status / ON or OFF	ON: During control	-
TRC(TRAC)			

Engine Ctrl Status	TR(A)C engine control status / ON or OFF	ON: During control	-
TRC(TRAC) Brake Ctrl Status	TR(A)C brake control status / ON or OFF	ON: During control	-
FR Wheel VSC Ctrl Status	Front wheel RH VSC control status / ON or OFF	ON: During control	-
FL Wheel VSC Ctrl Status	Front wheel LH VSC control status / ON or OFF	ON: During control	-
RR Wheel VSC Ctrl Status	Rear wheel RH VSC control status / ON or OFF	ON: During control	-
RL Wheel VSC Ctrl Status	Rear wheel LH VSC control status / ON or OFF	ON: During control	-
Engine Revolutions	Engine speed / Min.: 0 rpm, Max.: 65535 rpm	Engine stopped: 0 rpm	When engine speed is constant: No large fluctuations
Real Engine Torque	Real engine torque / Min.: -1024.0 Nm, Max.: 1023.0 Nm	-	-
Accelerator Opening Angle %	Percentage of accelerator pedal opening angle / Min.: 0.0%, Max.: 100.0%	When the accelerator pedal is released: 0.0%	During accelerator pedal operation: Changes in proportion with the pedal movement
Solenoid Relay	ABS solenoid relay / ON or OFF	ON: Solenoid relay on OFF: Solenoid relay off	-
ECB Motor Relay	ABS motor relay / ON or OFF	ON: Motor relay on OFF: Motor relay off	-
TRC(TRAC)/VSC Solenoid (SRM2)	Master cut solenoid (SRM2) / ON or OFF	ON: Operating	-
TRC(TRAC)/VSC Solenoid (SRM1)	Master cut solenoid (SRM1) / ON or OFF	ON: Operating	-
TRC(TRAC)/VSC Solenoid (SRC2)	Master cut solenoid (SRC2) / ON or OFF	ON: Operating	-
TRC(TRAC)/VSC Solenoid (SRC1)	Master cut solenoid (SRC1) / ON or OFF	ON: Operating	-
ABS Solenoid (SFRH)	ABS solenoid (SFRH) / ON or OFF	ON: Operating	-
ABS Solenoid (SFRR)	ABS solenoid (SFRR) / ON or OFF	ON: Operating	-
ABS Solenoid			

(SFLH)	ABS solenoid (SFLH) / ON or OFF	ON: Operating	-
ABS Solenoid (SFLR)	ABS solenoid (SFLR) / ON or OFF	ON: Operating	-
ABS Solenoid (SRRH)	ABS solenoid (SRRH) / ON or OFF	ON: Operating	-
ABS Solenoid (SRRR)	ABS solenoid (SRRR) / ON or OFF	ON: Operating	-
ABS Solenoid (SRLH)	ABS solenoid (SRLH) / ON or OFF	ON: Operating	-
ABS Solenoid (SRLR)	ABS solenoid (SRLR) / ON or OFF	ON: Operating	-
IG1 Voltage Value	IG1 voltage value / Min.: 0.00 V, Max.: 20.00 V	-	Changes in proportion to battery voltage
MT Voltage Value	Motor voltage value / Min.: 0.00 V, Max.: 20.00 V	-	Changes in proportion to battery voltage
TRC(TRAC)/VSC Off Mode	TR(A)C/VSC OFF mode / Normal, TRC(TRAC) OFF or VSC OFF	Normal: Normal mode TRC(TRAC) OFF: TR(A)C OFF mode VSC OFF: VSC OFF mode	-
Sports Mode	VSC SPORT mode / Normal or Sports	Normal: Normal mode Sports: VSC SPORT mode	-
Number of DTC	Number of DTC recorded / Min.: 0, Max.: 255	-	-
IG Voltage Value Decreased	IG voltage value decrease detection / Error or Normal	Error: Voltage low Normal: Normal	-
IG Voltage Value Increased	IG voltage value increase detection / Error or Normal	Error: Voltage high Normal: Normal	-

*: for Automatic Transmission

2. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts to operate without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.

- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch to ON.
- (e) Turn the Techstream on.
- (f) Enter the following menus: Chassis / ABS/VSC/TRAC / Active Test.
- (g) According to the display on the tester, perform the Active Test.

ABS/VSC/TRAC

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
ABS Warning Light	ABS warning light	Warning light ON/OFF	Observe combination meter assembly
VSC OFF Indicator Light	VSC OFF indicator light	Indicator light ON/OFF	Observe combination meter assembly
TRC(TRAC) OFF Indicator Light	TR(A)C OFF indicator light	Indicator light ON/OFF	Observe combination meter assembly
Brake Warning Light	Brake warning light	Warning light ON/OFF	Observe combination meter assembly
Slip Indicator Light	Slip indicator light	Indicator light ON/OFF	Observe combination meter assembly
Sports Mode Indicator Light	VSC SPORT indicator light	Indicator light ON/OFF	Observe combination meter assembly
Motor Relay	ABS motor relay	Relay ON/OFF	Operating sound of motor can be heard
ABS Solenoid (SRLR)	ABS solenoid (SRLR)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
ABS Solenoid (SRLH)	ABS solenoid (SRLH)	Solenoid ON/OFF	Operating sound of solenoid (clicking

			sound) can be heard
ABS Solenoid (SRRR)	ABS solenoid (SRRR)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
ABS Solenoid (SRRH)	ABS solenoid (SRRH)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
ABS Solenoid (SFLR)	ABS solenoid (SFLR)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
ABS Solenoid (SFLH)	ABS solenoid (SFLH)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
ABS Solenoid (SFRR)	ABS solenoid (SFRR)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
ABS Solenoid (SFRH)	ABS solenoid (SFRH)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
VSC/TRC(TRAC) Solenoid (SRMR)	Master cut solenoid (SRM2)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
VSC/TRC(TRAC) Solenoid (SRMF)	Master cut solenoid (SRM1)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard

VSC/TRC(TRAC) Solenoid (SRCR)	Master cut solenoid (SRC2)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
VSC/TRC(TRAC) Solenoid (SRCF)	Master cut solenoid (SRC1)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
ABS Solenoid	ABS solenoid (SRLR, SRLH, SRRR, SRRH, SFLR, SFLH, SFRR, SFRH)	Solenoid SRLR/SRLH/SRRR/SRRH/SFLR/SFLH/SFRR/SFRH	Operating sound of each solenoid (clicking sound) can be heard
VSC/TRC(TRAC) Solenoid	Master cut solenoid (SRMR, SRMF, SRCR, SRCF, SPFL, SPFR, SMR, SMF)	Solenoid SRMR/SRMF/SRCR/SRCF/SPFL/SPFR/SMR/SMF	Operating sound of each solenoid (clicking sound) can be heard

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XHP0DZX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: DIAGNOSIS SYSTEM (2013 FR-S)		

DIAGNOSIS SYSTEM

1. DESCRIPTION

When troubleshooting a vehicle with a diagnosis system, the only difference from the usual troubleshooting procedure is connecting the Techstream to the vehicle and reading various data output from the skid control ECU.

The skid control ECU records DTCs when it detects a malfunction in itself or in its circuits.

To check for DTCs, connect the Techstream to the DLC3 on the vehicle. The Techstream can be used to clear the DTCs, activate various actuators, and check the Freeze Frame Data and Data List.

- (a) Check the battery voltage.

Standard Voltage:

11 to 14 V

If the voltage is below 11 V, recharge the battery before proceeding to the next step.

- (b) Check the DLC3  .

2. DIAGNOSIS

- (a) If the skid control ECU detects a malfunction, the ABS warning, brake warning, and/or slip indicator lights will come on in order to warn the driver.

- (b) The DTCs are simultaneously stored in memory.

The DTCs can be read by connecting the Techstream  .

- (c) This system has a Test Mode (signal check) function.

The DTCs can be read by connecting the Techstream  .

3. WARNING LIGHT AND INDICATOR LIGHT INITIAL CHECK

- (a) Release the parking brake.

NOTICE:

Before releasing the parking brake, move the shift lever to P (for automatic transmission) or set chocks to prevent the vehicle from rolling.

HINT:

When the parking brake is applied or the brake fluid level is low, the brake warning light comes on.

- (b) When the ignition switch is turned to ON, check that the ABS warning, brake warning, TR(A)C OFF indicator, VSC OFF indicator, VSC SPORT indicator and slip indicator lights all come on.

HINT:

- If the warning light and indicator light check result is not normal, proceed to troubleshooting for the ABS warning, brake warning, TR(A)C OFF indicator, VSC OFF indicator, VSC SPORT indicator and slip indicator light circuits.
- If any of the indicators remains on or does not come on, proceed to troubleshooting for the light circuits listed below.

TROUBLE AREA	SEE PROCEDURE
ABS warning light circuit (Remains on)	INFO
ABS warning light circuit (Does not come on)	INFO
Brake warning light circuit (Remains on)	INFO
Brake warning light circuit (Does not come on)	INFO
TR(A)C OFF indicator light circuit (Remains on)	INFO
TR(A)C OFF indicator light circuit (Does not come on)	INFO
VSC OFF indicator light circuit (Remains on)	INFO
VSC OFF indicator light circuit (Does not come on)	INFO
VSC SPORT indicator light circuit (Remains on)	INFO
VSC SPORT indicator light circuit (Does not come on)	INFO
Slip indicator light circuit (Remains on)	INFO
Slip indicator light circuit (Does not come on)	INFO

- (1) When the ignition switch is turned to ON, check that the brake warning, TR(A)C OFF indicator, VSC OFF indicator and VSC SPORT indicator lights turn off after 3 seconds.
- (2) When the engine is started, check that the ABS warning and slip indicator lights turn off after 3 seconds.



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Model Year: 2013	Model: FR-S	Doc ID: RM000001NJG01RX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: DIAGNOSTIC TROUBLE CODE CHART (2013 FR-S)		

DIAGNOSTIC TROUBLE CODE CHART

NOTICE:

Turn the ignition switch off before removing any parts.

HINT:

- If no malfunction is found when inspecting parts, inspect the skid control ECU and ground points for poor connections.
- If a trouble code is displayed during the DTC check, inspect the trouble areas listed for that code. For details, refer to the "See page" reference for the DTC.
- When 2 or more DTCs are detected, perform diagnosis for each DTC, one by one until the problem is identified.
- If DTCs were checked using the warning light or indicator light, refer to the tables in DTC Check/Clear to cross-reference them to the 5-digit DTCs shown in the following tables.
- Inspect the fuses and relays before inspecting the trouble areas shown in the following table.

VSC System

DTC CODE	DETECTION ITEM	SEE PAGE
C1201	Engine Control System Malfunction	INFO
C1225	SA1 Solenoid Circuit	INFO
C1226	SA2 Solenoid Circuit	INFO
C1227	SA3 Solenoid Circuit	INFO
C1228	STR Solenoid Circuit	INFO
C1231	Steering Angle Sensor	INFO
C1234	Yaw Rate Sensor	INFO
C1237	Speed Sensor Rotor Faulty	INFO
C1241	Low or High Power Supply Voltage	INFO
C1246*2	Master Cylinder Pressure Sensor Malfunction	INFO
C1249	Open in Stop Light Switch Circuit	INFO
C1288	Error in Matching of ECUs	INFO
C1294	ECT System Malfunction	INFO
C1300	Skid Control ECU Malfunction	INFO
C1330	Open in Front Speed Sensor RH	INFO
C1331	Open in Front Speed Sensor LH	INFO
C1332	Open in Rear Speed Sensor RH	INFO
C1333	Open in Rear Speed Sensor LH	INFO

C1419	Acceleration Sensor Internal Circuit	INFO
C1464*1	Front Speed Sensor RH	INFO
C1465*1	Front Speed Sensor LH	INFO
C1466*1	Rear Speed Sensor RH	INFO
C1467*1	Rear Speed Sensor LH	INFO
C1468	SFR Solenoid Circuit	INFO
C1469	SFL Solenoid Circuit	INFO
C146A	SRR Solenoid Circuit	INFO
C146B	SRL Solenoid Circuit	INFO
C146C*1	Open in ABS Motor Relay Circuit	INFO
C146E	Open in ABS Solenoid Relay Circuit	INFO
C1472	Acceleration Sensor	INFO
C1474	Forward and Rearward G Sensor	INFO
U0073	Control Module Communication Bus "A" Off	INFO
U0100	Lost Communication with ECM / PCM "A"	INFO
U0101	Lost Communication with TCM	INFO
U0126	Lost Communication with Steering Angle Sensor Module	INFO

*1, *2:

Even after the trouble areas are repaired, the ABS warning light will not go off unless the following operations are performed:

- *1:
 - a. Drive the vehicle at 20 km/h (12 mph) for 30 seconds or more and check that the ABS warning light goes off.
 - b. Clear the DTC.
- *2:
 - a. Keep the vehicle stationary for 5 seconds or more and depress the brake pedal lightly 2 or 3 times.
 - b. Drive the vehicle at a vehicle speed of 50 km/h (31 mph) and keep depressing the brake pedal strongly for approximately 3 seconds.
 - c. Repeat the above operation 3 times or more and check that the ABS warning light goes off.
 - d. Clear the DTC.

ABS Test Mode DTC

DTC CODE	DETECTION ITEM	SEE PAGE
C1271	Low Output Signal of Front Speed Sensor RH (Test Mode DTC)	INFO
C1272	Low Output Signal of Front Speed Sensor LH (Test Mode DTC)	INFO
C1273	Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)	INFO


C1274	Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)	INFO
C1275	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)	INFO
C1276	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)	INFO
C1277	Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)	INFO
C1278	Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)	INFO

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Model Year: 2013	Model: FR-S	Doc ID: RM000000XHVOEHX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: DTC CHECK / CLEAR (2013 FR-S)		

DTC CHECK / CLEAR

1. DTC CHECK/CLEAR

(a) Check for DTCs.

- (1) Turn the ignition switch off.
- (2) Connect the Techstream to the DLC3.
- (3) Turn the ignition switch to ON.
- (4) Turn the Techstream on.
- (5) Read the DTCs following the prompts on the Techstream. Enter the following menus: Chassis / ABS/VSC/TRAC / Trouble Codes.
- (6) Check the details of the DTCs  .

(b) Clear the DTCs.

- (1) Turn the ignition switch off.
- (2) Connect the Techstream to the DLC3.
- (3) Turn the ignition switch to ON.
- (4) Turn the Techstream on.
- (5) Operate the Techstream to clear the codes. Enter the following menus: Chassis / ABS/VSC/TRAC / Trouble Codes.

2. END OF DTC CHECK/CLEAR

(a) Turn the ignition switch to ON.

(b) Check that the ABS warning and slip indicator lights go off within approximately 3 seconds after turning the ignition switch to ON.


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Model Year: 2013	Model: FR-S	Doc ID: RM000000XHX0A7X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: FAIL-SAFE CHART (2013 FR-S)		

FAIL-SAFE CHART


1. FAIL-SAFE OPERATION

- If there is a problem with sensor signals or actuator systems, the skid control ECU prohibits power supply to the brake actuator assembly and informs the ECM of VSC system malfunction.

The brake actuator turns off the solenoids and the ECM stops its VSC control according to signals from the skid control ECU. The vehicle will operate in a manner similar to a vehicle that is not equipped with ABS, TR(A)C and VSC systems.

ABS control will be prohibited, but EBD control will continue to the extent that EBD control is possible. If EBD control is impossible, the brake warning light will come on to warn the driver  .

- If a VSC system component malfunctions before VSC control begins, VSC control will be prohibited. If a system component malfunctions during VSC control, the system will gradually stop performing control so as not to trigger a sudden change in vehicle operation.

If it is impossible for control to continue, the indicator light comes on to inform the driver of system control termination  .

ABS, EBD and BA System

ITEM	OPERATION
Malfunction in the ABS system.	ABS, BA, TR(A)C and VSC control prohibited.
Malfunction in the BA system.	ABS, BA, TR(A)C and VSC control prohibited.
Malfunction in the EBD system.	ABS, EBD, BA, TR(A)C and VSC control prohibited.

TR(A)C and VSC System

ITEM	OPERATION
Malfunction in the engine control system (TR(A)C and VSC systems).	Before control: Disables control. During control: Uses only the brakes to perform control.
Malfunction in the automatic transmission control system (TR(A)C and VSC systems).	Disables control.
Malfunction in the brake control system (VSC system).	Disables control.
Malfunction in the brake control system (TR(A)C system).	Before control: Disables control. During control: Disables control (by gradually ending control).



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Model Year: 2013	Model: FR-S	Doc ID: RM000000XHY0FHX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: FREEZE FRAME DATA (2013 FR-S)		

FREEZE FRAME DATA

1. FREEZE FRAME DATA

- (a) Whenever an ABS DTC is detected, the skid control ECU stores the current vehicle (ECU or sensor) state as Freeze Frame Data.
- (b) The skid control ECU stores the number of times (maximum: 31) the ignition switch has been turned from off to ON since the last time the ABS was activated.

HINT:

- However, if the vehicle is stopped or driven at a low speed (7 km/h (4.3 mph) or less), or if a DTC is detected, the skid control ECU will stop counting the number.
- Freeze Frame Data at the time the ABS operates:

The skid control ECU stores and updates data whenever the ABS system operates.

When the ECU stores data at the time a DTC is detected, the data stored during ABS operation is cleared.

- Freeze Frame Data at the time a DTC is detected:

When the skid control ECU stores data at the time a DTC is detected, no updates will be performed until the data is cleared.

2. CHECK FREEZE FRAME DATA

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Chassis / ABS/VSC/ TRAC / Trouble Codes.
- (f) Select a DTC to display its Freeze Frame Data.

ABS/VSC/TRAC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Elapsed Time after Freeze Trigger	Elapsed time after freeze trigger / Min.: 0 msec, Max.: 510 msec	-	-
Number of IG ON	Number of times ignition switch turned to ON after Freeze Frame Data stored / 0 to 31	-	-
Stop Light SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

Parking Brake SW	Parking brake switch / ON or OFF	ON: Parking brake applied OFF: Parking brake released	-
Gear Position*	Gear position information / "P,N", R, 1st-6th or Fail	Actual gear position	-
Shift Lever Position*	Shift lever position information / "P,N", R, D/M or Fail	Actual shift lever position	-
Operated System	Operated system status / ABS, VSC, TRC(TRAC), BA or Fail	Actual operated system	ABS: ABS activated VSC: VSC activated TRC(TRAC): TR(A)C activated BA: BA activated Fail: Fail safe mode activated
Master Cylinder Sensor	Master cylinder pressure sensor reading / Min.: 0.00 V, Max.: 5.00 V	Brake pedal released: 0.20 to 0.40 V	Reading increases when brake pedal is depressed
M/C Sensor Grade	Master cylinder pressure sensor change / Min.: -30 MPa/s, Max.: 225 MPa/s	When brake pedal is released or pedal held at constant position: 0 MPa/s	When brake pedal is being operated: Changes in proportion with pedal movement speed
Yaw Rate Sensor	Yaw rate sensor / Min.: -128 °/s, Max.: 127 °/s	Vehicle stopped: 0 °/s Turning right: -128 to 0 °/s Turning left: 0 to 127 °/s	-
Lateral G	Lateral G / Min.: -25.10 m/s ² , Max.: 24.90 m/s ²	-	During turning: Changes in proportion with acceleration
Forward and Rearward G	Forward and backward G / Min.: - 25.10 m/s ² , Max.: 24.90 m/s ²	-	During acceleration/deceleration: Changes in proportion with acceleration
FR Wheel Speed	Front wheel speed sensor RH reading / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
FL Wheel Speed	Front wheel speed sensor LH reading / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
RR Wheel Speed	Rear wheel speed sensor RH reading / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
RL Wheel Speed	Rear wheel speed sensor LH reading / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations


Vehicle Speed	Maximum wheel speed sensor reading / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
Vehicle Speed Grade	Vehicle speed grade / Min.: - 25.10 m/s ² , Max.: 24.90 m/s ²	Vehicle stopped: 0 m/s ²	During driving: Changes in proportion with vehicle acceleration/deceleration
Real Engine Torque	Real engine torque / Min.: - 1024.0 Nm, Max.: 1023.0 Nm	-	-
Accelerator Opening Angle %	The difference of a present accelerator / Min.: 0.0%, Max.: 100.0%	When the accelerator pedal is released: 0.0%	During accelerator pedal operation: Changes in proportion with the pedal movement
Inspection Mode	Inspection mode / Other or Inspect	Other: Normal mode Inspect: Inspection mode	-
Steering Angle Sensor	Steering angle sensor / Min.: - 3276.8°, Max.: 3276.7°	Turning left: Increases Turning right: Decreases	-
TRC(TRAC)/VSC Off Mode	TR(A)C/VSC OFF mode / Normal, TRC(TRAC) OFF or VSC OFF	Normal: Normal mode TRC(TRAC) OFF: TR(A)C OFF mode VSC OFF: VSC OFF mode	-
Sports Mode	VSC SPORT mode / Normal or Sports	Normal: Normal mode Sports: VSC SPORT mode	-

*: for Automatic Transmission

3. CLEAR FREEZE FRAME DATA

NOTICE:

Clearing the DTC will also clear the Freeze Frame Data.

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Clear the DTCs and Freeze Frame Data  .



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Model Year: 2013	Model: FR-S	Doc ID: RM000000XHK0F2X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

*: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
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NEXT



2.	CUSTOMER PROBLEM ANALYSIS
-----------	----------------------------------

(a) Interview the customer and confirm the trouble INFO.

NEXT



3.	CHECK DTC AND FREEZE FRAME DATA*
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(a) Check and record DTCs and Freeze Frame Data.

(b) Clear the DTCs and Freeze Frame Data INFO for DTC Check/Clear, and INFO for Freeze Frame Data).

(c) Reconfirm the DTCs.

(1) Reconfirm the DTCs based on the recorded DTCs and Freeze Frame Data INFO for DTC Check/Clear, and INFO for Freeze Frame Data).

HINT:

- When DTCs indicating CAN communication system malfunctions are output, repair the CAN communication system first INFO.
- If the Techstream cannot communicate with the skid control ECU, inspect the CAN communication system INFO.
- If there is no response from the skid control ECU, inspect the power source circuit of the skid control ECU INFO.

Result:

RESULT	PROCEED TO
DTC is output.	A
DTC is not output. (Problem symptom does not occur.)	B
DTC is not output. (Problem symptom occurs.)	C

B ▶ Go to step 5

C ▶ Go to step 6

A



4.	DIAGNOSTIC TROUBLE CODE CHART
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(a) Proceed to Diagnostic Trouble Code Chart [INFO](#) .

NEXT ▶ Go to step 7

5.	SYMPTOM SIMULATION
-----------	---------------------------

(a) Proceed to How to Proceed with Troubleshooting [INFO](#) .

NEXT



6.	PROBLEM SYMPTOMS TABLE
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(a) Proceed to Problem Symptoms Table [INFO](#) .

NEXT



7.	CIRCUIT INSPECTION*
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NEXT



8.	IDENTIFICATION OF PROBLEM
----	---------------------------

NEXT



9.	REPAIR OR REPLACEMENT
----	-----------------------

NEXT



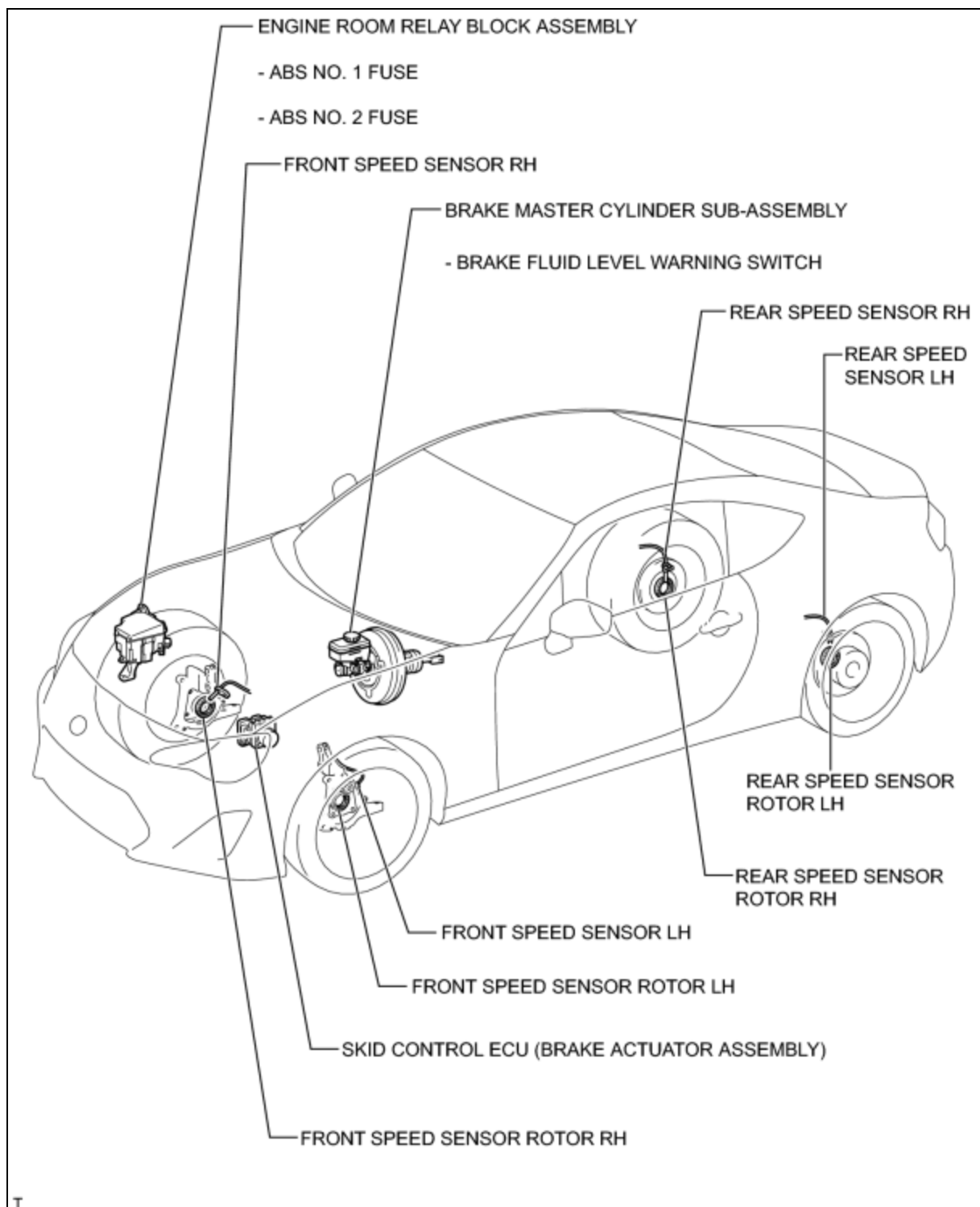
10.	CONFIRMATION TEST*
-----	--------------------

NEXT  **END**

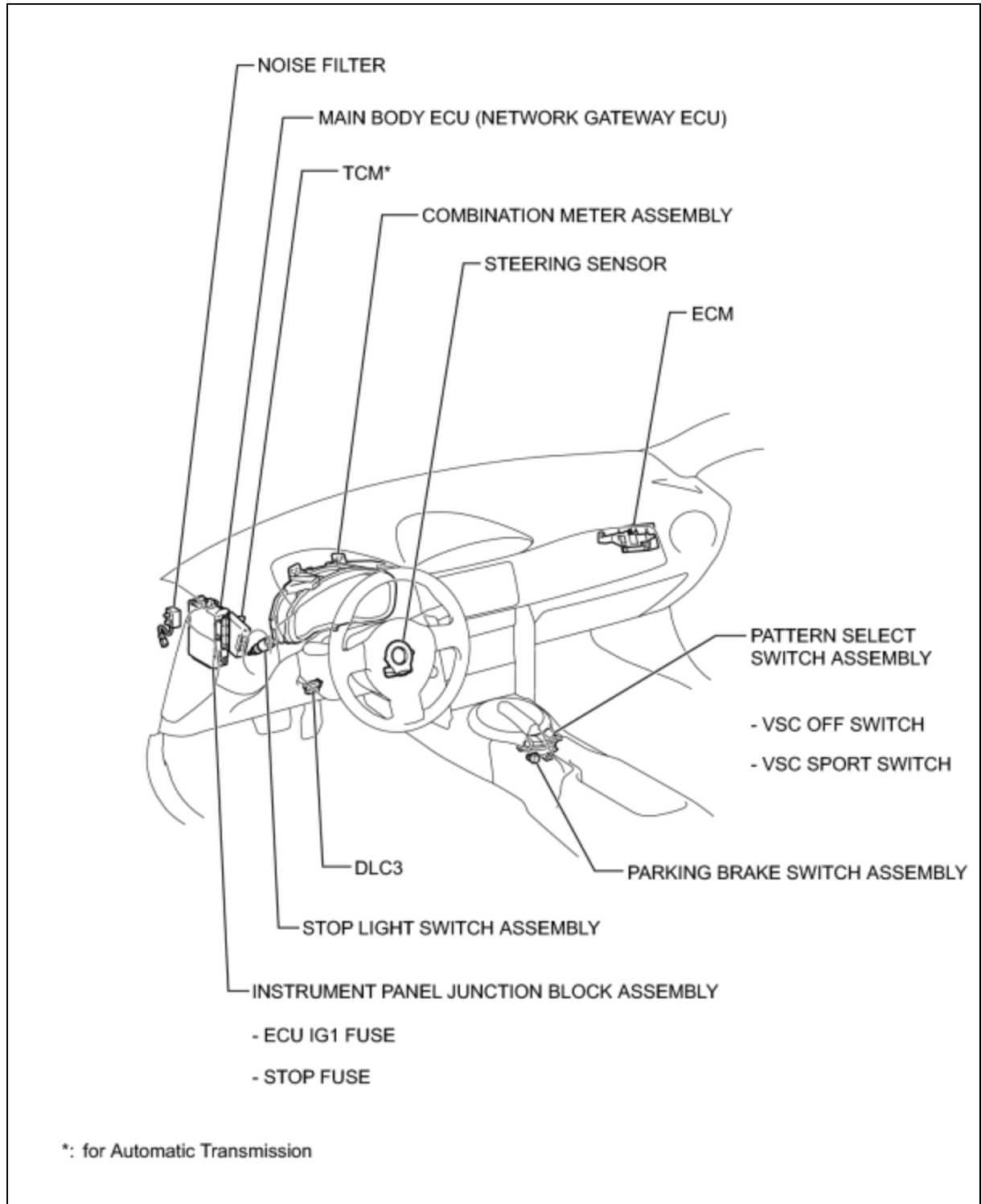
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001JB305LX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



ILLUSTRATION



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Model Year: 2013	Model: FR-S	Doc ID: RM000000XFTOCCX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

1. TROUBLESHOOTING PRECAUTIONS

- (a) When there is a malfunction with terminal contact points or part installation problems, removal and installation of the suspected parts may return the system to normal either completely or temporarily.
- (b) In order to determine the malfunctioning area, be sure to check the conditions at the time the malfunction occurred, such as DTC output and the Freeze Frame Data, and record it before disconnecting any connector or removing and installing parts.
- (c) Since the system may be influenced by malfunctions in systems other than the VSC system, be sure to check for DTCs in other systems.

2. HANDLING PRECAUTIONS

- (a) Do not remove or install VSC parts such as the steering sensor except when required, as they need to be adjusted correctly after removal and installation.
- (b) Be sure to perform preparation before work and confirmation after work is completed by following the directions in the repair manual when working on the VSC system.
- (c) Be sure to remove and install the ECU, brake actuator assembly, sensors, etc. with the ignition switch off unless it is otherwise specified in the inspection procedure.
- (d) If the ECU, brake actuator assembly or a sensor has been removed and installed, it is necessary to check the system for problems after the parts have been reassembled. Check for DTCs using the Techstream, also check that system functions and signals received by the ECU are normal using Test Mode.

3. DTC PRECAUTION

- (a) Warnings for some DTCs cannot be cleared only by repairing the malfunctioning parts. If the warning is displayed after repair work, the DTC should be cleared after turning the ignition switch off.

NOTICE:

If a DTC for a malfunctioning part reappears after it was cleared, then it has been stored again.

4. CHASSIS DYNAMOMETER PRECAUTION

When testing with a 2-wheel drum tester such as a speedometer tester, a combination tester for the speedometer and brakes, a chassis dynamometer, or when jacking up the front wheels and turning the wheels, perform the following procedure to enter Inspection Mode and stop the TR(A)C and VSC systems.

Enter Inspection Mode to disable TR(A)C and VSC operation when using a chassis dynamometer.

HINT:

- If Inspection Mode is not used, the vehicle may unexpectedly move off the dynamometer because of TR(A)C and VSC operation.
- The VSC OFF switch must not be used to disable TR(A)C and VSC operation when the vehicle is to be operated on a dynamometer. Pressing the VSC OFF switch does not disable TR(A)C and VSC operation completely.

NOTICE:

Secure the vehicle with lock chains for safety.

- (a) Activating Inspection Mode (When Using the Techstream)
 - (1) Ensure that the ignition switch is off and the engine is stopped.
 - (2) Make sure that the shift lever is in P.
 - (3) Connect the Techstream to the DLC3.
 - (4) Start the engine.
 - (5) Turn the Techstream on.
 - (6) Enter the following menus: Chassis / ABS/VSC/TRAC / Utility / Inspection Mode.
 - (7) Check that the VSC OFF indicator light will come on.

HINT:

- If the VSC OFF indicator light does not come on, repeat the steps.
- Turning the ignition switch off ends Inspection Mode.

- (b) Activating Inspection Mode (When not Using the Techstream)

HINT:

Perform steps "C" to "H" within 30 seconds.

- (1) Ensure that the ignition switch is off and the engine is stopped (Step "A").
- (2) for Manual Transmission:
Check that the shift lever is in neutral (Step "B").
for Automatic Transmission:
Make sure that the shift lever is in P (Step "B").
- (3) Start the engine (Step "C").
- (4) Apply the parking brake by pulling up the parking brake lever (Step "D").
- (5) Depress and release the brake pedal twice (Step "E").
- (6) While holding the brake pedal down, release and apply the parking brake twice (Step "F").
- (7) With the parking brake applied, depress and release the brake pedal twice (Step "G").
- (8) Check if the slip indicator light will come on (Step "H").

HINT:

- If the slip indicator light does not come on in step "H", repeat steps "A" to "H".
- Turning the ignition switch off ends Inspection Mode.

5. CAN COMMUNICATION SYSTEM PRECAUTIONS

- (a) The CAN communication system is used for communication between the skid control ECU (brake actuator assembly), the steering sensor and other ECUs. If any CAN communication DTCs are detected, DTCs corresponding to the malfunction will be output.
- (b) If any CAN communication DTCs are output, repair the malfunction and troubleshoot the VSC system while communication is normal.
- (c) In order to enable CAN communication, a specific type of wiring is used for the CAN communication lines. The wiring used for each communication line is a twisted pair of wires that have an equal length. A bypass wire should not be used because the data being transmitted will be corrupted.



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Model Year: 2013	Model: FR-S	Doc ID: RM000000XHN0D7X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

If there are no DTCs output and the problem still occurs, check the suspected areas for each problem symptom in the order given in the following table and proceed to the relevant troubleshooting page.

NOTICE:

When replacing the brake actuator assembly, sensors, etc., turn the ignition switch off.

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Vehicle Stability Control System

SYMPTOM	SUSPECTED AREA	SEE PAGE
ABS, BA and/or EBD does not operate.	Check for DTCs again and make sure that DTCs are not output.	INFO
	Power source circuit	INFO
	Front speed sensor circuit	INFO
	Rear speed sensor circuit	INFO
	Check the brake actuator assembly using the Techstream. (Check brake actuator assembly operation using the Active Test function.) If abnormal, check the hydraulic circuit for leaks.	INFO
	If the symptoms still occur even after the above suspected areas have been inspected and proved to be normal, replace the skid control ECU (brake actuator assembly).	INFO
ABS, BA and/or EBD does not operate efficiently.	Check for DTCs again and make sure that DTCs are not output.	INFO
	Front speed sensor circuit	INFO
	Rear speed sensor circuit	INFO
	Stop light switch circuit	INFO
	Check the brake actuator assembly using the Techstream. (Check brake actuator assembly operation using the Active Test function.) If abnormal, check the hydraulic circuit for leaks.	INFO
	If the symptoms still occur even after the above suspected areas have been inspected and proved to be normal, replace the skid control ECU (brake actuator assembly).	INFO
	Check for DTCs again and make sure that DTCs are not output.	INFO
	Check CAN communication system.	INFO

ABS sensor DTC check cannot be done.		
	If the symptoms still occur even after the above suspected areas has been inspected and proved to be normal, replace the skid control ECU (brake actuator assembly).	INFO
ABS warning light abnormal (Remains on).	ABS warning light circuit	INFO
	Skid control ECU (Brake actuator assembly)	INFO
ABS warning light abnormal (Does not come on).	ABS warning light circuit	INFO
	Skid control ECU (Brake actuator assembly)	INFO
Brake warning light abnormal (Remains on).	Brake warning light circuit	INFO
	Skid control ECU (Brake actuator assembly)	INFO
Brake warning light abnormal (Does not come on).	Brake warning light circuit	INFO
	Skid control ECU (Brake actuator assembly)	INFO
VSC and/or TR(A)C does not operate.	Check for DTCs again and make sure that DTCs are not output.	INFO
	Check the engine control system.	INFO
	Check the automatic transmission control system.	INFO
	Power source circuit	INFO
	Check the hydraulic circuit for leaks.	-
	Front speed sensor circuit	INFO
	Rear speed sensor circuit	INFO
	Steering sensor circuit	INFO
	Replace the ECM.	INFO
	If the symptoms still occur even after the above suspected areas have been inspected and proved to be normal, replace the skid control ECU (brake actuator assembly).	INFO
VSC sensor DTC check cannot be done.	Check for DTCs again and make sure that DTCs are not output.	INFO
	Check CAN communication system.	INFO
	If the symptoms still occur even after the above suspected areas has been inspected and proved to be normal, replace the skid control ECU (brake actuator assembly).	INFO
TR(A)C OFF indicator light abnormal (Remains on).	TR(A)C OFF indicator light circuit	INFO
	Skid control ECU (Brake actuator assembly)	INFO
TR(A)C OFF indicator light abnormal (Does not come on).	TR(A)C OFF indicator light circuit	INFO
	Skid control ECU (Brake actuator assembly)	INFO
VSC OFF indicator light abnormal (Remains on).	VSC OFF indicator light circuit	INFO
	Skid control ECU (Brake actuator assembly)	INFO
VSC OFF indicator	VSC OFF indicator light circuit	INFO

light abnormal (Does not come on).	Skid control ECU (Brake actuator assembly)	INFO
VSC SPORT indicator light abnormal (Remains on).	VSC SPORT indicator light circuit	INFO
	Skid control ECU (Brake actuator assembly)	INFO
VSC SPORT indicator light abnormal (Does not come on).	VSC SPORT indicator light circuit	INFO
	Skid control ECU (Brake actuator assembly)	INFO
Slip indicator light abnormal (Remains on).	Slip indicator light circuit	INFO
	Skid control ECU (Brake actuator assembly)	INFO
Slip indicator light abnormal (Does not come on).	Slip indicator light circuit	INFO
	Skid control ECU (Brake actuator assembly)	INFO
Sensor check cannot be done.	Check CAN communication system.	INFO
	Skid control ECU (Brake actuator assembly)	INFO



Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000YHJOAIX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: Slip Indicator Light does not Come ON (2013 FR-S)		

[Slip Indicator Light does not Come ON](#)

DESCRIPTION

The skid control ECU (brake actuator assembly) is connected to the combination meter assembly via CAN communication.


INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization  .

PROCEDURE

1.	CHECK CAN COMMUNICATION SYSTEM
-----------	---------------------------------------

(a) Check if a CAN communication system DTC is output  .

Result:

RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B

B INSPECT CAN COMMUNICATION SYSTEM

A



2.	PERFORM ACTIVE TEST USING TECHSTREAM (SLIP INDICATOR LIGHT)
-----------	--

(a) Connect the Techstream to the DLC3.

(b) Start the engine.

(c) Select the Active Test using the Techstream  .

ABS/VSC/TRAC

--	--	--	--

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Slip Indicator Light	Slip indicator light	Indicator light ON/OFF	Observe combination meter assembly

(d) Check that the slip indicator light on the combination meter assembly turns on or off in accordance with the Techstream operation.

OK:

The slip indicator light turns on or off in accordance with the Active Test operation.

HINT:


If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

NG ► INSPECT COMBINATION METER ASSEMBLY

OK ► REPLACE BRAKE ACTUATOR ASSEMBLY

3.	INSPECT COMBINATION METER ASSEMBLY
-----------	---

(a) Turn the ignition switch off.

(b) Perform an Active Test of the combination meter assembly (meter CPU) using the Techstream  .

(c) Check the combination meter assembly.

OK:

The slip indicator light turns on or off in accordance with the Active Test operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

NG ► REPLACE COMBINATION METER ASSEMBLY

OK ► REPLACE BRAKE ACTUATOR ASSEMBLY

Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000YH10AIX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: Slip Indicator Light Remains ON (2013 FR-S)		

Slip Indicator Light Remains ON

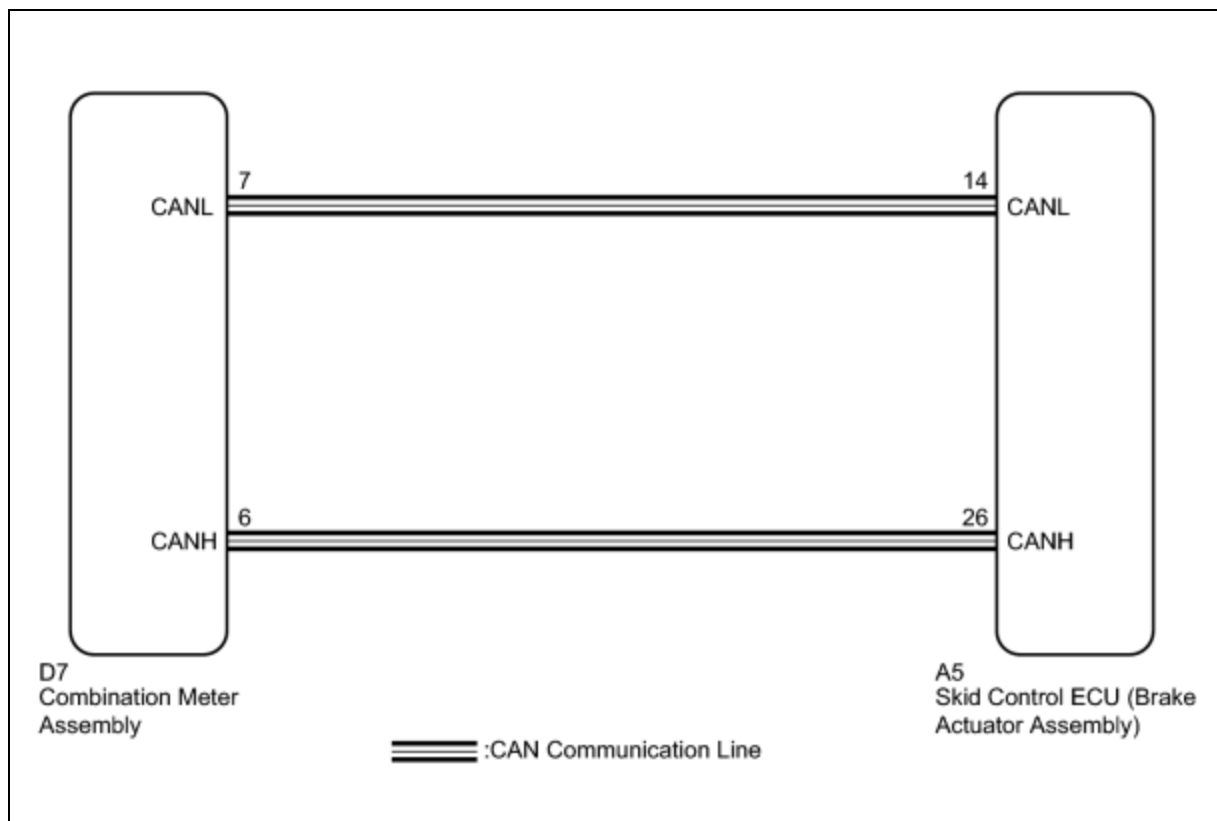
DESCRIPTION

The skid control ECU (brake actuator assembly) is connected to the combination meter assembly via CAN communication.

The slip indicator light blinks during VSC and/or TR(A)C operation.

If a malfunction is detected, the slip indicator light comes on to warn the driver INFO.

WIRING DIAGRAM

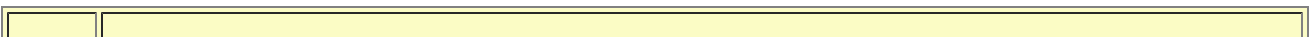


INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization INFO.

PROCEDURE



1. CHECK CAN COMMUNICATION SYSTEM

(a) Check if a CAN communication system DTC is output **INFO** .

Result:

RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B

B ▶ INSPECT CAN COMMUNICATION SYSTEM

A



2. CHECK IF BRAKE ACTUATOR ASSEMBLY CONNECTOR IS SECURELY CONNECTED

(a) Check if the skid control ECU (brake actuator assembly) connector is securely connected.

OK:

The connector is securely connected.

NG ▶ CONNECT CONNECTOR TO ECU CORRECTLY

OK



3. CHECK BATTERY

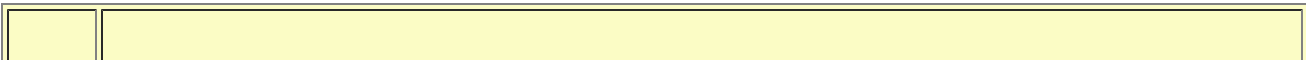
(a) Check the battery voltage.

Standard Voltage:


11 to 14 V

NG ▶ CHECK OR REPLACE CHARGING SYSTEM COMPONENT OR BATTERY

OK



4. INSPECT COMBINATION METER ASSEMBLY

(a) Perform an Active Test of the combination meter assembly (meter CPU) using the Techstream  .

(b) Check the combination meter assembly.

OK:

The slip indicator light turns on or off in accordance with the Active Test operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

NG  **REPLACE COMBINATION METER ASSEMBLY**

OK  **REPLACE BRAKE ACTUATOR ASSEMBLY**

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XHO09FX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

SYSTEM DESCRIPTION

1. FUNCTION DESCRIPTION

(a) Anti-lock Brake System (ABS)

- (1) Helps prevent the wheels from locking when the brakes are applied firmly or when braking on a slippery surface.

(b) Electronic Brake force Distribution (EBD)

- (1) EBD control utilizes ABS, realizing proper brake force distribution between the front and rear wheels in accordance with the driving conditions. In addition, during braking while cornering, it also controls the brake forces of the right and left wheels, helping maintain vehicle behavior.

(c) Brake Assist (BA)

- (1) The primary purpose of brake assist is to provide supplementary brake force to assist a driver who cannot generate a large brake force during emergency braking, thus helping ensure the vehicle's braking performance.

(d) Traction Control (TR(A)C)

- (1) Helps restrain the slippage of the drive wheels if the driver depresses the accelerator pedal excessively when starting off or accelerating on a slippery surface.

(e) Vehicle Stability Control (VSC)

- (1) Helps restrain sideways slippage of the vehicle during a strong understeer tendency or strong oversteer tendency while cornering.

2. FUNCTION OF COMPONENTS

COMPONENT		FUNCTION
Brake Actuator Assembly	Skid Control ECU	Judges the vehicle driving condition based on the signals from each sensor and switch, and sends the brake control signals to the brake actuator assembly.
	Master Cylinder Pressure Sensor	Detects the master cylinder pressure.
	Pump Motor	Drives the pumps inside the brake actuator assembly.
	Solenoid Valves	<ul style="list-style-type: none"> The hydraulic circuit has 2 master cylinder cut solenoid valves, 2 reservoir cut solenoid valves, 4 pressure holding solenoid valves and 4 pressure reduction solenoid valves. Change the fluid path based on the signals from the skid control ECU during the operation of the brake control system functions, in order to control the fluid pressure applied to the wheel cylinders.
	Yaw Rate and Acceleration	<ul style="list-style-type: none"> The yaw rate sensor detects the vehicle's yaw rate. The acceleration sensor detects the vehicle's longitudinal and

	Sensor	lateral acceleration.
Skid Control ECU	ABS Motor Relay	Supplies power to the pump motor.
	ABS Solenoid Relay	Supplies power to the solenoid valves.
Speed Sensor		Detect the wheel speed of each of the 4 wheels.
Pattern Select Switch Assembly	VSC OFF Switch	Enables the driver to select normal mode, TR(A)C OFF mode or VSC OFF mode.
	VSC SPORT Switch	Enables the driver to select normal mode or VSC SPORT mode.
Stop Light Switch Assembly		Detects the brake pedal depressing signal.
Main Body ECU (Network Gateway ECU)		Transmits the parking brake switch signal to the skid control ECU.
Parking Brake Switch Assembly		Detects the parking brake pedal status.
ECM		<ul style="list-style-type: none"> • Sends the accelerator pedal position signal, engine speed signal etc., to the skid control ECU. • Based on the signals from the skid control ECU, controls the engine output.
TCM*		Sends the gear position signal to the skid control ECU.
Steering Sensor		Detects the steering direction and angle of the steering wheel.
Combination Meter Assembly	ABS Warning Light	Illuminates to alert the driver when the skid control ECU detects a malfunction in the ABS.
	Brake Warning Light	<ul style="list-style-type: none"> • Illuminates to alert the driver when the skid control ECU detects a malfunction in the EBD or brake system. • Illuminates to alert the driver when the brake fluid level is low. • Illuminates to inform the driver when the parking brake is operated.
	TR(A)C OFF Indicator Light	Illuminates to inform the driver when TR(A)C OFF mode is selected.
	VSC OFF Indicator Light	Illuminates to inform the driver when VSC OFF mode or VSC SPORT mode is selected.
	VSC SPORT Indicator Light	Illuminates to inform the driver when VSC SPORT mode is selected.
	Slip Indicator Light	<ul style="list-style-type: none"> • Blinks to inform the driver when the TR(A)C or VSC is performing control. • Illuminates to alert the driver when the skid control ECU detects a

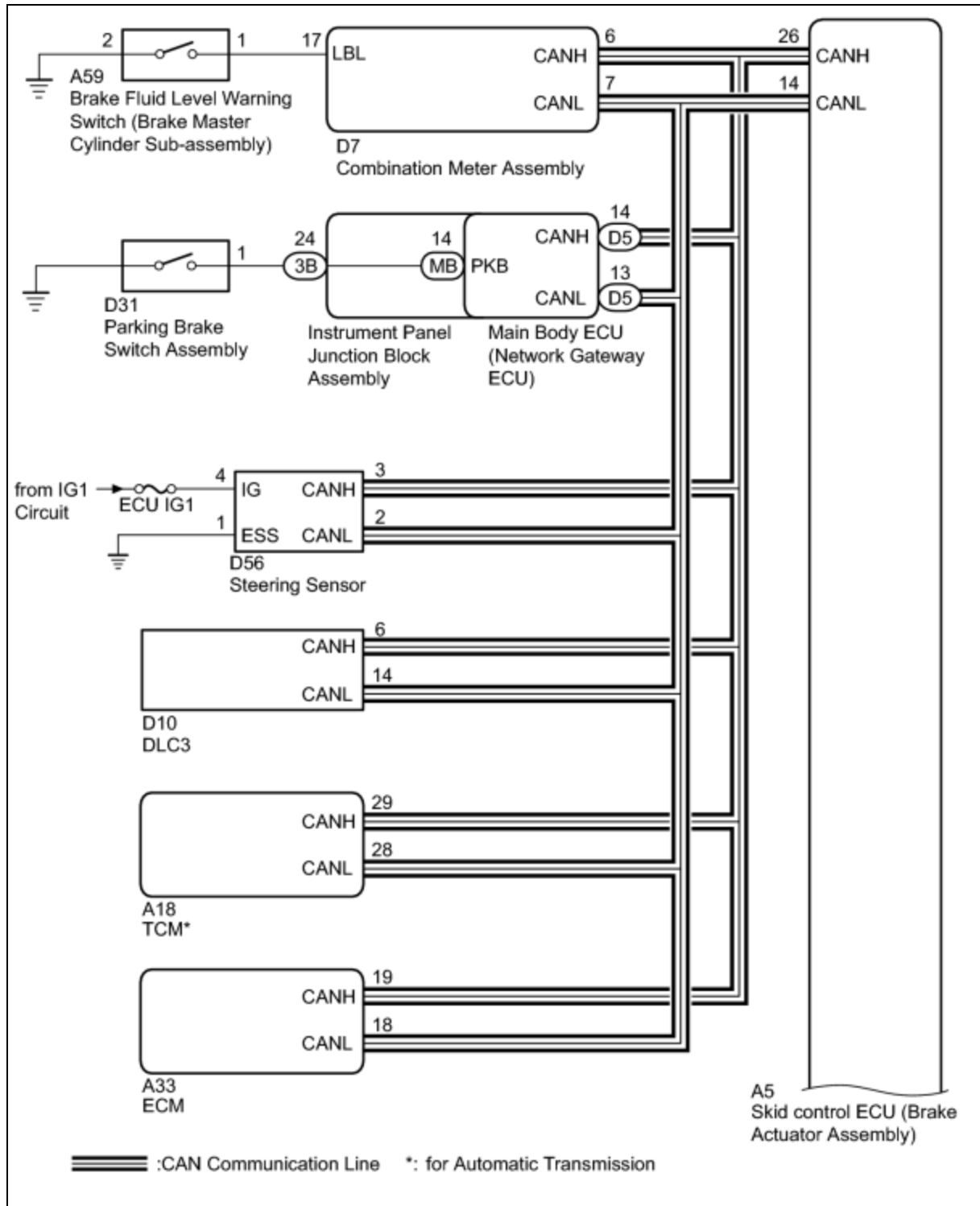
malfunction in the TR(A)C and/or VSC.

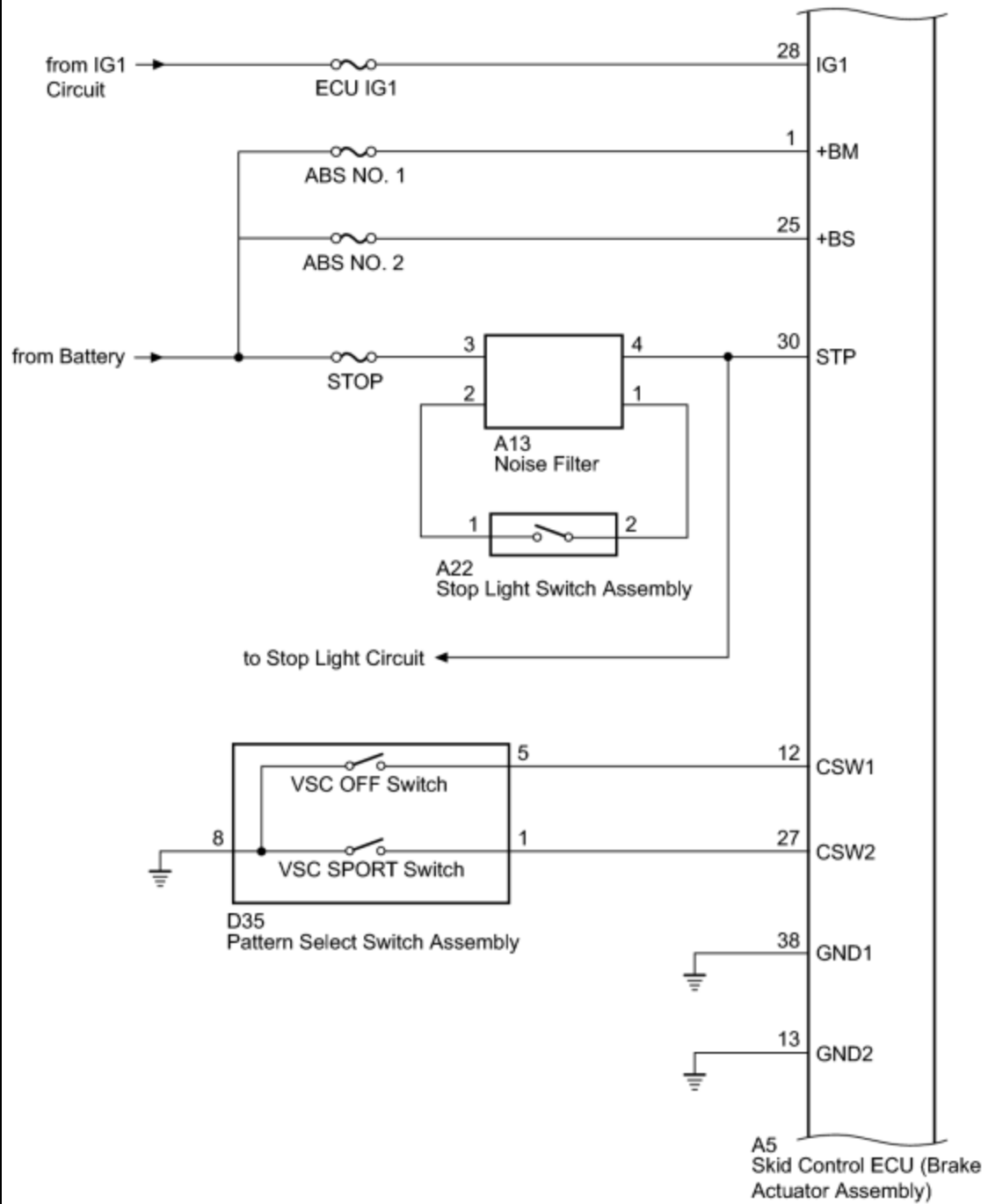
*: for Automatic Transmission

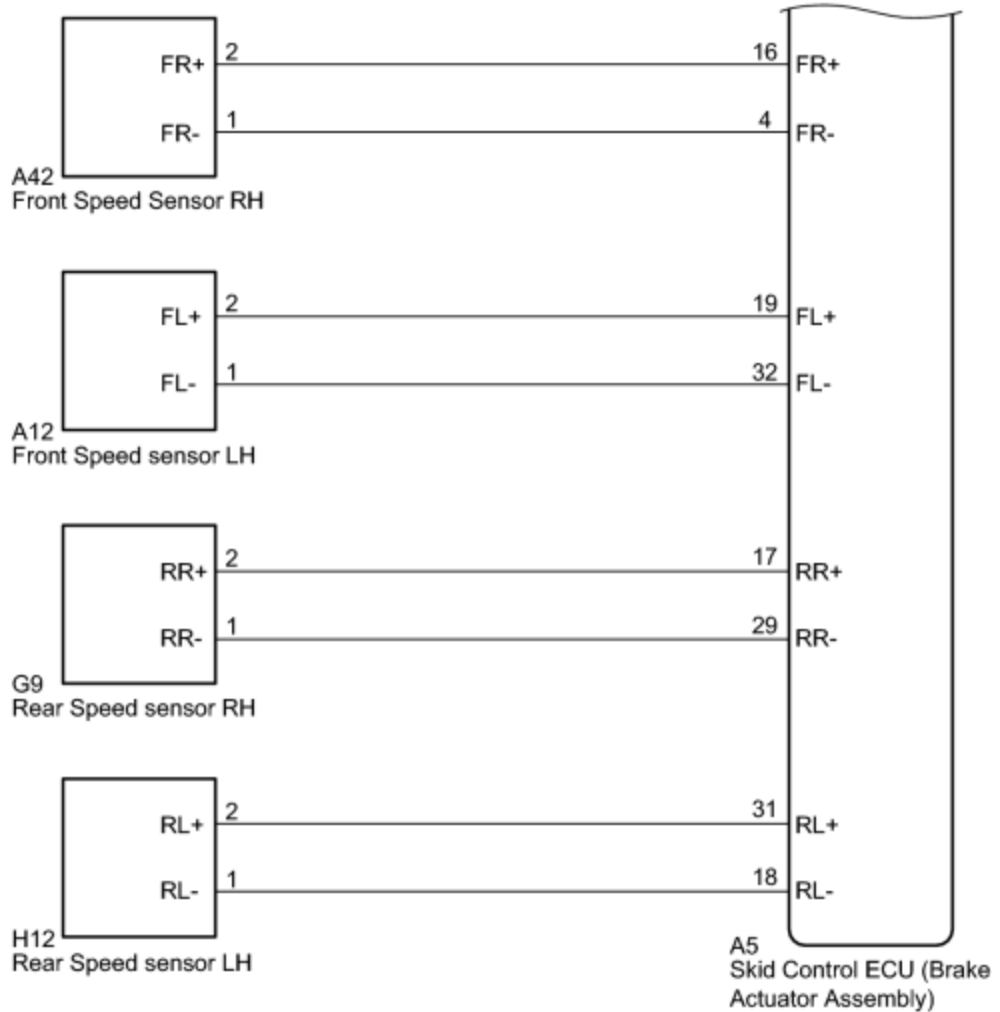


Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XHQ079X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM







TRANSMITTING ECU (TRANSMITTER)	RECEIVING ECU	SIGNAL	COMMUNICATION METHOD
Steering sensor	Skid control ECU	Steering sensor signal	CAN communication line
Skid control ECU	ECM	<ul style="list-style-type: none"> Wheel speed signal VSC data signal 	CAN communication line
ECM	Skid control ECU	<ul style="list-style-type: none"> Accelerator pedal position signal Engine speed signal Diagnosis signal 	CAN communication line
TCM*	Skid control ECU	Gear position signal	CAN communication line
Skid control ECU	Power steering ECU assembly	VSC data signal	CAN communication line
Main body ECU	Skid control ECU	Parking brake switch signal	CAN communication

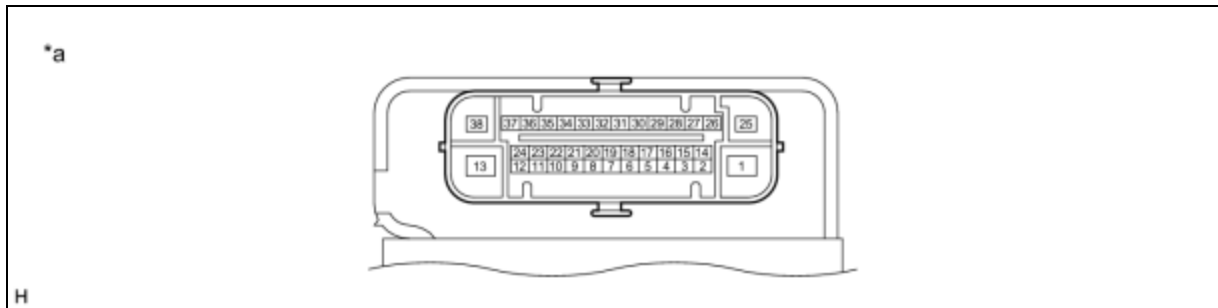
			line
Skid control ECU	Combination meter assembly	<ul style="list-style-type: none"> • ABS warning light signal • Brake warning light signal • TR(A)C OFF indicator light signal • VSC OFF indicator light signal • VSC SPORT indicator light signal • Slip indicator light signal • Wheel speed signal 	CAN communication line

*: for Automatic Transmission

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Model Year: 2013	Model: FR-S	Doc ID: RM000001NJI017X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. TERMINALS OF ECU



Text in Illustration

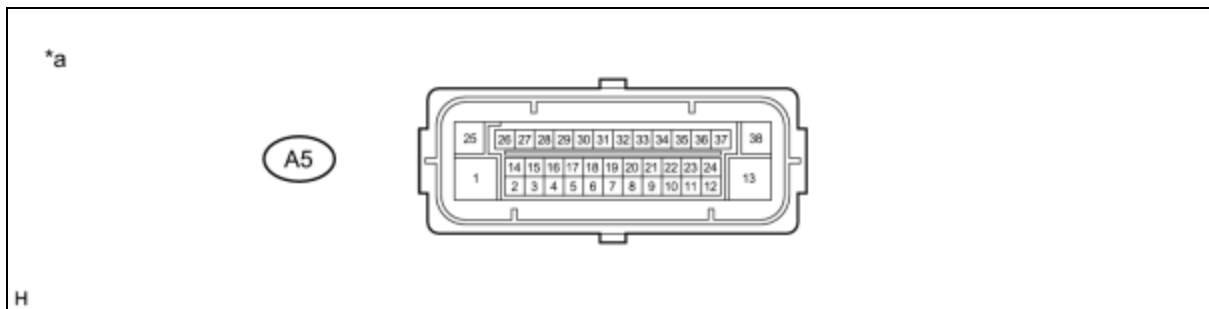
*a	Component without harness connected (Skid Control ECU (Brake Actuator Assembly))	-	-
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TERMINAL NO. (SYMBOL)	TERMINAL DESCRIPTION
1 (+BM)	ABS motor relay power supply
2 (SPD)	Speed signal output for speedometer
3	- (Not used)
4 (FR-)	Front wheel speed RH (-) signal input
5	- (Not used)
6	- (Not used)
7	- (Not used)
8	- (Not used)
9	- (Not used)
10	- (Not used)
11	- (Not used)
12 (CSW1)	VSC OFF switch input
13 (GND2)	Pump motor ground
14 (CANL)	CAN communication line L
15	- (Not used)
16 (FR+)	Front wheel speed RH (+) signal input
17 (RR+)	Rear wheel speed RH (+) signal input
18 (RL-)	Rear wheel speed LH (-) signal input
19 (FL+)	Front wheel speed LH (+) signal input

20	- (Not used)
21	- (Not used)
22	- (Not used)
23	- (Not used)
24	- (Not used)
25 (+BS)	ABS solenoid relay power supply
26 (CANH)	CAN communication line H
27 (CSW2)	VSC SPORT switch input
28 (IG1)	IG1 power source input
29 (RR-)	Rear wheel speed RH (-) signal input
30 (STP)	Stop light switch input
31 (RL+)	Rear wheel speed LH (+) signal input
32 (FL-)	Front wheel speed LH (-) signal input
33	- (Not used)
34	- (Not used)
35	- (Not used)
36	- (Not used)
37	- (Not used)
38 (GND1)	Skid control ECU ground

2. TERMINAL INSPECTION

(a) Disconnect the connector and measure the voltage and resistance on the wire harness side.



Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))	-	-
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HINT:

The voltage cannot be measured with the connector connected to the skid control ECU (brake actuator assembly) because the connector is watertight.

Standard

--	--	--	--	--

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A5-1 (+BM) - Body ground	W - Body ground	ABS motor relay power supply	Always	11 to 14 V
A5-12 (CSW1) - Body ground	O - Body ground	VSC OFF switch input	VSC OFF switch held ON → OFF (Not pressed)	Below 1 Ω → 10 kΩ or higher
A5-13 (GND2) - Body ground	B - Body ground	Pump motor ground	Always	Below 1 Ω
A5-25 (+BS) - Body ground	G - Body ground	ABS solenoid relay power supply	Always	11 to 14 V
A5-27 (CSW2) - Body ground	P - Body ground	VSC SPORT switch input	VSC SPORT switch held ON → OFF (Not pressed)	Below 1 Ω → 10 kΩ or higher
A5-28 (IG1) - Body ground	G-R - Body ground	IG1 power source input	Ignition switch ON	11 to 14 V
A5-30 (STP) - Body ground	R - Body ground	Stop light switch input	Stop light switch ON → OFF (Brake pedal depressed → released)	11 to 14 V* → Below 1.5 V
A5-38 (GND1) - Body ground	B - Body ground	Skid control ECU ground	Always	Below 1 Ω

HINT:

*: The standard voltage value varies depending on the +BS terminal voltage value. The standard voltage is 85% of the +BS terminal voltage.

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Model Year: 2013	Model: FR-S	Doc ID: RM000001JBD04SX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: TEST MODE PROCEDURE (2013 FR-S)		

TEST MODE PROCEDURE

1. WARNING LIGHT AND INDICATOR LIGHT INITIAL CHECK

(a) Release the parking brake.

NOTICE:

Before releasing the parking brake, move the shift lever to P (for automatic transmission) or set chocks to prevent the vehicle from rolling.

HINT:

When the parking brake is applied or the brake fluid level is low, the brake warning light comes on.

(b) When the ignition switch is turned to ON, check that the ABS warning, brake warning, TR(A)C OFF indicator, VSC OFF indicator, VSC SPORT indicator and slip indicator lights all come on.

HINT:

- If the skid control ECU stores a DTC, the ABS warning and slip indicator lights will come on.
- If any of the indicators remains on or does not come on, proceed to troubleshooting for the light circuits listed below.

TROUBLE AREA	SEE PROCEDURE
ABS warning light circuit (Remains on)	INFO
ABS warning light circuit (Does not come on)	INFO
Brake warning light circuit (Remains on)	INFO
Brake warning light circuit (Does not come on)	INFO
TR(A)C OFF indicator light circuit (Remains on)	INFO
TR(A)C OFF indicator light circuit (Does not come on)	INFO
VSC OFF indicator light circuit (Remains on)	INFO
VSC OFF indicator light circuit (Does not come on)	INFO
VSC SPORT indicator light circuit (Remains on)	INFO
VSC SPORT indicator light circuit (Does not come on)	INFO
Slip indicator light circuit (Remains on)	INFO
Slip indicator light circuit (Does not come on)	INFO

(1) When the ignition switch is turned to ON, check that the brake warning, TR(A)C OFF indicator, VSC OFF indicator and VSC SPORT indicator lights turn off after 3 seconds.

(2) When the engine is started, check that the ABS warning and slip indicator lights turn off after 3 seconds.

2. SENSOR CHECK USING TEST MODE (SIGNAL CHECK)

HINT:

DTCs are stored if any malfunctions are detected during the check of each sensor.

- (a) Procedure to enter Test Mode
- (1) Turn the ignition switch off.
 - (2) Check that the steering wheel is centered.
 - (3) Check that the shift lever is in neutral.
 - (4) Connect the Techstream to the DLC3.
 - (5) Turn the ignition switch to ON.
 - (6) Turn the Techstream on.
 - (7) Switch the skid control ECU to Test Mode using the Techstream. Enter the following menus:
Chassis / ABS/VSC/TRAC / Utility / Signal Check.
 - (8) Check that the ABS warning and slip indicator lights come on.
- (b) Speed Sensor Check
- (1) Drive the vehicle straight-ahead.
Accelerate the vehicle to a speed of 45 km/h (28 mph) or more for several seconds.

HINT:

- The sensor check may not complete if wheelspin occurs.
- The speed sensor check may not complete if the speed sensor check is started while turning the steering wheel or spinning the wheels.

NOTICE:

After the ABS warning light goes off, if the vehicle speed exceeds 80 km/h (50 mph), a sensor check code will be stored again.

Decelerate or stop the vehicle before the speed reaches 80 km/h (50 mph).

- (2) Check that the ABS warning light goes off.

HINT:

- The ABS warning light goes off when the sensor check has completed.
 - The ABS warning light comes on immediately after a malfunction has been detected during the speed sensor check.
- (3) Stop the vehicle.

HINT:

When the sensor check has completed, the ABS warning light goes off.

NOTICE:

If the sensor check has not completed, the ABS warning light will come on and the ABS system will not operate.

- (c) End of Sensor Check
- (1) If the sensor checks have completed, the ABS warning light goes off.

NOTICE:

If the sensor checks have not completed, the ABS warning light come on and the ABS system will not operate.

- (d) Reading Sensor Check DTCs
- (1) Read the DTC(s) by following the Techstream screen.

NOTICE:

- If only DTCs other than Test Mode sensor check DTCs are displayed, repair the malfunctions and clear the DTCs.
- If Test Mode sensor check DTCs and other DTCs are displayed or if only Test Mode sensor check DTCs are displayed, repair the malfunctions, clear the DTCs, and perform Test Mode inspection again.

HINT:

See "Sensor Check DTCs".

(2) Turn the ignition switch off and disconnect the Techstream.

(e) Sensor Check DTCs

ABS Sensor

DTC NO.	DETECTION ITEM	TROUBLE AREA
C1271	Low Output Signal of Front Speed Sensor RH	<ul style="list-style-type: none"> • Front speed sensor RH • Sensor installation • Front speed sensor rotor RH (Front axle hub and bearing assembly RH)
C1272	Low Output Signal of Front Speed Sensor LH	<ul style="list-style-type: none"> • Front speed sensor LH • Sensor installation • Front speed sensor rotor LH (Front axle hub and bearing assembly LH)
C1273	Low Output Signal of Rear Speed Sensor RH	<ul style="list-style-type: none"> • Rear speed sensor RH • Sensor installation • Rear speed sensor rotor RH (Rear axle hub and bearing assembly RH)
C1274	Low Output Signal of Rear Speed Sensor LH	<ul style="list-style-type: none"> • Rear speed sensor LH • Sensor installation • Rear speed sensor rotor LH (Rear axle hub and bearing assembly LH)
C1275	Abnormal Change in Output Signal of Front Speed Sensor RH	Front speed sensor rotor RH (Front axle hub and bearing assembly RH)
C1276	Abnormal Change in Output Signal of Front Speed Sensor LH	Front speed sensor rotor LH (Front axle hub and bearing assembly LH)
C1277	Abnormal Change in Output Signal of Rear Speed Sensor RH	Rear speed sensor rotor RH (Rear axle hub and bearing assembly RH)
C1278	Abnormal Change in Output Signal of Rear Speed Sensor LH	Rear speed sensor rotor LH (Rear axle hub and bearing assembly LH)

HINT:

The codes in this table are output only in Test Mode (signal check).

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Model Year: 2013	Model: FR-S	Doc ID: RM000001FQPODAX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: TRAC OFF Indicator Light does not Come ON (2013 FR-S)		

TRAC OFF Indicator Light does not Come ON

DESCRIPTION

The skid control ECU (brake actuator assembly) is connected to the combination meter assembly via CAN communication.


INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization  .

PROCEDURE

1.	CHECK CAN COMMUNICATION SYSTEM
-----------	---------------------------------------

(a) Check if a CAN communication system DTC is output  .

Result:

RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B

B  **INSPECT CAN COMMUNICATION SYSTEM**


A



2.	PERFORM ACTIVE TEST USING TECHSTREAM (TR(A)C OFF INDICATOR LIGHT)
-----------	--

(a) Connect the Techstream to the DLC3.

(b) Start the engine.

(c) Select the Active Test on the Techstream  .

ABS/VSC/TRAC

--	--	--

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
TRC(TRAC) OFF Indicator Light	TR(A)C OFF indicator light	Indicator light ON/OFF	Observe combination meter assembly

(d) Check that the TR(A)C OFF indicator light on the combination meter assembly turns on or off in accordance with the Techstream operation.

OK:

The TR(A)C OFF indicator light turns on or off in accordance with the Active Test operation.

HINT:


If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

NG  **INSPECT COMBINATION METER ASSEMBLY**

OK  **REPLACE BRAKE ACTUATOR ASSEMBLY**

3.	INSPECT COMBINATION METER ASSEMBLY
-----------	---

(a) Turn the ignition switch off.

(b) Perform an Active Test of the combination meter assembly (meter CPU) using the Techstream  .

(c) Check the combination meter assembly.

OK:

The TR(A)C OFF indicator light turns on or off in accordance with the Active Test operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

NG  **REPLACE COMBINATION METER ASSEMBLY**

OK  **REPLACE BRAKE ACTUATOR ASSEMBLY**

Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001FQ00DCX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: TRAC OFF Indicator Light Remains ON (2013 FR-S)		

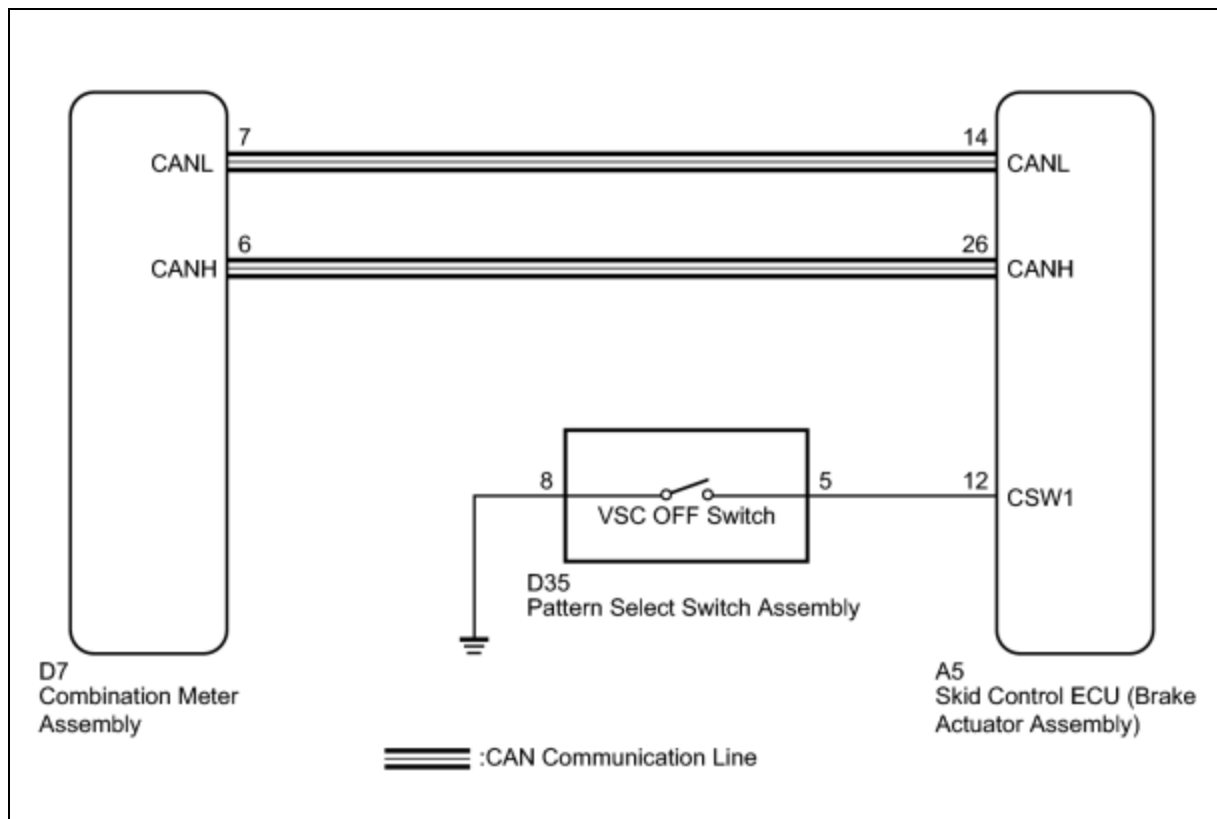
TRAC OFF Indicator Light Remains ON

DESCRIPTION

The skid control ECU (brake actuator assembly) is connected to the combination meter assembly via CAN communication.

Pressing the VSC OFF switch turns off TR(A)C, and pressing and holding this switch turns off TR(A)C and VSC. If TR(A)C is turned off, the TR(A)C OFF indicator light will come on.

WIRING DIAGRAM

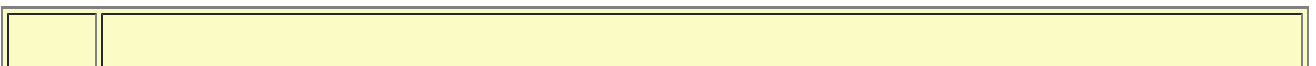


INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization .

PROCEDURE



1. CHECK CAN COMMUNICATION SYSTEM

(a) Check if a CAN communication system DTC is output **INFO** .

Result:

RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B

B ▶ INSPECT CAN COMMUNICATION SYSTEM

A



2. CHECK IF BRAKE ACTUATOR ASSEMBLY CONNECTOR IS SECURELY CONNECTED

(a) Check if the skid control ECU (brake actuator assembly) connector is securely connected.

OK:

The connector is securely connected.

NG ▶ CONNECT CONNECTOR TO ECU CORRECTLY

OK



3. CHECK BATTERY

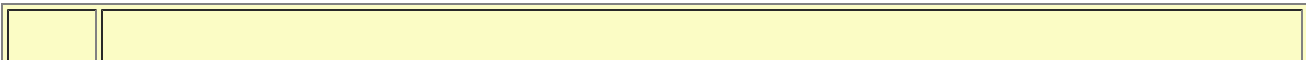
(a) Check the battery voltage.

Standard Voltage:


11 to 14 V

NG ▶ CHECK OR REPLACE CHARGING SYSTEM COMPONENT OR BATTERY

OK



4. READ VALUE USING TECHSTREAM (VSC OFF SWITCH)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Select the Data List using the Techstream  .

ABS/VSC/TRAC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
TRC(TRAC)/VSC Off Mode	TR(A)C/VSC OFF mode / Normal, TRC(TRAC) OFF, Unknown or VSC OFF	Normal: Normal mode TRC(TRAC) OFF: TR(A)C OFF mode Unknown: Unspecified VSC OFF: VSC OFF mode	-

- (d) Using the Techstream, check that the switch condition displayed on the Techstream changes according to VSC OFF switch operation.

OK:


The Techstream display changes according to VSC OFF switch operation.

NG  **INSPECT VSC OFF SWITCH**

OK



5. INSPECT COMBINATION METER ASSEMBLY

- (a) Perform an Active Test of the combination meter assembly (meter CPU) using the Techstream  .
- (b) Check the combination meter assembly.

OK:

The TR(A)C OFF indicator light turns on or off in accordance with the Active Test operation.



HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

NG  **REPLACE COMBINATION METER ASSEMBLY**

OK  **REPLACE BRAKE ACTUATOR ASSEMBLY**

6. INSPECT VSC OFF SWITCH

- (a) Remove the VSC OFF switch  .
- (b) Inspect the VSC OFF switch  .

NG  **REPLACE PATTERN SELECT SWITCH ASSEMBLY**

OK



7. CHECK HARNESS AND CONNECTOR (BRAKE ACTUATOR ASSEMBLY - VSC OFF SWITCH)

- (a) Disconnect the skid control ECU (brake actuator assembly) connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-12 (CSW1) - D35-5	Always	Below 1 Ω
A5-12 (CSW1) - Body ground	Always	10 k Ω or higher
D35-8 - Body ground	Always	Below 1 Ω

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **REPLACE BRAKE ACTUATOR ASSEMBLY**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000YU0018X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: U0073,U0100,U0101,U0126: Control Module Communication Bus "A" Off (2013 FR-S)		

DTC	U0073	Control Module Communication Bus "A" Off
------------	--------------	---

DTC	U0100	Lost Communication with ECM / PCM "A"
------------	--------------	--

DTC	U0101	Lost Communication with TCM
------------	--------------	------------------------------------

DTC	U0126	Lost Communication with Steering Angle Sensor Module
------------	--------------	---

DESCRIPTION

The skid control ECU (brake actuator assembly) receives signals from the ECM, steering sensor and TCM via the CAN communication system.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
U0073	The +BS terminal voltage is between 9.6 and 16.5 V and bus off is judged for 0.1 seconds or more.	CAN communication system
U0100	The +BS terminal voltage is between 9.6 and 16.5 V, the vehicle speed is 6 km/h (4 mph) or more, and signals cannot be sent to the ECM for 0.5 seconds or more.	<ul style="list-style-type: none"> • CAN communication system • Skid control ECU (Brake actuator assembly) • ECM
U0123	The +BS terminal voltage is between 9.6 and 16.5 V, the vehicle speed is 6 km/h (4 mph) or more, and signals cannot be sent to the TCM for 0.5 seconds or more.	<ul style="list-style-type: none"> • CAN communication system • Skid control ECU (Brake actuator assembly) • TCM
	The +BS terminal voltage is between 9.6 and 16.5 V, the vehicle	<ul style="list-style-type: none"> • CAN communication system

U0126	speed is 6 km/h (4 mph) or more, and signals from the steering sensor cannot be received for 0.1 seconds or more.	<ul style="list-style-type: none"> • Skid control ECU (Brake actuator assembly) • steering sensor
-------	---	---

INSPECTION PROCEDURE

PROCEDURE

1.	RECONFIRM DTC
-----------	----------------------

- (a) Clear the DTCs INFO.
- (b) Turn the ignition switch off.
- (c) Start the engine.
- (d) Drive the vehicle at a speed of 15 km/h (9 mph) or more and turn the steering wheel to the right and left.
- (e) Check that no CAN communication system DTC is output INFO.
- (f) If VSC system DTCs are output, record them INFO.

Result:

RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B
CAN communication system DTC is output.	C

HINT:

The CAN communication system must be normal when performing troubleshooting for sensor DTCs (for VSC system).

B ▶ REPAIR CIRCUITS INDICATED BY OUTPUT DTCs

C ▶ INSPECT CAN COMMUNICATION SYSTEM

A ▶ CHECK FOR INTERMITTENT PROBLEMS

Language Selection:
EN FR ES

- Scion 2013 FR-S Repair Manual (RM20S0U)
 - Audio / Visual / Telematics
 - Brake
 - BRAKE (FRONT)
 - BRAKE (REAR)
 - BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS
 - BRAKE ACTUATOR
 - FRONT SPEED SENSOR
 - REAR SPEED SENSOR
 - STEERING ANGLE SENSOR
 - VEHICLE STABILITY CONTROL SYSTEM
 - PRECAUTION (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - PARTS LOCATION (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - SYSTEM DIAGRAM (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - SYSTEM DESCRIPTION (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - CHECK FOR INTERMITTENT PROBLEMS (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - CALIBRATION (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - TEST MODE PROCEDURE (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - PROBLEM SYMPTOMS TABLE (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - TERMINALS OF ECU (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - DIAGNOSIS SYSTEM (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - DTC CHECK / CLEAR (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - FREEZE FRAME DATA (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - FAIL-SAFE CHART (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - DATA LIST / ACTIVE TEST (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - DIAGNOSTIC TROUBLE CODE CHART (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - C1201: Engine Control System Malfunction (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - C1225-C1228,C1468,C1469,C146A,C146B: SA1 Solenoid Circuit (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - C1231: Steering Angle Sensor (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - C1234,C1419,C1472,C1474: Yaw Rate Sensor (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - C1237,C1275-C1278: Speed Sensor Rotor Faulty (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - C1241: Low or High Power Supply Voltage (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - C1246: Master Cylinder Pressure Sensor Malfunction (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - C1249: Open in Stop Light Switch Circuit (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - C1271,C1272,C1330,C1331,C1464,C1465: Low Output Signal of Front Speed Sensor RH (Test Mode DTC) (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - C1273,C1274,C1332,C1333,C1466,C1467: Low Output Signal of Rear Speed Sensor RH (Test Mode DTC) (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - C1288: Error in Matching of ECUs (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - C1294: ECT System Malfunction (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - C1300: Skid Control ECU Malfunction (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - C146C: Open in ABS Motor Relay Circuit (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - C146E: Open in ABS Solenoid Relay Circuit (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - U0073,U0100,U0101,U0126: Control Module Communication Bus "A" Off (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - ABS Warning Light Remains ON (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - ABS Warning Light does not Come ON (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - Brake Warning Light Remains ON (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - Brake Warning Light does not Come ON (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - TRAC OFF Indicator Light Remains ON (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - TRAC OFF Indicator Light does not Come ON (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - VSC OFF Indicator Light Remains ON (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - VSC OFF Indicator Light does not Come ON (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - VSC SPORT Indicator Light Remains ON (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - VSC SPORT Indicator Light does not Come ON (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - Slip Indicator Light Remains ON (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - Slip Indicator Light does not Come ON (2013 FR-S):BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM
 - VSC OFF SWITCH
 - BRAKE SYSTEM (OTHER)
 - PARKING BRAKE
 - Drivetrain
 - Engine / Hybrid / EV System

Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XFTOCCX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

1. TROUBLESHOOTING PRECAUTIONS

- (a) When there is a malfunction with terminal contact points or part installation problems, removal and installation of the suspected parts may return the system to normal either completely or temporarily.
- (b) In order to determine the malfunctioning area, be sure to check the conditions at the time the malfunction occurred, such as DTC output and the Freeze Frame Data, and record it before disconnecting any connector or removing and installing parts.
- (c) Since the system may be influenced by malfunctions in systems other than the VSC system, be sure to check for DTCs in other systems.

2. HANDLING PRECAUTIONS

- (a) Do not remove or install VSC parts such as the steering sensor except when required, as they need to be adjusted correctly after removal and installation.
- (b) Be sure to perform preparation before work and confirmation after work is completed by following the directions in the repair manual when working on the VSC system.
- (c) Be sure to remove and install the ECU, brake actuator assembly, sensors, etc. with the ignition switch off unless it is otherwise specified in the inspection procedure.
- (d) If the ECU, brake actuator assembly or a sensor has been removed and installed, it is necessary to check the system for problems after the parts have been reassembled. Check for DTCs using the Techstream, also check that system functions and signals received by the ECU are normal using Test Mode.

3. DTC PRECAUTION

- (a) Warnings for some DTCs cannot be cleared only by repairing the malfunctioning parts. If the warning is displayed after repair work, the DTC should be cleared after turning the ignition switch off.

NOTICE:
If a DTC for a malfunctioning part reappears after it was cleared, then it has been stored again.

- ☰ General
- ☰ INTRODUCTION
- ☰ Power Source / Network
- ☰ Steering
- ☰ Suspension
- ☰ Vehicle Exterior
- ☰ Vehicle Interior

4. CHASSIS DYNAMOMETER PRECAUTION

When testing with a 2-wheel drum tester such as a speedometer tester, a combination tester for the speedometer and brakes, a chassis dynamometer, or when jacking up the front wheels and turning the wheels, perform the following procedure to enter Inspection Mode and stop the TR(A)C and VSC systems.

Enter Inspection Mode to disable TR(A)C and VSC operation when using a chassis dynamometer.

HINT:

- If Inspection Mode is not used, the vehicle may unexpectedly move off the dynamometer because of TR(A)C and VSC operation.
- The VSC OFF switch must not be used to disable TR(A)C and VSC operation when the vehicle is to be operated on a dynamometer. Pressing the VSC OFF switch does not disable TR(A)C and VSC operation completely.

NOTICE:

Secure the vehicle with lock chains for safety.

(a) Activating Inspection Mode (When Using the Techstream)

- (1) Ensure that the ignition switch is off and the engine is stopped.
- (2) Make sure that the shift lever is in P.
- (3) Connect the Techstream to the DLC3.
- (4) Start the engine.
- (5) Turn the Techstream on.
- (6) Enter the following menus: Chassis / ABS/VSC/TRAC / Utility / Inspection Mode.
- (7) Check that the VSC OFF indicator light will come on.

HINT:

- If the VSC OFF indicator light does not come on, repeat the steps.
- Turning the ignition switch off ends Inspection Mode.

(b) Activating Inspection Mode (When not Using the Techstream)

HINT:

Perform steps "C" to "H" within 30 seconds.

- (1) Ensure that the ignition switch is off and the engine is stopped (Step "A").
- (2) for Manual Transmission:
 - Check that the shift lever is in neutral (Step "B").
- for Automatic Transmission:
 - Make sure that the shift lever is in P (Step "B").

- (3) Start the engine (Step "C").
- (4) Apply the parking brake by pulling up the parking brake lever (Step "D").
- (5) Depress and release the brake pedal twice (Step "E").
- (6) While holding the brake pedal down, release and apply the parking brake twice (Step "F").
- (7) With the parking brake applied, depress and release the brake pedal twice (Step "G").
- (8) Check if the slip indicator light will come on (Step "H").

HINT:

- If the slip indicator light does not come on in step "H", repeat steps "A" to "H".
- Turning the ignition switch off ends Inspection Mode.

5. CAN COMMUNICATION SYSTEM

PRECAUTIONS

- (a) The CAN communication system is used for communication between the skid control ECU (brake actuator assembly), the steering sensor and other ECUs. If any CAN communication DTCs are detected, DTCs corresponding to the malfunction will be output.
- (b) If any CAN communication DTCs are output, repair the malfunction and troubleshoot the VSC system while communication is normal.
- (c) In order to enable CAN communication, a specific type of wiring is used for the CAN communication lines. The wiring used for each communication line is a twisted pair of wires that have an equal length. A bypass wire should not be used because the data being transmitted will be corrupted.

Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001FQP0DCX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: VSC OFF Indicator Light does not Come ON (2013 FR-S)		

VSC OFF Indicator Light does not Come ON

DESCRIPTION

The skid control ECU (brake actuator assembly) is connected to the combination meter assembly via CAN communication.


INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization  .

PROCEDURE

1.	CHECK CAN COMMUNICATION SYSTEM
-----------	---------------------------------------

(a) Check if a CAN communication system DTC is output  .

Result:

RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B

B  **INSPECT CAN COMMUNICATION SYSTEM**

A



2.	PERFORM ACTIVE TEST USING TECHSTREAM (VSC OFF INDICATOR LIGHT)
-----------	---

(a) Connect the Techstream to the DLC3.

(b) Start the engine.

(c) Select the Active Test using the Techstream  .

ABS/VSC/TRAC

--	--	--	--

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
VSC OFF Indicator Light	VSC OFF indicator light	Indicator light ON/OFF	Observe combination meter assembly

(d) Check that the VSC OFF indicator light on the combination meter assembly turns on or off in accordance with the Techstream operation.

OK:

The VSC OFF indicator light turns on or off in accordance with the Active Test operation.

HINT:


If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

NG ► INSPECT COMBINATION METER ASSEMBLY

OK ► REPLACE BRAKE ACTUATOR ASSEMBLY

3.	INSPECT COMBINATION METER ASSEMBLY
-----------	---

(a) Turn the ignition switch off.

(b) Perform an Active Test of the combination meter assembly (meter CPU) using the Techstream  .

(c) Check the combination meter assembly.

OK:

The VSC OFF indicator light turns on or off in accordance with the Active Test operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

NG ► REPLACE COMBINATION METER ASSEMBLY

OK ► REPLACE BRAKE ACTUATOR ASSEMBLY

Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001FQ00DEX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: VSC OFF Indicator Light Remains ON (2013 FR-S)		

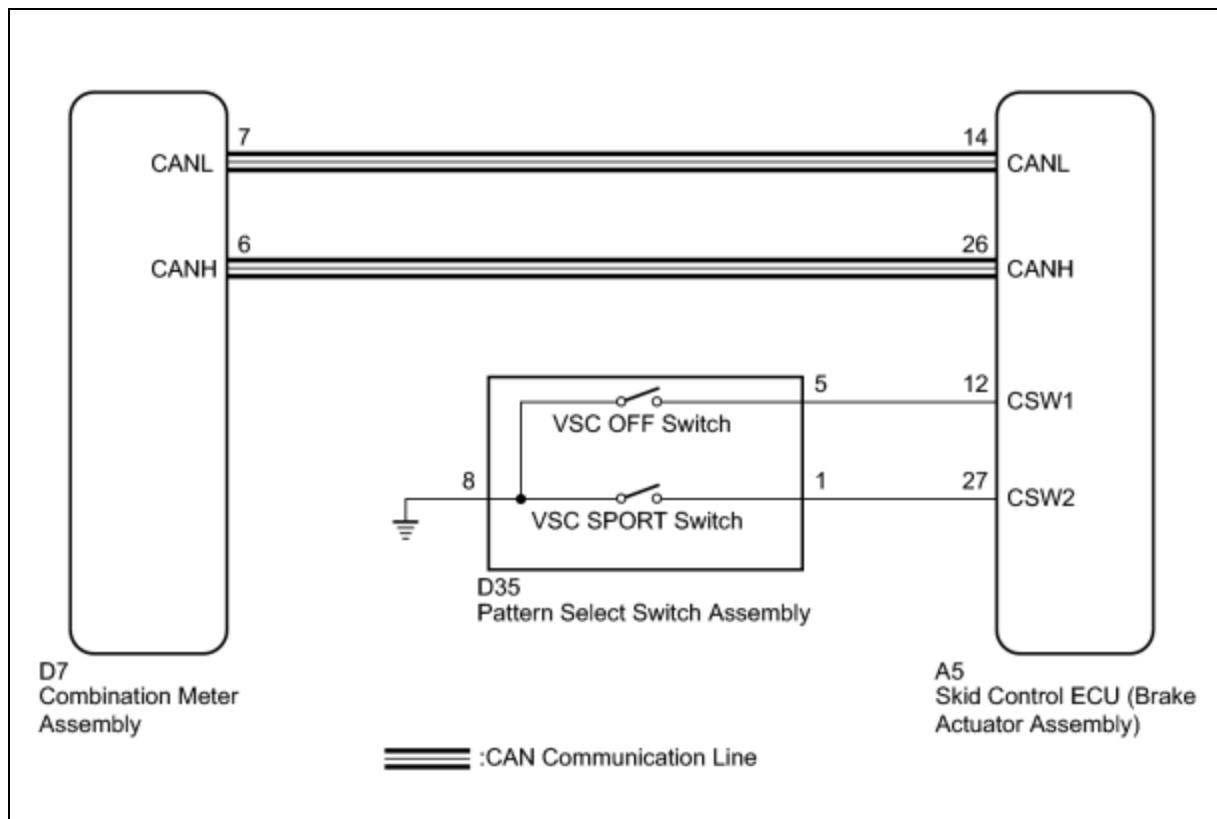
VSC OFF Indicator Light Remains ON

DESCRIPTION

The skid control ECU (brake actuator assembly) is connected to the combination meter assembly via CAN communication.

Pressing the VSC OFF switch turns off TR(A)C and pressing and holding this switch turns off TR(A)C and VSC. If VSC is turned off, the VSC OFF indicator light will come on.

WIRING DIAGRAM

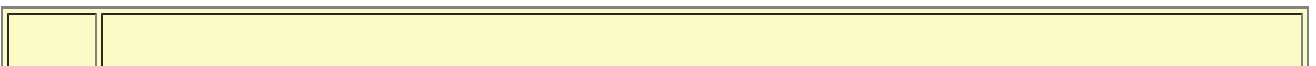


INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization INFO.

PROCEDURE



1. CHECK CAN COMMUNICATION SYSTEM

(a) Check if a CAN communication system DTC is output **INFO** .

Result:

RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B

B ▶ INSPECT CAN COMMUNICATION SYSTEM

A



2. CHECK IF BRAKE ACTUATOR ASSEMBLY CONNECTOR IS SECURELY CONNECTED

(a) Check if the skid control ECU (brake actuator assembly) connector is securely connected.

OK:

The connector is securely connected.

NG ▶ CONNECT CONNECTOR TO ECU CORRECTLY

OK



3. CHECK BATTERY

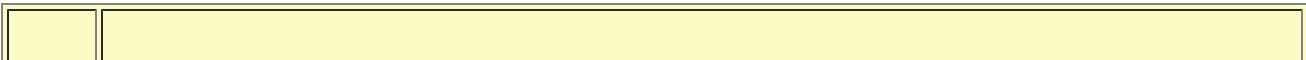
(a) Check the battery voltage.

Standard Voltage:


11 to 14 V

NG ▶ CHECK OR REPLACE CHARGING SYSTEM COMPONENT OR BATTERY

OK



4. READ VALUE USING TECHSTREAM (VSC OFF SWITCH)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Select the Data List using the Techstream  .

ABS/VSC/TRAC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
TRC(TRAC)/VSC Off Mode	TR(A)C/VSC OFF mode / Normal, TRC(TRAC) OFF, Unknown or VSC OFF	Normal: Normal mode TRC(TRAC) OFF: TR(A)C OFF mode Unknown: Unspecified VSC OFF: VSC OFF mode	-

- (d) Using the Techstream, check that the switch condition displayed on the Techstream changes according to VSC OFF switch operation.

OK:

The Techstream display changes according to VSC OFF switch operation.

NG  **INSPECT VSC OFF SWITCH**

OK



5. READ VALUE USING TECHSTREAM (VSC SPORT SWITCH)

- (a) Select the Data List using the Techstream  .

ABS/VSC/TRAC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Sports Mode	VSC SPORT mode / Normal or Sports	Normal: Normal mode Sports: VSC SPORT mode	-

- (b) Using the Techstream, check that the switch condition displayed on the Techstream changes according to VSC SPORT switch operation.

OK:


The Techstream display changes according to VSC SPORT switch operation.

NG  **INSPECT VSC SPORT SWITCH**

OK



6.	INSPECT COMBINATION METER ASSEMBLY
-----------	---

(a) Perform an Active Test of the combination meter assembly (meter CPU) using the Techstream  .

(b) Check the combination meter assembly.

OK:

The VSC OFF indicator and VSC SPORT indicator lights turn on or off in accordance with the Active Test operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

NG  **REPLACE COMBINATION METER ASSEMBLY**

OK  **REPLACE BRAKE ACTUATOR ASSEMBLY**

7.	INSPECT VSC OFF SWITCH
-----------	-------------------------------

(a) Remove the VSC OFF switch  .

(b) Inspect the VSC OFF switch  .

NG  **REPLACE PATTERN SELECT SWITCH ASSEMBLY**

OK



8.	CHECK HARNESS AND CONNECTOR (BRAKE ACTUATOR ASSEMBLY - VSC OFF SWITCH)
-----------	---

(a) Disconnect the skid control ECU (brake actuator assembly) connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-12 (CSW1) - D35-5	Always	Below 1 Ω

A5-12 (CSW1) - Body ground	Always	10 k Ω or higher
D35-8 - Body ground	Always	Below 1 Ω

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts .

NG  REPAIR OR REPLACE HARNESS OR CONNECTOR

OK  REPLACE BRAKE ACTUATOR ASSEMBLY

9.	INSPECT VSC SPORT SWITCH
-----------	---------------------------------

(a) Remove the VSC SPORT switch .

(b) Inspect the VSC SPORT switch .

NG  REPLACE PATTERN SELECT SWITCH ASSEMBLY

OK



10.	CHECK HARNESS AND CONNECTOR (BRAKE ACTUATOR ASSEMBLY - VSC SPORT SWITCH)
------------	---

(a) Disconnect the skid control ECU (brake actuator assembly) connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-27(CSW2) - D35-1	Always	Below 1 Ω
A5-27(CSW2) - Body ground	Always	10 k Ω or higher
D35-8 - Body ground	Always	Below 1 Ω

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts .

REPAIR OR REPLACE HARNESS OR

NG ▶ CONNECTOR

OK ▶ REPLACE BRAKE ACTUATOR ASSEMBLY



Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001FQP0DBX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: VSC SPORT Indicator Light does not Come ON (2013 FR-S)		

VSC SPORT Indicator Light does not Come ON

DESCRIPTION

The skid control ECU (brake actuator assembly) is connected to the combination meter assembly via CAN communication.


INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization  .

PROCEDURE

1.	CHECK CAN COMMUNICATION SYSTEM
-----------	---------------------------------------

(a) Check if a CAN communication system DTC is output  .

Result:

RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B

B  **INSPECT CAN COMMUNICATION SYSTEM**

A



2.	PERFORM ACTIVE TEST USING TECHSTREAM (VSC SPORT INDICATOR LIGHT)
-----------	---

(a) Connect the Techstream to the DLC3.

(b) Start the engine.

(c) Select the Active Test using the Techstream  .

ABS/VSC/TRAC

--	--	--	--

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Sports Mode Indicator Light	VSC SPORT indicator light	Indicator light ON/OFF	Observe combination meter assembly

(d) Check that the VSC SPORT indicator light on the combination meter assembly turns on or off in accordance with the Techstream operation.

OK:

The VSC SPORT indicator light turns on or off in accordance with the Active Test operation.

HINT:


If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

NG ► INSPECT COMBINATION METER ASSEMBLY

OK ► REPLACE BRAKE ACTUATOR ASSEMBLY

3.	INSPECT COMBINATION METER ASSEMBLY
-----------	---

(a) Turn the ignition switch off.

(b) Perform an Active Test of the combination meter assembly (meter CPU) using the Techstream  .

(c) Check the combination meter assembly.

OK:

The VSC SPORT indicator light turns on or off in accordance with the Active Test operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

NG ► REPLACE COMBINATION METER ASSEMBLY

OK ► REPLACE BRAKE ACTUATOR ASSEMBLY

Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001FQ00DDX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VEHICLE STABILITY CONTROL SYSTEM: VSC SPORT Indicator Light Remains ON (2013 FR-S)		

VSC SPORT Indicator Light Remains ON

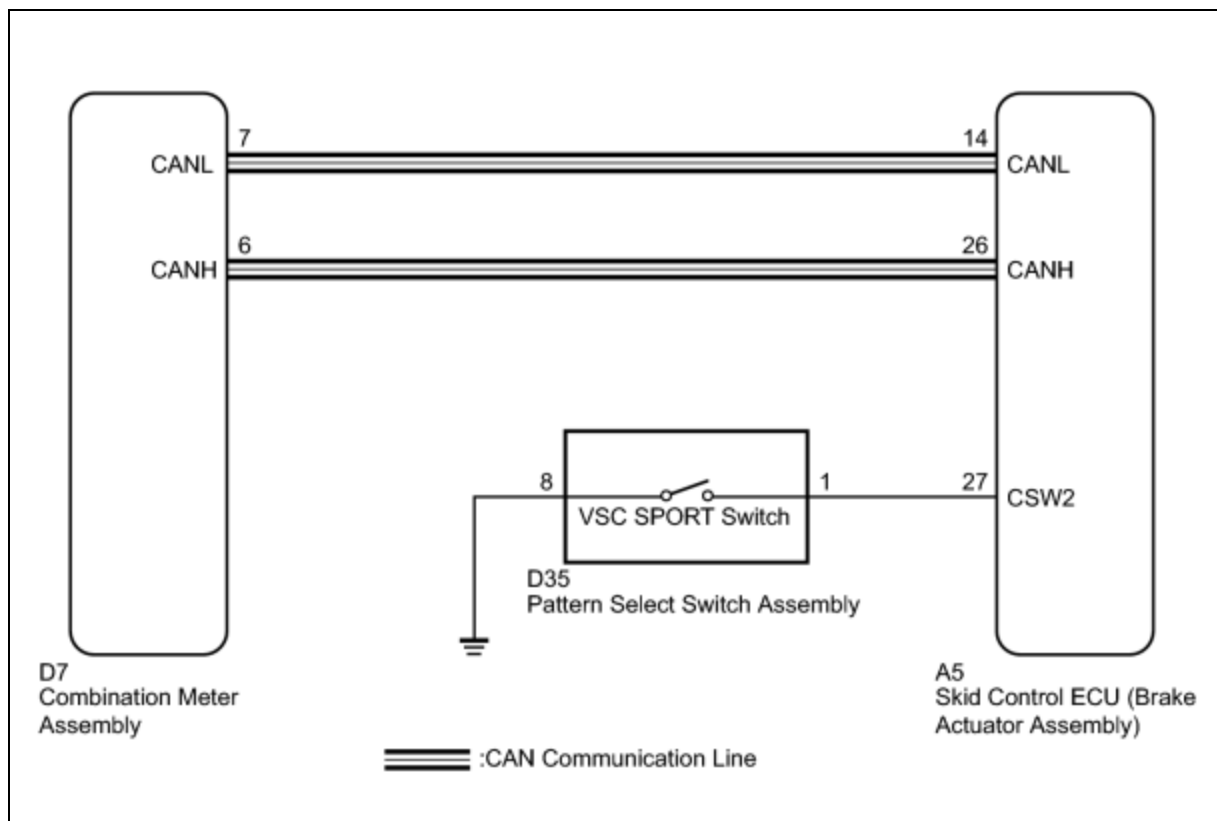
DESCRIPTION

The skid control ECU (brake actuator assembly) is connected to the combination meter assembly via CAN communication.

When the VSC SPORT switch is operated, the system switches between normal mode and sport mode.

If the VSC SPORT switch is pressed in normal mode, the system enters sport mode.

WIRING DIAGRAM

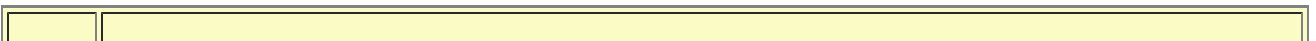


INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU (brake actuator assembly), perform VSC sensor neutral memorization [INFO](#) .

PROCEDURE



1. CHECK CAN COMMUNICATION SYSTEM

(a) Check if a CAN communication system DTC is output **INFO** .

Result:

RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B

B ▶ INSPECT CAN COMMUNICATION SYSTEM

A



2. CHECK IF BRAKE ACTUATOR ASSEMBLY CONNECTOR IS SECURELY CONNECTED

(a) Check if the skid control ECU (brake actuator assembly) connector is securely connected.

OK:
The connector is securely connected.

NG ▶ CONNECT CONNECTOR TO ECU CORRECTLY

OK



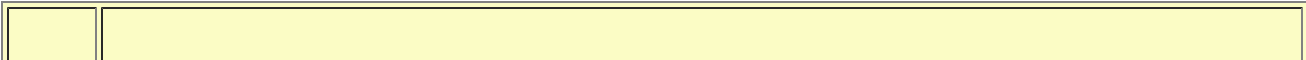
3. CHECK BATTERY

(a) Check the battery voltage.


Standard Voltage:
11 to 14 V

NG ▶ CHECK OR REPLACE CHARGING SYSTEM COMPONENT OR BATTERY

OK



4. READ VALUE USING TECHSTREAM (VSC SPORT SWITCH)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Select the Data List using the Techstream  .

ABS/VSC/TRAC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Sports Mode	VSC SPORT mode / Normal or Sports	Normal: Normal mode Sports: VSC SPORT mode	-

- (d) Using the Techstream, check that the switch condition displayed on the Techstream changes according to VSC SPORT switch operation.

OK:


The Techstream display changes according to VSC SPORT switch operation.

NG  **INSPECT VSC SPORT SWITCH**

OK



5. INSPECT COMBINATION METER ASSEMBLY

- (a) Perform an Active Test of the combination meter assembly (meter CPU) using the Techstream  .
- (b) Check the combination meter assembly.

OK:

The VSC SPORT indicator light turns on or off in accordance with the Active Test operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

NG  **REPLACE COMBINATION METER ASSEMBLY**

OK  **REPLACE BRAKE ACTUATOR ASSEMBLY**

6. INSPECT VSC SPORT SWITCH

- (a) Remove the VSC SPORT switch  .

(b) Inspect the VSC SPORT switch  .

NG  **REPLACE PATTERN SELECT SWITCH ASSEMBLY**

OK


7.	CHECK HARNESS AND CONNECTOR (BRAKE ACTUATOR ASSEMBLY - VSC SPORT SWITCH)
-----------	---

(a) Disconnect the skid control ECU (brake actuator assembly) connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-27 (CSW2) - D35-1	Always	Below 1 Ω
A5-27 (CSW2) - Body ground	Always	10 k Ω or higher
D35-8 - Body ground	Always	Below 1 Ω

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing parts  .

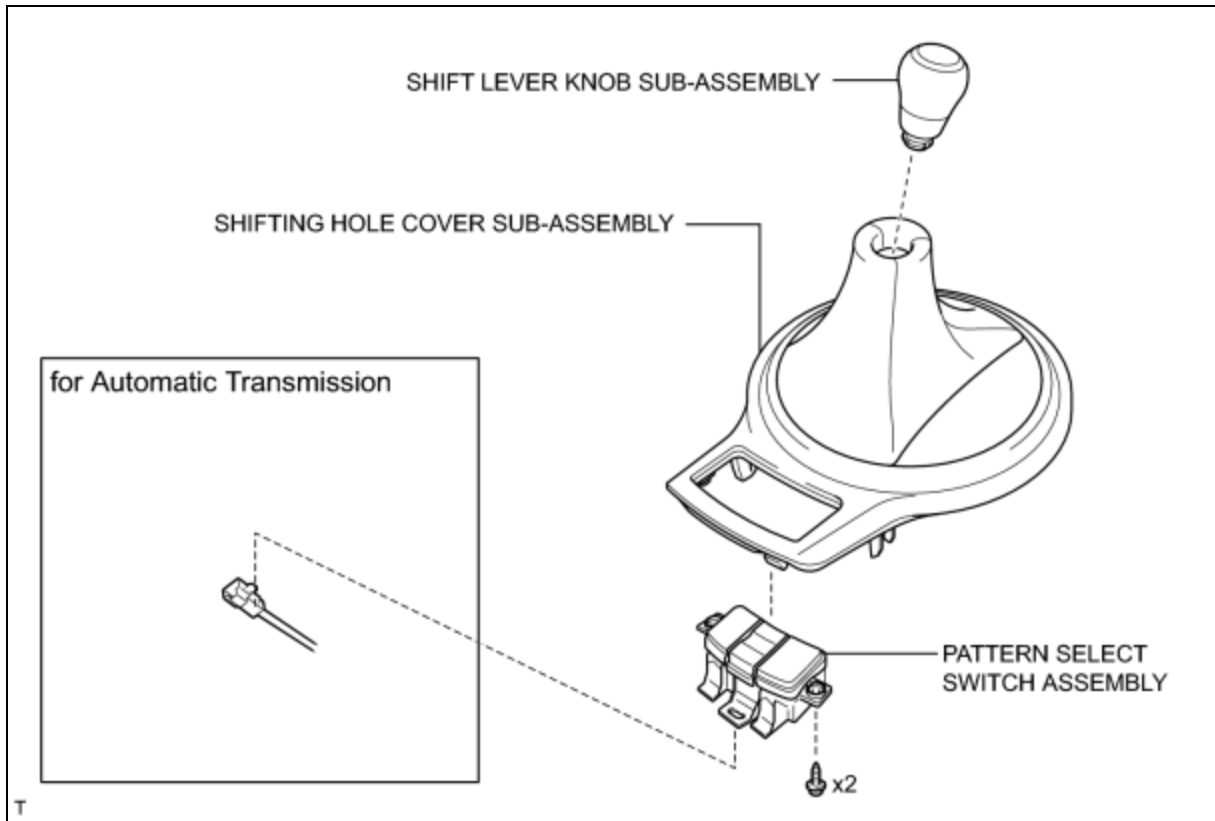
NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **REPLACE BRAKE ACTUATOR ASSEMBLY**

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001WZ102QX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VSC OFF SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



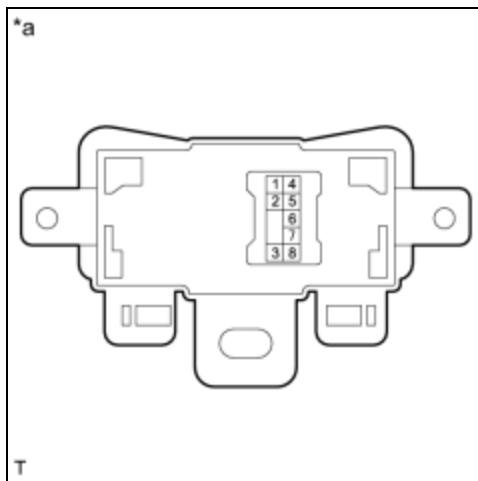
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000034VE00ZX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VSC OFF SWITCH: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT PATTERN SELECT SWITCH ASSEMBLY

(a) Make sure that there is no looseness in the locking part and the connecting part of the VSC OFF switch.

(1) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Pattern Select Switch Assembly)
----	---

Standard Resistance:

TESTER CONNECTION	CHECK CONDITION	SPECIFIED CONDITION
5 - 8	Switch not pushed in	10 k Ω or higher
	Switch pushed in	Below 1 Ω

(b) Make sure that there is no looseness in the locking part and the connecting part of the VSC SPORT switch.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CHECK CONDITION	SPECIFIED CONDITION
1 - 8	Switch not pushed in	10 k Ω or higher
	Switch pushed in	Below 1 Ω

(c) Check the illumination status

(1) Check the illumination when the battery voltage is applied between the connector terminals.

Standard:

CHECK CONDITION	SPECIFIED CONDITION
Battery positive → 2 Battery negative → 3	The illumination comes on



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001WYZ02WX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VSC OFF SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL PATTERN SELECT SWITCH ASSEMBLY

- (a) Install the 2 screws and the pattern select switch assembly to the shifting hole cover sub-assembly.
- (b) Connect the pattern select switch assembly connector clamp. (for Automatic Transmission)
- (c) Connect the pattern select switch assembly connector.

2. INSTALL SHIFTING HOLE COVER SUB-ASSEMBLY (for Manual Transmission) INFO

3. INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transmission) INFO

4. INSTALL SHIFTING HOLE COVER SUB-ASSEMBLY (for Automatic Transmission) INFO

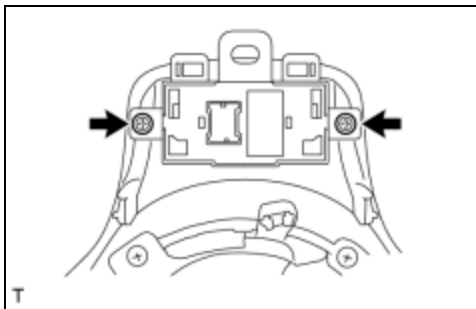
5. INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (for Automatic Transmission) INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001WZ202WX
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: VSC OFF SWITCH: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transmission) [INFO](#)
2. REMOVE SHIFTING HOLE COVER SUB-ASSEMBLY (for Manual Transmission) [INFO](#)
3. REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (for Automatic Transmission) [INFO](#)
4. REMOVE SHIFTING HOLE COVER SUB-ASSEMBLY (for Automatic Transmission) [INFO](#)
5. REMOVE PATTERN SELECT SWITCH ASSEMBLY
 - (a) Disconnect the pattern select switch assembly connector.
 - (b) Disconnect the pattern select switch assembly connector clamp. (for Automatic Transmission)

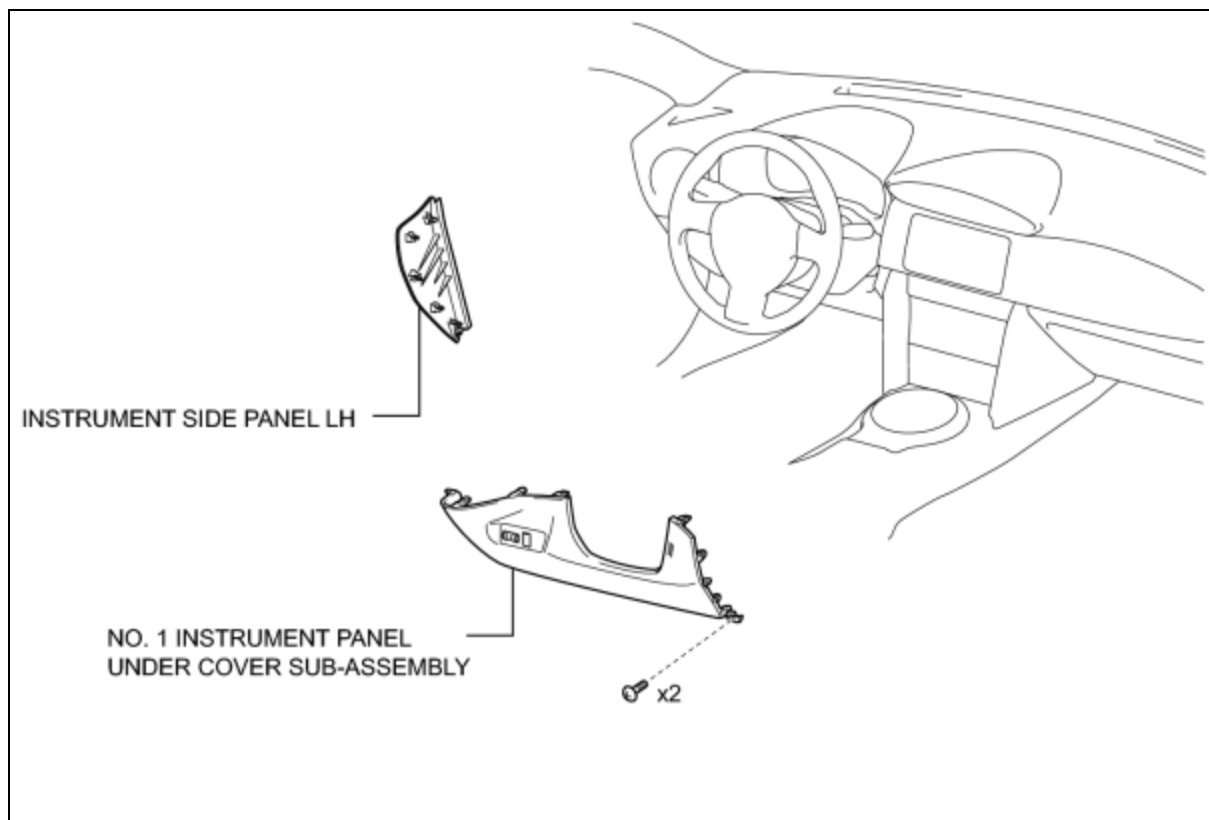


- (c) Remove the 2 screws and the pattern select switch assembly from the shifting hole cover sub-assembly.

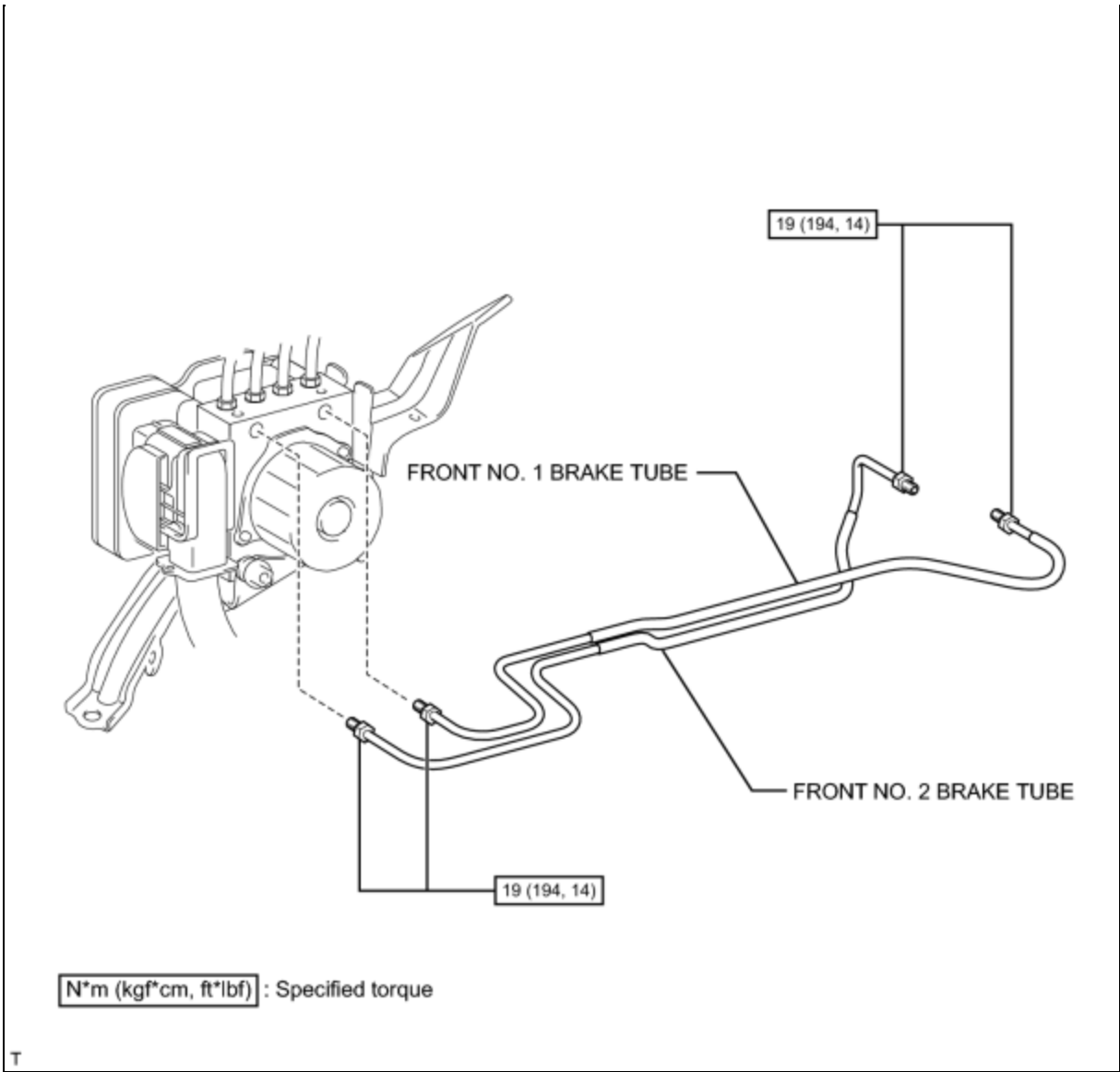
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HJC00SX
Title: BRAKE SYSTEM (OTHER): BRAKE BOOSTER: COMPONENTS (2013 FR-S)		

COMPONENTS

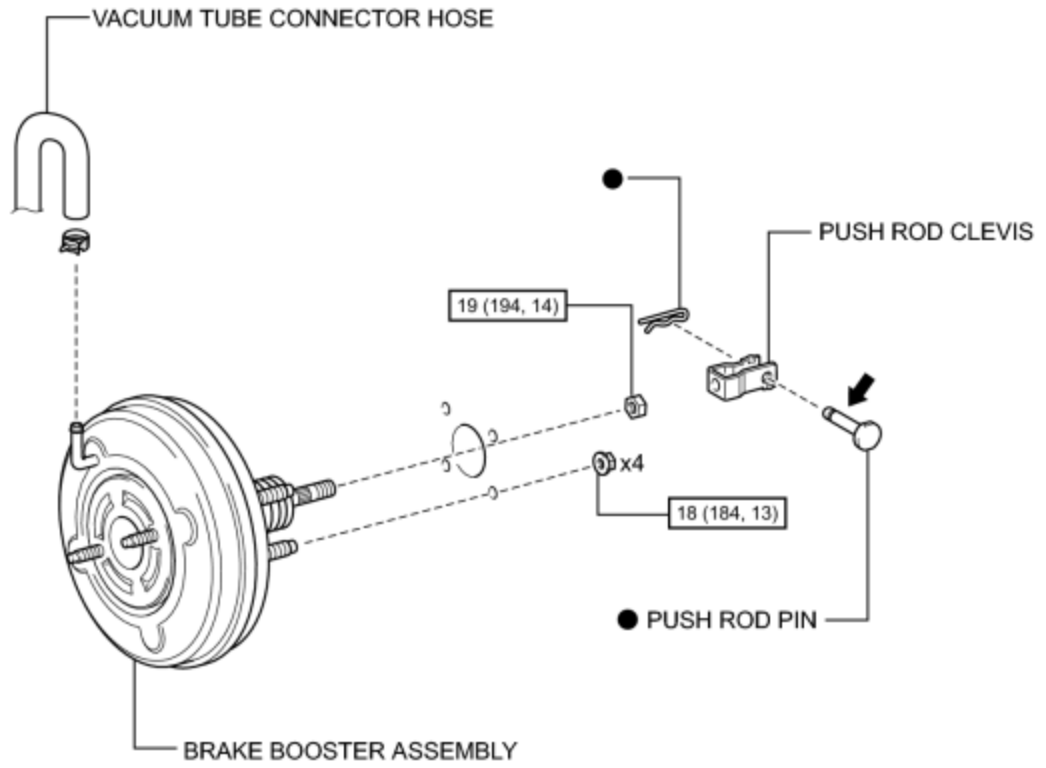
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION



N*m (kgf*cm, ft*lbf) : Specified torque

← Lithium soap base glycol grease

● Non-reusable part

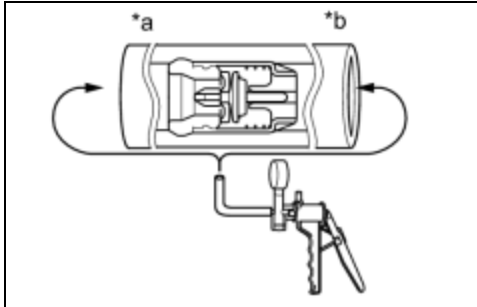
T

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004A0W005X
Title: BRAKE SYSTEM (OTHER): BRAKE BOOSTER: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT VACUUM TUBE CONNECTOR HOSE

(a) Slide the 2 clamps and remove the vacuum tube connector hose.

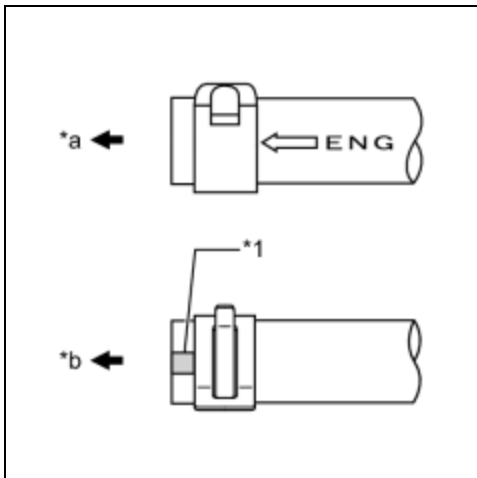


(b) Using a vacuum pump, check that there is ventilation from the booster to the engine, and no ventilation from the engine to the booster.

Text in Illustration

*a	Brake Booster Assembly Side
*b	Engine Assembly Side

If the result is not as specified, replace the vacuum tube connector hose.



(c) Connect the engine side of the vacuum hose with the engine stamp facing outside of the vehicle.

Text in Illustration

*1	Paint Mark
*a	Engine Assembly Side
*b	Brake Booster Assembly Side

(d) Connect the vacuum hose to the booster assembly with the paint mark facing front side of the vehicle.

HINT:

If the paint mark has been disappeared, check the ventilation and connect the hose so that there is ventilation from the booster to the engine, and no ventilation from the engine to the booster.

(e) Slide the 2 clamps and install the vacuum hose connector hose.

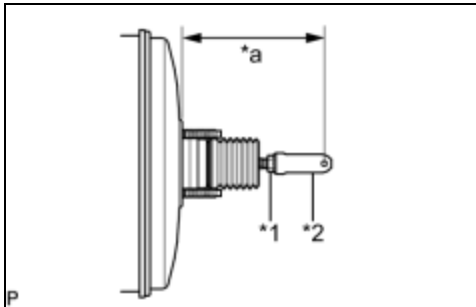
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HJB01YX
Title: BRAKE SYSTEM (OTHER): BRAKE BOOSTER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL BRAKE BOOSTER ASSEMBLY

(a) Temporarily install the lock nut and push rod clevis to the brake booster assembly.

(b) Set the push rod length as shown in the illustration.



Text in Illustration

*1	Lock Nut
*2	Push Rod Clevis
*a	Push Rod Length

Push rod length:
155.2 mm (6.11 in.)

(c) Tighten the lock nut.

Torque: 19 N·m (194 kgf·cm, 14ft·lbf)

(d) Install the 4 nuts to the brake booster assembly.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)


2. INSTALL FRONT NO. 2 BRAKE TUBE

(a) Connect 2 clips and install the front No. 2 brake tube.

(b) Using a union nut wrench 12 mm, connect the front No. 2 brake tube from the brake actuator.

Torque: 19 N·m (194 kgf·cm, 14ft·lbf)

NOTICE:


- Do not bend or damage the brake lines.
- Do not allow brake lines to twist and interfere with other parts or vehicle body during tightening.
- Do not allow any foreign matter such as dirt or dust to enter the brake lines.
- Use the formula to calculate special torque values for situations where the union nut wrench is combined with a torque wrench  .

3. INSTALL FRONT NO. 1 BRAKE TUBE

(a) Connect 2 clips and install the front No. 1 brake tube.

(b) Using a union nut wrench 12 mm, connect the front No. 1 brake tube from the brake actuator.

NOTICE:

- Do not bend or damage the brake lines.
- Do not allow brake lines to twist and interfere with other parts or vehicle body during tightening.
- Do not allow any foreign matter such as dirt or dust to enter the brake lines.
- Use the formula to calculate special torque values for situations where the union nut wrench is combined with a torque wrench  .

4. CONNECT VACUUM TUBE CONNECTOR HOSE INFO

5. INSTALL PUSH ROD PIN INFO

6. INSTALL BRAKE MASTER CYLINDER SUB-ASSEMBLY

INFO

7. CHECK AND ADJUST BRAKE PEDAL

INFO

8. INSTALL TCM (for Automatic Transmission)

INFO

9. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY INFO

10. INSTALL INSTRUMENT SIDE PANEL LH

HINT:

Use the same procedure for the LH side as for the RH side INFO .

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HJD01QX
Title: BRAKE SYSTEM (OTHER): BRAKE BOOSTER: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE INSTRUMENT SIDE PANEL LH

HINT:

Use the same procedure for the LH side as for the RH side [INFO](#) .

2. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)

3. REMOVE TCM (for Automatic Transmission)

[INFO](#)

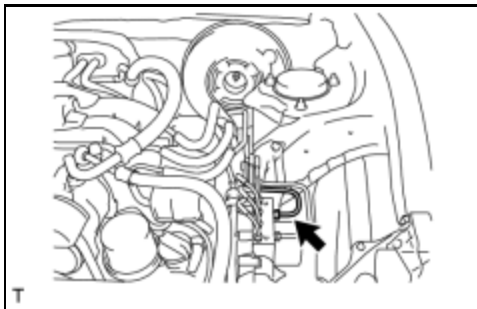
4. REMOVE BRAKE MASTER CYLINDER SUB-ASSEMBLY

[INFO](#)

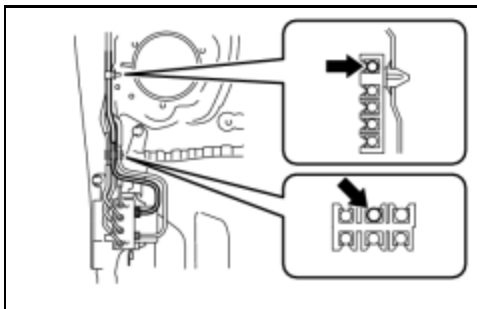
5. DISCONNECT VACUUM TUBE CONNECTOR HOSE

- (a) Slide the clip and disconnect the vacuum tube connector hose from the brake booster assembly.

6. REMOVE FRONT NO. 1 BRAKE TUBE

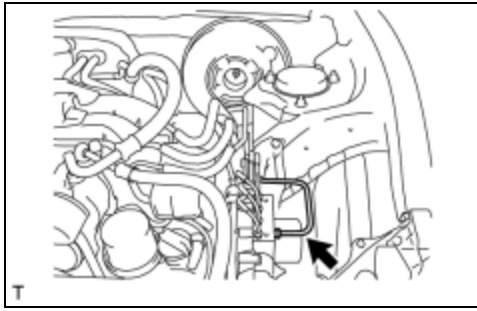


- (a) Using a union nut wrench 12 mm, disconnect the front No. 1 brake tube from the brake actuator.

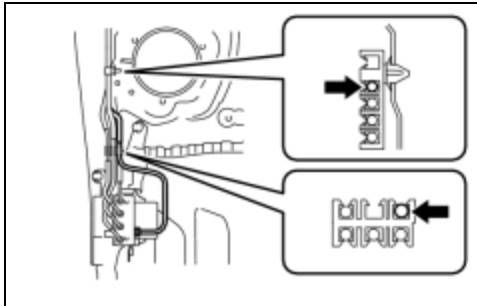


- (b) Disconnect 2 clips and remove the front No. 1 brake tube.

7. REMOVE FRONT NO. 2 BRAKE TUBE



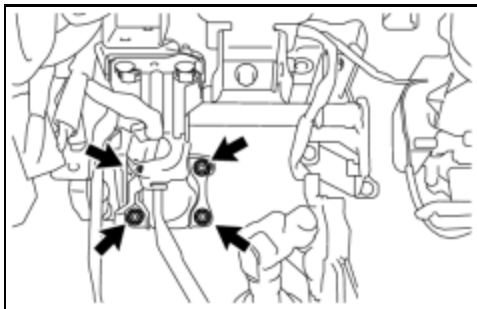
(a) Using a union nut wrench 12 mm, disconnect the front No. 2 brake tube from the brake actuator.



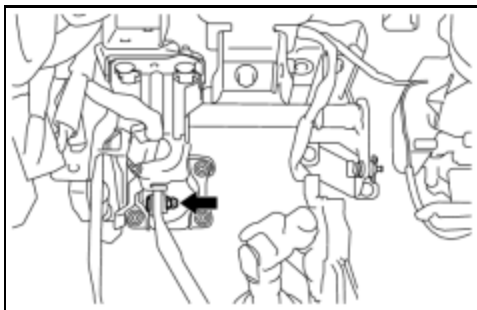
(b) Disconnect 2 clips and remove the front No. 2 brake tube.

8. REMOVE BRAKE BOOSTER ASSEMBLY

(a) Loosen the push rod clevis lock nut.



(b) Remove the 4 nuts.



(c) Remove the push rod clevis pin.

(d) Remove the brake booster assembly.

Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003WYV00DX
Title: BRAKE SYSTEM (OTHER): BRAKE FLUID: BLEEDING (2013 FR-S)		

BLEEDING

NOTICE:

- Move the shift lever to P and apply the parking brake before bleeding the brakes (for automatic transmission).
- Apply the parking brake before bleeding the brakes (for manual transmission).
- Add brake fluid to keep the level between the MIN and MAX lines of the reservoir while bleeding the brakes.
- If brake fluid leaks onto any painted surface, immediately wash it off.
- Do not operate the brake actuator assembly while air is in the brake system or in the brake master cylinder sub-assembly. Doing so may cause air to enter the brake actuator assembly.
- If bleeding the brake actuator assembly is difficult due to air in the brake actuator assembly, replace it with a new one.

HINT:

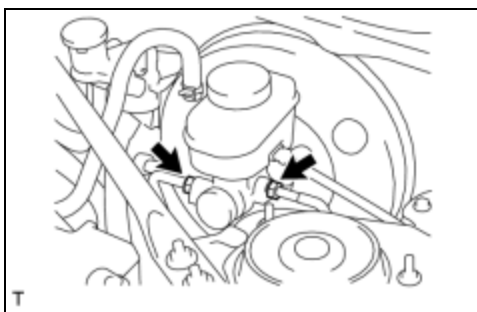
If any work is done on the brake system or if air in the brake lines is suspected, bleed the air from the system.

1. FILL RESERVOIR WITH BRAKE FLUID INFO

2. BLEED BRAKE MASTER CYLINDER SUB-ASSEMBLY

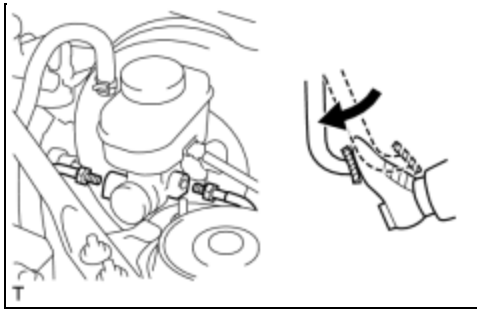
HINT:

If the master cylinder has been disassembled or if the reservoir becomes empty, bleed the air from the master cylinder.



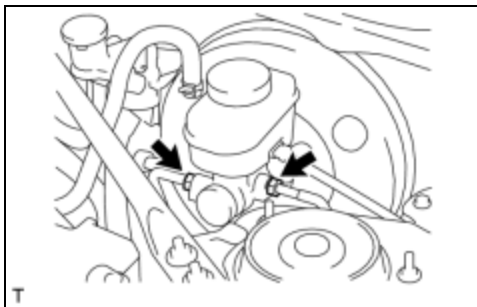
- (a) Using a union nut wrench 12 mm, separate the 2 brake tubes from the master cylinder.

- (b) Slowly depress the brake pedal and hold it there (Step A).



(c) Block the outer holes with your fingers, and release the brake pedal (Step B).

(d) Repeat Steps A and B 3 or 4 times.



(e) Using a union nut wrench 12 mm, install the 2 brake tubes into the master cylinder.

Torque: 19 N·m (194 kgf·cm, 14ft·lbf)

NOTICE:

- Do not bend or damage the brake lines.
- Do not allow brake lines to twist and interfere with other parts or vehicle body during tightening.
- Do not allow any foreign matter such as dirt or dust to enter the brake lines.
- Use the formula to calculate special torque values for situations where a union nut wrench is combined with a torque wrench [INFO](#).

3. BLEED BRAKE LINE [INFO](#)

4. INSPECT FOR BRAKE FLUID LEAK

5. INSPECT FLUID LEVEL [INFO](#)

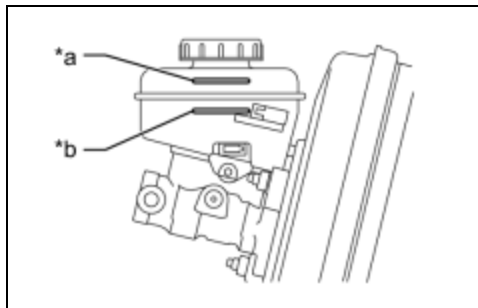
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000SRG03NX
Title: BRAKE SYSTEM (OTHER): BRAKE FLUID: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT BRAKE FLUID LEVEL IN RESERVOIR

(a) Check the fluid level.

Text in Illustration



*a	MAX Line
*b	MIN Line

If brake fluid level is lower than the MIN line, check for leaks and inspect the disc brake pads. If necessary, refill the reservoir with brake fluid to the MAX line after repair or replacement.

Brake Fluid:

SAE J1703 or FMVSS No. 116 DOT 3

NOTICE:

If using a dropper to adjust the fluid amount, make sure that the dropper has not been used with mineral oils, water or deteriorated brake fluid. Sealed areas may deteriorate and lead to fluid leaks, or the fluid may deteriorate and lead to decreased efficiency.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XY202KX
Title: BRAKE SYSTEM (OTHER): BRAKE FLUID: REPLACEMENT (2013 FR-S)		

REPLACEMENT

NOTICE:

- Move the shift lever to P and apply the parking brake before replacing the brake fluid (for automatic transmission).
- Move the shift lever to P and apply the parking brake before replacing the brake fluid (for manual transmission).
- Add brake fluid to keep the level between the MIN and MAX lines of the reservoir while replacing the brake fluid.
- If brake fluid leaks onto any painted surface, immediately wash it off.

HINT:

If any work is performed on the brake system or if air in the brake lines is suspected, bleed the brake system.

1. FILL RESERVOIR WITH BRAKE FLUID

- Remove the brake master cylinder reservoir filler cap.
- Fill the reservoir with brake fluid.

Brake Fluid:

SAE J1703 or FMVSS No. 116 DOT 3

NOTICE:

Make sure that there is sufficient brake fluid in the reservoir.

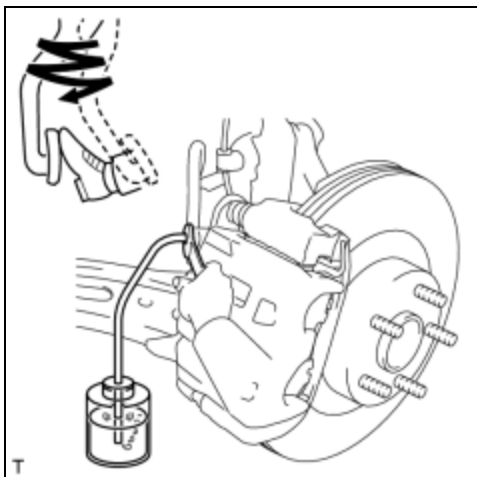
2. BLEED BRAKE LINE

NOTICE:

- Bleed the brake line of the wheel farthest from the master cylinder first.
 - Add brake fluid to keep the level between the MIN and MAX lines of the reservoir while bleeding the brake lines.
- Connect a vinyl tube to the bleeder plug.
 - Depress the brake pedal several times, and then loosen the bleeder plug with the pedal depressed.*1
 - When fluid stops coming out, tighten the bleeder plug and release the brake pedal.*2
 - Repeat steps *1 and *2 until all the air in the brake fluid is completely bled out and a new brake fluid comes out.
 - Tighten the bleeder plug completely.

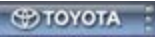
Torque: 8.0 N·m (82 kgf·cm, 71in·lbf)

- Repeat the above steps to replace the brake fluid of the brake lines for each wheel.



3. INSPECT FOR BRAKE FLUID LEAK

4. INSPECT BRAKE FLUID LEVEL IN RESERVOIR [INFO](#)



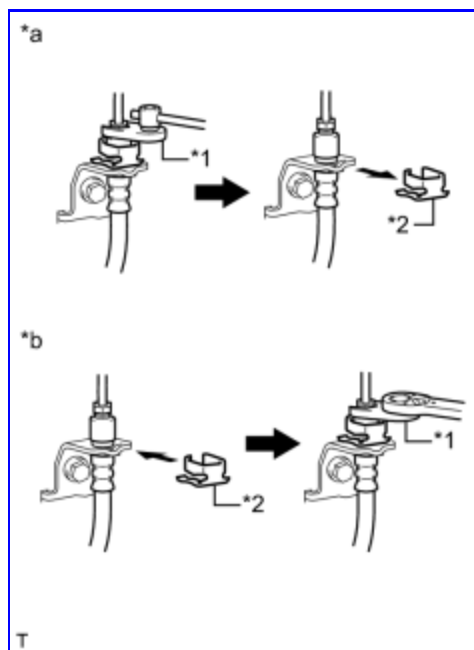
Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000SRD092X
Title: BRAKE SYSTEM (OTHER): BRAKE LINE: PRECAUTION (2013 FR-S)		

PRECAUTION

1. TROUBLESHOOTING PRECAUTION

NOTICE:

- Since the brake lines are classified as critical safety related parts, be sure to disassemble and inspect the components if a brake fluid leak is found. If any abnormality is found, replace the component with a new one.
- When removing brake components, cover the brake line connections to prevent foreign matter, such as dust or dirt, from entering the lines.
- Do not damage or deform the brake lines when removing or installing them.
- Do not deform the bracket and the body when connecting a brake line and flexible hose.
- When installing a brake tube grommet to the body, make sure that the brake line passes through the center of the grommet.
- When installing a brake line or flexible hose, make sure that it is free from twists or bends.
- If the cap of a flexible hose does not match the groove on the bracket, twist the hose slightly to insert it.
- Flexible hoses must be free from shock absorber oil, grease, etc.
- When installing a brake line to a plastic clamp, make sure that the brake line is not loose or pinched.
- Do not reuse any clips or plastic clamps removed from a flexible hose or brake line.
- After installing a brake line or flexible hose, make sure that it does not interfere with any other components.
- Do not allow brake fluid to adhere to any painted surface such as the vehicle body. If brake fluid leaks onto any painted surface, immediately wash it off.
- When disconnecting and connecting a flexible hose and brake line:

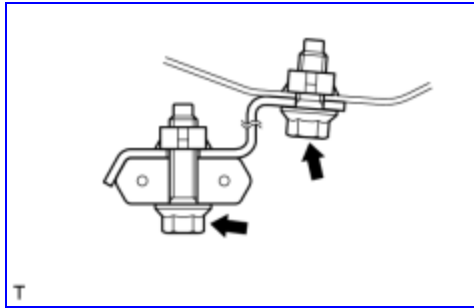


Text in Illustration

*1	Union Nut Wrench

*2	Clip
*a	Disconnecting
*b	Connecting

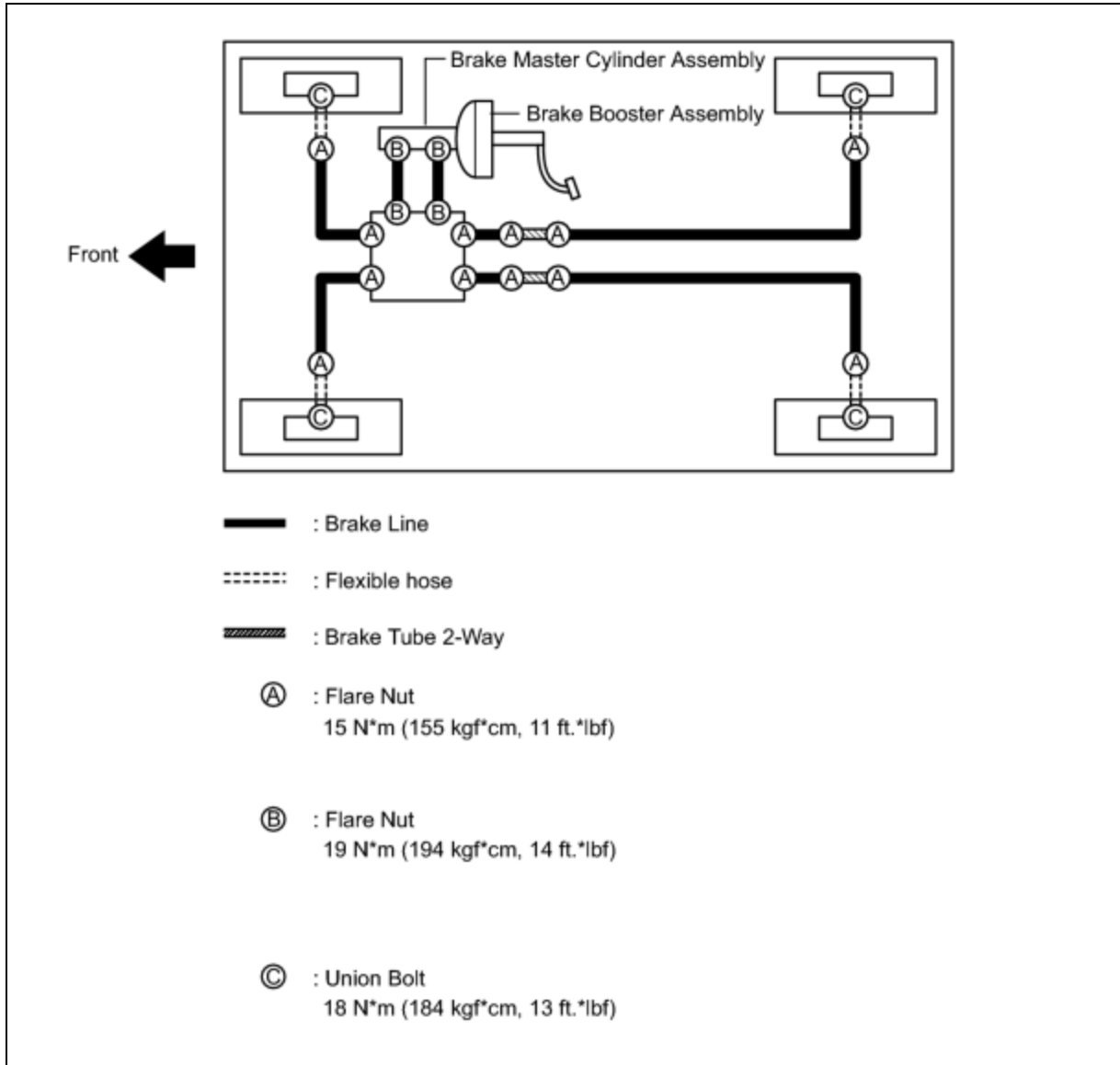
- a. Hold the flexible hose with a wrench and disconnect the brake line with a union nut wrench without deforming the line.
 - b. Remove the clip.
 - c. Install a new clip.
 - d. Hold the flexible hose with a wrench and connect the brake line with a union nut wrench without deforming the line.
- When connecting a brake line and way:



- a. Support the way to prevent deformation of the brake tube and connect the brake tube to the way with a union nut wrench.
- b. Support the way to prevent deformation of the brake tube and install the bolt to fix the way to the body.

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003D8B02EX
Title: BRAKE SYSTEM (OTHER): BRAKE LINE: SYSTEM DIAGRAM (2013 FR-S)		

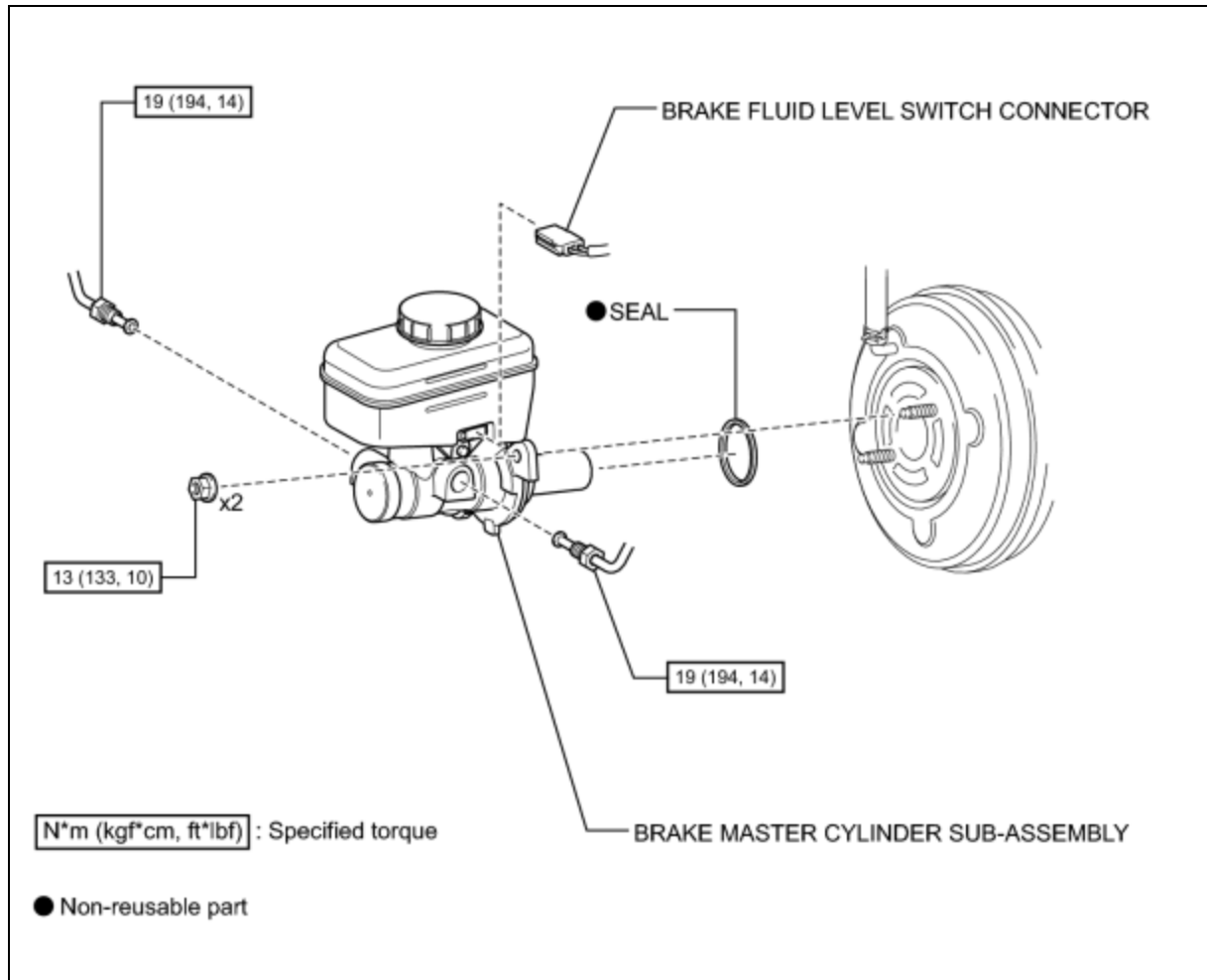
SYSTEM DIAGRAM



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HK8013X
Title: BRAKE SYSTEM (OTHER): BRAKE MASTER CYLINDER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HK602QX
Title: BRAKE SYSTEM (OTHER): BRAKE MASTER CYLINDER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL SEAL

- (a) Install a new seal to the brake master cylinder sub-assembly.

2. INSTALL BRAKE MASTER CYLINDER SUB-ASSEMBLY

- (a) Install the brake master cylinder sub-assembly to the brake booster assembly with the 2 nuts.

Torque: 13 N·m (133 kgf·cm, 10ft·lbf)

- (b) Using a union nut wrench 12 mm, install the 2 brake tubes to the brake master cylinder sub-assembly.

Torque: 19 N·m (194 kgf·cm, 14ft·lbf)

NOTICE:

Use the formula to calculate the special torque values for situations where a union nut wrench is combined with a torque wrench .

- (c) Connect the brake fluid level switch connector.

3. BLEED BRAKE SYSTEM



4. INSTALL FRONT SUSPENSION UPPER TO COWL BRACE SUB-ASSEMBLY LH



5. INSTALL FRONT WHEEL LH

Torque: 120 N·m (1224 kgf·cm, 86ft·lbf)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HK902FX
Title: BRAKE SYSTEM (OTHER): BRAKE MASTER CYLINDER: REMOVAL (2013 FR-S)		

REMOVAL

NOTICE:

Make sure to release the vacuum from the brake booster assembly before removing the brake master cylinder sub-assembly from the brake booster assembly.

1. REMOVE FRONT WHEEL LH

2. DRAIN BRAKE FLUID

NOTICE:

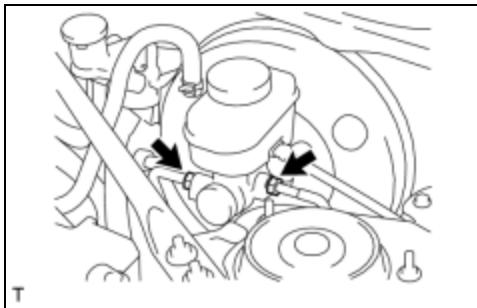
If brake fluid leaks onto any painted surface, wash it off immediately.

3. REMOVE FRONT SUSPENSION UPPER TO COWL BRACE SUB-ASSEMBLY LH

NFC

4. REMOVE BRAKE MASTER CYLINDER SUB-ASSEMBLY

- (a) Release the vacuum from the booster by depressing the brake pedal several times.
- (b) Disconnect the brake fluid level switch connector.

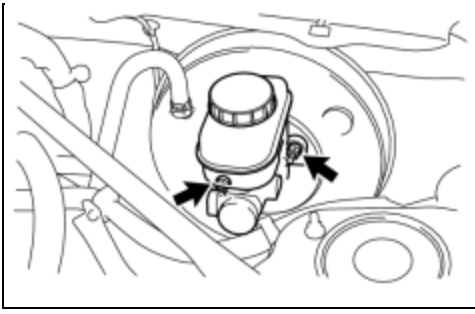


- (c) Using a union nut wrench 12 mm, disconnect the 2 brake tubes from the brake master cylinder sub-assembly.

- (d) Remove the 2 nuts and the brake master cylinder sub-assembly from the brake booster assembly.

NOTICE:

- Because of the way the master cylinder sub-assembly is designed, the piston can easily fall out, and so do not hold the master cylinder sub-assembly by the piston or pull the piston out. If the piston has been removed from the master cylinder sub-assembly by accident, there is a danger that the performance of the master cylinder sub-assembly will be degraded, and so it cannot be reused and must be replaced with a new master cylinder sub-assembly.
- The master cylinder requires careful handling. Do not allow the master cylinder to receive any impact, such as



from being dropped. Do not reuse a master cylinder that has been dropped.

- Do not strike or pinch the master cylinder piston, and do not cause any damage to the master cylinder piston by any other means.
- When installing the master cylinder to the brake booster or removing the master cylinder from the brake booster, make sure that the master cylinder is kept horizontal or with its tip facing downward (the piston faces upward) to prevent the master cylinder piston from falling out.
- Do not allow any foreign objects to contaminate the master cylinder piston. If a foreign object gets on the piston, remove it by using a piece of cloth, and then apply an even layer of lithium soap base glycol grease around the circumference (sliding part) of the piston.
- Do not use any other type of grease or fluid.
- Be careful not to damage the brake tubes.

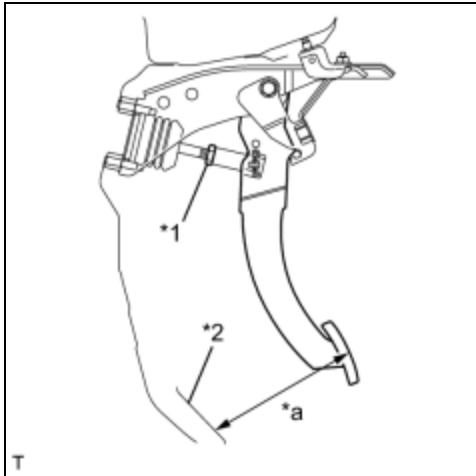
5. REMOVE SEAL

- (a) Remove the seal.

Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HJ3019X
Title: BRAKE SYSTEM (OTHER): BRAKE PEDAL (for Automatic Transmission): ADJUSTMENT (2013 FR-S)		

ADJUSTMENT

1. CHECK AND ADJUST BRAKE PEDAL HEIGHT



(a) Check the pedal height.

Text in Illustration

*1	Push Rod Clevis Lock Nut
*2	Floor mat
*a	Pedal Height

Standard Pedal Height from floor mat:
150mm (5.906in.)

(b) Adjust the pedal height.

- (1) Remove the instrument side panel LH.
- (2) Remove the No. 1 instrument panel under cover sub-assembly.
- (3) Disconnect the connector from the stop light switch assembly.
- (4) Remove the stop light switch assembly.
- (5) Loosen the push rod clevis lock nut.
- (6) Adjust the pedal height by turning the push rod.

Standard Pedal Height from floor mat:
150mm (5.906in.)

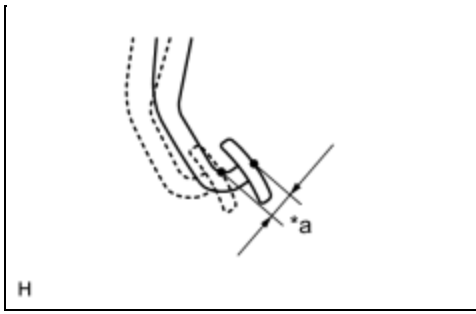
- (7) Tighten the push rod clevis lock nut.

Torque: 19 N·m (194 kgf·cm, 14ft·lbf)

- (8) Install the stop light switch NFC.
- (9) Connect the connector to the stop light switch assembly.
- (10) Check that the stop light does not illuminate when the brake pedal is not stepped.

2. CHECK BRAKE PEDAL FREE PLAY

(a) Stop the engine. Depress the pedal several times until



there is no vacuum in the booster. Then release the pedal.

- (b) Depress the pedal until resistance is felt.
- (c) Check the pedal free play by measuring the distance between the position in the previous step and the pedal released position.

Standard pedal free play:
0.5 to 2.0mm (0.020 to 0.079in.)

Text in Illustration

*a	Pedal Free Play
----	-----------------

HINT:

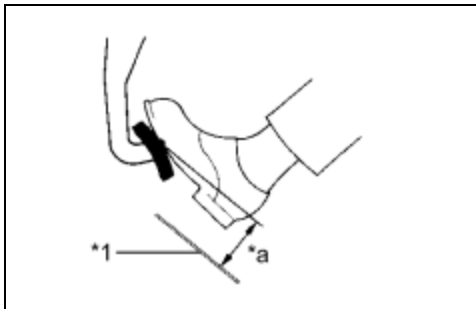
If the pedal free play distance 1mm (0.039in.) or less, adjust the stop light switch assembly.

3. CHECK BRAKE PEDAL RESERVE DISTANCE

- (a) Release the brake pedal. Start the engine, and when the pressure in the brake booster reaches 66.7 kPa (500 mmHg, 19.6 in.Hg), proceed with the next step.

- (b) Depress the pedal and check the pedal reserve distance.

Text in Illustration



*1	Floor mat
*a	Pedal Reserve Distance

Standard Pedal Reserve Distance from the floor mat at 490 N (50 kgf, 110.2 lbf):
More than 55 mm (2.165 in.)

If the distance is not as specified, troubleshoot the brake system.

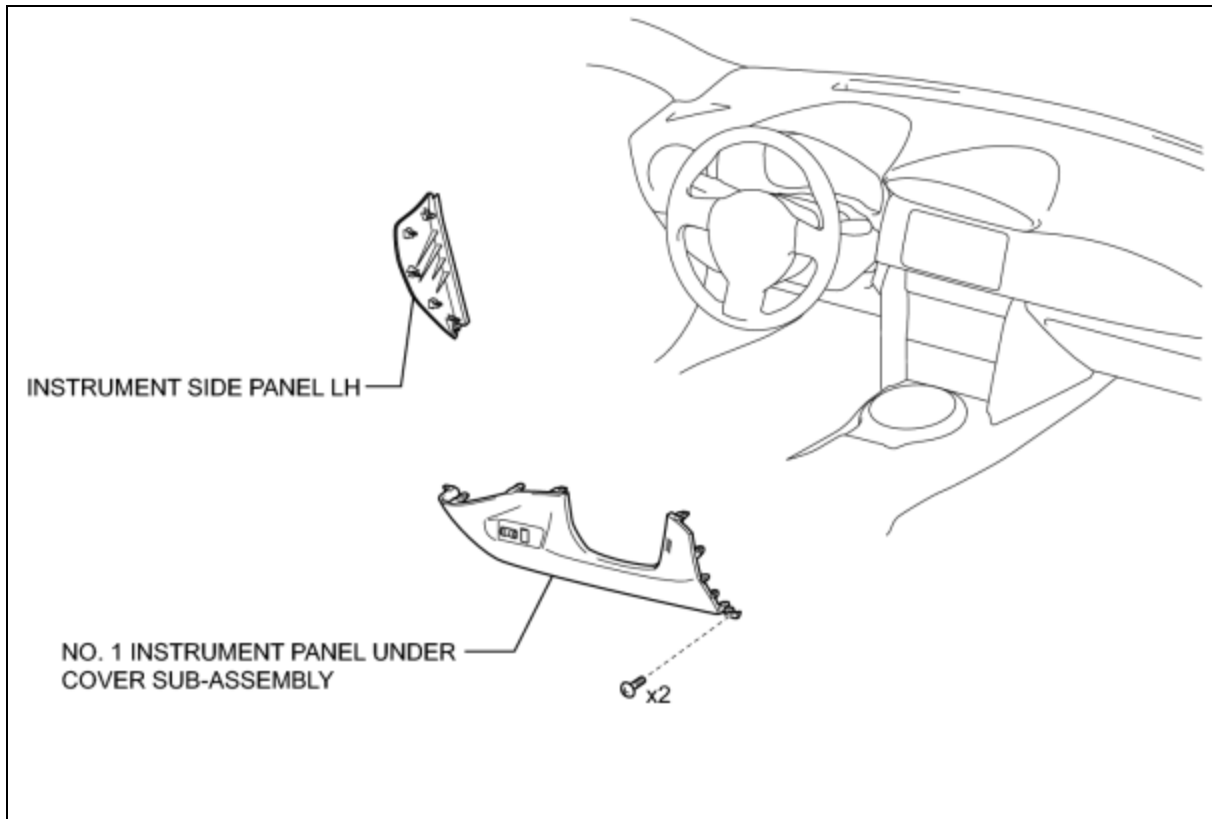
HINT:

Check the brake pedal reserve distance at the same location as that used when checking the brake pedal height.

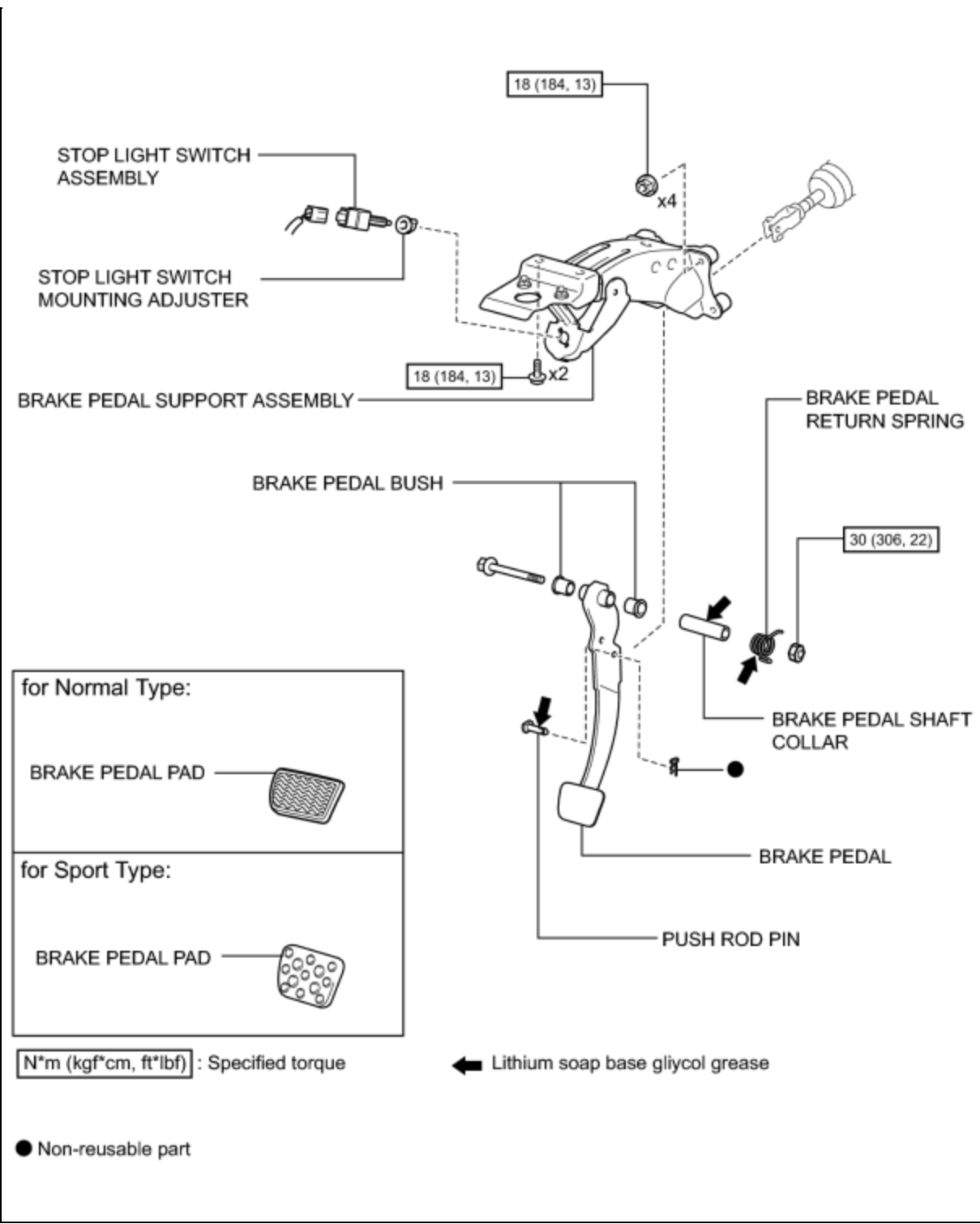
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003D8800HX
Title: BRAKE SYSTEM (OTHER): BRAKE PEDAL (for Automatic Transmission): COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



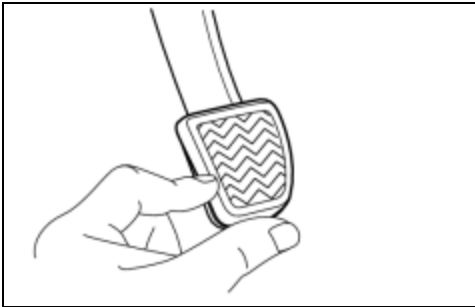
ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002W9103JX
Title: BRAKE SYSTEM (OTHER): BRAKE PEDAL (for Automatic Transmission): DISASSEMBLY (2013 FR-S)		

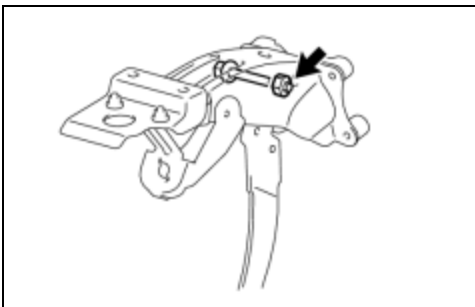
DISASSEMBLY

1. REMOVE BRAKE PEDAL PAD



- (a) Remove the brake pedal pad from the brake pedal support assembly.

2. REMOVE BRAKE PEDAL



- (a) Remove the bolt and nut from the brake pedal support assembly.

HINT:

Hold the bolt in place and loosen the nut.

3. REMOVE BRAKE PEDAL RETURN SPRING

- (a) Remove the brake pedal return spring.

4. REMOVE BRAKE PEDAL SHAFT COLLAR

- (a) Remove the brake pedal shaft collar.

5. REMOVE BRAKE PEDAL BUSH

- (a) Remove the 2 brake pedal bushes.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002W8Y04VX
Title: BRAKE SYSTEM (OTHER): BRAKE PEDAL (for Automatic Transmission): INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL BRAKE PEDAL SUPPORT ASSEMBLY

(a) Install the brake pedal support assembly with the 4 nuts.

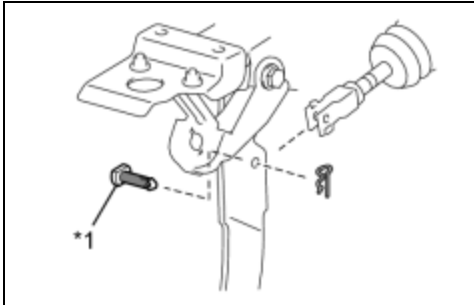
Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

(b) Install the brake pedal support assembly with the 2 bolts.


Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

2. INSTALL PUSH ROD PIN

(a) Apply lithium soap base glycol grease to the new push rod pin.



Text in Illustration

*1	Push Rod Pin
	Lithium Soap Base Glycol Grease

(b) Connect the brake master cylinder push rod clevis to the brake pedal with the new push rod pin, and install a new clip as shown in the illustration.

NOTICE:

After installation, check that the pedal operates smoothly.

3. INSTALL STOP LIGHT SWITCH MOUNTING ADJUSTER

(a) Engage the 2 claws and install the stop light switch mounting adjuster.

4. INSPECT AND ADJUST BRAKE PEDAL

INFO

5. INSPECT AND ADJUST BRAKE PEDAL HEIGHT

INFO

6. INSPECT BRAKE PEDAL FREE PLAY

INFO

7. INSPECT BRAKE PEDAL RESERVE DISTANCE

INFO

8. INSTALL STOP LIGHT SWITCH ASSEMBLY

INFO

9. INSTALL TCM

INFO

10. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

INFO

11. INSTALL INSTRUMENT SIDE PANEL LH

HINT:

Use the same procedure for the LH side as for the RH side

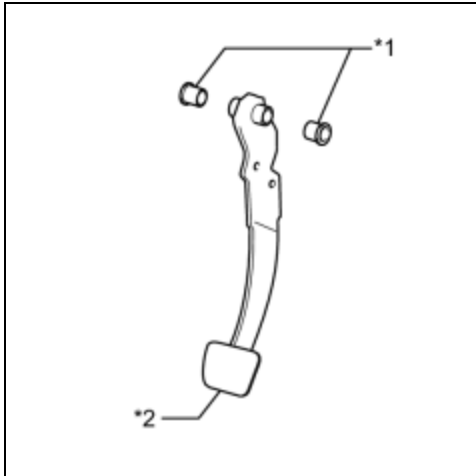
INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002W9203WX
Title: BRAKE SYSTEM (OTHER): BRAKE PEDAL (for Automatic Transmission): REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL BRAKE PEDAL BUSH



(a) Install the 2 brake pedal bushes to the brake pedal.

Text in Illustration


*1	Brake Pedal Bush
*2	Brake Pedal

2. INSTALL BRAKE PEDAL

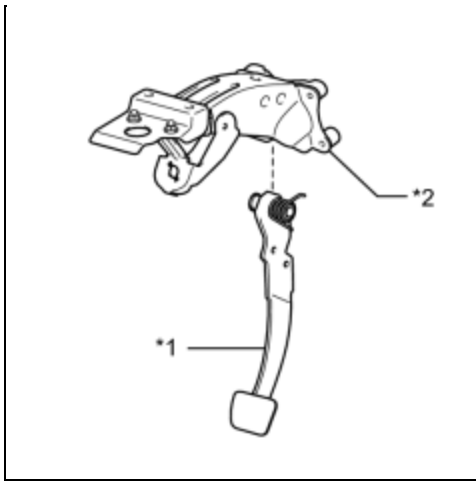
(a) Apply a light layer of lithium soap base glycol grease to the entire circumference of the brake pedal return spring and brake pedal shaft collar.



Text in Illustration

	Lithium soap base glycol grease
---	---------------------------------

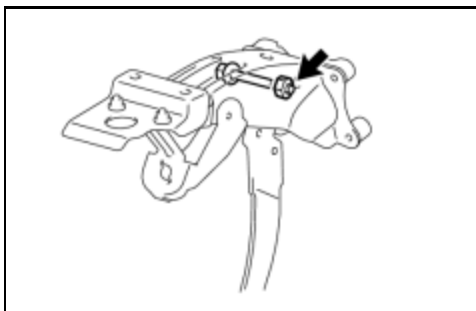
(b) Install the brake pedal return spring and brake pedal shaft collar to the brake pedal.



(c) Install the brake pedal to the brake pedal bracket support assembly.

Text in Illustration

*1	Brake Pedal
*2	Brake Pedal Support Assembly



(d) Install the bolt and nut to the brake pedal support assembly.

HINT:

Hold the bolt in place and tighten the nut.

Torque: 30 N·m (306 kgf·cm, 22ft·lbf)

3. INSTALL BRAKE PEDAL PAD

(a) Install the brake pedal pad to the brake pedal.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002W9004UX
Title: BRAKE SYSTEM (OTHER): BRAKE PEDAL (for Automatic Transmission): REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE INSTRUMENT SIDE PANEL LH

HINT:

Use the same procedure for the LH side as for the RH side [INFO](#) .

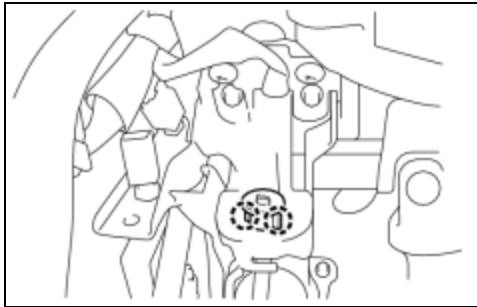
2. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)

3. REMOVE TCM

[INFO](#)

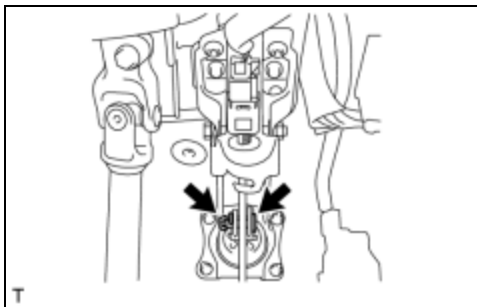
4. REMOVE STOP LIGHT SWITCH ASSEMBLY [INFO](#)

5. REMOVE STOP LIGHT SWITCH MOUNTING ADJUSTER



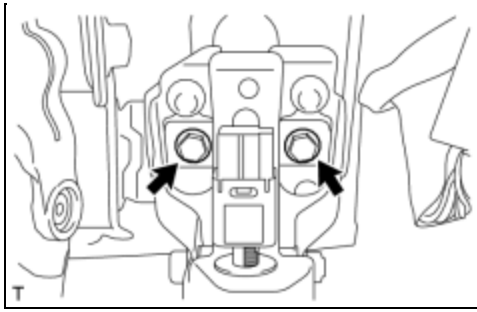
- (a) Disengage the 2 clamps and remove the stop light switch mounting adjuster from the brake pedal support assembly.

6. REMOVE PUSH ROD PIN

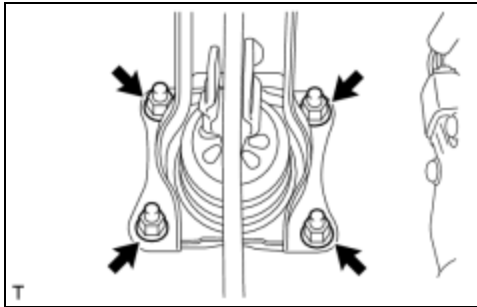


- (a) Remove the clip and the push rod pin from the push rod clevis.

7. REMOVE BRAKE PEDAL SUPPORT ASSEMBLY



(a) Remove the 2 bolts from the brake pedal support assembly.

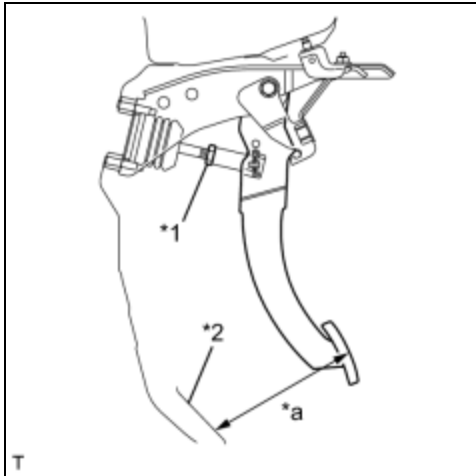


(b) Remove the 4 nuts and the brake pedal support assembly.

Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HJ3018X
Title: BRAKE SYSTEM (OTHER): BRAKE PEDAL (for Manual Transmission): ADJUSTMENT (2013 FR-S)		

ADJUSTMENT

1. CHECK AND ADJUST BRAKE PEDAL HEIGHT



(a) Check the pedal height.

Text in Illustration

*1	Push Rod Clevis Lock Nut
*2	Floor mat
*a	Pedal Height

Standard Pedal Height from floor mat:
145mm
(5.709in.)

(b) Adjust the pedal height.

- (1) Remove the instrument side panel LH.
- (2) Remove the No. 1 instrument panel under cover sub-assembly.
- (3) Disconnect the connector from the stop light switch assembly.
- (4) Remove the stop light switch assembly.
- (5) Loosen the push rod clevis lock nut.
- (6) Adjust the pedal height by turning the push rod.

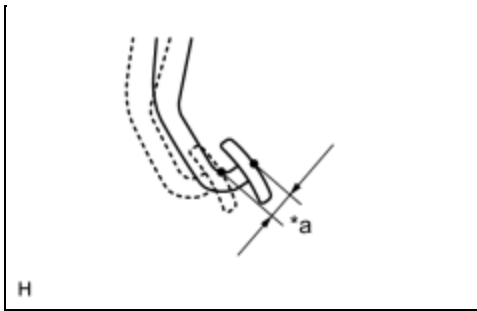
Standard Pedal Height from floor mat:
145mm
(5.709in.)

- (7) Tighten the push rod clevis lock nut.

Torque: 19 N·m (194 kgf·cm, 14ft·lbf)

- (8) Install the stop light switch assembly INFO.
- (9) Connect the connector to the stop light switch assembly.
- (10) Check that the stop light does not illuminate when the brake pedal is not stepped.

2. CHECK BRAKE PEDAL FREE PLAY



(a) Stop the engine. Depress the pedal several times until there is no vacuum in the booster. Then release the pedal.

(b) Depress the pedal until resistance is felt.

(c) Check the pedal free play by measuring the distance between the position in the previous step and the pedal released position.

Standard pedal free play:

0.5 to 2.0mm

(0.020 to 0.079in.)

Text in Illustration

*a	Pedal Free Play
----	-----------------

HINT:

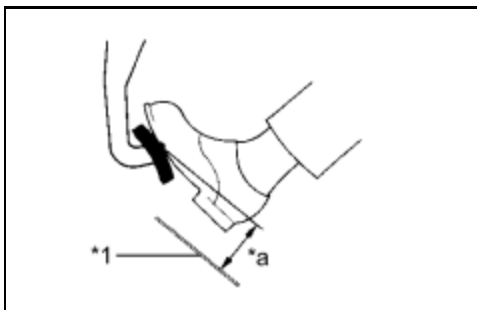
Check the brake pedal free play at the same location as that used when checking the brake pedal height.

3. CHECK BRAKE PEDAL RESERVE DISTANCE

(a) Release the brake pedal. Start the engine, and when the pressure in the brake booster reaches 66.7 kPa (500 mmHg, 19.6 in.Hg), proceed with the next step.

(b) Depress the pedal and check the pedal reserve distance.

Text in Illustration



*1	Floor mat
*a	Pedal Reserve Distance

Standard Pedal Reserve Distance from the floor mat at 490 N (50 kgf, 110.2 lbf):

More than 55 mm (2.165 in.)

If the distance is not as specified, troubleshoot the brake system.

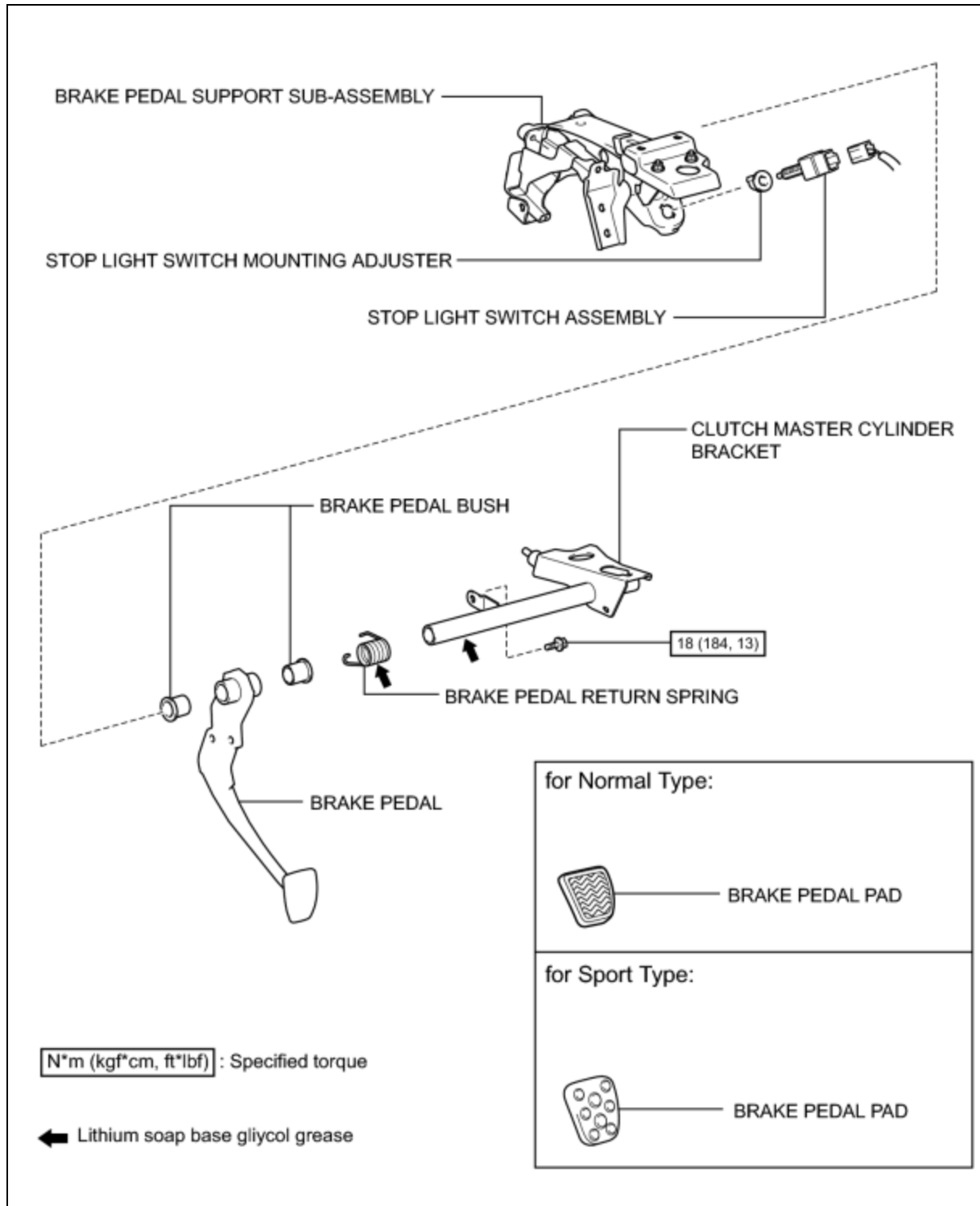
HINT:

Check the brake pedal reserve distance at the same location as that used when checking the brake pedal height.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HJ500QX
Title: BRAKE SYSTEM (OTHER): BRAKE PEDAL (for Manual Transmission): COMPONENTS (2013 FR-S)		

COMPONENTS

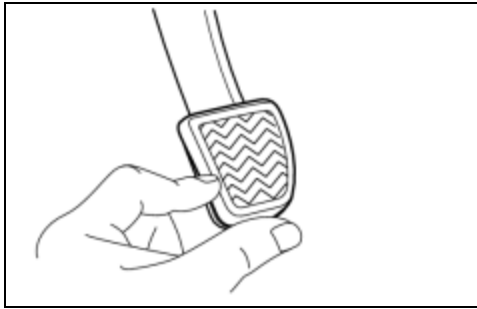
ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002W9103KX
Title: BRAKE SYSTEM (OTHER): BRAKE PEDAL (for Manual Transmission): DISASSEMBLY (2013 FR-S)		

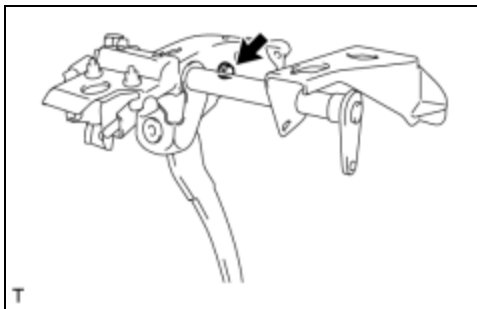
DISASSEMBLY

1. REMOVE BRAKE PEDAL PAD

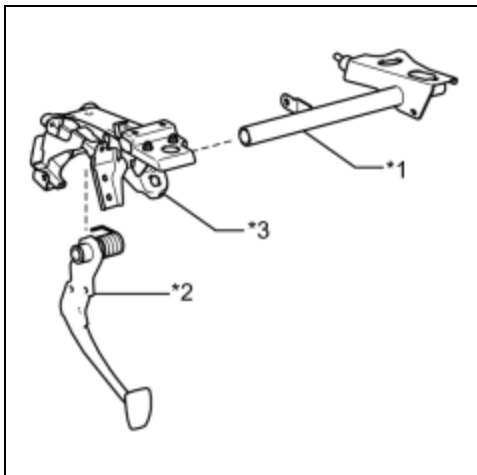


(a) Remove the brake pedal pad from the brake pedal support assembly.

2. REMOVE BRAKE PEDAL



(a) Remove the bolt.



(b) Remove the clutch master cylinder bracket and the brake pedal from the brake pedal support assembly.

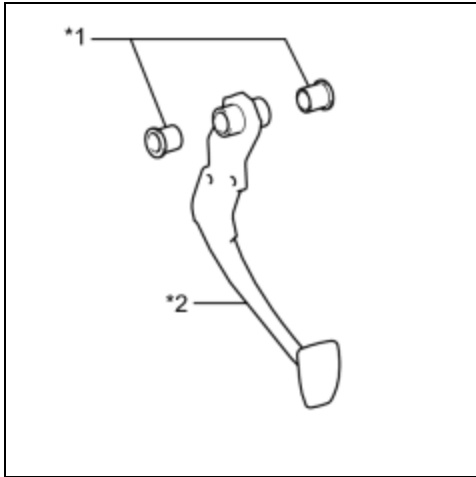
Text in Illustration

*1	Clutch Master Cylinder Bracket
*2	Brake Pedal
*3	Brake Pedal Support Assembly

3. REMOVE BRAKE PEDAL RETURN SPRING

(a) Remove the brake pedal return spring from the clutch master cylinder bracket.

4. REMOVE BRAKE PEDAL BUSH



(a) Remove the 2 brake pedal bushes from the brake pedal.

Text in Illustration

*1	Brake Pedal Bush
*2	Brake Pedal



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HJ401BX
Title: BRAKE SYSTEM (OTHER): BRAKE PEDAL (for Manual Transmission): INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL STOP LIGHT SWITCH MOUNTING ADJUSTER

(a) Engage the 2 clamps and install the stop light switch mounting adjuster.

2. INSPECT AND ADJUST BRAKE PEDAL

INFO

3. INSTALL STOP LIGHT SWITCH ASSEMBLY **INFO**

4. INSTALL CLUTCH PEDAL SUB-ASSEMBLY

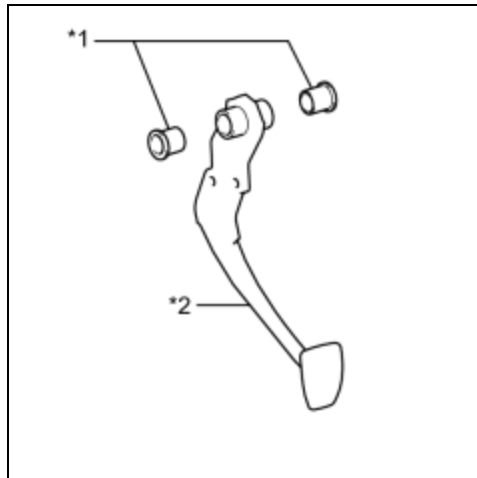
INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002W9203XX
Title: BRAKE SYSTEM (OTHER): BRAKE PEDAL (for Manual Transmission): REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL BRAKE PEDAL BUSH



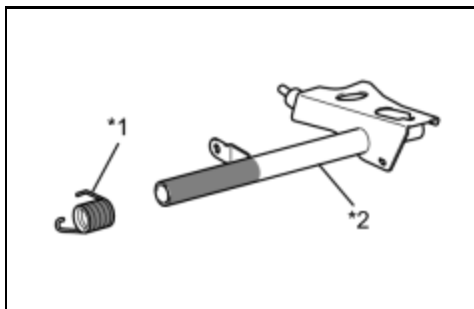
(a) Install the 2 brake pedal bushes to the brake pedal.

Text in Illustration


*1	Brake Pedal Bush
*2	Brake Pedal

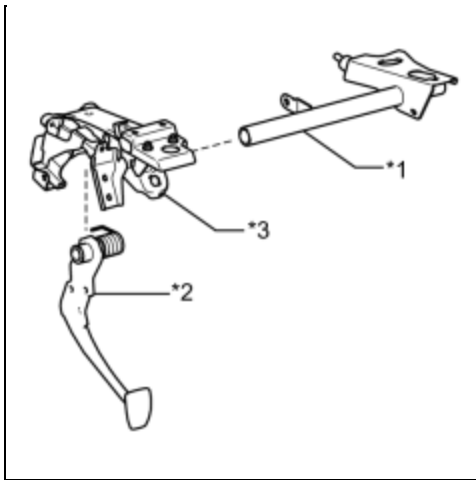
2. INSTALL BRAKE PEDAL

(a) Apply lithium soap base glycol grease to the brake pedal return spring and the clutch master cylinder bracket.



Text in Illustration

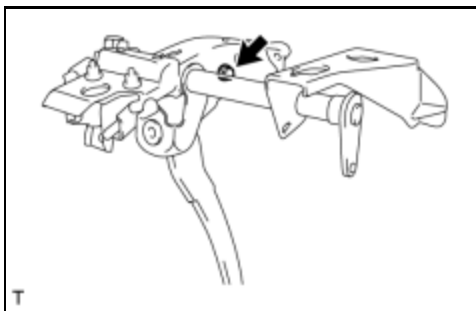
*1	Brake Pedal Return Spring
*2	Clutch Master Cylinder Bracket
	Lithium Soap Base Glycol Grease



(b) Install the clutch master cylinder bracket and the brake pedal to the brake pedal support sub-assembly.

Text in Illustration

*1	Clutch Master Cylinder Bracket
*2	Brake Pedal
*3	Brake Pedal Support Sub-assembly



(c) Install the bolt.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

3. INSTALL BRAKE PEDAL PAD

(a) Install the brake pedal pad to the brake pedal.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HJ6018X
Title: BRAKE SYSTEM (OTHER): BRAKE PEDAL (for Manual Transmission): REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE CLUTCH PEDAL SUB-ASSEMBLY

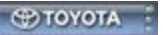
INFO

2. REMOVE STOP LIGHT SWITCH ASSEMBLY **INFO**

3. REMOVE STOP LIGHT SWITCH MOUNTING ADJUSTER



- (a) Disengage the 2 clamps and remove the stop light switch mounting adjuster from the brake pedal support sub-assembly.



Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HJ901XX
Title: BRAKE SYSTEM (OTHER): BRAKE SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

NOTICE:

- Take extra care to replace each part properly. Improper installation or repair could affect the performance of the brake system and cause a driving hazard.
- It is very important to keep the brake system parts and the work area clean when repairing the brake system.
- If the vehicle is equipped with a mobile communication system, refer to the Precautions in the Introduction section.
- Care must be taken when using magnets as they could affect the performance of the speed sensors.
- Since the brake line is one of the critical safety-related parts, be sure to disassemble the components if a brake fluid leak is found. If any abnormality is found, replace the component with a new one.
- When removing brake components, cover the brake tube connections to prevent foreign matter such as dust or dirt from entering the tubes.
- Do not damage or deform the brake tubes when removing or installing them.
- Do not deform the bracket and the body when connecting a brake line and flexible hose.
- When installing a brake tube grommet to the body, make sure that the brake tube passes through the center of the grommet.
- When installing a brake tube or flexible hose, make sure that it is not twisted or bent.
- If the fitting of the flexible hose does not match the groove on the bracket, twist the hose slightly to insert it.
- Flexible hoses must be free from absorber oil, grease, etc.
- When installing a brake tube to a plastic clamp, make sure that the brake tube is not loose or being pinched.
- Do not reuse a clip or plastic clamp removed from a flexible hose.
- After installing a brake tube and flexible hose, make sure that they do not interfere with any other components.
- Do not allow brake fluid to adhere to any painted surface such as the vehicle body. If brake fluid leaks onto any painted surface, immediately wash it off.

Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HJA01YX
Title: BRAKE SYSTEM (OTHER): BRAKE SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

Brake System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Low pedal or spongy pedal	Fluid leaks in brake system	-
	Air in brake system	INFO
	Front brake piston seals (worn or damaged)	INFO
	Rear brake piston seals (worn or damaged)	INFO
	Brake master cylinder (faulty)	INFO
	Booster push rod (adjustment necessary)	INFO
Brake drag	Brake pedal free play (minimum)	INFO
	Parking brake lever travel (adjustment necessary)	INFO
	Parking brake cable (sticking)	INFO
	Parking brake shoe clearance (adjustment necessary)	INFO
	Front brake pad (cracked or distorted)	INFO
	Rear brake pad (cracked or distorted)	INFO
	Parking brake lining (cracked or distorted)	INFO
	Front brake piston (stuck or seized)	INFO
	Rear brake piston (stuck or seized)	INFO
	Parking brake shoe return tension spring	INFO
	Vacuum leaks in booster system	INFO
	Brake master cylinder (faulty)	INFO
Brake pull	Front brake piston (stuck or seized)	INFO
	Rear brake piston (stuck or seized)	INFO
	Front brake pad (oily, cracked or distorted)	INFO
	Rear brake pad (oily, cracked or distorted)	INFO
	Parking brake lining (oily, cracked or distorted)	INFO

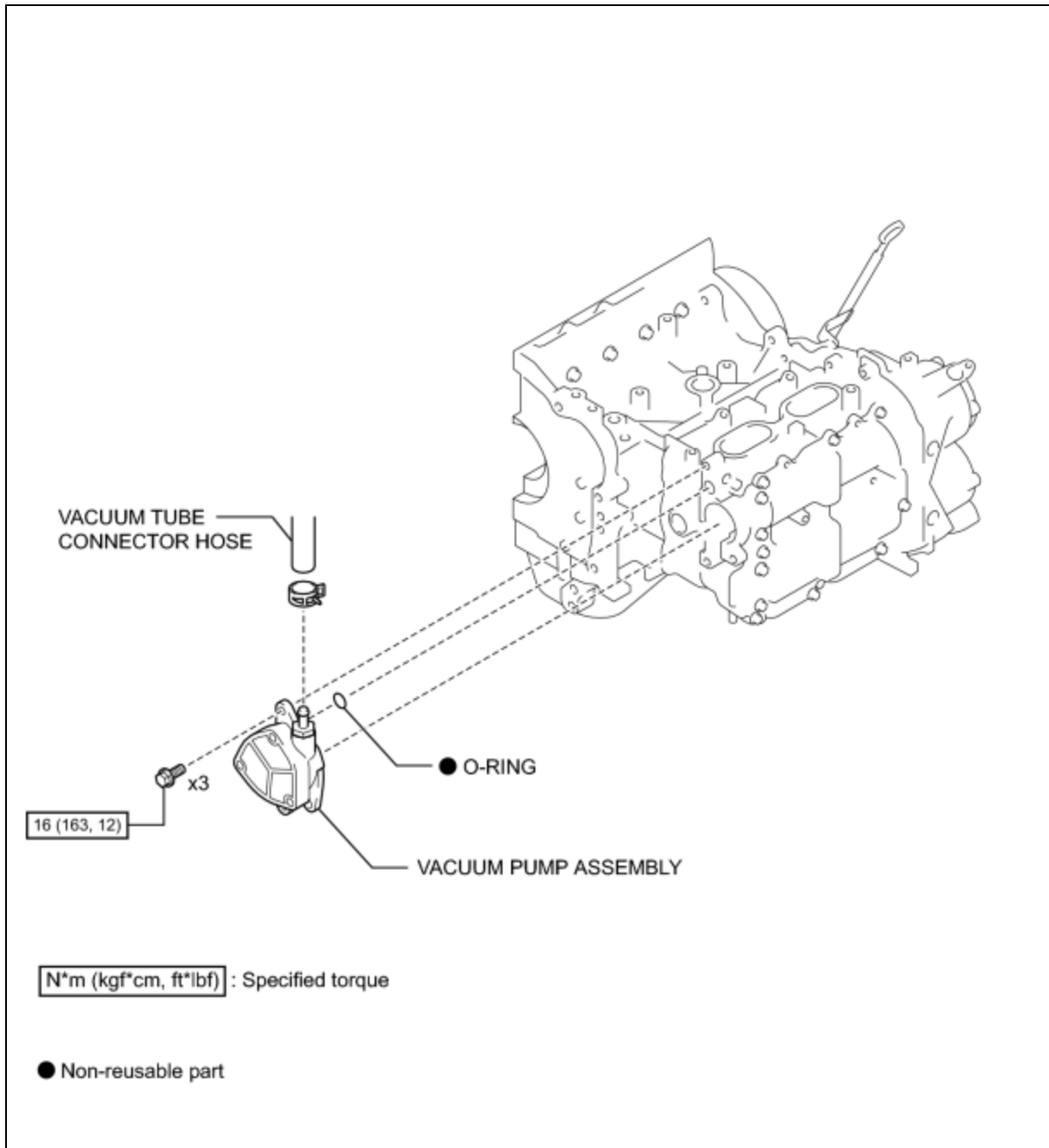
	Front brake disc (scored)	INFO
	Rear brake disc (scored)	INFO
Hard pedal but braking inefficient	Fluid leaks in brake system	-
	Air in brake system	INFO
	Front brake pad (worn, cracked, distorted, oily or glazed)	INFO
	Rear brake pad (worn, cracked, distorted, oily or glazed)	INFO
	Parking brake lining (worn, cracked, distorted, oily or glazed)	INFO
	Front brake disc (scored)	INFO
	Rear brake disc (scored)	INFO
	Vacuum leaks in booster system	INFO
Noise from brakes	Front brake pad (cracked, distorted, dirty or glazed)	INFO
	Rear brake pad (cracked, distorted, dirty or glazed)	INFO
	Front disc brake pad clip (worn)	INFO
	Rear disc brake pad clip (worn)	INFO
	Front brake installation bolt (loose)	INFO
	Rear brake installation bolt (loose)	INFO
	Front brake disc (scored)	INFO
	Rear brake disc (scored)	INFO
	Front brake anti-squeal shim (damaged)	INFO
	Rear brake anti-squeal shim (damaged)	INFO
	Parking brake shoe hold-down spring (damaged)	INFO



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000218900HX
Title: BRAKE SYSTEM (OTHER): VACUUM PUMP: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000159A017X
Title: BRAKE SYSTEM (OTHER): VACUUM PUMP: INSTALLATION (2013 FR-S)		

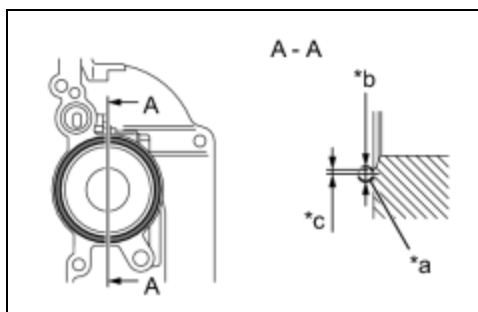
INSTALLATION

1. INSTALL VACUUM PUMP ASSEMBLY

(a) Coat a new O-ring with engine oil, and install it.

(b) Apply seal packing in a continuous line as shown in the illustration.

Text in Illustration



*a	Edge of groove
*b	2.0 to 4.0 mm (0.078 to 0.158 in.) in diameter
*c	1.0mm or less

NOTICE:

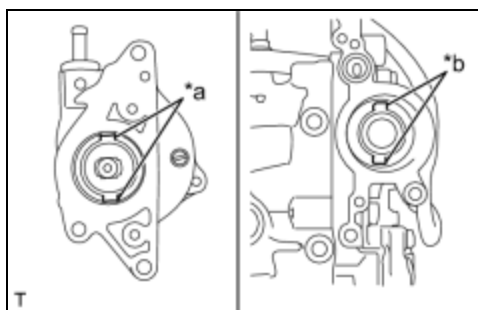
- Clean and degrease the contact surface.
- Install the vacuum pump assembly within 5 minutes of applying seal packing.

HINT:

When replace the vacuum pump assembly on the vehicle, apply seal packing to the vacuum pump assembly.

(c) Install the vacuum pump assembly while aligning the grooves of the vacuum pump assembly with the claws of the intake camshaft RH.

Text in Illustration



*a	Groove of the vacuum pump assembly
*b	Claw of the intake camshaft

NOTICE:

Make sure that the O-ring is not pinched.

(d) Install the 3 bolts.

Torque: 16 N·m (163 kgf·cm, 12ft·lbf)

2. INSTALL VACUUM TUBE CONNECTOR HOSE

(a) Install the vacuum tube connector hose.

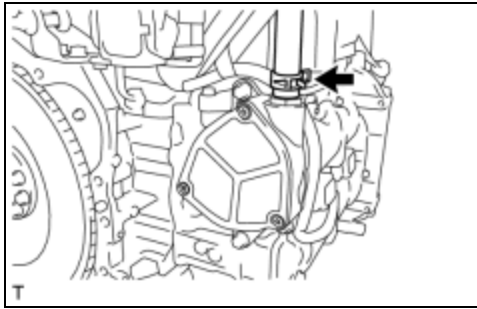
3. INSTALL FRONT SUSPENSION UPPER TO COWL BRACE SUB-ASSEMBLY RH



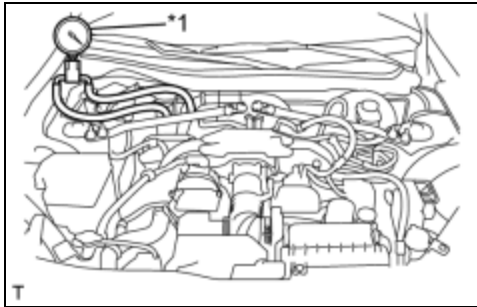
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000159D016X
Title: BRAKE SYSTEM (OTHER): VACUUM PUMP: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT VACUUM PUMP ASSEMBLY OPERATION



- (a) Move the clamp and disconnect the vacuum tube connector hose from the vacuum pump assembly.



- (b) Connect the hose of a vacuum gauge to the vacuum pump assembly.

Text in Illustration

*1	Vacuum Gauge
----	--------------

- (c) Start the engine and warm it up for more than 2 minutes.
 (d) With the engine idling, check the vacuum of the vacuum pump assembly.

Standard pressure:

More than 93 kPa (698 mmHg, 27 in.Hg) of vacuum

If the is not as specified, disassemble the vacuum pump assembly and inspect or replace it [INFO](#).

HINT:

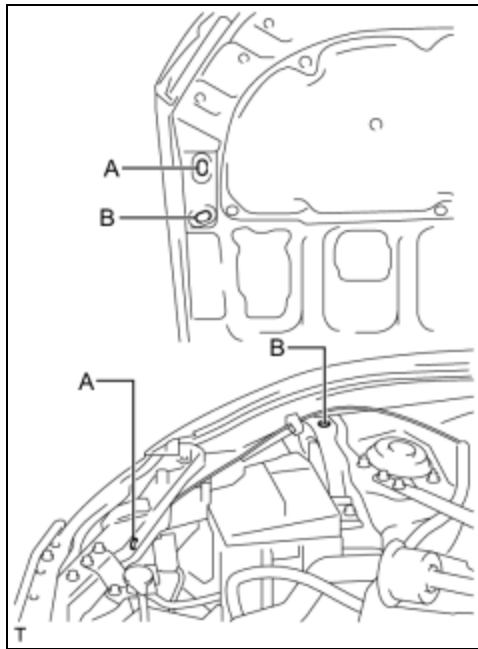
After disassembling and checking the vacuum pump assembly, check the vacuum pump assembly function.

- (e) Remove the vacuum gauge from the vacuum pump assembly.
 (f) Connect the vacuum tube connector hose to the vacuum pump and move the clamp back into position.

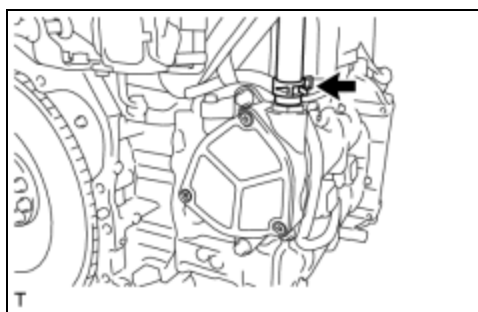
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000159C017X
Title: BRAKE SYSTEM (OTHER): VACUUM PUMP: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE VACUUM TUBE CONNECTOR HOSE



- (a) Change the locations of the front hood stay from A to B, and support the hood sub-assembly with the location B.

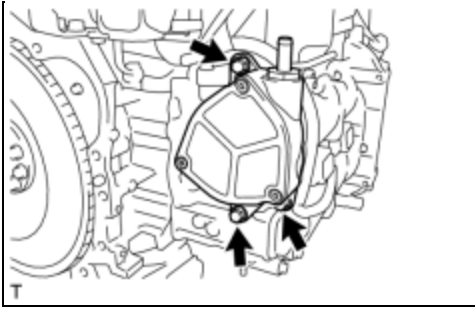


- (b) Disconnect the vacuum tube connector hose from the vacuum pump assembly.

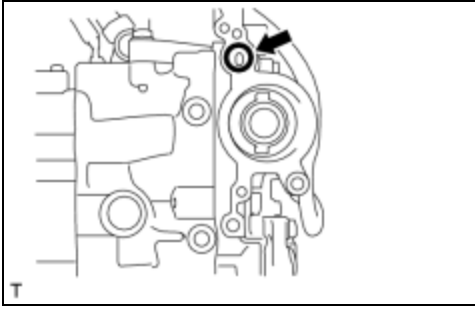
2. REMOVE FRONT SUSPENSION UPPER TO COWL BRACE SUB-ASSEMBLY RH

NFC

3. REMOVE VACUUM PUMP ASSEMBLY



(a) Remove the 3 bolts and vacuum pump assembly.



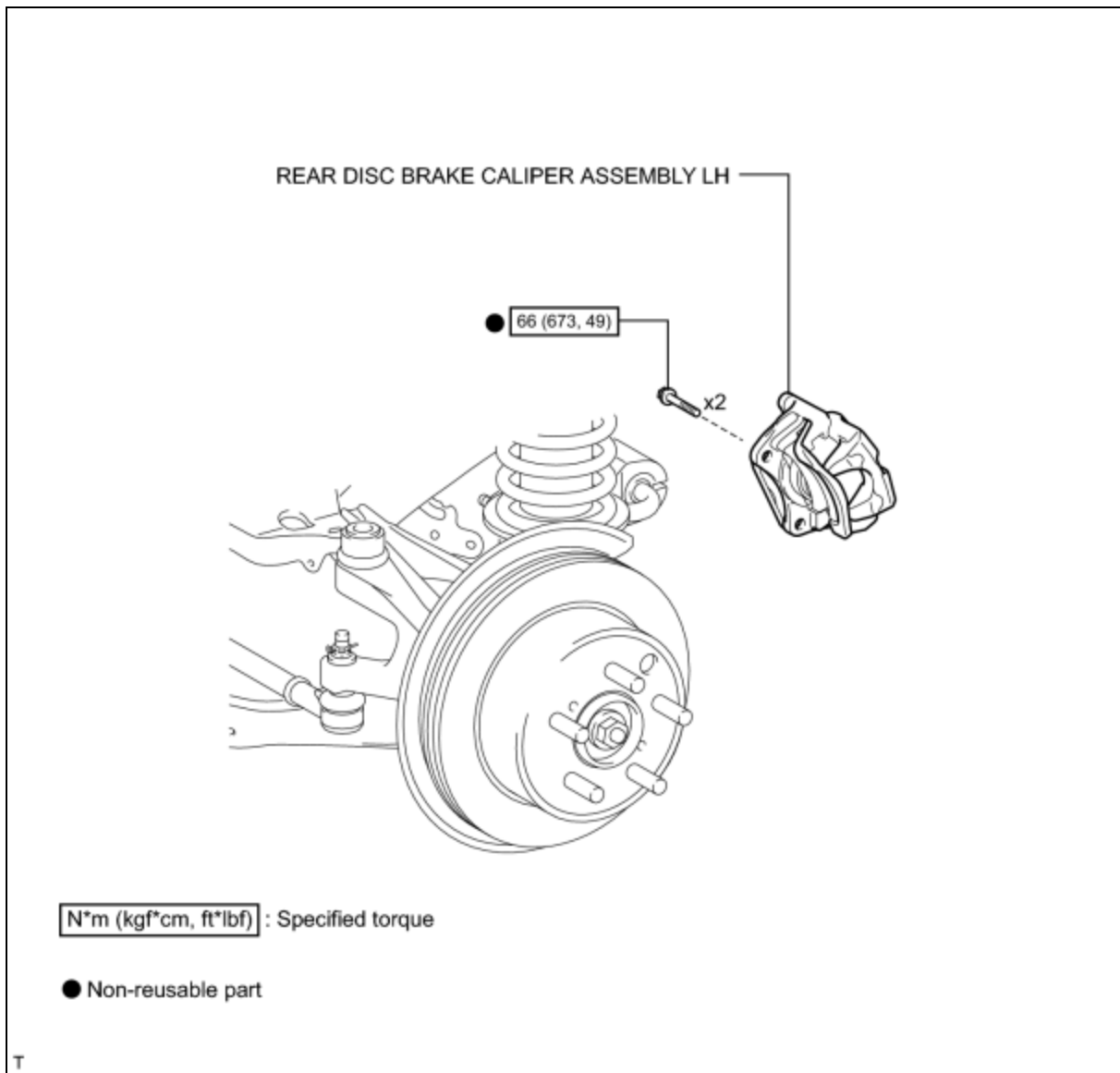
(b) Remove the O-ring.

(c) Remove the seal packing from the vacuum pump assembly and the engine.

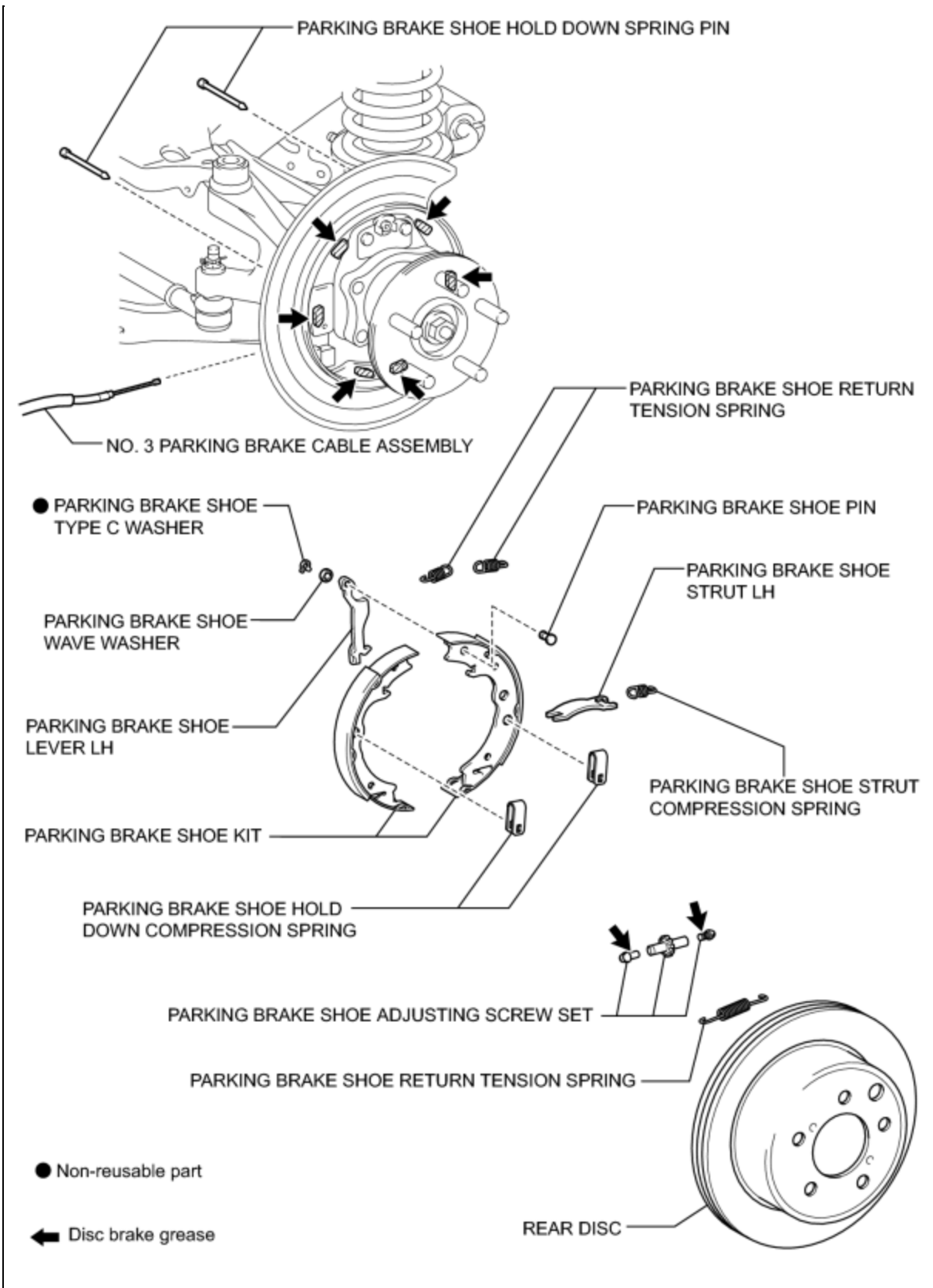
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000006NP00LX
Title: PARKING BRAKE: PARKING BRAKE ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000006NR000X
Title: PARKING BRAKE: PARKING BRAKE ASSEMBLY: DISASSEMBLY (2013 FR-S)		

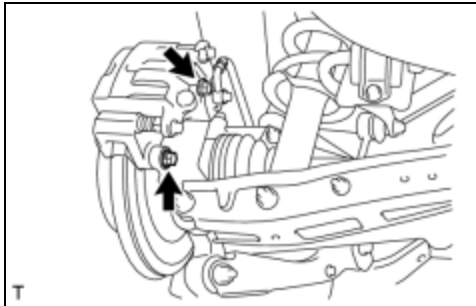
DISASSEMBLY

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. REMOVE REAR WHEEL

2. SEPARATE REAR DISC BRAKE CALIPER ASSEMBLY LH

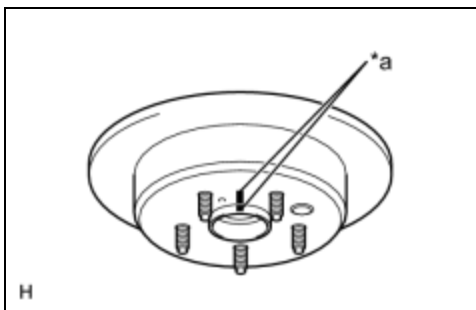


- (a) Remove the 2 bolts and separate the rear disc brake caliper assembly LH.

NOTICE:

Hang the rear disc brake cylinder assembly LH with wire or equivalent.

3. REMOVE REAR DISC



- (a) Put matchmarks on the rear disc and the rear axle hub.

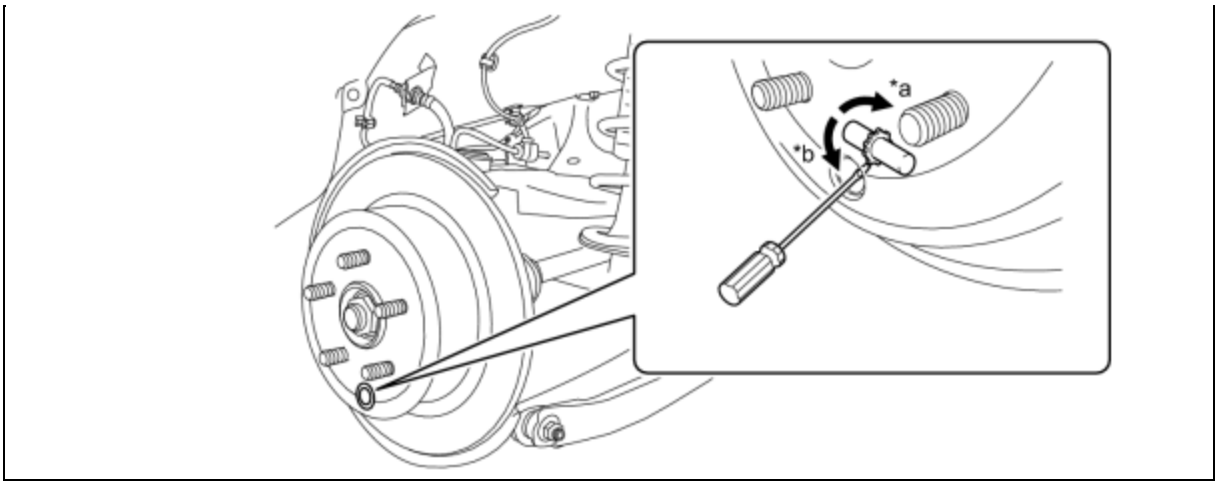
Text in Illustration

*a	Matchmark
----	-----------

- (b) Release the parking brake and remove the rear disc.

HINT:

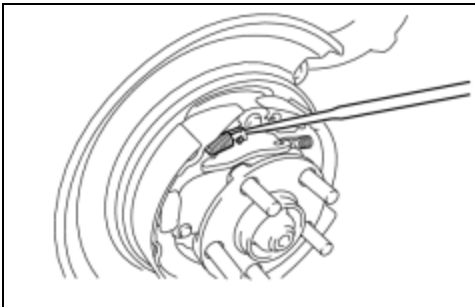
If the disc cannot be removed easily, use a screwdriver to turn the shoe adjuster as shown in the illustration in order to contract the parking brake shoes.



Text in illustration

*a	Expand	*b	Contract
----	--------	----	----------

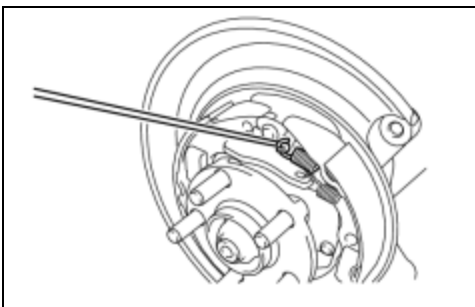
4. REMOVE PARKING BRAKE SHOE RETURN TENSION SPRING (for Front Side)



(a) Using SST, remove the parking brake shoe return tension spring.

SST: 09921-00011

5. REMOVE PARKING BRAKE SHOE RETURN TENSION SPRING (for Rear Side)

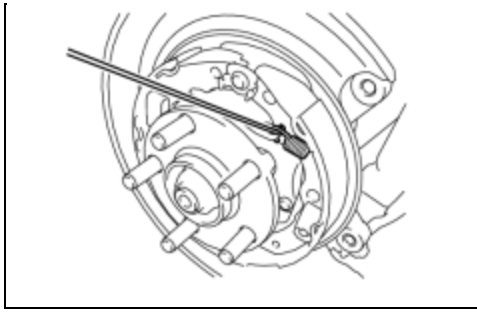


(a) Using SST, remove the parking brake shoe return tension spring.

SST: 09921-00011

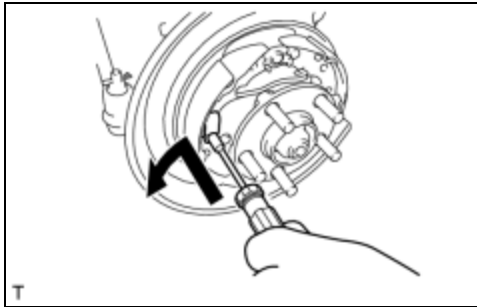
6. REMOVE PARKING BRAKE SHOE STRUT COMPRESSION SPRING

(a) Using SST, remove the parking brake shoe strut



compression spring.
SST: 09921-00011

7. FIX PARKING BRAKE SHOE HOLD DOWN COMPRESSION SPRING (for Front Side)



(a) Using SST, remove the brake shoe hold down compression spring.
SST: 09718-00011

HINT:

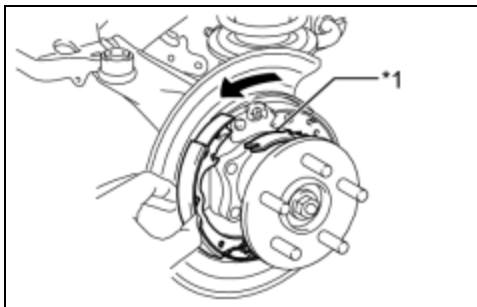
Hold the parking brake shoe hold down spring pin with your finger.

8. REMOVE PARKING BRAKE SHOE HOLD DOWN SPRING PIN (for Front Side)

(a) Remove the parking brake shoe hold down spring pin (for front side).

9. REMOVE PARKING BRAKE SHOE STRUT LH

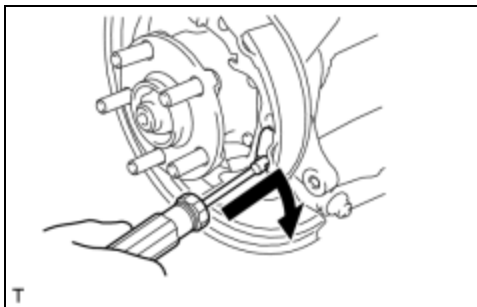
(a) Pull the parking brake shoe towards the front of the vehicle by hand as shown in the illustration.



(b) Remove the parking brake shoe strut LH.

Text in Illustration

*1	Parking brake shoe strut LH
----	-----------------------------



10. REMOVE PARKING BRAKE SHOE HOLD DOWN COMPRESSION SPRING (for Rear Side)

(a) Using SST, remove the brake shoe hold down compression spring (for rear side).

SST: 09718-00011

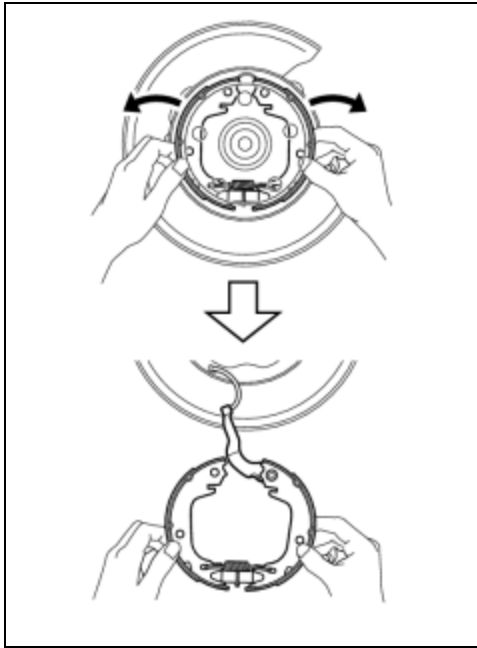
HINT:

Use the service hole to hold the parking brake shoe hold down spring pin with your finger.

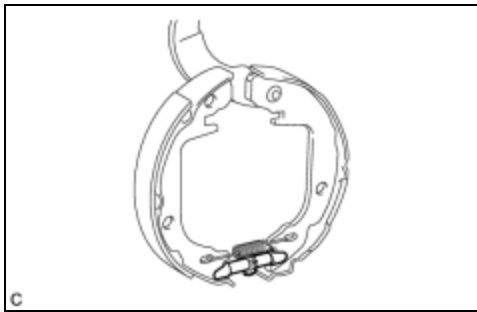
11. REMOVE PARKING BRAKE SHOE HOLD DOWN SPRING PIN (for Rear Side)

(a) Remove the parking brake shoe hold down spring pin (for rear side).

12. REMOVE PARKING BRAKE SHOE ADJUSTING SCREW SET

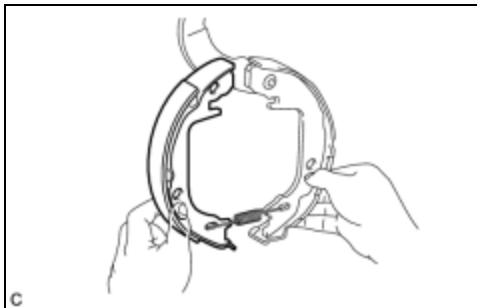


(a) Expand the parking brake shoe outward by hand and pull downward to separate them from the parking brake plate.



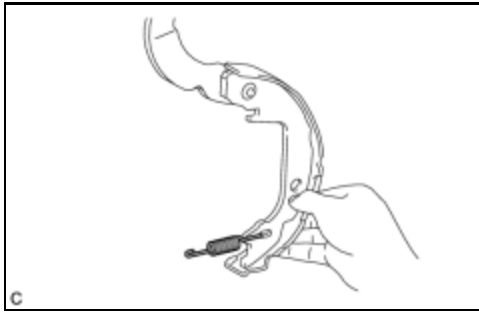
(b) Remove the parking brake shoe adjusting screw set.

13. REMOVE PARKING BRAKE SHOE KIT



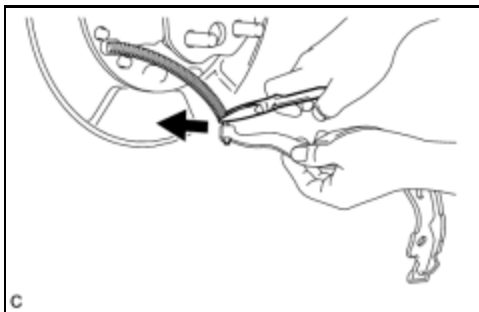
(a) Remove the parking brake shoe kit.

14. REMOVE PARKING BRAKE SHOE RETURN TENSION SPRING



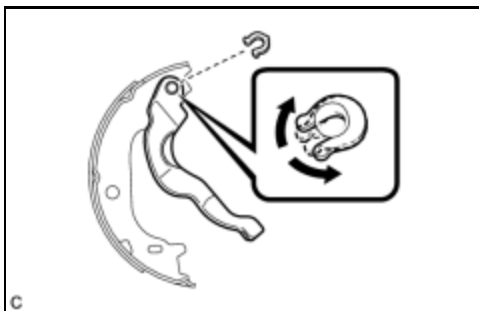
(a) Remove the parking brake shoe return tension spring.

15. REMOVE PARKING BRAKE SHOE LEVER LH



(a) Using needle-nose pliers, remove the parking brake shoe lever LH from the No. 3 parking brake cable assembly as shown in the illustration.

16. REMOVE PARKING BRAKE SHOE TYPE C WASHER



(a) Widen and remove the parking brake shoe type C washer from the parking brake shoe as shown in the illustration.

17. REMOVE PARKING BRAKE SHOE WAVE WASHER

(a) Remove the parking brake shoe wave washer.

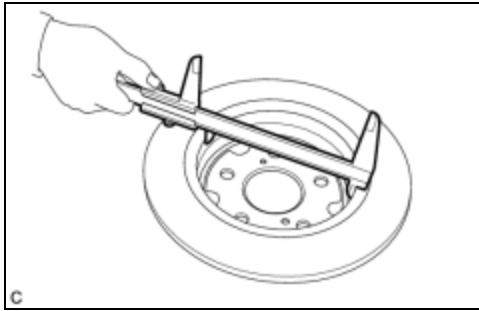
18. REMOVE PARKING BRAKE SHOE PIN

(a) Remove the parking brake shoe pin.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000V6G04TX
Title: PARKING BRAKE: PARKING BRAKE ASSEMBLY: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT BRAKE DISC INSIDE DIAMETER



- (a) Using a brake drum gauge or an equivalent tool, measure the inside diameter of the disc.

Standard inside diameter:

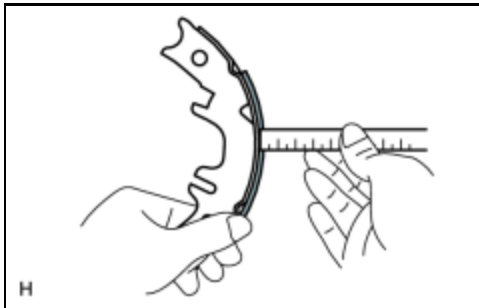
190 mm (7.48 in.)

Maximum inside diameter:

191 mm (7.52 in.)

If the inside diameter is more than the maximum, replace the rear disc.

2. INSPECT PARKING BRAKE SHOE LINING THICKNESS



- (a) Using a ruler, measure the thickness of the parking brake shoe lining.

Standard thickness:

3.5 mm (0.1378 in.)

Minimum thickness:

1.5 mm (0.0591 in.)

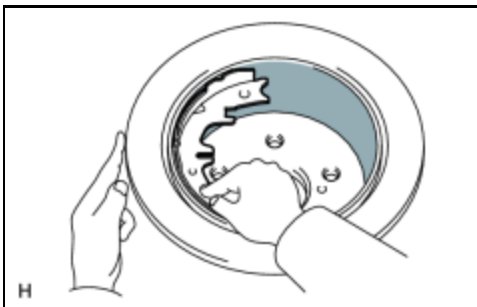
If the lining thickness is less than the minimum, or if there is severe or uneven wear, replace the parking brake shoe assembly.

NOTICE:

Always replace both right and left parking brake shoes together.

3. INSPECT BRAKE DISC AND PARKING BRAKE SHOE LINING FOR PROPER CONTACT

- (a) Apply chalk to the inside surface of the disc, then slide the brake shoe against the disc to check the fit of the brake shoe lining to the disc.



Text in Illustration



If the contact between the disc and the brake shoe lining is incorrect, repair it using a brake shoe grinder or replace the parking brake shoe assembly.

NOTICE:

- Always replace both right and left parking brake shoes together.
- Wipe off the chalk after inspection.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000006NT00RX
Title: PARKING BRAKE: PARKING BRAKE ASSEMBLY: REASSEMBLY (2013 FR-S)		

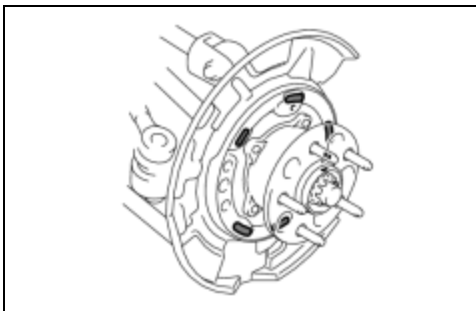
REASSEMBLY

HINT:


- The procedure listed below is for the LH side.
- Use the same procedure for the RH and LH sides.

1. APPLY DISC BRAKE GREASE

- (a) Apply a light coat of disc brake grease to the areas of the backing plate which make contact with the shoe as shown in the illustration.



Text in Illustration

	Disc Brake Grease
---	-------------------

2. INSTALL PARKING BRAKE SHOE PIN

- (a) Install the parking brake shoe pin.

3. INSTALL PARKING BRAKE SHOE LEVER LH

- (a) Apply a light coat of disc brake grease to the areas of the parking brake shoe lever LH which make contact with the parking brake shoe pin.
- (b) Install the parking brake shoe lever LH to the parking brake shoe.

4. INSTALL PARKING BRAKE SHOE WAVE WASHER

- (a) Install the wave washer.

5. INSTALL PARKING BRAKE SHOE TYPE C WASHER

- (a) Install a new parking brake shoe type C washer.

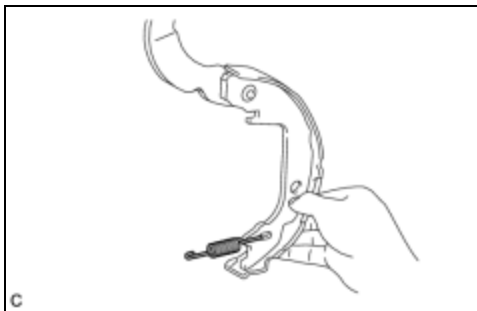


- (b) Using a pair of pliers, squeeze together the ends of the parking brake shoe type C washer.

6. INSTALL NO. 3 PARKING BRAKE CABLE ASSEMBLY

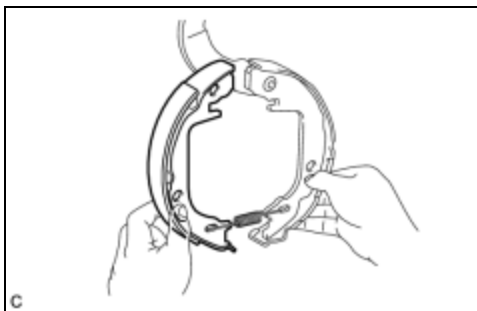
- (a) Using needle-nose pliers, connect the No. 3 parking brake cable assembly to the parking brake shoe lever LH.

7. INSTALL PARKING BRAKE SHOE RETURN TENSION SPRING



- (a) Install the parking brake shoe return tension spring to the parking brake shoe.

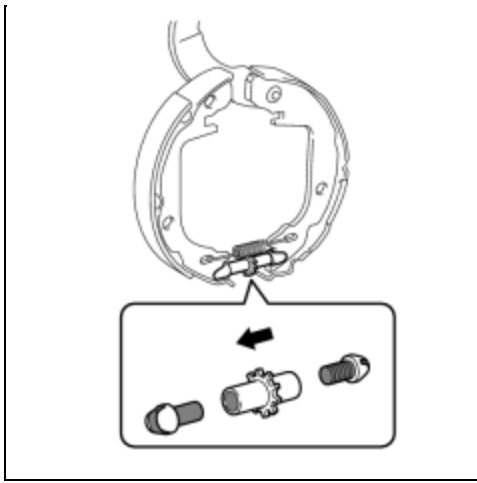
8. INSTALL PARKING BRAKE SHOE KIT



- (a) Install the parking brake shoe to the parking brake shoe return tension spring.

9. INSTALL PARKING BRAKE SHOE ADJUSTING SCREW SET

- (a) Apply disc brake grease to the parking brake shoe adjusting screw set as shown in the illustration.





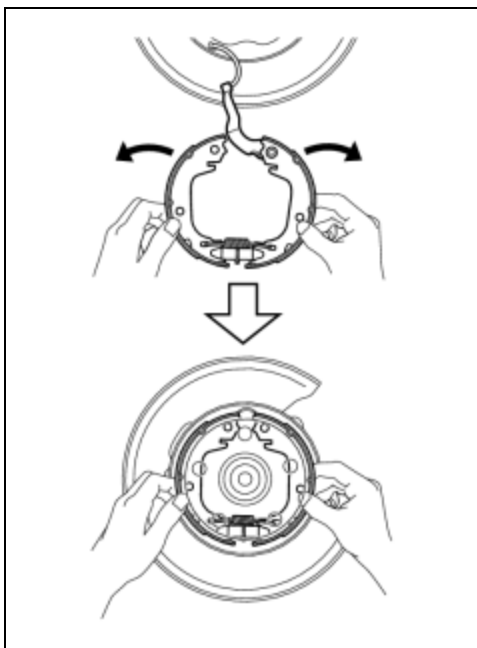
(b) Install the parking brake shoe adjusting screw set to the parking brake shoes.

NOTICE:

Take care to install the correct parking brake shoe adjusting screw set because the direction of the parking brake shoe adjusting screw set is different between the left and right sides.

Text in Illustration

	Disc Brake Grease
	For front side (LH Side) For rear side (RH Side)

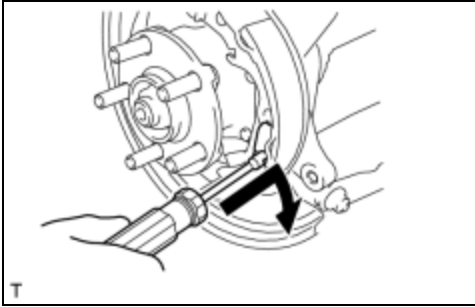


(c) Expand the parking brake shoes outward by hand and fit them to the parking brake plate.

10. INSTALL PARKING BRAKE SHOE HOLD DOWN SPRING PIN (for Rear Side)

(a) Install the parking brake shoe hold down spring pin (for rear side) to the parking brake plate.

11. INSTALL PARKING BRAKE SHOE HOLD DOWN COMPRESSION SPRING (for Rear Side)



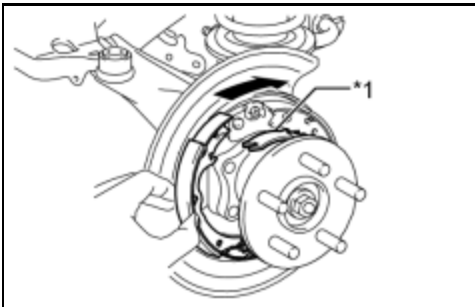
(a) Using SST, install the parking brake shoe hold down compression spring (for rear side) as shown in the illustration.

SST: 09718-00011

12. INSTALL PARKING BRAKE SHOE STRUT LH

(a) Pull the parking brake shoe towards the front of the vehicle by hand as shown in the illustration.

(b) Install the parking brake shoe strut LH.



(c) Install the parking brake shoe.

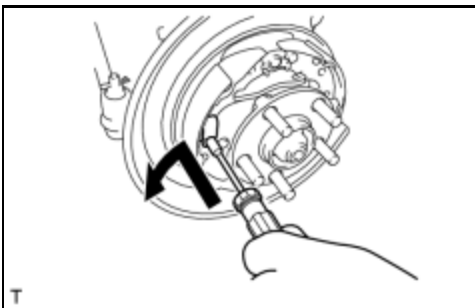
Text in Illustration

*1	Parking brake shoe strut LH
----	-----------------------------

13. INSTALL PARKING BRAKE SHOE HOLD DOWN SPRING PIN (for Front Side)

(a) Install the parking brake shoe hold down spring pin (for Front side) to the parking brake plate.

14. INSTALL PARKING BRAKE SHOE HOLD DOWN COMPRESSION SPRING (for Front Side)



(a) Using SST, install the parking brake shoe hold down compression spring (for Front Side) as shown in the illustration.

SST: 09718-00011

15. INSTALL PARKING BRAKE SHOE STRUT COMPRESSION SPRING

(a) Install the parking brake shoe strut compression spring to the shoe strut.

16. INSTALL PARKING BRAKE SHOE RETURN TENSION SPRING (for Rear Side)

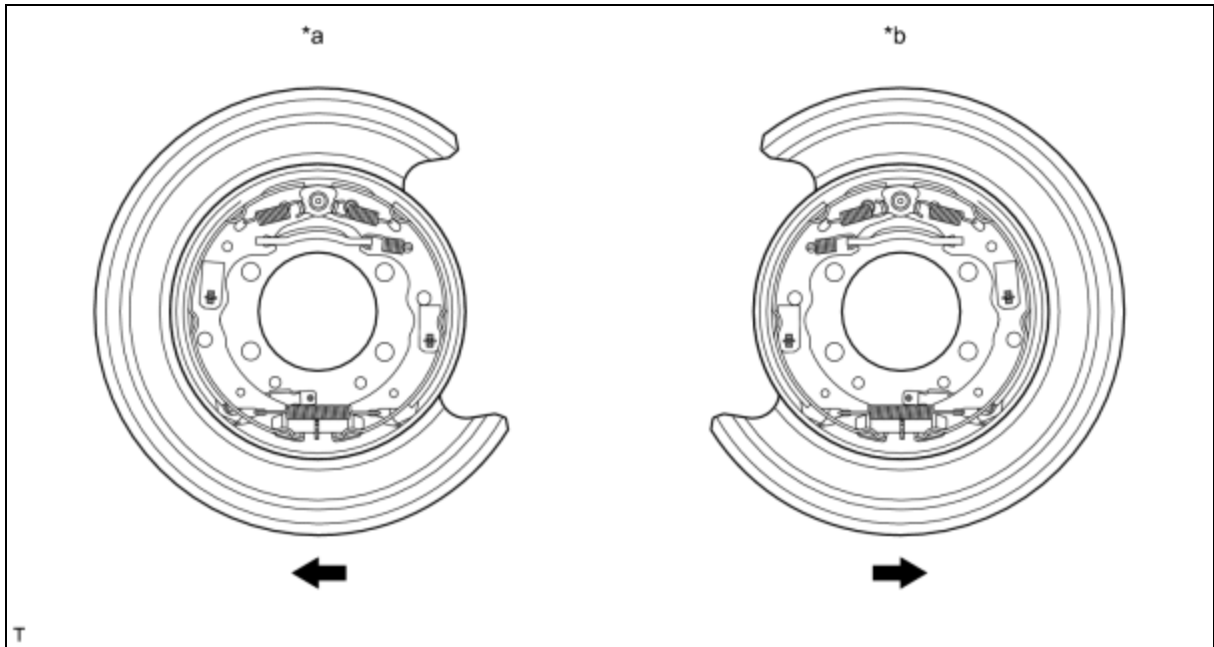
(a) Install the parking brake shoe return tension spring (for rear side).

17. INSTALL PARKING BRAKE SHOE RETURN TENSION SPRING (for Front Side)

(a) Install the parking brake shoe return tension spring (for front side).

18. CHECK PARKING BRAKE INSTALLATION

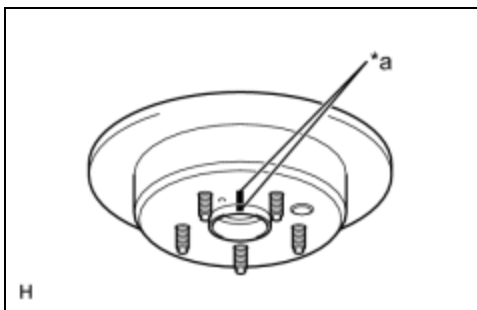
(a) Make sure that all the parts are installed properly. If necessary, remove and reinstall the parts.



Text in Illustration

*a	LH Side	*b	RH Side
	Front of the Vehicle	-	-

19. INSTALL REAR DISC



(a) Align the matchmarks of the rear disc and rear axle hub, and install the rear disc.

Text in Illustration

*a	Matchmark
----	-----------

HINT:

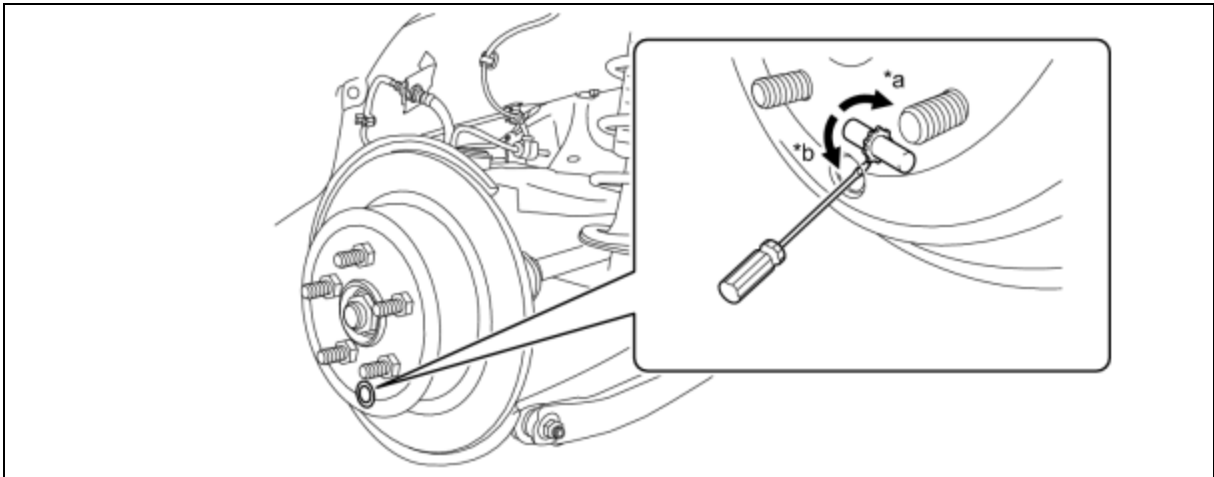
When replacing the disc with a new one, select the installation position where the rear disc has minimal runout.

20. ADJUST PARKING BRAKE SHOE CLEARANCE AND PARKING BRAKE PEDAL TRAVEL

(a) Temporarily install the hub nuts to the hub bolts.

(b) Remove the parking brake shoe adjusting hole plug.

(c) Turn the shoe adjuster and expand the shoes until the disc locks.



Text in illustration

*a	Expand	*b	Contract
----	--------	----	----------

(d) Turn and contract the shoe adjuster until the disc can rotate smoothly.

Standard:

Returns 10 notches.

(e) Check that the parking brake does not drag.

(f) Remove the hub nuts from the hub bolts.

21. INSTALL REAR DISC BRAKE CALIPER ASSEMBLY LH

(a) Install the rear disc brake caliper assembly LH with the new 2 bolts.

Torque: 66 N·m (673 kgf·cm, 49ft·lbf)

22. INSPECT PARKING BRAKE LEVER TRAVEL

INFO

23. ADJUST PARKING BRAKE LEVER TRAVEL

INFO

24. INSTALL REAR WHEEL

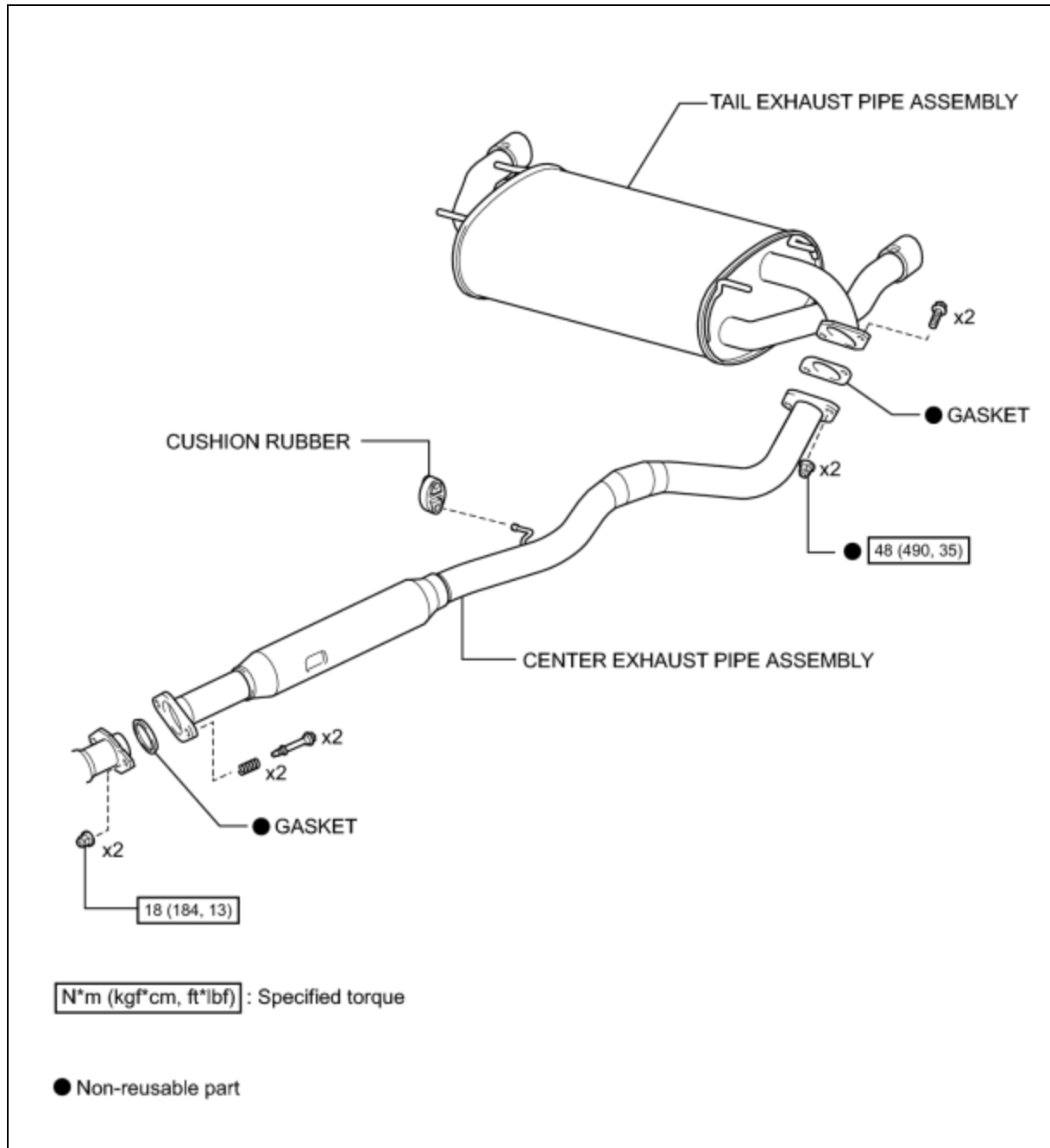
Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)



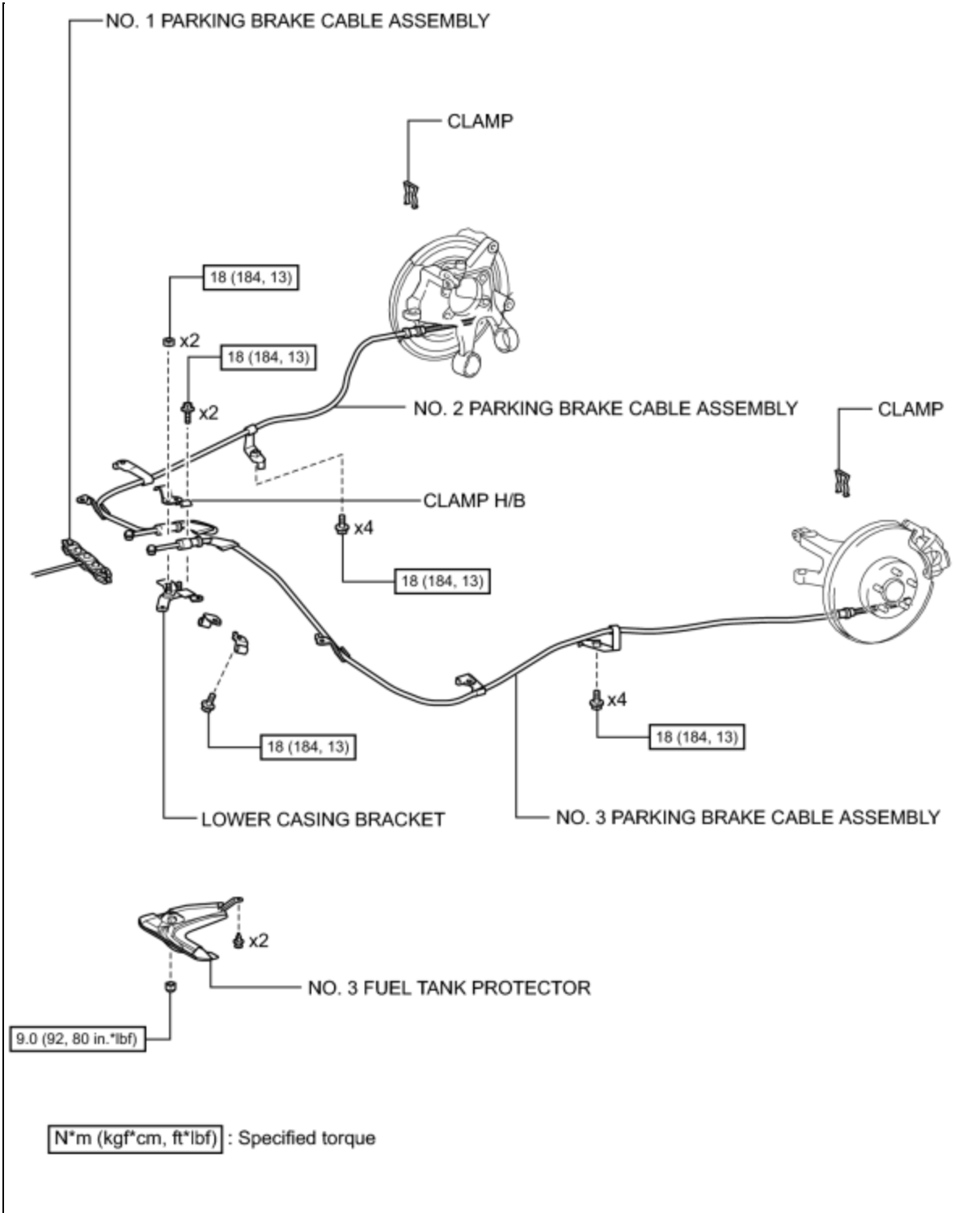
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KG2009X
Title: PARKING BRAKE: PARKING BRAKE CABLE: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KG1009X
Title: PARKING BRAKE: PARKING BRAKE CABLE: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL NO. 3 PARKING BRAKE CABLE ASSEMBLY

- (a) Install the No. 3 parking brake cable assembly to the parking brake plate with the clamp.
- (b) Install the No. 3 parking brake cable assembly to the body with the 4 bolts.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

2. INSTALL NO. 2 PARKING BRAKE CABLE ASSEMBLY

HINT:

Use the same procedure for the No. 2 parking brake cable assembly as for the No. 3 parking brake cable assembly.

3. INSTALL PROPELLER WITH CENTER BEARING SHAFT ASSEMBLY

INFO

4. INSTALL CENTER EXHAUST PIPE ASSEMBLY

- (a) Install the center exhaust pipe assembly with the cushion rubber.
- (b) Install the new gasket and the center exhaust pipe assembly with the 2 new nuts and the 2 bolts.

Torque: 48 N·m (490 kgf·cm, 35ft·lbf)

HINT:

- Do not reuse the gaskets.
- Do not reuse the nuts.

- (c) Install the new gasket and the front exhaust pipe assembly with the 2 nuts and the 2 bolts and the 2 compression springs to the center exhaust pipe assembly.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

HINT:

Do not reuse the gaskets.

5. INSTALL NO. 3 FUEL TANK PROTECTOR

INFO

6. INSTALL LOWER CASING BRACKET

- (a) Install the lower casing bracket of the body with the 2 bolts.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

7. INSTALL CLAMP H/B

- (a) Install the clamp H/B of the casing lower bracket with the 2 nuts.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

8. INSTALL PARKING BRAKE ASSEMBLY

INFO

9. INSTALL NO. 1 PARKING BRAKE CABLE ASSEMBLY INFO

10. INSTALL CONSOLE BOX ASSEMBLY

INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KG3009X
Title: PARKING BRAKE: PARKING BRAKE CABLE: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE CONSOLE BOX ASSEMBLY

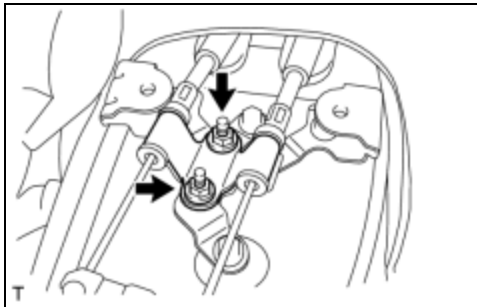
INFO

2. REMOVE NO. 1 PARKING BRAKE CABLE ASSEMBLY INFO

3. REMOVE PARKING BRAKE ASSEMBLY

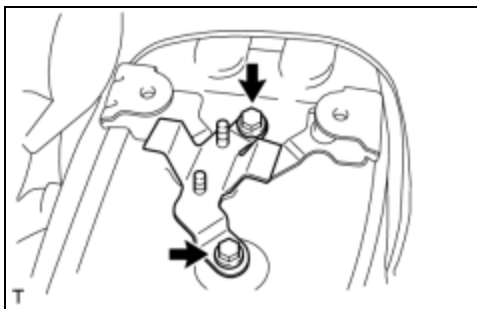
INFO

4. REMOVE CLAMP H/B



(a) Remove the 2 nuts and the clamp H/B.

5. REMOVE LOWER CASING BRACKET

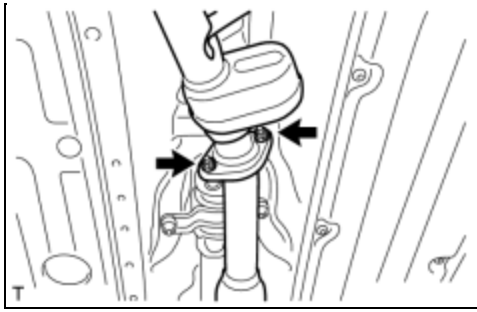


(a) Remove the 2 bolts and the lower casing bracket.

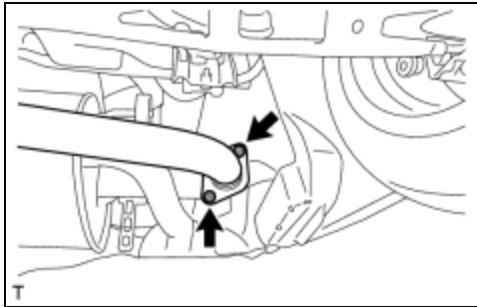
6. REMOVE NO. 3 FUEL TANK PROTECTOR INFO

7. REMOVE CENTER EXHAUST PIPE ASSEMBLY

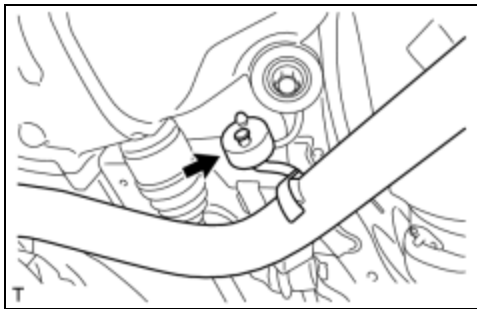
(a) Remove the 2 nuts and the 2 bolts and the 2 compression spring and disconnect the center exhaust



pipe assembly.



(b) Remove the 2 nuts and the 2 bolts and disconnect the tail exhaust pipe assembly.



(c) Remove the cushion rubber and the center exhaust pipe assembly.

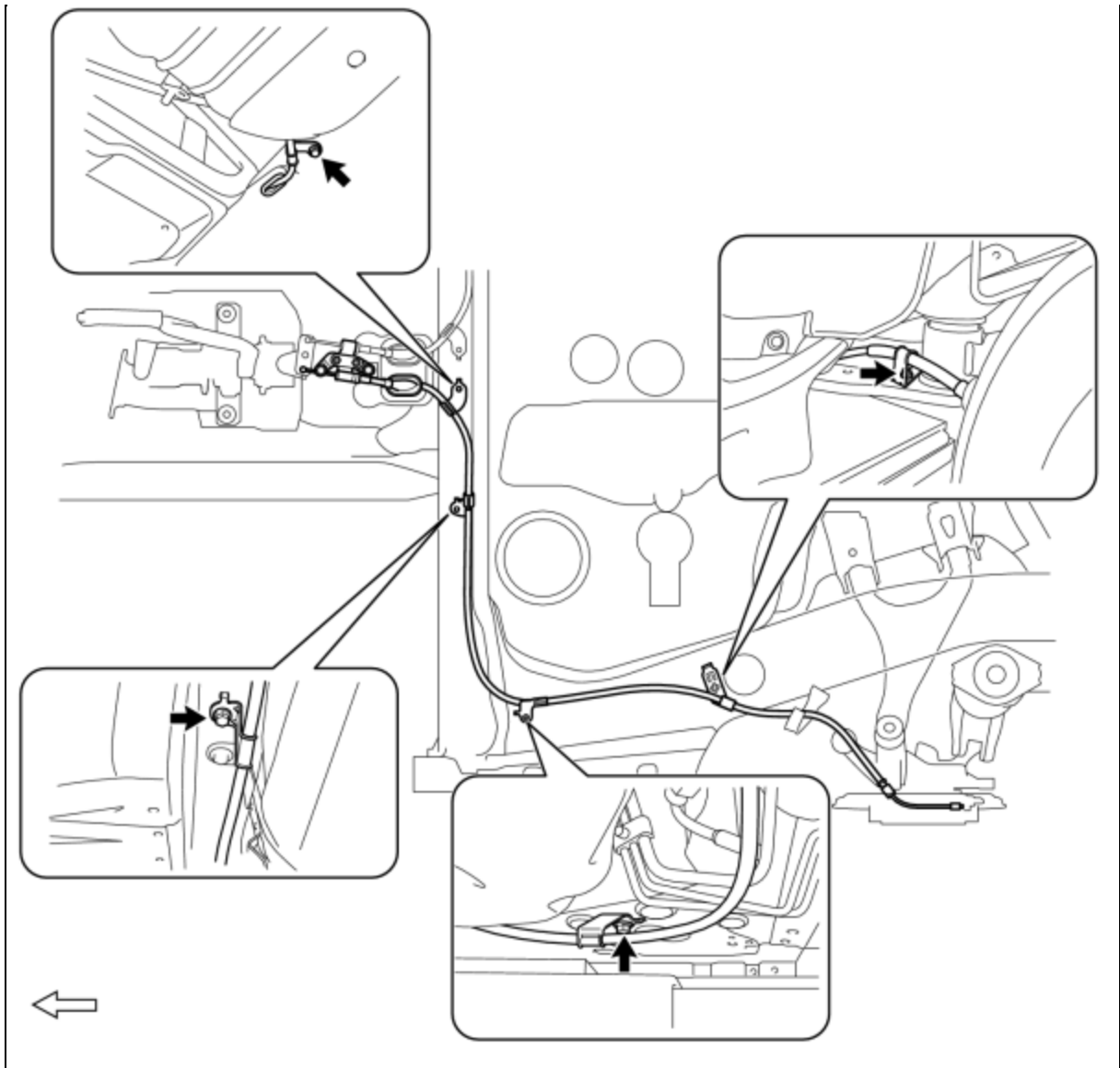
(d) Remove the gasket.

8. REMOVE PROPELLER WITH CENTER BEARING SHAFT ASSEMBLY



NFC

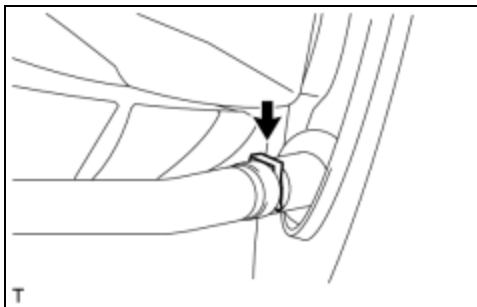
9. REMOVE NO. 3 PARKING BRAKE CABLE ASSEMBLY

(a) Remove the 4 bolts and separate the No. 3 parking brake cable assembly from the vehicle.



Text in illustration

	Bolt		Vehicle front side
---	------	---	--------------------



(b) Remove the clamp and remove the No. 3 parking brake cable assembly.

10. REMOVE NO. 2 PARKING BRAKE CABLE ASSEMBLY

HINT:

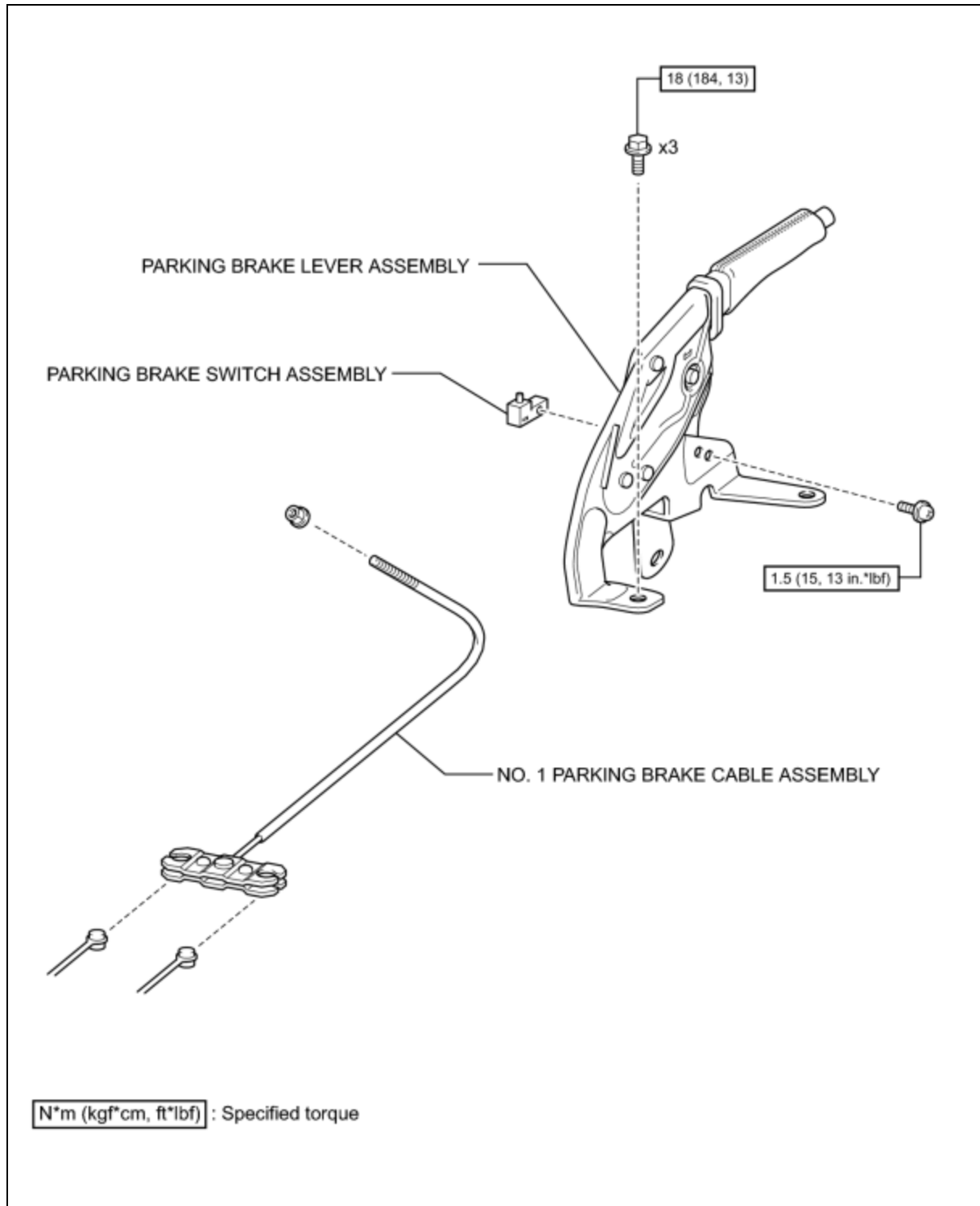
Use the same No. 3 parking brake cable assembly as for the No. 2 parking brake cable assembly.



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000026OG007X
Title: PARKING BRAKE: PARKING BRAKE LEVER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000026OF008X
Title: PARKING BRAKE: PARKING BRAKE LEVER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL PARKING BRAKE SWITCH ASSEMBLY

- (a) Install the parking brake switch assembly with the screw.

Torque: 1.5 N·m (15 kgf·cm, 13in·lbf)

2. INSTALL PARKING BRAKE LEVER ASSEMBLY

- (a) Install the parking brake lever assembly with the 3 bolts.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

- (b) Connect the parking brake switch assembly connector.

3. INSTALL NO. 1 PARKING BRAKE CABLE ASSEMBLY

- (a) Temporarily install the NO. 1 parking brake cable assembly to the parking brake lever with the adjusting nut.

- (b) Install the NO. 2 parking brake cable assembly and NO. 3 to the NO. 1 parking brake cable assembly.

4. INSPECT PARKING BRAKE LEVER TRAVEL INFO

5. ADJUST PARKING BRAKE LEVER TRAVEL INFO

6. INSTALL CONSOLE BOX ASSEMBLY

INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000026OH008X
Title: PARKING BRAKE: PARKING BRAKE LEVER: REMOVAL (2013 FR-S)		

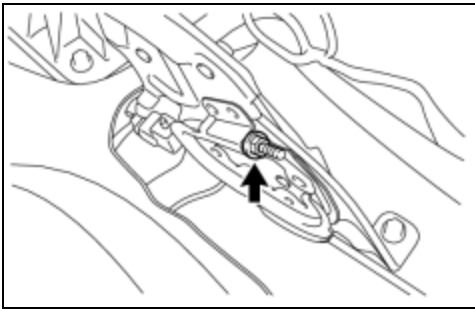
REMOVAL

1. REMOVE CONSOLE BOX ASSEMBLY

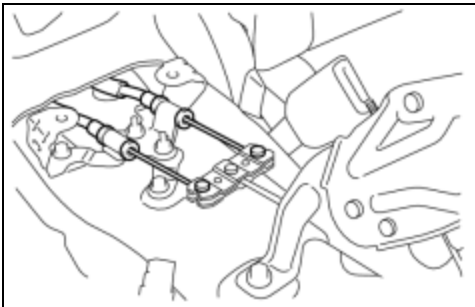
INFO

2. REMOVE NO. 1 PARKING BRAKE CABLE ASSEMBLY

- (a) Release the parking brake lever assembly.



- (b) Remove the adjusting nut.

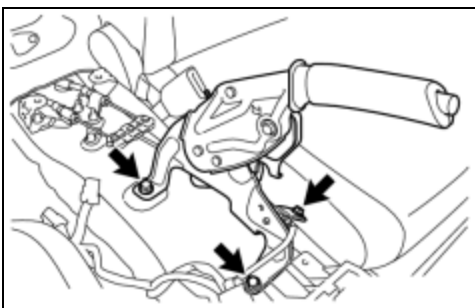


- (c) Disconnect the NO. 2 parking brake cable assembly and NO. 3 parking brake cable assembly from the NO. 1 parking brake cable assembly.

- (d) Remove the NO. 1 parking brake cable assembly from the parking brake lever assembly.

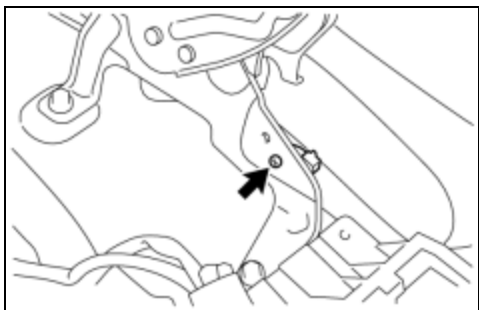
3. REMOVE PARKING BRAKE LEVER ASSEMBLY

- (a) Disconnect the parking brake switch assembly connector.



- (b) Remove the 3 bolts and parking brake lever assembly.

4. REMOVE PARKING BRAKE SWITCH ASSEMBLY



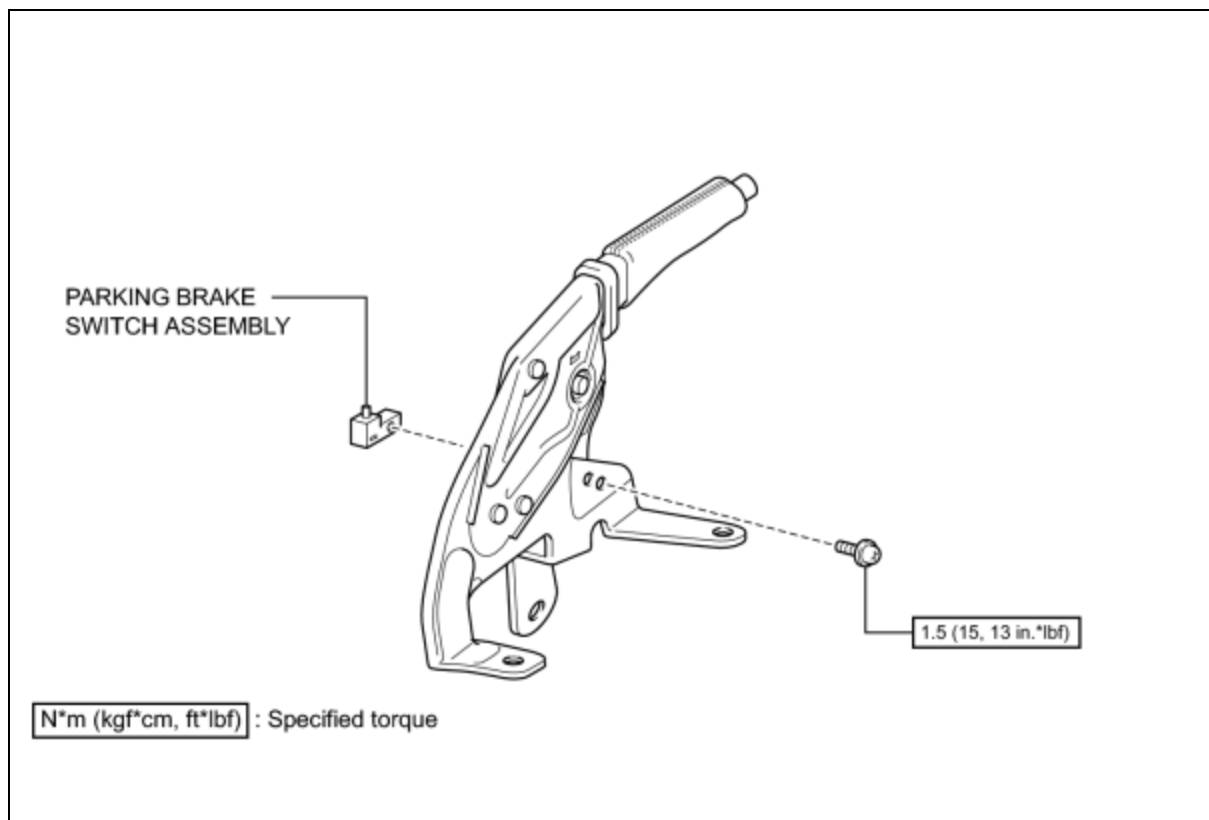
- (a) Remove the screw and parking brake switch assembly from the parking brake lever assembly.



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000026OU007X
Title: PARKING BRAKE: PARKING BRAKE SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



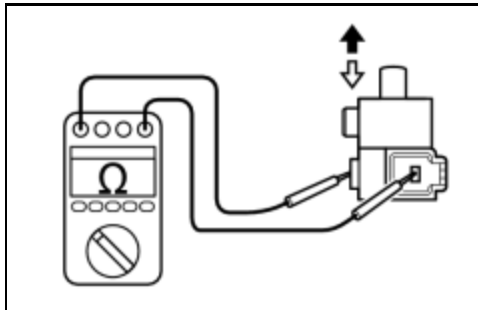
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000026OT007X
Title: PARKING BRAKE: PARKING BRAKE SWITCH: INSPECTION (2013 FR-S)		

INSPECTION



1. INSPECT PARKING BRAKE SWITCH ASSEMBLY

(a) Check the resistance.

(1) Using an ohmmeter, measure the resistance between the terminals.



Text in Illustration

	ON
	OFF

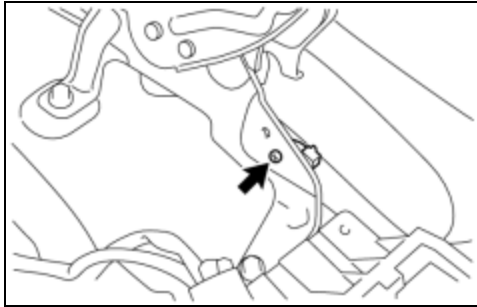
Standard resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 - Ground	Released (ON)	Below 1 Ω
1 - Ground	Pushed in (OFF)	10 k Ω or higher

If the result is not as specified, replace the parking brake switch assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000026OS008X
Title: PARKING BRAKE: PARKING BRAKE SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION



1. INSTALL PARKING BRAKE SWITCH ASSEMBLY

- (a) Install the parking brake switch assembly with the screw.

Torque: 1.5 N·m (15 kgf·cm, 13in·lbf)

- (b) Connect the parking brake switch assembly connector.

2. INSTALL CONSOLE BOX ASSEMBLY

INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000026OV008X
Title: PARKING BRAKE: PARKING BRAKE SWITCH: REMOVAL (2013 FR-S)		

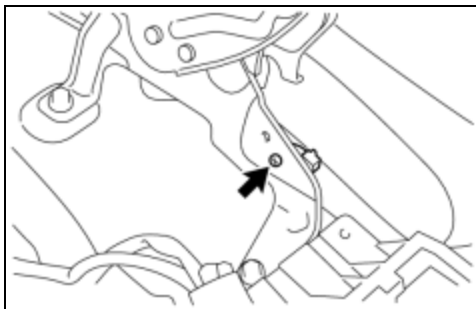
REMOVAL

1. REMOVE CONSOLE BOX ASSEMBLY

INFO

2. REMOVE PARKING BRAKE SWITCH ASSEMBLY

- (a) Disconnect the parking brake switch assembly connector.



- (b) Remove the screw and parking brake switch assembly.

Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UVR057X
Title: PARKING BRAKE: PARKING BRAKE SYSTEM: ADJUSTMENT (2013 FR-S)		

ADJUSTMENT

1. INSPECT PARKING BRAKE LEVER TRAVEL

- (a) Fully pull the parking brake lever to engage the parking brake.
- (b) Pull the lever again to disengage the parking brake.
- (c) Slowly pull the parking brake lever using the specified force, and count the number of clicks.

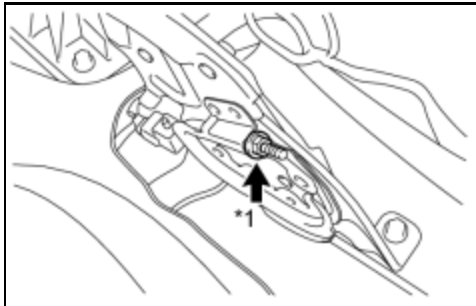
Parking brake lever travel:

7 to 8 notches at 200 N (20 kgf, 45.0 lbf)

If the parking brake lever travel is not as specified, adjust the parking brake shoe clearance and parking brake lever travel.

2. ADJUST PARKING BRAKE LEVER TRAVEL

- (a) Remove the front console box INFO.
- (b) Completely release the parking brake lever.

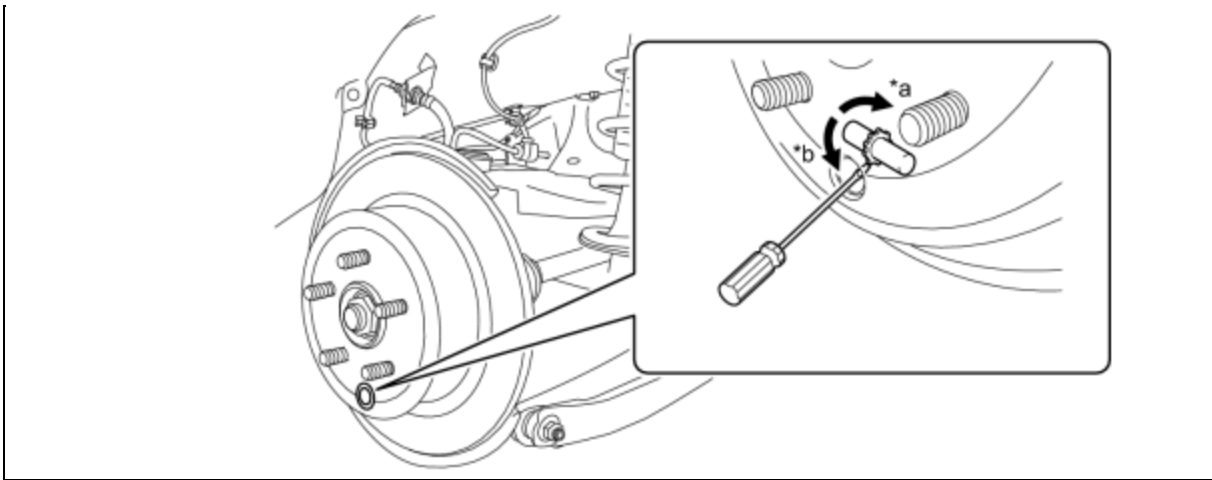


- (c) Loosen the adjusting nut to completely release the parking brake cable.

Text in Illustration

*1	Adjusting nut
----	---------------

- (d) Remove the rear wheels.
- (e) Temporarily install the hub nuts to the hub bolts.
- (f) Remove the parking brake shoe adjusting hole plug.
- (g) Turn the shoe adjuster and expand the shoes until the disc locks.



Text in illustration

*a	Expand	*b	Contract
----	--------	----	----------

(h) Turn and contract the shoe adjuster until the disc can rotate smoothly.

Standard:

Returns 10 notches.

(i) Check that there is no brake drag against the shoe.

(j) Install the parking brake shoe adjusting hole plug.

(k) Turn the adjusting nut until the parking brake lever travel is corrected to be within the specified range.

Parking brake lever travel:

7 to 8 notches at 200 N (20 kgf, 45.0 lbf)

(l) Using a wrench or an equivalent tool, tighten the adjusting nut.

(m) Operate the parking brake lever 3 to 4 times, and check the parking brake lever travel.

Parking brake lever travel:

7 to 8 notches at 200 N (20 kgf, 45.0 lbf)

(n) Check that the parking brake does not drag.

(o) Remove the hub nuts from the hub bolts.

(p) Install the rear wheels.

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

(q) Install the front console box [INFO](#) .

3. INSPECT BRAKE WARNING LIGHT

(a) When operating the parking brake lever, check that the brake warning light illuminates.

Standard:

The brake warning light always illuminates at the first click.

Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003KNR00AX
Title: PARKING BRAKE: PARKING BRAKE SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PARKING BRAKE: PARKING BRAKE SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)

HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

SYMPTOM	SUSPECTED AREA	SEE PAGE
Brake drag	Parking brake lever travel (Out of adjustment)	INFO
	Parking brake wire (Sticking) (No. 1 cable)	INFO
	Parking brake wire (Sticking) (No. 2 cable)	INFO
	Parking brake wire (Sticking) (No. 3 cable)	INFO
	Parking brake shoe clearance (Out of adjustment)	INFO
	Parking brake shoe lining (Cracked or distorted)	INFO
	Tension or return spring (Damaged)	INFO

Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000X11026X
Title: AXLE AND DIFFERENTIAL: AXLE SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

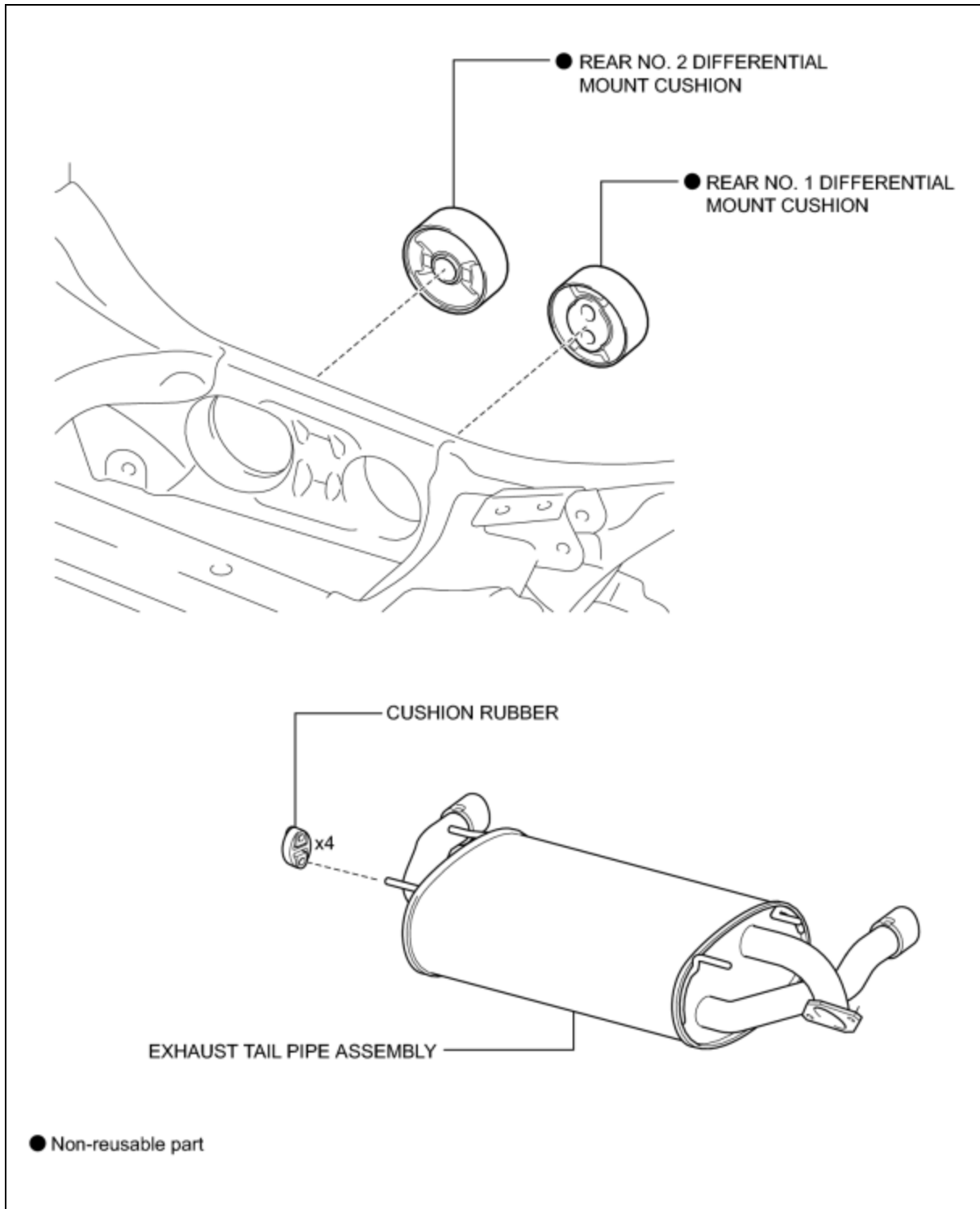
Axle System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Wander/pulls	Tires (Worn or improperly inflated)	INFO
	Front wheel alignment (Incorrect)	INFO
	Rear wheel alignment (Incorrect)	INFO
	Steering linkage (Loose or worn)	INFO
	Front hub bearings (Loose or worn)	INFO
	Front stabilizer bar (Bend or breach)	INFO
Front wheel shimmy	Wheels (Out of balance)	INFO
	Front Shock absorber (Worn)	INFO
	Wheel alignment (Incorrect)	INFO
	Lower ball joint (Worn)	INFO
	Hub bearings (Loose or worn)	INFO
Front wheel shimmy	Wheel alignment (Incorrect)	INFO
	Lower ball joint (Worn)	INFO
	Hub bearings (Loose or worn)	INFO
	Front Shock absorber (Worn)	INFO
Rear wheel shimmy	Hub bearings (Loose or worn)	INFO
	Shock absorber (Worn)	INFO

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001V2R00VX
Title: AXLE AND DIFFERENTIAL: DIFFERENTIAL MOUNT CUSHION: COMPONENTS (2013 FR-S)		

COMPONENTS

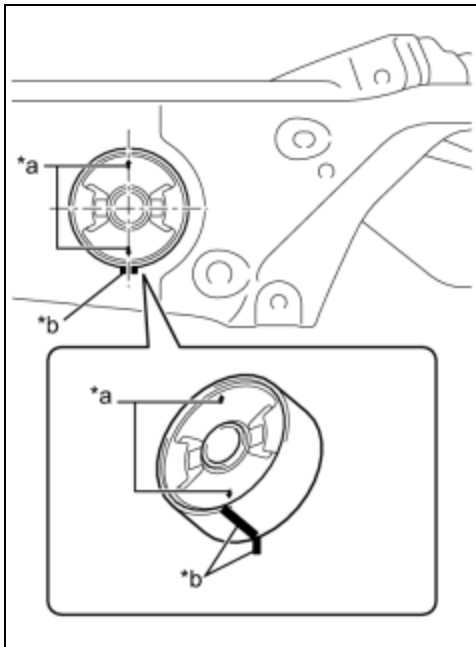
ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000TLO02FX
Title: AXLE AND DIFFERENTIAL: DIFFERENTIAL MOUNT CUSHION: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL REAR NO. 2 DIFFERENTIAL MOUNT CUSHION



- (a) Put matchmarks on rear suspension member and new rear No. 2 differential mount cushion.

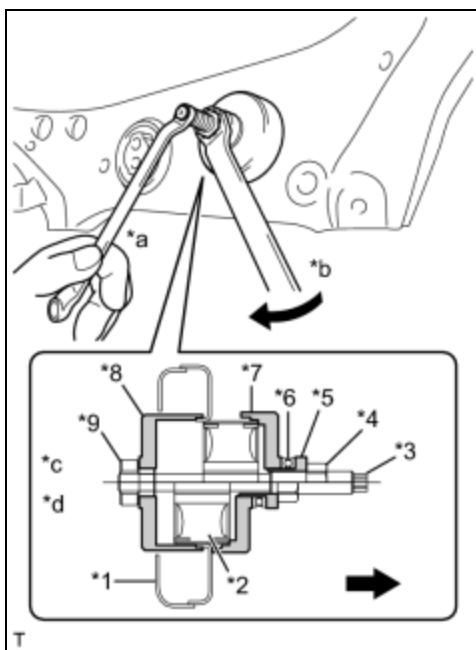
Text in Illustration

*a	Arrow
*b	Matchmark


CAUTION:

Install the rear No. 2 differential mount cushion with the arrow marks facing upward and downward.

- (b) Using SST and install the rear No. 2 differential mount cushion.

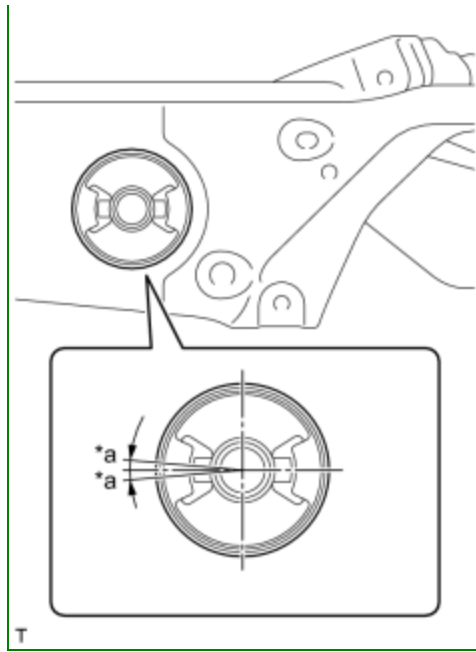


SST: 09570-18010*09571-01030**09571-01040**09571-01050**09571-01060**09571-01070**09571-01080**09571-01090***Text in Illustration**

*1	Rear Suspension Member
*2	Rear No. 2 Differential Mount Cushion
*3	SST(09571-01090)
*4	SST(09571-01070)
*5	SST(09571-01050)
*6	SST(09571-01080)
*7	SST(09571-01040)
*8	SST(09571-01030)
*9	SST(09571-01060)
*a	Hold
*b	Turn
*c	Start
*d	End
	Front side

HINT:

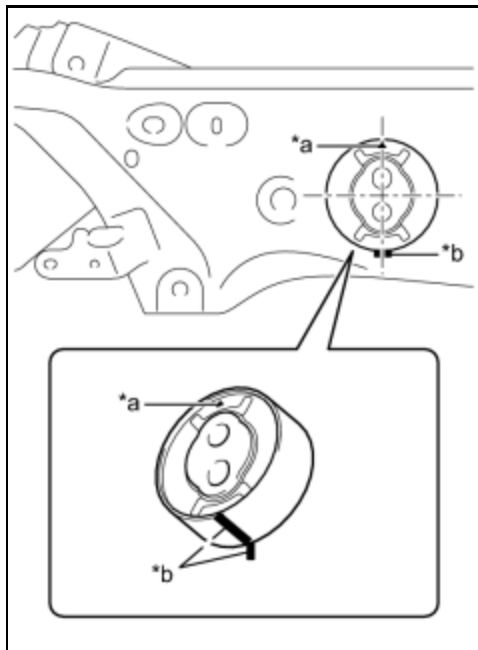
- Install the rear No. 2 differential mount cushion while aligning with the matchmark on the rear suspension member and checking misalignment.
- Push in the rear No. 2 differential mount cushion until SST (09571-01040) comes into contact with the rear suspension member.
- Make sure that the differential mount cushion is aligned within 5° from the center.



Text in Illustration

*a	5°
----	----

2. INSTALL REAR NO. 1 DIFFERENTIAL MOUNT CUSHION



- (a) Put matchmarks on rear suspension member and new rear No. 1 differential mount cushion.

Text in Illustration

*a	Triangle Mark
*b	Matchmark

NOTICE:

Install the rear No. 1 differential mount cushion with the triangle mark facing upward.

- (b) Using SST and install the rear No. 1 differential mount cushion.

SST: 09570-18020

09571-01120

09571-01130

09571-01140

09571-01150

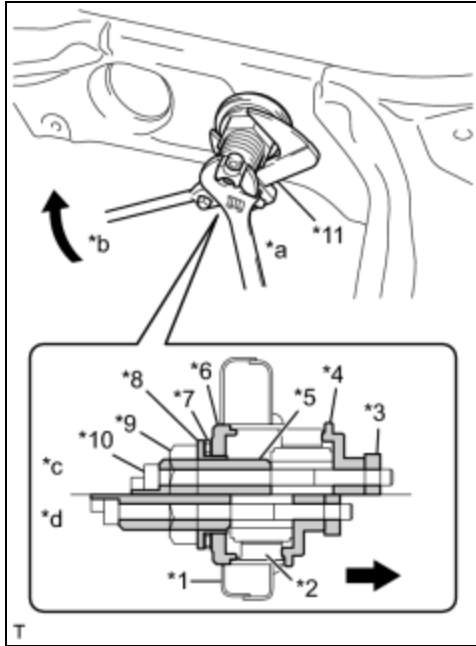
09571-01160

09571-01170

09571-01180

09571-01190

SST: 09922-10010



Text in Illustration

*1	Rear Suspension Member
*2	Rear No. 1 Differential Mount Cushion
*3	SST(09571-01150)
*4	SST(09571-01130)
*5	SST(09571-01190)
*6	SST(09571-01120)
*7	SST(09571-01170)
*8	SST(09571-01140)
*9	SST(09571-01160)
*10	SST(09571-01180)
*11	SST(09922-10010)
*a	Hold
*b	Turn
*c	Start
*d	End
	Front side

NOTICE:

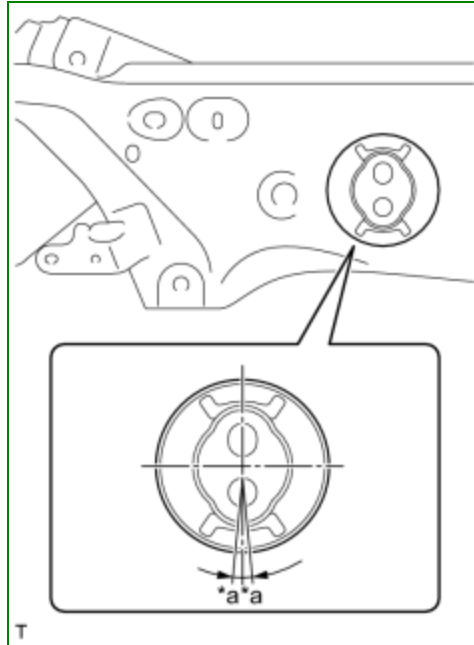
- Install the rear No. 1 differential mount cushion while checking that SST and the rear No. 1

differential mount cushion are not at an angle.

- If the rear No. 1 differential mount cushion is pushed in at an angle, the installation becomes difficult. Be sure to set SST on the rear No. 1 differential mount cushion with no clearance.

HINT:

- Install the rear No. 1 differential mount cushion while aligning with the matchmark on the rear suspension member and checking misalignment.
- Push in the rear No. 1 differential mount cushion until SST (09571-01130) comes into contact with the rear suspension member.
- Make sure that the differential mount cushion is aligned within 3° from the center.



Text in Illustration

*a	3°
----	----

3. INSTALL REAR DIFFERENTIAL CARRIER ASSEMBLY

INFO

4. INSTALL REAR STABILIZER BAR

INFO

5. INSTALL EXHAUST TAIL PIPE ASSEMBLY

INFO

6. INSTALL DIFFERENTIAL CARRIER ASSEMBLY

INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000TLR02FX
Title: AXLE AND DIFFERENTIAL: DIFFERENTIAL MOUNT CUSHION: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE REAR DIFFERENTIAL CARRIER ASSEMBLY

INFO

2. REMOVE EXHAUST TAIL PIPE ASSEMBLY

INFO

3. REMOVE REAR STABILIZER BAR

INFO

4. REMOVE REAR NO. 1 DIFFERENTIAL MOUNT CUSHION

(a) Using SST, remove the rear No. 1 differential mount cushion.

SST: 09570-18020

09571-01100

09571-01110

09571-01140

09571-01150

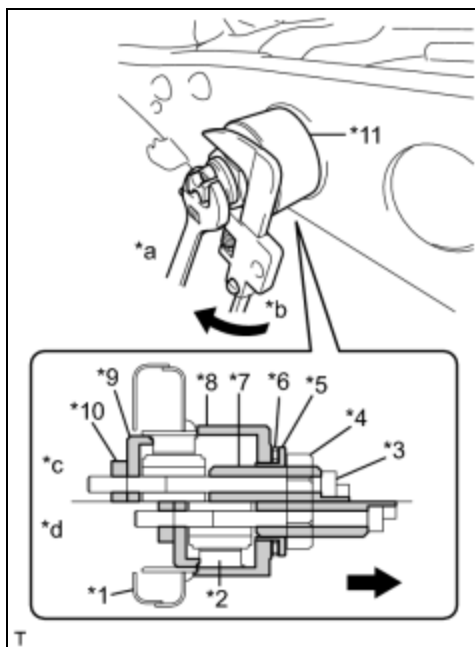
09571-01160

09571-01170

09571-01180


09571-01190

SST: 09922-10010



Text in Illustration

*1	Rear Suspension Member
----	------------------------

*2	Rear No. 1 Differential Mount Cushion
*3	SST(09571-01180)
*4	SST(09571-01160)
*5	SST(09571-01140)
*6	SST(09571-01170)
*7	SST(09571-01190)
*8	SST(09571-01110)
*9	SST(09571-01100)
*10	SST(09571-01150)
*11	SST(09922-10010)
*a	Hold
*b	Turn
*c	Start
*d	End
	Front side

NOTICE:

- Make sure that SST does not come into contact with the cylindrical part of the rear suspension member and is not set at an angle.
- Make sure that SST does not run on the weld bead around the cylindrical part.

5. REMOVE REAR NO. 2 DIFFERENTIAL MOUNT CUSHION

(a) Using SST, remove the rear No. 2 differential mount cushion.

SST: 09570-18010

09571-01010

09571-01020

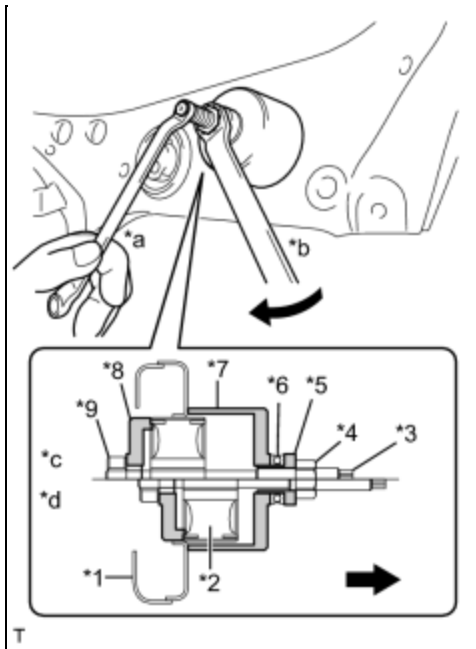
09571-01050

09571-01060


09571-01070

09571-01080

09571-01090



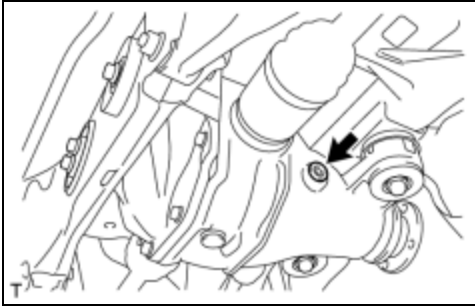
Text in Illustration

*1	Rear Suspension Member
*2	Rear No. 2 Differential Mount Cushion
*3	SST(09571-01090)
*4	SST(09571-01070)
*5	SST(09571-01050)
*6	SST(09571-01080)
*7	SST(09571-01020)
*8	SST(09571-01010)
*9	SST(09571-01060)
*a	Hold
*b	Turn
*c	Start
*d	End
	Front side

Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000009HK00DX
Title: AXLE AND DIFFERENTIAL: DIFFERENTIAL OIL: ADJUSTMENT (2013 FR-S)		

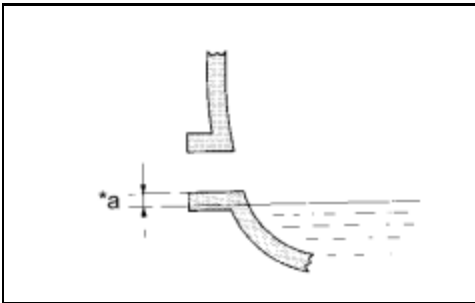
ADJUSTMENT

1. INSPECT DIFFERENTIAL OIL LEVEL



(a) Using a hexagon wrench 10 mm, remove the rear differential filler plug and gasket.

(b) Check that the oil level is between 0 to 5 mm (0 to 0.197 in.) from the bottom lip of the rear differential filler plug opening.



Text in illustration

*a	0 to 5 mm (0 to 0.197 in.)
----	----------------------------

NOTICE:

- An excessively large or small amount of differential oil may cause damage.
- After replacing oil, drive the vehicle and check the oil level.

If necessary, fill the rear differential carrier assembly with differential synthetic gear oil.

(c) Inspect for oil leaks if the oil level is low.

(d) Using a hexagon wrench 10 mm, install the rear differential filler plug and a new gasket.

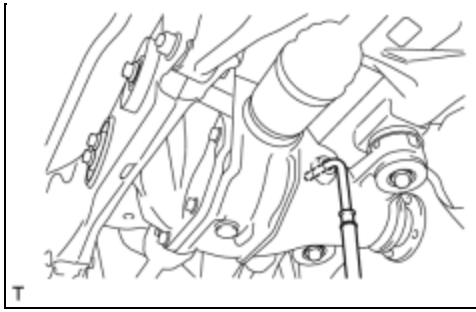
Torque: 49 N·m (500 kgf·cm, 36ft·lbf)

2. ADD DIFFERENTIAL OIL

(a) Using a hexagon wrench 10 mm, remove the rear differential filler plug and gasket.

(b) Add differential oil.

Capacity	Oil Grade
	<ul style="list-style-type: none"> • Toyota genuine differential gear oil LT 75W-85 GL-5



1.10 to 1.20 liters (1.17 to 1.27 US qts, 0.97 to 1.05 Imp. qts)

- or equivalent (except for LSD)
- Toyota genuine differential gear oil LX 75W-85 GL-5 or equivalent (for LSD)

(c) Using a hexagon wrench 10 mm, install the rear differential filler plug together with a new gasket.

Torque: 49 N·m (500 kgf·cm, 36ft·lbf)

NOTICE:

- When adding differential oil, make sure that the vehicle is level.
- An excessively large or small amount of differential oil may cause damage.
- After adding differential oil, drive the vehicle and recheck the oil level.

Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000013SC00YX
Title: AXLE AND DIFFERENTIAL: DIFFERENTIAL SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

1. Before disassembly, clean the outside of the rear differential carrier assembly and remove any sand or mud to prevent it from entering the inside of the rear differential carrier assembly during disassembly and installation.
2. When removing a connected part made of light alloy such as a rear differential carrier cover, tap it off with a plastic-faced hammer. Do not attempt to pry it off with a screwdriver.
3. Always arrange disassembled parts in order to protect them from dust.
4. Before installation, thoroughly clean and dry each part, and then apply Toyota genuine differential gear oil LT 75W-85 GL-5 to those parts. Do not use alkaline cleaner for aluminum or rubber parts and ring gear set bolts. Also, do not clean rubber parts such as O-rings or oil seals with non-residue solvent (except LSD).
5. Before installation, thoroughly clean and dry each part, and then apply Toyota genuine differential gear oil LX 75W-85 GL-5 to those parts. Do not use alkaline cleaner for aluminum or rubber parts and ring gear set bolts. Also, do not clean rubber parts such as O-rings or oil seals with non-residue solvent (for LSD).
6. Coat sliding surfaces and rotating parts with Toyota genuine differential gear oil LT 75W-85 GL-5 (except LSD).
7. Coat sliding surfaces and rotating parts with Toyota genuine differential gear oil LX 75W-85 GL-5 (for LSD).
8. When holding a part in a vise, be sure to place an aluminum sheet between the part and vise. Do not put the part directly in the vise.
9. Do not damage the contact surfaces of the rear differential carrier. Such damage may cause oil leakage.
10. Do not fill the differential with oil immediately after parts have been installed using seal packing. Allow at least 1 hour for the seal packing to dry before filling the differential.
11. Damage to surfaces in contact with an oil seal, O-ring or gasket may cause oil leakage.
12. When press-fitting an oil seal, do not damage the oil seal lip or outside periphery.
13. When replacing a bearing, replace the inner and outer races as a set.

Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001RFE016X
Title: AXLE AND DIFFERENTIAL: DIFFERENTIAL SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

Differential System

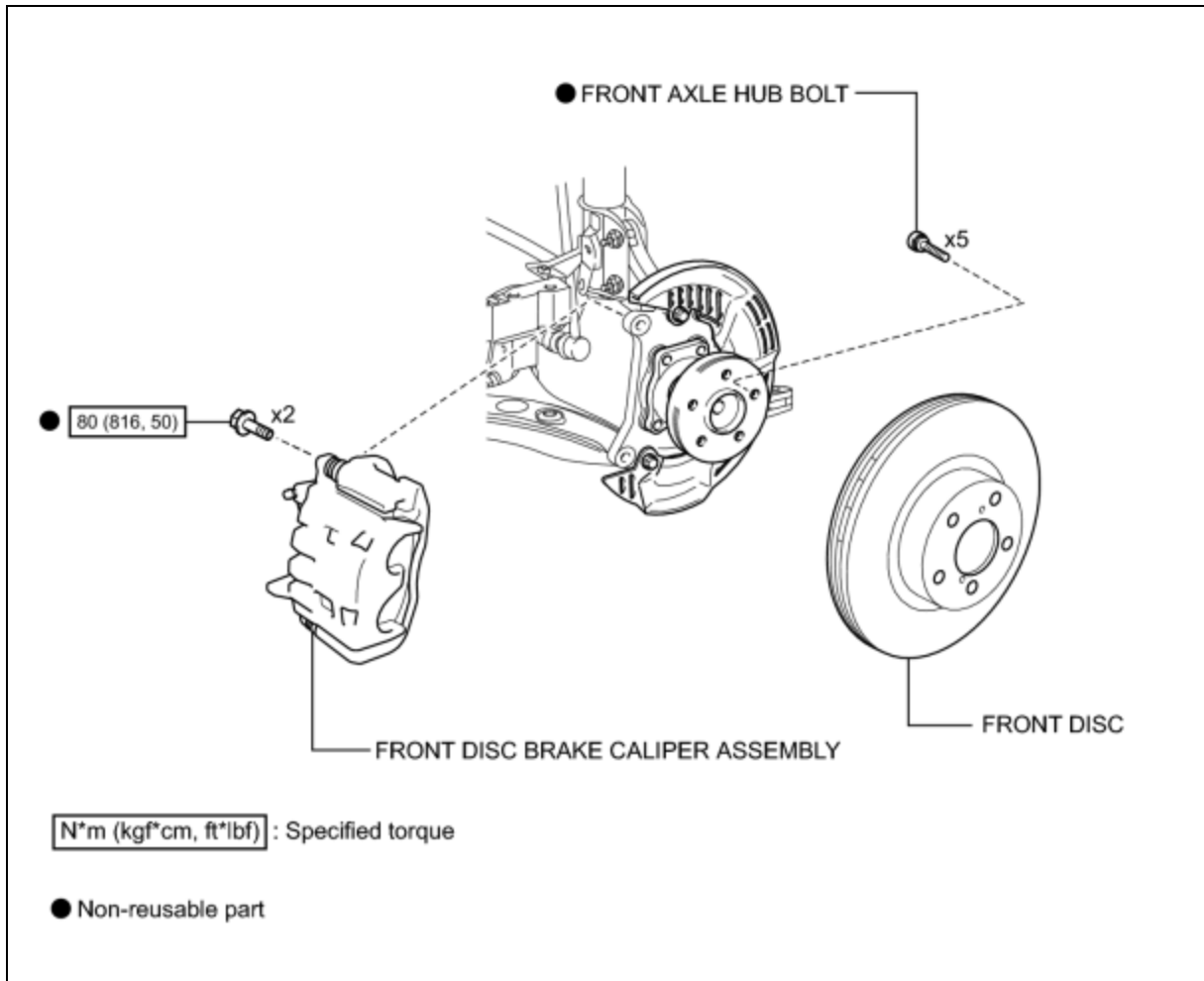
SYMPTOM	SUSPECTED AREA	SEE PAGE
Noise in rear differential	Oil (Level low or wrong grade)	INFO
	Ring gear or drive pinion (Worn or chipped)	INFO
	Backlash adjustment (Incorrect)	INFO
	Preload adjustment (Incorrect)	INFO
	Tooth contact between ring gear and drive pinion (Incorrect)	INFO
	Bearing (Worn)	INFO
Oil leak from rear differential	Oil (Level too high or wrong grade)	INFO
	Side gear shaft oil seal (Worn or damaged)	INFO
	Carrier oil seal (Worn or damaged)	INFO



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000V7F01AX
Title: AXLE AND DIFFERENTIAL: FRONT AXLE HUB BOLT: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000V7G01UX
Title: AXLE AND DIFFERENTIAL: FRONT AXLE HUB BOLT: REPLACEMENT (2013 FR-S)		

REPLACEMENT

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. REMOVE FRONT WHEEL

2. SEPARATE FRONT DISC BRAKE CALIPER ASSEMBLY

- (a) Remove the 2 bolts and separate the front disc brake caliper assembly from the steering knuckle.

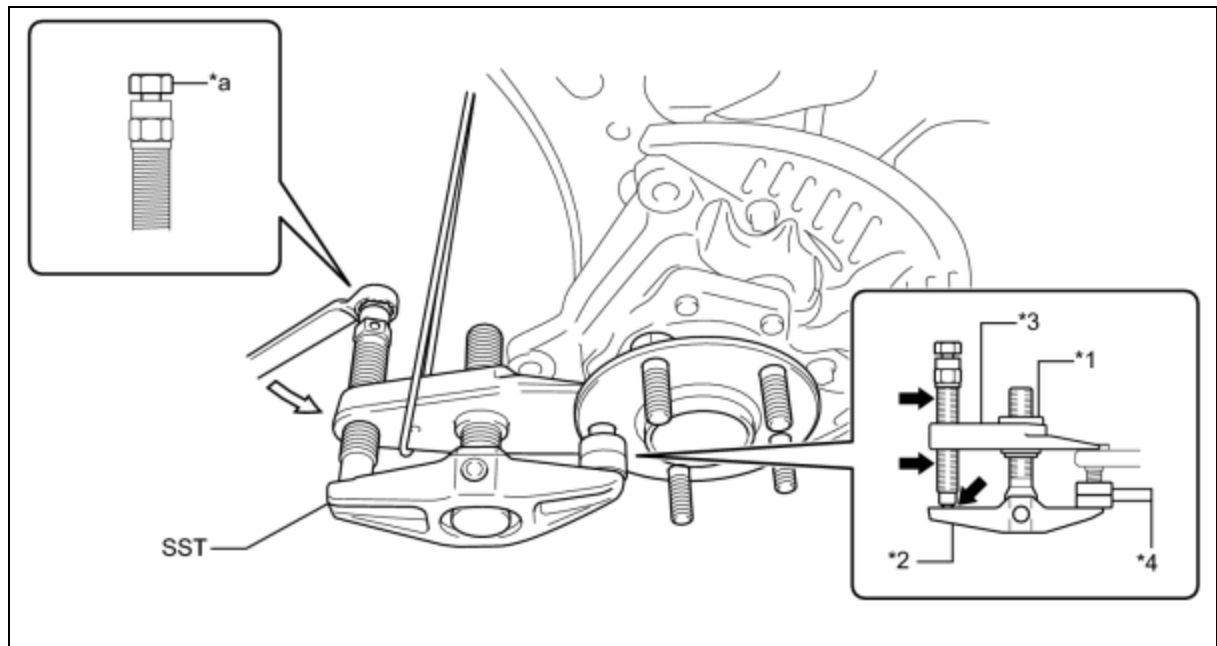
NOTICE:

Hang the caliper using a piece of string or equivalent.

3. REMOVE FRONT DISC INFO

4. REMOVE FRONT AXLE HUB BOLT

- (a) Using SST, remove the front axle hub bolt from the front axle hub sub-assembly.



SST: 09960-20010

09961-02010

09961-02060

Text in Illustration

*1	Nut	*2	Body
*3	Claw	*4	SST (spacer B)
*a	Place a wrench here	-	-

	Molybdenum grease		Turn
---	-------------------	---	------

CAUTION:

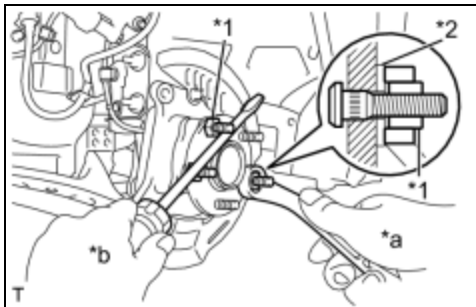
Before working, apply molybdenum grease to the bolt threads and bolt tip of SST.

NOTICE:

- Install SST so that claw and body are parallel.
- Make sure to tie the string of SST to the vehicle to prevent SST from dropping.
- Do not damage the front disc brake dust cover.
- Do not damage the front axle hub.
- Do not damage the steering knuckle.

5. INSTALL FRONT AXLE HUB BOLT

- (a) Set a new axle hub bolt onto the front axle hub, and tighten the nut (M12 x P1.25mm (0.0492 in.)) through the washer plate to install the axle hub bolt.



Text in Illustration

*1	Nut
*2	Washer
*a	Turn
*b	Hold

NOTICE:

Install the nuts to prevent damage to the front axle hub bolts.

6. INSTALL FRONT DISC INFO

7. INSTALL FRONT DISC BRAKE CALIPER ASSEMBLY

- (a) Install the front disc brake caliper assembly to the steering knuckle with the 2 new bolts.

Torque: 80 N·m (816 kgf·cm, 59ft·lbf)

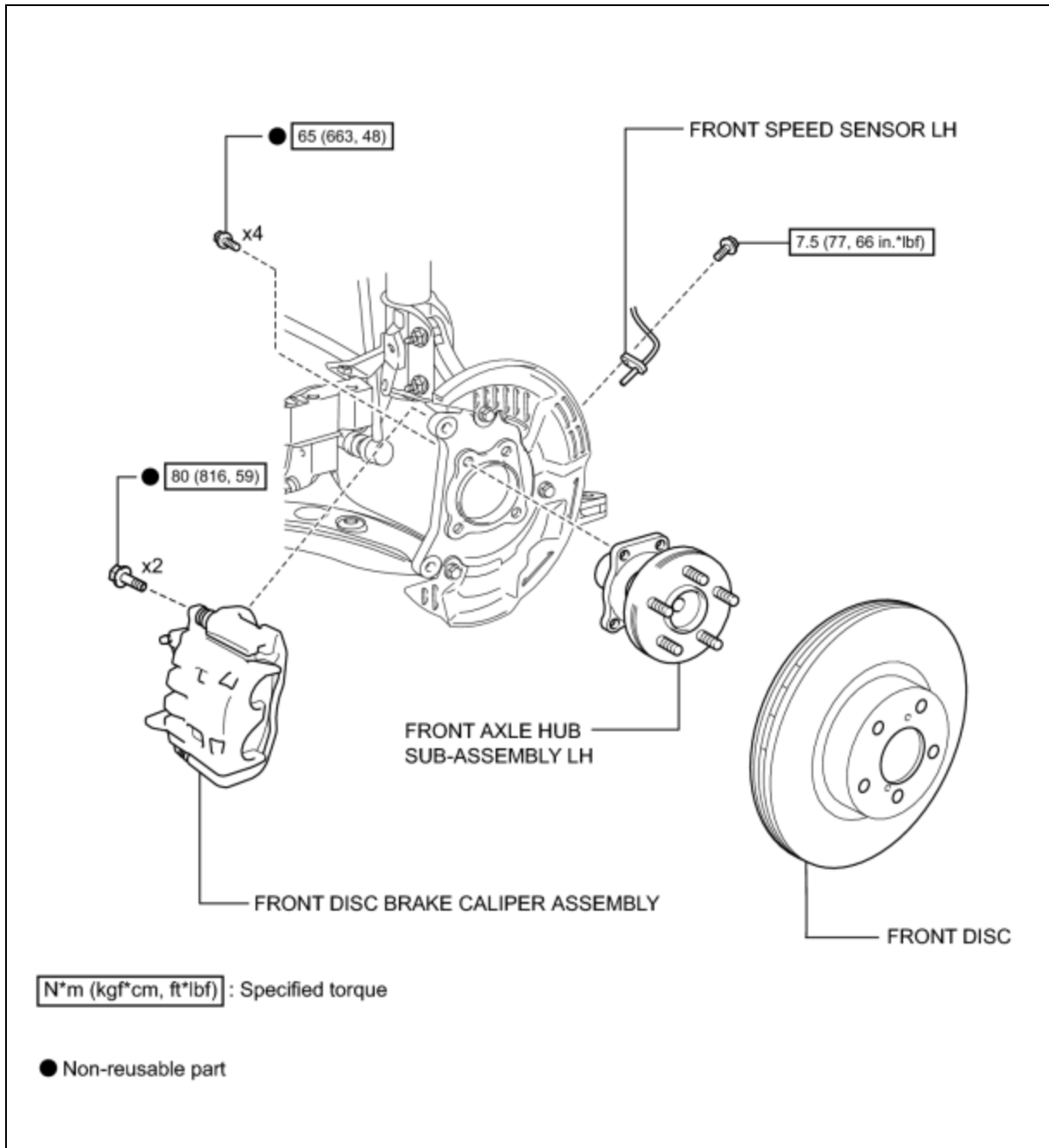
8. INSTALL FRONT WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000004D01SX
Title: AXLE AND DIFFERENTIAL: FRONT AXLE HUB: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000004C02GX
Title: AXLE AND DIFFERENTIAL: FRONT AXLE HUB: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. INSTALL FRONT AXLE HUB SUB-ASSEMBLY LH

(a) Install the front axle hub sub-assembly to steering knuckle with the 4 new bolts.

Torque: 65 N·m (663 kgf·cm, 48ft·lbf)

NOTICE:

- Do not allow any foreign matter such as dirt or dust to enter between the steering knuckle.
- Do not allow any foreign matter such as dirt or dust to enter between the front axle hub sub-assembly.

2. INSPECT FRONT AXLE HUB BEARING LOOSENESS INFO

3. INSPECT FRONT AXLE HUB RUNOUT INFO

4. INSTALL FRONT SPEED SENSOR LH

(a) Install the bolt and speed sensor front to steering knuckle.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

NOTICE:

Do not allow any foreign matter such as dirt or dust to enter between the steering knuckle and the front disc brake dust cover.

5. INSTALL FRONT DISC INFO

6. INSTALL FRONT DISC BRAKE CALIPER ASSEMBLY INFO

7. INSTALL FRONT WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

8. INSPECT SPEED SENSOR SIGNAL

INFO

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000X12021X
Title: AXLE AND DIFFERENTIAL: FRONT AXLE HUB: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

HINT:

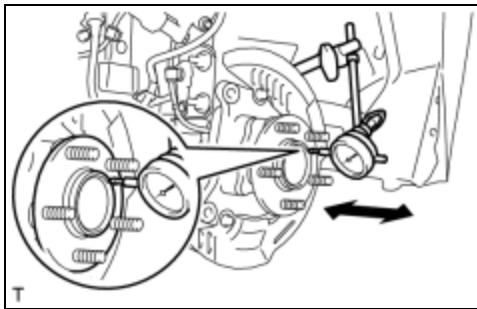
- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. REMOVE FRONT WHEEL

2. SEPARATE FRONT DISC BRAKE CALIPER ASSEMBLY INFO

3. REMOVE FRONT DISC INFO

4. INSPECT FRONT AXLE HUB BEARING LOOSENESS



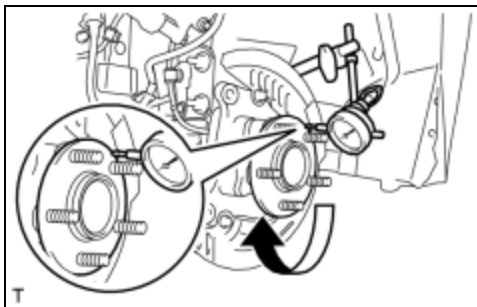
- (a) Using a dial indicator, check for looseness near the center of the front axle hub.

Maximum looseness:
0.05 mm (0.00196 in.)

NOTICE:

If the looseness is more than the maximum, replace the front axle hub and bearing assembly.

5. INSPECT FRONT AXLE HUB RUNOUT



- (a) Using a dial indicator, check for runout on the surface of the axle hub outside the hub bolt.

Maximum runout:
0.05 mm (0.00196 in.)

NOTICE:

If the looseness is more than the maximum, replace the front axle hub and bearing assembly.

6. INSTALL FRONT DISC INFO

7. INSTALL FRONT DISC BRAKE CALIPER ASSEMBLY INFO

8. INSTALL FRONT WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000004E025X
Title: AXLE AND DIFFERENTIAL: FRONT AXLE HUB: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

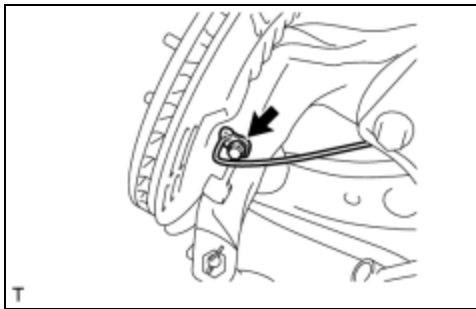
- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. REMOVE FRONT WHEEL

2. SEPARATE FRONT DISC BRAKE CALIPER ASSEMBLY INFO

3. REMOVE FRONT DISC INFO

4. DISCONNECT FRONT SPEED SENSOR LH

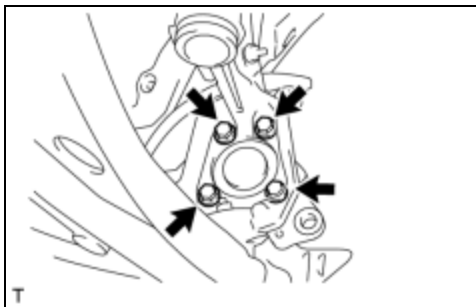


- (a) Remove the bolt, disconnect the front speed sensor LH from the steering knuckle.

NOTICE:

Clean the speed sensor installation hole and the contact surfaces every time the front speed sensor LH is removed.

5. REMOVE FRONT AXLE HUB SUB-ASSEMBLY LH

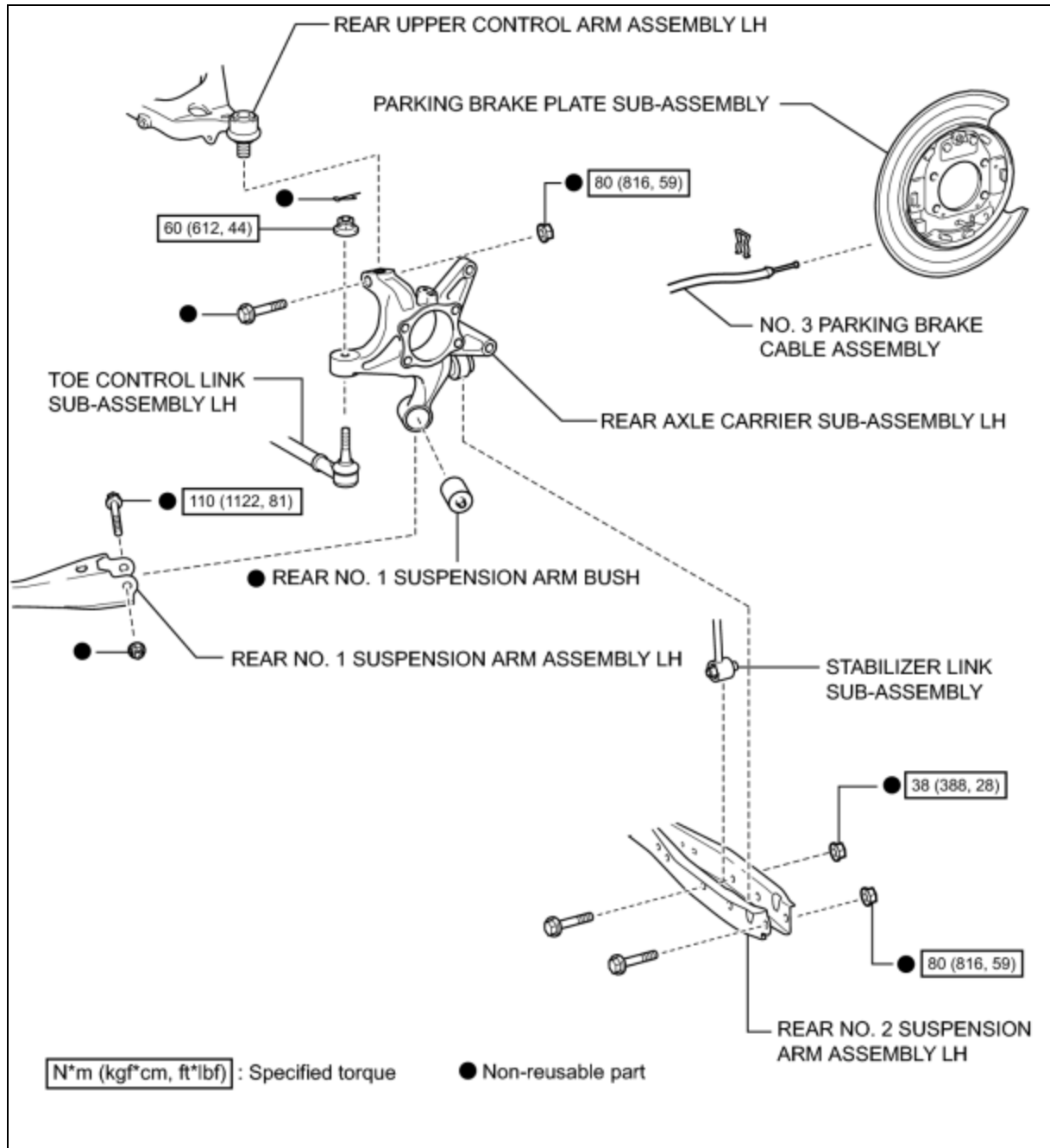


- (a) Remove the 4 bolts, front axle hub sub-assembly LH from the steering knuckle.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000004L02KX
Title: AXLE AND DIFFERENTIAL: REAR AXLE CARRIER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000005905000X
Title: AXLE AND DIFFERENTIAL: REAR AXLE CARRIER: DISASSEMBLY (2013 FR-S)		

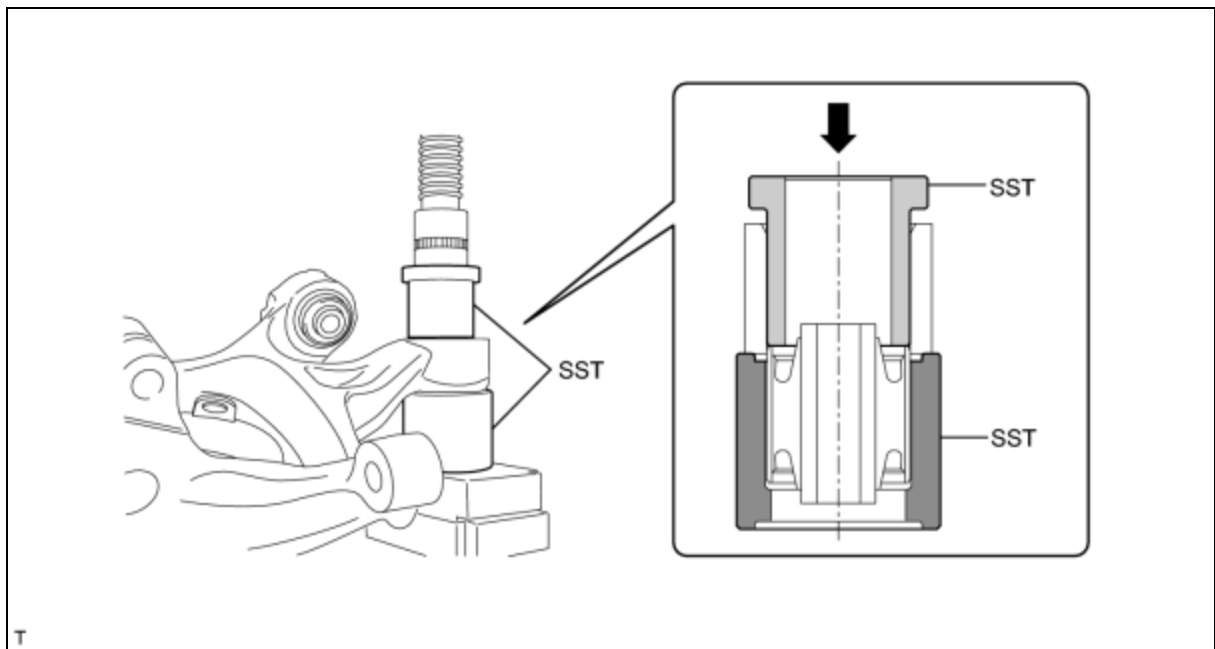
DISASSEMBLY

HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. REMOVE REAR NO. 1 SUSPENSION ARM BUSH

(a) Using SST and press, remove the rear No. 1 suspension arm bush.



SST: 09710-18030

SST: 09716-18010

Text in Illustration

	Aspect Weight	-	-
---	---------------	---	---

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000004K03IX
Title: AXLE AND DIFFERENTIAL: REAR AXLE CARRIER: INSTALLATION (2013 FR-S)		

INSTALLATION

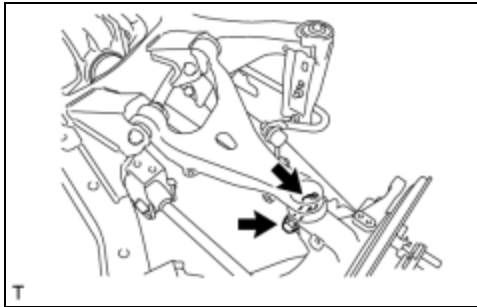
HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. INSTALL REAR AXLE CARRIER SUB-ASSEMBLY LH

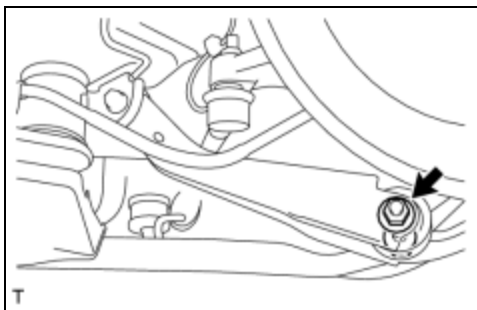
- (a) Using a jack and wooden block, jack up the rear axle carrier sub-assembly LH to replicate standard vehicle height conditions.

2. TEMPORARILY TIGHTEN REAR UPPER CONTROL ARM ASSEMBLY LH



- (a) Temporarily tighten the rear upper control arm assembly LH to the rear axle carrier sub-assembly with the new bolt and new nut.

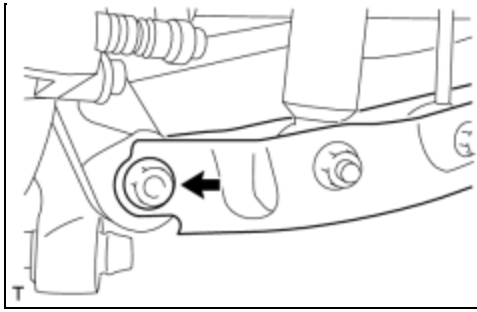
3. TEMPORARILY TIGHTEN REAR NO. 1 SUSPENSION ARM ASSEMBLY LH



- (a) Temporarily tighten the rear NO. 1 suspension arm assembly LH to the rear axle carrier sub-assembly with the new bolt and new nut.

4. TEMPORARILY TIGHTEN REAR NO. 2 SUSPENSION ARM ASSEMBLY LH

- (a) Temporarily tighten the rear NO. 2 suspension arm assembly LH to the rear axle carrier sub-assembly with



the bolt and new nut.

5. INSTALL TOE CONTROL LINK SUB-ASSEMBLY LH

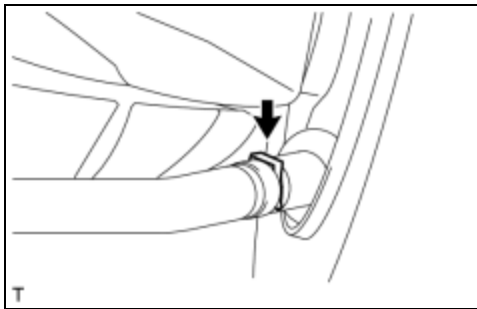
(a) Install the nut and the toe control link sub-assembly LH to the rear axle carrier sub-assembly.

Torque: 60 N·m (612 kgf·cm, 44ft·lbf)

(b) Install the new cotter pin.

6. TEMPORARILY TIGHTEN STABILIZER LINK SUB-ASSEMBLY INFO

7. INSTALL NO. 3 PARKING BRAKE CABLE ASSEMBLY



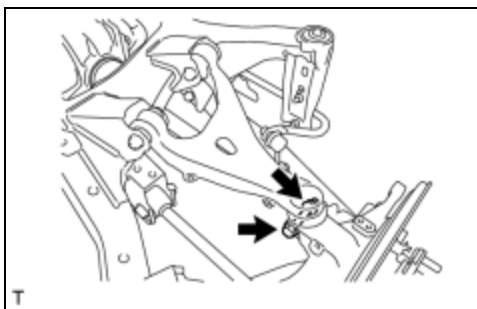
(a) Install the clip and the NO. 3 parking brake cable assembly to the parking brake plate sub-assembly.

8. REASSEMBLY PARKING BRAKE ASSEMBLY

INFO

9. STABILIZE SUSPENSION INFO

10. FULLY TIGHTEN REAR UPPER CONTROL ARM ASSEMBLY LH



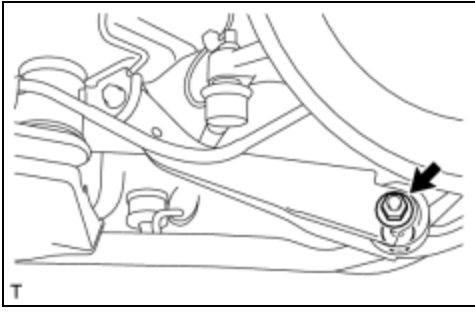
(a) Fully tighten the bolt.

Torque: 80 N·m (816 kgf·cm, 59ft·lbf)

HINT:

Hold the bolt and tighten the nut.

11. FULLY TIGHTEN REAR NO. 1 SUSPENSION ARM ASSEMBLY LH



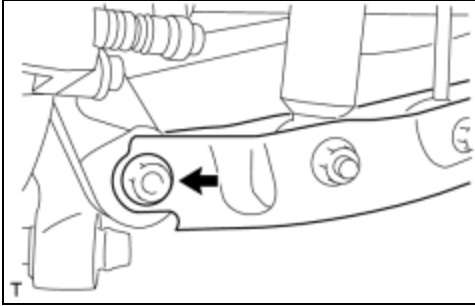
(a) Fully tighten the bolt.

Torque: 110 N·m (1122 kgf·cm, 81ft·lbf)

HINT:

Hold the nut and tighten the bolt.

12. FULLY TIGHTEN REAR NO. 2 SUSPENSION ARM ASSEMBLY LH



(a) Fully tighten the bolt.

Torque: 80 N·m (816 kgf·cm, 59ft·lbf)

HINT:

Hold the bolt and tighten the nut.

13. FULLY TIGHTEN STABILIZER LINK SUB-ASSEMBLY INFO

14. INSTALL REAR AXLE HUB AND BEARING ASSEMBLY LH

INFO

15. INSPECT AND ADJUST REAR WHEEL ALIGNMENT

INFO

16. VSC SENSOR NEUTRAL MEMORIZATION

INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000005906000X
Title: AXLE AND DIFFERENTIAL: REAR AXLE CARRIER: REASSEMBLY (2013 FR-S)		

REASSEMBLY

HINT:

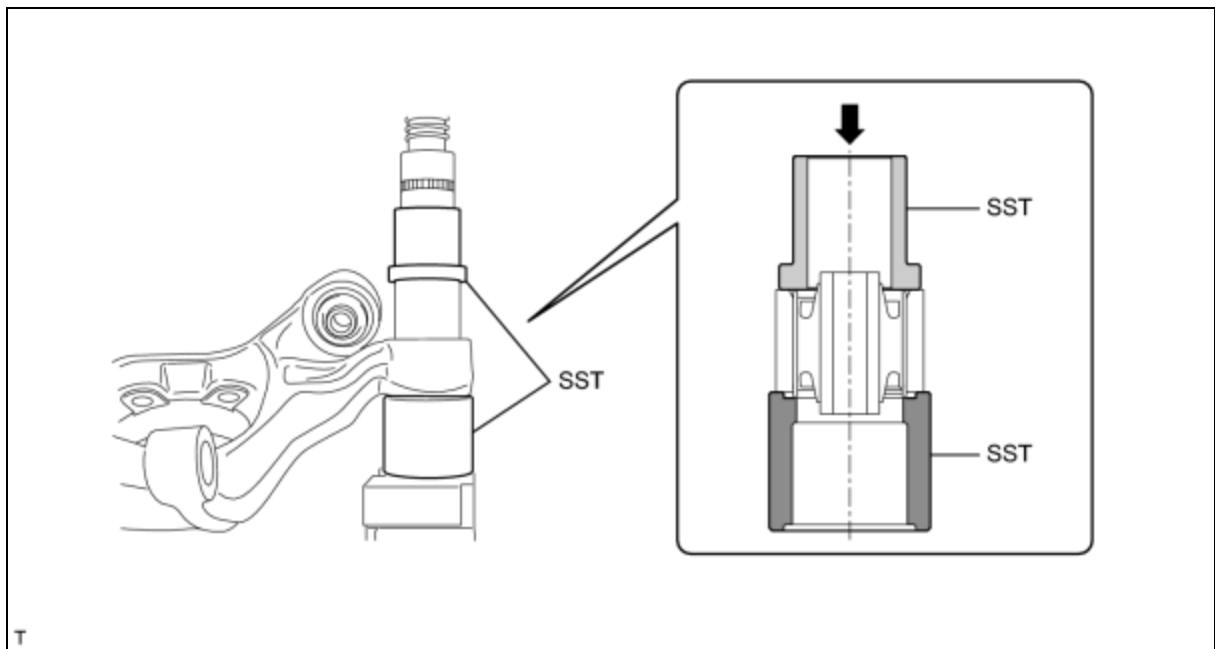
- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. INSTALL REAR NO. 1 SUSPENSION ARM BUSH

(a) Using SST and a press, install the new rear No. 1 suspension arm bush.

SST: 09710-18030

SST: 09716-18010



Text in Illustration

	Aspect Weight	-	-
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Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000004M033X
Title: AXLE AND DIFFERENTIAL: REAR AXLE CARRIER: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. REMOVE REAR AXLE HUB AND BEARING ASSEMBLY LH

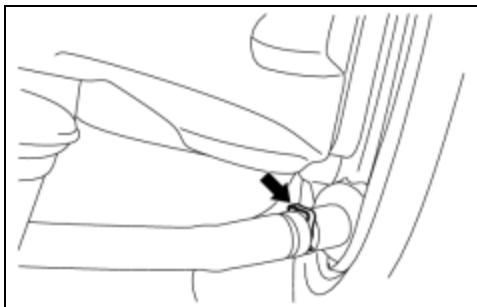
INFO

2. DISASSEMBLY PARKING BRAKE ASSEMBLY

INFO

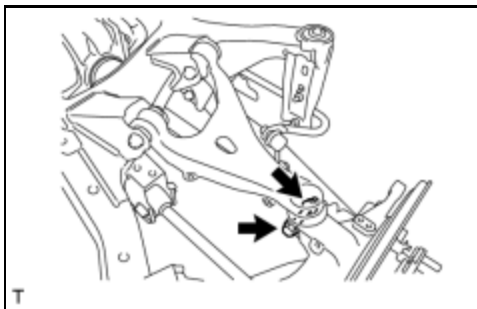
3. SEPARATE STABILIZER LINK SUB-ASSEMBLY INFO

4. SEPARATE NO. 3 PARKING BRAKE CABLE ASSEMBLY



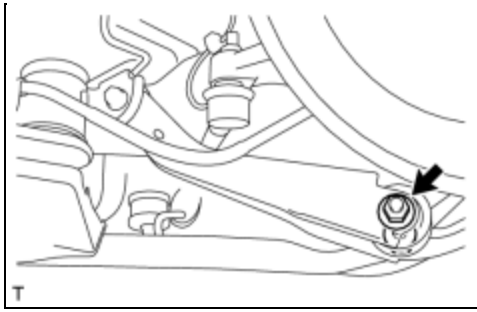
- (a) Remove the clip and separate the No. 3 parking brake cable assembly from parking brake plate sub-assembly.

5. SEPARATE REAR UPPER CONTROL ARM ASSEMBLY LH



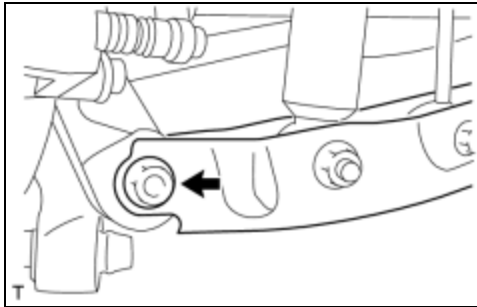
- (a) Remove the bolt, nut and separate the rear upper control arm assembly LH from rear axle carrier.

6. SEPARATE REAR NO. 1 SUSPENSION ARM ASSEMBLY LH



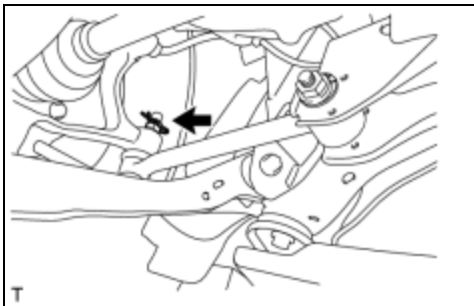
- (a) Remove the bolt, nut and separate the rear No. 1 suspension arm assembly LH from rear axle carrier.

7. SEPARATE REAR NO. 2 SUSPENSION ARM ASSEMBLY LH



- (a) Remove the bolt, nut and separate the rear No. 2 suspension arm assembly LH from rear axle carrier.

8. DISCONNECT TOE CONTROL LINK SUB-ASSEMBLY LH

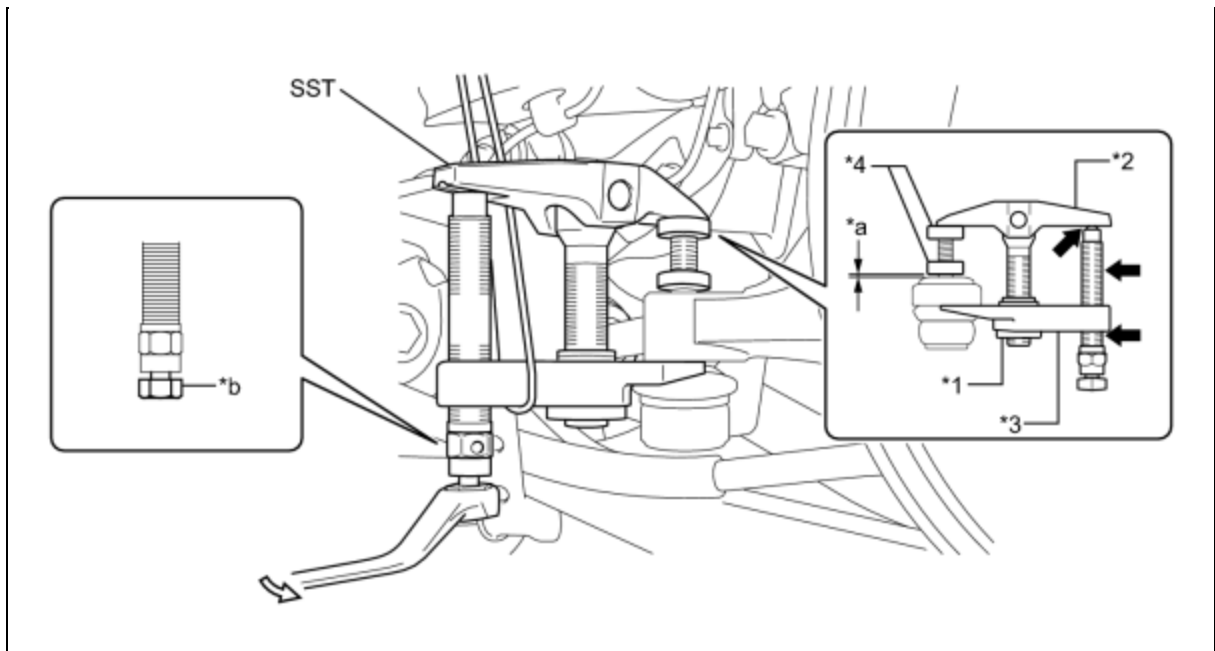


- (a) Remove the cotter pin.
(b) Remove the nut.
(c) Install the SST (spacer B) as shown in the illustration.

NOTICE:

As SST may become damaged, make sure the space between the toe control link sub-assembly LH and spacers is not less than 1 mm (0.0394 in.).

- (d) Using SST, disconnect the toe control link sub-assembly LH from the rear axle carrier as shown in the illustration.





SST: 09960-20010

09961-02010

09961-02060

Text in Illustration

*1	Nut	*2	Body
*3	Claw	*4	SST (spacer B)
*a	1 mm (0.0394 in.)	*b	Place a wrench here
	Molybdenum grease		Turn

CAUTION:

Before working, apply molybdenum grease to the bolt threads and bolt tip of SST.

NOTICE:

- Install SST so that claw and body are parallel.
- Make sure to tie the string of SST to the vehicle to prevent SST from dropping.
- Do not damage the toe-control link ball joint dust cover.
- Do not damage the toe-control link sub-assembly.
- Do not damage the parking brake plate sub-assembly.
- Do not damage the rear axle carrier.

9. REMOVE PARKING BRAKE PLATE SUB-ASSEMBLY

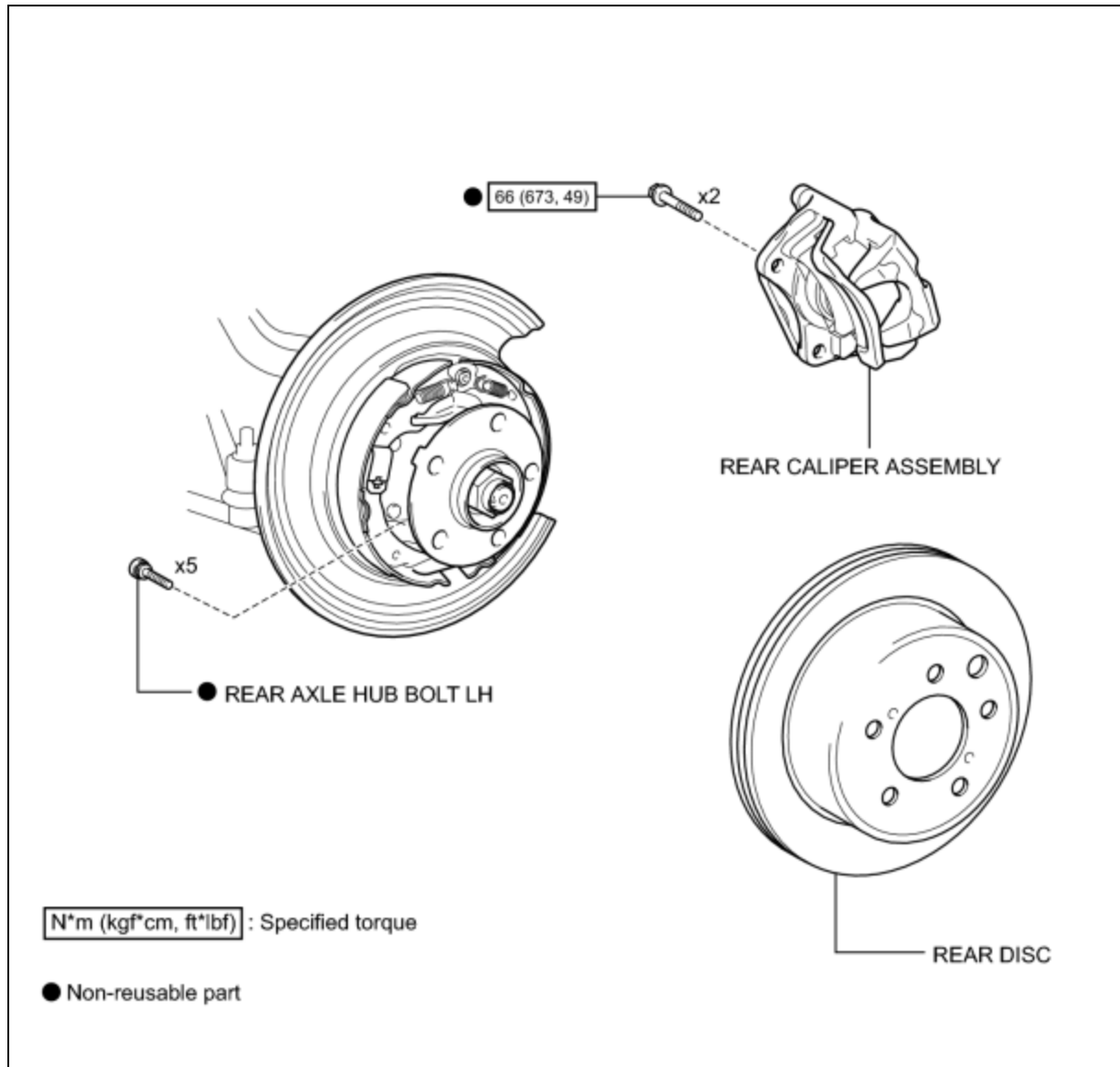
10. REMOVE REAR AXLE CARRIER SUB-ASSEMBLY LH

- (a) Hold the drive shaft and remove the rear axle carrier sub-assembly LH.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000V7I01TX
Title: AXLE AND DIFFERENTIAL: REAR AXLE HUB BOLT: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000V7H02FX
Title: AXLE AND DIFFERENTIAL: REAR AXLE HUB BOLT: REPLACEMENT (2013 FR-S)		

REPLACEMENT

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

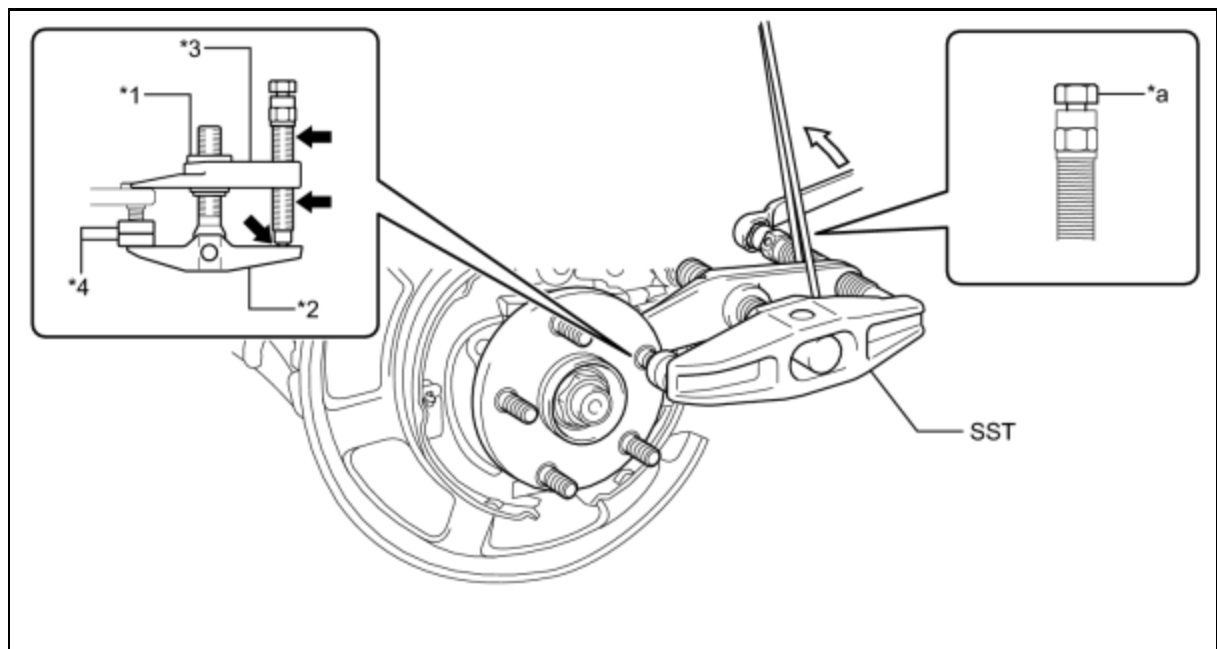
1. REMOVE REAR WHEEL

2. SEPARATE REAR CALIPER ASSEMBLY [INFO](#)

3. REMOVE REAR DISC [INFO](#)

4. REMOVE REAR AXLE HUB BOLT LH

(a) Using SST, remove the rear axle hub bolt LH from rear axle hub and bearing assembly LH.





SST: 09960-20010

09961-02010

09961-02060

Text in illustration

*1	Nut	*2	Body
*3	Claw	*4	SST (spacer B)
*a	Place a wrench here	-	-
	Molybdenum grease		Turn

CAUTION:

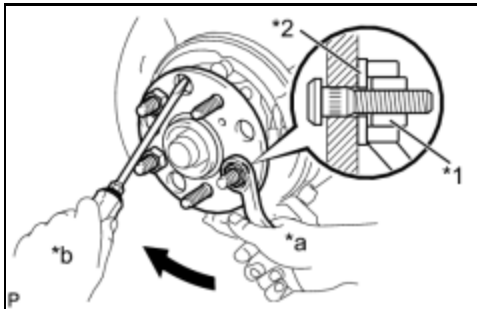
Before working, apply molybdenum grease to the bolt threads and bolt tip of SST.

NOTICE:

- Install SST so that claw and body are parallel
- Make sure to tie the string of SST to the vehicle to prevent SST from dropping.
- Do not damage the parking brake plate sub-assembly.
- Do not damage the rear axle carrier.
- Do not damage the rear axle hub and bearing.

5. INSTALL REAR AXLE HUB BOLT LH

- (a) Set a new axle hub bolt onto the rear axle hub and bearing, and tighten the nut (M12 x P1.25mm (0.0492 in.)) through the washer plate to install the axle hub bolt.



Text in Illustration

*1	Nut
*2	Washer
*a	Turn
*b	Hold

NOTICE:

Install the nuts to prevent damage to the rear axle hub bolt LHs LH.

6. INSTALL REAR DISC INFO

7. INSTALL REAR CALIPER ASSEMBLY INFO

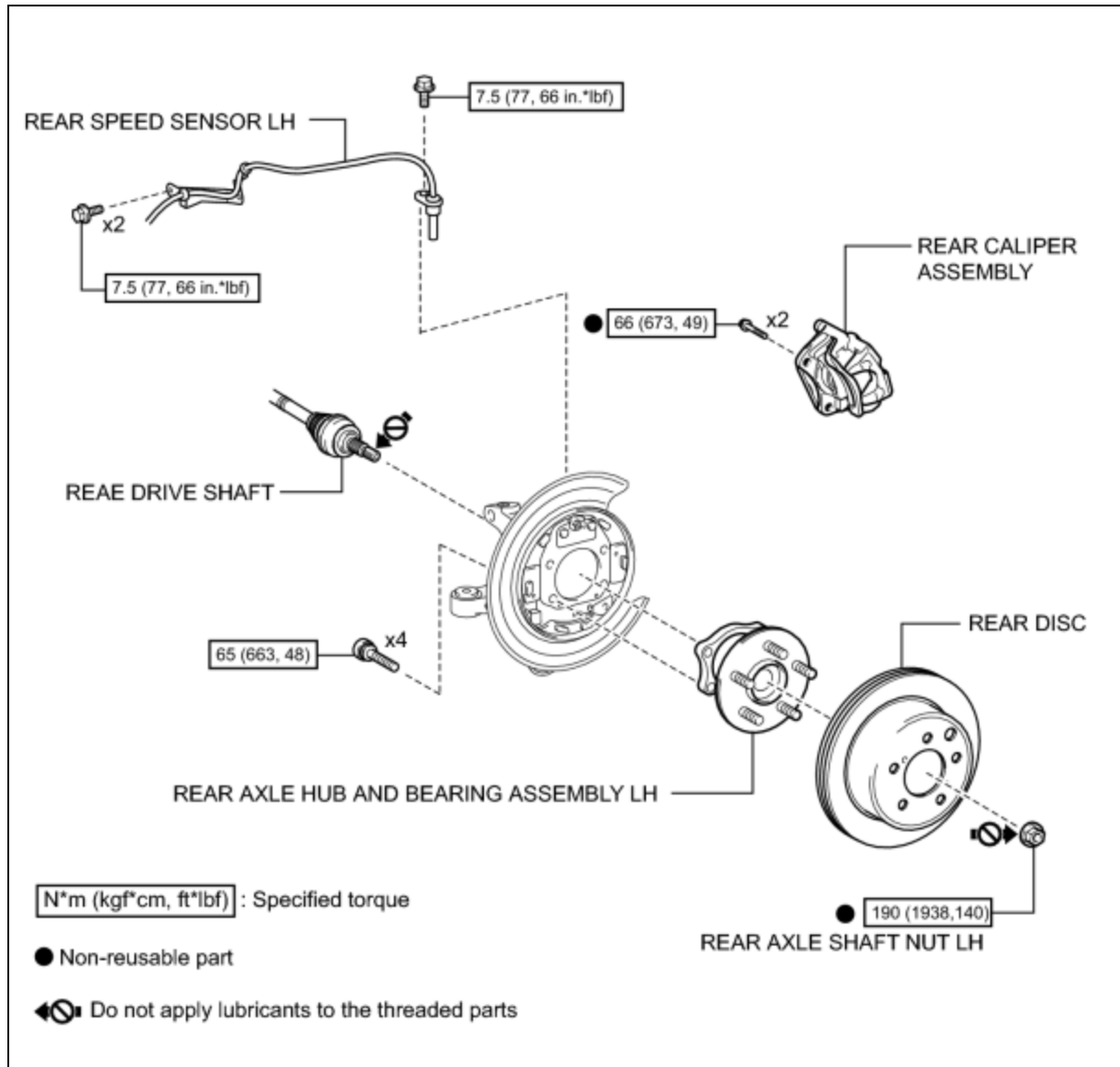
8. INSTALL REAR WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000004L021X
Title: AXLE AND DIFFERENTIAL: REAR AXLE HUB: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000004K03FX
Title: AXLE AND DIFFERENTIAL: REAR AXLE HUB: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. INSTALL REAR AXLE HUB AND BEARING ASSEMBLY LH

(a) Install the rear axle hub and bearing assembly to the rear axle assembly with the 4 bolts.

Torque: 65 N·m (663 kgf·cm, 48ft·lbf)

2. INSTALL REAR DISC INFO

3. INSTALL REAR CALIPER ASSEMBLY INFO

4. STAKE REAR AXLE SHAFT NUT LH

(a) Clean the threaded parts on the rear drive shaft assembly and a new rear axle shaft nut using a non-residue solvent.

NOTICE:

- Be sure to perform this step even when using a new rear drive shaft assembly.
- Keep the threaded parts free of oil and foreign matter.

(b) Install the new rear axle shaft nut.

Torque: 190 N·m (1938 kgf·cm, 140ft·lbf)

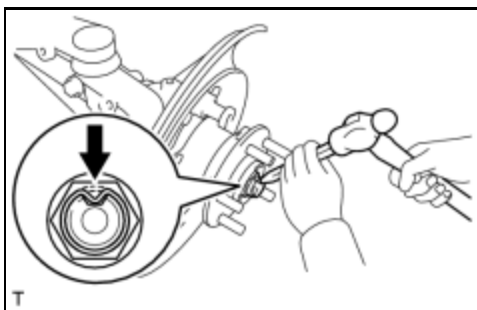
HINT:

Stake the rear axle shaft nut LH after inspecting for looseness and runout in the following steps.

5. INSPECT REAR AXLE HUB BEARING LOOSENESS INFO

6. INSPECT REAR AXLE HUB RUNOUT INFO

7. STAKE REAR AXLE SHAFT NUT LH



(a) Using a chisel and hammer, stake the rear axle shaft nut LH.

8. INSTALL REAR SPEED SENSOR LH

(a) Install the bolt and the rear speed sensor LH.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

9. INSTALL REAR WHEEL

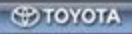
Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

10. ADJUST PARKING BRAKE LEVER TRAVEL

INFO

11. INSPECT SPEED SENSOR SIGNAL

INFO



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000X1301ZX
Title: AXLE AND DIFFERENTIAL: REAR AXLE HUB: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. REMOVE REAR WHEEL

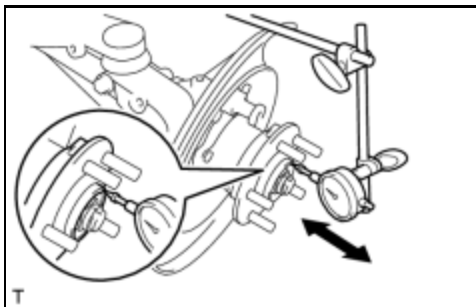
2. SEPARATE REAR CALIPER ASSEMBLY INFO

3. REMOVE REAR DISC INFO

4. INSPECT REAR AXLE HUB BEARING LOOSENESS

- (a) Using a dial indicator, check for looseness near the center of the rear axle hub.

Maximum looseness:
0.05 mm (0.00196 in.)



NOTICE:

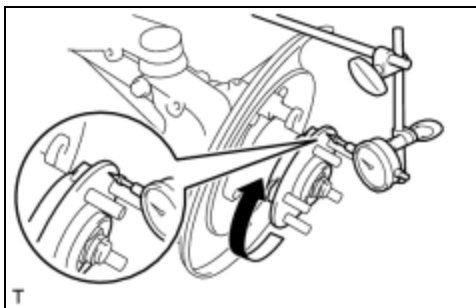
- Make sure that the dial indicator is set perpendicular to the measurement surface.
- Keep the magnet of the dial indicator away from the rear axle hub and bearing assembly.

If the looseness is more than the maximum, replace the rear axle hub and bearing assembly.

5. INSPECT REAR AXLE HUB RUNOUT

- (a) Using a dial indicator, check for runout on the surface of the rear axle hub and bearing assembly outside the rear axle hub bolt.

Maximum runout:
0.05 mm (0.00196 in.)



NOTICE:

- Make sure that the dial indicator is set perpendicular to the measurement surface.
- Keep the magnet of the dial indicator away from the rear axle hub and bearing assembly.

If the runout is more than the maximum, replace the rear axle hub and bearing assembly.

6. INSTALL REAR DISC INFO

7. INSTALL REAR CALIPER ASSEMBLY

INFO

8. INSTALL REAR WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000004M031X
Title: AXLE AND DIFFERENTIAL: REAR AXLE HUB: REMOVAL (2013 FR-S)		

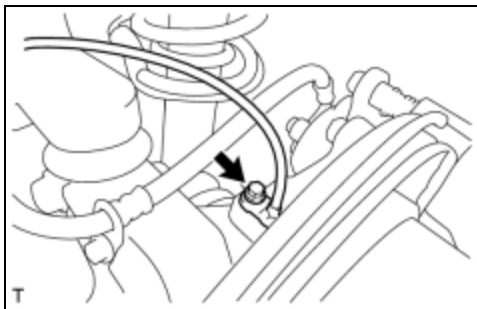
REMOVAL

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. REMOVE REAR WHEEL

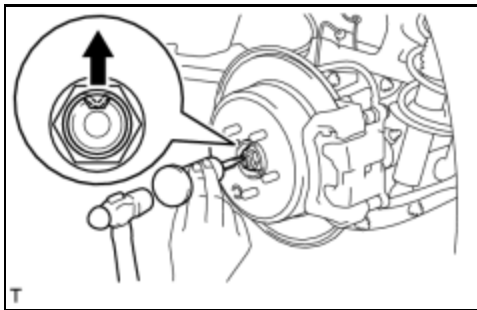
2. SEPARATE REAR SPEED SENSOR LH



- (a) Remove the bolt and separate rear speed sensor LH.

NOTICE:

Prevent foreign matter from attaching to the sensor tip.



3. REMOVE REAR AXLE SHAFT NUT LH

- (a) Using SST and a hammer, release the staked part of the rear axle shaft nut.

SST: 09930-00010

NOTICE:

- Do not grind the SST.
- Release the staked part of the nut completely, otherwise the threads of the drive shaft may be damaged.

- (b) Remove the rear axle shaft nut.

4. SEPARATE REAR CALIPER ASSEMBLY INFO

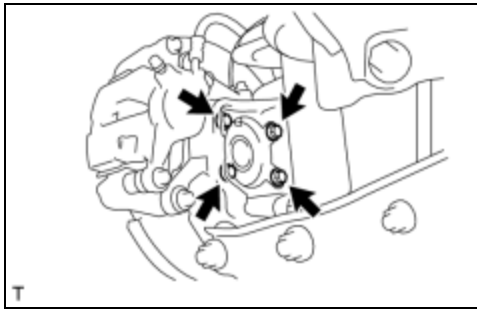
5. REMOVE REAR DISC INFO

6. REMOVE REAR AXLE HUB AND BEARING ASSEMBLY LH

- (a) Using a plastic-faced hammer, disconnect the rear drive shaft assembly from the rear axle hub and bearing assembly LH.

NOTICE:

- Be careful not to damage the boot.
- Use wire or equivalent to prevent the rear drive shaft assembly from hanging down.

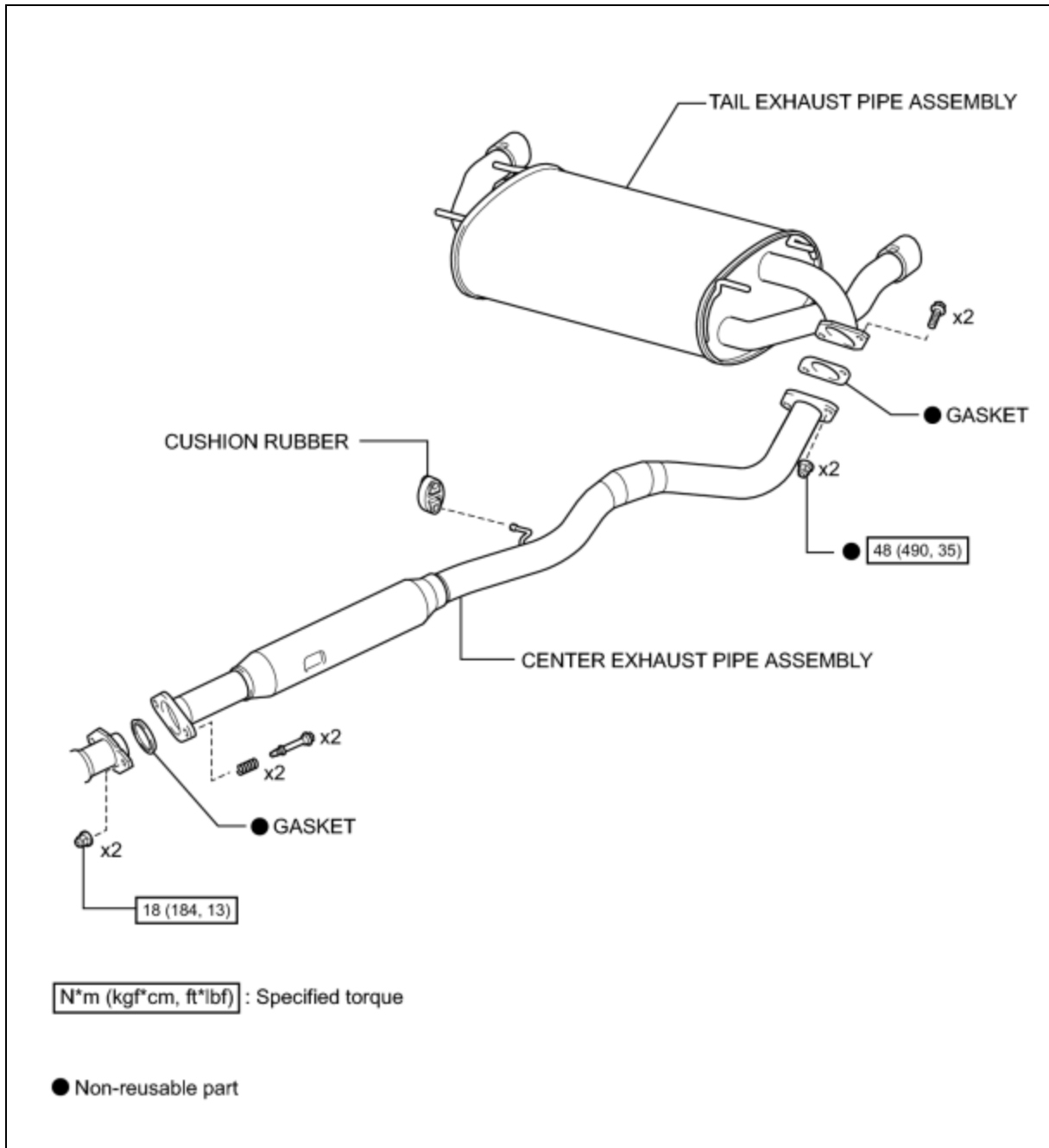


(b) Remove the 4 bolts and the rear axle hub and bearing assembly LH from the rear axle assembly.

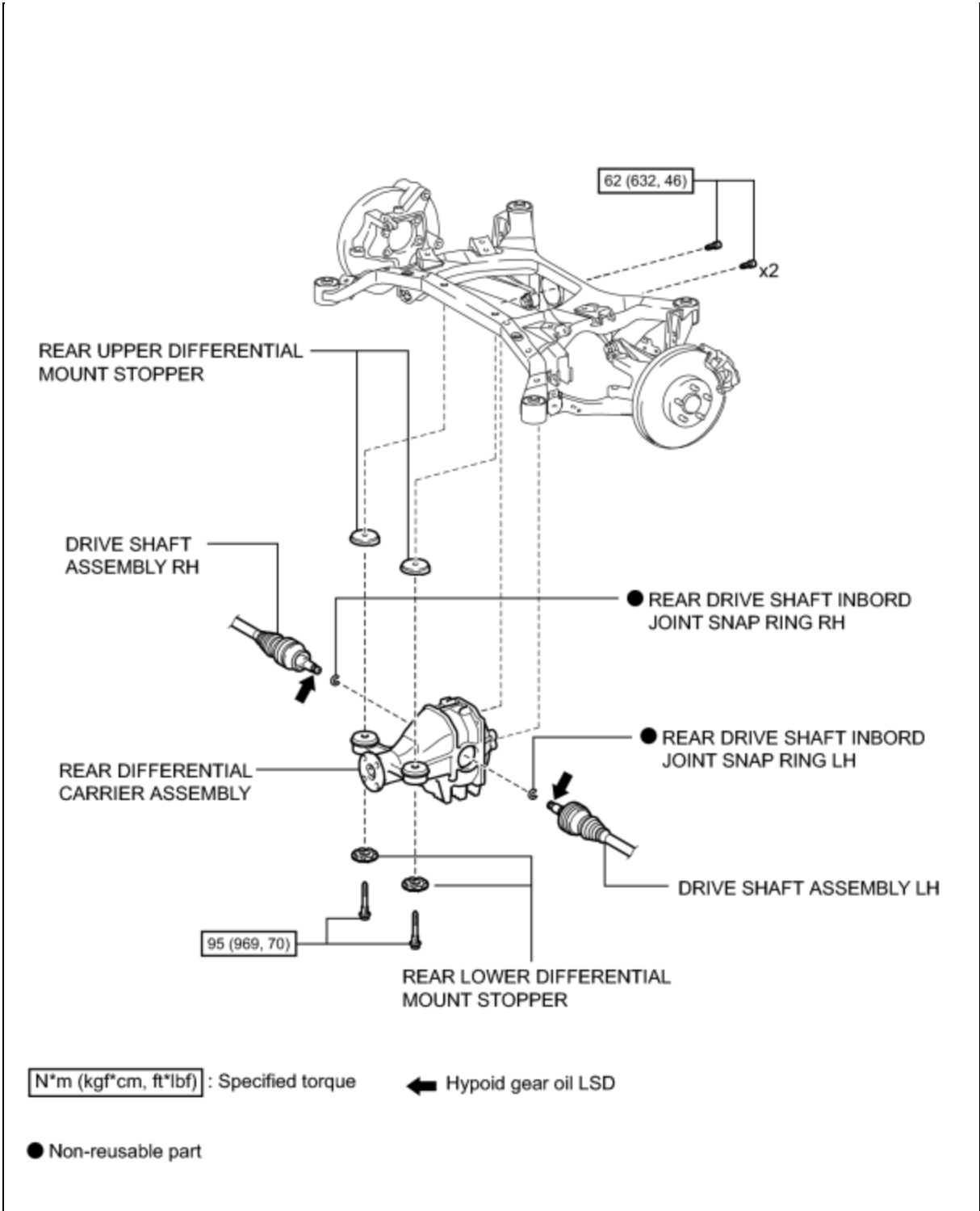
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001V2P01DX
Title: AXLE AND DIFFERENTIAL: REAR DIFFERENTIAL CARRIER ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

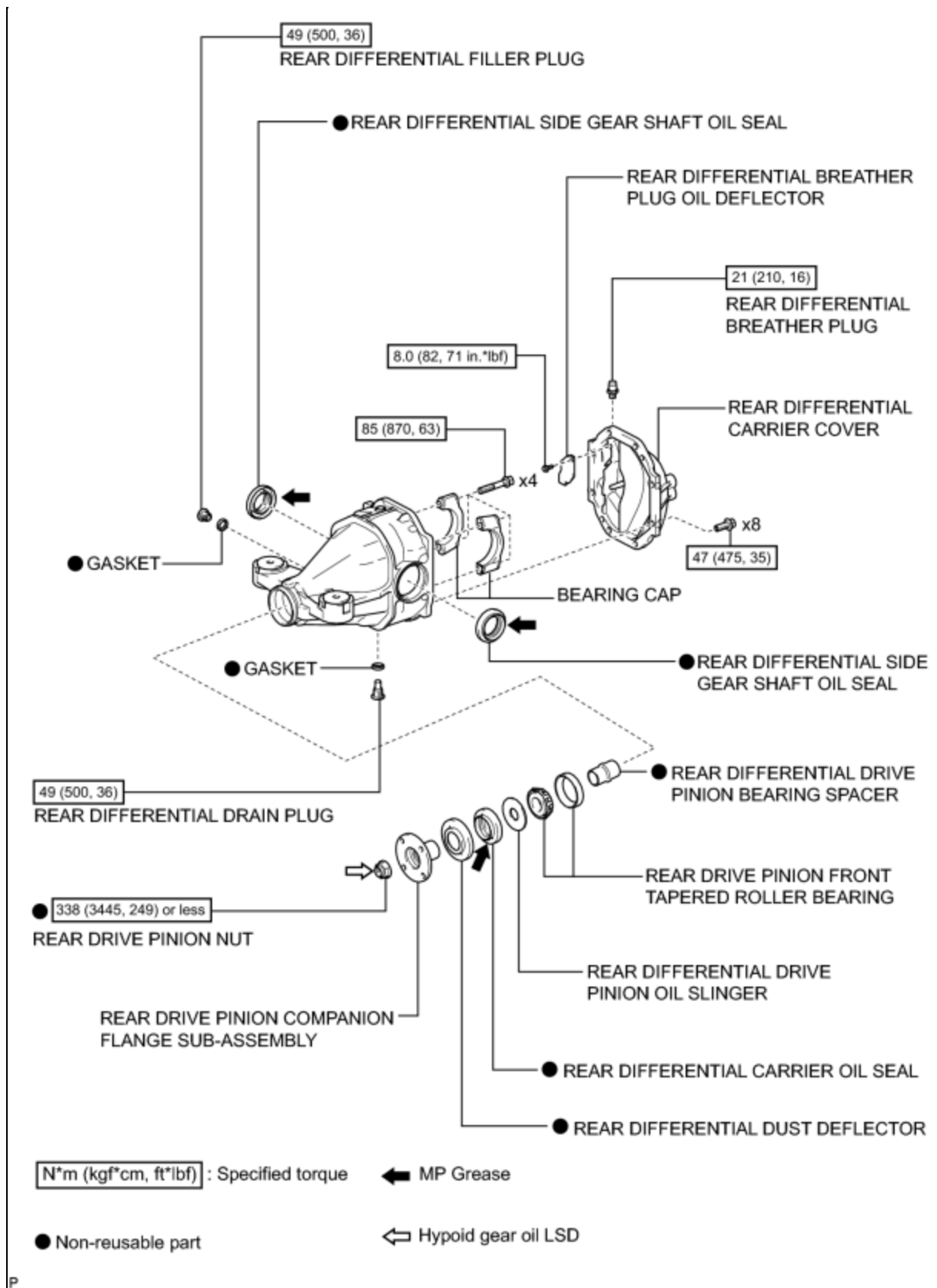
ILLUSTRATION



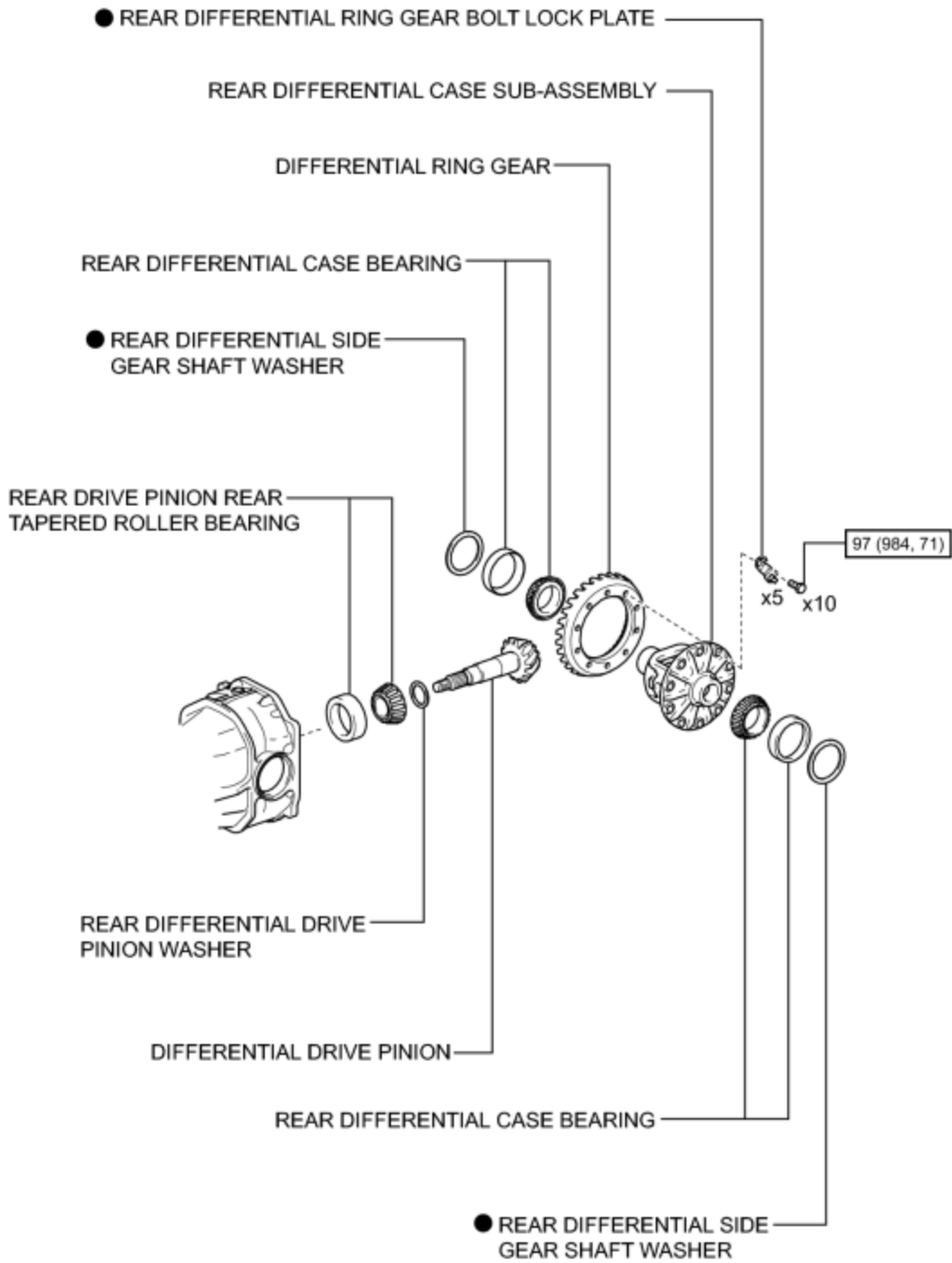
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION



N*m (kgf*cm, ft*lb) : Specified torque

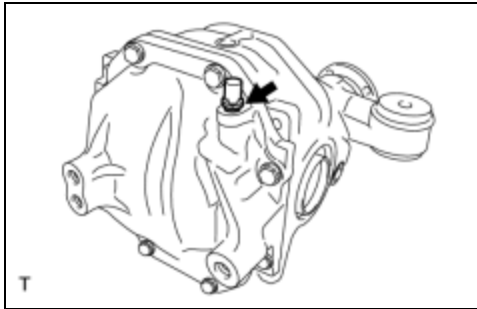
● Non-reusable part



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000005901CX
Title: AXLE AND DIFFERENTIAL: REAR DIFFERENTIAL CARRIER ASSEMBLY: DISASSEMBLY (2013 FR-S)		

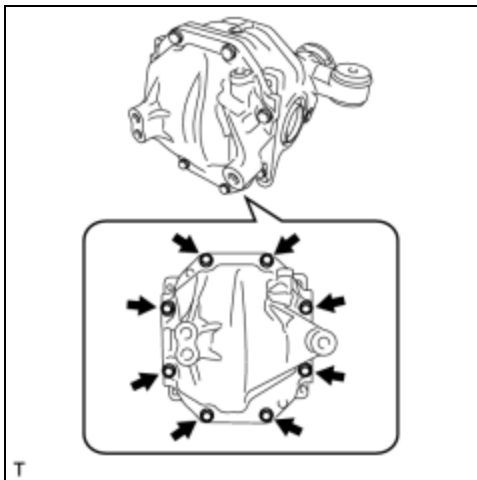
DISASSEMBLY

1. REMOVE REAR DIFFERENTIAL BREATHER PLUG



- (a) Remove the rear differential breather plug from the rear differential carrier cover.

2. REMOVE REAR DIFFERENTIAL CARRIER COVER

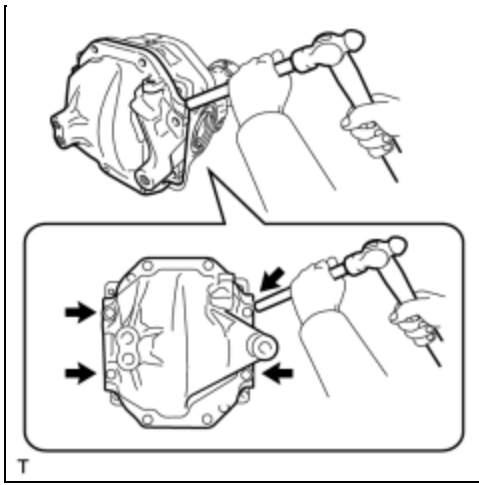


- (a) Remove the 8 bolts.

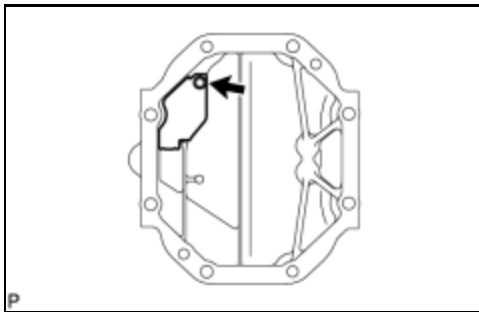
- (b) Using a brass bar and a hammer, remove the rear differential carrier cover from the rear differential carrier assembly.

NOTICE:

- Place the brass bar onto the corners of the rear differential carrier cover.
- Do not damage the sealing surface of the rear differential carrier.

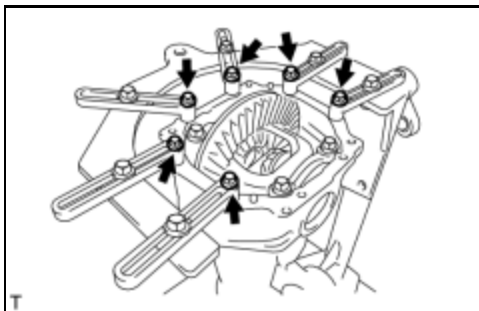


3. REMOVE REAR DIFFERENTIAL BREATHER PLUG OIL DEFLECTOR



(a) Remove the bolt and the rear differential breather plug oil deflector from the rear differential carrier cover.

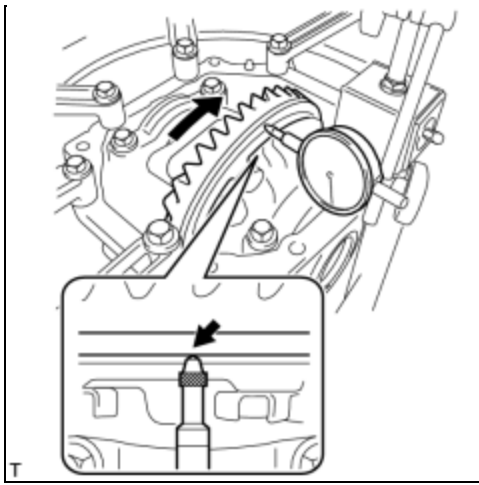
4. SECURE REAR DIFFERENTIAL CARRIER SUB-ASSEMBLY



(a) Secure the rear differential carrier sub-assembly to the overhaul stand with the 6 bolts.

5. INSPECT RUNOUT OF DIFFERENTIAL RING GEAR

(a) Set a dial indicator perpendicular to the end of the



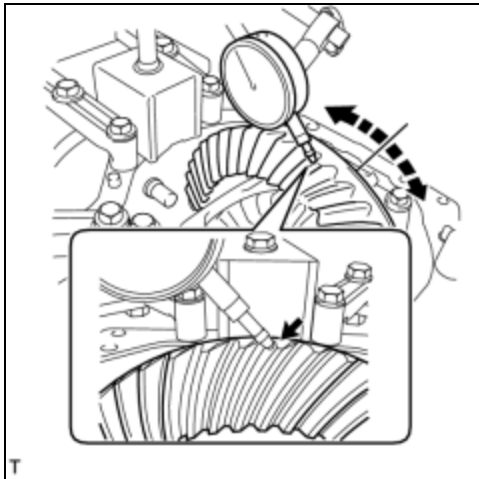
differential ring gear face.

(b) Rotate the differential ring gear and measure the runout.

Maximum runout:
0.07 mm (0.00275 in.)

If the runout is more than the specified maximum value, remove the differential ring gear and check the runout of the rear differential case sub-assembly.

6. INSPECT DIFFERENTIAL RING GEAR BACKLASH



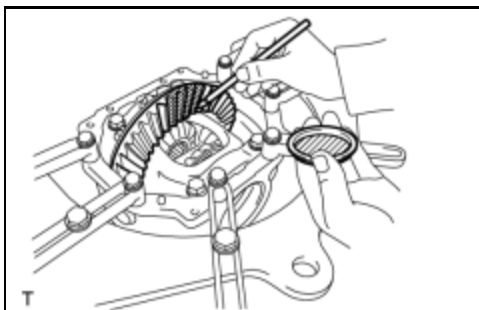
(a) While holding the rear drive pinion companion flange sub-assembly, rotate the differential ring gear and measure the backlash.

Standard Backlash:
0.13 to 0.18 mm (0.00512 to 0.00708 in.)

HINT:

- Record the measured backlash to use as a reference for selecting a rear differential side gear shaft plate washer.
- Inspect the tooth contact and use the result as a reference for selecting a rear differential side gear shaft plate washer.

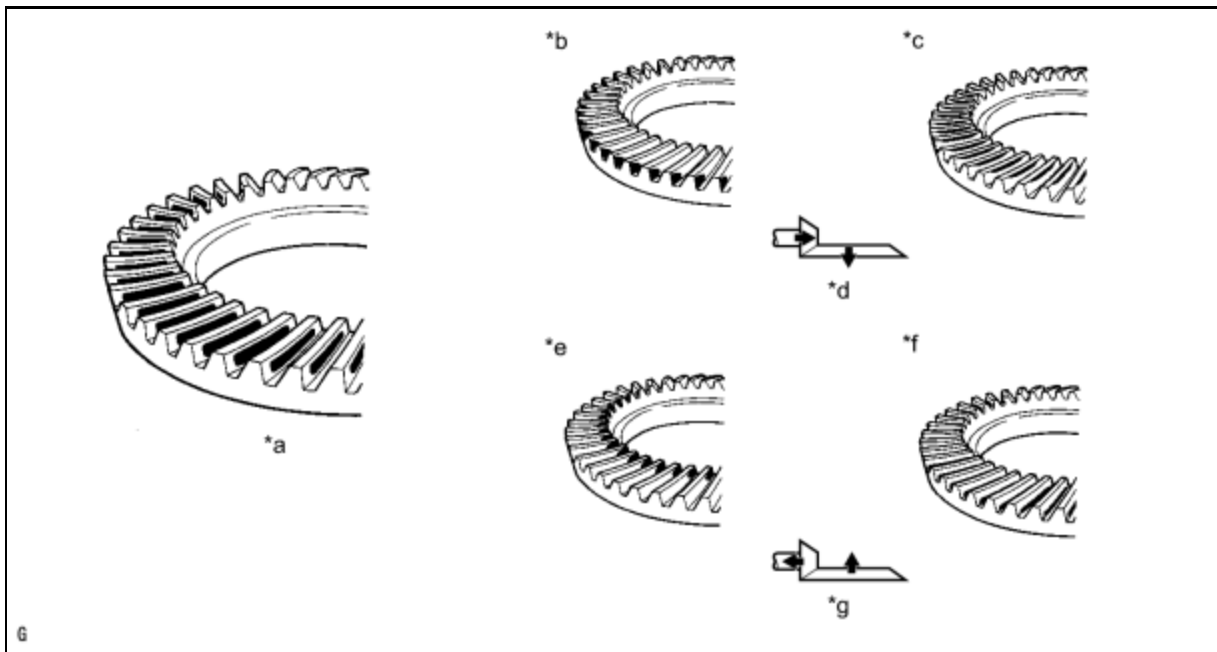
7. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION



(a) Coat 3 or 4 teeth at 3 different positions on the differential ring gear with Prussian blue.

(b) Rotate the differential ring gear in both directions.

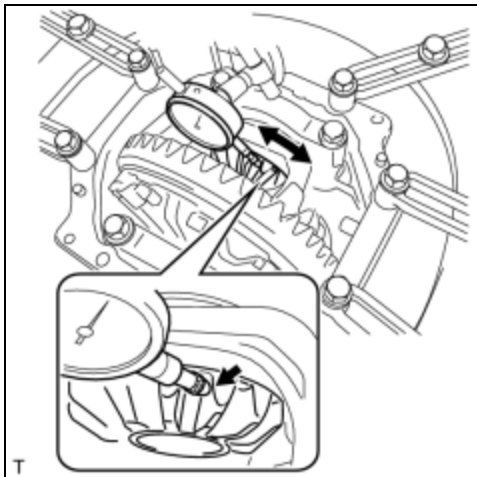
(c) Inspect the tooth contact pattern.



Text in Illustration

*a	Proper Contact	*b	Heel Contact
*c	Face Contact	*d	Select an adjusting washer that brings the drive pinion closer to the ring gear
*e	Toe Contact	*f	Flank Contact
*g	Select an adjusting washer that shifts the drive pinion away from the ring gear	-	-

8. INSPECT DIFFERENTIAL SIDE GEAR BACKLASH



(a) Place a dial indicator on the tip of a side gear tooth at a right angle. Hold the pinion gear in the rear differential case sub-assembly and check that the backlash.

Standard Backlash:

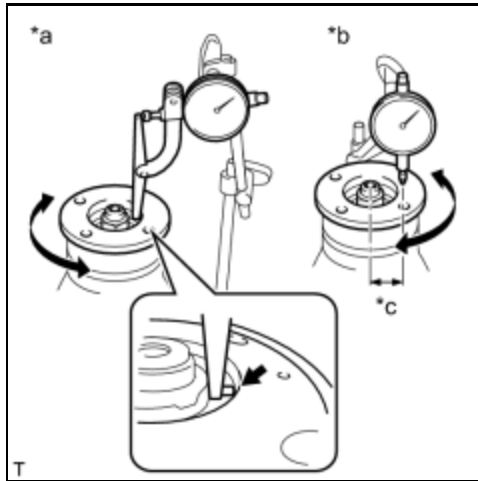
0 mm (0 in.)

If the result is not as specified, replace the rear differential case sub-assembly with a new one.

9. INSPECT RUNOUT OF REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY

- (a) Using a dial indicator, measure the vertical and lateral runout of the rear drive pinion companion flange sub-assembly.

Text in Illustration



*a	Vertical Runout
*b	Lateral Runout
*c	30 mm (1.181 in.)

Maximum Runout:

ITEM	SPECIFIED CONDITION
Vertical runout	0.09 mm (0.00354 in.)
Lateral runout	0.09 mm (0.00354 in.)

NOTICE:

Measure the runout of the rear drive pinion companion flange horizontally at a position 30 mm (1.18 in.) away from the center of the differential drive pinion shaft.

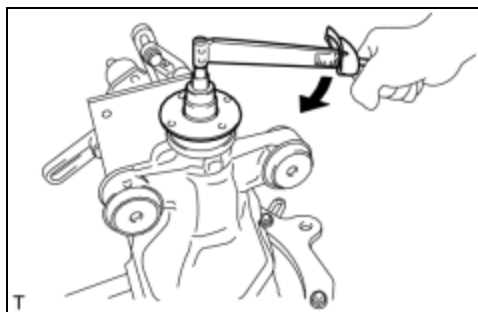
If the runout is more than the maximum value, replace the rear drive pinion companion flange.

10. INSPECT DIFFERENTIAL DRIVE PINION PRELOAD

- (a) Using a torque wrench, measure the starting torque of the differential drive pinion.

Differential drive pinion preload (at starting):

1.11 to 1.91 N*m (11.3 to 19.5 kgf*cm, 9.8 to 16.9 in.*lbf)



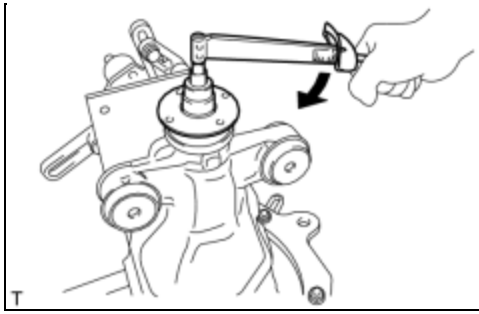
HINT:

- The backlash between the differential drive pinion and differential ring gear should allow enough movement of the differential drive pinion to allow this measurement to be performed.
- Make sure not to include the preload of the differential ring gear (rear differential case sub-assembly) in the measurement of the differential drive pinion preload.

11. INSPECT TOTAL PRELOAD

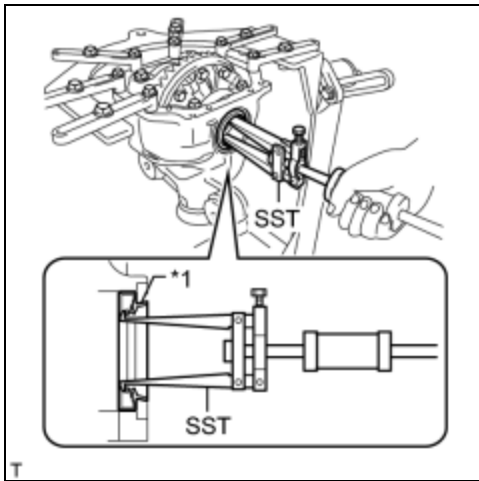
- (a) Using a torque wrench, measure the preload with the teeth of the differential drive pinion and differential ring gear in contact.

Total preload (at starting):



1.60 to 2.69 N*m (16.3 to 27.4 kgf*cm, 14.2 to 23.8 in.*lbf)

12. REMOVE REAR DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL



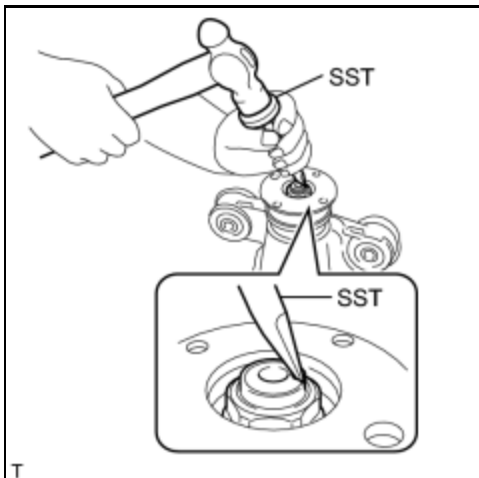
(a) Using SST, remove the 2 rear differential side gear shaft oil seals.

SST: 09308-00010

Text in Illustration

*1	Rear Differential Side Gear Shaft Oil Seal
----	--

13. REMOVE REAR DRIVE PINION NUT



(a) Using SST and a hammer, unstack the staked part of the rear drive pinion nut.

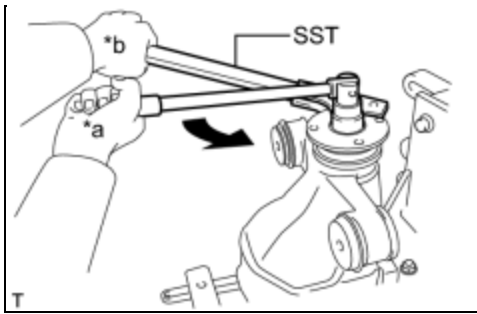
SST: 09930-00010

NOTICE:

- Be sure to use SST with the tapered surface facing the differential drive pinion.
- Do not grind the tip of SST with a grinder, etc.
- Completely loosen the staked part of the rear drive pinion nut when removing it.
- Do not damage the threads of the differential drive pinion.

(b) Using SST to hold the rear drive pinion companion flange, remove the rear drive pinion nut.

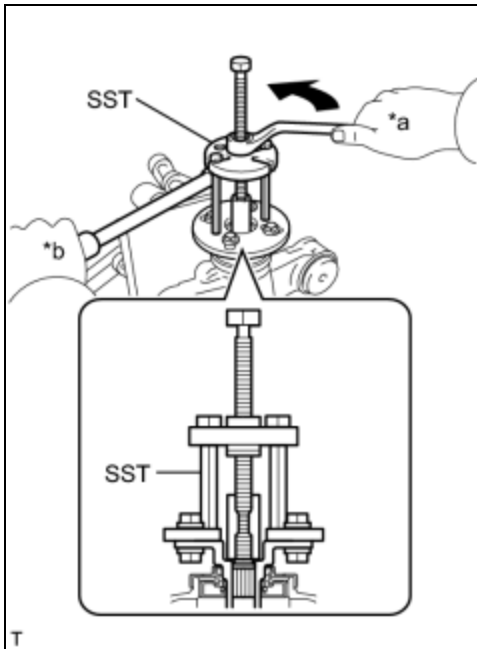
SST: 09330-00021



Text in Illustration

*a	Turn
*b	Hold

14. REMOVE REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY



(a) Using SST, remove the rear drive pinion companion flange sub-assembly.

Text in Illustration

*a	Turn
*b	Hold

SST: 09950-30012

09951-03010

09953-03010

09954-03010

09955-03030

09956-03030

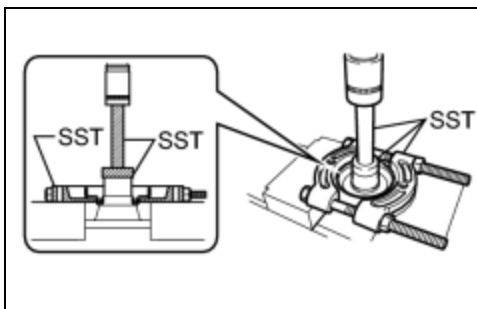
NOTICE:

Apply grease to the threads of SST center bolt before use.

15. REMOVE REAR DIFFERENTIAL DUST DEFLECTOR

HINT:

Perform this procedure only when the rear differential dust deflector is damaged.



(a) Using SST and a press, remove the rear differential dust deflector.

SST: 09950-00020

SST: 09950-60010

09951-00380

SST: 09950-70010

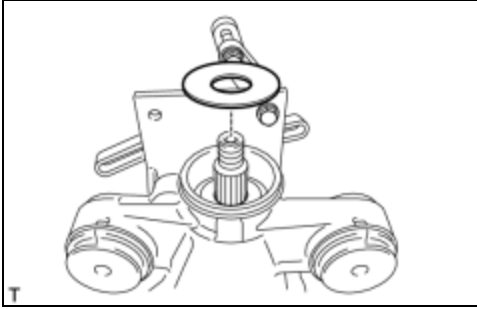
09951-07100

NOTICE:

Do not drop the rear drive pinion companion flange.

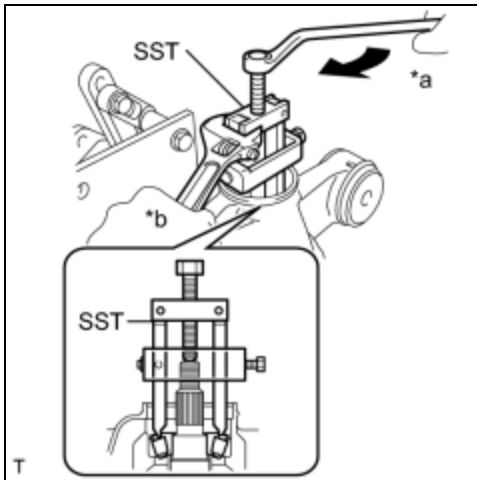
16. REMOVE REAR DIFFERENTIAL CARRIER OIL SEAL INFO

17. REMOVE REAR DIFFERENTIAL DRIVE PINION OIL SLINGER



- (a) Remove the rear differential drive pinion oil slinger.

18. REMOVE REAR DRIVE PINION FRONT TAPERED ROLLER BEARING



- (a) Using SST, remove the rear drive pinion front tapered roller bearing (inner race) from the differential drive pinion.

SST: 09556-22010

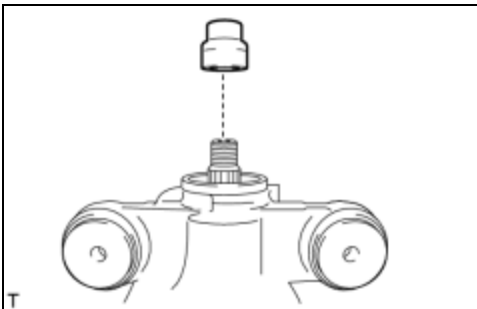
Text in Illustration

*a	Turn
*b	Hold

NOTICE:

Apply grease to the threads and tip of SST center bolt before use.

19. REMOVE REAR DIFFERENTIAL DRIVE PINION BEARING SPACER

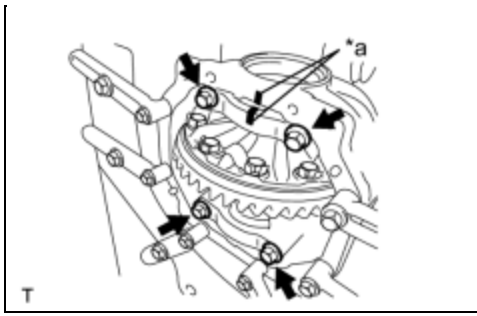


- (a) Remove the rear differential drive pinion bearing spacer.

20. REMOVE REAR DIFFERENTIAL CASE SUB-ASSEMBLY

- (a) Put matchmarks on either bearing cap and the rear differential carrier sub-assembly.

Text in Illustration



*a	Matchmark
----	-----------

(b) Remove the 4 bolts and 2 bearing caps from the rear differential carrier sub-assembly.

NOTICE:

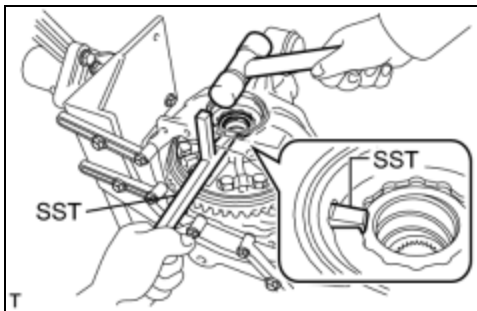
Do not exchange bearing caps, as each cap is only suitable for its original location and the installation direction relative to the rear differential carrier sub-assembly for which it was manufactured.

(c) Using SST and a hammer, remove the 2 rear differential side gear shaft plate washers.

SST: 09504-22011

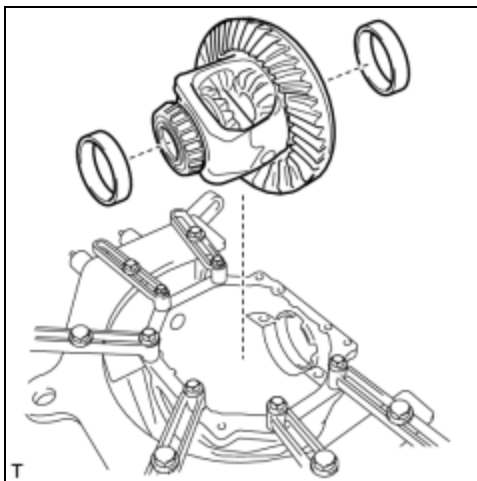
NOTICE:

Put identification marks on the rear differential side gear shaft plate washers to show the location for installation (differential ring gear back side or differential ring gear teeth side), or keep them separate so that they can be distinguished.



HINT:

Measure the thickness of each rear differential side gear shaft plate washer and note it.



(d) Remove the rear differential case sub-assembly and the rear differential case bearing outer races differential ring gear back side and differential ring gear teeth side from the rear differential carrier.

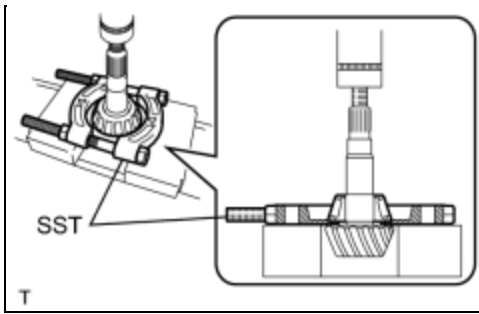
NOTICE:

- Do not damage the rear differential case bearing or the differential ring gear.
- Put identification marks on the rear differential case bearing outer races to show the location for installation (back side or teeth side), or keep them separate so that they can be distinguished.

21. REMOVE REAR DRIVE PINION REAR TAPERED ROLLER BEARING

(a) Remove the differential drive pinion from the rear differential carrier sub-assembly.

(b) Using SST and a press, remove the rear drive pinion rear tapered roller bearing (inner race) from the differential



drive pinion.

SST: 09950-00020

NOTICE:

Do not drop the differential drive pinion.

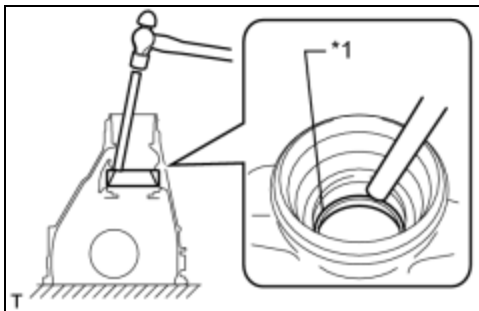
HINT:

If either the differential drive pinion or differential ring gear is damaged, replace both as a set.

(c) Remove the rear differential drive pinion plate washer from the differential drive pinion.

HINT:

Measure the thickness of the rear differential drive pinion plate washer and note it.



(d) Using a brass bar and a hammer, remove the rear drive pinion rear tapered roller bearing (outer race) from the rear differential carrier sub-assembly.

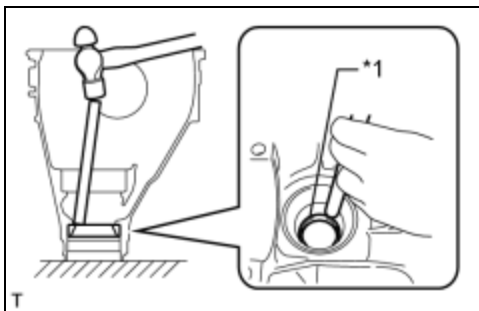
Text in Illustration

*1	Outer Race
----	------------

NOTICE:

Place the brass bar onto the rear drive pinion rear tapered roller bearing outer race. Do not damage the rear differential carrier.

22. REMOVE REAR DRIVE PINION FRONT TAPERED ROLLER BEARING



(a) Using a brass bar and a hammer, remove the rear drive pinion front tapered roller bearing (outer race) from the rear differential carrier sub-assembly.

Text in Illustration

*1	Outer Race
----	------------

NOTICE:

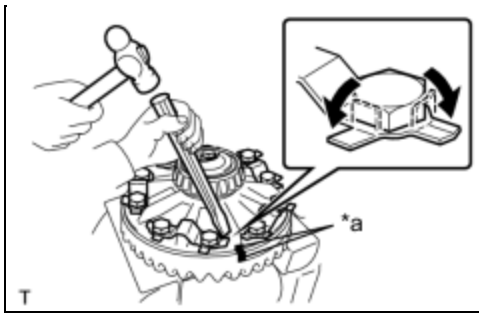
Place the brass bar onto the rear drive pinion front tapered roller bearing outer race. Do not damage the rear differential carrier sub-assembly.

23. REMOVE DIFFERENTIAL RING GEAR

(a) Hold the rear differential case sub-assembly in a vise between aluminum plates.

Text in Illustration

*a	Matchmark
----	-----------

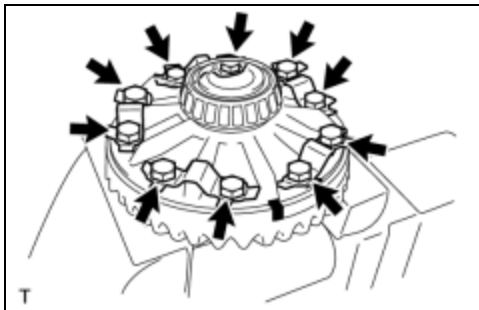


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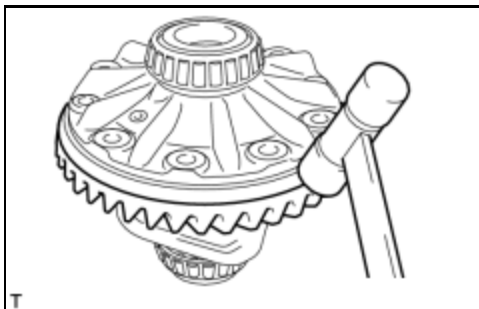
NOTICE:

Do not overtighten the vise.

- (b) Put matchmarks on the differential ring gear and the rear differential case sub-assembly.
- (c) Using a chisel and hammer, unstake the 5 rear differential ring gear set bolt lock plates.



- (d) Remove the 10 rear differential ring gear set bolts and the 5 rear differential ring gear set bolt lock plates.



- (e) Using a plastic-faced hammer, tap on the differential ring gear to separate it from the rear differential case sub-assembly.

NOTICE:

Do not damage the differential ring gear.

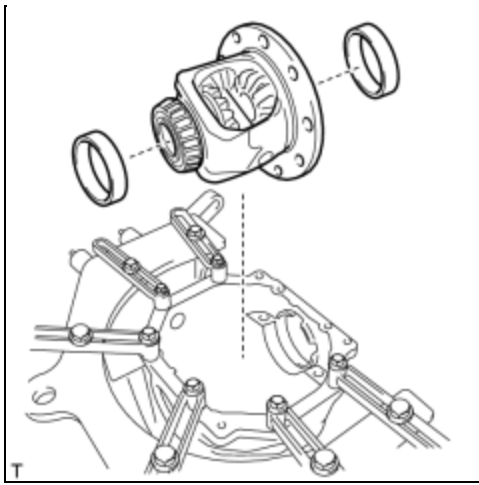
24. INSPECT RUNOUT OF REAR DIFFERENTIAL CASE SUB-ASSEMBLY

HINT:

Perform this procedure only when the runout of the differential ring gear exceeds the specified maximum value.

- (a) Install the rear differential case bearing outer races differential ring gear back side and differential ring gear teeth side to the rear differential case bearing inner races LH and RH respectively.

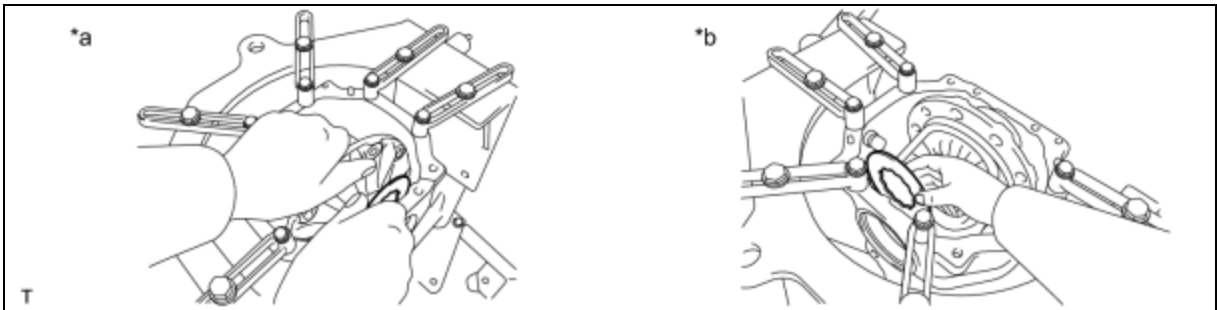
NOTICE:



- Be sure to install the rear differential case bearing outer races in the correct position.
- Do not damage the rear differential case bearing or differential ring gear.

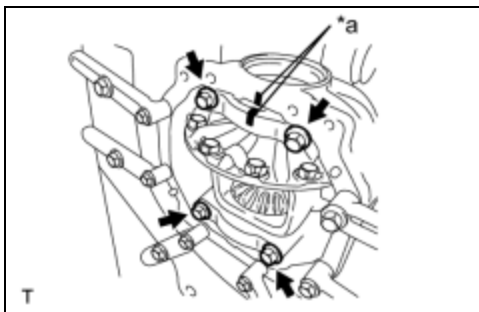
(b) Install the rear differential case sub-assembly to the rear differential carrier sub-assembly.

(c) Install the differential ring gear back side and differential ring gear teeth side rear differential side gear shaft plate washers so that there is no looseness in the rear differential case bearings.



Text in Illustration

*a	Differential Ring Gear Back Side	*b	Differential Ring Gear Teeth Side
----	----------------------------------	----	-----------------------------------



(d) Align the matchmarks on the bearing cap and the rear differential carrier sub-assembly and install the 2 bearing caps.

Text in Illustration

*a	Matchmark
----	-----------

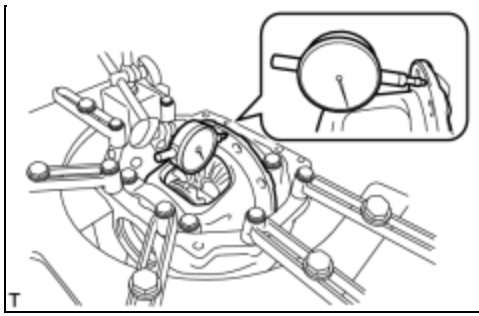
NOTICE:

Make sure that the right and left bearing caps are not interchanged.

(e) Tighten both bearing caps with the 4 bolts.

Torque: 85 N·m (867 kgf·cm, 63ft·lbf)

(f) Using a dial indicator, measure the rear differential case sub-assembly runout.



Maximum runout:
0.07 mm (0.00275 in.)

If the runout is more than the maximum value, replace the rear differential case sub-assembly with a new one.

(g) Remove the 4 bolts and 2 bearing caps.

NOTICE:

Do not exchange bearing caps, as each cap is only suitable for its original location and the installation direction relative to the carrier for which it was manufactured.

(h) Remove the rear differential case sub-assembly and the rear differential case bearing outer races differential ring gear back side and differential ring gear teeth side from the rear differential carrier sub-assembly.

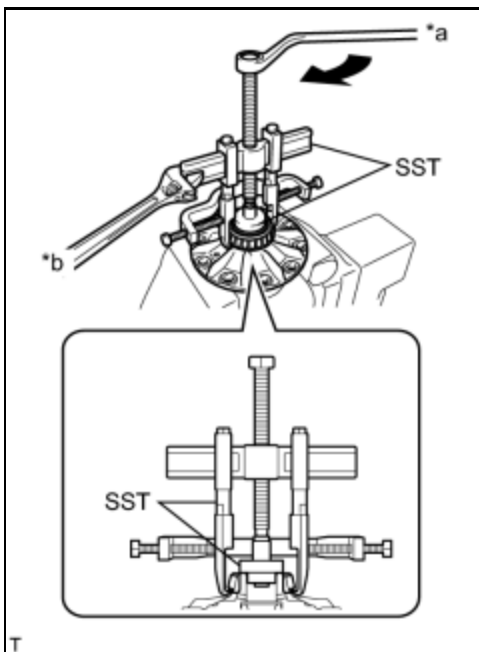
NOTICE:

Do not damage the rear differential case bearing or differential ring gear.

25. REMOVE REAR DIFFERENTIAL CASE BEARING

HINT:

Perform this procedure only when replacing the rear differential case bearing or rear differential case sub-assembly.



(a) Hold the rear differential case sub-assembly in a vise between aluminum plates.

Text in Illustration

*a	Turn
*b	Hold

NOTICE:

Do not overtighten the vise.

(b) Using SST, remove the rear differential case bearing inner races LH and RH from the rear differential case sub-assembly.

SST: 09950-40011

09951-04020

09952-04010

09953-04030

09954-04010

09955-04061

09957-04010

09958-04011

SST: 09950-60010

09951-00350

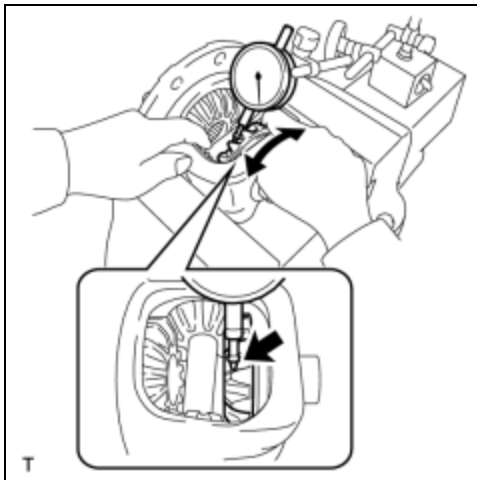
09951-00480

09952-06010

NOTICE:

- Do not deform the bearing cage if the bearing is to be reused.
- Hook the claws of SST to the rear differential case bearing inner race.
- Apply grease to the threads and tip of SST center bolt before use.

26. INSPECT DIFFERENTIAL SIDE GEAR BACKLASH



- (a) Secure the rear differential case sub-assembly in a vise between aluminum plates.

NOTICE:

Do not overtighten the vise.

- (b) Place a dial indicator on the tip of a side gear tooth at a right angle. Hold the pinion gear in the rear differential case sub-assembly and check that the backlash.

Standard Backlash:

0 mm (0 in.)

If the result is not as specified, replace the rear differential case sub-assembly with a new one.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000005701QX
Title: AXLE AND DIFFERENTIAL: REAR DIFFERENTIAL CARRIER ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL REAR DIFFERENTIAL CARRIER ASSEMBLY

- (a) Support the rear differential carrier assembly using a jack.
- (b) Install a new snap ring to the rear drive shaft assembly.
- (c) Coat the spline of the inboard joint shaft assembly with toyota genuine differential gear oil LT 75W-85 GL-5 (except LSD).
- (d) Coat the spline of the inboard joint shaft assembly with toyota genuine differential gear oil LX 75W-85 GL-5 (for LSD).
- (e) Install the shaft snap ring with the opening facing downward.
- (f) Align the shaft splines and install the drive shaft assembly with a brass bar and hammer.

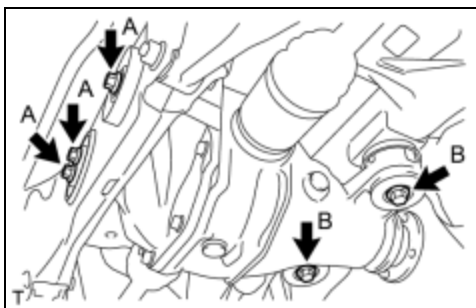
NOTICE:

- Be careful not to damage the drive shaft dust cover, boot or oil seal.
- Keep the drive shaft assembly level while handling it.
- Do not tap the axle side of the drive shaft with the hammer.
- Set the hole snap ring with the opening facing down word.

HINT:

Whether the inboard joint shaft is in contact with the pinion shaft or not can be confirmed from the sound or feeling when tapping it in.

- (g) Install the rear upper differential mount stopper and rear lower differential mount stopper to the rear differential carrier assembly.



- (h) Install the rear differential carrier assembly along with the rear differential mount stopper with the 5 bolts.

A - Torque: 62 N·m (632 kgf·cm, 46ft·lbf)
B - Torque: 95 N·m (969 kgf·cm, 70ft·lbf)

2. INSTALL PROPELLER WITH CENTER BEARING SHAFT ASSEMBLY

INFO

3. INSTALL CENTER EXHAUST PIPE ASSEMBLY

INFO

4. ADD DIFFERENTIAL OIL

INFO

5. INSTALL REAR WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)



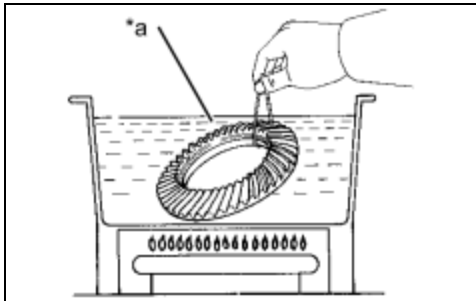
TOYOTA

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000O5A01DX
Title: AXLE AND DIFFERENTIAL: REAR DIFFERENTIAL CARRIER ASSEMBLY: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL DIFFERENTIAL RING GEAR

- (a) Clean the contact surfaces of the rear differential case sub-assembly and differential ring gear.
- (b) Clean the rear differential ring gear set bolt hole.



- (c) Heat the differential ring gear to approximately 100°C (212°F) in boiling water.

Text in Illustration

*a	Boiling Water
----	---------------

- (d) Carefully take the differential ring gear out of the boiling water.

CAUTION:

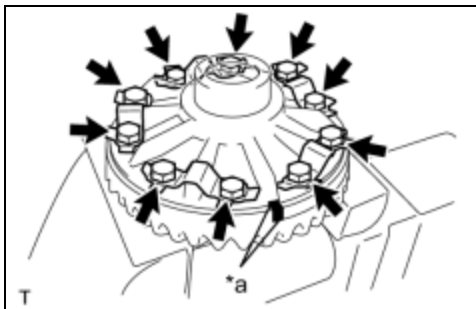
Use thick gloves to protect your hands as the differential ring gear is hot.

- (e) Secure the rear differential case sub-assembly between aluminum plates in a vise.

NOTICE:

Do not overtighten the vise.

- (f) After the moisture on the differential ring gear has completely evaporated, quickly install the differential ring gear to the rear differential case sub-assembly.



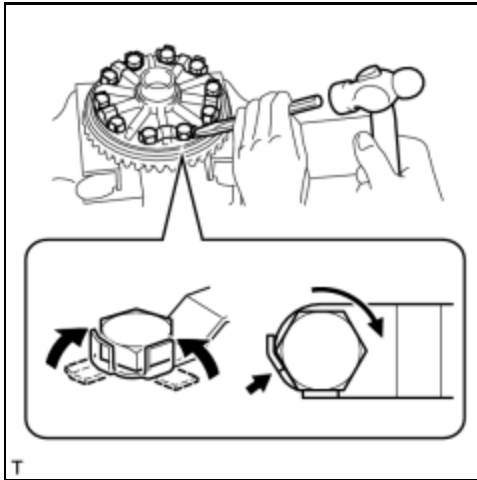
- (g) Align the matchmarks on the differential ring gear and rear differential case sub-assembly.

Text in Illustration

*a	Matchmark
----	-----------

- (h) Temporarily install 5 new rear differential ring gear set bolt lock plates with the 10 rear differential ring gear set bolts.
- (i) After the differential ring gear cools down, tighten the 10 ring gear set bolts uniformly.

Torque: 97 N·m (984 kgf·cm, 71ft·lbf)



(j) Using a chisel and hammer, stake the 5 rear differential ring gear set bolt lock plates.

- (1) Stake one claw so that it is flush against the flat surface of the bolt.
- (2) Stake the other claw against the surface of the bolt head to act as a stopper if the bolt starts to loosen.

2. INSTALL REAR DIFFERENTIAL CASE BEARING

(a) Using SST and a press, install the rear differential case bearing inner races LH and RH to the rear differential case sub-assembly.

SST: 09710-30012

09710-04081

SST: 09950-60010

09951-00430

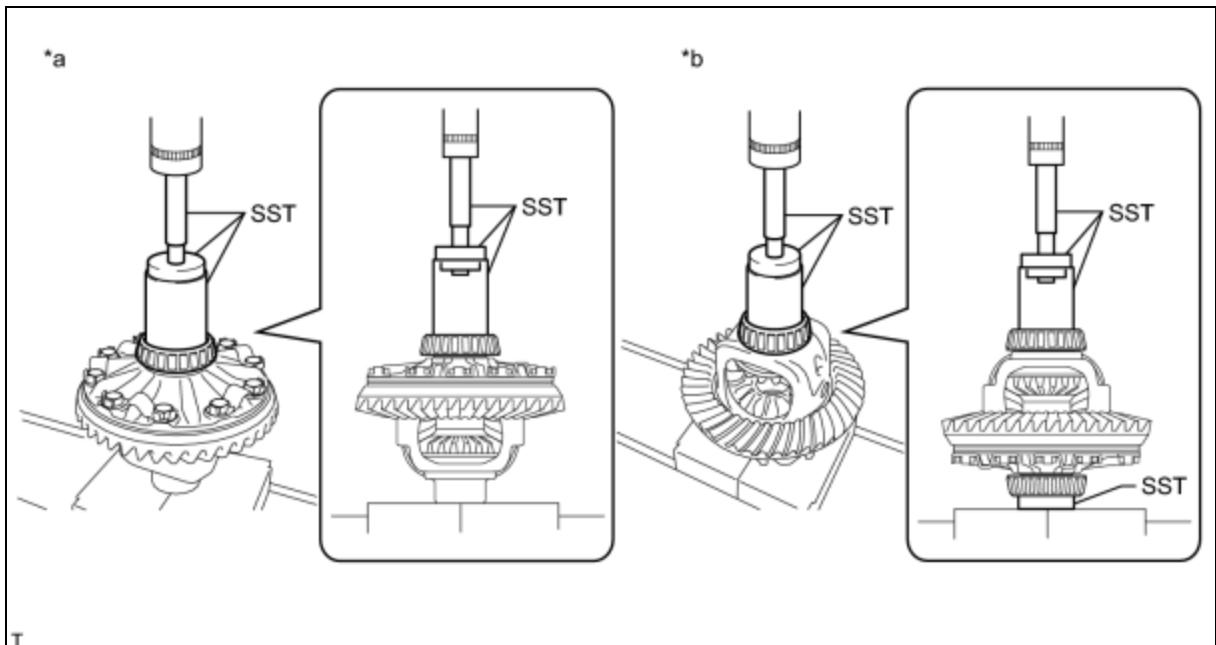
09951-00580

09951-00590

09952-06010

SST: 09950-70010

09951-07100

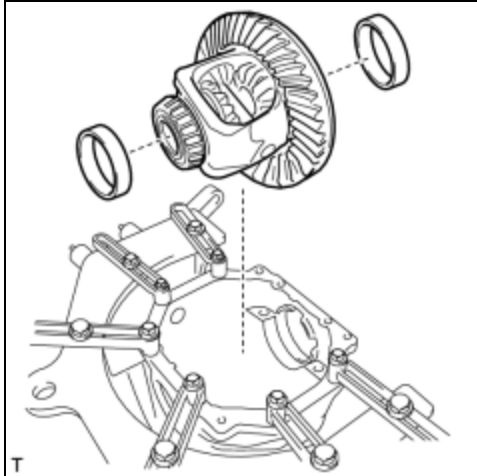


Text in Illustration

NOTICE:

- Do not apply hypoid gear oil to a new bearing.
- Do not deform the bearing cage. Set SST to the center of the rear differential case sub-assembly.
- If the bearing is replaced, replace it and its outer race as a set.

3. INSPECT RUNOUT OF DIFFERENTIAL RING GEAR

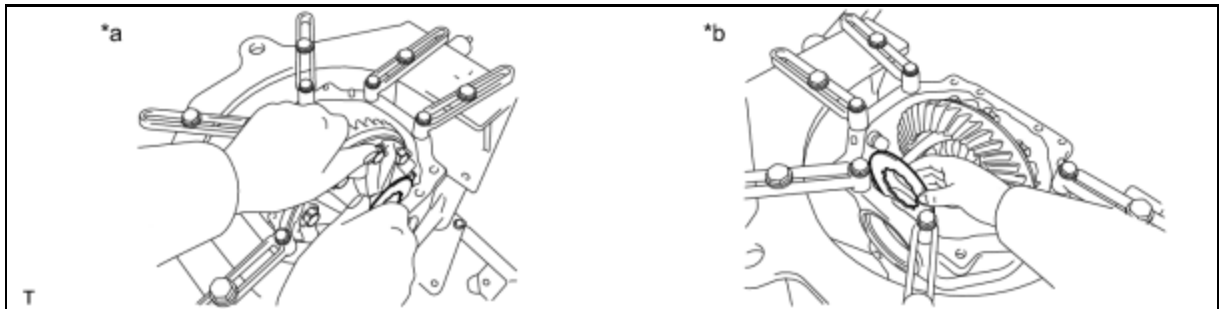


- (a) Install the rear differential case bearing outer races differential ring gear back side and differential ring gear teeth side to the rear differential case bearing inner races LH and RH respectively.

NOTICE:

- Be sure to install the rear differential case bearing outer races in the correct position.
- Do not damage the rear differential case bearing or differential ring gear.

- (b) Install the rear differential case sub-assembly to the rear differential carrier.
- (c) Install the differential ring gear back side and differential ring gear teeth side rear differential side gear shaft plate washers so that there is no looseness in the rear differential case bearings.



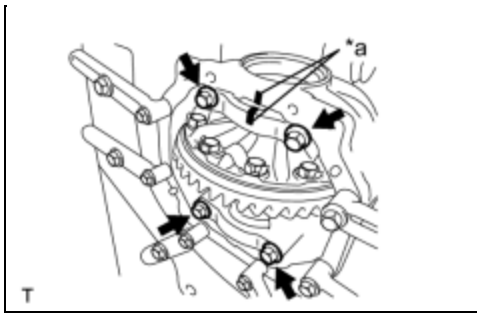
Text in Illustration

*a	Differential Ring Gear Back Side	*b	Differential Ring Gear Teeth Side
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HINT:

- If the rear differential case bearing is new, select a thinner rear differential side gear shaft plate washer and install it.
- If the rear differential case bearing is reused, install a rear differential side gear shaft plate washer with the same thickness as the removed one.

- (d) Align the matchmarks on the bearing cap and the rear



differential carrier and install the 2 bearing caps.

Text in Illustration

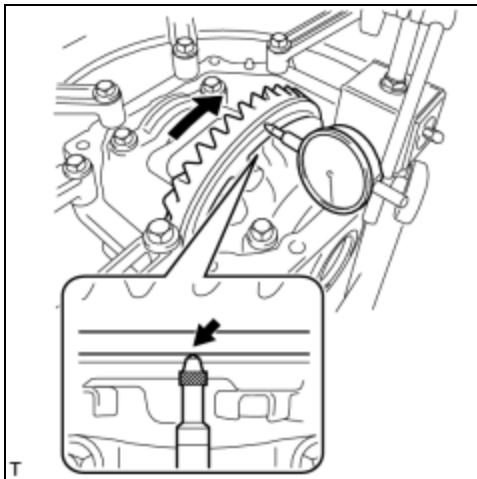
*a	Matchmark
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NOTICE:

Make sure that the right and left bearing caps are not interchanged.

(e) Tighten both bearing caps with the 4 bolts.

Torque: 85 N·m (870 kgf·cm, 63ft·lbf)



(f) Using a dial indicator, measure the runout of the differential ring gear.

Maximum runout:
0.07 mm (0.00275 in.)

(g) Remove the 4 bolts and 2 bearing caps.

Text in Illustration

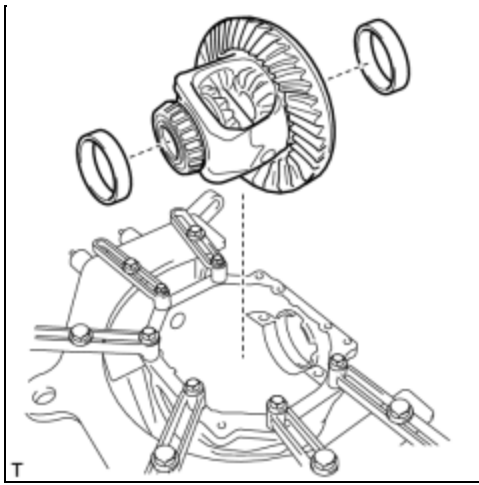
*a	Matchmark
----	-----------

NOTICE:

Do not exchange bearing caps, as each cap is only suitable for its original location and the installation direction relative to the carrier for which it was manufactured.

(h) Remove the 2 rear differential side gear shaft plate washers.

(i) Remove the rear differential case sub-assembly and the rear differential case bearing outer races differential ring gear back side and differential ring gear teeth side from the rear differential carrier.



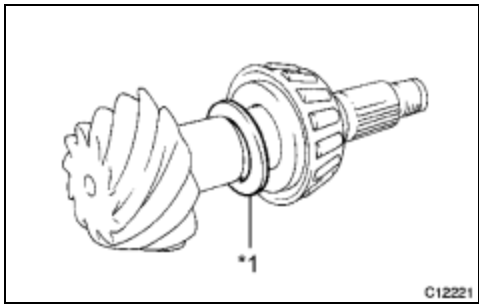
NOTICE:

Do not damage the rear differential case bearing or differential ring gear.

4. INSTALL REAR DRIVE PINION REAR TAPERED ROLLER BEARING

- (a) Install the rear differential drive pinion plate washer to the differential drive pinion.

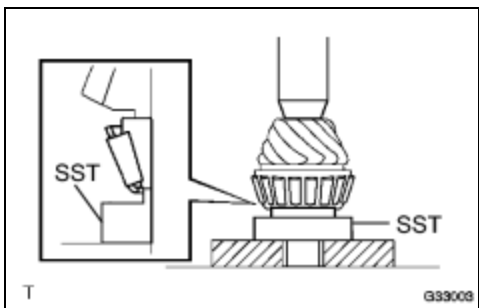
Text in Illustration



*1	Rear Differential Drive Pinion Plate Washer
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HINT:

- Temporarily install the rear drive pinion rear tapered roller bearing (inner race) to prevent the rear differential drive pinion plate washer from being dropped.
- The rear differential drive pinion plate washer can be installed in either direction.



- (b) Using SST and a press, install the rear drive pinion rear tapered roller bearing (inner race) to the differential drive pinion.

SST: 09506-30012

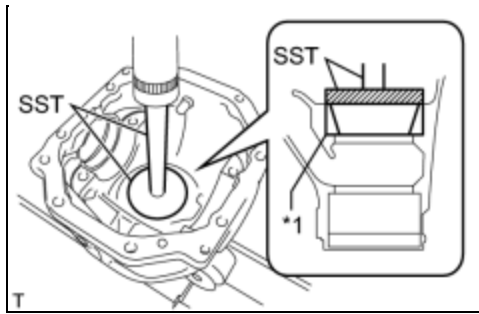
- (c) Using SST and a press, install the rear drive pinion rear tapered roller bearing (outer race) to the differential carrier assembly rear.

SST: 09950-60020

09951-00890

SST: 09950-70010

09951-07200

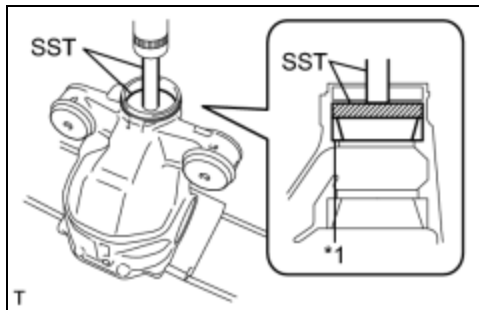


Text in Illustration

*1	Rear Drive Pinion Rear Tapered Roller Bearing (Outer Race)
----	--

5. INSTALL REAR DRIVE PINION FRONT TAPERED ROLLER BEARING

- (a) Using SST and a press, install the rear drive pinion front tapered roller bearing (outer race) to the differential carrier assembly rear.



SST: 09950-60020

09951-00720

SST: 09950-70010

09951-07100

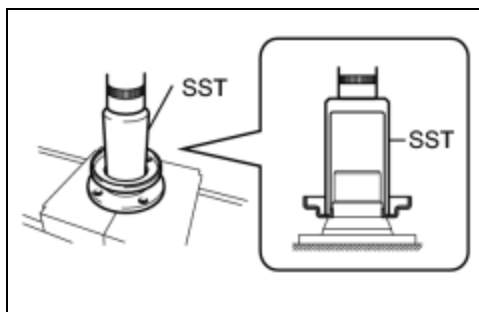
Text in Illustration

*1	Rear Drive Pinion Front Tapered Roller Bearing (Outer Race)
----	---

6. INSTALL REAR DIFFERENTIAL DUST DEFLECTOR

HINT:

Perform this procedure only when replacing the rear differential dust deflector.



- (a) Using SST and a press, install a new rear differential dust deflector to the rear drive pinion companion flange.

SST: 09636-20010

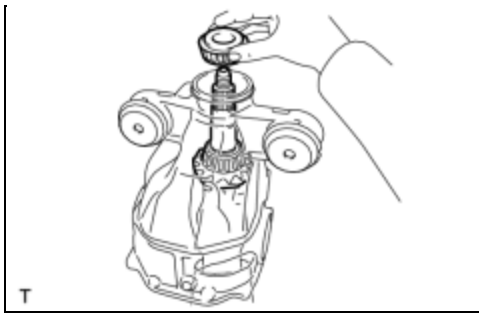
NOTICE:

- Slowly press in the rear differential dust deflector.
- If any burrs remain after pressing in the rear differential dust deflector, remove them.

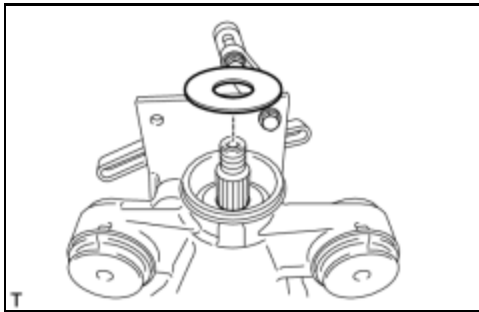
7. ADJUST DIFFERENTIAL DRIVE PINION PRELOAD

- (a) Install the differential drive pinion and the rear drive pinion front tapered roller bearing (inner race) to the differential carrier assembly rear.

NOTICE:

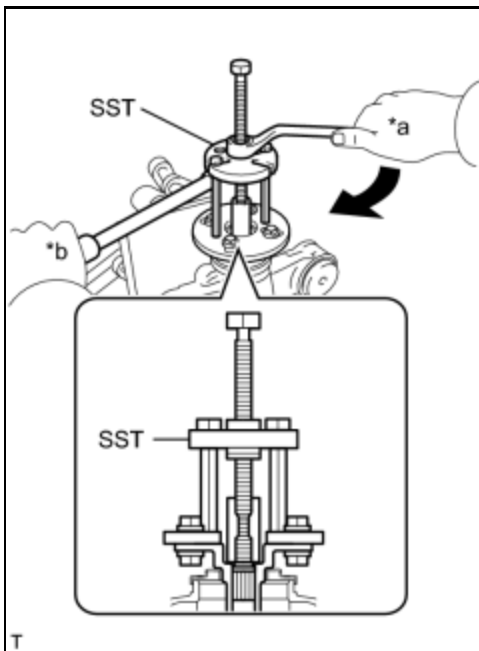


- Do not drop the differential drive pinion.
- Install the rear differential drive pinion bearing spacer and the differential carrier assembly rear oil seal after adjusting the tooth contact pattern.



- (b) Install the rear differential drive pinion oil slinger to the differential carrier assembly rear.

- (c) Using SST, install the rear drive pinion companion flange to the differential carrier assembly rear.



Text in Illustration

*a	Turn
*b	Hold

SST: 09950-30012

- 09951-03010
- 09953-03010
- 09954-03010
- 09955-03030
- 09956-03030

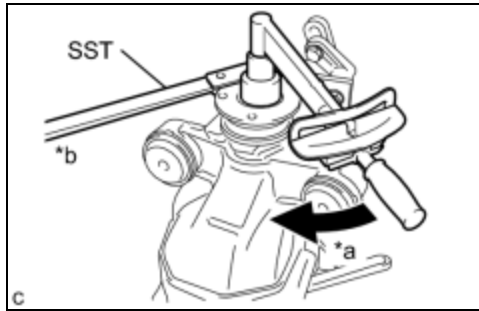
NOTICE:

- Hold the differential drive pinion until SST is installed.
- Install the rear drive pinion companion flange so that there is a slight looseness in the differential drive pinion because the rear differential drive pinion bearing spacer is not yet installed.
- Apply grease to the threads and tip of SST center bolt before use.

- (d) Coat the threads of a new rear drive pinion nut with hypoid gear oil LSD.

- (e) Using SST and a torque wrench, hold the rear drive pinion companion flange and tighten the rear drive pinion nut.

Text in Illustration



*a	Turn
*b	Hold

SST: 09330-00021

Torque: 338 N·m (3445 kgf·cm, 249ft·lbf) or less

NOTICE:

- Tighten the rear drive pinion nut to approximately 100 N*m (1020 kgf*cm, 74 ft.*lbf), and then tighten it further while checking the differential drive pinion preload.
- Apply hypoid gear oil LSD to the rear drive pinion nut and the threads of the differential drive pinion.
- As there is no rear differential drive pinion bearing spacer, tighten the rear drive pinion nut a little at a time. Do not overtighten it.

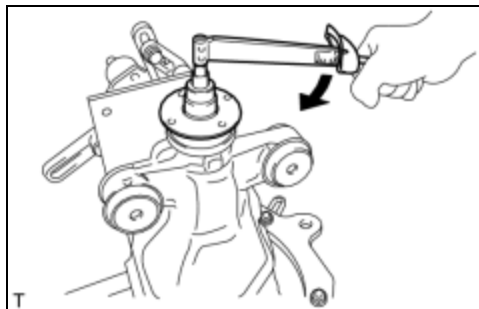
(f) Turn the bearing clockwise and counterclockwise several times to stabilize it.

(g) Using a torque wrench, measure the starting torque of the differential drive pinion.

HINT:

- The backlash between the differential drive pinion and differential ring gear should allow enough movement of the differential drive pinion to allow this measurement to be performed.
- Make sure not to include the preload of the differential ring gear (rear differential case sub-assembly) in the measurement of the differential drive pinion preload.

Differential Drive Pinion Preload (at Starting):



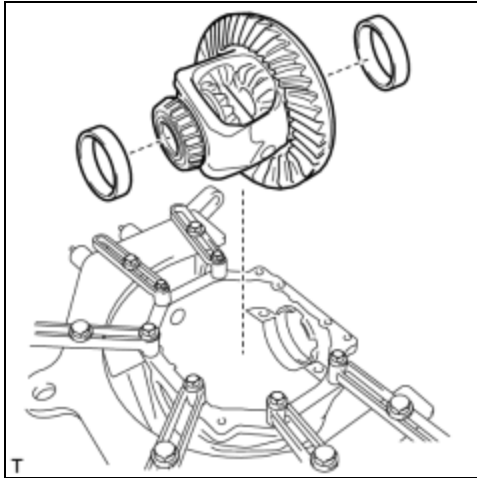
ITEM	SPECIFIED CONDITION
New rear drive pinion tapered roller bearing	1.39 to 2.49 N*m (14.2 to 25.4 kgf*cm, 12.3 to 22.0 in.*lbf)
Reused rear drive pinion tapered roller bearing	1.01 to 1.81 N*m (10.3 to 18.5 kgf*cm, 8.9 to 16.0 in.*lbf)

NOTICE:

- Record the differential drive pinion preload for the total preload measurement.
- Do not apply hypoid gear oil to a new rear drive pinion tapered roller bearing.

If the preload is not within the specified range, adjust the differential drive pinion preload or perform repairs as necessary.

8. INSTALL REAR DIFFERENTIAL CASE SUB-ASSEMBLY



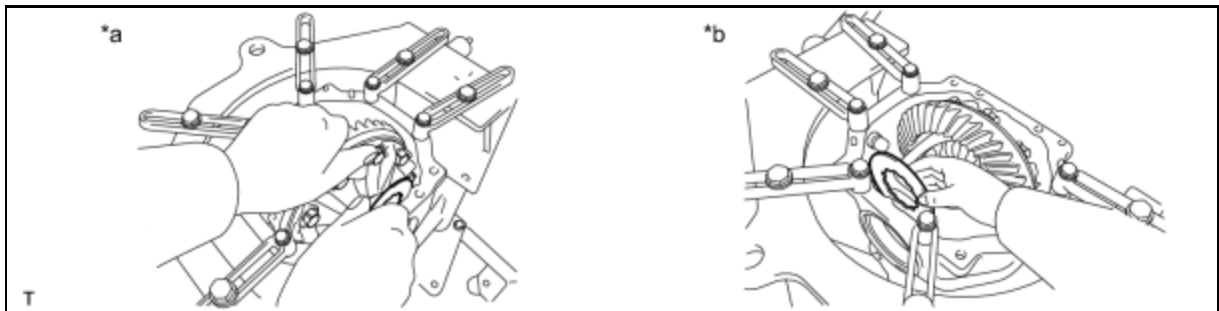
- (a) Install the rear differential case bearing outer races differential ring gear back side and differential ring gear teeth side to the rear differential case bearing inner races LH and RH respectively.

NOTICE:

- Be sure to install the rear differential case bearing outer races in the correct position.
- Do not damage the rear differential case bearing or differential ring gear.

- (b) Install the rear differential case sub-assembly to the differential carrier assembly rear.

- (c) Install the differential ring gear back side and differential ring gear teeth side rear differential side gear shaft plate washers so that the rear differential case bearing is not loose.



Text in Illustration

*a	Differential Ring Gear Back Side	*b	Differential Ring Gear Teeth Side
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HINT:

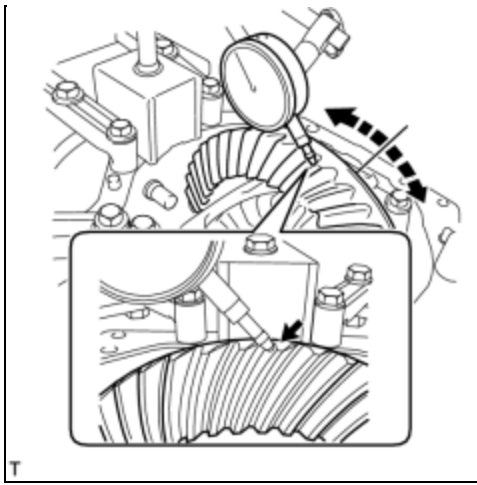
- If the final gear set (differential drive pinion and differential ring gear) and rear differential case bearing are new, select a thinner rear differential side gear shaft plate washer and install it.
- If the final gear set (differential drive pinion and differential ring gear) and rear differential case bearing are reused, install a rear differential side gear shaft plate washer with the same thickness as the removed one.

9. INSPECT AND ADJUST DIFFERENTIAL RING GEAR BACKLASH

- (a) While holding the rear drive pinion companion flange, rotate the differential ring gear and measure the backlash.

Standard Backlash:

0.13 to 0.18 mm (0.00512 to 0.00708 in.)



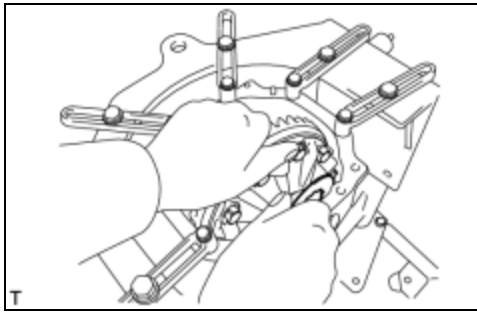
HINT:

- Record the measured backlash to use as a reference for selecting a rear differential side gear shaft plate washer.
- Inspect the tooth contact and use the result as a reference for selecting a rear differential side gear shaft plate washer.

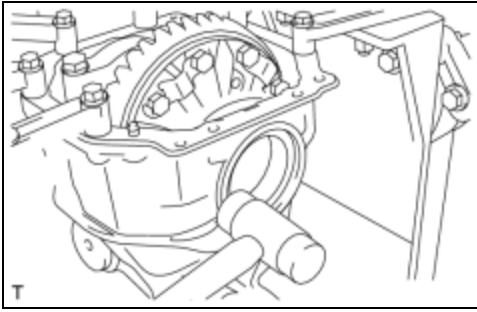
(b) Select a new rear differential side gear shaft plate washer so that the differential ring gear backlash will be within the specified range, and install it to the differential ring gear back side.

Standard Plate Washer:

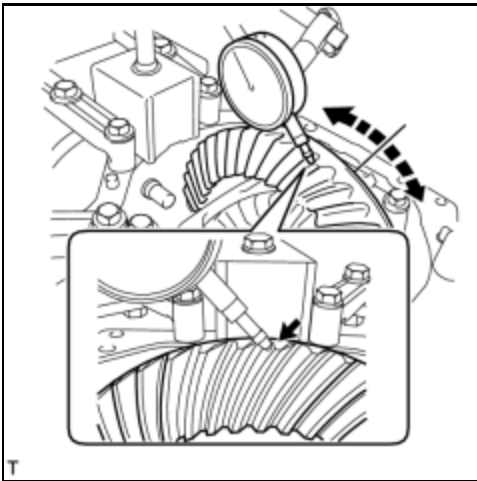
PART NO.	MARK	THICKNESS	PART NO.	MARK	THICKNESS
90201-52001	01	2.58 mm (0.1016 in.)	90564-46029	47	3.04 mm (0.1200 in.)
90564-46014	32	2.60 mm (0.1024 in.)	90201-52017	17	3.06 mm (0.1205 in.)
90564-46015	33	2.62 mm (0.1031 in.)	90564-46030	48	3.08 mm (0.1213 in.)
90201-52003	03	2.64 mm (0.1039 in.)	90564-46031	49	3.10 mm (0.1221 in.)
90564-46016	34	2.66 mm (0.1047 in.)	90201-52019	19	3.12 mm (0.1228 in.)
90564-46017	35	2.68 mm (0.1055 in.)	90564-46032	50	3.14 mm (0.1236 in.)
90201-52005	05	2.70 mm (0.1063 in.)	90564-46033	51	3.16 mm (0.1244 in.)
90564-46018	36	2.72 mm (0.1070 in.)	90201-52021	21	3.18 mm (0.1252 in.)
					3.20 mm



90564-46019	37	2.74 mm (0.1078 in.)	90564-46034	52	(0.1260 in.)
90201-52007	07	2.76 mm (0.1087 in.)	90564-46035	53	3.22 mm (0.1268 in.)
90564-46020	38	2.78 mm (0.1094 in.)	90201-52023	23	3.24 mm (0.1276 in.)
90564-46021	39	2.80 mm (0.1102 in.)	90564-46036	54	3.26 mm (0.1283 in.)
90201-52009	09	2.82 mm (0.1110 in.)	90564-46037	55	3.28 mm (0.1291 in.)
90564-46022	40	2.84 mm (0.1118 in.)	90201-52025	25	3.30 mm (0.1299 in.)
90564-46023	41	2.86 mm (0.1126 in.)	90564-46038	56	3.32 mm (0.1307 in.)
90201-52011	11	2.88 mm (0.1134 in.)	90564-46039	57	3.34 mm (0.1315 in.)
90564-46024	42	2.90 mm (0.1142 in.)	90201-52027	27	3.36 mm (0.1323 in.)
90564-46025	43	2.92 mm (0.1150 in.)	90564-46040	58	3.38 mm (0.1331 in.)
90201-52013	13	2.94 mm (0.1157 in.)	90564-46041	59	3.40 mm (0.1339 in.)
90564-46026	44	2.96 mm (0.1165 in.)	90201-52029	29	3.42 mm (0.1346 in.)
90564-46027	45	2.98 mm (0.1173 in.)	90564-46042	60	3.44 mm (0.1354 in.)
90201-52015	15	3.00 mm (0.1181 in.)	90564-46043	61	3.46 mm (0.1362 in.)
90564-46028	46	3.02 mm (0.1189 in.)	90201-52031	31	3.48 mm (0.1370 in.)



- (c) Make the rear differential case bearing and the rear differential side gear shaft plate washer snug by tapping on the rear differential carrier with a plastic-faced hammer.

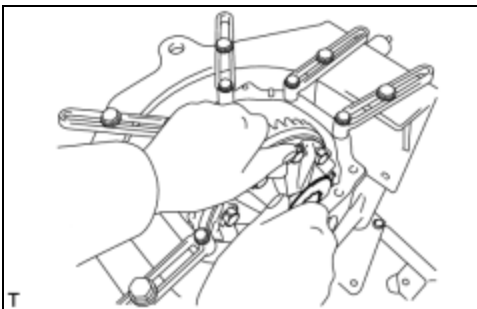


- (d) Set a dial indicator perpendicular to the end of the differential ring gear face.

- (e) While holding the rear drive pinion companion flange, rotate the differential ring gear and measure the backlash.

Standard Backlash:

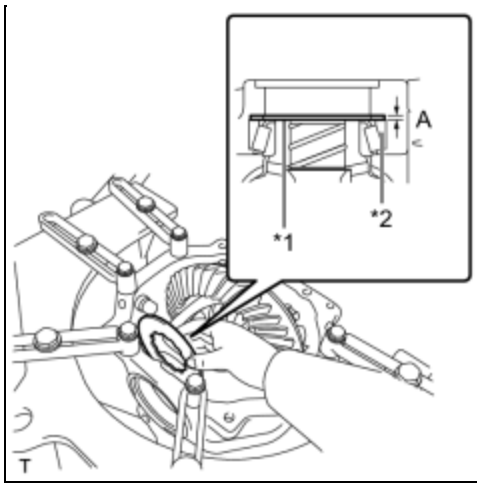
0.13 to 0.18 mm (0.00512 to 0.00708 in.)



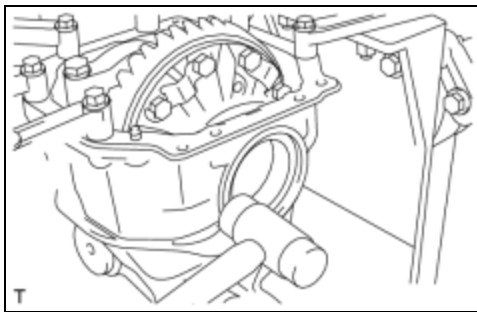
- (f) If the backlash is not within the specified range, select a new rear differential side gear shaft plate washer so that the differential ring gear backlash will be within the specified range, and install it to the differential ring gear back side.

- (g) Select a thicker rear differential side gear shaft plate washer so that the clearance (A) becomes zero or close to zero.

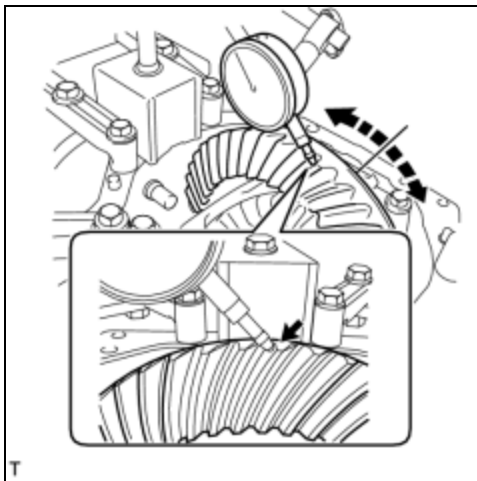
Text in Illustration



*1	Rear Differential Side Gear Shaft Plate Washer
*2	Rear Differential Case Bearing LH



(h) Make the rear differential case bearing and the rear differential side gear shaft plate washer snug by tapping on the rear differential carrier with a plastic-faced hammer.



(i) Set a dial indicator perpendicular to the end of the differential ring gear face.

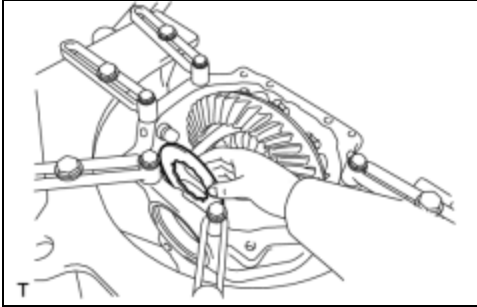
(j) While holding the rear drive pinion companion flange, rotate the differential ring gear and measure the backlash.

Standard Backlash:

0.13 to 0.18 mm (0.00512 to 0.00708 in.)

If the backlash is not within the specified range, adjust the thickness of the right and left rear differential side gear shaft plate washers by an equal amount so that the backlash is within the specified range.

10. ADJUST REAR DIFFERENTIAL CASE BEARING PRELOAD

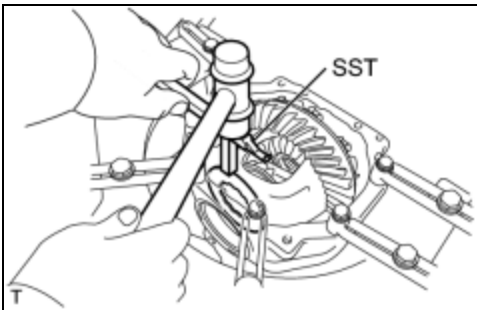


- (a) After adjusting the backlash of the differential ring gear, remove the differential ring gear teeth side rear differential side gear shaft plate washer.

- (b) Using a micrometer, measure the thickness of the removed rear differential side gear shaft plate washer.
- (c) Select a new rear differential side gear shaft plate washer which is 0.06 to 0.09 mm (0.00236 to 0.00354 in.) thicker than the removed one.

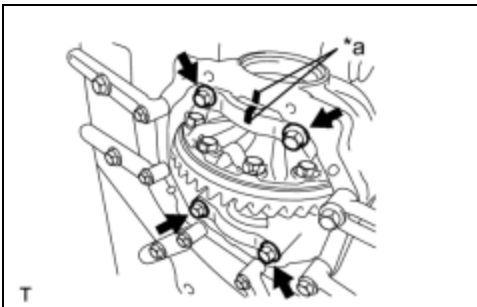
HINT:

Select a rear differential side gear shaft plate washer which can be pressed in 2/3 of the way with a finger.



- (d) Using SST and a plastic-faced hammer, drive in the rear differential side gear shaft plate washer.

SST: 09504-22011



- (e) Align the matchmarks on the bearing cap and rear differential carrier and install the 2 bearing caps.

Text in Illustration

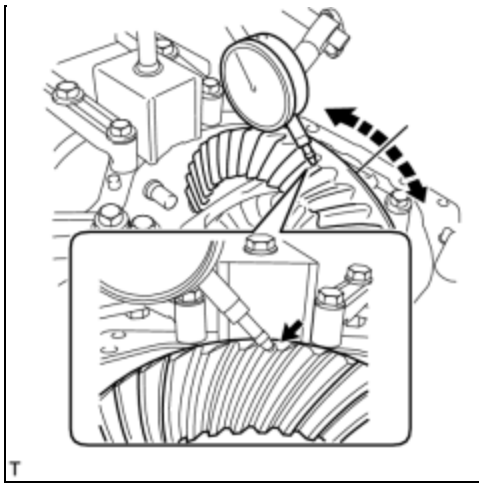
*a	Matchmark
----	-----------

NOTICE:

Make sure that the right and left bearing caps are not interchanged.

- (f) Tighten both bearing caps with the 4 bolts.

Torque: 85 N·m (870 kgf·cm, 63ft·lbf)



(g) Set a dial indicator perpendicular to the end of the differential ring gear face.

(h) While holding the rear drive pinion companion flange, rotate the differential ring gear and measure the backlash.

Standard Backlash:

0.13 to 0.18 mm (0.00512 to 0.00708 in.)

If the measured value is out of the specified range, adjust it by increasing or decreasing the thickness of both the right and left rear differential side gear shaft plate washers equally.

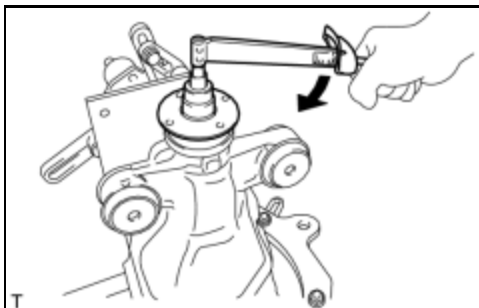
HINT:

- Record the measured backlash to use as a reference for selecting a rear differential side gear shaft plate washer.
- Inspect the tooth contact and use the result as a reference for selecting a rear differential side gear shaft plate washer.

11. INSPECT TOTAL PRELOAD

(a) Using a torque wrench, measure the preload with the teeth of the differential drive pinion and the differential ring gear in contact.

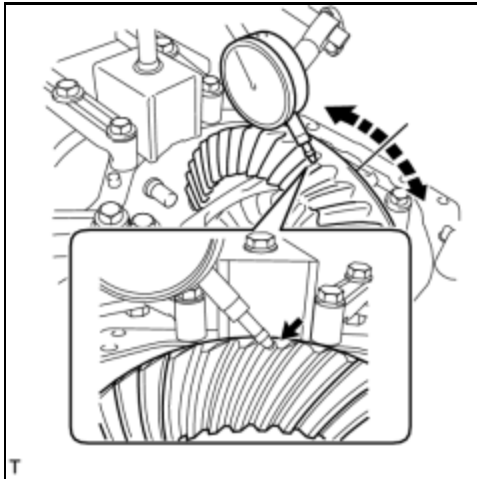
Total Preload (at Starting):



ITEM		SPECIFIED CONDITION
New rear drive pinion tapered roller bearing	New differential case bearing	2.47 to 4.16 N*m (25.2 to 42.4 kgf*cm, 21.9 to 36.8 in.*lbf)
	Reused differential case bearing	1.88 to 3.27 N*m (19.2 to 33.3 kgf*cm, 16.6 to 28.9 in.*lbf)
Reused rear drive pinion tapered roller bearing	New differential case bearing	2.09 to 3.48 N*m (21.3 to 35.5 kgf*cm, 18.5 to 30.8 in.*lbf)
	Reused differential case bearing	1.50 to 2.59 N*m (15.3 to 26.4 kgf*cm, 13.3 to 22.9 in.*lbf)

If the measured preload is less than the specified value, replace the rear differential side gear shaft plate washer of the differential ring gear tooth surface side with a new thicker one.

If the preload is more than the specified value, replace the rear differential side gear shaft plate washer of the differential ring gear tooth surface side with a new thinner one.



(b) Set a dial indicator to the end of the differential ring gear face.

(c) While holding the rear drive pinion companion flange, rotate the differential ring gear and measure the backlash.

Standard Backlash:

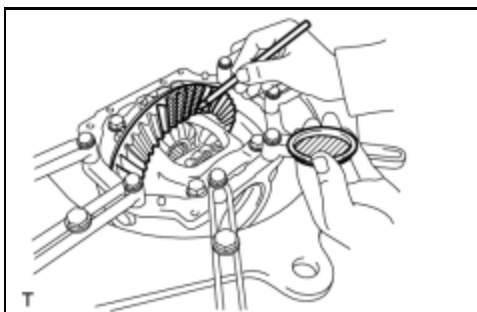
0.13 to 0.18 mm (0.00512 to 0.00708 in.)

If the backlash is not within the specified range, change the thickness of the right and left rear differential side gear shaft plate washers by equal amounts to adjust it.

HINT:

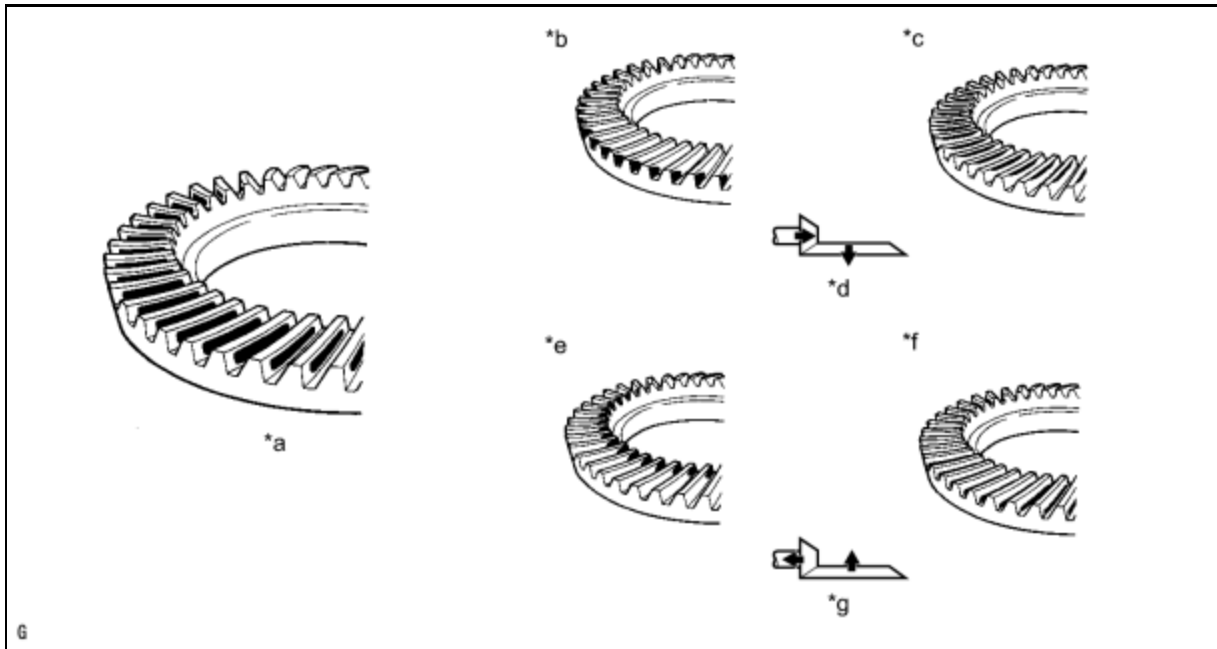
- Record the measured backlash to use as a reference for selecting a rear differential side gear shaft plate washer.
- Inspect the tooth contact and use the result as a reference for selecting a rear differential side gear shaft plate washer.

12. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION



(a) Coat 3 or 4 teeth at 3 different positions on the differential ring gear with Prussian blue.

- (b) Rotate the differential ring gear in both directions.
 (c) Inspect the tooth contact pattern.



Text in Illustration

*a	Proper Contact	*b	Heel Contact
*c	Face Contact	*d	Select an adjusting washer that brings the drive pinion closer to the ring gear
*e	Toe Contact	*f	Flank Contact
*g	Select an adjusting washer that shifts the drive pinion away from the ring gear	-	-

- (d) If the teeth are not contacting properly, use the following table to select a proper rear differential drive pinion plate washer for correction.

Text in Illustration

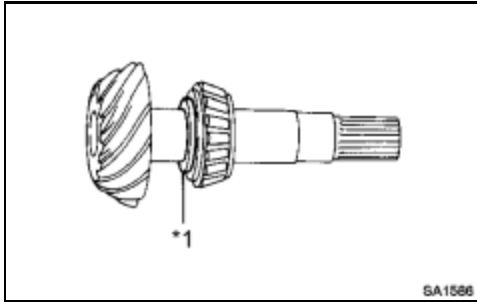
*1	Rear Differential Drive Pinion Plate Washer
----	---

NOTICE:

- If the contact pattern is face contact or flank contact, tooth contact may be adjustable while keeping the backlash within the specified range.
- If the thickness of the rear differential drive pinion plate washer has been changed, adjust the backlash and measure the total preload.

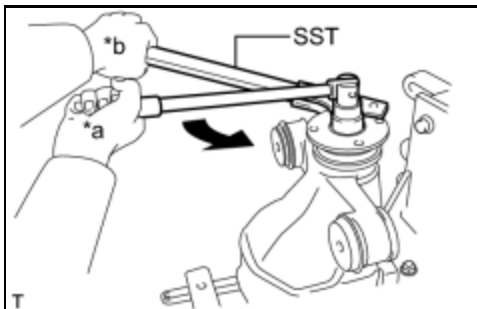
Standard Plate Washer:

PART NO.	MARK	THICKNESS	PART NO.	MARK	THICKNESS



90201-35497	-	1.70 mm (0.0669 in.)	90201-35508	-	2.03 mm (0.0799 in.)
90201-35498	-	1.73 mm (0.0681 in.)	90201-35509	-	2.06 mm (0.0811 in.)
90201-35499	-	1.76 mm (0.0693 in.)	90201-35510	-	2.09 mm (0.0823 in.)
90201-35500	-	1.79 mm (0.0705 in.)	90201-35511	-	2.12 mm (0.0795 in.)
90201-35501	-	1.82 mm (0.0717 in.)	90201-35512	-	2.15 mm (0.0846 in.)
90201-35502	-	1.85 mm (0.0728 in.)	90201-35513	-	2.18 mm (0.0858 in.)
90201-35503	-	1.88 mm (0.0740 in.)	90201-35514	-	2.21 mm (0.0870 in.)
90201-35504	-	1.91 mm (0.0752 in.)	90201-35515	01	2.24 mm (0.0882 in.)
90201-35505	-	1.94 mm (0.0764 in.)	90201-35516	02	2.27 mm (0.0894 in.)
90201-35506	-	1.97 mm (0.0776 in.)	90201-35517	03	2.30 mm (0.0906 in.)
90201-35507	-	2.00 mm (0.0787 in.)	90201-35518	04	2.33 mm (0.0917 in.)

13. REMOVE REAR DRIVE PINION NUT



(a) Using SST to hold the rear drive pinion companion flange, remove the differential carrier assembly rear.

Text in Illustration

*a	Turn
*b	Hold

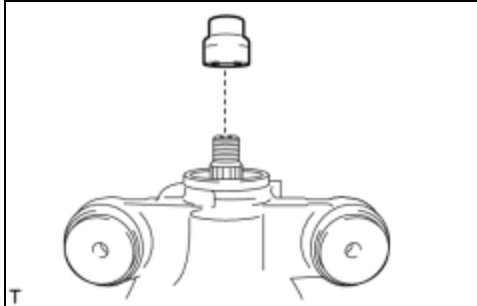
SST: 09330-00021

14. REMOVE REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY INFO

15. REMOVE REAR DIFFERENTIAL DRIVE PINION OIL SLINGER INFO

16. REMOVE REAR DRIVE PINION FRONT TAPERED ROLLER BEARING INFO

17. INSTALL REAR DIFFERENTIAL DRIVE PINION BEARING SPACER

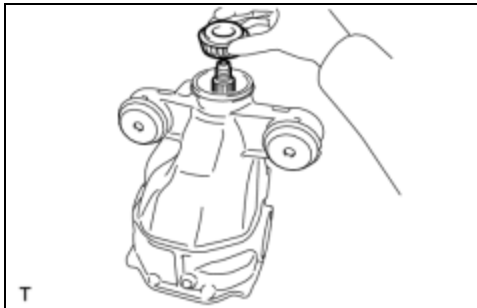


- (a) Install a new rear differential drive pinion bearing spacer to the differential drive pinion.

NOTICE:

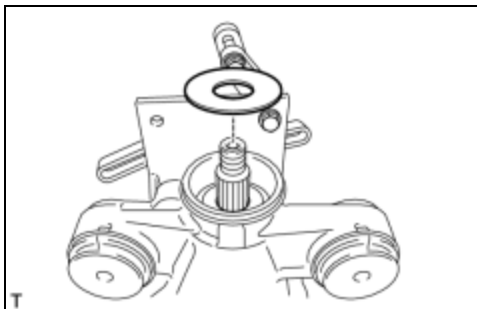
Be sure to install the spacer so that the side with the larger inner diameter faces the rear differential carrier as shown in the illustration.

18. INSTALL REAR DRIVE PINION FRONT TAPERED ROLLER BEARING



- (a) Install the rear drive pinion front tapered roller bearing (inner race) to the differential drive pinion.

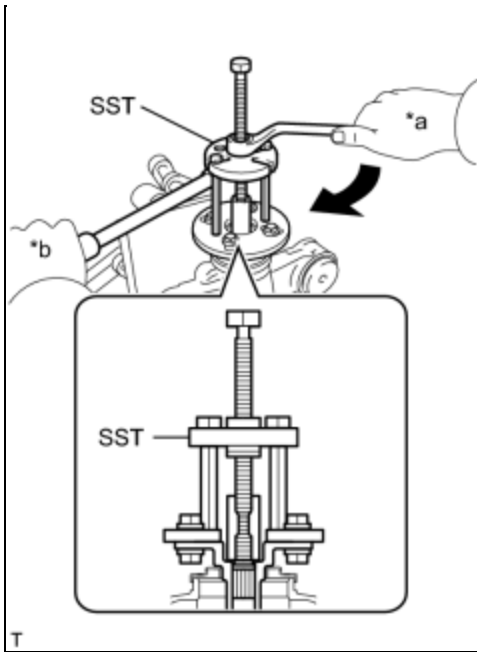
19. INSTALL REAR DIFFERENTIAL DRIVE PINION OIL SLINGER



- (a) Install the rear differential drive pinion oil slinger to the differential drive pinion.

20. INSTALL REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY

- (a) Using SST, install the rear drive pinion companion flange.



Text in Illustration

*a	Turn
*b	Hold

SST: 09950-30012

- 09951-03010
- 09953-03010
- 09954-03010
- 09955-03030
- 09956-03030

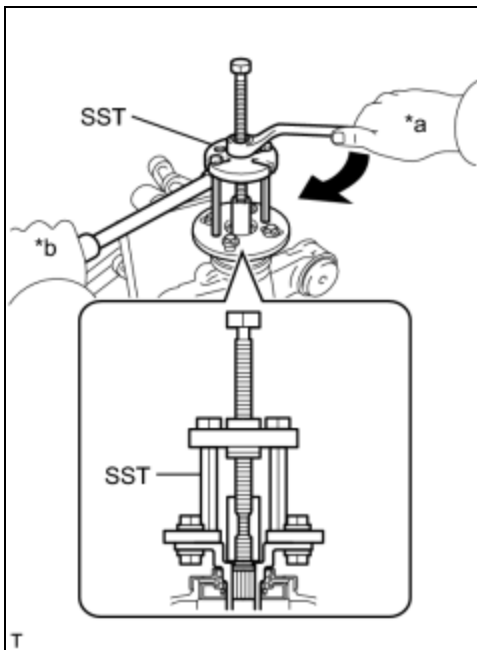
NOTICE:

Apply grease to the threads of SST center bolt before use.

21. REMOVE REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY INFO

22. INSTALL REAR DIFFERENTIAL CARRIER OIL SEAL INFO

23. INSTALL REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY



(a) Using SST, install the rear drive pinion companion flange.

Text in Illustration

*a	Turn
*b	Hold

SST: 09950-30012

- 09951-03010
- 09953-03010
- 09954-03010
- 09955-03030
- 09956-03030

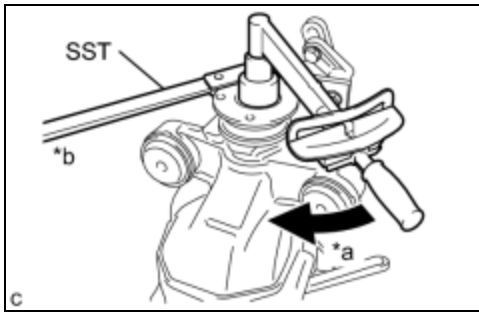
NOTICE:

Apply grease to the threads of SST center bolt before use.

(b) Coat the threads of the rear drive pinion nut with hypoid gear oil LSD.

(c) Using SST and a torque wrench, hold the rear drive pinion companion flange and tighten the rear drive pinion nut.

Text in Illustration



*a	Turn
*b	Hold

SST: 09330-00021

Torque: 338 N·m (3445 kgf·cm, 249ft·lbf) or less

NOTICE:

- Tighten the rear drive pinion nut to approximately 100 N*m (1020 kgf*cm, 74 ft.*lbf), and then tighten it further while checking the differential drive pinion preload.
- Apply hypoid gear oil LSD to the rear drive pinion nut and the threads of the differential drive pinion.

24. ADJUST DIFFERENTIAL DRIVE PINION PRELOAD

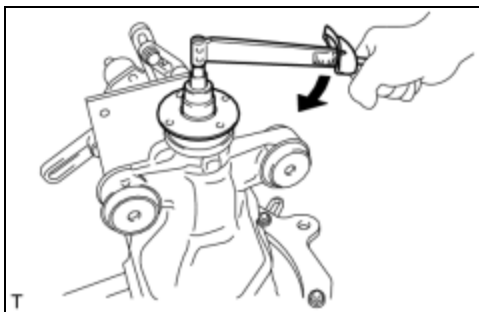
(a) Using a torque wrench, measure the starting torque of the differential drive pinion.

HINT:

- The backlash between the differential drive pinion and differential ring gear should allow enough movement of the differential drive pinion to allow this measurement to be performed.
- Make sure not to include the preload of the differential ring gear (rear differential case sub-assembly) in the measurement of the differential drive pinion preload.

Differential Drive Pinion Preload (at Starting):

ITEM	SPECIFIED CONDITION
New rear drive pinion tapered roller bearing	1.49 to 2.59 N*m (15.2 to 26.4 kgf*cm, 13.2 to 22.9 in.*lbf)
Reused rear drive pinion tapered roller bearing	1.11 to 1.91 N*m (11.3 to 19.5 kgf*cm, 9.8 to 16.9 in.*lbf)



- If the preload is less than the specified minimum value, check the preload while retightening the rear drive pinion nut by 5 to 10° to adjust it so that it is within the specified range.

Torque:

338 N*m (3445 kgf*cm, 249 ft.*lbf) or less

- If the preload is less than the specified minimum value even when the tightening torque of the rear drive pinion nut is more than the specified maximum value, loosen the rear drive pinion nut and check that the

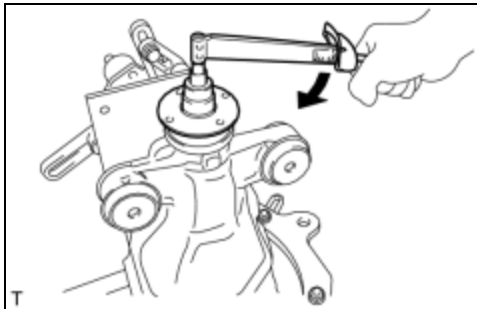
threads of the rear drive pinion nut and differential drive pinion are not stripped.

- If the threads are not stripped, replace the rear differential drive pinion bearing spacer. Apply hypoid gear oil LSD to the threads of the differential drive pinion and repeat the procedure.

25. INSPECT TOTAL PRELOAD

- (a) Using a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.

Total Preload (at Starting):

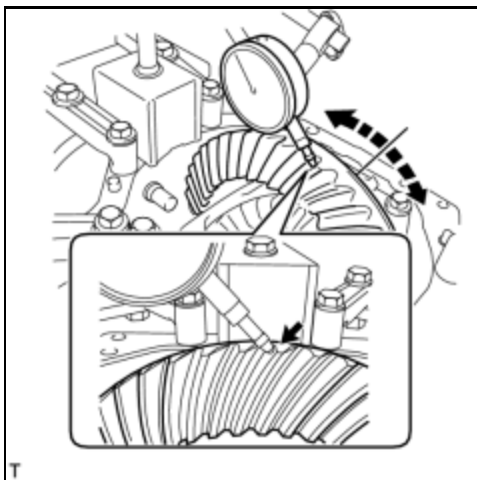


ITEM		SPECIFIED CONDITION
New rear drive pinion tapered roller bearing	New differential case bearing	2.57 to 4.26 N*m (26.2 to 43.4 kgf*cm, 22.7 to 37.7 in.*lbf)
	Reused differential case bearing	1.98 to 3.37 N*m (20.2 to 34.4 kgf*cm, 17.5 to 29.8 in.*lbf)
Reused rear drive pinion tapered roller bearing	New differential case bearing	2.19 to 3.58 N*m (22.3 to 36.5 kgf*cm, 19.4 to 31.7 in.*lbf)
	Reused differential case bearing	1.60 to 2.69 N*m (16.3 to 27.4 kgf*cm, 14.2 to 23.8 in.*lbf)

If the total preload is not within the specified range, adjust the total preload or perform repairs as necessary.

26. INSPECT DIFFERENTIAL RING GEAR BACKLASH

- (a) Set a dial indicator perpendicular to the end of the differential ring gear face.



- (b) While holding the rear drive pinion companion flange, rotate the differential ring gear and measure the backlash.

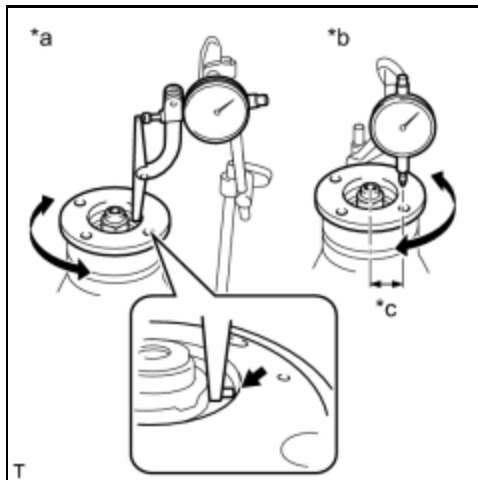
Standard Backlash:

0.13 to 0.18 mm (0.00512 to 0.00708 in.)

27. INSPECT RUNOUT OF REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY

- (a) Using a dial indicator, measure the vertical and lateral runout of the rear drive pinion companion flange.

Text in Illustration



*a	Vertical Runout
*b	Lateral Runout
*c	30 mm (1.181 in.)

Maximum Runout:

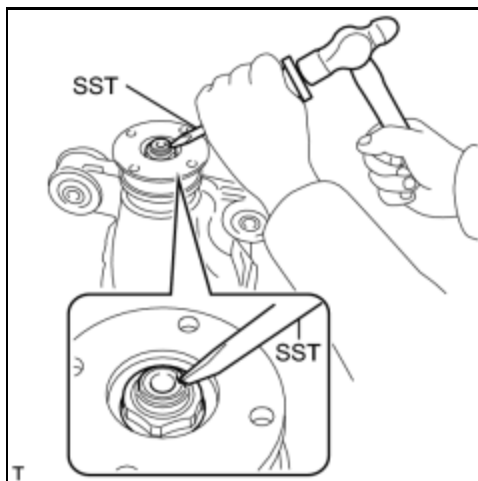
ITEM	SPECIFIED CONDITION
Vertical runout	0.09 mm (0.00354 in.)
Lateral runout	0.09 mm (0.00354 in.)

NOTICE:

Measure the runout of the rear drive pinion companion flange horizontally at a position 30 mm (1.181 in.) away from the center of the differential drive pinion shaft.

If the runout is more than the maximum, replace the rear drive pinion companion flange and differential ring gear.

28. STAKE REAR DRIVE PINION NUT



- (a) Using SST and a hammer, stake the rear drive pinion nut.

SST: 09930-00010

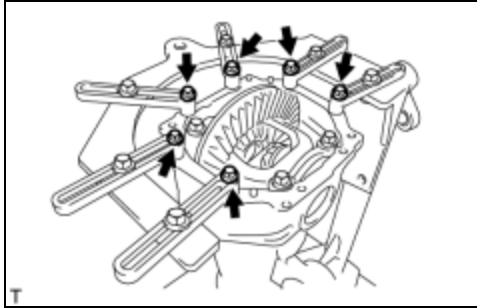
29. INSTALL REAR DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL INFO

30. INSTALL REAR DIFFERENTIAL DRAIN PLUG

- (a) Using a hexagon wrench 10 mm, install the rear differential drain plug and a new gasket.

Torque: 49 N·m (500 kgf·cm, 36ft·lbf)

31. REMOVE REAR DIFFERENTIAL CARRIER SUB-ASSEMBLY



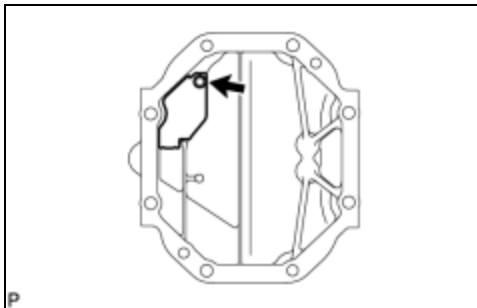
- (a) Remove the rear differential carrier sub-assembly from the overhaul stand.

32. INSTALL REAR DIFFERENTIAL BREATHER PLUG OIL DEFLECTOR

- (a) Clean the seal packing attached to the rear differential carrier and the rear differential carrier cover using a scraper and wire brush. Then remove the oil with non-residue solvent or equivalent.

NOTICE:

Do not scratch the sealing surface.



- (b) Install the rear differential breather plug oil deflector to the rear differential carrier cover with the bolt.

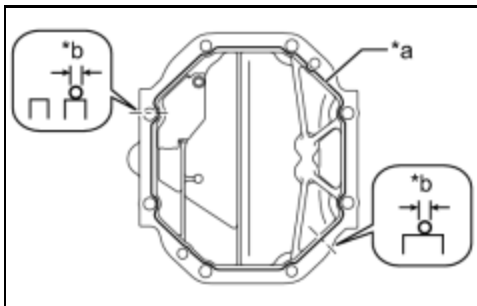
Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)

33. INSTALL REAR DIFFERENTIAL CARRIER COVER

- (a) Apply seal packing to the rear differential carrier cover as shown in the illustration.

Text in Illustration

*a	Seal packing
*b	2 to 3 mm (0.0787 to 0.118 in.)



Seal packing:

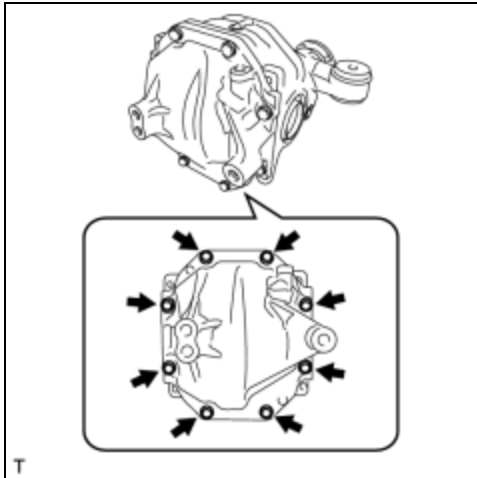
Toyota Genuine Seal Packing 1281, Three Bond 1281 or equivalent

NOTICE:

- Apply the seal packing in a continuous line, approximately 2 to 3 mm (0.0787 to 0.118 in.) in diameter.
- Overlap the seal packing at least 10 mm (0.394 in.) at

the beginning and end of application.

- Install the rear differential carrier cover within 3 minutes of application.



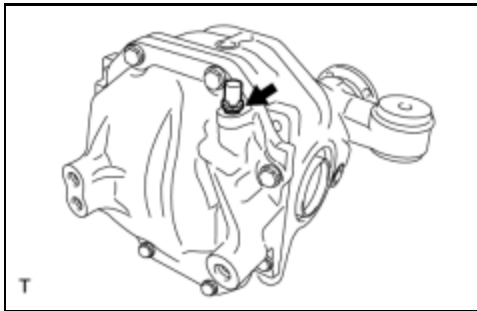
- (b) Install the rear differential carrier cover with the 8 bolts.

Torque: 47 N·m (475 kgf·cm, 35ft·lbf)

NOTICE:

Do not fill the differential with oil or drive the vehicle immediately after installing the differential carrier cover. Leave the vehicle for at least 1 hour. Also, avoid sudden acceleration and deceleration for at least 12 hours after application.

34. INSTALL REAR DIFFERENTIAL BREATHER PLUG



- (a) Install the rear differential breather plug to the rear differential carrier cover.

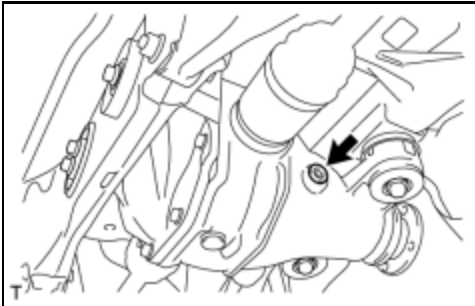
Torque: 21 N·m (210 kgf·cm, 16ft·lbf)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000005801NX
Title: AXLE AND DIFFERENTIAL: REAR DIFFERENTIAL CARRIER ASSEMBLY: REMOVAL (2013 FR-S)		

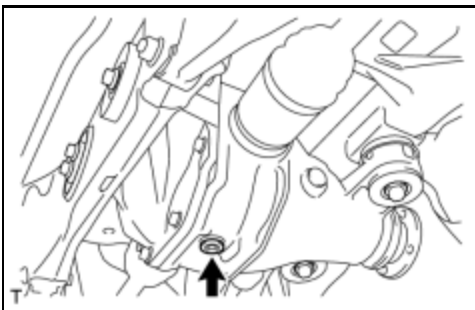
REMOVAL

1. REMOVE REAR WHEEL

2. DRAIN DIFFERENTIAL OIL



- (a) Using a hexagon wrench 10 mm, remove the rear differential filler plug and gasket.



- (b) Using a hexagon wrench 10 mm, remove the rear differential drain plug and gasket to drain the differential oil.

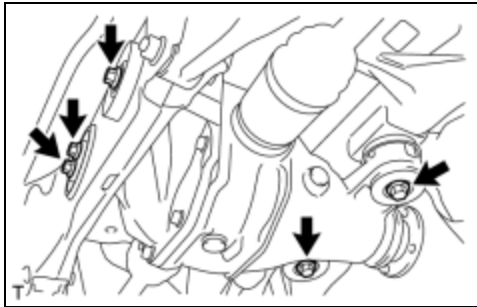
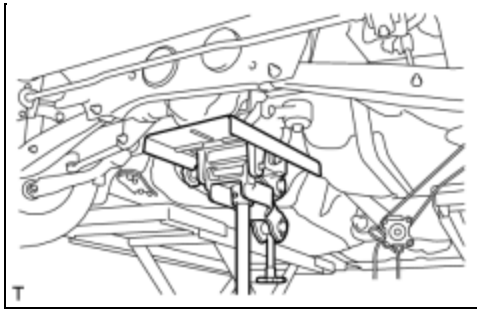
3. REMOVE CENTER EXHAUST PIPE ASSEMBLY INFO

4. REMOVE PROPELLER WITH CENTER BEARING SHAFT ASSEMBLY

INFO

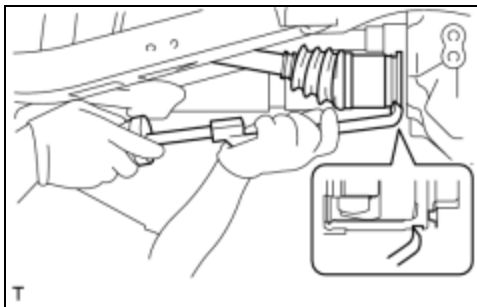
5. REMOVE REAR DIFFERENTIAL CARRIER ASSEMBLY

- (a) Support the rear differential carrier assembly with a transmission jack.



(b) Remove the 5 bolts, rear upper differential mount stopper and rear lower differential mount stopper.

(c) Lower the transmission jack slowly.



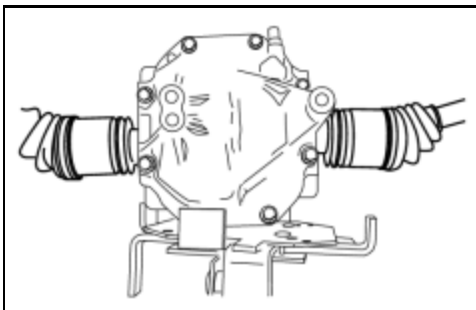
(d) Using a SST, disconnect the rear drive shaft assembly from the rear differential carrier assembly as shown in the illustration.

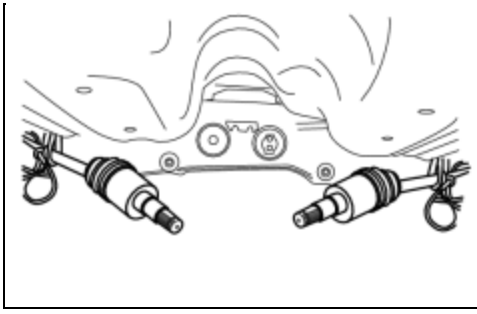
SST: 09520-01010

SST: 09520-24010

09520-32040

(e) Lower the transmission jack and pull off the rear drive shaft assembly from the rear differential carrier assembly, and then remove the rear differential carrier assembly.





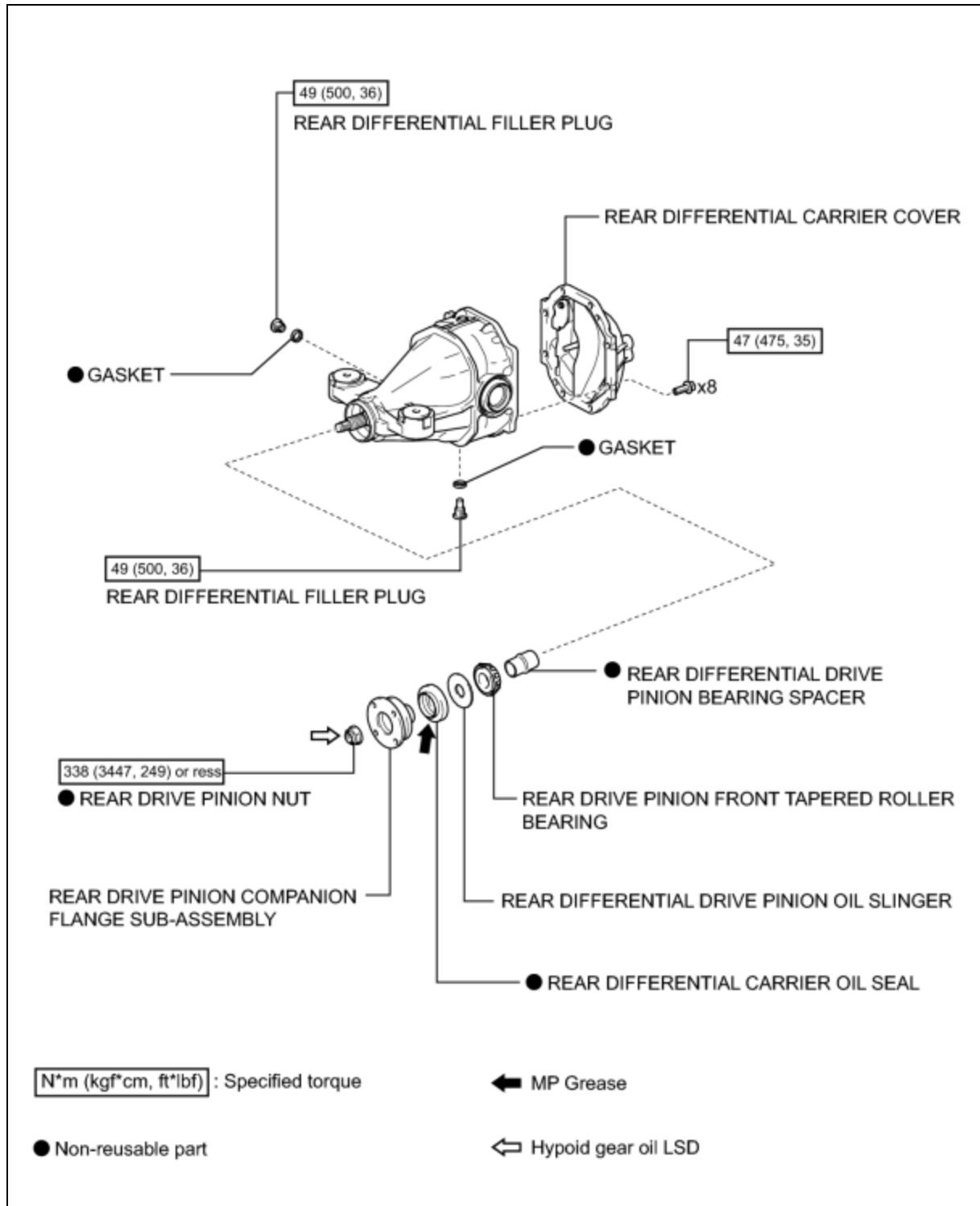
HINT:

Tie the disconnected rear drive shaft with a rope.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003F7X00NX
Title: AXLE AND DIFFERENTIAL: REAR DIFFERENTIAL CARRIER OIL SEAL: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000009HY02YX
Title: AXLE AND DIFFERENTIAL: REAR DIFFERENTIAL CARRIER OIL SEAL: REPLACEMENT (2013 FR-S)		

REPLACEMENT

1. REMOVE REAR DIFFERENTIAL CARRIER ASSEMBLY

INFO

2. REMOVE REAR DIFFERENTIAL CARRIER COVER

INFO

3. SECURE REAR DIFFERENTIAL CARRIER ASSEMBLY

INFO

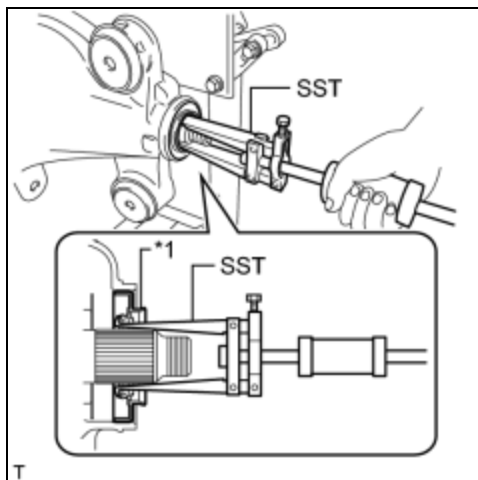
4. REMOVE REAR DRIVE PINION NUT

INFO

5. REMOVE REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY

INFO

6. REMOVE REAR DIFFERENTIAL CARRIER OIL SEAL



- (a) Using SST, remove the rear differential carrier oil seal from the rear differential carrier.

SST: 09308-00010

*1	Rear Differential Carrier Oil Seal
----	------------------------------------

HINT:

When replace the rear differential carrier oil seal, replace the rear differential drive pinion bearing spacer and adjust the drive pinion preload.

7. REMOVE REAR DIFFERENTIAL DRIVE PINION OIL SLINGER

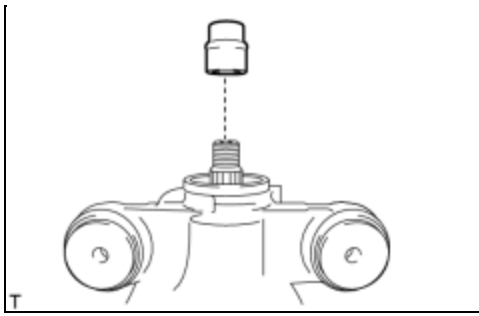
INFO

8. REMOVE REAR DRIVE PINION FRONT TAPERED ROLLER BEARING

INFO

9. REPLACE REAR DIFFERENTIAL DRIVE PINION BEARING SPACER

- (a) Replace the new rear differential drive pinion bearing spacer.



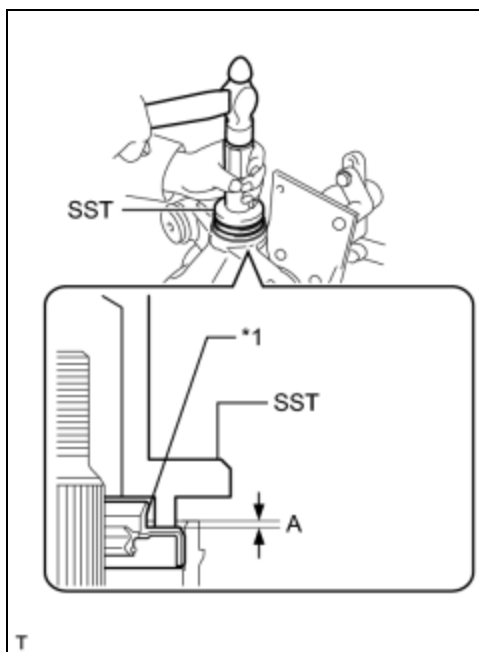
10. INSTALL REAR DRIVE PINION FRONT TAPERED ROLLER BEARING INFO

11. INSTALL REAR DIFFERENTIAL DRIVE PINION OIL SLINGER INFO

12. INSTALL REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY INFO

13. REMOVE REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY INFO

14. INSTALL REAR DIFFERENTIAL CARRIER OIL SEAL



(a) Using SST and a hammer, install the new rear differential carrier oil seal.

SST: 09554-22010

Standard depth:

1.55 to 2.45 mm (0.0610 to 0.0964 in.)

*1	Rear Differential Carrier Oil Seal
----	------------------------------------

NOTICE:

- Tap the oil seal uniformly so that the oil seal is straight.
- Do not excessively tap the oil seal.

(b) Apply MP grease to the rear differential carrier oil seal lip.

15. INSTALL REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY INFO

16. ADJUST DIFFERENTIAL DRIVE PINION PRELOAD INFO

17. INSPECT TOTAL PRELOAD INFO

18. STAKE REAR DRIVE PINION NUT INFO

19. REMOVE REAR DIFFERENTIAL CARRIER ASSEMBLY INFO

20. INSTALL REAR DIFFERENTIAL CARRIER COVER INFO

21. INSTALL REAR DIFFERENTIAL CARRIER ASSEMBLY

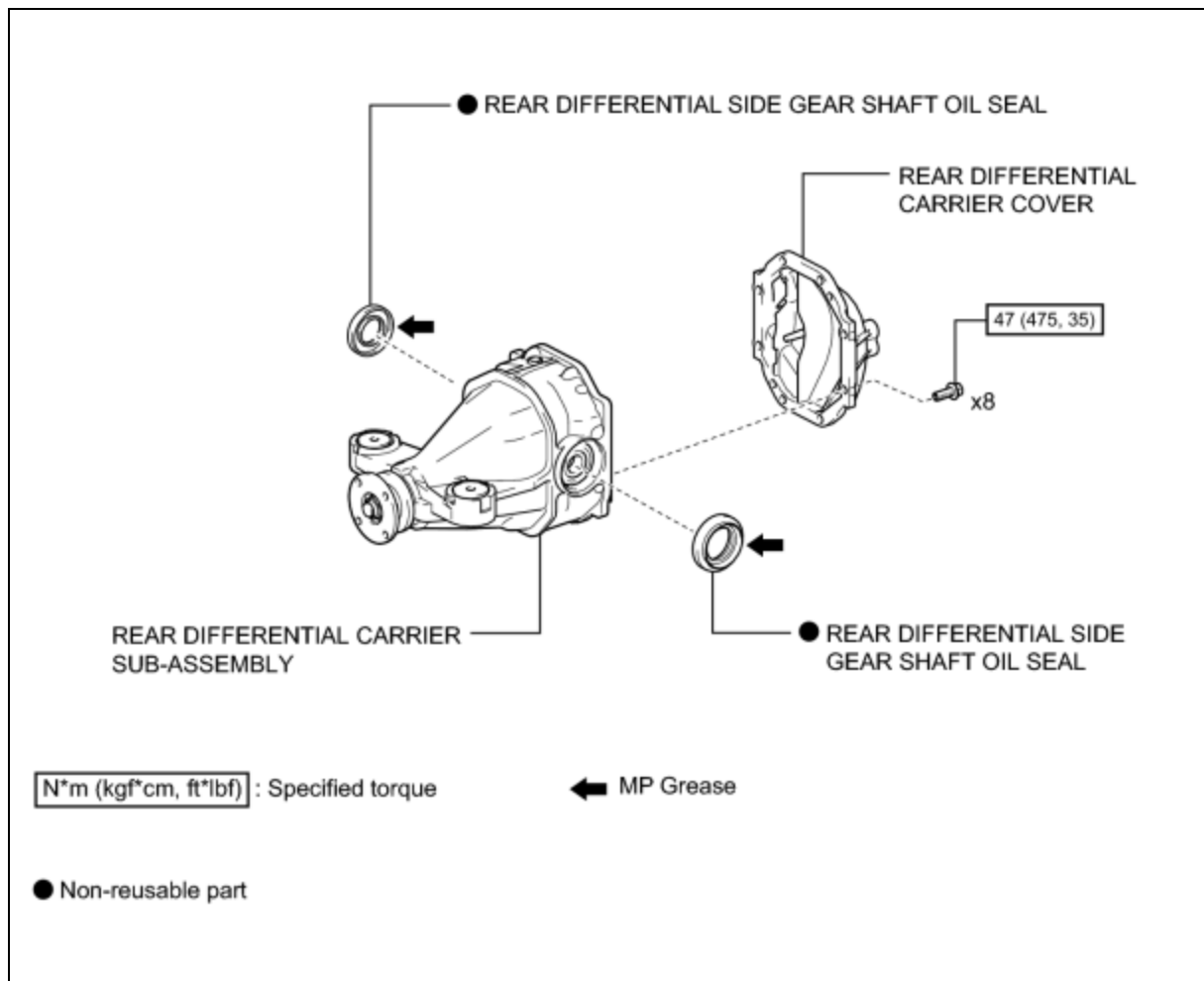
INFO



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001RHY00TX
Title: AXLE AND DIFFERENTIAL: REAR DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001RHX01BX
Title: AXLE AND DIFFERENTIAL: REAR DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL: REPLACEMENT (2013 FR-S)		

REPLACEMENT

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. DRAIN DIFFERENTIAL OIL INFO

2. REMOVE REAR DRIVE SHAFT ASSEMBLY LH

INFO

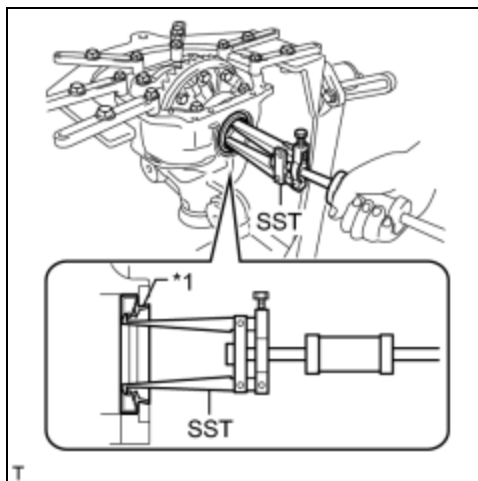
3. REMOVE REAR DIFFERENTIAL CARRIER ASSEMBLY

INFO

4. REMOVE REAR DIFFERENTIAL CARRIER COVER INFO

5. SECURE REAR DIFFERENTIAL CARRIER SUB-ASSEMBLY INFO

6. REMOVE REAR DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL



- (a) Using SST, remove the rear differential side gear shaft oil seal.

SST: 09308-00010

Text in Illustration

*1	Rear Differential Side Gear Shaft Oil Seal
----	--

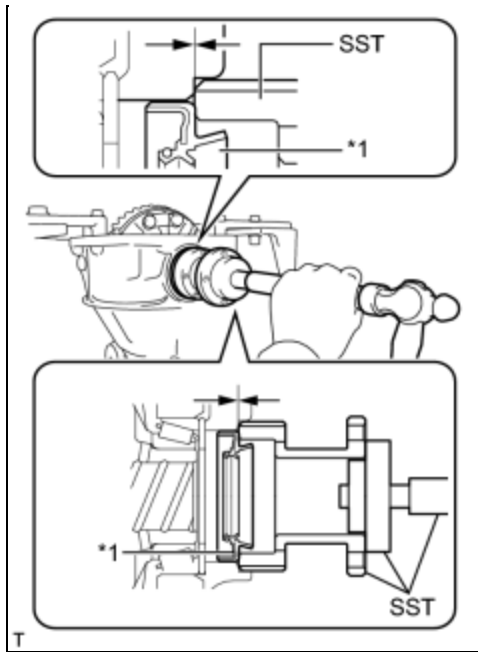
7. INSTALL REAR DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL

- (a) Using SST and a hammer, install a new 2 rear differential side gear shaft oil seals.

SST: 09213-70011

SST: 09950-60010

SST: 09950-70010



09951-00410
 09951-00620
 09951-07100
 09952-06010

Text in Illustration

*1	Rear Differential Side Gear Shaft Oil Seal
----	--

Oil seal depth:
 -0.5 to 0.5 mm (-0.0197 to 0.0197 in.)

NOTICE:

- To ensure a proper seal, evenly tap in the rear differential side gear shaft oil seal.
- When installing the oil seal, tap it in until its surface is flush with the rear differential carrier.

8. INSTALL REAR DIFFERENTIAL CARRIER SUB-ASSEMBLY [INFO](#)

9. INSTALL REAR DIFFERENTIAL CARRIER COVER [INFO](#)

10. INSTALL REAR DIFFERENTIAL CARRIER ASSEMBLY

[INFO](#)

11. INSTALL REAR DRIVE SHAFT ASSEMBLY

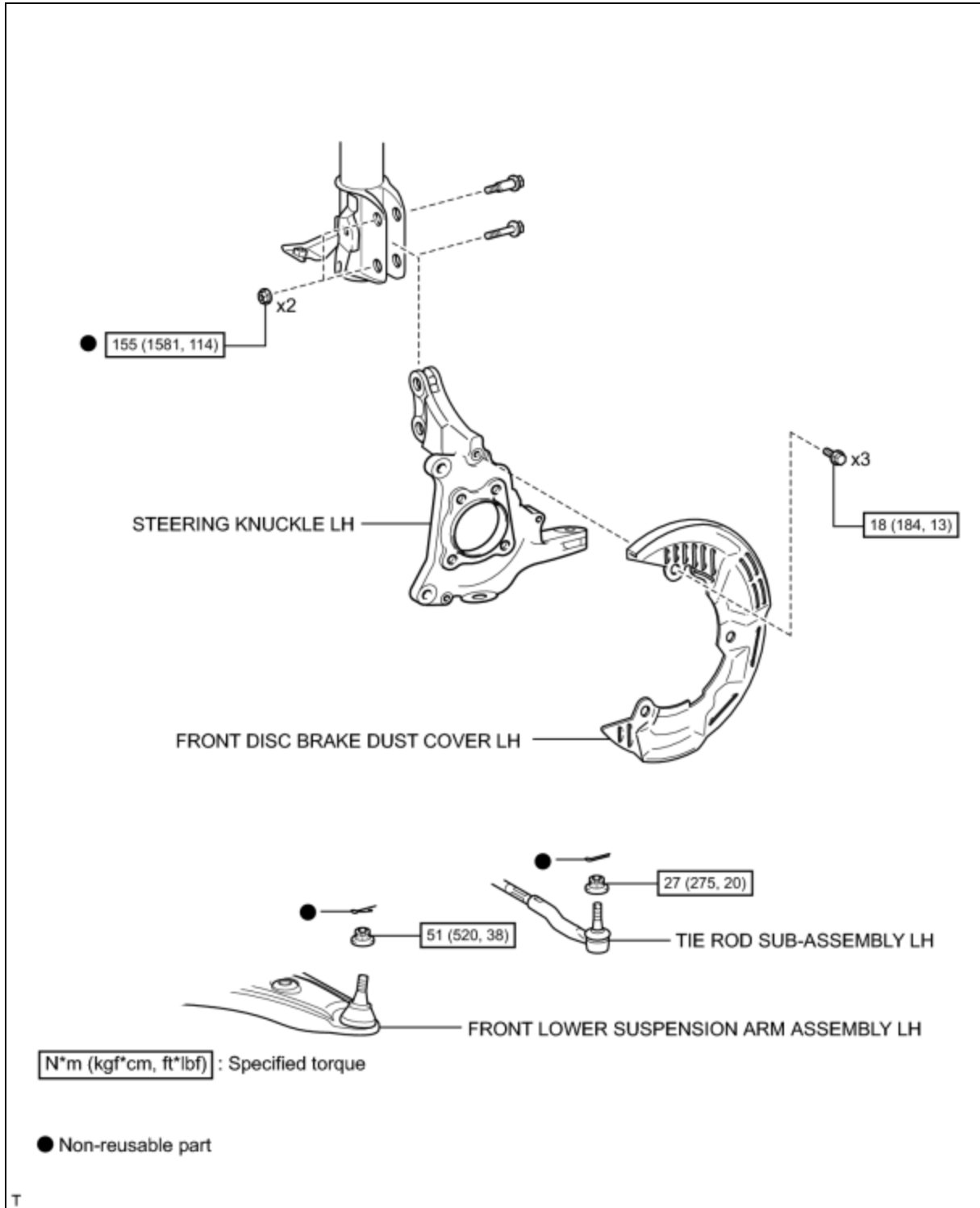
[INFO](#)

12. ADD DIFFERENTIAL OIL [INFO](#)

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000004G01SX
Title: AXLE AND DIFFERENTIAL: STEERING KNUCKLE: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000O4F02HX
Title: AXLE AND DIFFERENTIAL: STEERING KNUCKLE: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. INSTALL STEERING KNUCKLE LH

- (a) Install the steering knuckle LH with the 2 bolts and 2 new nuts.

Torque: 155 N·m (1581 kgf·cm, 114ft·lbf)

2. INSTALL FRONT LOWER SUSPENSION ARM ASSEMBLY LH

- (a) Install the nut and the front lower suspension arm assembly LH.

Torque: 51 N·m (520 kgf·cm, 38ft·lbf)

- (b) Install new cotter pin.

3. INSTALL TIE ROD SUB-ASSEMBLY LH

- (a) Install the nut and the tie rod sub-assembly LH to the steering knuckle LH.

Torque: 27 N·m (275 kgf·cm, 20ft·lbf)

- (b) Install new cotter pin.

NOTICE:

If the holes for the clip are not aligned, tighten the nut up to an additional 60°

4. INSTALL FRONT DISC BRAKE DUST COVER LH

- (a) Install the 3 bolts and the front disc brake dust cover LH to the steering knuckle LH.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

5. INSTALL FRONT WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

6. INSTALL FRONT AXLE HUB SUB-ASSEMBLY

INFO

7. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT

INFO

8. VSC SENSOR NEUTRAL MEMORIZATION

INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000O4H024X
Title: AXLE AND DIFFERENTIAL: STEERING KNUCKLE: REMOVAL (2013 FR-S)		

REMOVAL

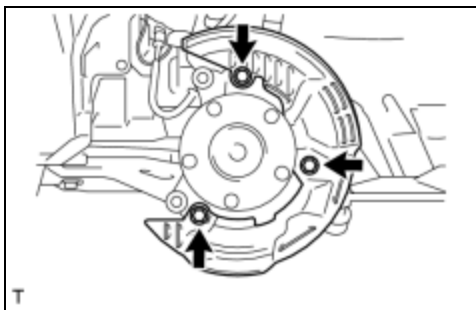
HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. REMOVE FRONT AXLE HUB SUB-ASSEMBLY LH

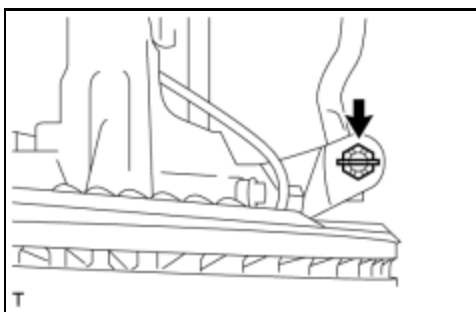
INFO

2. REMOVE FRONT DISC BRAKE DUST COVER LH



- (a) Remove the 3 bolts and the front disc brake dust cover LH.

3. DISCONNECT TIE ROD SUB-ASSEMBLY LH



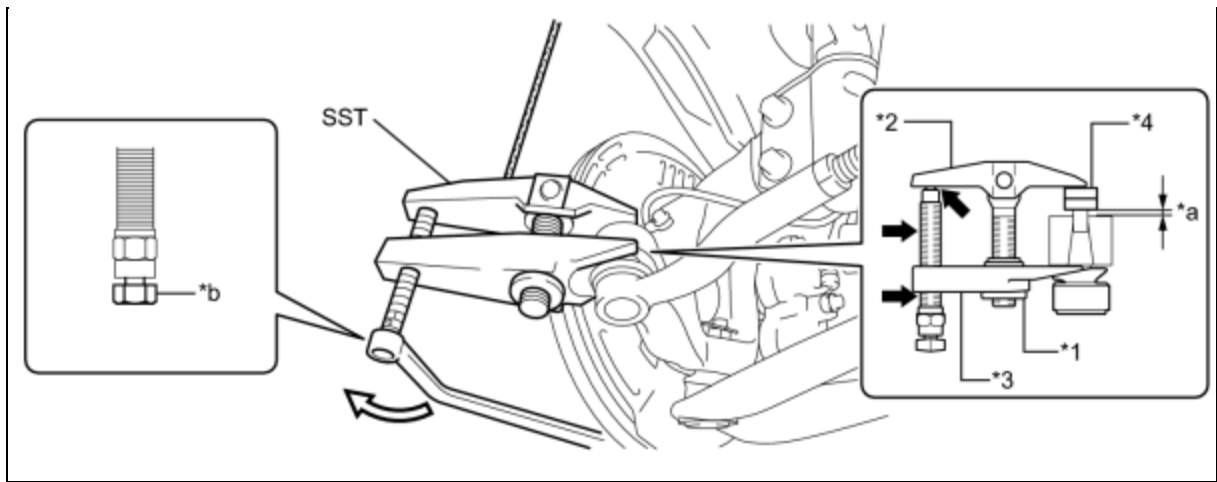
- (a) Remove the cotter pin and nut.

- (b) Install the SST (spacer B) to tie rod assembly.

NOTICE:

As SST may become damaged, make sure the space between the tie rod and spacers is not less than 1 mm (0.0394 in.).

- (c) Using SST, disconnect the tie rod assembly.





SST: 09960-20010

09961-02010

09961-02060

Text in Illustration

*1	Nut	*2	Body
*3	Claw	*4	SST (spacer B)
*a	1 mm (0.0394 in.)	*b	Place a wrench here
	Molybdenum grease		Turn

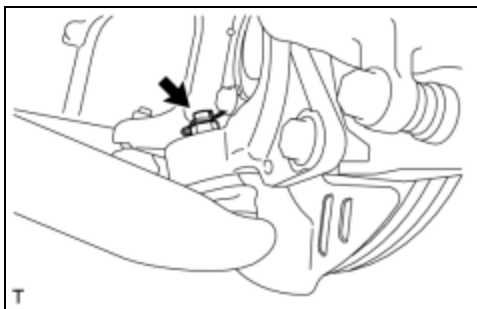
CAUTION:

Apply the molybdenum grease to the end and threads of SST bolt.

NOTICE:

- Install SST so that claw and body are parallel.
- Make sure to tie the string of SST to the vehicle to prevent SST from dropping.
- Do not damage the dust cover on the tie rod end sub-assembly.
- Do not damage the tie-rod end.
- Do not damage the ball joint dust cover.
- Do not damage the steering knuckle.

4. REMOVE FRONT LOWER SUSPENSION ARM ASSEMBLY LH



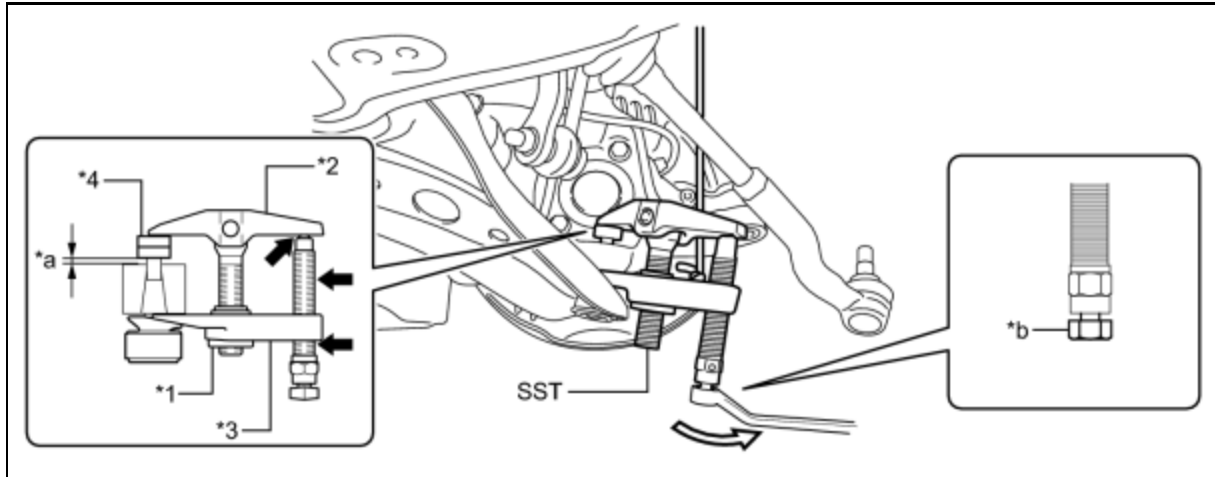
(a) Remove the cotter pin and nut.

(b) Install the SST (spacer B) to the front lower suspension arm assembly LH.

NOTICE:

As SST may become damaged, make sure the space between the front lower suspension arm assembly LH and spacers is not less than 1 mm (0.0394 in.).

(c) Using SST, disconnect the front lower suspension arm assembly LH.





SST: 09960-20010

09961-02010

09961-02060

Text in Illustration

*1	Nut	*2	Body
*3	Claw	*4	SST (spacer B)
*a	1 mm (0.0394 in.)	*b	Place a wrench here
	Molybdenum grease		Turn

CAUTION:

Apply the molybdenum grease to the end and threads of SST bolt.

NOTICE:

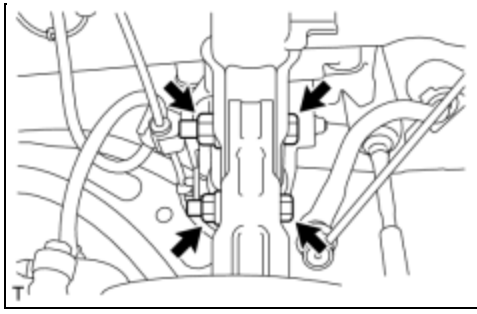
- Install SST so that claw and body are parallel.
- Make sure to tie the string of SST to the vehicle to prevent SST from dropping.
- Do not damage the dust cover on the front suspension lower arm assembly.
- Do not damage the front lower arm sub-assembly.
- Do not damage the front disc brake dust cover.
- Do not damage the steering knuckle.

5. REMOVE STEERING KNUCKLE LH

(a) Remove the steering knuckle LH with the 2 bolts and 2 nuts.

NOTICE:

When removing the nuts, keep the bolts from rotating.



Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003WYV00FX
Title: CLUTCH: CLUTCH FLUID: BLEEDING (2013 FR-S)		

BLEEDING

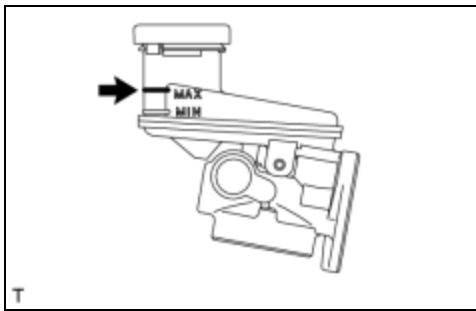
NOTICE:

Immediately wash off any clutch fluid that comes into contact with any painted surfaces.

HINT:

If any work is done on the clutch system or if air in the clutch lines is suspected, bleed the air from the system.

1. FILL CLUTCH FLUID



(a) Fill the clutch fluid.

Fluid:

SAE J1703 or FMVSS No. 116 DOT3

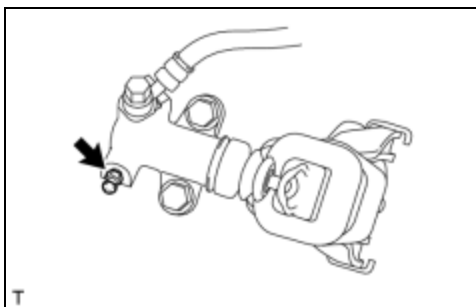
NOTICE:

Add clutch fluid to keep the level between the MIN and MAX lines of the master cylinder reservoir sub-assembly while bleeding the clutch.

2. BLEED CLUTCH LINE

NOTICE:

In case of clutch fluid replacement, make sure that the old fluid is replaced in the clutch line between the master cylinder reservoir sub-assembly and the bleeder before bleeding.



(a) Connect a vinyl tube to the clutch release cylinder bleeder plug.

- (b) Depress the clutch pedal 5 times, and then loosen the clutch release cylinder bleeder plug while the pedal is depressed (Step C).
- (c) When fluid no longer comes out, tighten the clutch release cylinder bleeder plug, and then release the clutch pedal (Step D).
- (d) Repeat Steps C and D until all the air in the fluid is completely bled out.
- (e) Tighten the clutch release cylinder bleeder plug.

Torque: 7.8 N·m (80 kgf·cm, 69in·lbf)

(f) Depress the clutch pedal 10 times or more and confirm its operation.

3. INSPECT FOR CLUTCH FLUID LEAK

4. INSPECT CLUTCH FLUID LEVEL

INFO

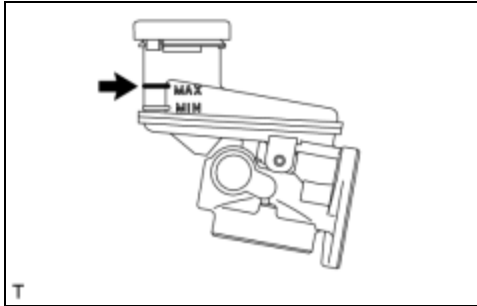


TOYOTA

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002WKJ014X
Title: CLUTCH: CLUTCH FLUID: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT CLUTCH FLUID LEVEL



- (a) Check the clutch fluid level.

If clutch fluid level is lower than the MIN line, check for leaks and inspect the clutch lines. If necessary, refill the master cylinder reservoir sub-assembly with clutch fluid to the MAX line after repair or replacement.

Fluid:

SAE J1703 or FMVSS No. 116 DOT 3

NOTICE:

When adjusting fluid amount using a dropper or the like, do not use one which was used with liquid petroleum, water, or deteriorated clutch fluid. This may deteriorate seals or fluid, resulting in a fluid leak and poor clutch function.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000033BB00WX
Title: CLUTCH: CLUTCH FLUID: REPLACEMENT (2013 FR-S)		

REPLACEMENT

NOTICE:

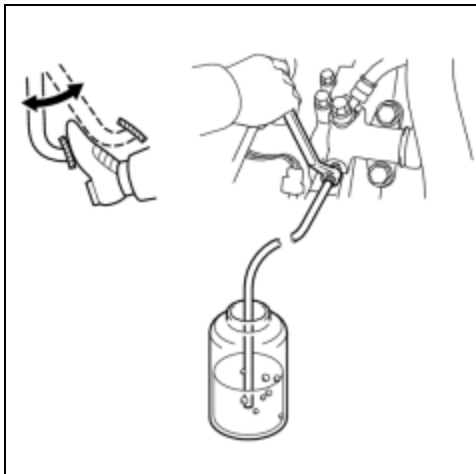
Immediately wash off any clutch fluid that comes into contact with any painted surfaces.

HINT:

If any work is done on the clutch system or if air in the clutch lines is suspected, bleed the air from the system.

1. FILL CLUTCH FLUID INFO

2. REPLACE CLUTCH FLUID



(a) Connect a vinyl tube to the clutch release cylinder bleeder plug.

- (b) Depress the clutch pedal several times, and then loosen the clutch release cylinder bleeder plug with the pedal depressed (Step A).
- (c) At the point where the fluid stops coming out, tighten the clutch release cylinder bleeder plug, and then release the clutch pedal (Step B).
- (d) Repeat Steps A and B until the new clutch fluid is comes out.

NOTICE:

Make sure that the master cylinder reservoir sub-assembly does not run out of clutch fluid.

- (e) Tighten the clutch release cylinder bleeder plug.

Torque: 7.8 N·m (80 kgf·cm, 69in·lbf)

- (f) Repeat the above procedure to bleed the air out of the clutch line for each wheel.

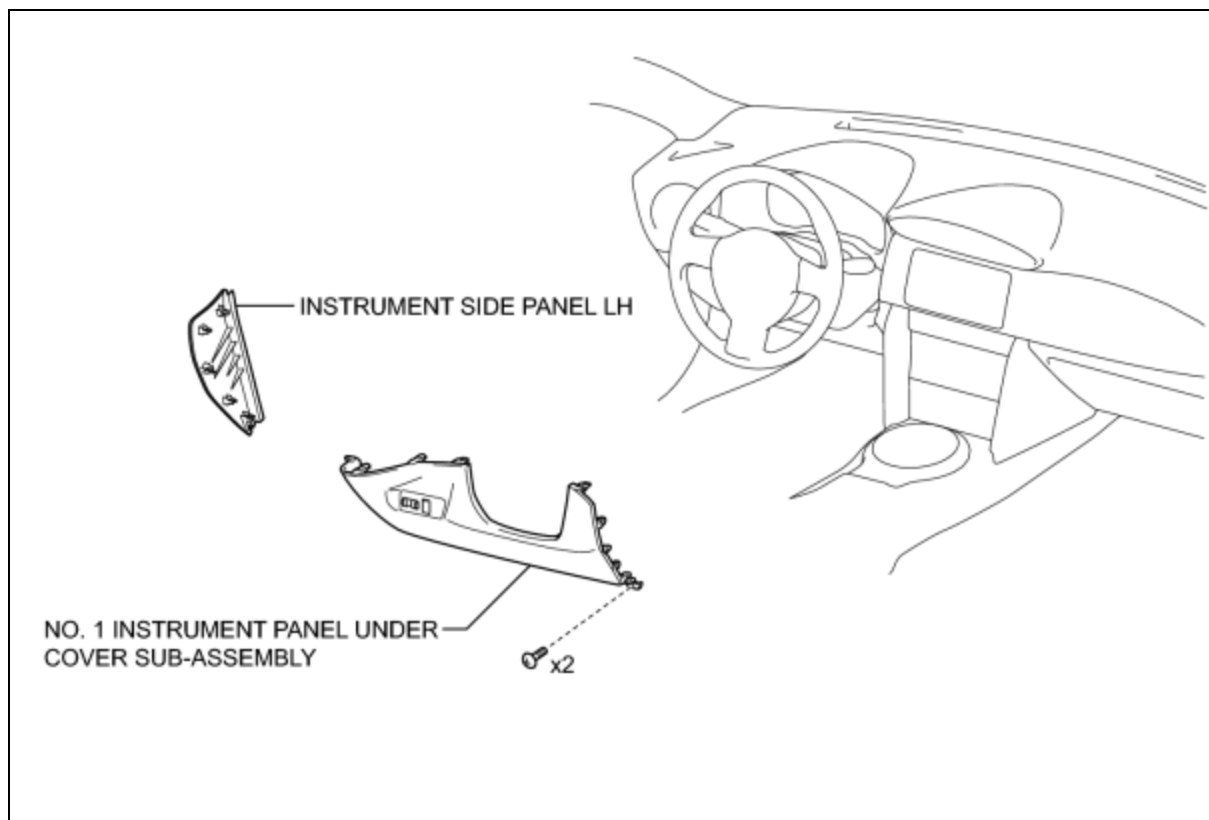
3. INSPECT FOR CLUTCH FLUID

4. INSPECT CLUTCH FLUID LEVEL INFO

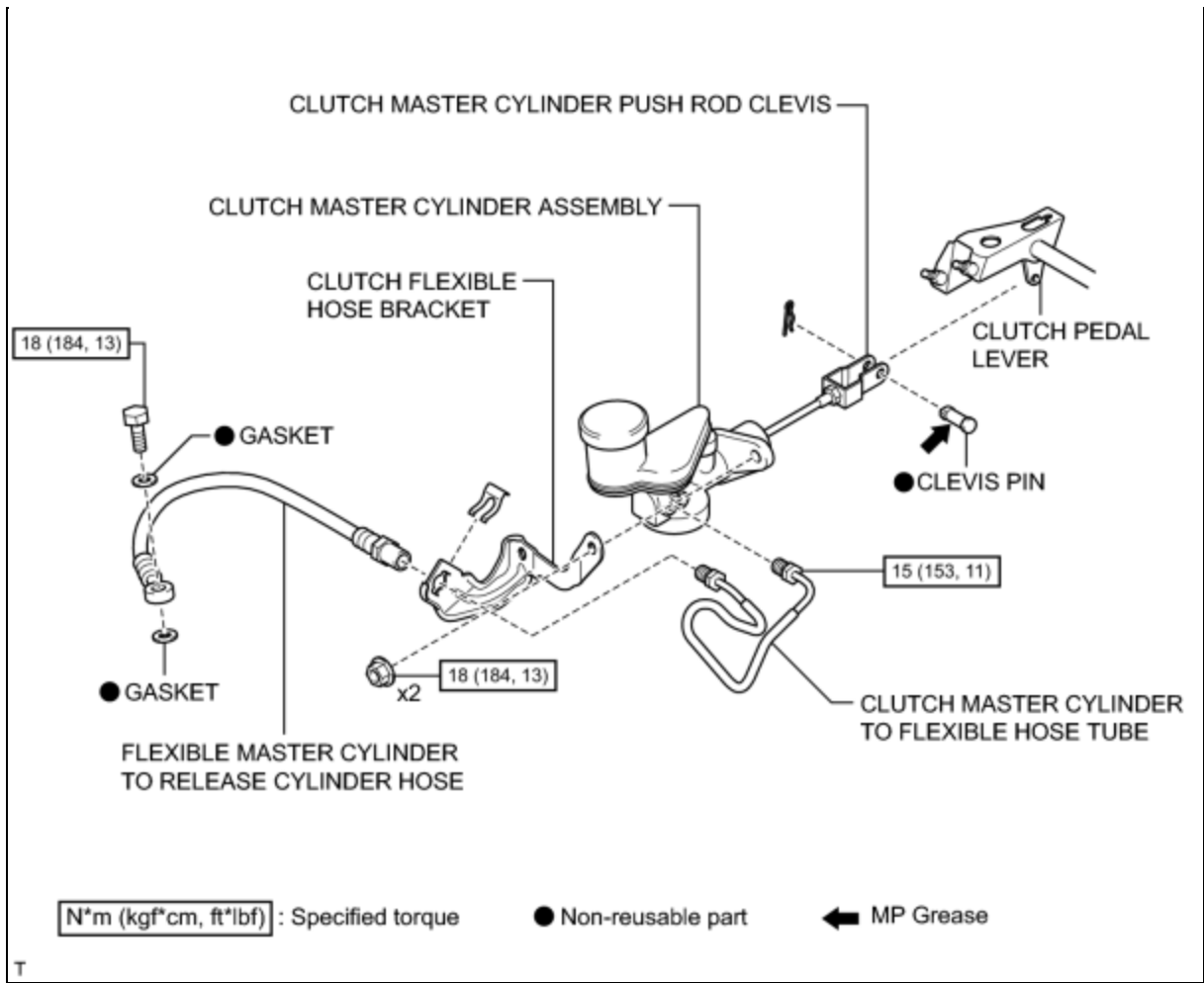
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001B2Z01VX
Title: CLUTCH: CLUTCH MASTER CYLINDER: COMPONENTS (2013 FR-S)		

COMPONENTS

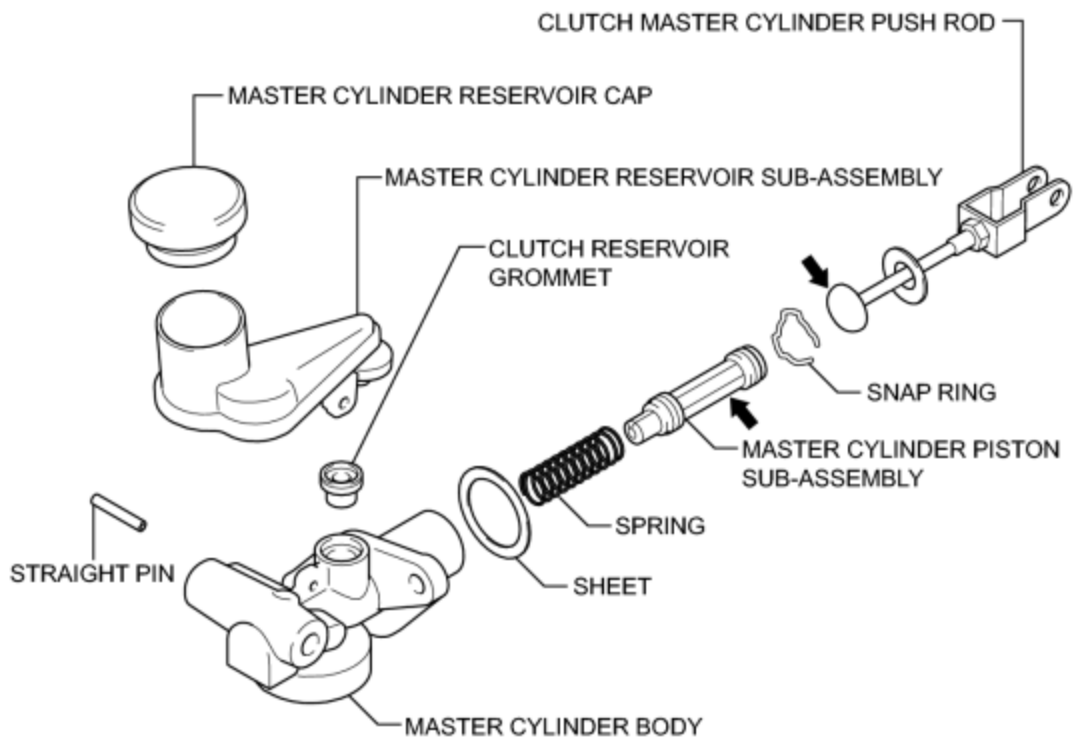
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION



← Lithium soap base glycol grease

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000023TJ010X
Title: CLUTCH: CLUTCH MASTER CYLINDER: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. REMOVE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY

- (a) Remove the master cylinder reservoir cap.
- (b) Fix the clutch master cylinder assembly in a vise between aluminum plates.

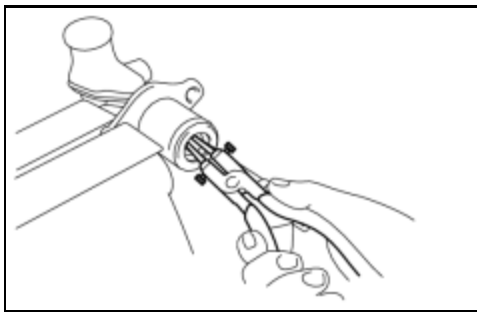
NOTICE:

Do not overtighten the vise.

- (c) Using a pin punch and a hammer, tap out the straight pin and remove the master cylinder body.

2. REMOVE CLUTCH RESERVOIR GROMMET

- (a) Remove the clutch reservoir grommet from the clutch master cylinder assembly.



3. REMOVE MASTER CYLINDER PISTON SUB-ASSEMBLY

- (a) Using snap ring pliers, remove the snap ring while pushing the clutch master cylinder push rod.
- (b) Remove the master cylinder piston sub-assembly and spring from the master cylinder body.

NOTICE:

Do not damage the inside of the master cylinder body.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001B2Y02UX
Title: CLUTCH: CLUTCH MASTER CYLINDER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL CLUTCH MASTER CYLINDER TO FLEXIBLE HOSE TUBE

- (a) Install the master cylinder to release cylinder hose to the clutch flexible hose bracket with the clip.
- (b) Using a union nut wrench (10 mm), connect the clutch master cylinder to flexible hose tube to the master cylinder to release cylinder hose.

Torque: 15 N·m (153 kgf·cm, 11ft·lbf)

NOTICE:

Use the formula to calculate special torque values for situations where a union nut wrench is combined with a torque wrench **INFO** .

- (c) Using a union nut wrench (10 mm), connect the clutch master cylinder to flexible hose tube to the clutch master cylinder assembly.

Torque: 15 N·m (153 kgf·cm, 11ft·lbf)

NOTICE:

Use the formula to calculate special torque values for situations where a union nut wrench is combined with a torque wrench **INFO** .

2. INSTALL CLUTCH MASTER CYLINDER ASSEMBLY

- (a) Install the sheet to the clutch master cylinder assembly.
- (b) Install the clutch master cylinder assembly with the 2 nuts.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

- (c) Install the master cylinder to release cylinder hose with a union bolt and 2 new gaskets.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

3. INSTALL CLUTCH MASTER CYLINDER PUSH ROD CLEVIS

- (a) Apply MP grease to the new clevis pin.
- (b) Install the clutch master cylinder push rod clevis to the clutch pedal lever sub-assembly with the clevis pin and a clip.

HINT:

Install the clevis pin from the left side of the vehicle.

4. FILL UP FILL CLUTCH FLUID **INFO**

5. BLEED CLUTCH LINE **INFO**

6. INSPECT FOR CLUTCH FLUID LEAK

7. INSPECT CLUTCH FLUID LEVEL **INFO**

8. INSPECT AND ADJUST CLUTCH PEDAL

INFO

9. INSTALL FRONT SUSPENSION UPPER TO COWL BRACE SUB-ASSEMBLY LH

INFO

10. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

INFO

11. INSTALL INSTRUMENT SIDE PANEL LH

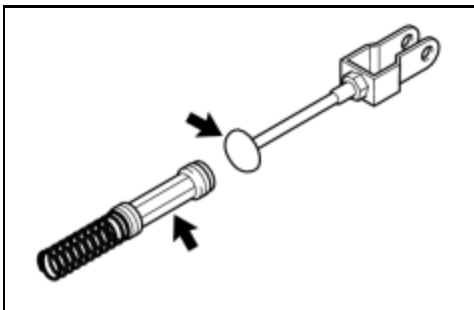
INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000023TK01PX
Title: CLUTCH: CLUTCH MASTER CYLINDER: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL MASTER CYLINDER PISTON SUB-ASSEMBLY



(a) Apply lithium soap base glycol grease to the portions shown in the illustration.

Text in Illustration

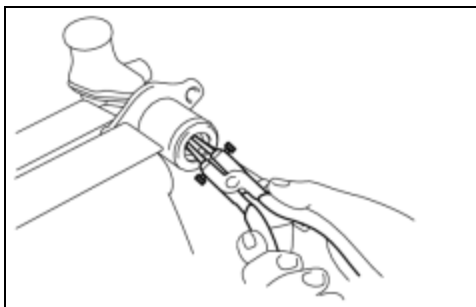
	Lithium Soap Base Glycol Grease
--	---------------------------------

(b) Install the master cylinder piston sub-assembly and spring into the master cylinder body.

(c) Fix the clutch master cylinder assembly in a vise between aluminum plates.

NOTICE:

Do not overtighten the vise.



(d) Using snap ring pliers, install the snap ring while pushing the clutch master cylinder push rod.

2. INSTALL CLUTCH RESERVOIR GROMMET

(a) Install the clutch reservoir grommet onto the master cylinder body.

3. INSTALL MASTER CYLINDER RESERVOIR SUB-ASSEMBLY

(a) Install the master cylinder reservoir sub-assembly to the master cylinder body.

(b) Using a pin punch and a hammer, tap in the straight pin.

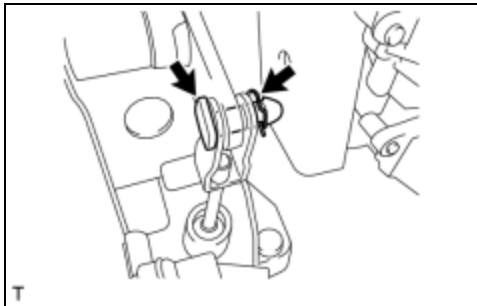
(c) Install the master cylinder reservoir cap.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001B3002TX
Title: CLUTCH: CLUTCH MASTER CYLINDER: REMOVAL (2013 FR-S)		

REMOVAL

1. DRAIN CLUTCH FLUID INFO
2. REMOVE INSTRUMENT SIDE PANEL LH INFO
3. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY INFO
4. REMOVE CLUTCH MASTER CYLINDER PUSH ROD CLEVIS

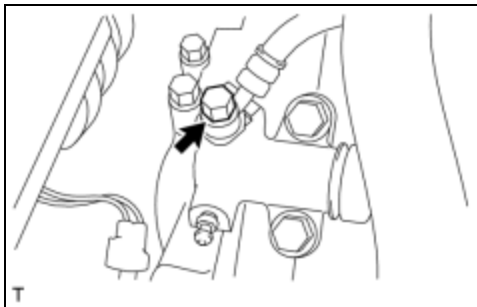


- (a) Remove the clip and the clevis pin, and separate the clutch master cylinder push rod clevis from the clutch pedal lever sub-assembly.

5. REMOVE FRONT SUSPENSION UPPER TO COWL BRACE SUB-ASSEMBLY LH

INFO

6. REMOVE CLUTCH MASTER CYLINDER ASSEMBLY

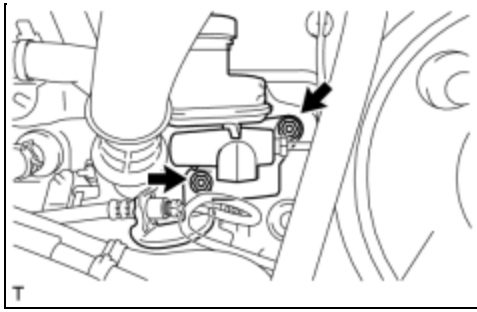


- (a) Remove the union bolt, 2 gaskets and the master cylinder to the release cylinder hose from the clutch release cylinder assembly.

HINT:

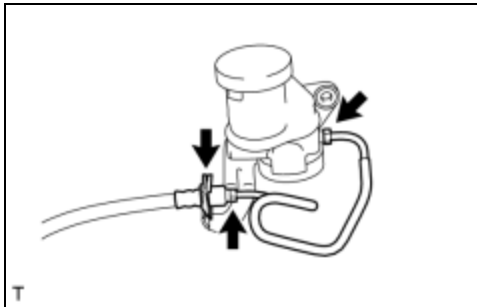
Use a container to collect the fluid.

- (b) Remove the 2 nuts and the clutch master cylinder assembly and sheet.



7. REMOVE CLUTCH MASTER CYLINDER TO FLEXIBLE HOSE TUBE

- (a) Using a union nut wrench (10 mm), disconnect the clutch master cylinder to flexible hose tube from the master cylinder to release cylinder hose.



HINT:

Use a container to collect the fluid.

- (b) Remove the clip and the clutch flexible hose bracket.
- (c) Using a union nut wrench (10 mm), remove the clutch master cylinder to flexible hose tube from the clutch master cylinder assembly.

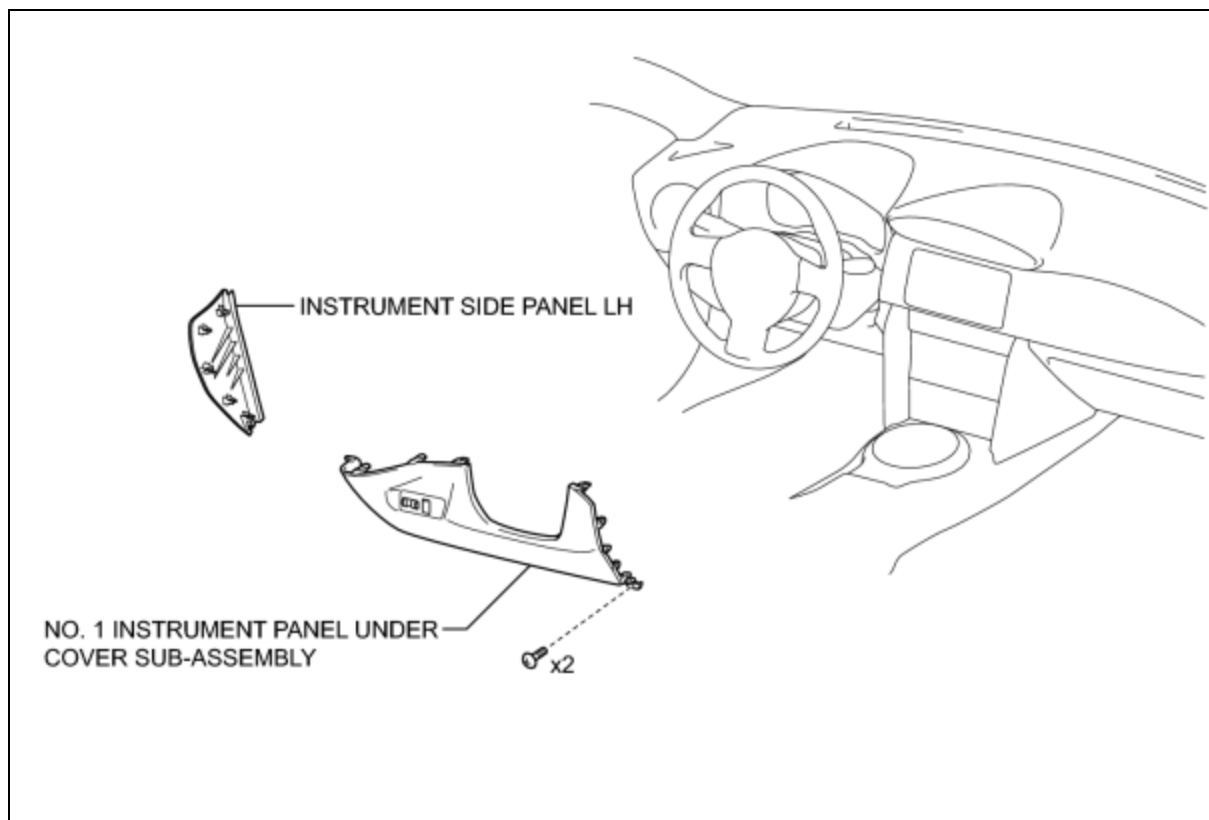
HINT:

Use a container to collect the fluid.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001B3C012X
Title: CLUTCH: CLUTCH PEDAL SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION

8.0 (82, 71 in.*lbf)

CLUTCH START
SWITCH ASSEMBLY

8.0 (82, 71 in.*lbf)

CLUTCH SWITCH ASSEMBLY

N*m (kgf*cm, ft*lbf) : Specified torque



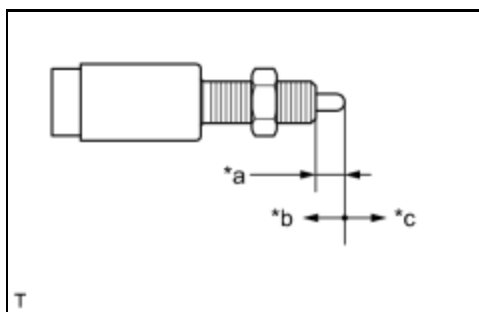
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001B3B016X
Title: CLUTCH: CLUTCH PEDAL SWITCH: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT CLUTCH START SWITCH ASSEMBLY

(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration



*a	9.0 to 10.0 mm (0.354 to 0.394 in.)
*b	ON
*c	OFF

Standard Resistance:

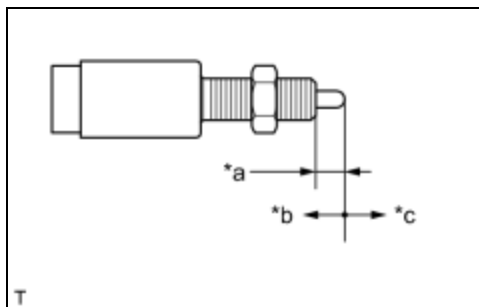
TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 - 2	ON (Pushed in)	Below 1Ω
	OFF (Released)	10 kΩ or higher

If the resistance is not as specified, replace the clutch start switch assembly.

2. INSPECT CLUTCH SWITCH ASSEMBLY

(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration



*a	5.0 to 6.5 mm (0.197 to 0.256 in.)
*b	ON
*c	OFF

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 - 2	ON (Pushed in)	Below 1Ω
	OFF (Released)	10 kΩ or higher

If the resistance is not as specified, replace the clutch switch assembly.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001B3A013X
Title: CLUTCH: CLUTCH PEDAL SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

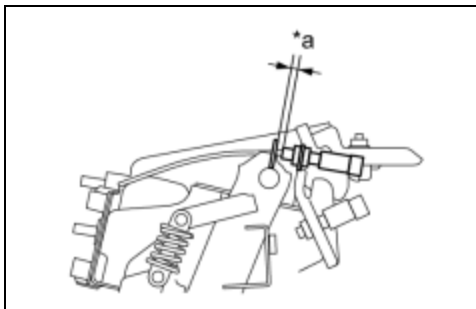
1. INSTALL CLUTCH START SWITCH ASSEMBLY

(a) Install the clutch start switch assembly to the clutch pedal support sub-assembly with the nut.

Torque: 8.0 N·m (82 kgf·cm, 71in·lbf)

(b) Connect the clutch start switch connector.

(c) With the clutch pedal fully depressed, check that the clearance shown in the illustration is as specified.



Text in Illustration

*a	Clearance
----	-----------

Standard clearance:

3.0 to 3.5 mm (0.118 to 0.138n.)

HINT:

Do not turn the clutch start switch assembly.

2. INSTALL CLUTCH PEDAL SUPPORT SUB-ASSEMBLY

NFO

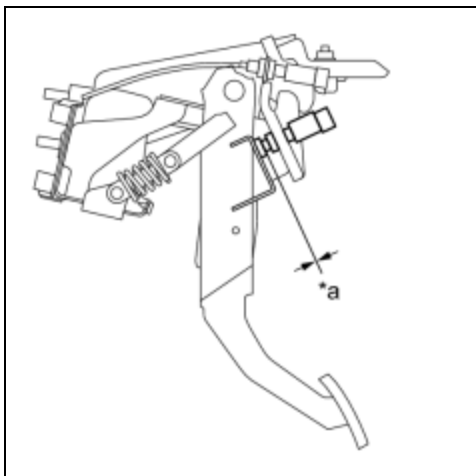
3. INSTALL CLUTCH SWITCH ASSEMBLY

(a) Install the clutch switch assembly to the clutch pedal support sub-assembly with the nut.

Torque: 8.0 N·m (82 kgf·cm, 71in·lbf)

(b) Connect the clutch switch connector.

(c) Without depressing the clutch pedal, check that there is no clearance between the switch shaft and the clutch pedal stopper.



Text in Illustration

*a	No Clearance
----	--------------

HINT:

Do not turn the clutch switch assembly.

4. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)

5. INSTALL INSTRUMENT SIDE PANEL LH [INFO](#)

6. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL [INFO](#)

7. INSPECT CLUTCH START SYSTEM [INFO](#)



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001BFZ010X
Title: CLUTCH: CLUTCH PEDAL SWITCH: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT CLUTCH START SYSTEM

- (a) Check that the engine does not start when the clutch pedal is released.
- (b) Check that the engine starts when the clutch pedal is fully depressed.

If necessary, replace or adjust the clutch start switch assembly.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001B3D013X
Title: CLUTCH: CLUTCH PEDAL SWITCH: REMOVAL (2013 FR-S)		

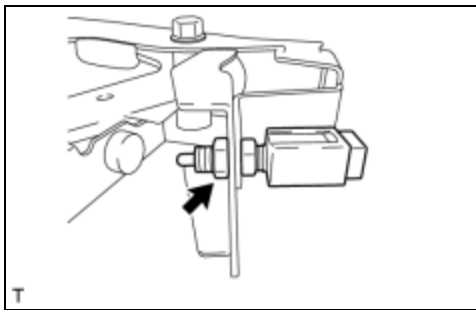
REMOVAL

1. REMOVE INSTRUMENT SIDE PANEL LH INFO

2. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY INFO

3. REMOVE CLUTCH SWITCH ASSEMBLY

(a) Disconnect the clutch switch connector.



(b) Remove the nut and the clutch switch assembly from the clutch pedal support sub-assembly.

HINT:

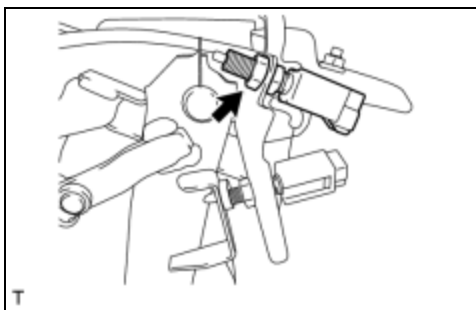
Do not turn the clutch switch assembly.

4. REMOVE CLUTCH PEDAL SUPPORT SUB-ASSEMBLY

INFO

5. REMOVE CLUTCH START SWITCH ASSEMBLY

(a) Disconnect the clutch start switch connector.



(b) Remove the nut and the clutch start switch assembly from the clutch pedal support sub-assembly.

HINT:

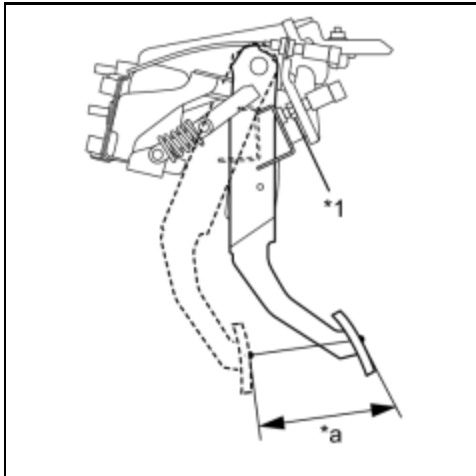
Do not turn the clutch start switch assembly.

Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000ERC032X
Title: CLUTCH: CLUTCH PEDAL: ADJUSTMENT (2013 FR-S)		

ADJUSTMENT

1. INSPECT AND ADJUST CLUTCH PEDAL

- (a) If the full stroke of the clutch pedal sub-assembly is not within the specified value, loosen the lock nuts of the clutch switch assembly and adjust the full stroke of the clutch pedal sub-assembly with the clutch switch assembly.



Text in Illustration

*1	Lock Nut
*a	Pedal stroke

Pedal stroke:

110 to 115 mm (4.331 to 4.528 in.)

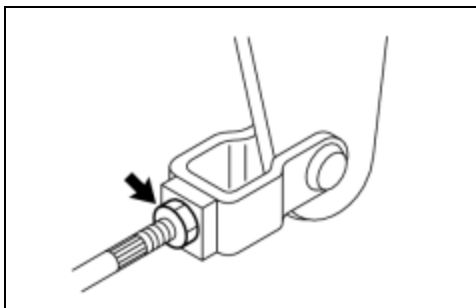
Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)

NOTICE:

When adjusting the full stroke of clutch pedal sub-assembly, do not turn the clutch switch assembly.

HINT:

If the clutch switch assembly cannot adjust the full stroke of clutch pedal sub-assembly to the specified value, adjust it by turning the clutch master cylinder push rod.

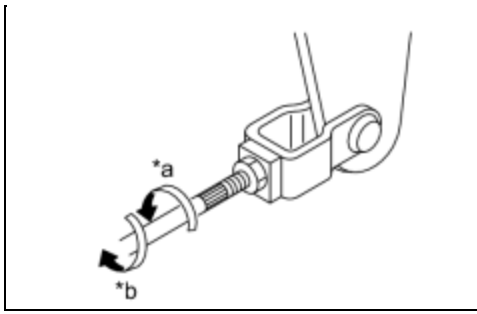


- (b) Loosen the push rod lock nuts of the clutch master cylinder assembly.

- (c) Rotate the clutch master cylinder push rod to adjust.

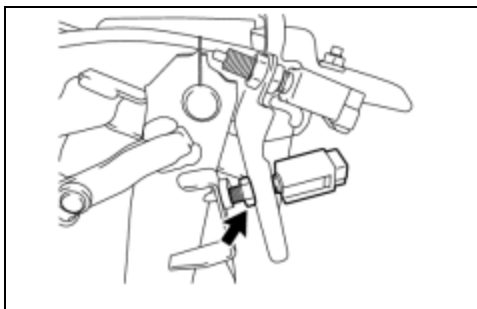
Text in Illustration

*a	In the Longer Direction
----	-------------------------



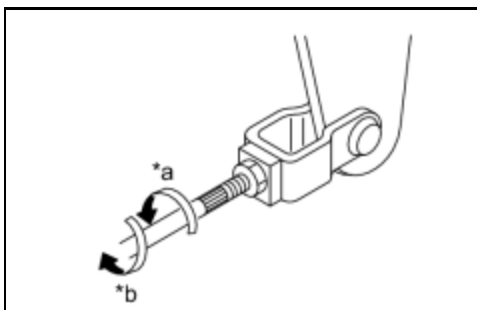
*b	In the Shorter Direction

- (d) Make sure that the clutch pedal sub-assembly contacts the clutch pedal stopper when the clutch pedal sub-assembly is at the maximum stroke position.
- (e) Make sure that the clutch pedal sub-assembly contacts the clutch switch side when the pedal is released.



- (f) Turn the clutch master cylinder push rod to shorten until a clearance is gained on the clutch switch side.

- (g) Turn the clutch master cylinder push rod to lengthen until the clutch pedal sub-assembly contacts the clutch switch assembly.



- (h) Turn further in the direction that will shorten the clutch master cylinder push rod by 270°.

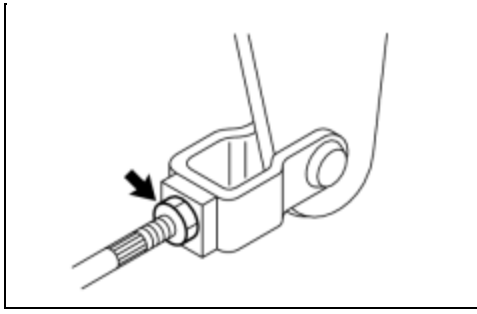
Text in Illustration

*a	In the Longer Direction
*b	In the Shorter Direction

- (i) Check that the clevis pin moves smoothly by moving it to the left and right directions.

- (j) Tighten the clutch master cylinder push rod lock nut of the clutch master cylinder assembly.

Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

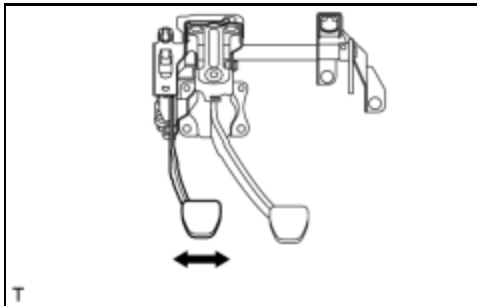


- (k) Depress and release the clutch pedal sub-assembly two or three times to ensure that the clutch pedal sub-assembly and the release lever operate smoothly. If the clutch pedal sub-assembly and the release lever do not operate smoothly, bleed the air from the clutch line.
- (l) Measure the clutch pedal sub-assembly full stroke length again to ensure that it is within specifications. If it is not within specifications, repeat the adjustment procedures again from the beginning.

Pedal stroke:

105 to 115 mm (4.134 to 4.528 in.)

2. INSPECT CLUTCH PEDAL SUB-ASSEMBLY



- (a) Move the clutch pedal sub-assembly in the lateral direction with a force of approximately 10 N (1.0 kgf, 2.2 lbf) to check that the clutch pedal sub-assembly deflection is within the service limit.

Maximum play:

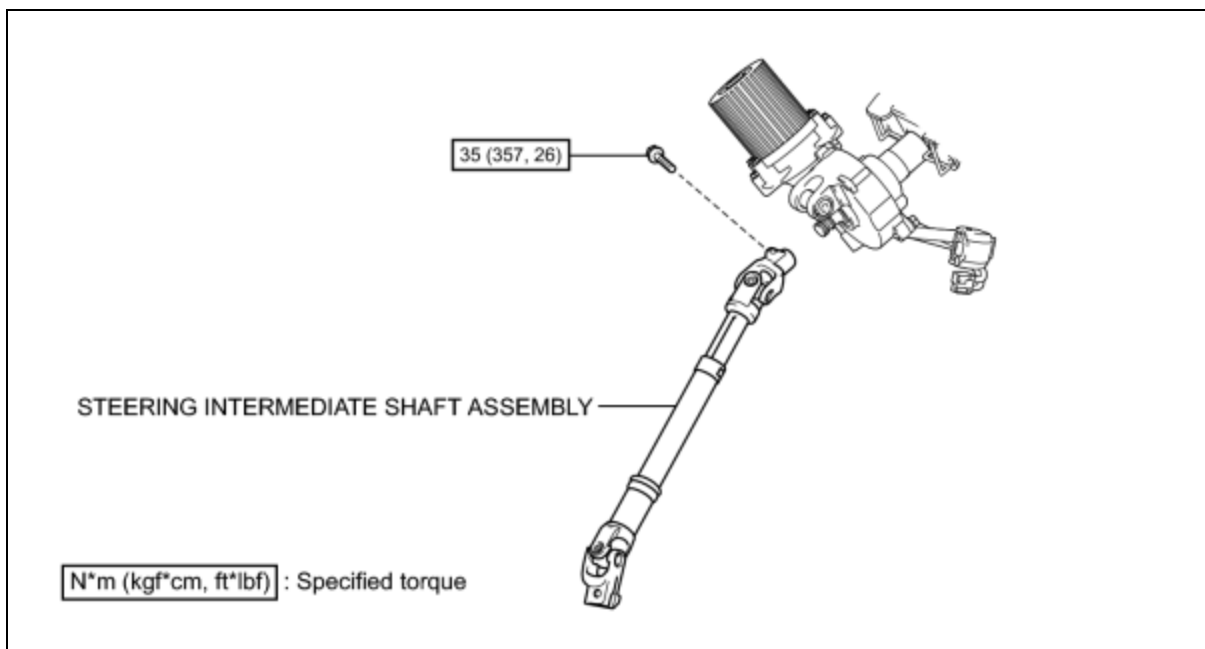
4.0 (0.158 in.)

If the play exceeds the maximum, replace the clutch pedal sub-assembly.

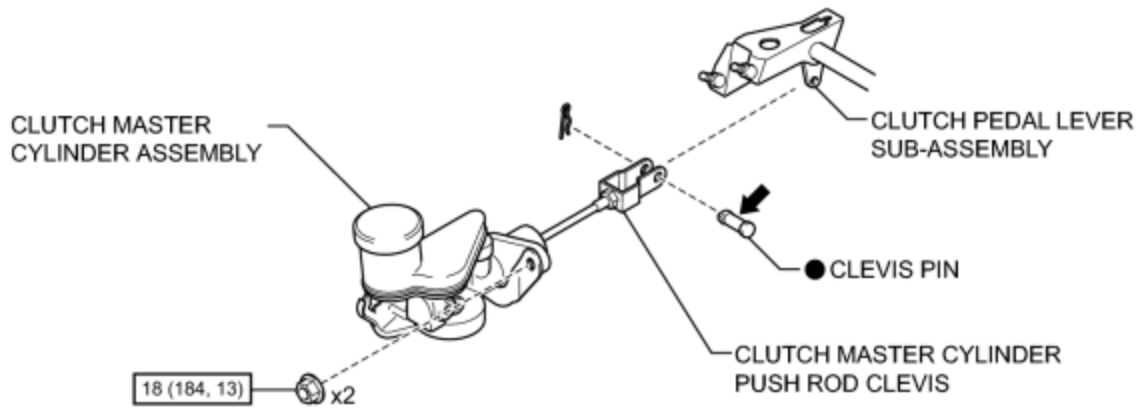
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002VLN000X
Title: CLUTCH: CLUTCH PEDAL: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



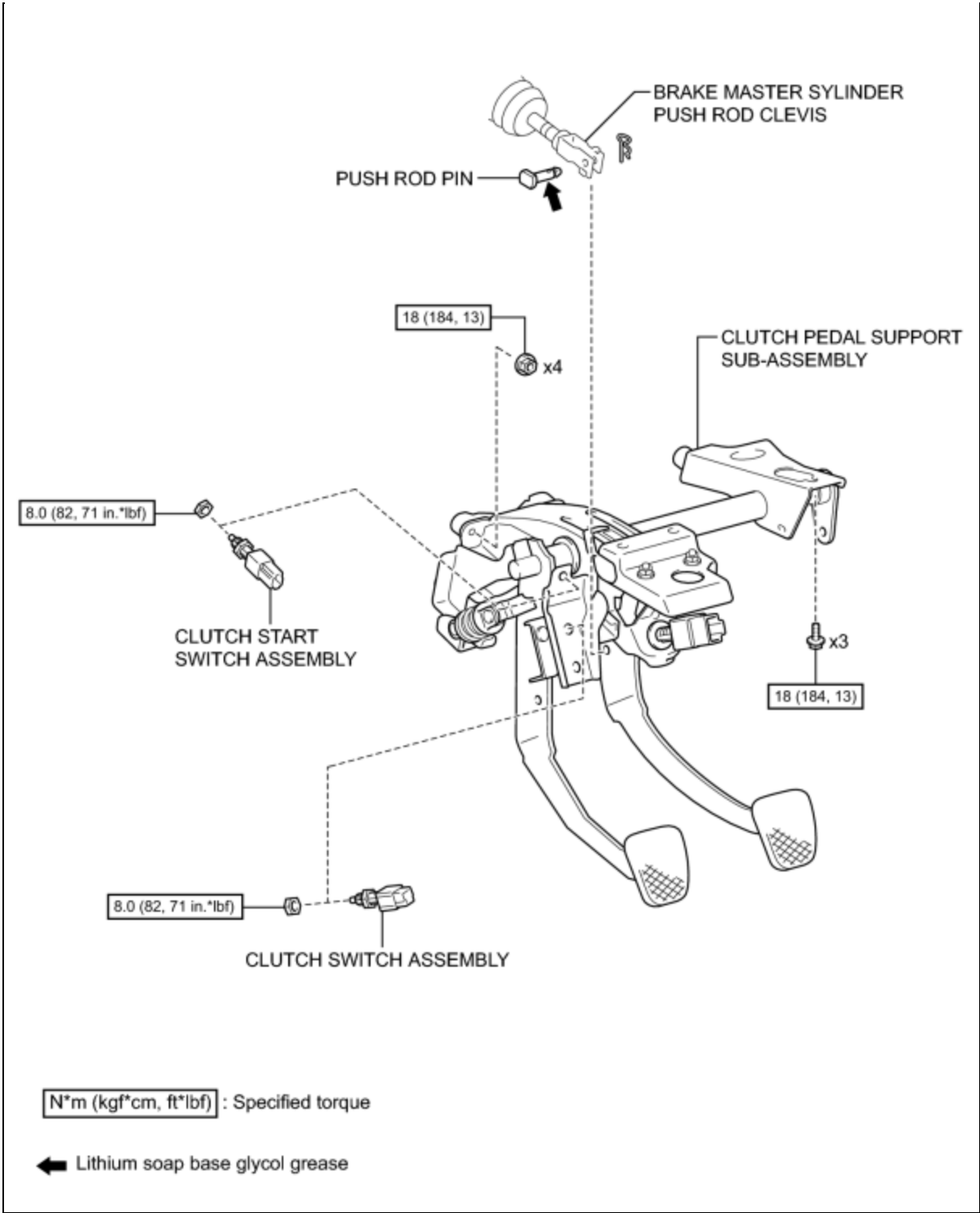
18 (184, 13) : Specified torque

● Non-reusable part

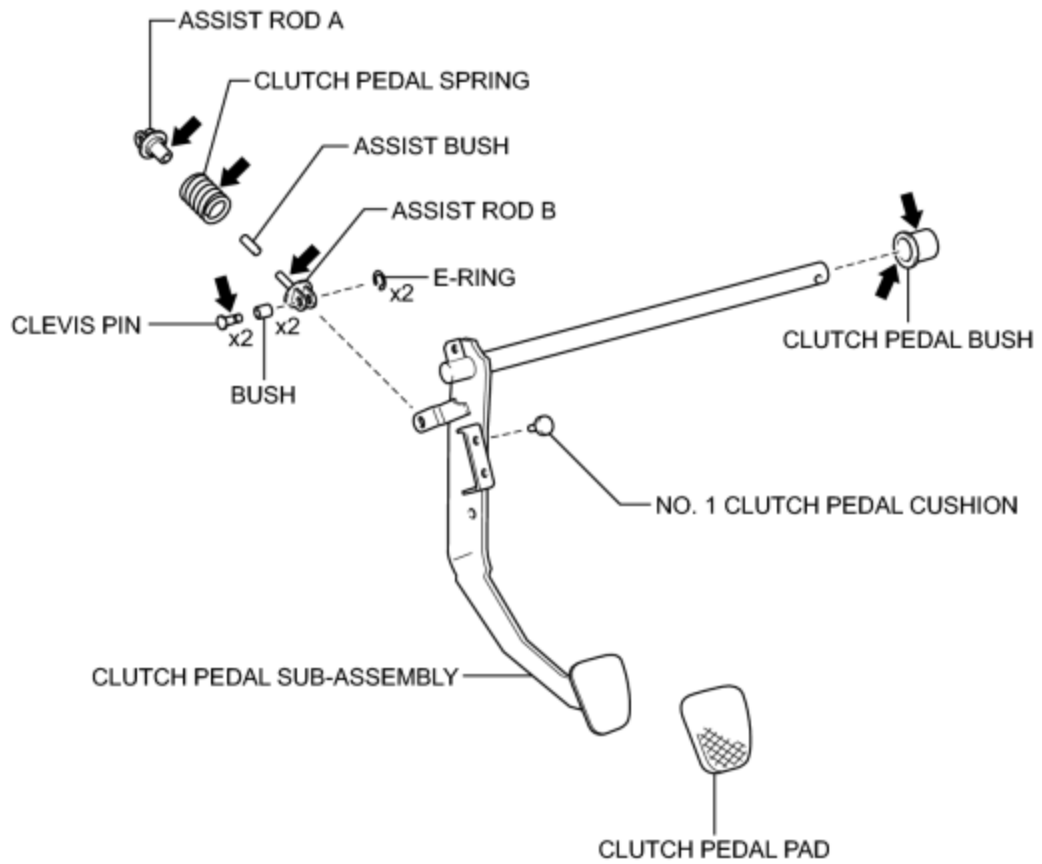
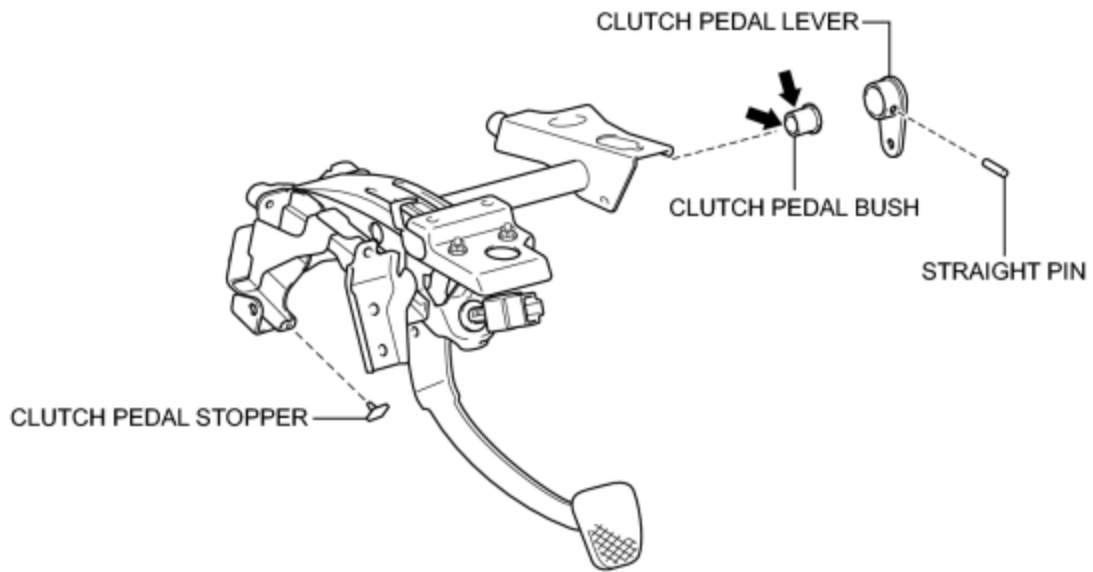
← MP Grease

T

ILLUSTRATION



ILLUSTRATION



← MP Grease

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001EXM00ZX
Title: CLUTCH: CLUTCH PEDAL: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL CLUTCH PEDAL PAD

- (a) Install the clutch pedal pad to the clutch pedal sub-assembly.

2. INSTALL NO. 1 CLUTCH PEDAL CUSHION

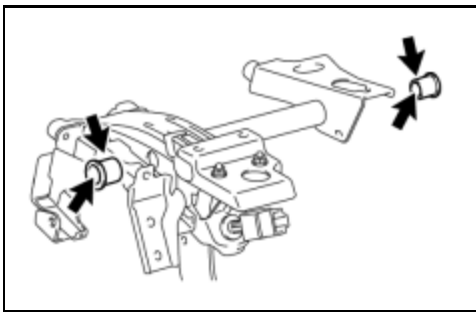
- (a) Install the No. 1 clutch pedal cushion to the clutch pedal sub-assembly.

3. INSTALL CLUTCH PEDAL STOPPER


- (a) Install the clutch pedal stopper to the clutch pedal support sub-assembly.

4. INSTALL CLUTCH PEDAL SUB-ASSEMBLY

- (a) Apply MP grease to the 2 clutch pedal bushes.



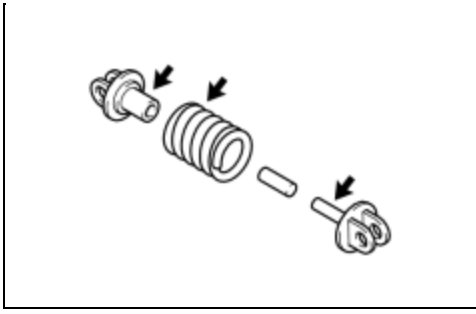
Text in Illustration

	MP grease
---	-----------


- (b) Install the clutch pedal sub-assembly and 2 clutch pedal bushes to the clutch pedal support sub-assembly.
- (c) Using a pin punch (3 mm (0.118 in.)) and a hammer, align the clutch pedal lever sub-assembly hole and the clutch pedal sub-assembly hole, and insert the straight pin from above.

5. INSTALL CLUTCH PEDAL SPRING

- (a) Install the 2 bushes to the clutch pedal sub-assembly and clutch pedal support sub-assembly.
- (b) Apply MP grease to the assist rod A, assist rod B and clutch pedal spring.

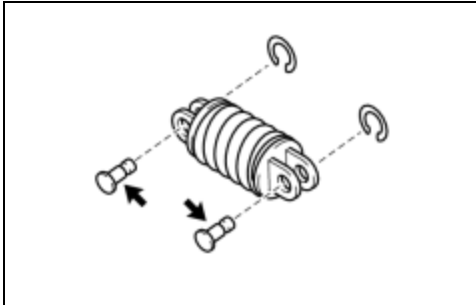


Text in Illustration


	MP grease
---	-----------

(c) Install the assist rod A, assist rod B, clutch pedal spring and assist bush to the clutch pedal sub-assembly and the clutch pedal support sub-assembly.

(d) Apply MP grease to the 2 clevis pins.



Text in Illustration

	MP grease
---	-----------

(e) Install the 2 clevis pins and 2 E-rings.

HINT:

Install the clevis pin from the left side of the vehicle.

6. INSTALL CLUTCH SWITCH ASSEMBLY

(a) Install the clutch switch assembly to the clutch pedal support sub-assembly with the nut.

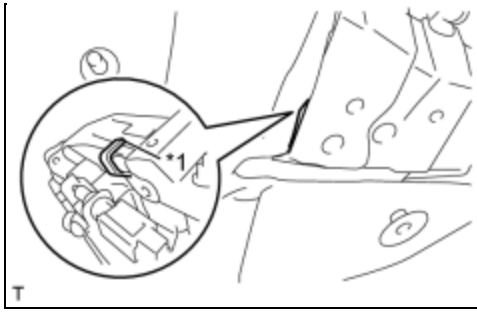
Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)

7. INSTALL CLUTCH START SWITCH ASSEMBLY INFO

8. INSTALL CLUTCH PEDAL SUPPORT SUB-ASSEMBLY

(a) Insert the hook on the clutch pedal support sub-assembly into the vehicle panel.

Text in Illustration



*1	Hook
----	------

(b) Install the clutch pedal support sub-assembly to the vehicle with the 4 nuts and 3 bolts.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

(c) Install the clutch master cylinder assembly with the 2 nuts.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

(d) Apply MP grease to the new clevis pin.

(e) Install the clutch master cylinder push rod clevis to the clutch pedal lever sub-assembly with the clevis pin and a clip.

HINT:

Install the clevis pin from the left side of the vehicle.

(f) Apply MP grease to the push rod pin.

(g) Install the brake master cylinder push rod clevis with the push rod pin and a clip.

HINT:

Install the push rod pin from the left side of the vehicle.

(h) Connect the connector and engage the wire harness clamp.

(i) Connect the 3 connectors.

9. INSTALL STEERING INTERMEDIATE SHAFT ASSEMBLY



(a) Install the steering intermediate shaft assembly to the steering column assembly.

Text in Illustration

*a	Matchmark
----	-----------

NOTICE:

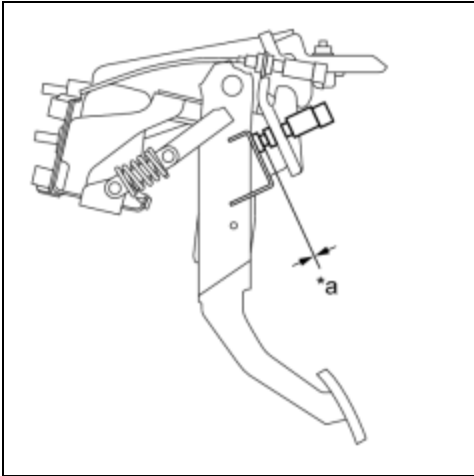
Align the matchmarks on the steering intermediate shaft assembly and the steering column assembly.

(b) Install the bolt.

Torque: 35 N·m (357 kgf·cm, 26ft·lbf)

10. INSPECT AND ADJUST CLUTCH PEDAL

11. INSPECT CLUTCH SWITCH ASSEMBLY



- (a) Without depressing the clutch pedal sub-assembly, check that there is no clearance between the clutch switch shaft and the clutch pedal stopper.

Text in Illustration

*a	No Clearance
----	--------------

12. INSTALL POWER STEERING ECU ASSEMBLY

INFO

13. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

INFO

14. INSPECT CLUTCH START SYSTEM

INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001EXO00ZX
Title: CLUTCH: CLUTCH PEDAL: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE POWER STEERING ECU ASSEMBLY

INFO

2. SEPARATE STEERING INTERMEDIATE SHAFT ASSEMBLY



- (a) Put matchmarks on the steering intermediate shaft assembly and the steering column assembly.

Text in Illustration

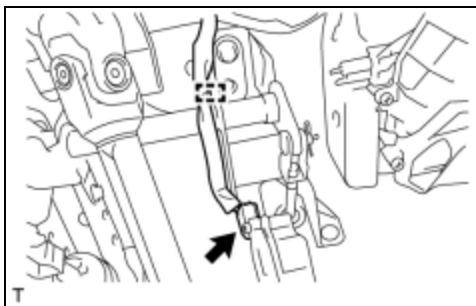
*a	Matchmark
----	-----------

- (b) Remove the bolt and separate the steering intermediate shaft assembly from the steering column assembly.

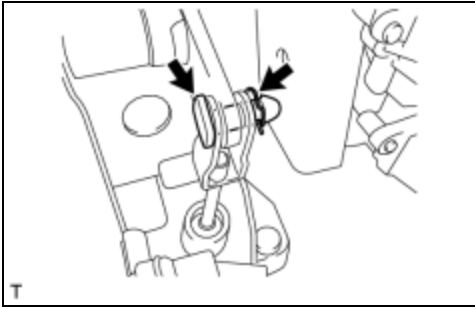
3. REMOVE CLUTCH PEDAL SUPPORT SUB-ASSEMBLY



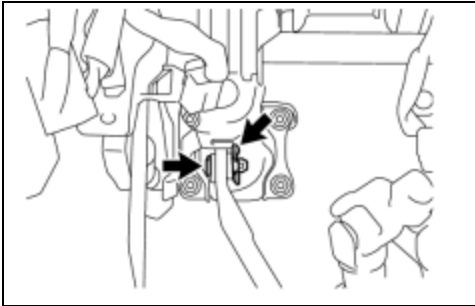
- (a) Disconnect the 3 connectors.



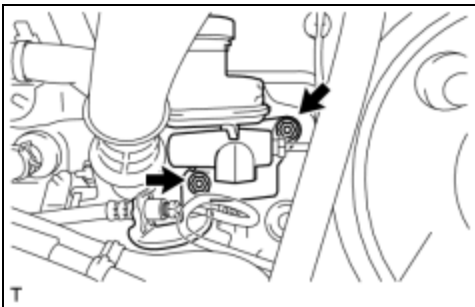
- (b) Disconnect the connector and wire harness clamp.



(c) Remove the clip and the clevis pin, and separate the clutch master cylinder push rod clevis from the clutch pedal lever sub-assembly.

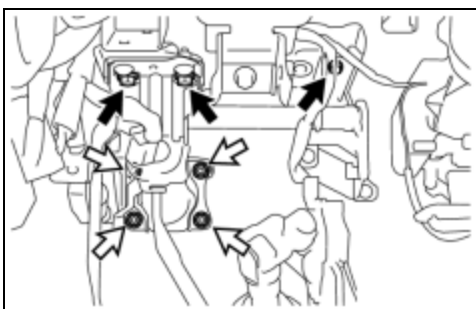


(d) Remove the clip and push rod pin, and separate the brake master cylinder push rod clevis from the brake pedal.




(e) Remove the 2 nuts and separate the clutch master cylinder assembly.

(f) Remove the 3 bolts, 4 nuts and the clutch pedal support sub-assembly.



Text in Illustration

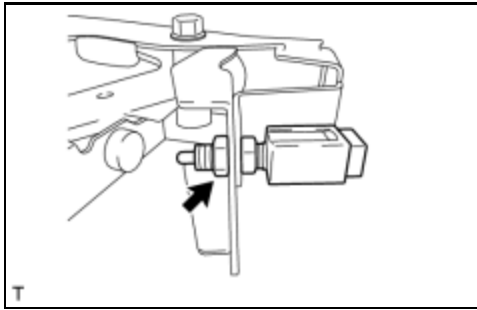
	Bolt
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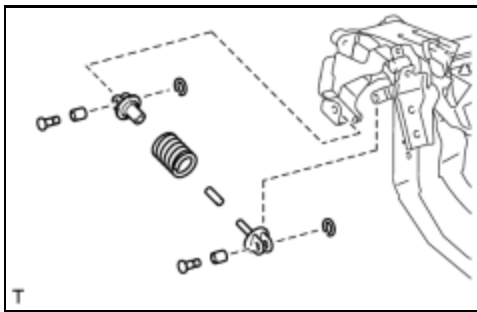
Nut

4. REMOVE CLUTCH START SWITCH ASSEMBLY INFO

5. REMOVE CLUTCH SWITCH ASSEMBLY



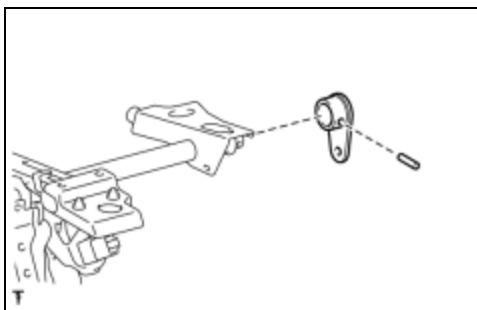
- (a) Remove the nut and the clutch switch assembly from the clutch pedal support sub-assembly.



6. REMOVE CLUTCH PEDAL SPRING

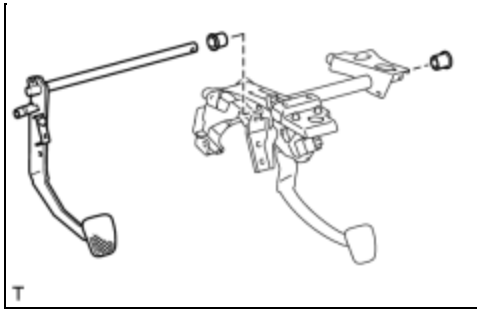
- (a) Remove the 2 E-rings and the 2 clevis pins.
- (b) Remove the assist rod A, assist rod B, clutch pedal spring and assist bush.
- (c) Remove the 2 bushes from the clutch pedal sub-assembly and clutch pedal support sub-assembly.

7. REMOVE CLUTCH PEDAL SUB-ASSEMBLY

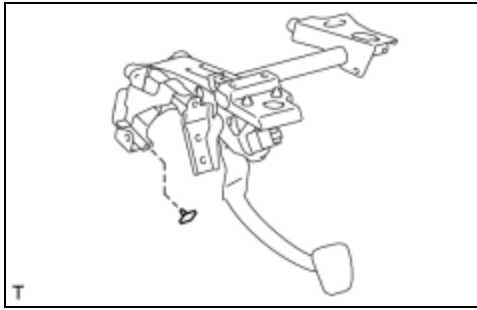


- (a) Using a pin punch (3 mm (0.118 in.)) and a hammer, tap out the straight pin and remove the clutch pedal lever sub-assembly.

- (b) Remove the clutch pedal sub-assembly and 2 clutch pedal bushes from the clutch pedal support sub-assembly.



8. REMOVE CLUTCH PEDAL STOPPER



- (a) Remove the clutch pedal stopper from the clutch pedal support sub-assembly.

9. REMOVE NO. 1 CLUTCH PEDAL CUSHION

- (a) Remove the No. 1 clutch pedal cushion from the clutch pedal sub-assembly.

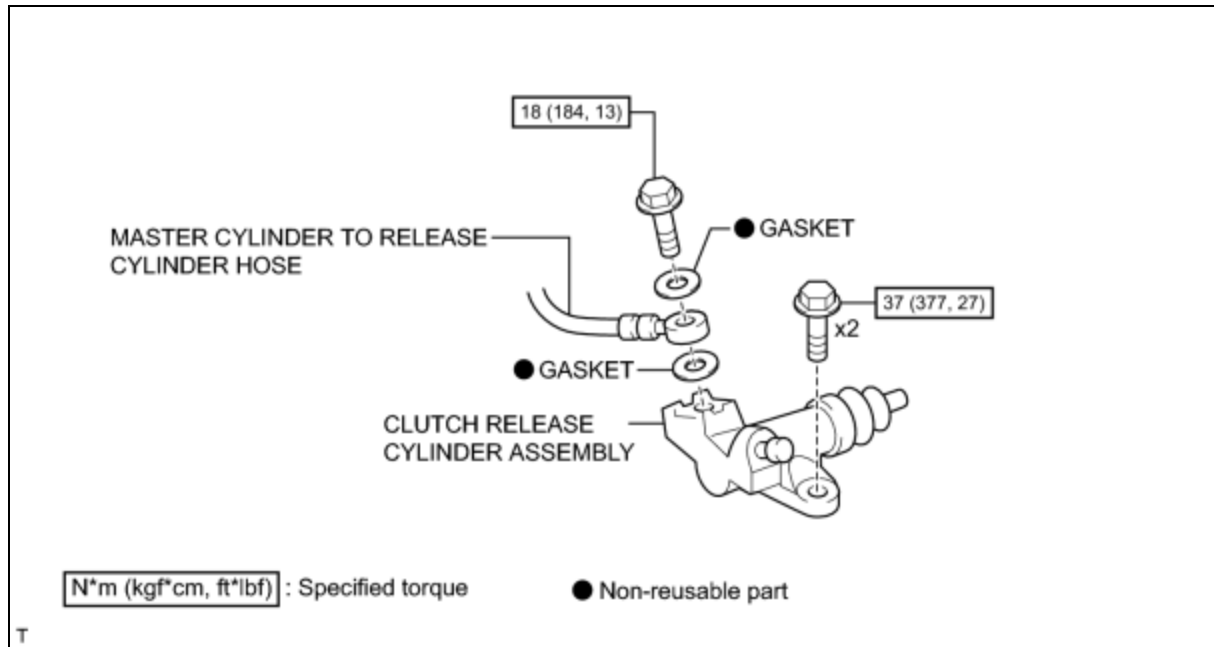
10. REMOVE CLUTCH PEDAL PAD

- (a) Remove the clutch pedal pad from the clutch pedal sub-assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001EXS008X
Title: CLUTCH: CLUTCH RELEASE CYLINDER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001F1D008X
Title: CLUTCH: CLUTCH RELEASE CYLINDER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL CLUTCH RELEASE CYLINDER ASSEMBLY

- (a) Install the clutch release cylinder assembly with the 2 bolts.

Torque: 37 N·m (377 kgf·cm, 27ft·lbf)

2. CONNECT MASTER CYLINDER TO RELEASE CYLINDER HOSE

- (a) Install the master cylinder to release cylinder hose with a union bolt and 2 new gaskets.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

3. FILL CLUTCH FLUID INFO

4. BLEED CLUTCH LINE INFO

5. INSPECT FOR CLUTCH FLUID LEAK

6. INSPECT CLUTCH FLUID LEVEL INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001F1E008X
Title: CLUTCH: CLUTCH RELEASE CYLINDER: REMOVAL (2013 FR-S)		

REMOVAL

1. DRAIN CLUTCH FLUID

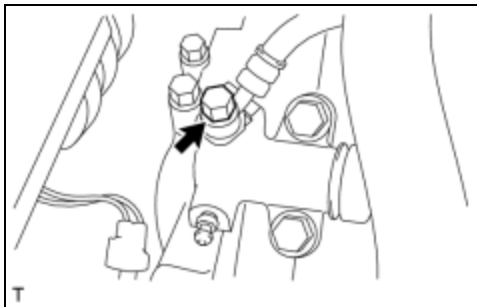
NOTICE:

Immediately wash off any clutch fluid that comes into contact with any painted surfaces.

HINT:

If any work is done on the clutch system or if air in the clutch lines is suspected, bleed the air from the system.

2. DISCONNECT MASTER CYLINDER TO RELEASE CYLINDER HOSE

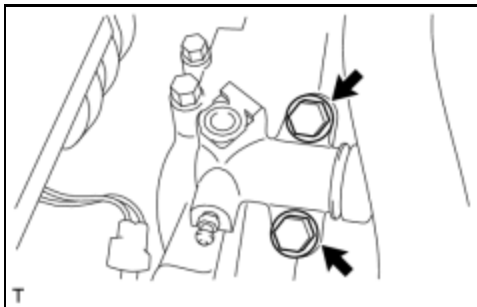


- (a) Remove the union bolt, 2 gaskets and disconnect the master cylinder to release cylinder hose from the clutch release cylinder assembly.

HINT:

Use a container to collect the fluid.

3. REMOVE CLUTCH RELEASE CYLINDER ASSEMBLY



- (a) Remove the 2 bolts and the clutch release cylinder assembly.

Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004UA6005X
Title: CLUTCH: CLUTCH SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

Clutch System

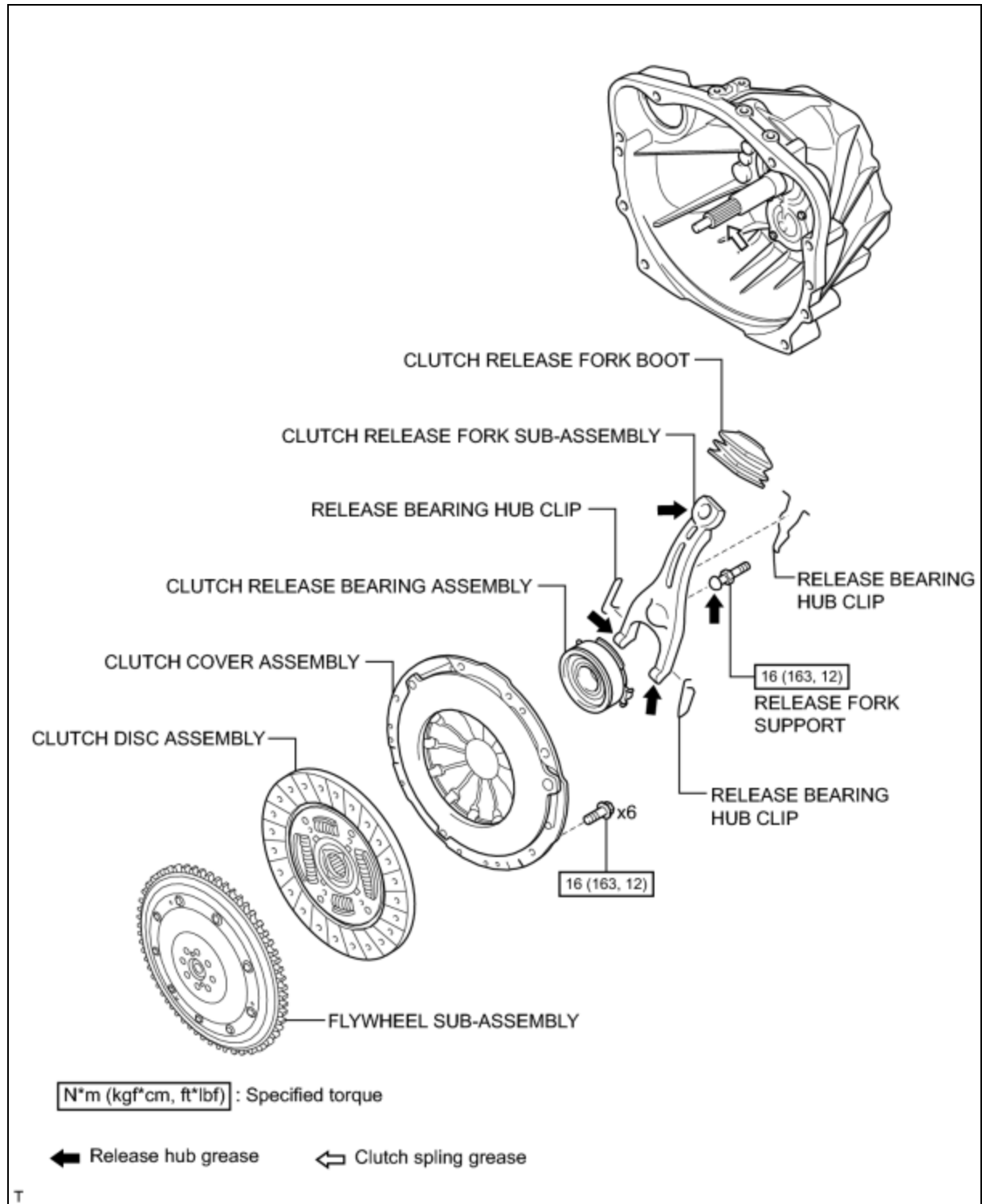
SYMPTOM	SUSPECTED AREA	SEE PAGE
Clutch grabs/chatters	Engine mounting (Loose)	-
	Clutch disc assembly (Excessive runout)	INFO
	Clutch disc assembly (Oily)	INFO
	Clutch disc assembly (Worn out)	INFO
	Clutch disc torsion spring (Damaged)	INFO
	Clutch disc assembly (Glazed)	INFO
	Diaphragm spring (Tip out of alignment)	INFO
Clutch pedal spongy	Clutch line (Air in line)	INFO
	Master cylinder cup (Damaged)	INFO
	Release cylinder cup (Damaged)	INFO
Clutch noisy	Clutch release bearing assembly (Worn, dirty or damaged)	INFO
	Clutch disc torsion spring (Damaged)	INFO
Clutch slips	Clutch pedal (Free play out of adjustment)	INFO
	Clutch disc assembly (Oily)	INFO
	Clutch disc assembly (Worn out)	INFO
	Diaphragm spring (Damaged)	INFO
	Pressure plate (Distorted)	INFO
	Flywheel sub-assembly (Distorted)	INFO
Clutch does not disengage	Clutch pedal (Free play out of adjustment)	INFO
	Clutch line (Air in line)	INFO
	Master cylinder cup (Damaged)	INFO
	Release cylinder cup (Damaged)	INFO
	Clutch disc assembly (Out of line)	INFO
	Clutch disc assembly (Excessive runout)	INFO

	Clutch disc assembly (Lining broken)	INFO
	Clutch disc assembly (Dirty or burned)	INFO
	Clutch disc assembly (Oily)	INFO
	Clutch disc assembly (Lack of spline grease)	INFO

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001EY5008X
Title: CLUTCH: CLUTCH UNIT: COMPONENTS (2013 FR-S)		

COMPONENTS

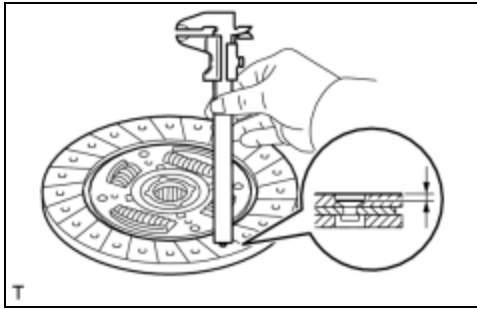
ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000OPT00EX
Title: CLUTCH: CLUTCH UNIT: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT CLUTCH DISC ASSEMBLY

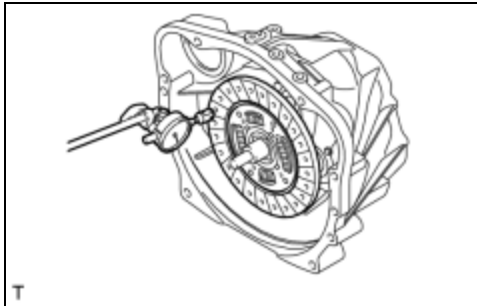


(a) Using a vernier caliper, measure the rivet head depth.

Minimum rivet depth:

0.3 mm (0.0118 in.)

If necessary, replace the clutch disc assembly.



(b) Install the clutch disc assembly to the manual transmission assembly.

NOTICE:

Insert the clutch disc assembly in the correct direction.

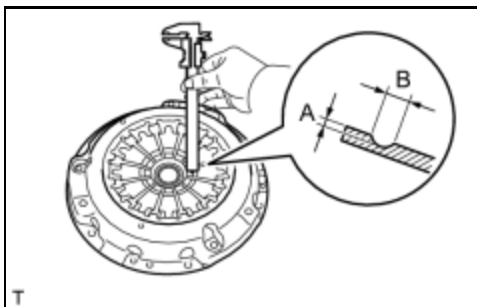
(c) Using a dial indicator with a roller instrument, measure the clutch disc assembly runout.

Maximum runout:

0.8 mm (0.0315 in.)

If necessary, replace the clutch disc assembly.

2. INSPECT CLUTCH COVER ASSEMBLY



(a) Using a vernier caliper, measure the depth and width of the diaphragm spring wear.

Maximum:

A (Depth)

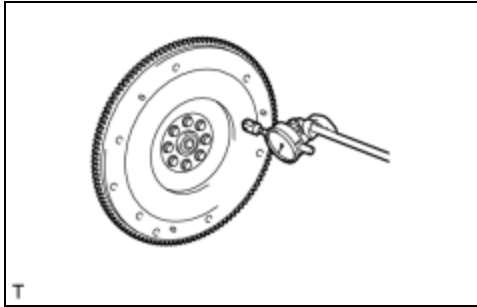
0.5 mm (0.0197 in.)

B (Width)

6.0 mm (0.236 in.)

If necessary, replace the clutch cover assembly.

3. INSPECT FLYWHEEL SUB-ASSEMBLY



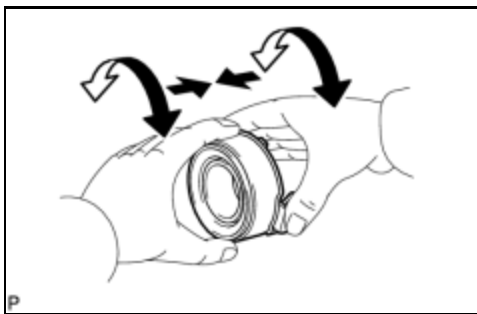
- (a) Using a dial indicator, measure the flywheel sub-assembly runout.

Maximum runout:

0.1 mm (0.00394 in.)

If necessary, replace the flywheel sub-assembly.

4. INSPECT CLUTCH RELEASE BEARING ASSEMBLY



- (a) Check that the clutch release bearing assembly moves smoothly without abnormal resistance by turning the sliding parts of the clutch release bearing assembly (contact surfaces with the clutch cover) while applying force in the axial direction.

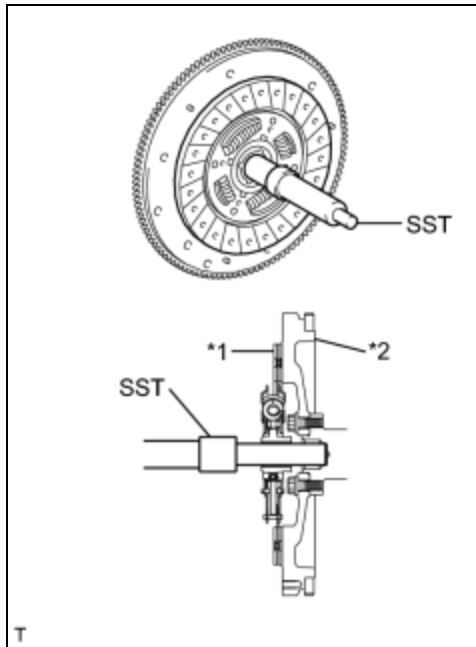
- (b) Inspect the clutch release bearing assembly for damage and wear.

If necessary, replace the clutch release bearing assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PA600EX
Title: CLUTCH: CLUTCH UNIT: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL CLUTCH DISC ASSEMBLY



- (a) Insert SST into the clutch disc assembly, and then insert them both into the flywheel sub-assembly.

Text in Illustration

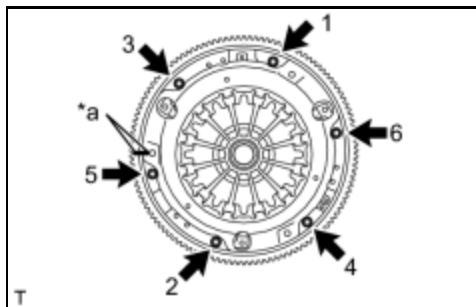
*1	Clutch Disc Assembly
*2	Flywheel Sub-assembly

SST: 09301-00110

NOTICE:

Insert the clutch disc assembly in the correct direction.

2. INSTALL CLUTCH COVER ASSEMBLY



- (a) Align the matchmark on the clutch cover assembly with that on the flywheel sub-assembly.

Text in Illustration

*a	Matchmark
----	-----------

- (b) Following the procedures shown in the illustration, tighten the 6 bolts in order, starting with the bolt located near the knock pin at the top.

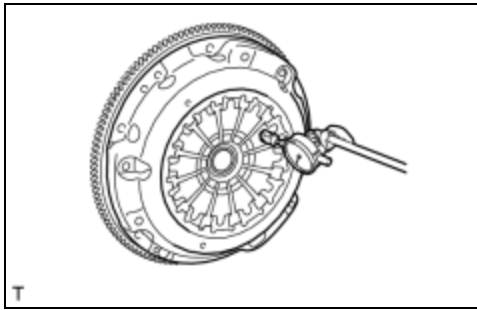
SST: 09301-00110

Torque: 16 N·m (163 kgf·cm, 12ft·lbf)

HINT:

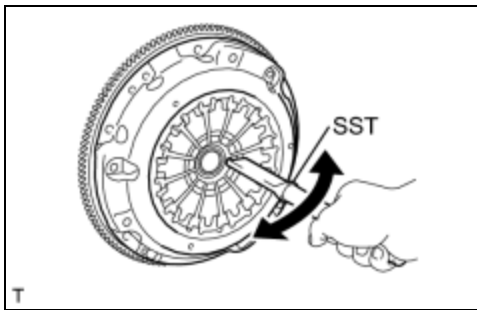
- Following the order in the illustration, tighten the bolts evenly one at a time.
- Move SST up, down, right and left lightly after checking that the disc is in the center, and tighten the bolts.

3. INSPECT AND ADJUST CLUTCH COVER ASSEMBLY



- (a) Using a dial indicator with a roller instrument, measure the diaphragm spring tip alignment.

Maximum non-alignment:
0.5 mm (0.0197 in.)



- (b) If the alignment is not as specified, using SST, adjust the diaphragm spring tip alignment.

SST: 09333-00013

4. INSTALL RELEASE FORK SUPPORT

- (a) Install the release fork support to the manual transmission assembly.

Torque: 16 N·m (163 kgf·cm, 12ft·lbf)

5. INSTALL CLUTCH RELEASE FORK BOOT

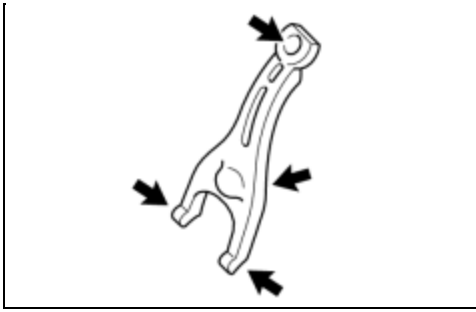
- (a) Install the clutch release fork boot to the manual transmission assembly.

6. INSTALL RELEASE BEARING HUB CLIP

- (a) Install the 3 release bearing hub clips to the clutch release bearing assembly.
(b) Install the release bearing hub clip to the clutch release fork sub-assembly.

7. INSTALL CLUTCH RELEASE FORK SUB-ASSEMBLY

- (a) Apply release hub grease to the contact surfaces of the clutch release fork sub-assembly and clutch release bearing assembly, clutch release fork sub-assembly and clutch release cylinder push rod, and clutch release fork sub-assembly and release fork support.



Text in Illustration

	Release Hub Grease
---	--------------------

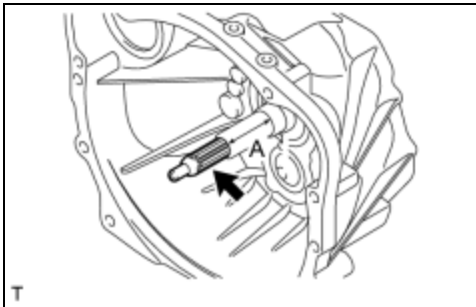
Grease:

Toyota Genuine Release Hub Grease or equivalent

- (b) Engage the 2 release bearing hub clips and install the clutch release fork sub-assembly to the clutch release bearing assembly.

8. INSTALL CLUTCH RELEASE BEARING ASSEMBLY

- (a) Apply clutch spline grease to the input shaft spline.



Text in Illustration

	Clutch Spline Grease
---	----------------------

Grease:

Toyota Genuine Clutch Spline Grease or equivalent

NOTICE:

Do not apply grease to portion A shown in the illustration.

- (b) Install the clutch release bearing assembly with the clutch release fork sub-assembly to the manual transmission assembly.

NOTICE:

After the installation, move the fork forward and backward to check that the release bearing slides smoothly.

9. INSTALL MANUAL TRANSMISSION ASSEMBLY



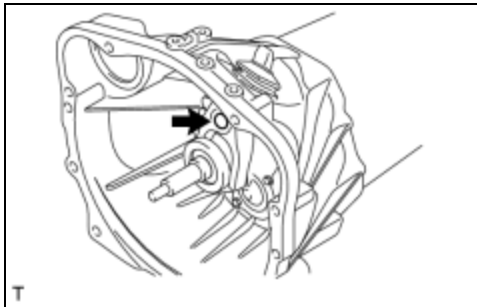
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PA700EX
Title: CLUTCH: CLUTCH UNIT: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE MANUAL TRANSMISSION ASSEMBLY

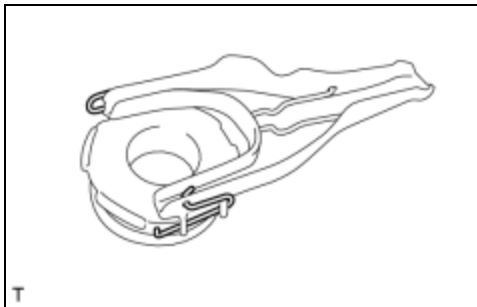
INFO

2. REMOVE CLUTCH RELEASE FORK SUB-ASSEMBLY



- (a) Remove the clutch release fork sub-assembly with the clutch release bearing assembly from the manual transmission assembly.

3. REMOVE CLUTCH RELEASE BEARING ASSEMBLY



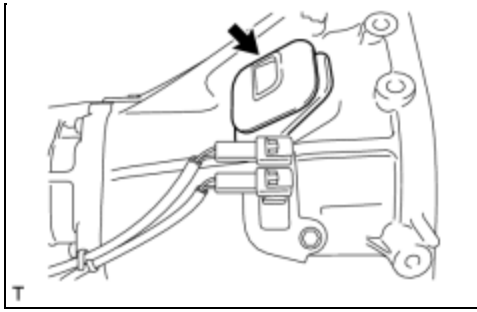
- (a) Disengage the 2 release bearing hub clips and remove the clutch release bearing assembly from the clutch release fork sub-assembly.

4. REMOVE RELEASE BEARING HUB CLIP

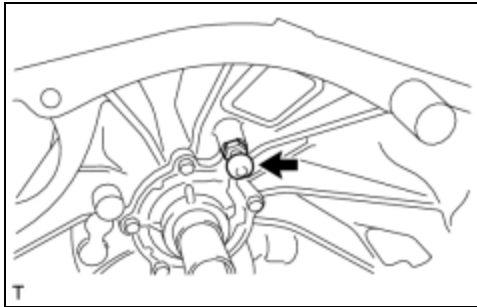
- (a) Remove the 3 release bearing hub clips from the clutch release bearing assembly.

5. REMOVE CLUTCH RELEASE FORK BOOT

- (a) Remove the clutch release fork boot from the manual transmission assembly.

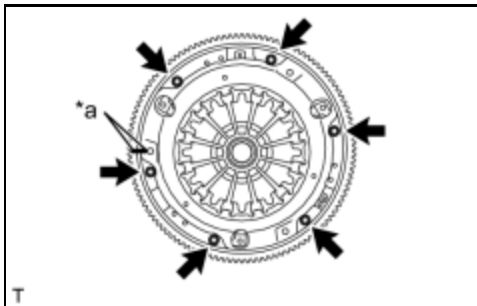


6. REMOVE RELEASE FORK SUPPORT



- (a) Remove the release fork support from the manual transmission assembly.

7. REMOVE CLUTCH COVER ASSEMBLY



- (a) Put the matchmarks on the clutch cover assembly and the flywheel sub-assembly.

Text in Illustration

*a	Matchmark
----	-----------

- (b) Loosen the 6 bolts one turn at a time until spring tension is released.

- (c) Remove the 6 bolts and pull off the clutch cover assembly.

NOTICE:

Do not drop the clutch disc assembly.

8. REMOVE CLUTCH DISC ASSEMBLY

- (a) Remove the clutch disc assembly.

NOTICE:

Keep the lining part of the clutch disk and the surfaces of the pressure plate and flywheel free of oil and foreign matter.



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003FRR00HX
Title: DRIVE SHAFT / PROPELLER SHAFT: DRIVE SHAFT SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

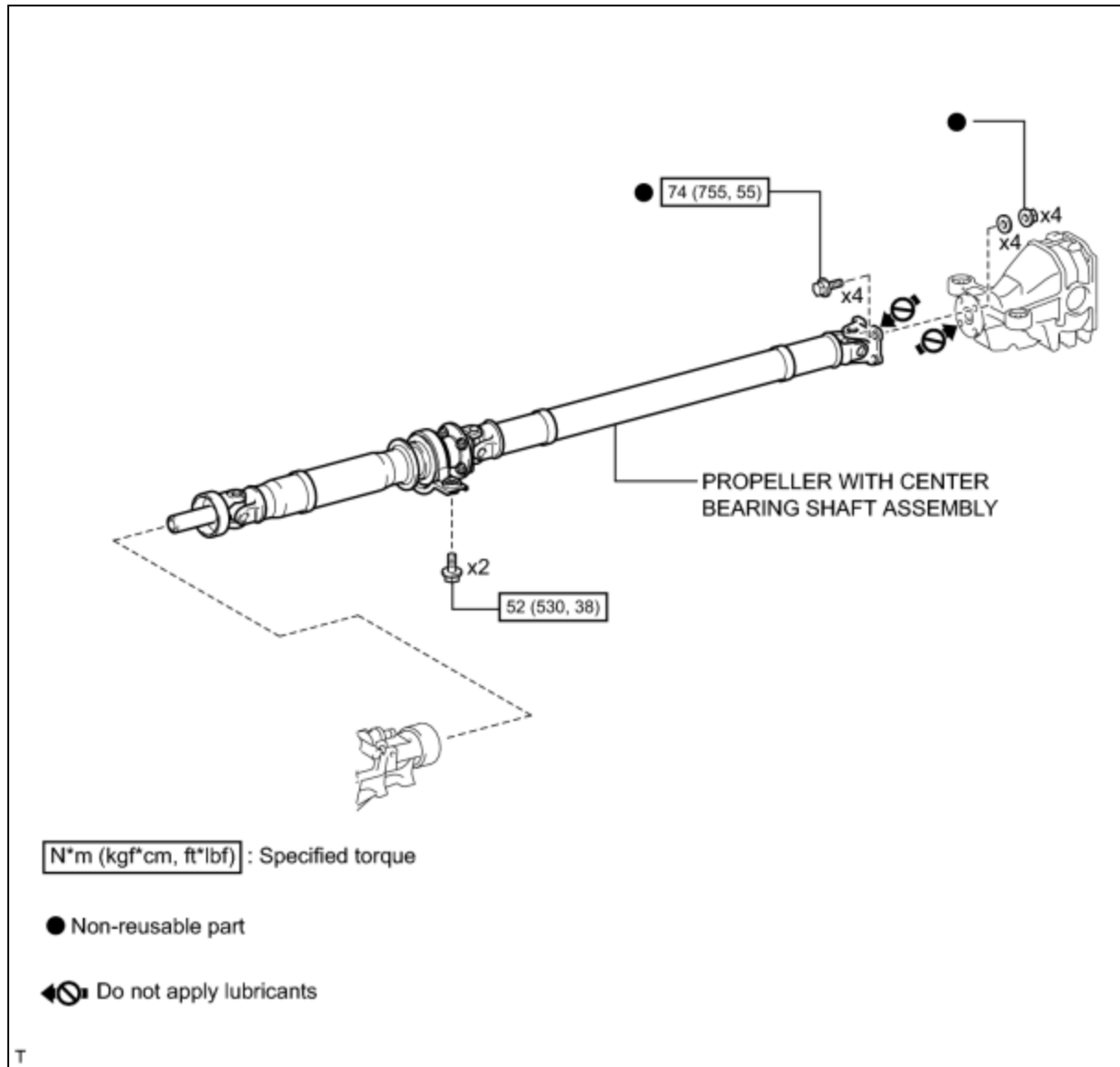
Drive Shaft System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Rear wheel shimmy	Rear drive shaft (worm)	INFO

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004198009X
Title: DRIVE SHAFT / PROPELLER SHAFT: PROPELLER SHAFT ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION

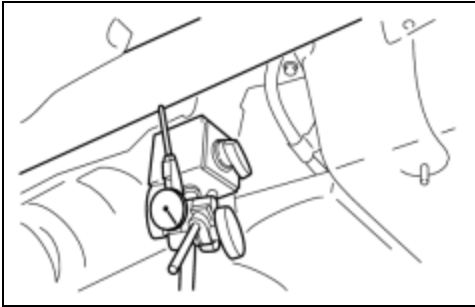


Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PKS00PX
Title: DRIVE SHAFT / PROPELLER SHAFT: PROPELLER SHAFT ASSEMBLY: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT PROPELLER WITH CENTER BEARING SHAFT ASSEMBLY

- (a) Set the dial indicator so that the dial indicator measurement probe is centered on the propeller shaft with center bearing shaft assembly.



- (b) Lightly turn the propeller shaft with center bearing shaft assembly by hand, and measure the deflection.

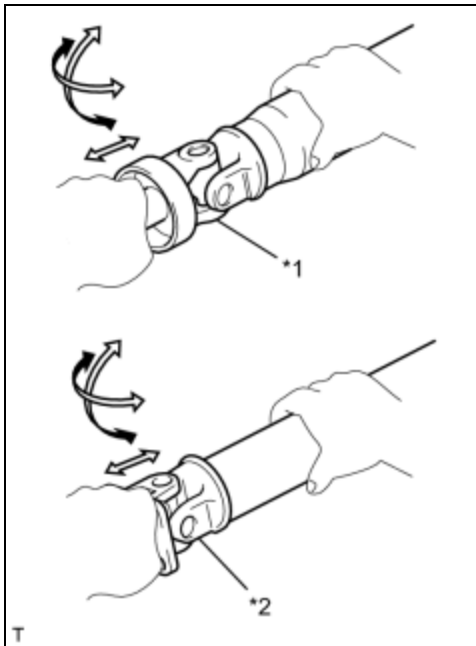
Maximum runout:
0.6 mm (0.0236 in.)

NOTICE:

The dial indicator must be placed so that it is perpendicular to the propeller shaft with center bearing shaft assembly at the center of the shaft.

If the shaft runout is more than the maximum, replace the propeller shaft with center bearing shaft assembly.

2. INSPECT SPIDER BEARING



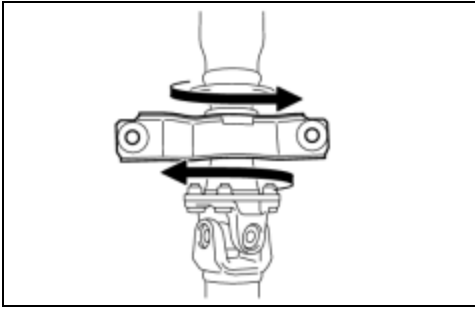
- (a) Check that the spider bearing rotates smoothly.

- (b) Check that there is no play in the spider bearing.

Text in Illustration

*1	Front spider bearing
*2	Rear spider bearing

3. INSPECT CENTER SUPPORT BEARING ASSEMBLY



(a) Turn the center support bearing assembly by hand. Check that the center support bearing assembly turns smoothly.

(b) Check that the center support bracket of the center support bearing assembly is not cracked or deformed.

(c) Check that the seals are not cracked or damaged.

HINT:

If the center support bearing assembly is damaged or worn, or does not turn smoothly, replace it.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000003V01KX
Title: DRIVE SHAFT / PROPELLER SHAFT: PROPELLER SHAFT ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

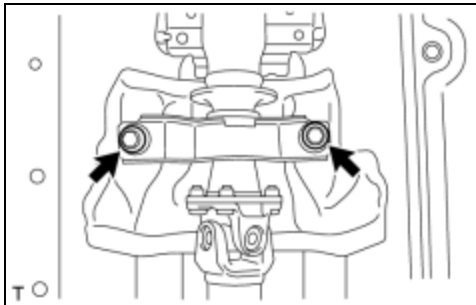
1. INSTALL PROPELLER WITH CENTER BEARING SHAFT ASSEMBLY

- (a) Completely remove any oil or the like and clean the contact surfaces of the propeller shaft assembly and the rear drive pinion companion flange.
- (b) Remove SST from the extension housing. (for Manual Transmission)
SST: 09325-20010
- (c) Remove SST from the extension housing. (for Automatic Transmission)
SST: 09325-40010
- (d) Insert the front propeller shaft assembly into the extension housing.

NOTICE:

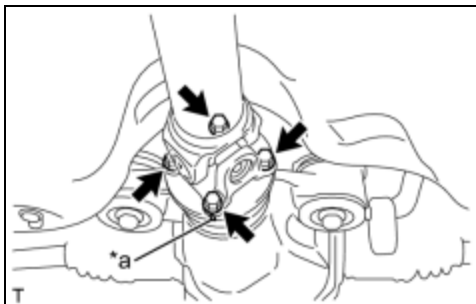
Be careful not to damage the oil seal.

- (e) Install the 2 center support bearing washers and the center support bearing.



- (f) Install the 2 bolts and the center support bearing bracket.

Torque: 52 N·m (530 kgf·cm, 38ft·lbf)



- (g) Align the matchmarks on the differential companion flange and the flexible coupling and connect the propeller shaft.

Text in Illustration

*a	Matchmark
----	-----------

- (h) Install the rear propeller shaft assembly with the 4 new bolts, 4 washers and 4 new nuts.

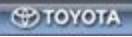
NOTICE:

Hold the nut and tighten the bolt.

Torque: 74 N·m (755 kgf·cm, 55ft·lbf)

2. INSTALL CENTER EXHAUST PIPE ASSEMBLY

INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000003X01KX
Title: DRIVE SHAFT / PROPELLER SHAFT: PROPELLER SHAFT ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE CENTER EXHAUST PIPE ASSEMBLY

INFO

2. REMOVE PROPELLER WITH CENTER BEARING SHAFT ASSEMBLY

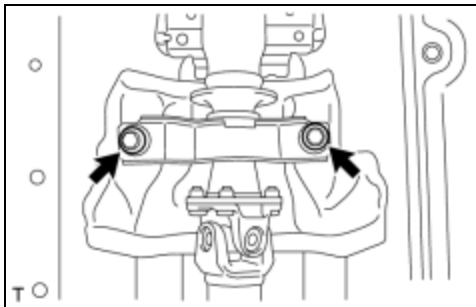


(a) Place matchmarks on the differential companion flange and flexible coupling.

Text in Illustration

*a	Matchmark
----	-----------

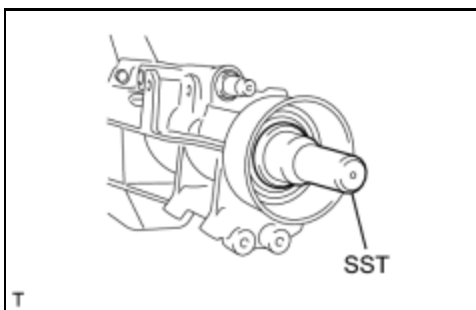
(b) Remove the 4 nuts, 4 bolts and 4 washers.



(c) Remove the 2 bolts.

(d) Disconnect the center support bearing.

(e) Remove the front propeller shaft with the center bearing assembly.

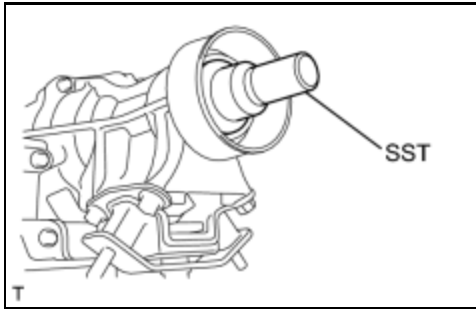


(f) Insert SST in the transmission to prevent oil leaks. (for Manual Transmission)

NOTICE:

Be careful not to damage the oil seal.

SST: 09325-20010



(g) Insert SST in the transmission to prevent oil leaks. (for Automatic Transmission)

NOTICE:

Be careful not to damage the oil seal.

SST: 09325-40010

Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000U0301MX
Title: DRIVE SHAFT / PROPELLER SHAFT: PROPELLER SHAFT SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

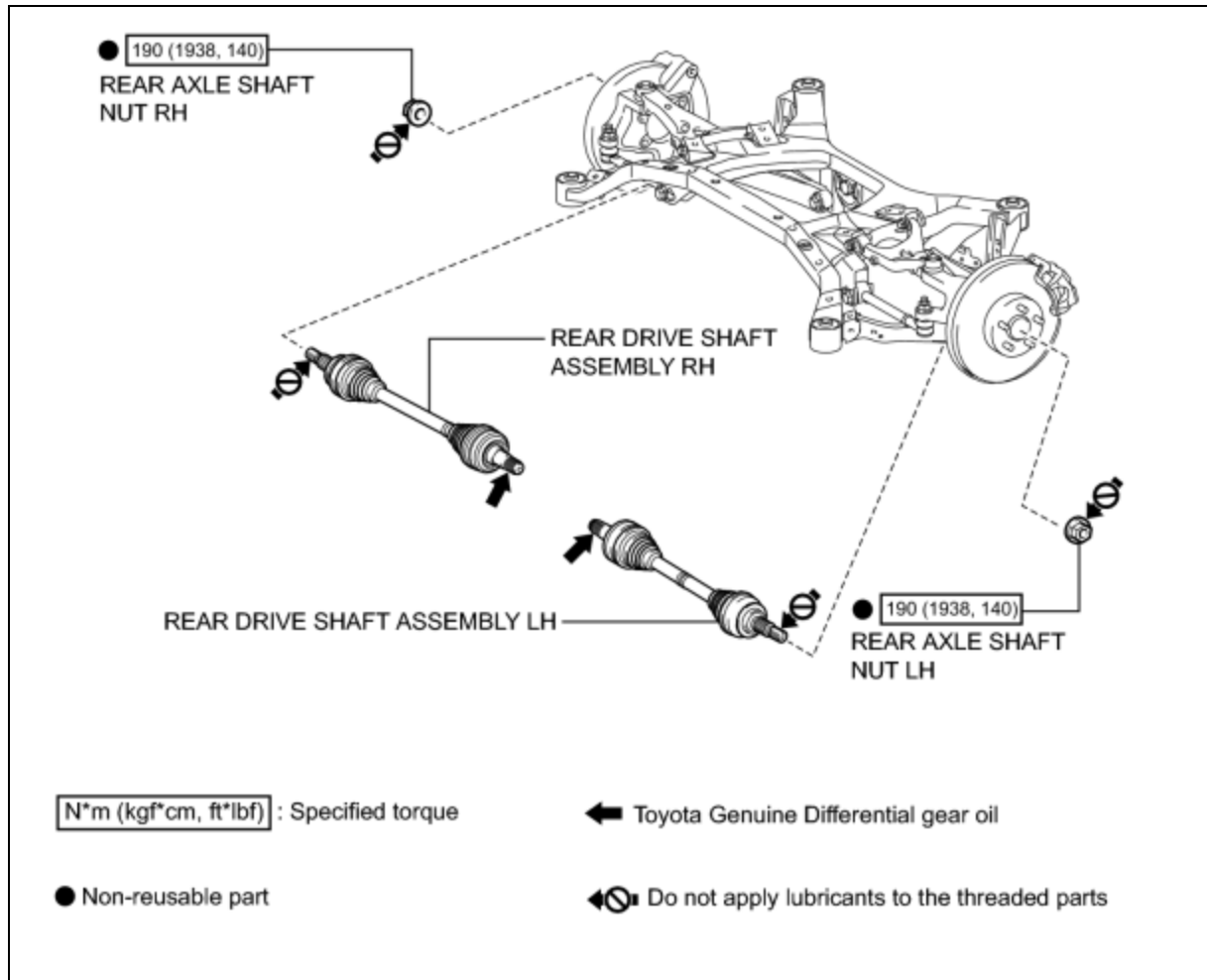
Propeller Shaft Assembly

SYMPTOM	SUSPECTED AREA	SEE PAGE
Noise and Vibration	Center support bearing (Worn)	INFO
	Propeller with center bearing shaft assembly (Runout)	INFO
	Spider bearing (Worn or stuck)	INFO

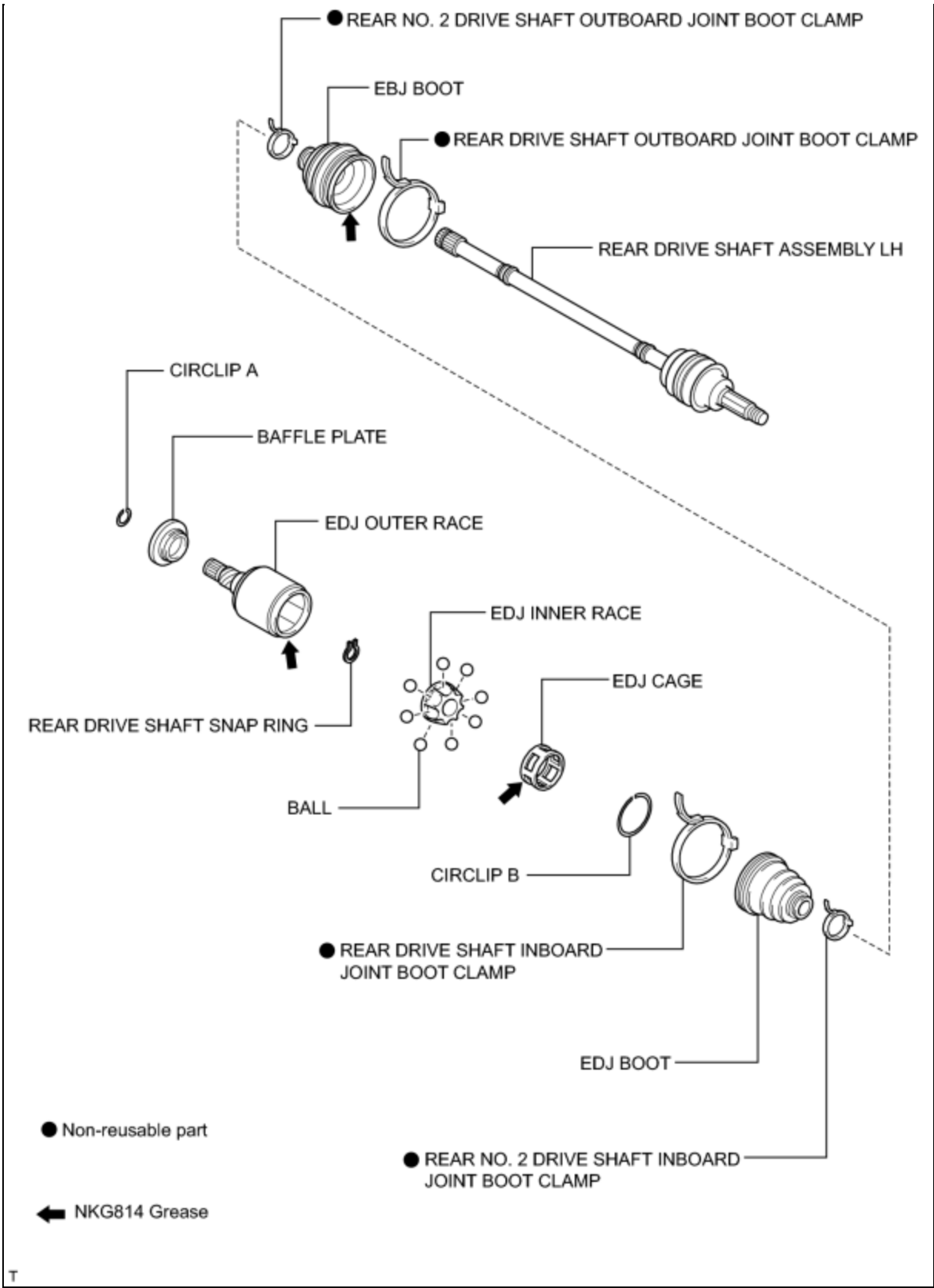
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000O4701JX
Title: DRIVE SHAFT / PROPELLER SHAFT: REAR DRIVE SHAFT ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



T

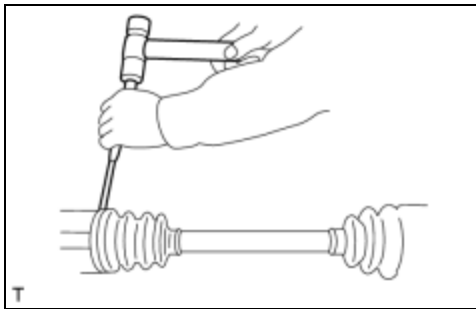
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000021T700VX
Title: DRIVE SHAFT / PROPELLER SHAFT: REAR DRIVE SHAFT ASSEMBLY: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. REMOVE REAR NO. 2 DRIVE SHAFT INBOARD JOINT BOOT CLAMP



- (a) Using a flat tip screwdriver or needle-nose pliers, loosen the boot band on the large end of rear No.2 drive shaft inboard joint boot clamp.

NOTICE:

Do not damage the rear drive shaft outboard joint boot.

2. REMOVE REAR DRIVE SHAFT INBOARD JOINT BOOT CLAMP

HINT:

Remove the rear drive shaft inboard joint boot clamp on the small end of rear No.2 drive shaft inboard joint boot clamp in the same manner.

3. REMOVE REAR NO. 2 DRIVE SHAFT OUTBOARD JOINT BOOT CLAMP

HINT:

Remove the rear No. 2 drive shaft outboard joint boot clamp on the small end of rear drive shaft inboard joint boot No.2 clamp in the same manner.

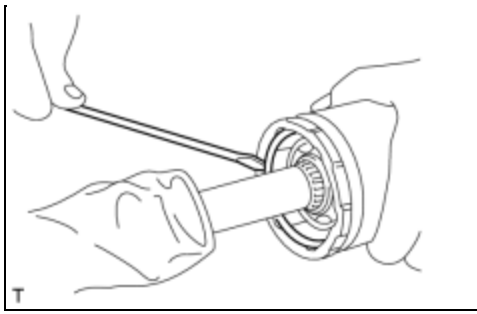
4. REMOVE REAR DRIVE SHAFT OUTBOARD JOINT BOOT CLAMP

HINT:

Remove the rear drive shaft outboard joint boot clamp on the small end of rear drive shaft inboard joint boot No.2 clamp in the same manner.

5. REMOVE CIRCLIP B

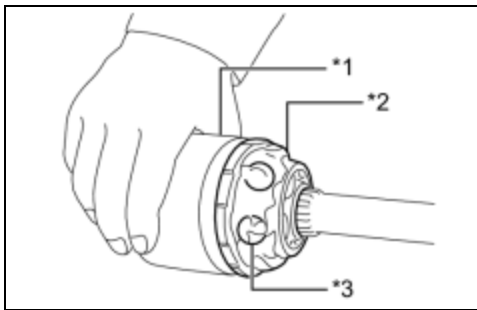
- (a) Using screwdriver, remove the round circlip B at the neck of the EDJ outer race.



6. REMOVE EDJ OUTER RACE

- (a) Take out the EDJ outer race from the shaft assembly.
- (b) Wipe off the grease and take out the balls.

Text in Illustration



*1	EDJ outer race
*2	Grease
*3	Balls (8 pieces)

NOTICE:

The grease is a special grease (grease for constant velocity joints). Do not mix it with other greases.

HINT:

Disassemble exercising care not to lose the balls (8 pieces).

- (c) To remove the EDJ cage from the EDJ inner race, turn the EDJ cage by a half pitch to the track groove of the EDJ inner race and shift the EDJ cage.

7. REMOVE EDJ INNER RACE

- (a) Using pliers, remove the snap ring fixing the EDJ inner race to the shaft.
- (b) Remove the EDJ inner race.

8. REMOVE EDJ BOOT

- (a) Disconnect the EDJ cage from the shaft and remove the EDJ boot.

NOTICE:

Wrap the shaft splines with vinyl tape to protect the boot from scratches.

9. REMOVE EBJ BOOT

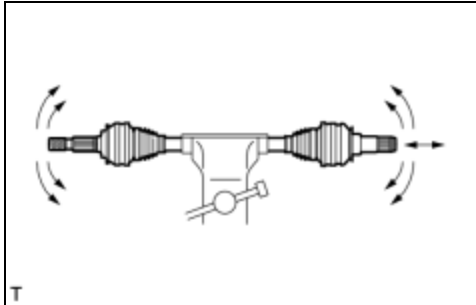
- (a) Remove the EDJ boot or EBJ boot in the same procedure as for the EDJ boot.

HINT:

Further disassembly of the drive shaft is impossible because the DOJ and EBJ cannot be disassembled.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000499Z004X
Title: DRIVE SHAFT / PROPELLER SHAFT: REAR DRIVE SHAFT ASSEMBLY: INSPECTION (2013 FR-S)		

INSPECTION



1. INSPECT DRIVE SHAFT

- (a) Check that there is no excessive play in the outboard joint.
- (b) Check that the inboard joint slides smoothly in the thrust direction.
- (c) Check that there is no excessive play in the radial directions of the inboard joint.
- (d) Check the boots for damage.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000O46027X
Title: DRIVE SHAFT / PROPELLER SHAFT: REAR DRIVE SHAFT ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL REAR DRIVE SHAFT ASSEMBLY LH

- (a) Align the rear axle carrier splines and rear drive shaft assembly splines, and install the rear drive shaft assembly.

2. INSTALL REAR AXLE SHAFT NUT LH INFO

3. INSTALL REAR DRIVE SHAFT ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

4. INSTALL REAR AXLE SHAFT NUT RH

HINT:

Use the same procedure described for the LH side.

5. INSTALL REAR DIFFERENTIAL CARRIER ASSEMBLY

INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000021T800VX
Title: DRIVE SHAFT / PROPELLER SHAFT: REAR DRIVE SHAFT ASSEMBLY: REASSEMBLY (2013 FR-S)		

REASSEMBLY

HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. INSTALL EBJ BOOT

- (a) Wrap the shaft splines with vinyl tape.

NOTICE:

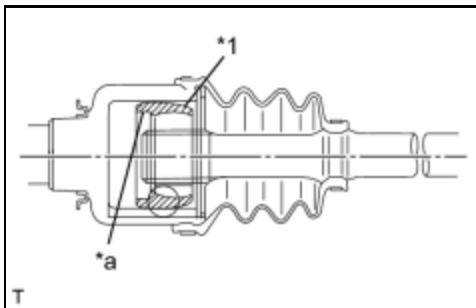
Wrap the shaft splines with vinyl tape to protect the boot from scratches.

- (b) Install the EDJ boot in the specified position, and fill of the specified grease.

Standard grease capacity:
50 to 60g (1.76 to 2.12 oz.)

2. INSTALL EDJ BOOT

- (a) Place the EDJ boot at the center of the shaft.



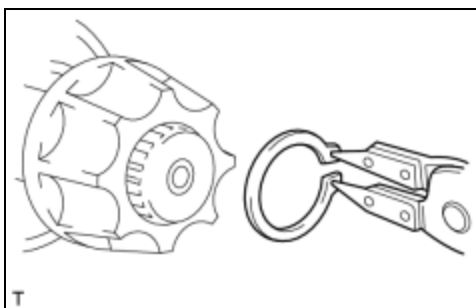
- (b) Insert the EDJ cage onto the shaft.

Text in Illustration

*1	EDJ cage
*a	Cutout portion

HINT:

Insert the EDJ cage with the cutout portion facing the shaft end, since the EDJ cage has an orientation.



3. INSTALL EDJ INNER RACE

- (a) Install the EDJ inner race on the shaft and fix the rear drive the shaft snap ring in place using pliers.

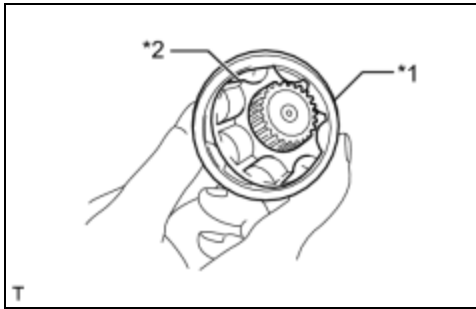
HINT:

Confirm that the rear drive the shaft snap ring is completely fitted into the shaft groove.

4. INSTALL EDJ CAGE

- (a) Install the EDJ cage to EDJ inner race fixed upon the

shaft.



Text in Illustration

*1	EDJ cage
*2	EDJ inner race

HINT:

Fit the cage with the protruding section aligned with the track on the EDJ inner race, and turn by a half pitch.

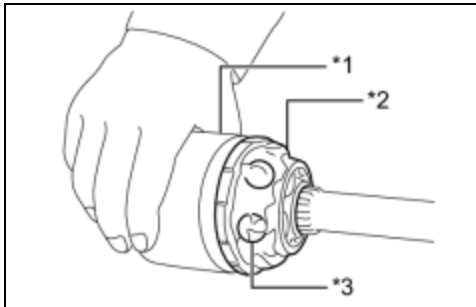
(b) Fill of the specified grease into the inner side of the EDJ outer race.

Standard grease capacity:

80 to 90 g (2.82 to 3.17 oz)

(c) Apply a thin coat of the specified grease to the cage pocket and 8 ball bearings.

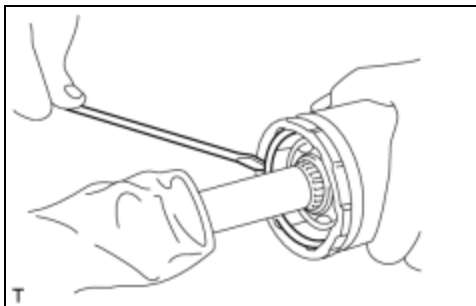
(d) Insert the 8 ball bearings into the cage pocket.



(e) Align the outer race track and ball positions, and place the shaft, EDJ inner race, cage and ball bearings in the original positions, and then fix the outer race in place.

Text in Illustration

*1	Outer race
*2	Grease
*3	Balls (8 pieces)



(f) Install the circlip B in the groove on the EDJ outer race.

HINT:

- Assure that the balls, cage and EDJ inner race are completely fitted in the outer race of EDJ.
- Use care not to place the matched position of rear drive shaft snap ring in the ball groove of outer race.
- Pull the shaft lightly and assure that the circlip is completely fitted in the groove.

(g) NKG814 apply an even coat of the specified grease to the entire inner surface of the boot. Also apply grease to the shaft.

Standard grease capacity:

20 to 30 g (0.71 to 1.06 oz)

(h) Install the EDJ boot taking care not to twist it.

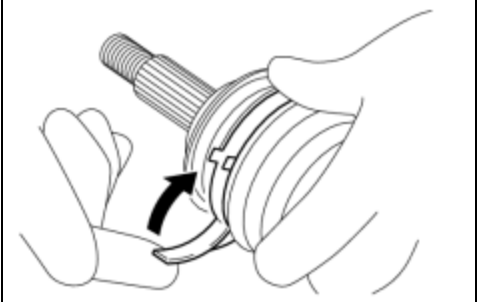
HINT:

- The inside of the large end of EDJ boot and the boot groove shall be cleaned so as to be free from

- grease and other substances.
- When installing the EDJ boot, position the outer race of EDJ at center of the stroke.

5. INSTALL REAR NO. 2 DRIVE SHAFT OUTBOARD JOINT BOOT CLAMP

(a) Apply NKG814 grease to the interior surface of the new rear No. 2 drive shaft outboard joint boot clamp.



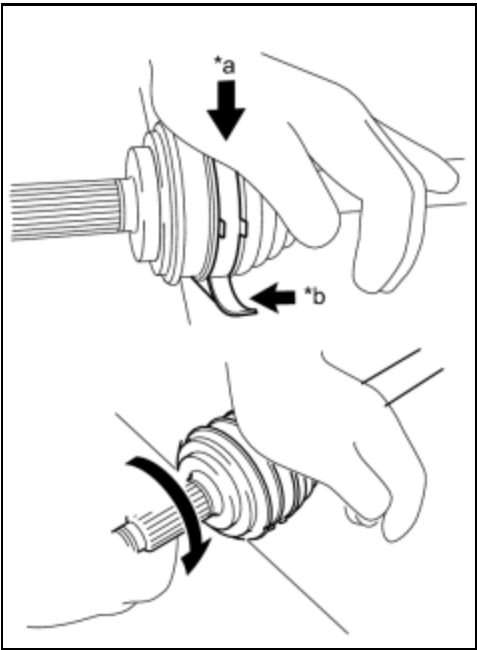
(b) Mount the rear No. 2 drive shaft outboard joint boot clamp to the EDJ boot, and temporarily bend the lever.

CAUTION:

Make sure that protective gloves are worn during work in order to prevent injury to hands, etc.

NOTICE:

- When temporarily bending the lever, make sure that the band and lever are not twisted.
- In order to prevent breakage of the rear No. 2 drive shaft outboard joint boot clamp, do not repeatedly bend the lever.



(c) While pushing the joint towards the work surface, press down using one hand, and fold the lever while turning the drive shaft forward.

Text in Illustration

*a	Weight
*b	Ground

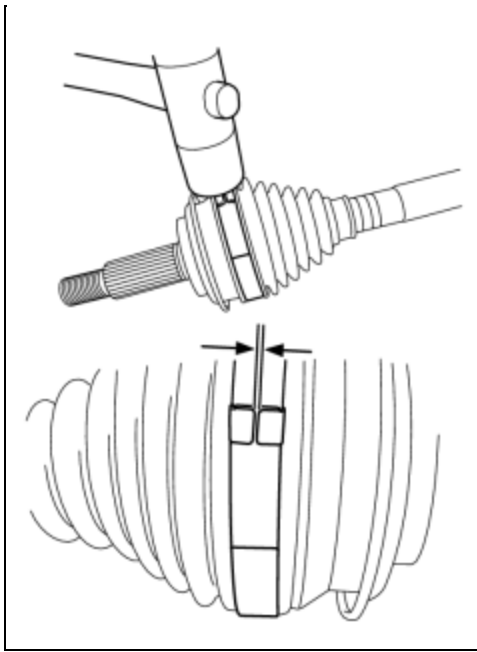
NOTICE:

- Do not damage the deflector.
- Do not raise the joint off the work surface.

(d) Using a plastic hammer, tap the buckle to affix.

NOTICE:

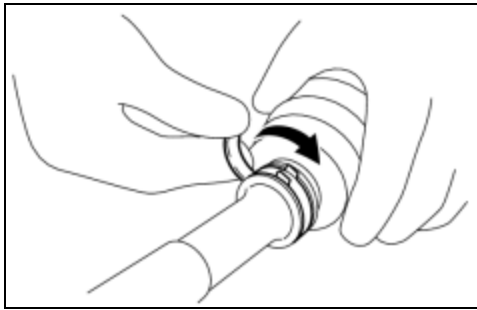
- Do not hit the buckle with the plastic hammer excessively hard



- Install the clamp so that the lever does not rise.
- Make sure that the gap between the two buckles is parallel.

6. INSTALL REAR DRIVE SHAFT OUTBOARD JOINT BOOT CLAMP

- (a) Install a new rear drive shaft outboard joint boot clamp to the EDJ boot and temporarily bend the lever.



CAUTION:

Make sure that protective gloves are worn during work in order to prevent injury to hands, etc.

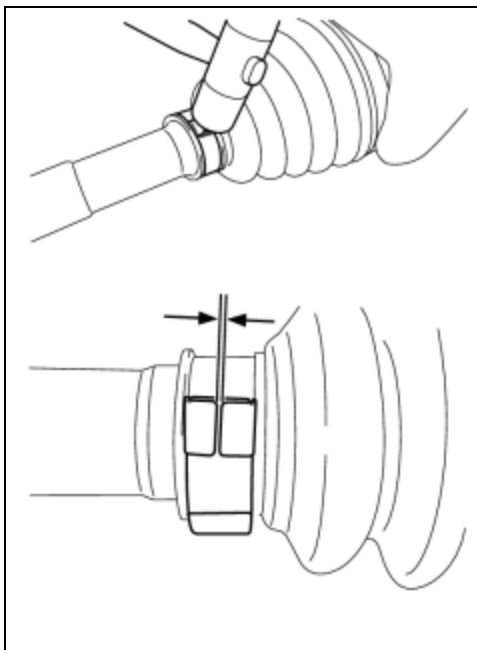
NOTICE:

- When temporarily bending the lever, make sure that the band and lever are not twisted.
- In order to prevent breakage of the rear drive shaft outboard joint boot clamp, do not repeatedly bend the lever.

- (b) Use water pump pliers to tighten the rear drive shaft outboard joint boot clamp, and temporarily fasten.

Text in Illustration

*a	The end is near the center of the lever.
----	--



(c) Use a plastic hammer to tap the buckle to affix.

NOTICE:

- Do not hit the buckle with the plastic hammer excessively hard.
- Affix the lever so that it does not rise.
- Make sure that the gap between the two buckles is parallel.

7. INSTALL REAR NO. 2 DRIVE SHAFT INBOARD JOINT BOOT CLAMP

HINT:

Work on the rear No. 2 drive shaft inboard joint boot clamp in the same way as the rear No. 2 drive shaft outboard joint boot clamp.

8. INSTALL REAR DRIVE SHAFT INBOARD JOINT BOOT CLAMP

HINT:

Work on the rear drive shaft inboard joint boot clamp in the same way as the rear drive shaft outboard joint boot clamp.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000O4801WX
Title: DRIVE SHAFT / PROPELLER SHAFT: REAR DRIVE SHAFT ASSEMBLY: REMOVAL (2013 FR-S)		

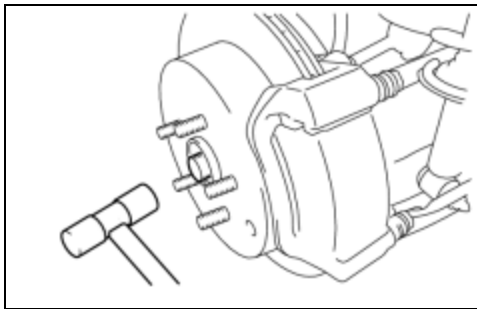
REMOVAL

1. REMOVE REAR DIFFERENTIAL CARRIER ASSEMBLY

INFO

2. REMOVE REAR AXLE SHAFT NUT LH INFO

3. REMOVE REAR DRIVE SHAFT ASSEMBLY LH



- (a) Using a plastic hammer, separate the rear drive shaft assembly LH from the rear axle carrier. If it is difficult to separate, tap the end of the rear drive shaft assembly LH using a brass bar and a hammer.

- (b) Remove the rear drive shaft assembly LH.

NOTICE:

- Be careful not to damage the joint boot or speed sensor.
- Do not push out the rear axle carrier excessively.

4. REMOVE REAR AXLE SHAFT NUT RH

HINT:

Use the same procedure described for the LH side.

5. REMOVE REAR DRIVE SHAFT ASSEMBLY RH

HINT:

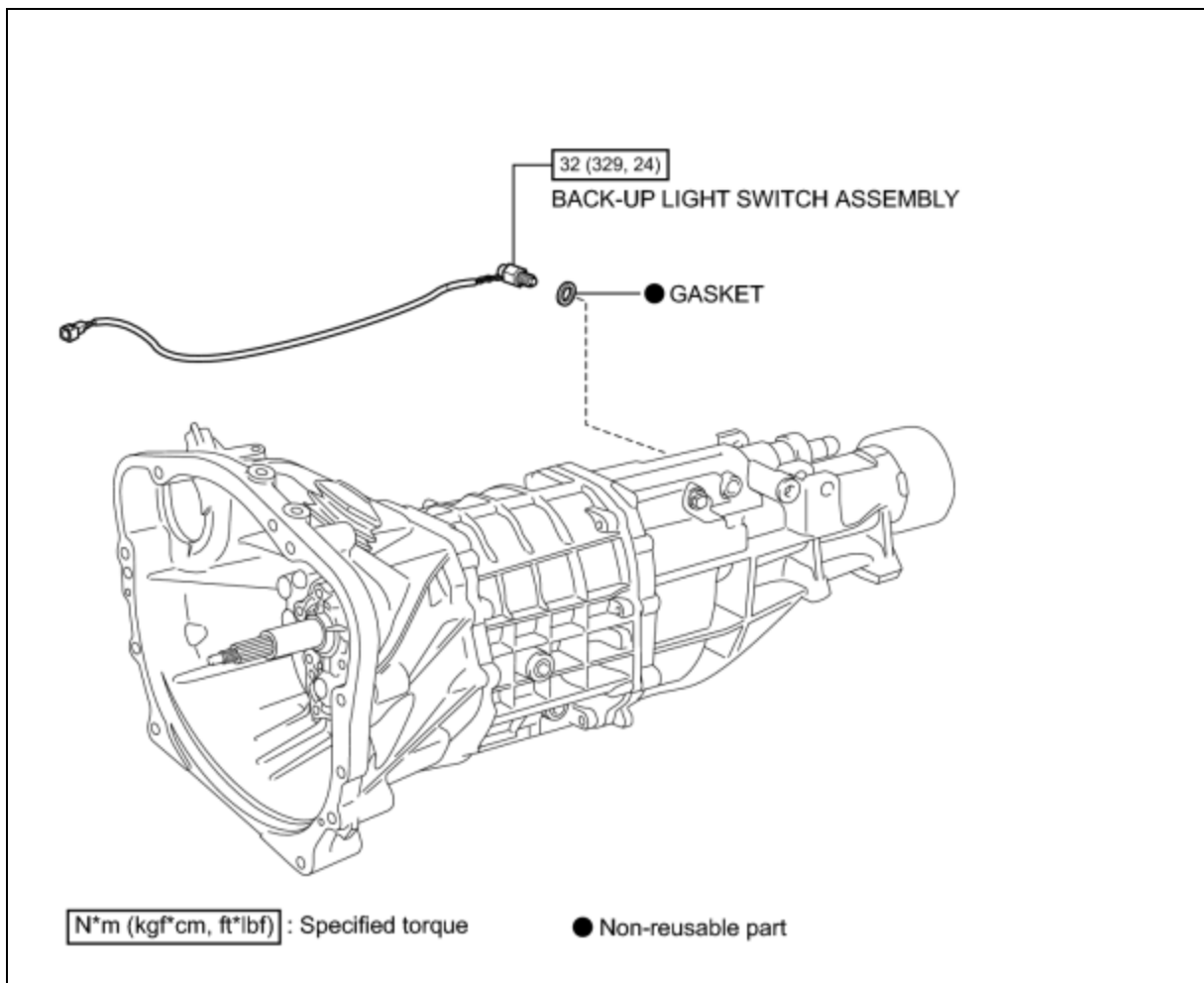
Use the same procedure described for the LH side.



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000032KE02UX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: BACK-UP LIGHT SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



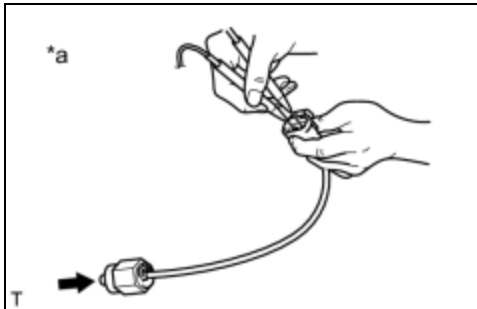
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000017MP03IX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: BACK-UP LIGHT SWITCH: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT BACK-UP LIGHT SWITCH ASSEMBLY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 - 2	Pushed	Below 1 Ω
1 - 2	Released	10 k Ω or higher

Text in Illustration

*a	Component without harness connected (Back-Up Light Switch Assembly)
----	--

If the result is not as specified, replace the back-up light switch assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001YVJ04BX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: BACK-UP LIGHT SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

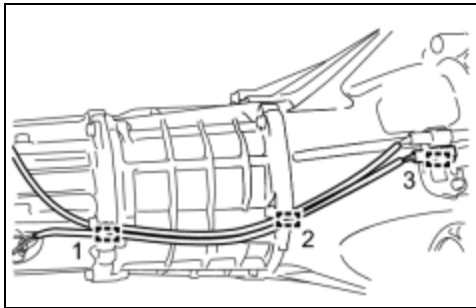
1. INSTALL BACK-UP LIGHT SWITCH ASSEMBLY

- (a) Using a 19 mm union nut wrench, install the back-up light switch assembly with a new gasket to the manual transmission assembly.

Torque: 32 N·m (329 kgf·cm, 24ft·lbf)

NOTICE:

Use the formula to calculate special torque values for situations where a union nut wrench is combined with a torque wrench [INFO](#) .



- (b) In the order indicated in the illustration, engage the 3 clamps in place, and connect the back-up light switch assembly wire and neutral position switch assembly wire.

HINT:

Install the wire harness so that there is slack on the connector side.

2. INSTALL MANUAL TRANSMISSION ASSEMBLY

[INFO](#)

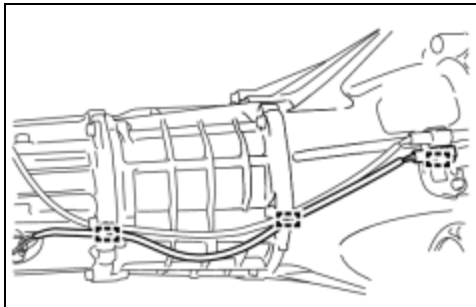
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001YVLO4BX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: BACK-UP LIGHT SWITCH: REMOVAL (2013 FR-S)		

REMOVAL

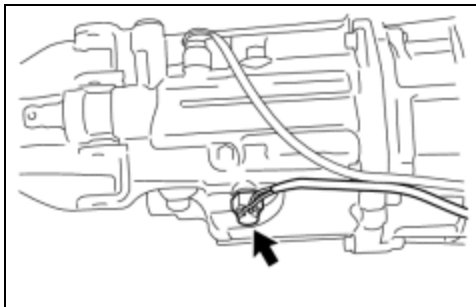
1. REMOVE MANUAL TRANSMISSION ASSEMBLY

INFO

2. REMOVE BACK-UP LIGHT SWITCH ASSEMBLY



(a) Disconnect the 3 clamps.

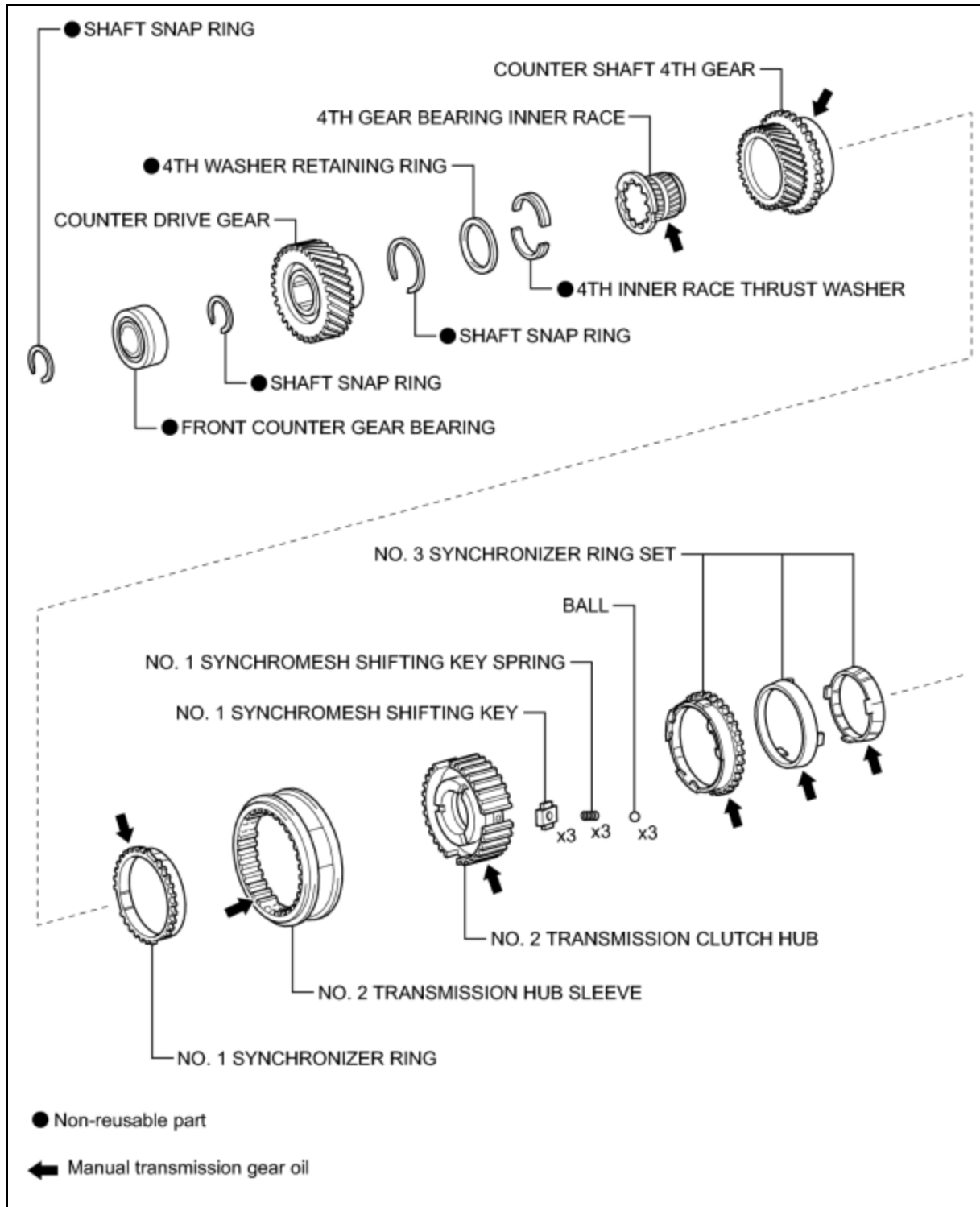


(b) Using a 19 mm union nut wrench, remove the back-up light switch assembly and gasket from the manual transmission assembly.

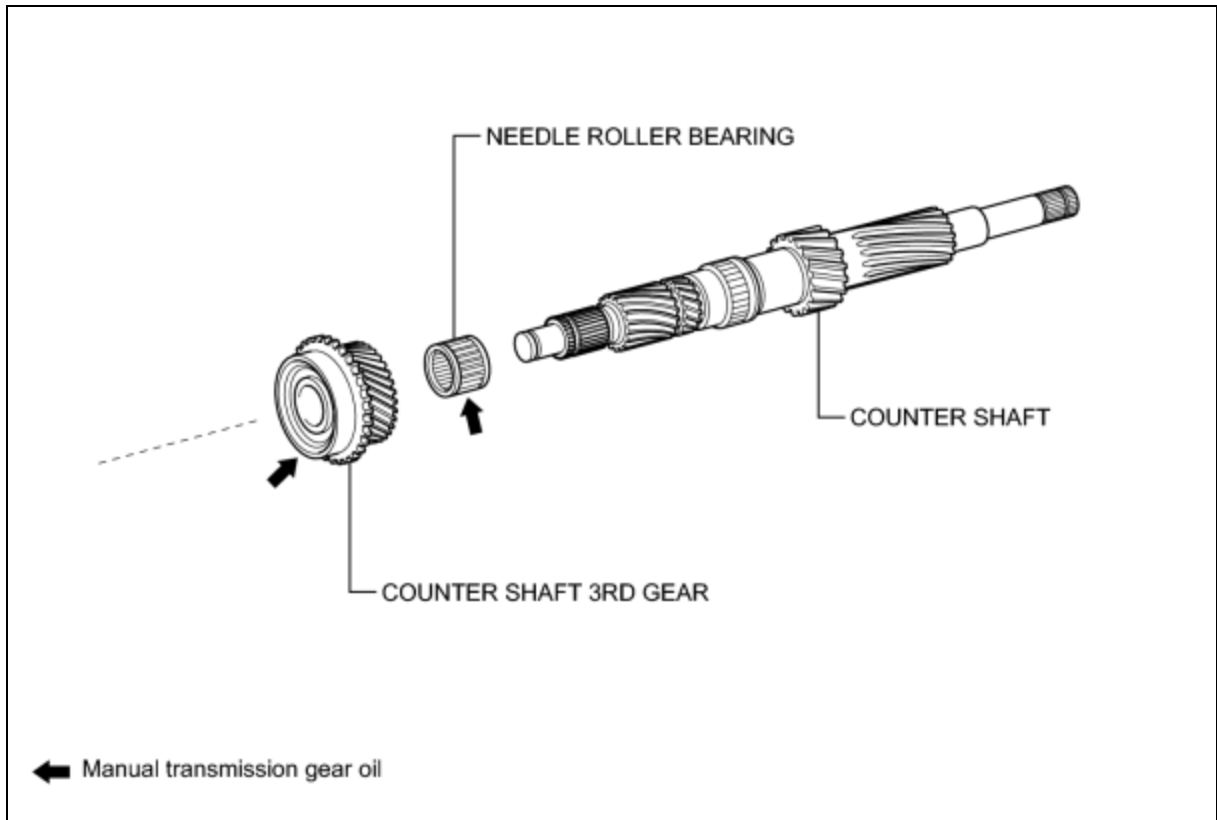
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002H8K00EX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: COUNTER GEAR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002RI2006X
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: COUNTER GEAR: DISASSEMBLY (2013 FR-S)		

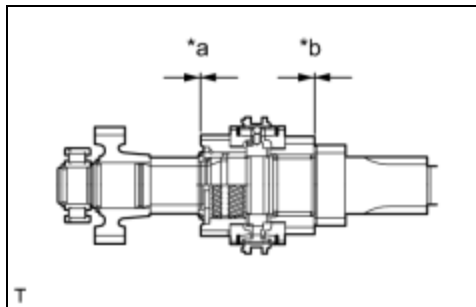
DISASSEMBLY

1. INSPECT THRUST CLEARANCE

- (a) Using a feeler gauge, measure the thrust clearance of the counter shaft 3rd gear and counter shaft 4th gear.

Text in Illustration

*a	Counter shaft 4th gear thrust clearance
*b	Counter shaft 3rd gear thrust clearance



Standard Clearance

GEAR	STANDARD CLEARANCE MM (IN.)	MAXIMUM CLEARANCE MM (IN.)
Counter shaft 3rd gear	0.10 to 0.35 (0.00393 to 0.0138)	0.35 (0.0138)
Counter shaft 4th gear	0.10 to 0.35 (0.00393 to 0.0138)	0.35 (0.0138)

HINT:

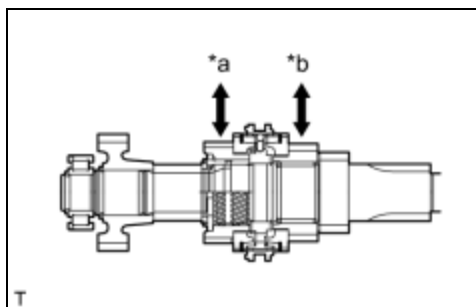
If the clearance exceeds the maximum, adjust it with the 4th inner race thrust washer.

2. INSPECT RADIAL CLEARANCE

- (a) Using a feeler gauge, measure the radial clearance of the counter shaft 3rd gear and counter shaft 4th gear.

Text in Illustration

*a	Counter shaft 4th gear radial clearance
*b	Counter shaft 3rd gear radial clearance



Standard Clearance

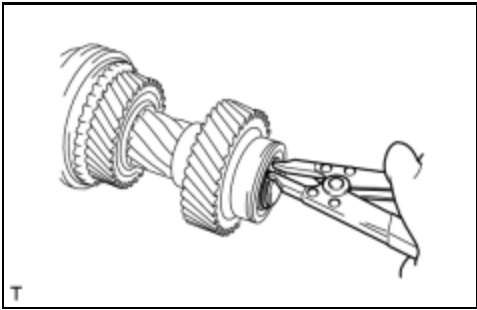
GEAR	STANDARD CLEARANCE MM (IN.)	MAXIMUM CLEARANCE MM (IN.)
Counter shaft 3rd gear	0.015 to 0.068 (0.000590 to 0.00268)	0.068 (0.00268)
Counter shaft 4th gear	0.065 to 0.115	

4th gear	(0.002559 to 0.00453)	0.115 (0.00453)
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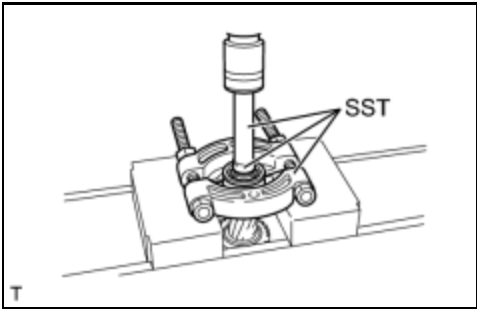
HINT:

If the clearance exceeds the maximum, replace the corresponding gear and needle roller bearing or 4th gear bearing inner race all together with a new ones.

3. REMOVE FRONT COUNTER GEAR BEARING



(a) Using a snap ring expander, remove the shaft snap ring.



(b) Using SST and a press, remove the front counter gear bearing.

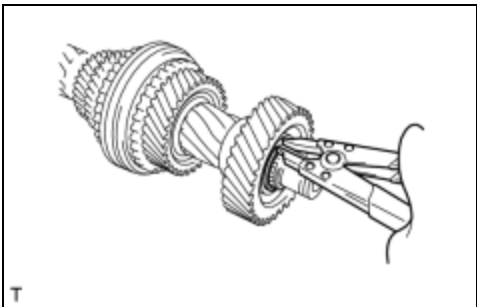
SST: 09950-00020

SST: 09950-60010

09951-00230

SST: 09950-70010

4. REMOVE COUNTER DRIVE GEAR



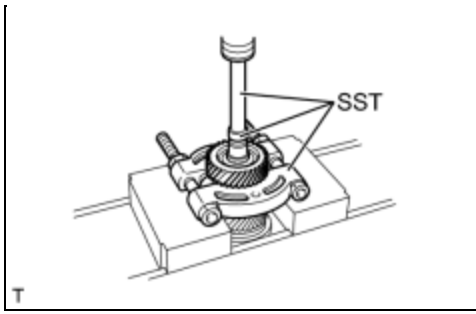
(a) Using a snap ring expander, remove the shaft snap ring.

(b) Using SST and a press, remove the counter drive gear.

SST: 09950-00020

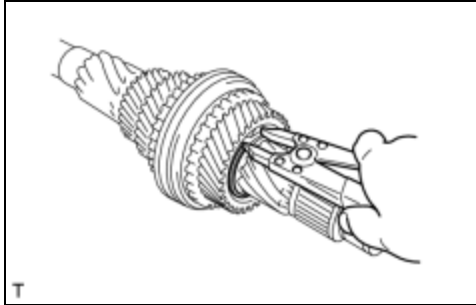
SST: 09950-60010

09951-00230

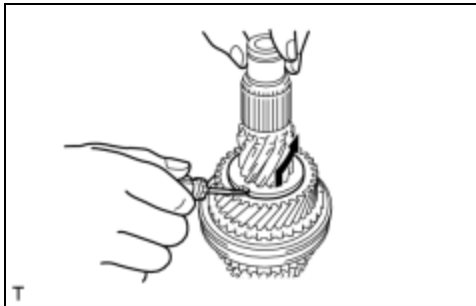


SST: 09950-70010
09951-07100

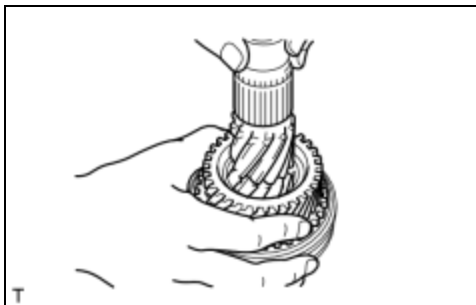
5. REMOVE COUNTER SHAFT 4TH GEAR



- (a) Using a snap ring expander, remove the shaft snap ring, and then remove the 4th washer retaining ring and 4th inner race thrust washer.

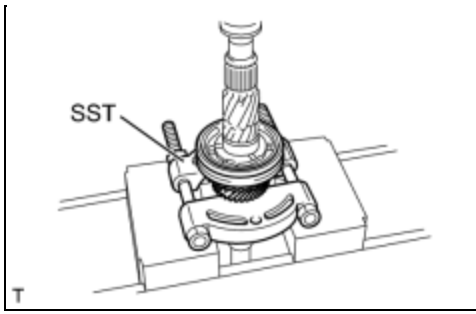


- (b) Using a screwdriver, pry the 4th gear bearing inner race and turn it counterclockwise along the gear, and remove the 4th gear bearing inner race.



- (c) Remove the counter shaft 4th gear and No. 1 synchronizer ring.

6. REMOVE COUNTER SHAFT 3RD GEAR



- (a) Using SST and a press, remove the No. 2 transmission clutch hub, counter shaft 3rd gear, No. 3 synchronizer ring set and needle roller bearing.

SST: 09950-00020

7. REMOVE NO. 2 TRANSMISSION HUB SLEEVE

- (a) Remove the No. 2 transmission hub sleeve, and then remove the 3 No. 1 synchronesh shifting keys, 3 No. 1 synchronesh shifting key springs and 3 balls from the transmission clutch hub.



NOTICE:

- Use a cloth to prevent the No. 1 synchronesh shifting keys, No. 1 synchronesh shifting key springs and balls from popping out.
- Do not deform the No. 1 synchronesh shifting key spring.

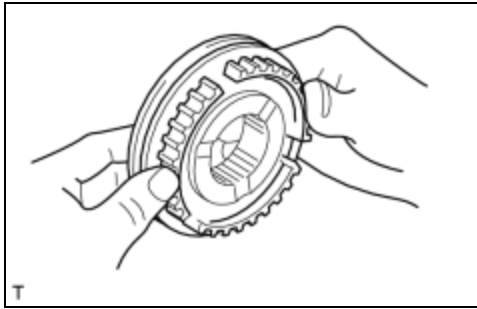
HINT:

During this operation, keep the No. 2 transmission clutch hub and No. 1 synchronesh shifting key intact.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000590U000X
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: COUNTER GEAR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT NO. 2 TRANSMISSION HUB SLEEVE



- (a) Check that the spline gear edges of the No. 2 transmission hub sleeve are not worn down.

HINT:

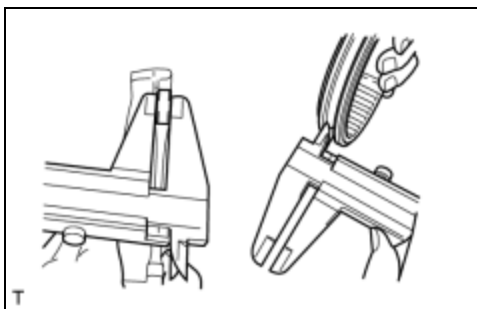
If it shows any sign of wear, replace the No. 2 transmission hub sleeve with a new one.

- (b) Install the No. 2 transmission hub sleeve to the No. 2 transmission clutch hub, and then check that it slides smoothly.

HINT:

If it does not slide smoothly, replace the No. 2 transmission hub sleeve and No. 2 transmission clutch hub with a new one.

2. INSPECT NO. 2 TRANSMISSION HUB SLEEVE CLEARANCE



- (a) Using a vernier caliper, measure the claw width of the No. 2 gear shift fork.

Standard width:

7.9 to 8.0 mm (0.311 to 0.315 in.)

Minimum width:

7.9 mm (0.311 in.)

HINT:

If the width is less than the minimum, replace the No. 2 gear shift fork with a new one.

- (b) Using a vernier caliper, measure the groove of the No. 2 transmission hub sleeve, and then calculate the clearance with the No. 2 gear shift fork.

Standard clearance:

0.15 to 0.35 mm (0.00590 to 0.0138 in.)

Maximum clearance:

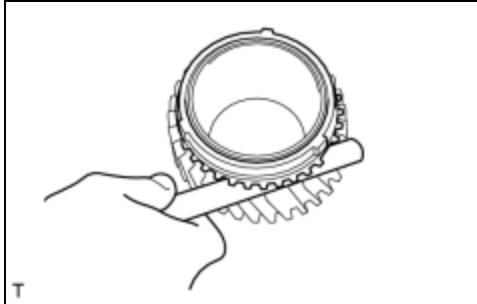
0.35 mm (0.0138 in.)

HINT:

If the clearance exceeds the maximum, replace both the No. 2 gear shift fork and No. 2 transmission hub sleeve with a new ones.

3. INSPECT NO. 1 SYNCHRONIZER RING

- (a) Apply manual transmission gear oil to the taper cone of the counter shaft 4th gear, and then hold the No. 1 synchronizer ring in position with your hand to measure the clearance between the No. 1 synchronizer ring and counter shaft 4th gear by using a feeler gauge.



Standard clearance:

0.8 to 1.6 mm (0.0314 to 0.0629 in.)

Maximum clearance:

1.6 mm (0.0629 in.)

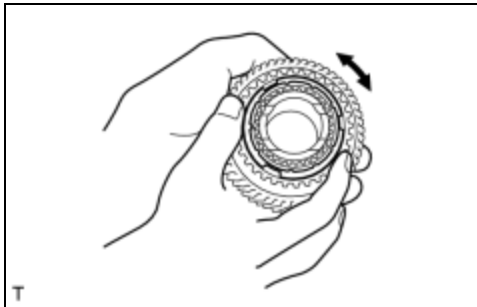
NOTICE:

Check the entire circumference of the gear.

HINT:

If the clearance exceeds the maximum, replace the No. 1 synchronizer ring with a new one.

- (b) Apply manual transmission gear oil to the taper cone of the counter shaft 4th gear, and then hold the No. 1 synchronizer ring in position with your hand to check that it does not slide in the circumferential direction.

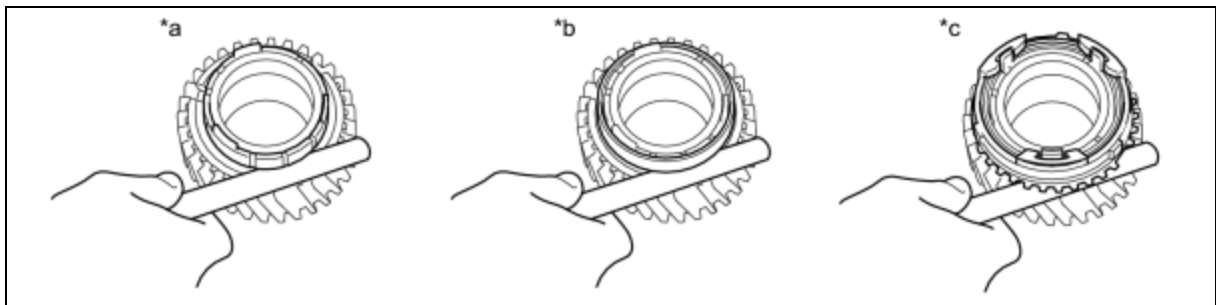


HINT:

If the ring slides, replace the No. 1 synchronizer ring with a new one.

4. INSPECT NO. 3 SYNCHRONIZER RING SET

- (a) Apply manual transmission gear oil to the taper cone of the counter shaft 3rd gear and No. 3 synchronizer ring set, and then hold the No. 3 synchronizer ring set in position with your hand to measure the clearance between the No. 3 synchronizer ring set and the counter shaft 3rd gear by using a feeler gauge.



Text in Illustration

*a	Inner	*b	Middle
----	-------	----	--------

*c	Outer	-	-
----	-------	---	---

Standard Clearance:

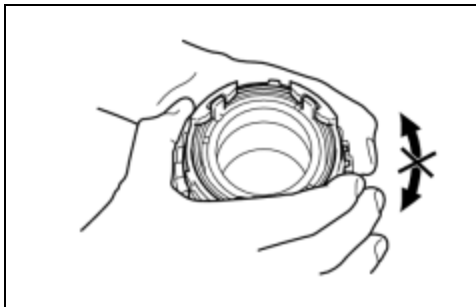
LOCATION	STANDARD CLEARANCE MM (IN.)
Inner	0.4 to 1.2 (0.0157 to 0.0472)
Middle	0.3 to 1.3 (0.0118 to 0.0512)
Outer	0.8 to 1.8 (0.0315 to 0.0709)

NOTICE:

Check the entire circumference of the gear.

HINT:

If the result is not as specified, replace the No. 3 synchronizer ring set with a new one.



(b) Apply manual transmission gear oil to the taper cone of the counter shaft 3rd gear, and then hold the No. 3 synchronizer ring set in position with your hand to check that it does not slide in the circumferential direction.

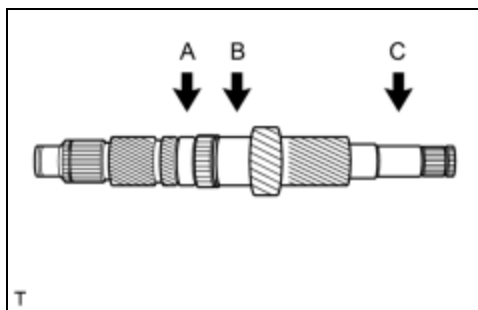
HINT:

If the No. 3 synchronizer ring set slides, replace the No. 3 synchronizer ring set with a new one.

5. INSPECT COUNTER SHAFT

(a) Using a micrometer, measure the outer diameter of each location.

Standard Outer Diameter:

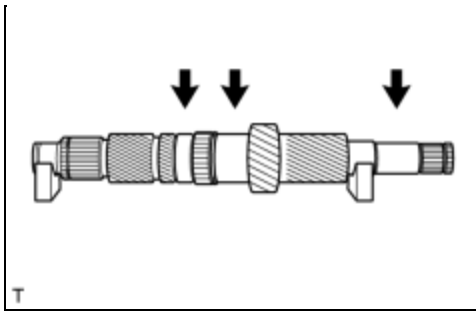


PART	STANDARD OUTER DIAMETER MM (IN.)	MINIMUM OUTER DIAMETER MM (IN.)
A	39.284 to 39.300 (1.54661 to 1.54721)	39.284 (1.54661)
B	37.984 to 38.000 (1.49543 to 1.49606)	37.984 (1.49543)
C	24.987 to 25.000 (0.98374 to 0.98425)	24.987 (0.98374)

HINT:

If the diameter is less than the minimum, replace the counter shaft with a new one.

(b) Using V-block and a dial gauge, measure the runout of



each location as shown in the illustration.

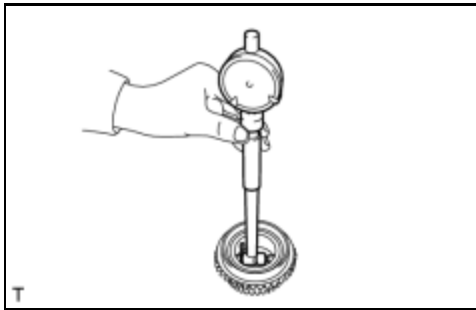
Standard runout:

0.03 mm (0.00118 in.) or less

HINT:

If the runout exceeds the standard, replace the counter shaft with a new one.

6. INSPECT COUNTER SHAFT 3RD GEAR



(a) Using a cylinder gauge, measure the inside diameter of the counter shaft 3rd gear.

Standard inside diameter:

43.015 to 43.040 mm (1.69350 to 1.69448 in.)

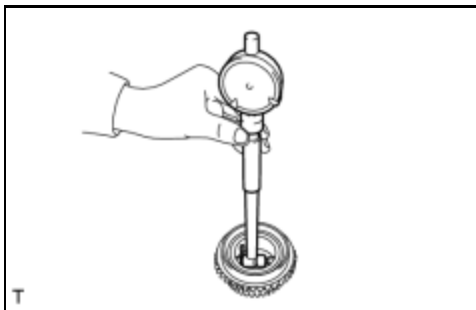
Maximum inside diameter:

43.040 mm (1.69448 in.)

HINT:

If the inside diameter exceeds the maximum, replace the counter shaft 3rd gear with a new one.

7. INSPECT COUNTER SHAFT 4TH GEAR



(a) Using a cylinder gauge, measure the inside diameter of the counter shaft 4th gear.

Standard inside diameter:

46.315 to 46.340 mm (1.82425 to 1.82441 in.)

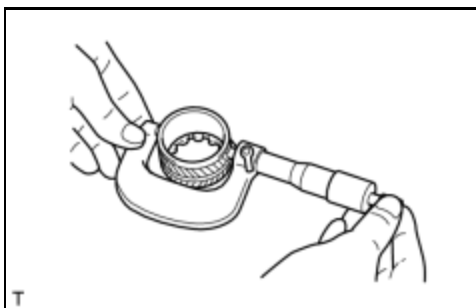
Maximum inside diameter:

46.340 mm (1.82441 in.)

HINT:

If the inside diameter exceeds the maximum, replace the counter shaft 4th gear with a new one.

8. REMOVE 4TH GEAR BEARING INNER RACE



(a) Using a micrometer, measure the outside diameter of the 4th gear bearing inner race.

Standard outside diameter:

46.225 to 46.250 mm (1.81988 to 1.82087 in.)

Minimum outside diameter:

46.225 mm (1.81988 in.)

NOTICE:

Do not measure the oil groove.

HINT:

If the outside diameter is less than the minimum, replace the 4th gear bearing inner race with a new one.

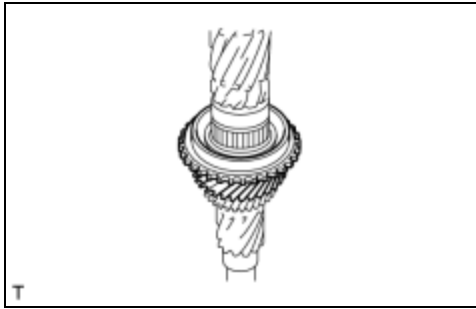


TOYOTA

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002RI3006X
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: COUNTER GEAR: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL COUNTER SHAFT 3RD GEAR

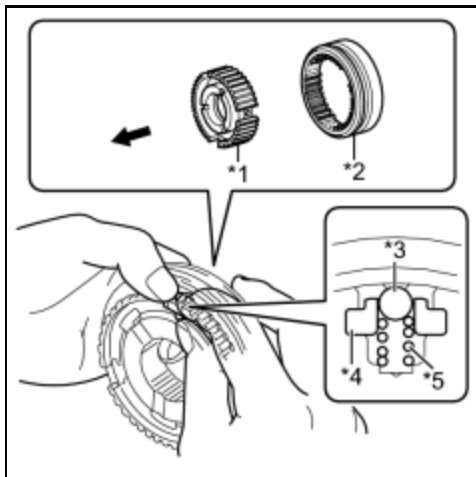


- (a) Apply manual transmission gear oil to the mounting point of the counter shaft, needle roller bearing and inside surface and taper cone of the counter shaft 3rd gear.

- (b) Install the needle roller bearing and counter shaft 3rd gear.

2. INSTALL NO. 2 TRANSMISSION HUB SLEEVE

- (a) Apply manual transmission gear oil to the moving parts of the No. 2 transmission clutch hub.



Text in Illustration

*1	No. 2 Transmission Clutch Hub
*2	No. 2 Transmission Hub Sleeve
*3	Ball
*4	No. 1 Synchromesh Shifting Key
*5	No. 1 Synchromesh Shifting Key Spring
	Front Side

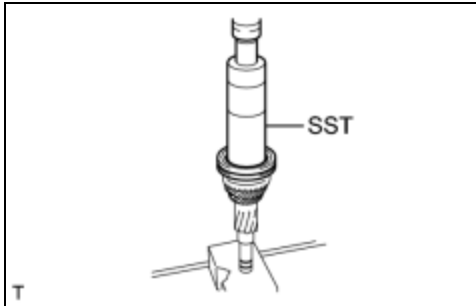


(b) As shown in the illustration, install the No. 2 transmission hub sleeve to the No. 2 transmission clutch hub. Install the 3 No. 1 synchronesh shifting keys and 3 No. 1 synchronesh shifting key springs all together, and then install the balls.

HINT:

- Install the shifting key ball while holding down the synchronesh shifting key spring. Install the ball while holding down the No. 1 synchronesh shifting key spring.
- After the installation, let the No. 1 synchronesh shifting key spring settle down.

3. INSTALL NO. 2 TRANSMISSION CLUTCH HUB



(a) Install the No. 3 synchronizer ring set to the counter shaft 3rd gear.

HINT:

- Align the middle ring claw with the groove in the counter shaft 3rd gear.
- Align the inner ring claw with the groove in the outer ring.

(b) Using SST and a press, install the No. 2 transmission clutch hub.

SST: 09316-60011

09316-00011

NOTICE:

Make sure that the No. 3 synchronizer ring set is positioned properly.

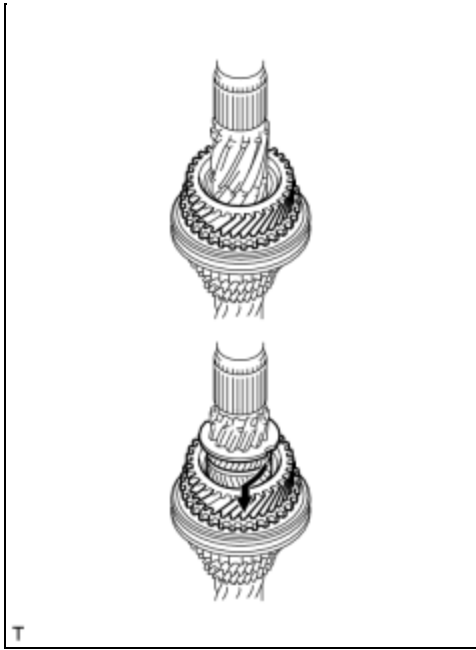
HINT:

- Align the No. 2 transmission clutch hub and the No. 3 synchronizer ring set so that they can fit together.
- Make sure to press fit the No. 2 transmission clutch hub until it touches the counter shaft.
- After the press fit, make sure that the No. 3 synchronizer ring set moves toward the thrust direction.

4. INSTALL COUNTER SHAFT 4TH GEAR

(a) Install the No. 1 synchronizer ring to the No. 2 transmission clutch hub.

HINT:



Align the No. 2 transmission clutch hub and the No. 1 synchronizer ring so that they can fit together.

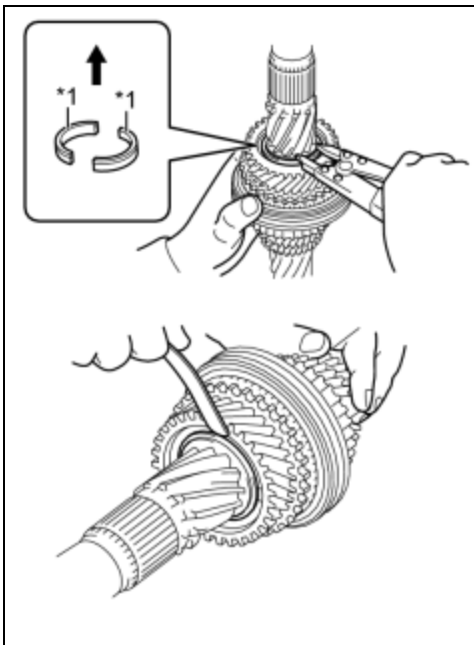
- (b) Apply manual transmission gear oil to the 4th gear bearing inner race and inside surface and taper cone of the counter shaft 4th gear.
- (c) Install the counter shaft 4th gear and 4th gear bearing inner race.

HINT:

To install it, rotate the 4th gear bearing inner race along the gear in a clockwise direction.


5. INSTALL 4TH INNER RACE THRUST WASHER

- (a) Select a 4th inner race thrust washer that is suitable to retain the specific thrust clearance between the 4th gear bearing inner race and 4th inner race thrust washer.



Text in Illustration



*1	4th Inner Race Thrust Washer
	Front Side

Standard clearance:
0 to 0.1 mm (0 to 0.00394 in.)

HINT:

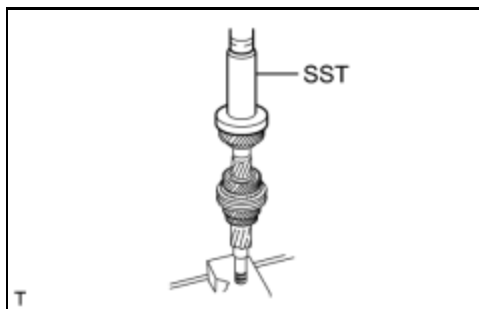
Select the thickest 4th inner race thrust washer possible for installation.

4th Inner Race Thrust Washer Thickness

PART NO.	THICKNESS MM (IN.)	MARK
SU003-03500	3.75 (0.14763)	A
SU003-03501	3.80 (0.14960)	B
SU003-03502	3.85 (0.15157)	C
SU003-03503	3.90 (0.15354)	D
SU003-03504	3.95 (0.15551)	E
SU003-03505	4.00 (0.15748)	F
SU003-03506	4.05 (0.15944)	G
SU003-03507	4.10 (0.16141)	H

(b) Using a snap ring expander, as shown in the illustration, install a new 4th inner race thrust washer, new 4th washer retaining ring and new shaft snap ring to the counter shaft.

6. INSTALL COUNTER DRIVE GEAR



(a) Using SST and a press, install the counter drive gear.

SST: 09309-36010

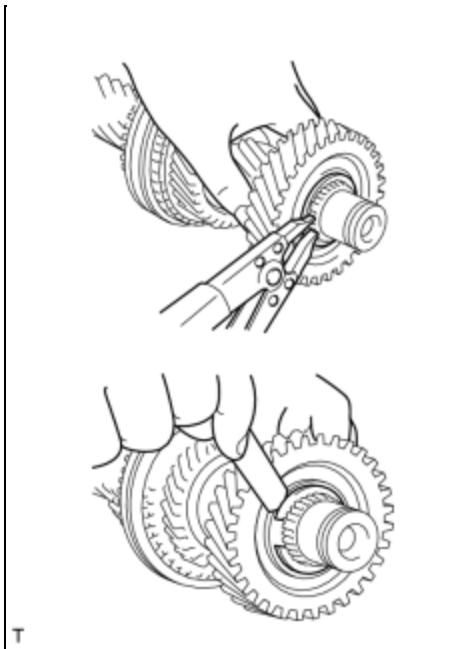
7. INSTALL SHAFT SNAP RING (for Counter Drive Gear)

(a) Select a shaft snap ring that is suitable to retain the specific thrust clearance between the counter drive gear and shaft snap ring.

Standard clearance:
0 to 0.1 mm (0 to 0.00394 in.)

HINT:

Select the thickest shaft snap ring possible for installation.



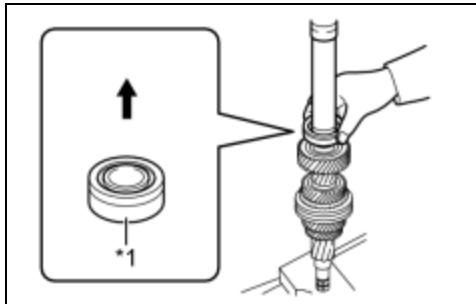
Shaft Snap Ring Thickness

PART NO.	THICKNESS: MM (IN.)	MARK
SU003-03581	1.80 (0.07086)	A
SU003-03582	1.85 (0.07283)	B
SU003-03583	1.90 (0.07480)	C
SU003-03584	1.95 (0.07677)	D
SU003-03585	2.00 (0.07874)	E
SU003-03586	2.05 (0.08070)	F


(b) Using a snap ring expander, install a new shaft snap ring to the counter shaft.

8. INSTALL FRONT COUNTER GEAR BEARING

(a) Using SST and a press, as shown in the illustration, install a new front counter gear bearing while holding it with your hand.



Text in Illustration

*1	Front Counter Gear Bearing
	Front Side

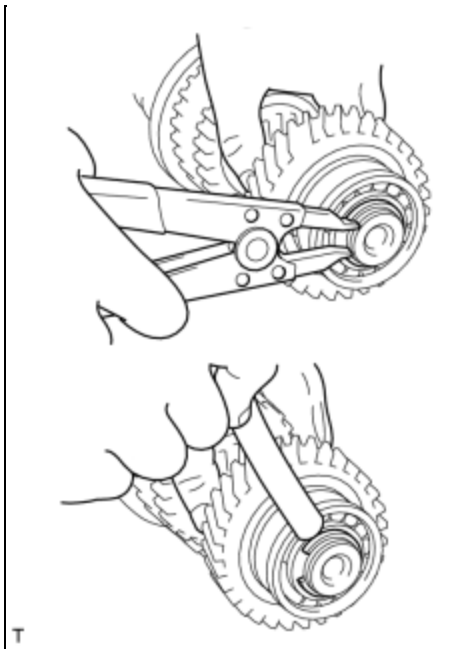
SST: 09330-50010

NOTICE:

Attach SST to the inner race of the front counter gear bearing, and then install the front counter gear bearing.

9. INSTALL SHAFT SNAP RING (for Front Counter Gear Bearing)

(a) Select a shaft snap ring that is suitable to retain the specific thrust clearance between the counter gear front



bearing and shaft snap ring.

Standard clearance:

0 to 0.1 mm (0 to 0.00394 in.)

HINT:

Select the thickest shaft snap ring possible for installation.

Shaft Snap Ring Thickness

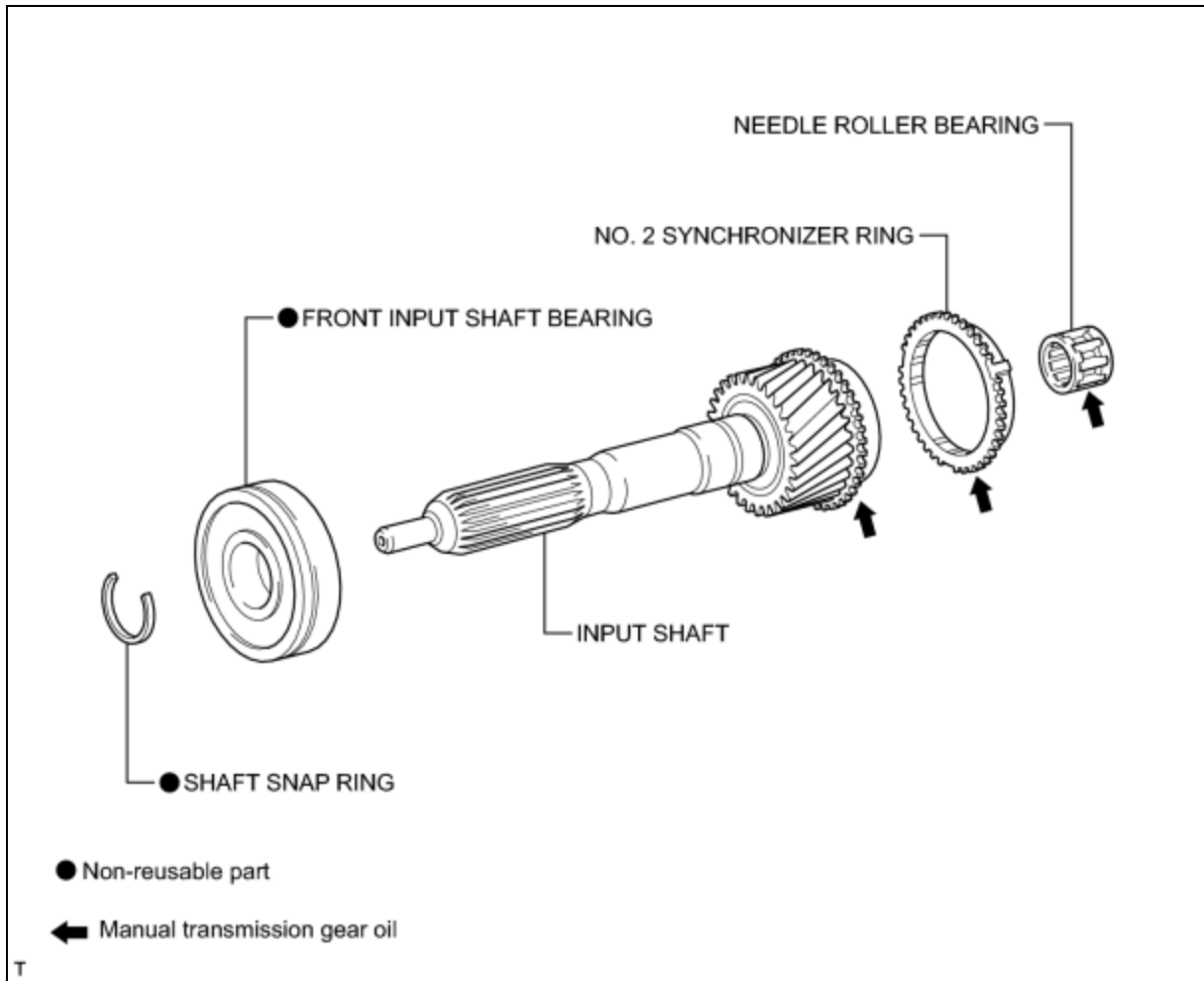
PART NO.	THICKNESS: MM (IN.)	MARK
SU003-03560	2.05 (0.08070)	1
SU003-03558	2.10 (0.08267)	2
SU003-03561	2.15 (0.08464)	3
SU003-03559	2.20 (0.08661)	4
SU003-03562	2.25 (0.08858)	5
SU003-03563	2.30 (0.09055)	6

(b) Using a snap ring expander, install a new shaft snap ring to the counter shaft.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002H8K00CX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: INPUT SHAFT: COMPONENTS (2013 FR-S)		

COMPONENTS

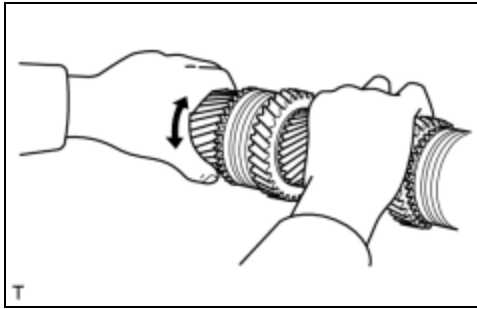
ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002H8L00BX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: INPUT SHAFT: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. INSPECT NEEDLE ROLLER BEARING



- (a) Install the input shaft to the output shaft, and then check the needle roller bearing.

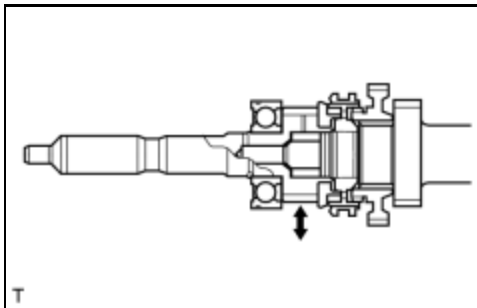
Standard:

Abnormal fitting, interfering, abnormal noise, or looseness should not be found.

HINT:

If any abnormality is found, replace the needle roller bearing with a new one.

2. INSPECT RADIAL CLEARANCE



- (a) Install the input shaft to the output shaft, and then using a dial indicator, measure the radial clearance.

Standard clearance:

0.029 to 0.072 mm (0.00114 to 0.00283 in.)

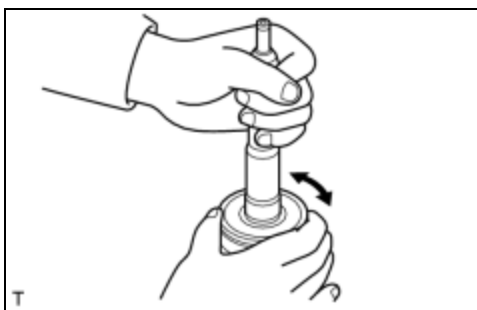
Maximum clearance:

0.072 mm (0.00283 in.)

HINT:

If the clearance exceeds the maximum, replace the needle roller bearing and output shaft with a new ones.

3. INSPECT FRONT INPUT SHAFT BEARING



- (a) Check the front input shaft bearing.

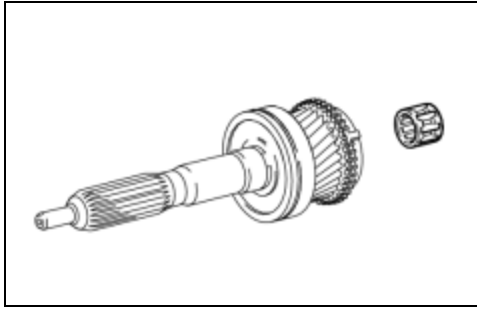
Standard:

Abnormal fitting, interfering, abnormal noise, or looseness should not be found.

HINT:

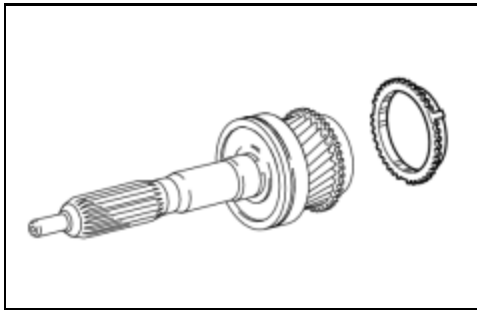
If any abnormality is found, replace the front input shaft bearing with a new one.

4. REMOVE NEEDLE ROLLER BEARING



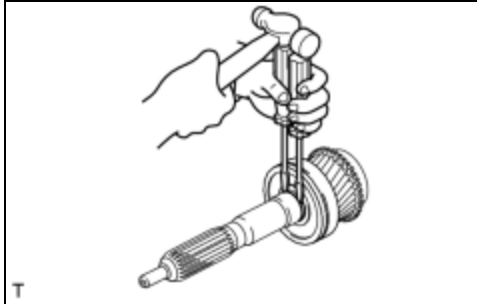
(a) Remove the needle roller bearing from the input shaft.

5. REMOVE NO. 2 SYNCHRONIZER RING



(a) Remove the No. 2 synchronizer ring from the input shaft.

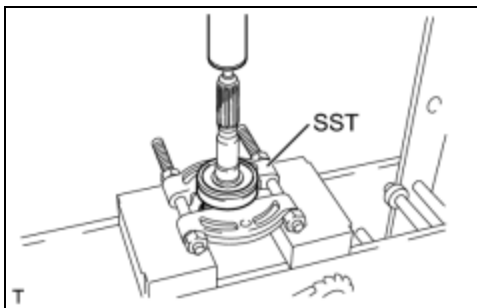
6. REMOVE FRONT INPUT SHAFT BEARING



(a) Using 2 screwdrivers and a hammer, remove the shaft snap ring from the input shaft.

NOTICE:

Use a cloth to prevent the shaft snap ring from popping out.



(b) Using SST and a press, remove the front input shaft bearing from the input shaft.

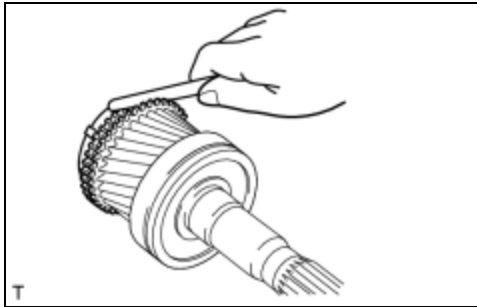
SST: 09950-00020

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000590S000X
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: INPUT SHAFT: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT NO. 2 SYNCHRONIZER RING

- (a) Apply manual transmission gear oil to the taper cone of the 3rd gear, and hold the No. 2 synchronizer ring in position with your hand to measure the clearance between the No. 2 synchronizer ring and 3rd gear by using a feeler gauge.



Standard clearance:

0.8 to 1.6 mm (0.0315 to 0.0630 in.)

Minimum clearance:

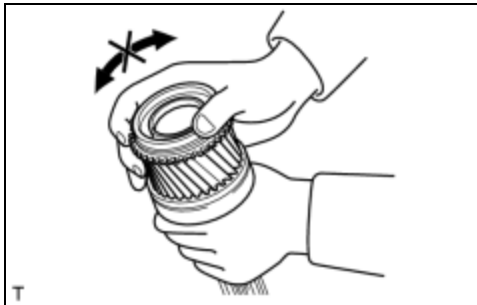
0.8 mm (0.0315 in.)

NOTICE:

Check the entire circumference of the gear.

HINT:

If the clearance is less than the minimum, replace the No. 2 synchronizer ring with a new one.



- (b) Apply manual transmission gear oil to the taper cone of the 3rd gear, and then hold the No. 2 synchronizer ring in position with your hand to check that it does not slide in the circumferential direction.

HINT:

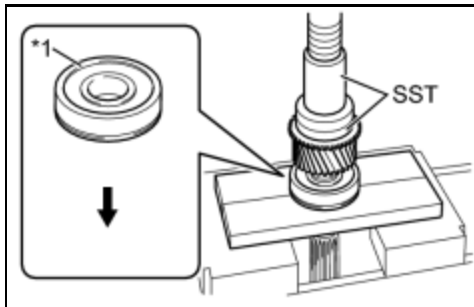
If the No. 2 synchronizer ring slides, replace the No. 2 synchronizer ring with a new one.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002H8M00BX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: INPUT SHAFT: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL FRONT INPUT SHAFT BEARING

- (a) Using SST and a press, as shown in the illustration, install a new front input shaft bearing to the input shaft.



Text in Illustration

*1	Front Input Shaft Bearing
	Front Side

SST: 09527-20011

SST: 09950-60010

09951-00560

NOTICE:

Retain the front input shaft bearing inner race, and press fit.

- (b) Select a shaft snap ring that is suitable to retain the specific thrust clearance between the front input shaft bearing and shaft snap ring.

Standard clearance:

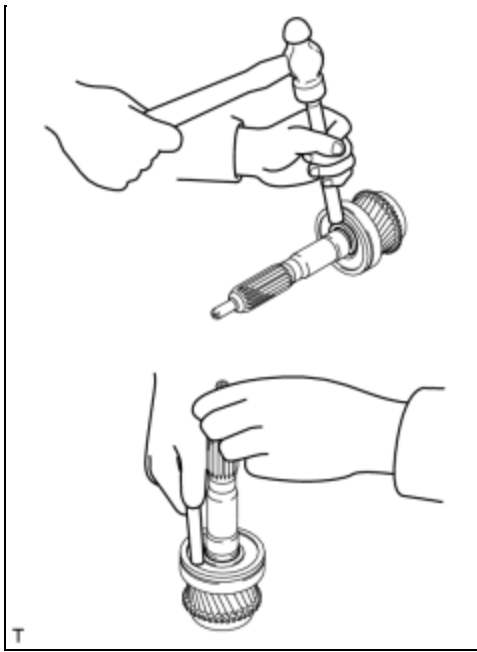
0 mm (0 in.)

Maximum clearance:

0.1 mm (0.00394 in.)

Shaft Snap Ring Thickness

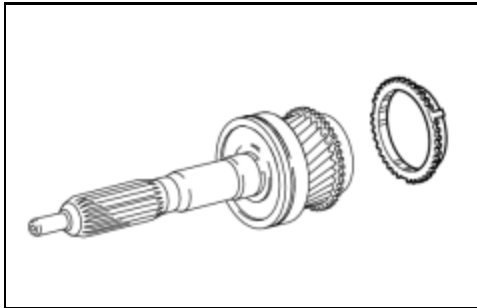
PART NO.	THICKNESS MM (IN.)	MARK
SU003-03575	1.95 (0.07677)	0
SU003-03576	2.00 (0.07874)	1
SU003-03577	2.05 (0.08070)	2
SU003-03578	2.10 (0.08267)	3



SU003-03579	2.15 (0.08464)	4
SU003-03580	2.20 (0.08661)	5

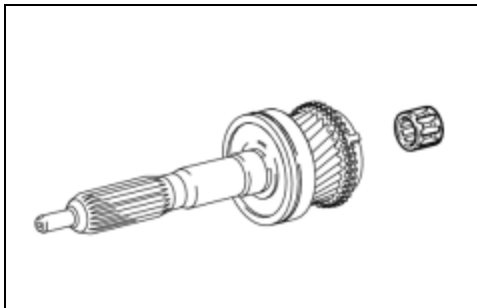
(c) Using a brass bar and a hammer, install a new shaft snap ring to the input shaft.

2. INSTALL NO. 2 SYNCHRONIZER RING



(a) Apply manual transmission gear oil to the No. 2 synchronizer ring, and then install the No. 2 synchronizer ring to the input shaft.

3. INSTALL NEEDLE ROLLER BEARING

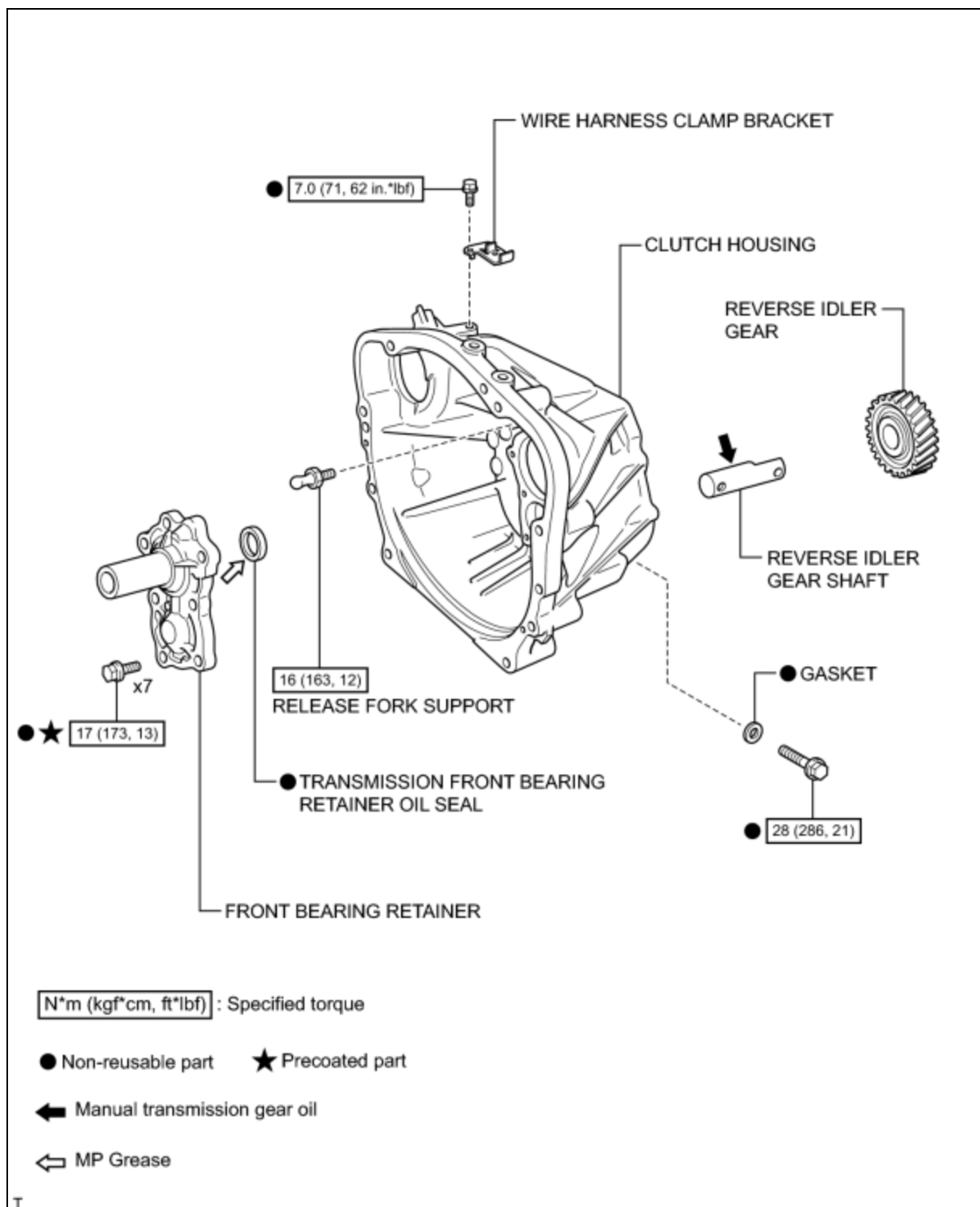


(a) Apply manual transmission gear oil to the needle roller bearing, and then install the needle roller bearing to the input shaft.

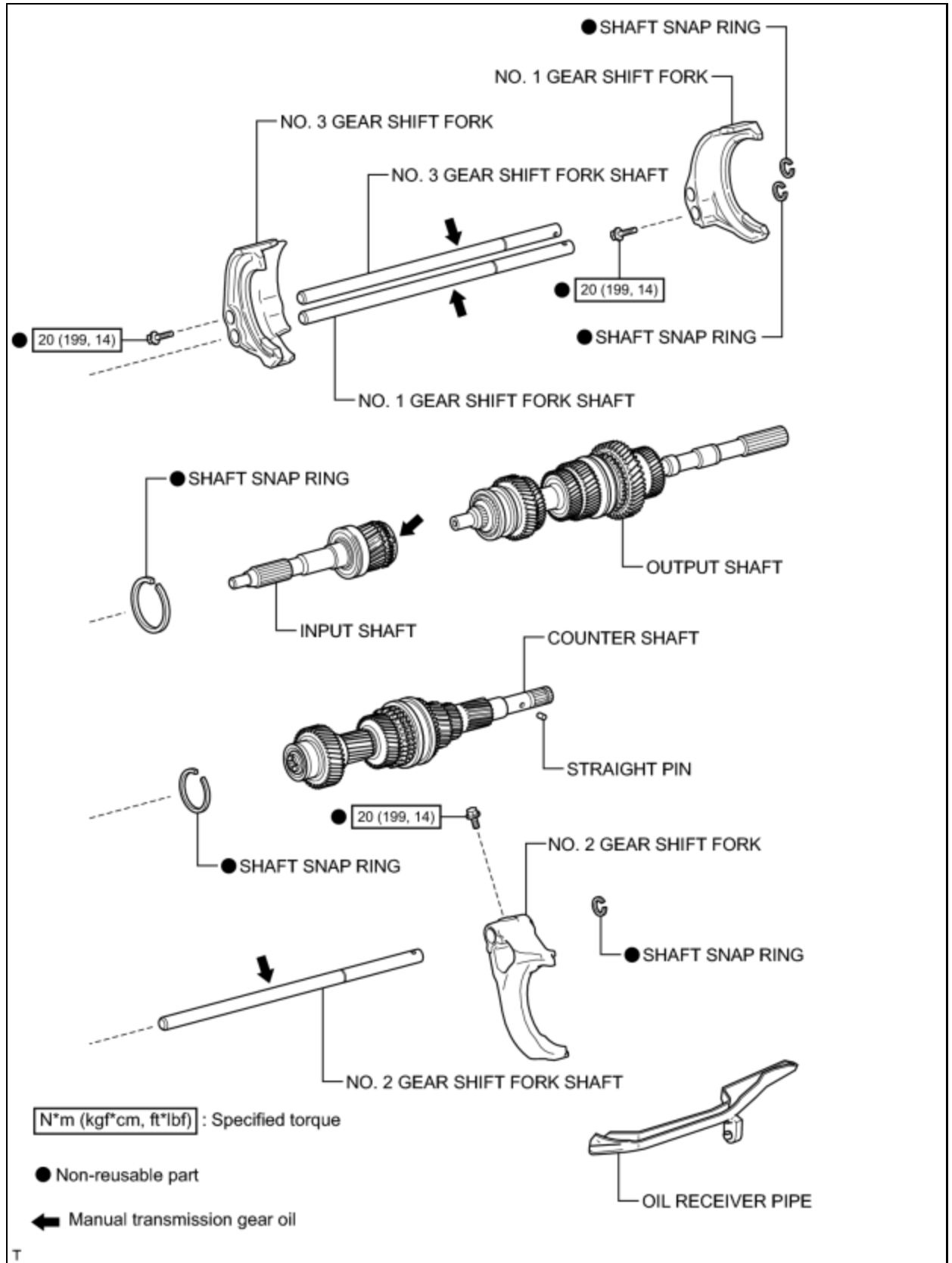
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002H8K00BX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: MANUAL TRANSAXLE UNIT: COMPONENTS (2013 FR-S)		

COMPONENTS

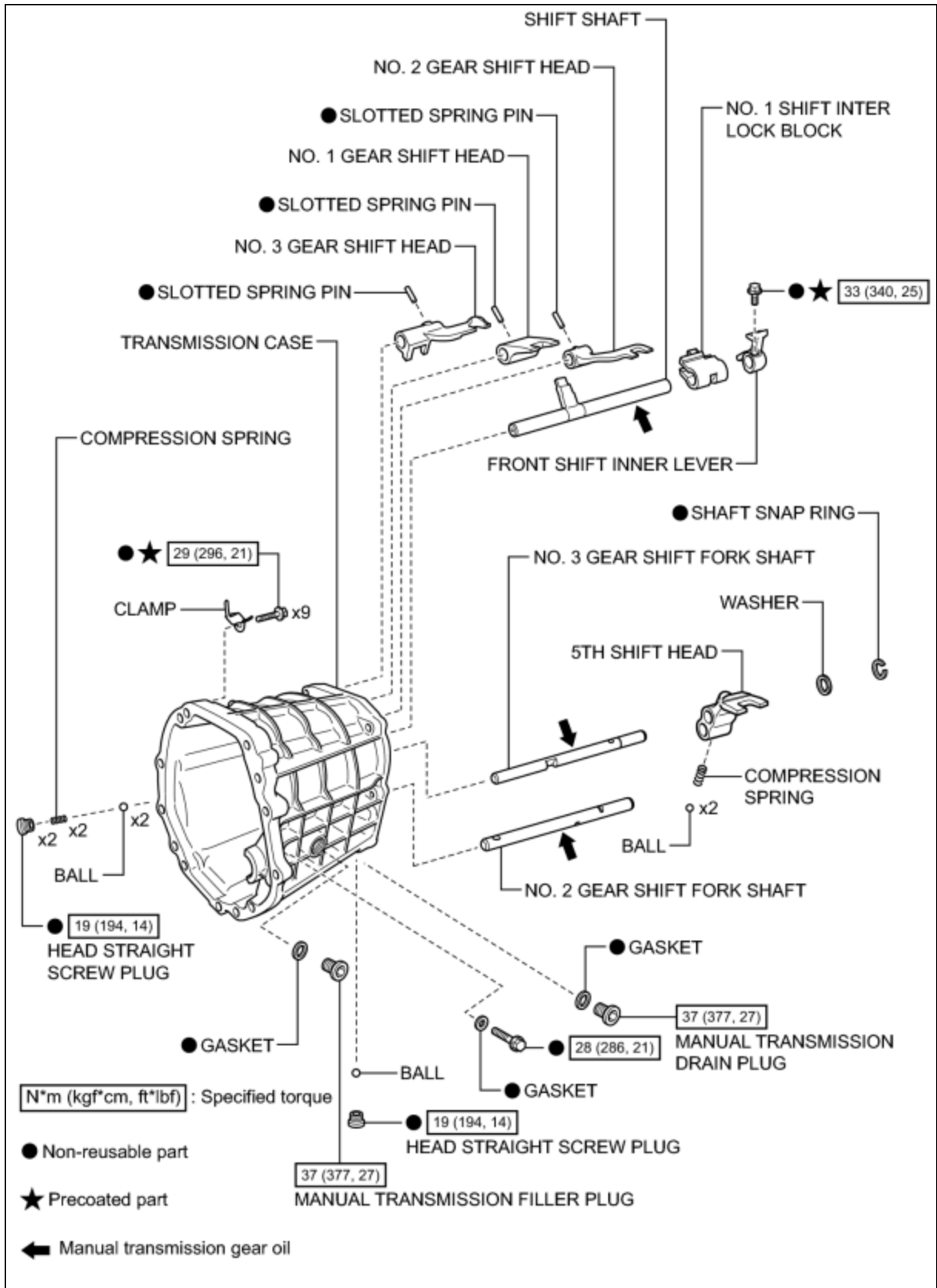
ILLUSTRATION



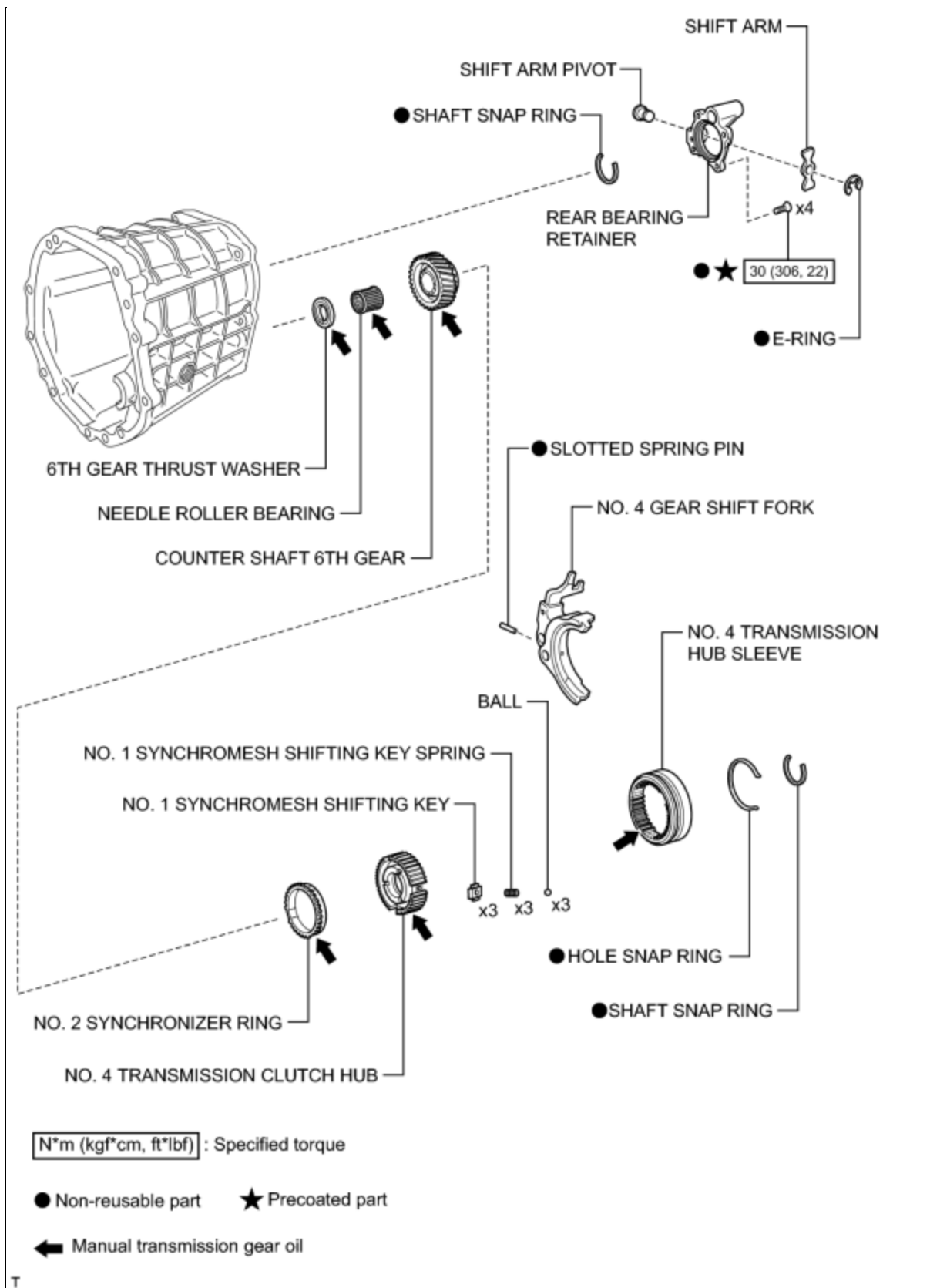
ILLUSTRATION



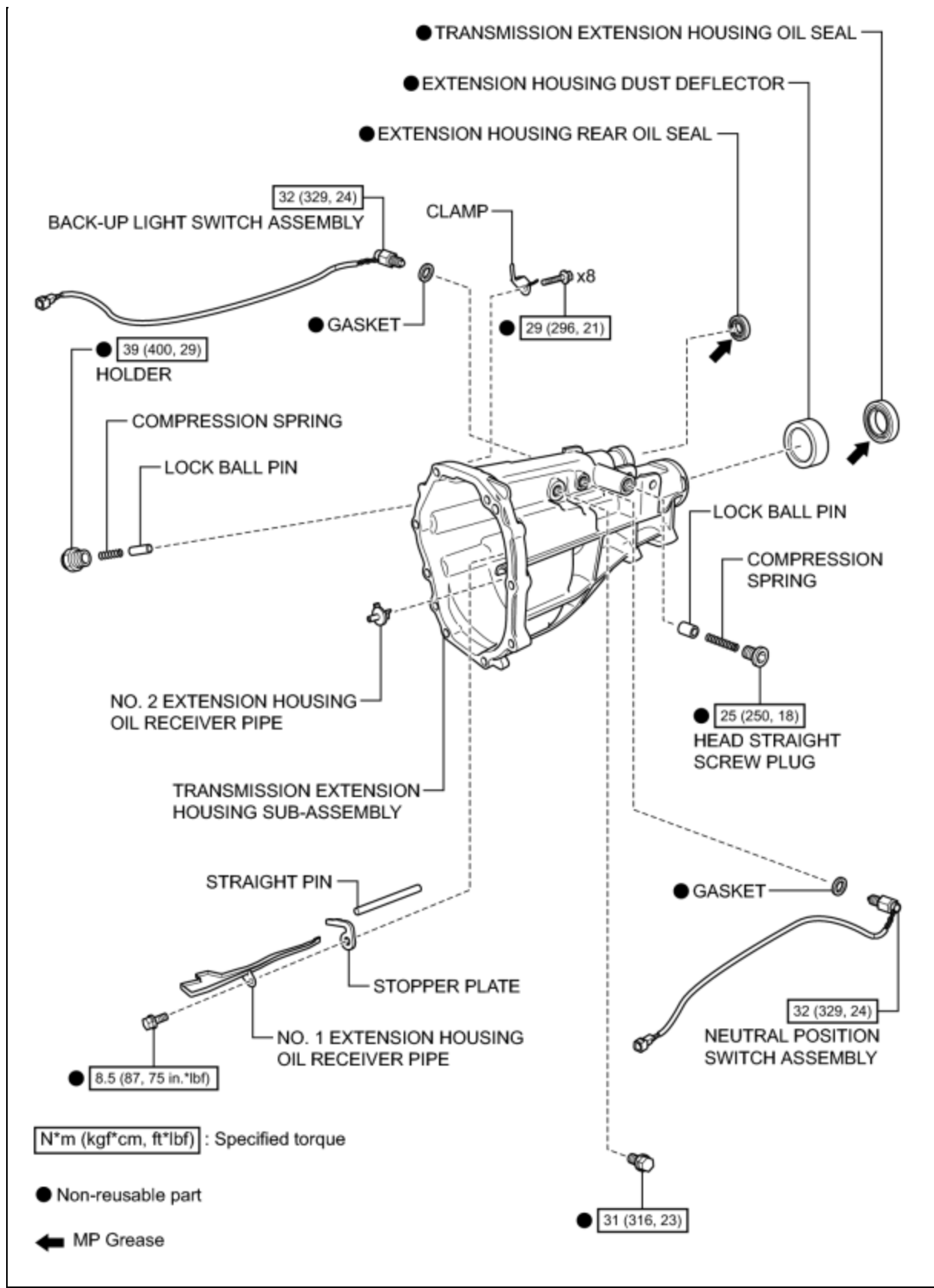
ILLUSTRATION



ILLUSTRATION



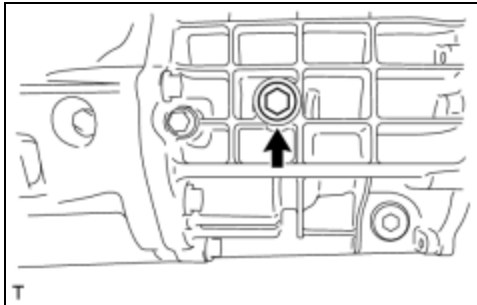
ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002RHU007X
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: MANUAL TRANSAXLE UNIT: DISASSEMBLY (2013 FR-S)		

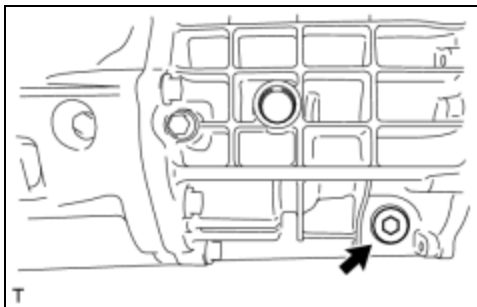
DISASSEMBLY

1. REMOVE MANUAL TRANSMISSION FILLER PLUG



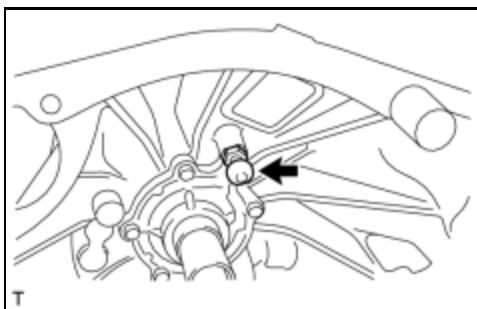
(a) Remove the manual transmission filler plug and gasket.

2. REMOVE MANUAL TRANSMISSION DRAIN PLUG



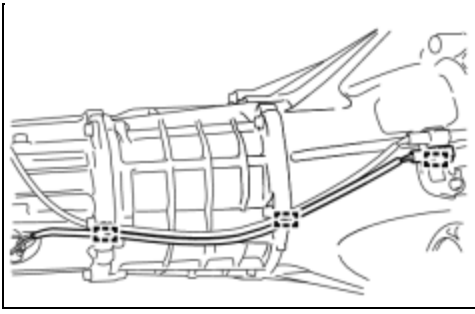
(a) Remove the manual transmission drain plug and gasket.

3. REMOVE RELEASE FORK SUPPORT

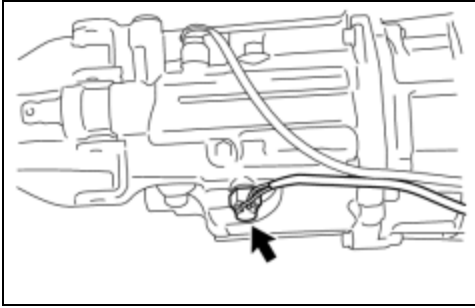


(a) Using a 19 mm deep socket wrench, remove the release fork support from the clutch housing.

4. REMOVE BACK-UP LIGHT SWITCH ASSEMBLY

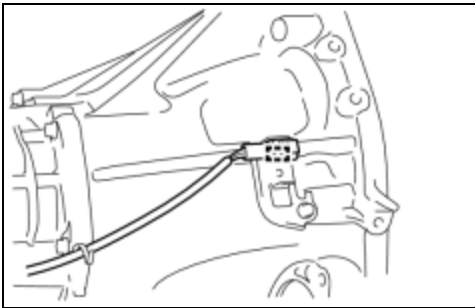


(a) Disengage the 3 clamps.

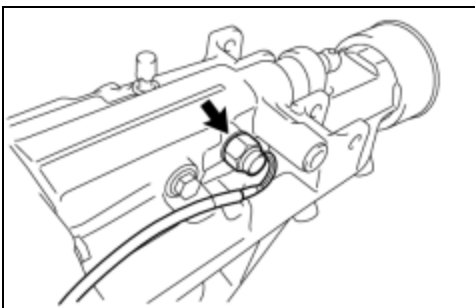


(b) Using a 19 mm union nut wrench, remove the back-up light switch assembly and gasket.

5. REMOVE NEUTRAL POSITION SWITCH ASSEMBLY

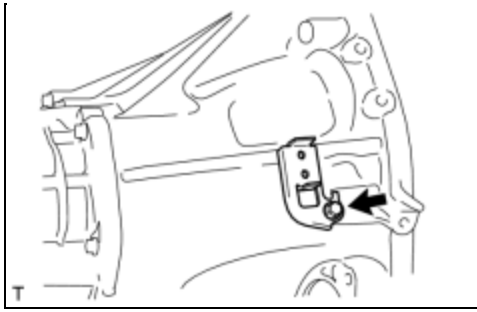


(a) Disengage the clamp.



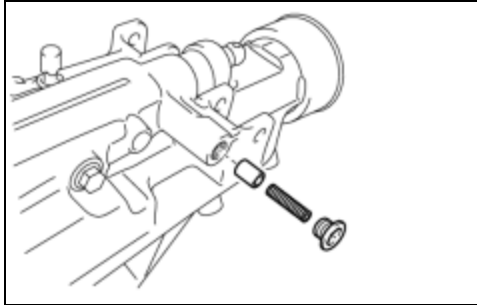
(b) Using a 19 mm union nut wrench, remove the neutral position switch assembly and gasket.

6. REMOVE WIRE HARNESS CLAMP BRACKET



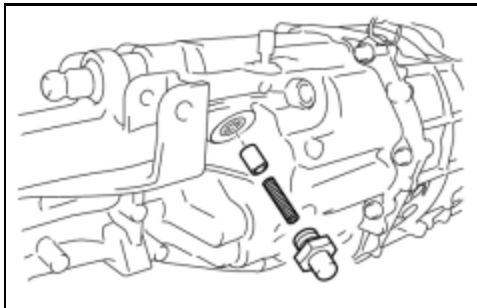
(a) Remove the bolt and wire harness clamp bracket.

7. REMOVE LOCK BALL PIN



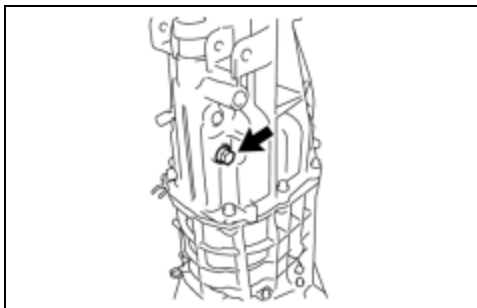
(a) Using a 10 mm hexagon socket wrench, remove the head straight screw plug, compression spring and lock ball pin.

8. REMOVE HOLDER

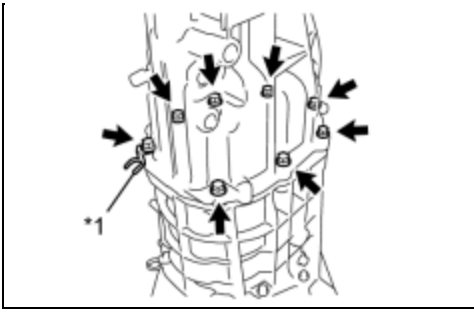


(a) Using a 27 mm deep socket wrench, remove the holder, compression spring and lock ball pin.

9. REMOVE TRANSMISSION EXTENSION HOUSING SUB-ASSEMBLY



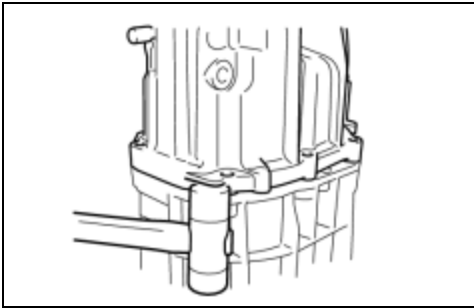
(a) Remove the bolt.



(b) Remove the 8 bolts and clamp.

Text in Illustration

*1	Clamp
----	-------



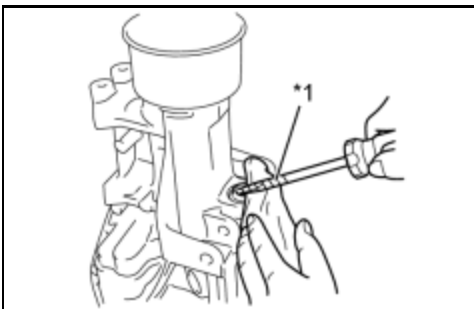
(c) Using a plastic hammer, remove the transmission extension housing sub-assembly.

NOTICE:

- Be sure to remove the transmission extension housing sub-assembly while the transmission is in neutral.
- Do not damage the transmission extension housing sub-assembly.

10. REMOVE EXTENSION HOUSING REAR OIL SEAL

(a) Using a screwdriver with its tip wrapped with protective tape, remove the extension housing rear oil seal.



Text in Illustration

*1	Protective Tape
----	-----------------

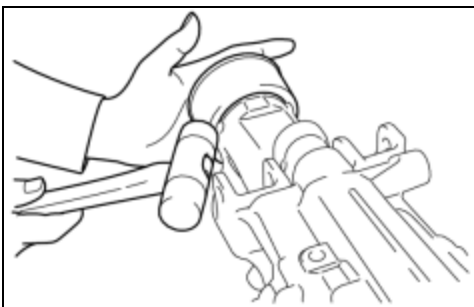
NOTICE:

- Do not damage the transmission extension housing sub-assembly.

HINT:

Remove the transmission extension housing sub-assembly while protecting it with a piece of cloth.

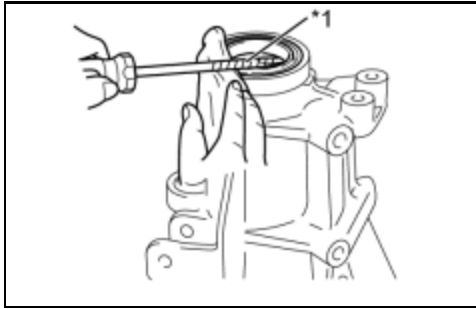
11. REMOVE EXTENSION HOUSING DUST DEFLECTOR



(a) Using a plastic hammer, remove the extension housing dust deflector.

12. REMOVE TRANSMISSION EXTENSION HOUSING OIL SEAL

- (a) Using a screwdriver with its tip wrapped with protective tape, remove the transmission extension housing oil seal.



Text in Illustration

*1

Protective Tape

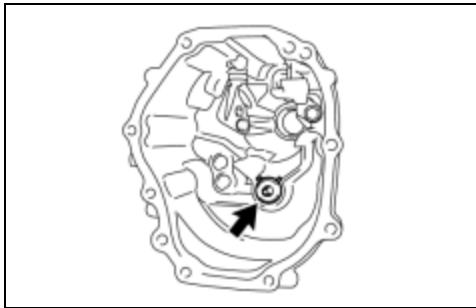
NOTICE:

Do not damage the transmission extension housing sub-assembly.

HINT:

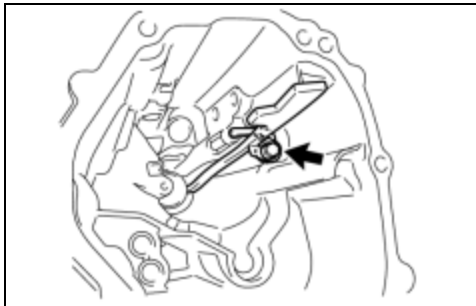
Remove the transmission extension housing sub-assembly while protecting it with a piece of cloth.

13. REMOVE NO. 2 EXTENSION HOUSING OIL RECEIVER PIPE



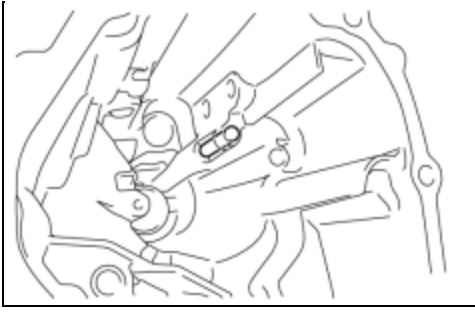
- (a) Remove the No. 2 extension housing oil receiver pipe.

14. REMOVE NO. 1 EXTENSION HOUSING OIL RECEIVER PIPE

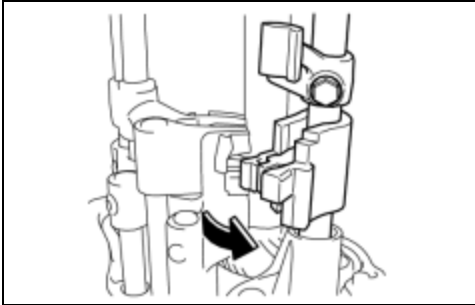


- (a) Remove the bolt, No. 1 extension housing oil receiver pipe and stopper plate.

- (b) Remove the straight pin.

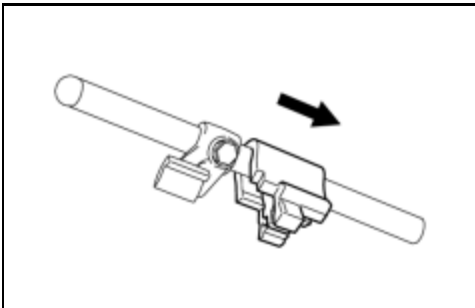


15. REMOVE SHIFT SHAFT



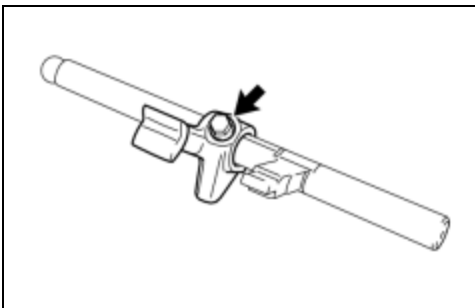
(a) Slide and remove the shift shaft and No. 1 shift inter lock block.

16. REMOVE NO. 1 SHIFT INTER LOCK BLOCK



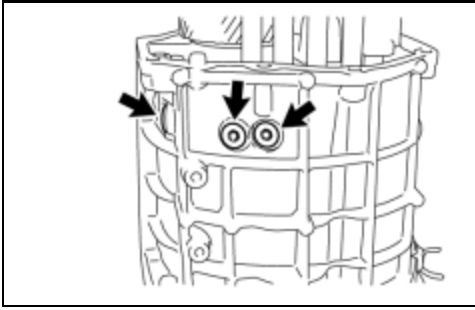
(a) Remove the No. 1 shift inter lock block from the shift shaft.

17. REMOVE FRONT SHIFT INNER LEVER

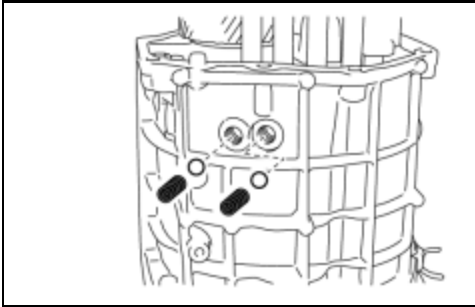


(a) Remove the bolt and front shift inner lever from the shift shaft.

18. REMOVE HEAD STRAIGHT SCREW PLUG

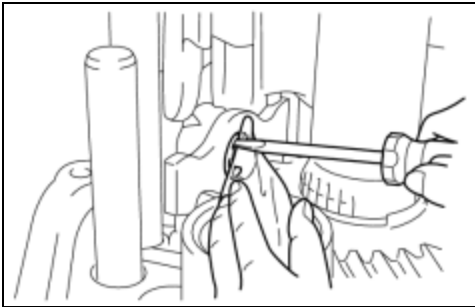


- (a) Using a T40 "TORX" socket wrench, remove 3 head straight screw plugs.



- (b) Using a magnet hand, remove the 2 compression springs and 2 balls.

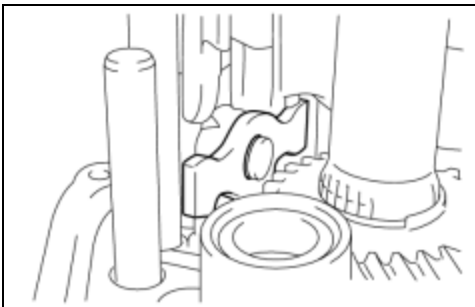
19. REMOVE SHIFT ARM



- (a) Using a screwdriver, remove the E-ring.

NOTICE:

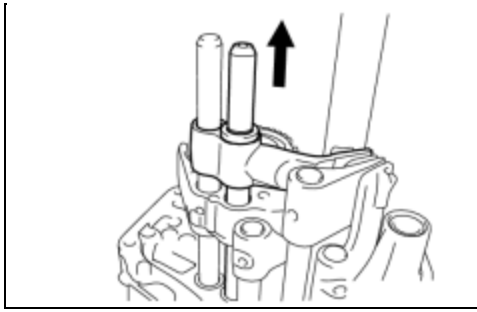
Use a cloth to prevent the E-ring from flying off.



- (b) Remove the shift arm.

20. REMOVE NO. 3 GEAR SHIFT FORK SHAFT

- (a) Remove the No. 3 gear shift fork shaft and 5th shift head

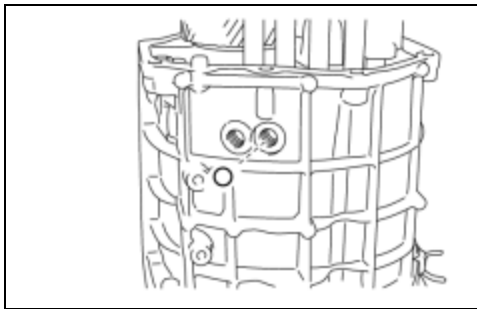


together.

NOTICE:

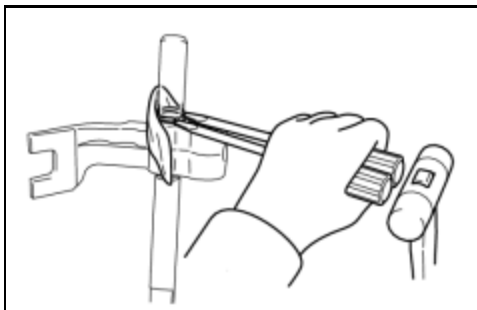
- Be careful not to drop the ball from the 5th shift head.
- The ball on the transmission case may fall inside the transmission case. If that happens, take it out when the transmission case is removed.

(b) Remove the ball from the 5th shift head.



(c) Using a magnetic hand, remove the ball.

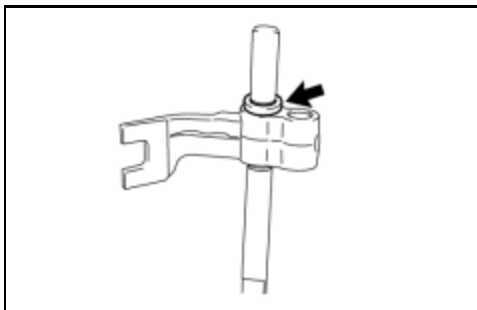
21. REMOVE 5TH SHIFT HEAD



(a) Using 2 screwdrivers and a plastic hammer, remove the shaft snap ring.

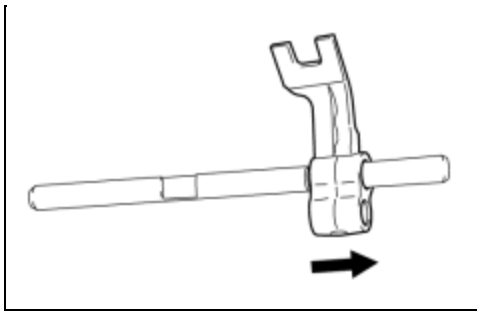
NOTICE:

Use a cloth to prevent the shaft snap ring from flying off.



(b) Remove the washer.

(c) Remove the 5th shift head, compression spring and ball.

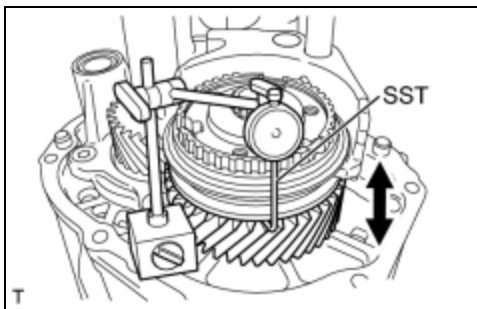


NOTICE:

Be careful of the ball and compression spring that fall out when sliding the 5th shift head.

22. INSPECT COUNTER SHAFT 6TH GEAR THRUST CLEARANCE

- (a) Using SST and a dial indicator, measure the thrust clearance.



SST: 09350-20015

09350-06120

Standard clearance:

0.10 to 0.40 mm (0.00394 to 0.0157 in.)

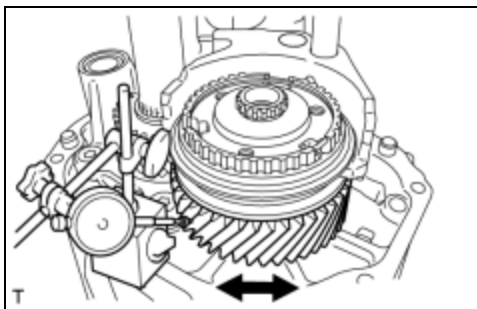
Maximum clearance:

0.40 mm (0.0157 in.)

HINT:

If the clearance exceeds the maximum, replace the counter shaft 6th gear, No. 4 transmission clutch hub, 6th gear thrust washer, needle roller bearing and counter shaft with a new ones.

23. INSPECT COUNTER SHAFT 6TH GEAR RADIAL CLEARANCE



- (a) Using a dial indicator, measure the radial clearance.

Standard clearance:

0.015 to 0.068 mm (0.000590 to 0.00268 in.)

Maximum clearance:

0.068 mm (0.00268 in.)

HINT:

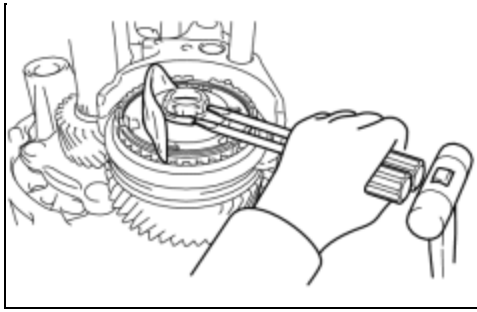
If the clearance exceeds the maximum, replace the counter shaft 6th gear, needle roller bearing and counter shaft with a new ones.

24. REMOVE NO. 4 TRANSMISSION CLUTCH HUB

- (a) Using 2 screwdrivers and a plastic hammer, remove the shaft snap ring.

NOTICE:

Use a cloth to prevent the shaft snap ring from flying

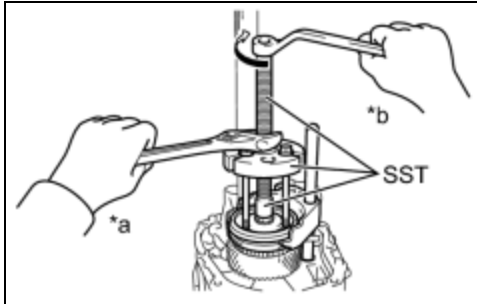


off.

- (b) Using SST and 3 bolts, remove the No. 4 transmission clutch hub, No.4 transmission hub sleeve, No. 4 gear shift fork and No. 2 gear shift fork shaft all together.

Text in Illustration

*a	Hold
*b	Turn



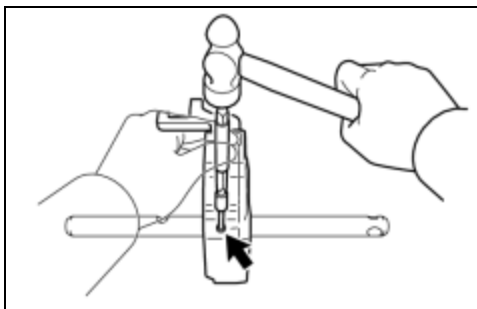
SST: 09950-30012

09951-03010

09953-03010

09956-03010

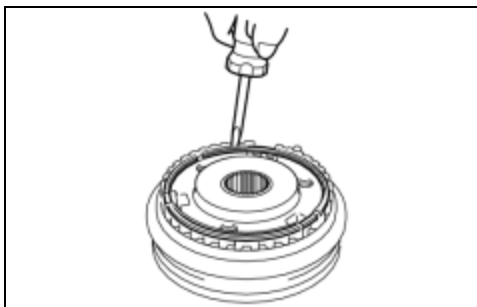
25. REMOVE NO. 4 GEAR SHIFT FORK



- (a) Using a 5 mm pin punch and hammer, remove the slotted spring pin.

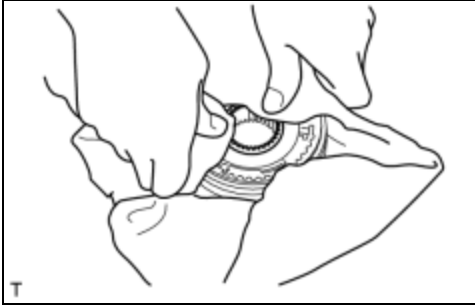
- (b) Remove the No. 4 gear shift fork from the No. 2 gear shift fork shaft.

26. REMOVE NO. 4 TRANSMISSION HUB SLEEVE



- (a) Using a screwdriver, remove the hole snap ring.

- (b) Remove the No. 4 transmission hub sleeve, and then remove the 3 No. 1 synchromesh shifting keys, 3 No. 1 synchromesh shifting key springs and 3 balls from the No. 4 transmission clutch hub.



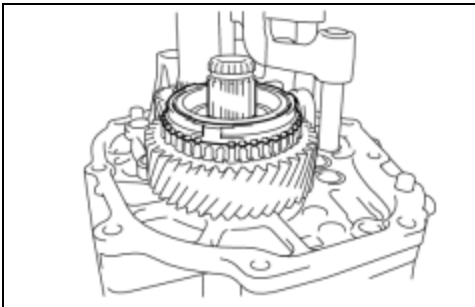
NOTICE:

- Use a cloth to prevent the No. 1 synchromesh shifting keys, No. 1 synchromesh shifting key springs and balls from popping out.
- Do not deform the No. 1 synchromesh shifting key spring.

HINT:

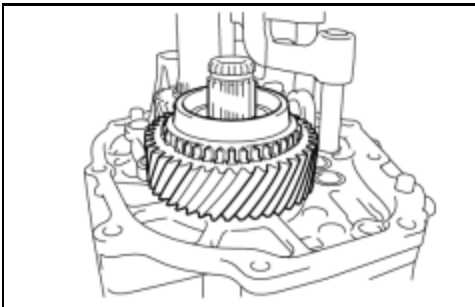
During this operation, keep intact the No. 4 transmission clutch hub and No. 1 synchromesh shifting key.

27. REMOVE NO. 2 SYNCHRONIZER RING



- (a) Remove the No. 2 synchronizer ring.

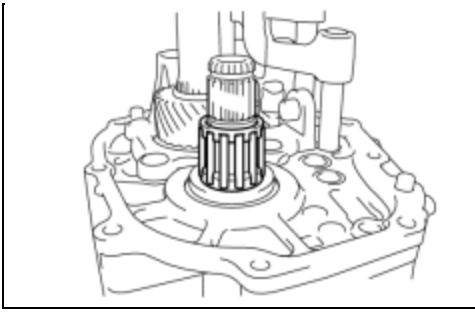
28. REMOVE COUNTER SHAFT 6TH GEAR



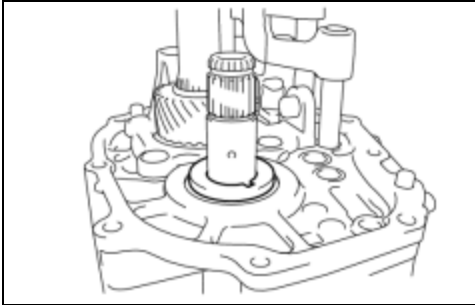
- (a) Remove the counter shaft 6th gear.

29. REMOVE NEEDLE ROLLER BEARING

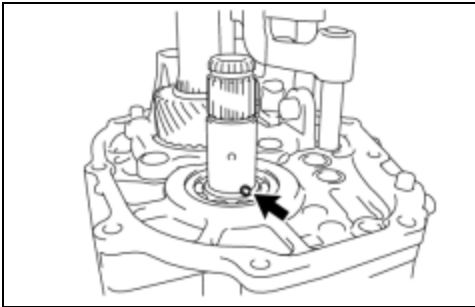
- (a) Remove the needle roller bearing.



30. REMOVE 6TH GEAR THRUST WASHER

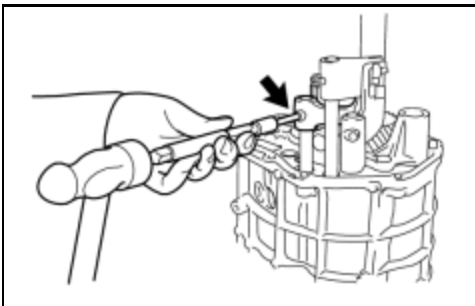


(a) Remove the 6th gear thrust washer.



(b) Remove the straight pin.

31. REMOVE NO. 2 GEAR SHIFT HEAD



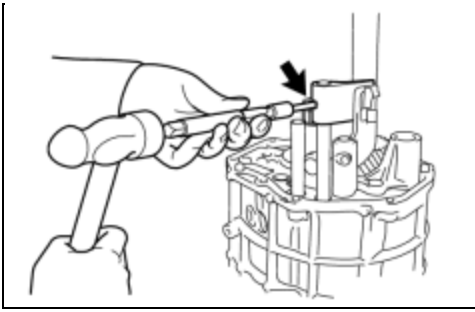
(a) Using a 5 mm pin punch and hammer, remove the slotted spring pin.

NOTICE:

- Use a cloth to prevent the slotted spring pin from flying off.
- Take care in order that the slotted spring pin does not fall inside through the gear shift fork shaft hole.

(b) Remove the No. 2 gear shift head from the No. 2 gear shift fork shaft.

32. REMOVE NO. 1 GEAR SHIFT HEAD



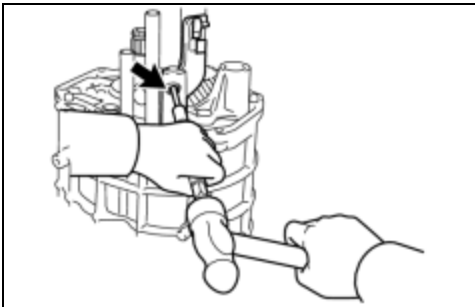
- (a) Using a 5 mm pin punch and a hammer, remove the slotted spring pin.

NOTICE:

- Use a cloth to prevent the slotted spring pin from flying off.
- Take care in order that the slotted spring pin does not fall inside through the gear shift fork shaft hole.

- (b) Remove the No. 1 gear shift head from the No. 1 gear shift fork shaft.

33. REMOVE NO. 3 GEAR SHIFT HEAD



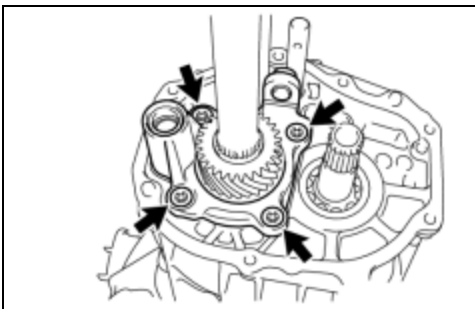
- (a) Using a 5 mm pin punch and a hammer, remove the slotted spring pin.

NOTICE:

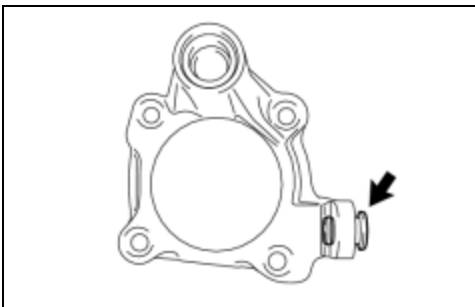
- Use a cloth to prevent the slotted spring pin from flying off.
- Take care in order that the slotted spring pin does not fall inside through the gear shift fork shaft hole.

- (b) Remove the No. 3 gear shift head from the No. 3 gear shift fork shaft.

34. REMOVE REAR BEARING RETAINER

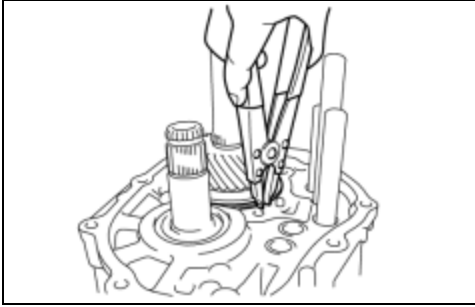


- (a) Using a T45 "TORX" socket wrench, remove the 4 bolts and rear bearing retainer.

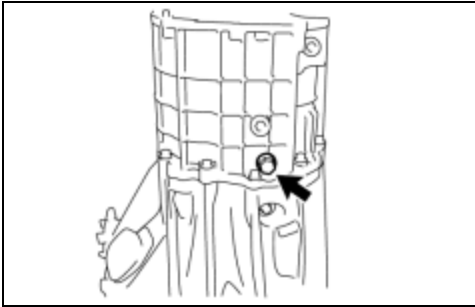


- (b) Remove the shift arm pivot.

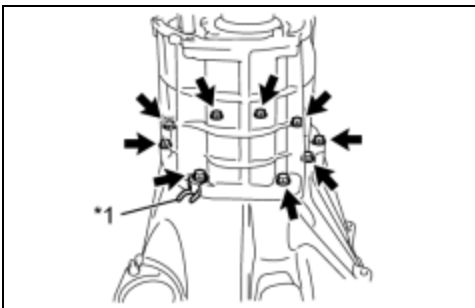
35. REMOVE TRANSMISSION CASE



(a) Using a snap ring expander, remove the shaft snap ring.



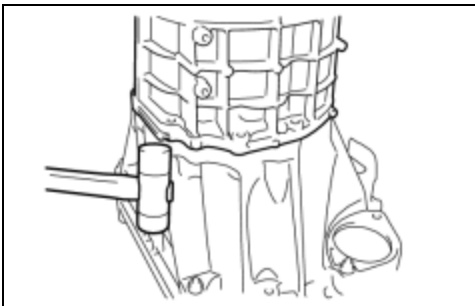
(b) Remove the bolt that retains the reverse idler gear shaft, and the gasket (transmission case side)



(c) Remove the 9 bolts and clamp.

Text in Illustration

*1	Clamp
----	-------

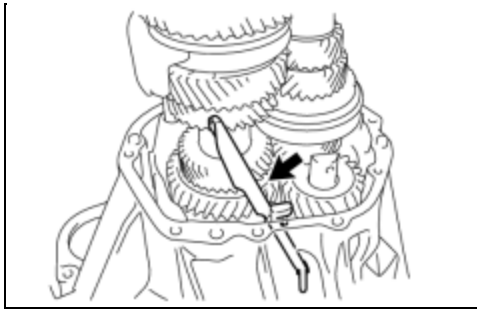


(d) Using a plastic hammer, remove the transmission case.

NOTICE:

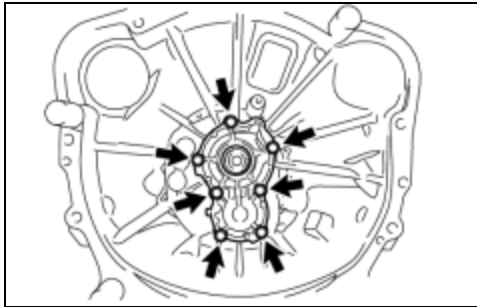
Do not damage the transmission case.

36. REMOVE OIL RECEIVER PIPE



(a) Remove the oil receiver pipe.

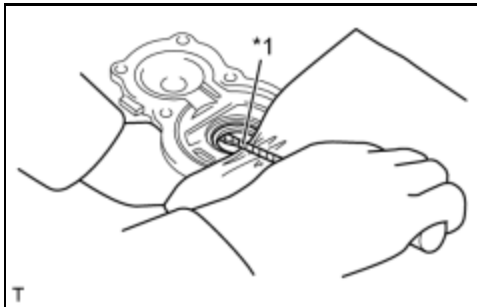
37. REMOVE FRONT BEARING RETAINER



(a) Remove 7 bolts and front bearing retainer.

38. REMOVE TRANSMISSION FRONT BEARING RETAINER OIL SEAL

(a) Using a screwdriver with its tip wrapped with protective tape, remove the transmission front bearing retainer oil seal.



Text in Illustration

*1	Protective Tape
----	-----------------

NOTICE:

Do not damage the front bearing retainer.

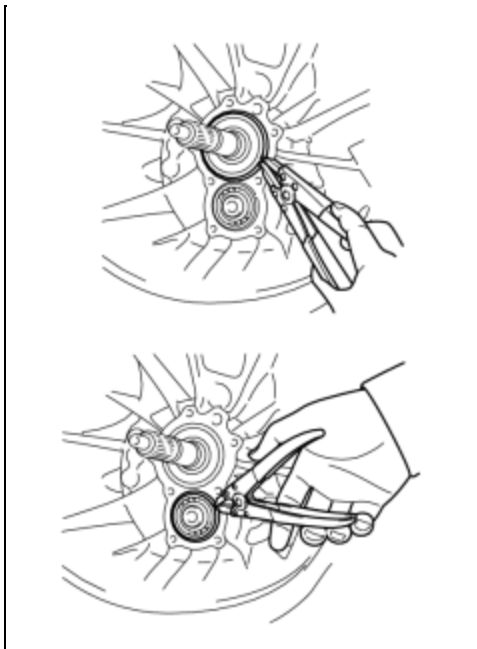
HINT:

Remove the front bearing retainer while protecting it with a piece of cloth.

39. REMOVE COUNTER SHAFT

(a) Using a snap ring expander, remove the 2 shaft snap rings.

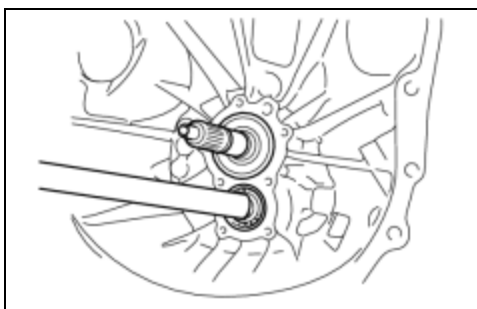
HINT:



Remove the 2 shaft snap rings from the input shaft and counter shaft.



(b) Remove the bolt and gasket to free the reverse idler gear and reverse idler gear shaft. (Clutch housing side)

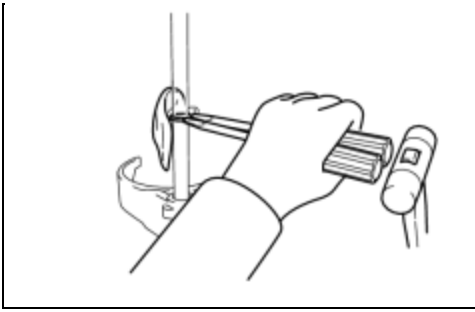


(c) Using a hammer handle edge, tap to remove the input shaft, output shaft, counter shaft, reverse idler gear, reverse idler gear shaft, No. 1 gear shift fork shaft, No. 2 gear shift fork shaft and No. 3 gear shift fork shaft all together from the clutch housing side.

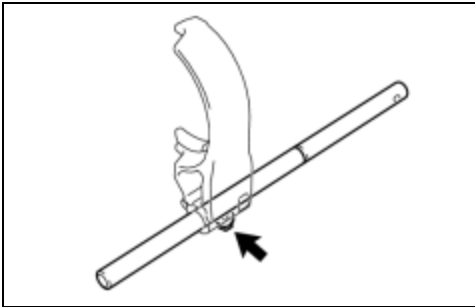
40. REMOVE NO. 2 GEAR SHIFT FORK SHAFT

(a) Using 2 screwdrivers and a plastic hammer, remove the shaft snap ring.

NOTICE:

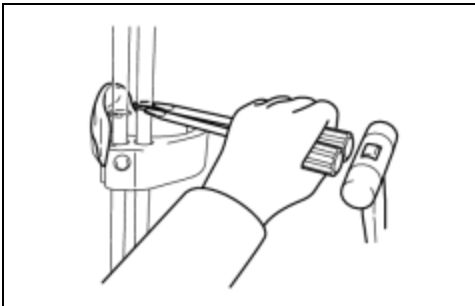


Use a cloth to prevent the shaft snap ring from flying off.



(b) Remove the bolt and No. 2 gear shift fork shaft.

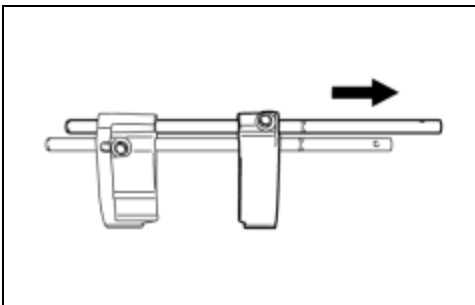
41. REMOVE NO. 1 GEAR SHIFT FORK SHAFT



(a) Using 2 screwdrivers and a plastic hammer, remove the shaft snap ring.

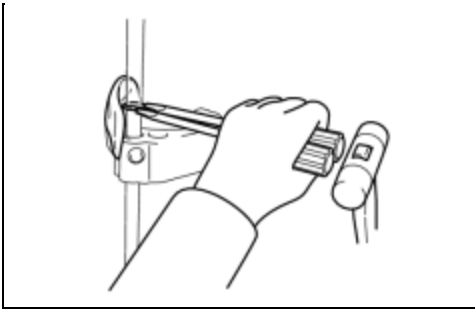
NOTICE:

Use a cloth to prevent the shaft snap ring from flying off.



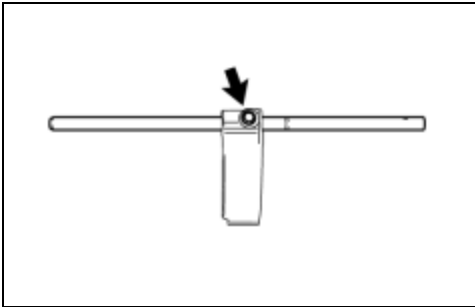
(b) Remove the No. 1 gear shift fork shaft and No.1 gear shift fork together.

(c) Using 2 screwdrivers and a plastic hammer, remove the shaft snap ring.



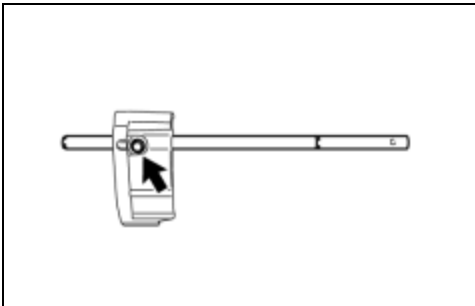
NOTICE:

Use a cloth to prevent the shaft snap ring from flying off.



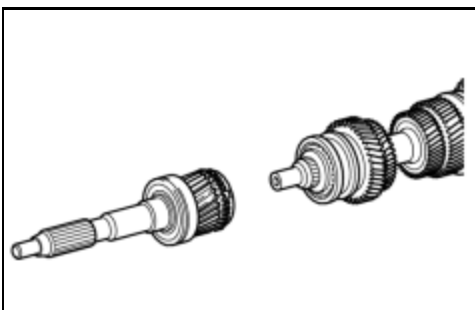
(d) Remove the bolt and No. 1 gear shift fork shaft.

42. REMOVE NO. 3 GEAR SHIFT FORK SHAFT



(a) Remove the bolt and No. 3 gear shift fork shaft.

43. REMOVE INPUT SHAFT

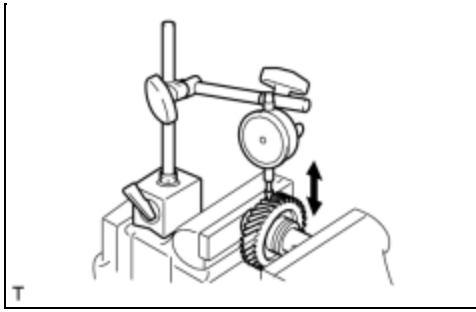


(a) Remove the input shaft from the output shaft.

44. INSPECT REVERSE IDLER GEAR RADIAL CLEARANCE

(a) Use a vice to secure the reverse idler gear, and then use a dial indicator to measure the radial clearance.

Standard clearance:



0.040 to 0.082 mm (0.00157 to 0.00323 in.)

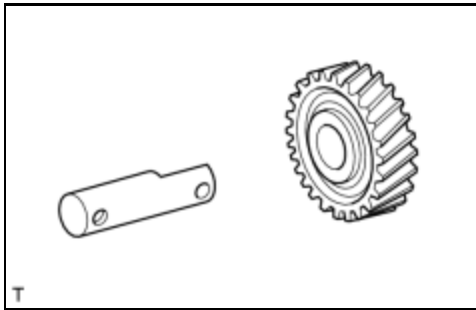
Maximum clearance:

0.082 mm (0.00323 in.)

HINT:

If the clearance exceeds the maximum, replace the reverse idler gear and reverse idler gear shaft with a new ones.

45. REMOVE REVERSE IDLER GEAR SHAFT

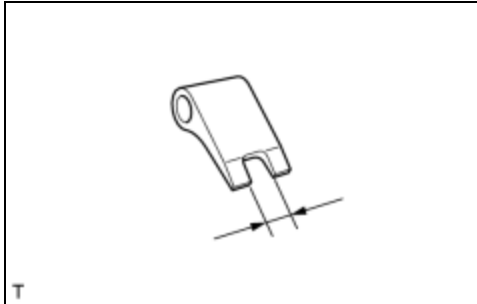


- (a) Remove the reverse idler gear shaft from the reverse idler gear.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000590P000X
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: MANUAL TRANSAXLE UNIT: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT NO. 1 GEAR SHIFT HEAD



- (a) Using a vernier caliper, measure the clearance of the No. 1 gear shift head groove.

Standard clearance:

15.2 to 15.4 mm (0.59843 to 0.60630 in.)

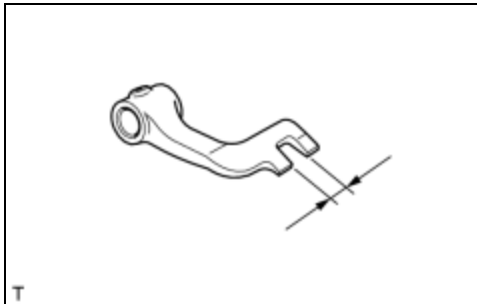
Maximum clearance:

15.4 mm (0.60630 in.)

HINT:

If the clearance exceeds the maximum, replace the No. 1 gear shift head with a new one.

2. INSPECT NO. 2 GEAR SHIFT HEAD



- (a) Using a vernier caliper, measure the clearance of the No. 2 gear shift head groove.

Standard clearance:

15.2 to 15.4 mm (0.59843 to 0.60630 in.)

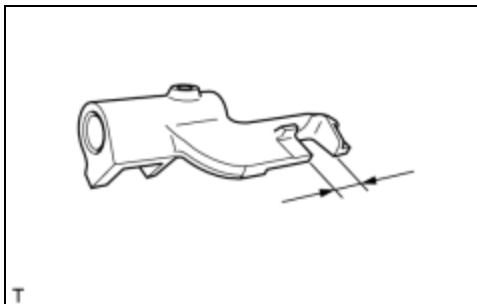
Maximum clearance:

15.4 mm (0.60630 in.)

HINT:

If the clearance exceeds the maximum, replace the No. 2 gear shift head with a new one.

3. INSPECT NO. 3 GEAR SHIFT HEAD



- (a) Using a vernier caliper, measure the clearance of the No. 3 gear shift head groove.

Standard clearance:

15.2 to 15.4 mm (0.598 to 0.606 in.)

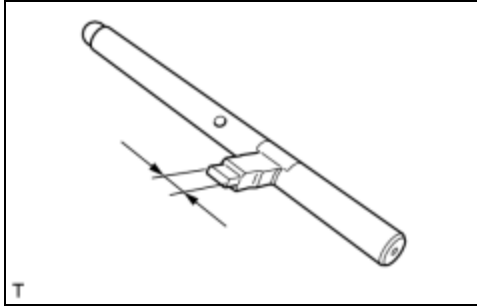
Maximum clearance:

15.4 mm (0.606 in.)

HINT:

If the clearance exceeds the maximum, replace the No. 3 gear shift head with a new one.

4. INSPECT SHIFT SHAFT



- (a) Using a vernier caliper, measure the claw width of the shift shaft.

Standard width:

14.8 to 15.0 mm (0.583 to 0.591 in.)

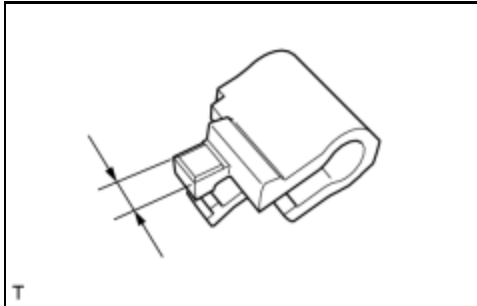
Minimum width:

14.8 mm (0.583 in.)

HINT:

If the width is less than the minimum, replace the gear shift with a new one.

5. INSPECT NO. 1 SHIFT INTER LOCK BLOCK



- (a) Using a vernier caliper, measure the claw width of the No. 1 shift inter lock block.

Standard width:

14.8 to 15.0 mm (0.583 to 0.591 in.)

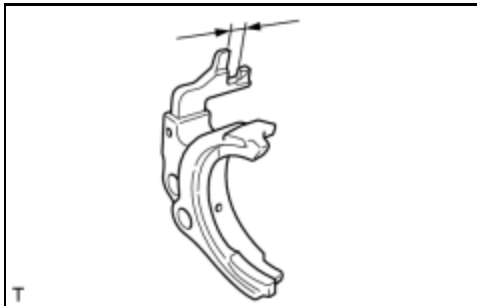
Minimum width:

14.8 mm (0.583 in.)

HINT:

If the width is less than the minimum, replace the No. 1 shift inter lock block.

6. INSPECT NO. 4 GEAR SHIFT FORK



- (a) Using a vernier caliper, measure the clearance of the No. 4 gear shift fork groove.

Standard clearance:

15.2 to 15.4 mm (0.598 to 0.606 in.)

Maximum clearance:

15.4 mm (0.606 in.)

HINT:

If the clearance exceeds the maximum, replace the No. 4 gear shift fork with a new one.

7. INSPECT 5TH SHIFT HEAD

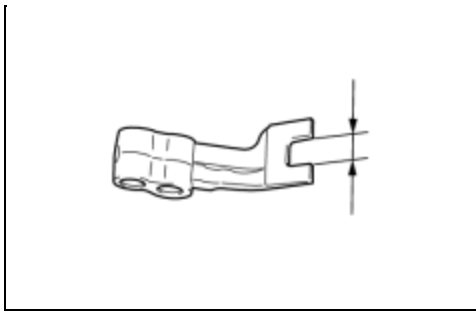
- (a) Using a vernier caliper, measure the clearance of the 5th shift head groove.

Standard clearance:

15.2 to 15.4 mm (0.598 to 0.606 in.)

Maximum clearance:

15.4 mm (0.606 in.)

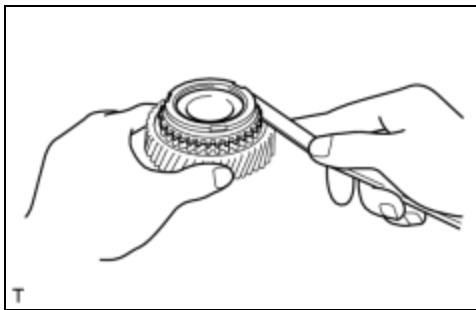


HINT:

If the clearance exceeds the maximum, replace the 5th shift head with a new one.

8. INSPECT NO. 2 SYNCHRONIZER RING

- (a) Apply manual transmission gear oil to the taper cone of the counter shaft 6th gear, and then hold the No. 2 synchronizer ring in position with your hand to measure the clearance between the No. 2 synchronizer ring and counter shaft 6th gear by using a feeler gauge.



Standard clearance:

0.88 to 1.52 mm (0.0346 to 0.0598 in.)

Minimum clearance:

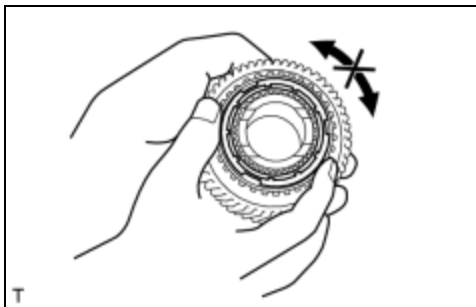
0.88 mm (0.0346 in.)

NOTICE:

Check the entire circumference of the gear.

HINT:

If the clearance is less than the minimum, replace the No. 2 synchronizer ring and counter shaft 6th gear with a new one.



- (b) Apply manual transmission gear oil to the taper cone of the counter shaft 6th gear, and then hold the No. 2 synchronizer ring in position with your hand to check that it does not slide in the circumferential direction.

HINT:

If the No. 2 synchronizer ring slides, replace the No. 2 synchronizer ring and counter shaft 6th gear with a new one.

9. INSPECT COUNTER SHAFT 6TH GEAR

- (a) Using a cylinder gauge, measure the inside diameter of the counter shaft 6th gear.

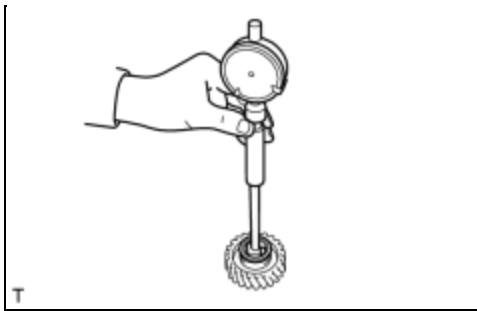
Standard inside diameter:

34.015 to 34.040 mm (1.33917 to 1.34016 in.)

Maximum inside diameter:

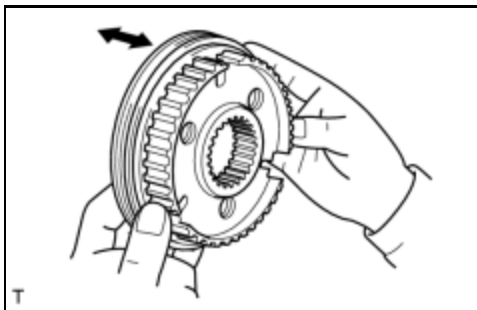
34.040 mm (1.34016 in.)

HINT:



If the inside diameter exceeds the maximum, replace the counter shaft 6th gear with a new one.

10. INSPECT NO. 4 TRANSMISSION HUB SLEEVE



- (a) Check that the spline gear edges of the No. 4 transmission hub sleeve are not worn down.

HINT:

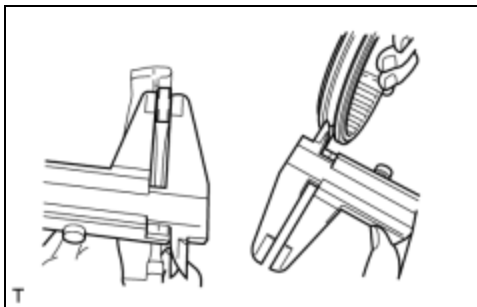
If it shows any sign of wear, replace the No. 4 transmission hub sleeve with a new one.

- (b) Install the No. 4 transmission hub sleeve to the No. 4 transmission clutch hub, and then check that it slides smoothly.

HINT:

If it does not slide smoothly, replace the No. 4 transmission hub sleeve and No. 4 transmission clutch hub with a new one.

11. INSPECT NO. 4 TRANSMISSION HUB SLEEVE CLEARANCE



- (a) Using a vernier caliper, measure the claw width of the No. 4 gear shift fork.

Standard width:

7.9 to 8.0 mm (0.311 to 0.315 in.)

Minimum width:

7.9 mm (0.311 in.)

HINT:

If the width is less than the minimum, replace the gear No. 4 shift fork with a new one.

- (b) Using a vernier caliper, measure the groove of the No. 4 transmission hub sleeve and then calculate the clearance with the No. 4 gear shift fork.

Standard clearance:

0.15 to 0.35 mm (0.00590 to 0.0138 in.)

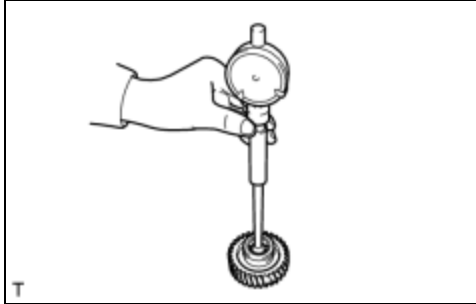
Maximum clearance:

0.35 mm (0.0138 in.)

HINT:

If the clearance exceeds the maximum, replace both the No. 4 gear shift fork and No. 4 transmission hub sleeve with a new ones.

12. INSPECT REVERSE IDLER GEAR



(a) Using a cylinder gauge, measure the inner diameter of the reverse idler gear.

Standard inside diameter:

22.040 to 22.061mm (0.86771 to 0.86854 in.)

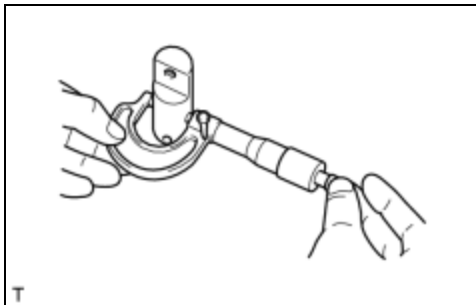
Maximum inside diameter:

22.061mm (0.86854 in.)

HINT:

If the inside diameter exceeds the maximum, replace the reverse idler gear with a new one.

13. INSPECT REVERSE IDLER GEAR SHAFT



(a) Using a micrometer, measure the outer diameter of the reverse idler gear shaft.

Standard outer diameter:

21.979 to 22.000 mm (0.86531 to 0.86614 in.)

Minimum outer diameter:

21.979 mm (0.86531 in.)

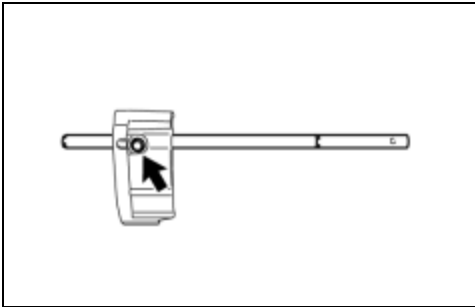
HINT:

If the outer diameter is less than the minimum, replace the reverse idler gear shaft with a new one.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002RHV007X
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: MANUAL TRANSAXLE UNIT: REASSEMBLY (2013 FR-S)		

REASSEMBLY

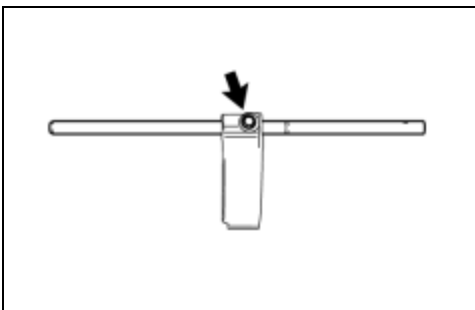
1. INSTALL NO. 3 GEAR SHIFT FORK SHAFT



- (a) Install the No. 3 gear shift fork shaft to the No. 3 gear shift fork with a new bolt.

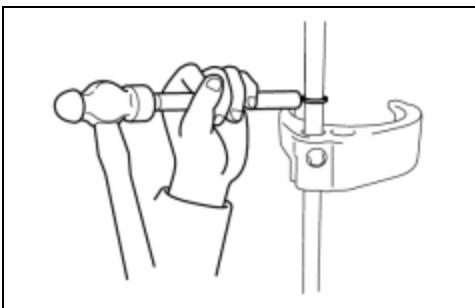
Torque: 20 N·m (199 kgf·cm, 14ft·lbf)

2. INSTALL NO. 1 GEAR SHIFT FORK SHAFT

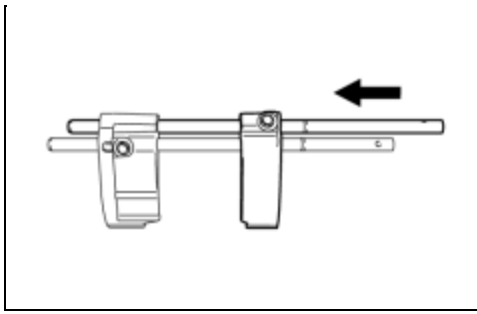


- (a) Install the No. 1 gear shift fork shaft to the No. 1 gear shift fork with a new bolt.

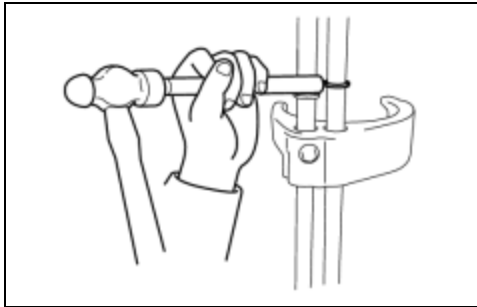
Torque: 20 N·m (199 kgf·cm, 14ft·lbf)



- (b) Using a brass bar and a hammer, install a new shaft snap ring.

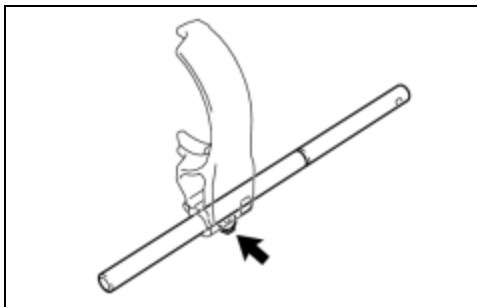


- (c) Install the No. 1 gear shift fork shaft together with the No. 1 gear shift fork to the No. 3 gear shift fork shaft and No. 3 gear shift fork.



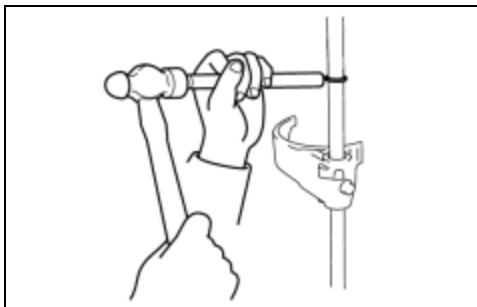
- (d) Using a brass bar and a hammer, install a new shaft snap ring.

3. INSTALL NO. 2 GEAR SHIFT FORK SHAFT



- (a) Install the No. 2 gear shift fork shaft to the No. 2 gear shift fork with a new bolt.

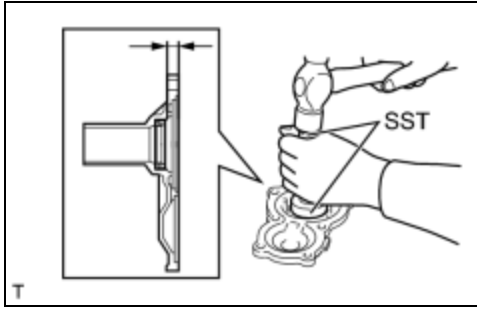
Torque: 20 N·m (199 kgf·cm, 14ft·lbf)



- (b) Using a brass bar and a hammer, install a new shaft snap ring.

4. INSTALL TRANSMISSION FRONT BEARING RETAINER OIL SEAL

- (a) Using SST and a hammer, install a new transmission front bearing retainer oil seal.



SST: 09950-60010

09951-00420

SST: 09950-70010

09951-07100

Installation depth:

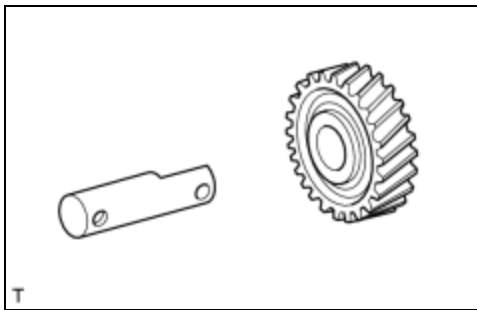
11.1 to 11.9 mm (0.437 to 0.469 in.) (from the end surface of the front bearing retainer)

NOTICE:

- Do not damage the lip of the transmission front bearing retainer oil seal.
- Do not damage the front bearing retainer.

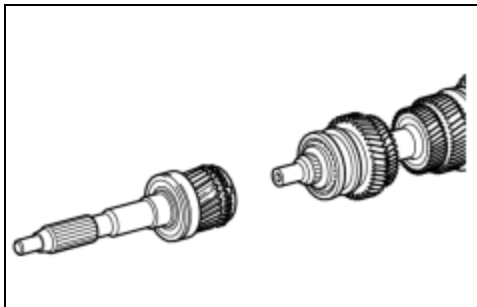
(b) Apply MP grease to the lip of the transmission front bearing retainer oil seal.

5. INSTALL REVERSE IDLER GEAR SHAFT



(a) Apply manual transmission gear oil to the reverse idler gear shaft, and then install it to the reverse idler gear.

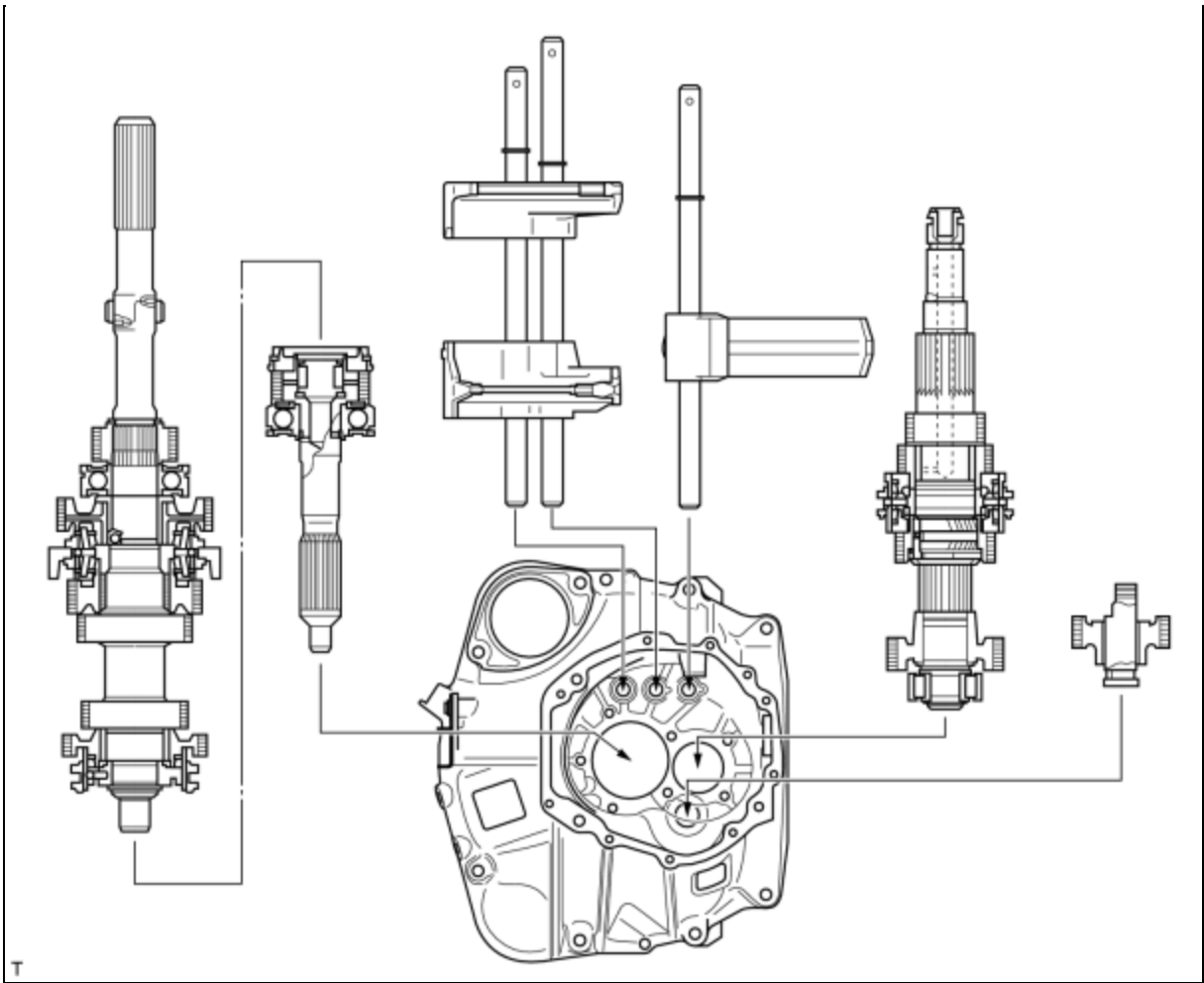
6. INSTALL INPUT SHAFT



(a) Apply manual transmission gear oil to the needle roller bearing of the input shaft, and then install the input shaft to the output shaft.

7. INSTALL COUNTER SHAFT

(a) Install the input shaft, output shaft, counter shaft, reverse idler gear, reverse idler gear shaft, No. 1 gear shift fork shaft, No. 2 gear shift fork shaft and No. 3 gear shift fork shaft all together to the clutch housing.

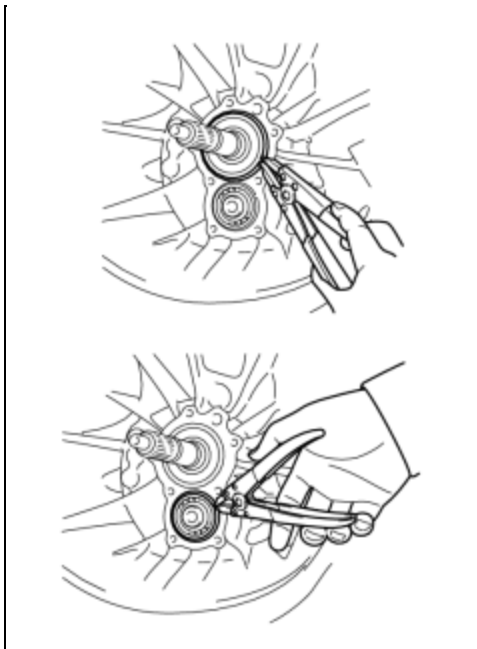


(b) Using a new gasket and a new bolt, temporarily install the reverse idler gear shaft (clutch housing side).

(c) Using a snap ring expander, install 2 new shaft snap rings.

HINT:

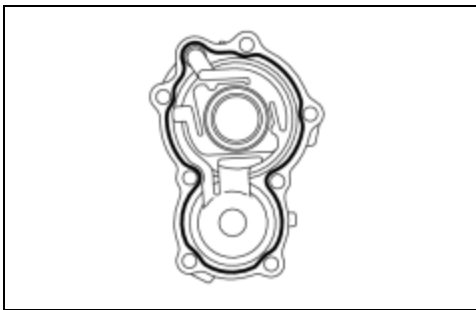
Install the shaft snap rings to the input shaft and counter



shaft.

8. INSTALL FRONT BEARING RETAINER

(a) Apply seal packing 1281 continuously to the front bearing retainer as shown in the illustration.

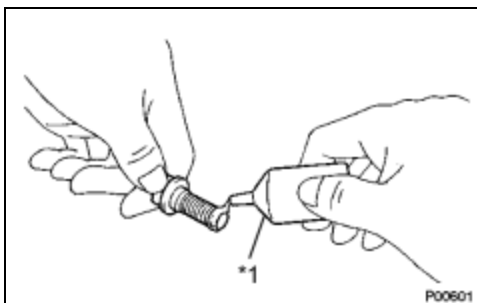


Text in Illustration

	Seal Packing 1281
--	-------------------

NOTICE:

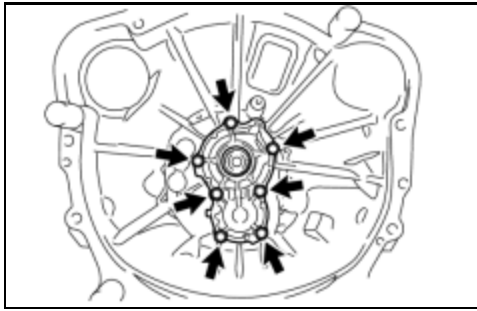
Install it within 10 minutes of the seal packing application.



(b) Apply adhesive 1344 to the 2nd and 3rd pitches from the tip of new bolt.

Text in Illustration

*1	Adhesive 1344
----	---------------



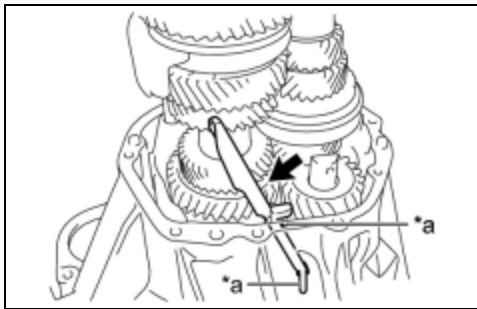
(c) Install the front bearing retainer with the 7 bolts.

Torque: 17 N·m (173 kgf·cm, 13ft·lbf)

NOTICE:

Install the front bearing retainer ensuring that the transmission front bearing retainer oil seal lip is not damaged.

9. INSTALL OIL RECEIVER PIPE



(a) Install the oil receiver pipe.

NOTICE:

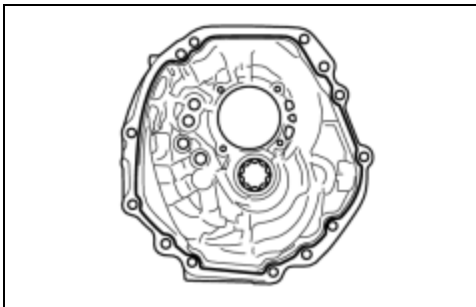
Confirm that the protrusions of the oil receiver pipe are properly fitted in the grooves.

Text in Illustration


*a	Protrusion
----	------------

10. INSTALL TRANSMISSION CASE

(a) Apply seal packing 1281 continuously to the transmission case as shown in the illustration.



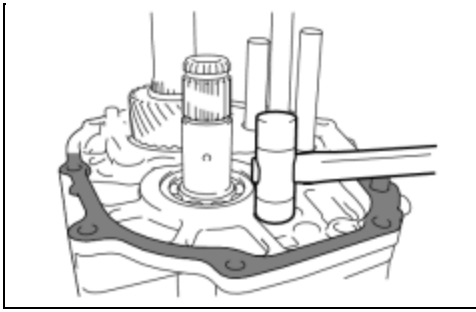
Text in Illustration

	Seal Packing 1281
---	-------------------


NOTICE:

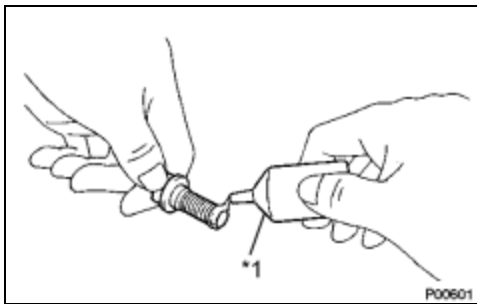
Install within 10 minutes of the seal packing application.

(b) Check the location of the knock pin, and then using a plastic hammer, install the transmission case.



Text in Illustration

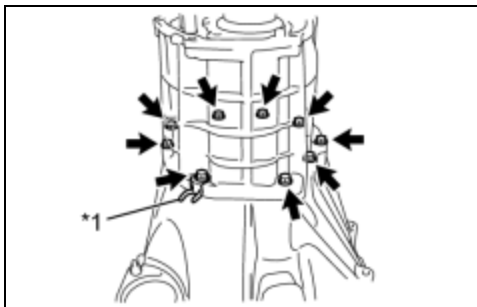
	<p>Do not hit hard.</p>
---	-------------------------



(c) Apply adhesive 1324 to the 2nd and 3rd pitches.

Text in Illustration

*1	Adhesive 1324
----	---------------

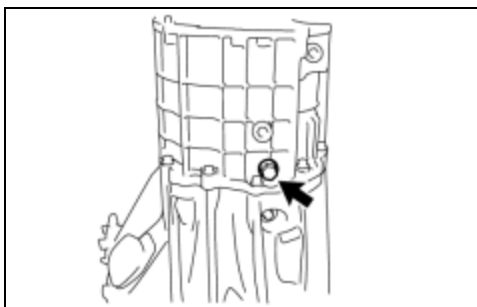


(d) Install the transmission case and clamp with the 9 bolts.

Text in Illustration

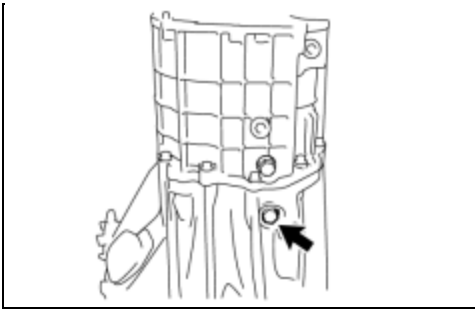
*1	clamp
----	-------

Torque: 29 N·m (296 kgf·cm, 21ft·lbf)



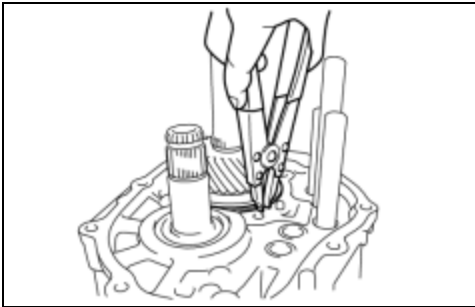
(e) Install a new reverse idler gear shaft fixing bolt and new gasket (transmission case side).

Torque: 28 N·m (286 kgf·cm, 21ft·lbf)



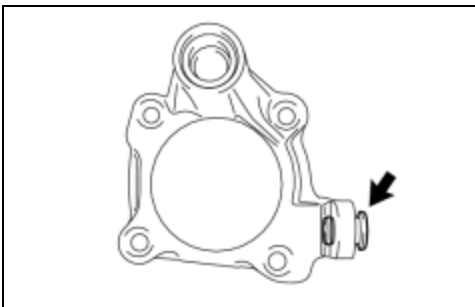
(f) Securely tighten the reverse idler gear shaft fixing bolt (clutch housing side).

Torque: 28 N·m (286 kgf·cm, 21ft·lbf)

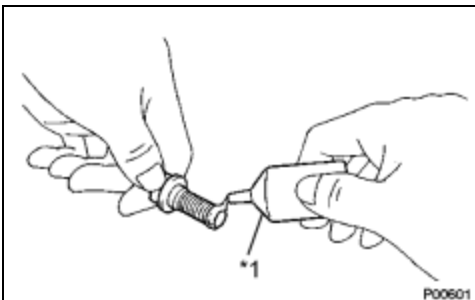


(g) Using a snap ring expander, install a new shaft snap ring.

11. INSTALL REAR BEARING RETAINER



(a) Install the shift arm pivot to the rear bearing retainer.

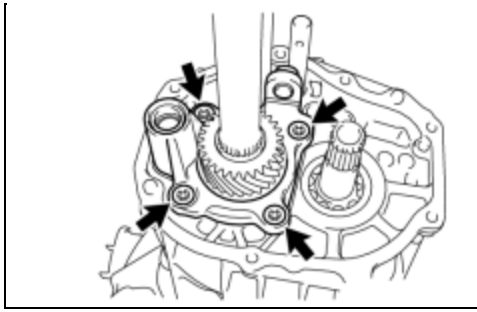


(b) Apply adhesive 1324 to the 2nd and 3rd pitches from the tip of new bolt.

Text in Illustration

*1	Adhesive 1324
----	---------------

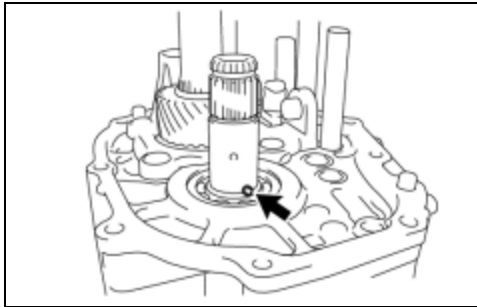
(c) Using a T45 "TORX" socket wrench, install the rear



bearing retainer with the 4 bolts.

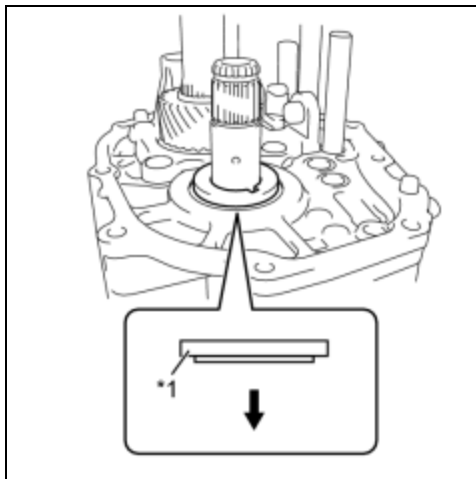
Torque: 30 N·m (306 kgf·cm, 22ft·lbf)

12. INSTALL 6TH GEAR THRUST WASHER




(a) Install the straight pin to the counter shaft.

(b) Apply manual transmission gear oil to the 6th gear thrust washer.

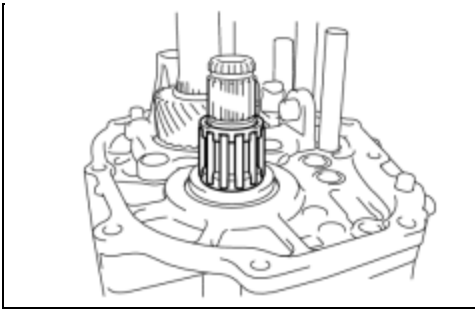


Text in Illustration

*1	6th Gear Thrust Washer
	Front Side

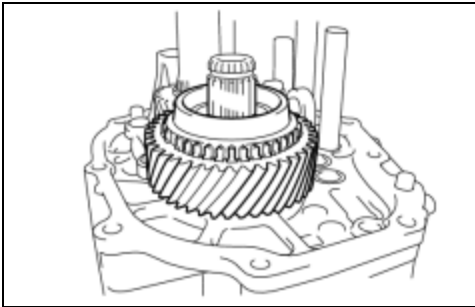
(c) As shown in the illustration, install the 6th gear thrust washer to the counter shaft.

13. INSTALL NEEDLE ROLLER BEARING



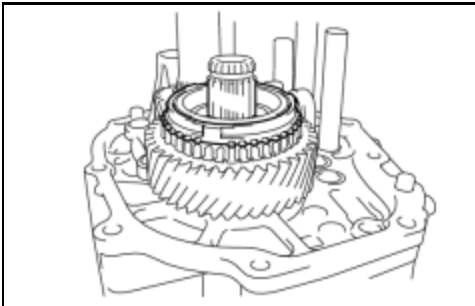
- (a) Apply manual transmission gear oil to the needle roller bearing, and then install the needle roller bearing to the counter shaft.

14. INSTALL COUNTER SHAFT 6TH GEAR



- (a) Apply manual transmission gear oil to the counter shaft 6th gear, and then install the counter shaft 6th gear to the counter shaft.

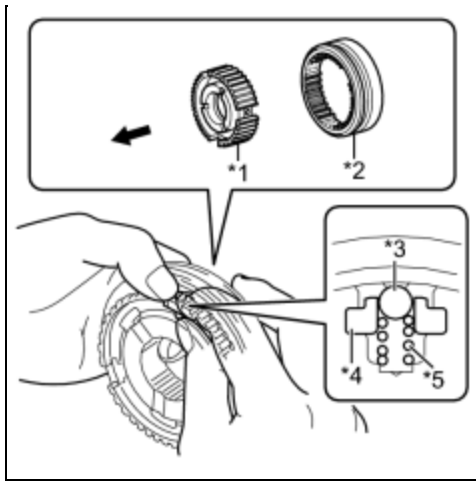
15. INSTALL NO. 2 SYNCHRONIZER RING




- (a) Apply manual transmission gear oil to the No. 2 synchronizer ring, and then install the No. 2 synchronizer ring to the counter shaft.

16. INSTALL NO. 4 TRANSMISSION HUB SLEEVE

- (a) Apply manual transmission gear oil to the moving parts of the No. 4 transmission clutch hub.



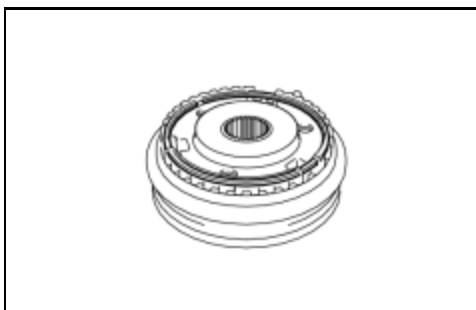
Text in Illustration

*1	No. 4 Transmission Clutch Hub
*2	No. 4 Transmission Hub Sleeve
*3	Ball
*4	No. 1 Synchromesh Shifting Key
*5	No. 1 Synchromesh Shifting Key Spring
	Front Side

(b) As shown in the illustration, install the No. 4 transmission hub sleeve to the No. 4 transmission clutch hub, and install the 3 No. 1 synchromesh shifting keys and 3 No. 1 synchromesh shifting key springs all together, and then install the 3 balls.

HINT:

- Install the ball while holding down the No. 1 synchromesh shifting key spring.
- After the installation, settle the No. 1 synchromesh shifting key spring.

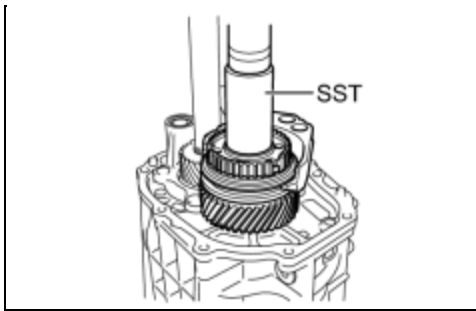


(c) Install a new hole snap ring.

17. INSTALL NO. 4 TRANSMISSION CLUTCH HUB

(a) Using SST and a press, install the No. 4 transmission clutch hub, No. 4 transmission hub sleeve, and No. 4 gear shift fork all together.

SST: 09632-36010



HINT:

- Align the No. 4 transmission clutch hub and the No. 2 synchronizer ring so that they can fit together.
- Engage the No. 4 gear shift fork with the groove of the No. 4 transmission hub sleeve.

18. INSTALL SHAFT SNAP RING

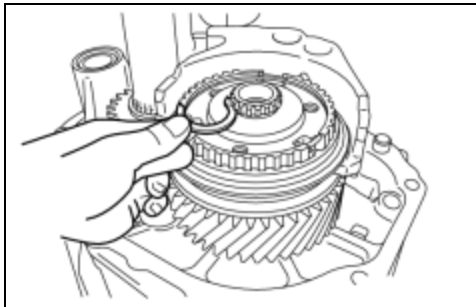
- (a) Select a shaft snap ring that is suitable to retain the specific thrust clearance between the No. 4 transmission clutch hub and shaft snap ring.

Standard clearance:

0 to 0.1 mm (0 to 0.00394 in.)

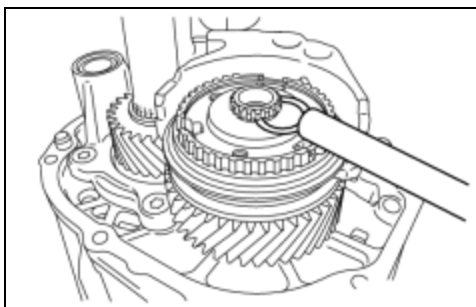
HINT:

Select the thickest shaft snap ring possible for installation.



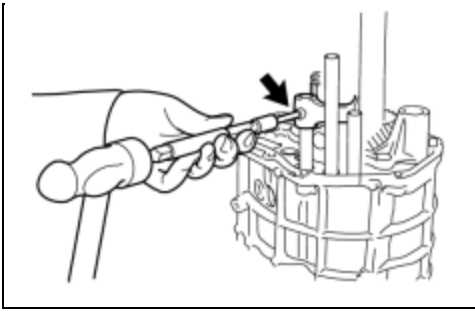
Shaft Snap Ring Thickness

PART NO.	THICKNESS MM (IN.)	MARK
SU003-03552	2.80 (0.11023)	A
SU003-03553	2.85 (0.11220)	B
SU003-03554	2.90 (0.11417)	C
SU003-03555	2.95 (0.11614)	D
SU003-03556	3.00 (0.11811)	E
SU003-03557	3.05 (0.12007)	F



- (b) Using a brass bar and a hammer, install a new shaft snap ring to the counter shaft.

19. INSTALL NO. 2 GEAR SHIFT HEAD



(a) Install the No. 2 gear shift head to the No. 2 gear shift fork shaft.

(b) Using a 5 mm pin punch and a hammer, install a new slotted spring pin to the No. 2 gear shift fork shaft.

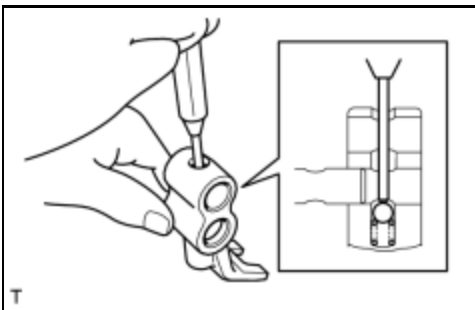
NOTICE:

Do not tap the pin too deep.

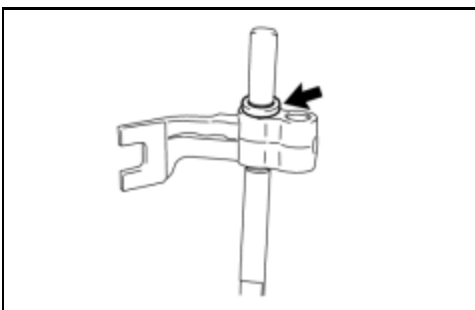
Standard depth:

0 mm (0 in.) (from the end surface of the No. 2 gear shift head)

20. INSTALL 5TH SHIFT HEAD



(a) Install the compression spring to the 5th shift head, and then, while holding down the ball with the 5 mm pin punch, install the 5th shift head to the No. 3 gear shift fork shaft.

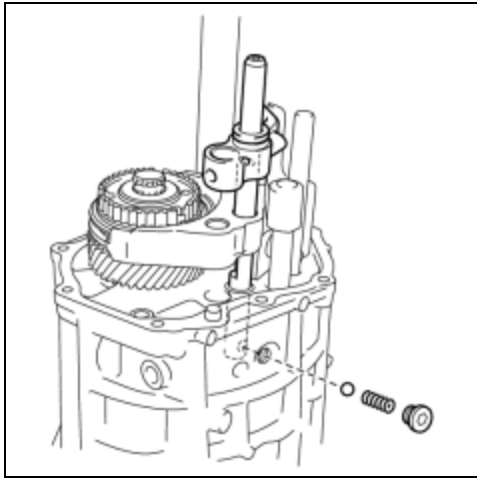


(b) Install the washer.

(c) Using a brass bar and a hammer, install a new shaft snap ring to the No. 3 gear shift fork shaft.



21. INSTALL NO. 3 GEAR SHIFT FORK SHAFT



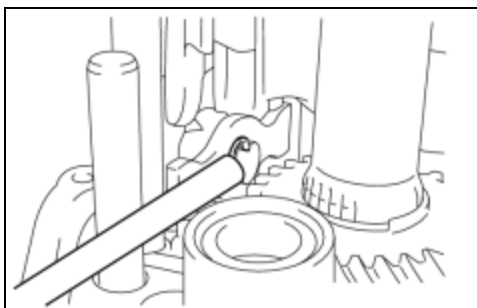
- (a) As shown in the illustration, insert the No. 3 gear shift fork shaft. Using a T40 "TORX" socket wrench, install the ball and compression spring, and then tighten with a new head straight screw plug.

Torque: 19 N·m (194 kgf·cm, 14ft·lbf)

22. INSTALL SHIFT ARM

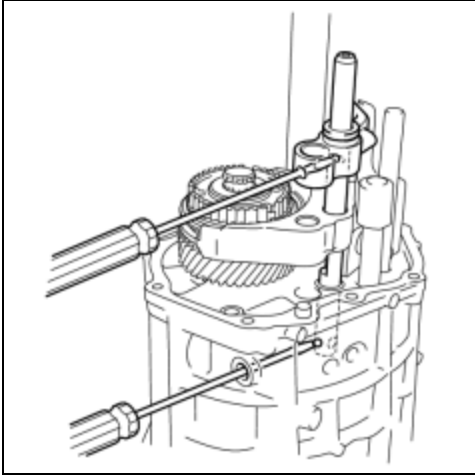


- (a) Install the shift arm to the shift arm pivot.



- (b) Using a brass bar and a hammer, install a new E- ring to the shift arm pivot.

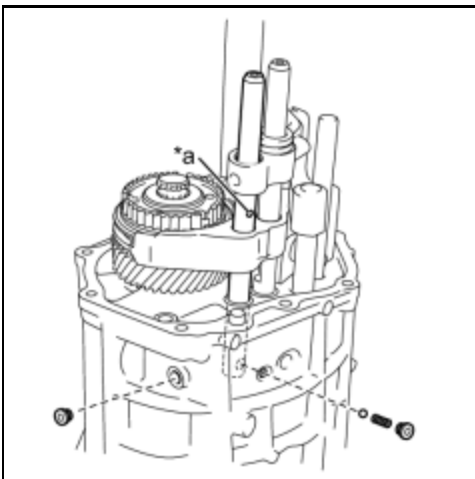
23. INSTALL NO. 2 GEAR SHIFT FORK SHAFT



- (a) Using a screwdriver, install the 2 balls to the No. 3 gear shift fork shaft.

HINT:

Support the ball with the screwdriver so that the ball does not fall off.

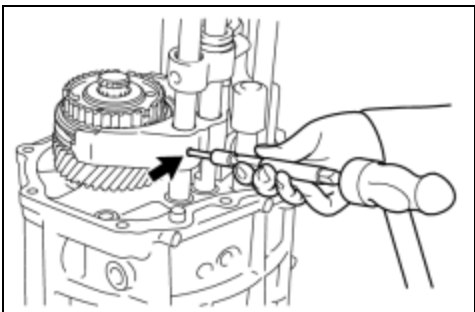


- (b) While the identification hole is facing towards the outside, insert the No. 2 gear shift fork shaft. And then, using a T40 "TORX" socket wrench, install the ball and compression spring, and then tighten 2 new head straight screw plugs.

Text in Illustration

*a	Identification Hole
----	---------------------

Torque: 19 N·m (194 kgf·cm, 14ft·lbf)



- (c) Using a 5 mm pin punch and a hammer, install a new slotted spring pin to the No. 2 gear shift fork shaft.

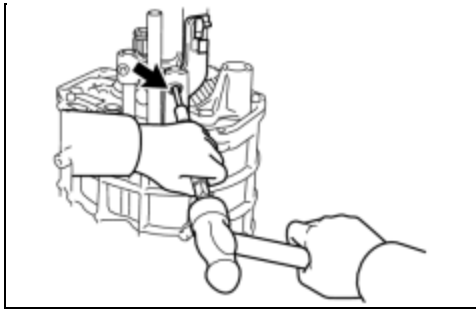
NOTICE:

Do not tap the pin too deep.

Standard depth:

0 mm (0 in.) (from the end surface of the No. 4 gear shift fork)

24. INSTALL NO. 3 GEAR SHIFT HEAD



(a) Install the No. 3 gear shift head to the No. 3 gear shift fork shaft.

HINT:

While rotating, install the No. 3 gear shift head so that the shift arm is engaged with the groove of the No. 3 gear shift head.

(b) Using a 5 mm pin punch and a hammer, install a new slotted spring pin to the No. 3 gear shift fork shaft.

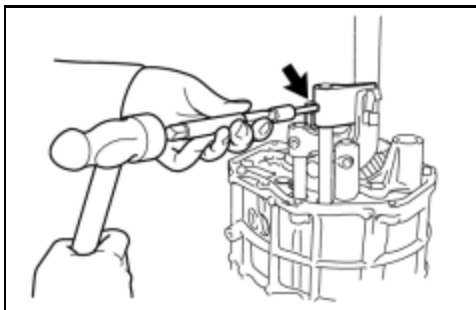
NOTICE:

Do not tap the pin too deep.

Standard depth:

0 mm (0 in.) (from the end surface of the No. 3 gear shift head)

25. INSTALL NO. 1 GEAR SHIFT HEAD



(a) Install the No. 1 gear shift head to the No. 1 gear shift fork shaft.

(b) Using a 5 mm pin punch and a hammer, install a new slotted spring pin to the No. 1 gear shift fork shaft.

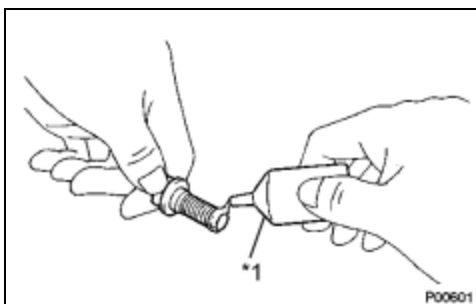
NOTICE:

Do not tap the pin too deep.

Standard depth:

0 mm (0 in.) (from the end surface of the No. 1 gear shift head)

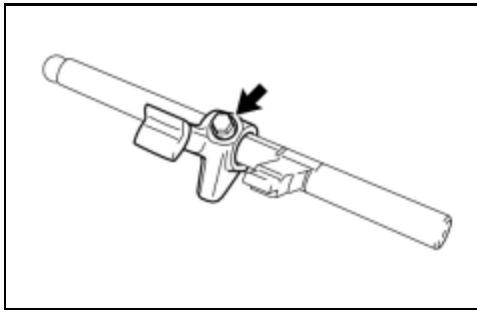
26. INSTALL FRONT SHIFT INNER LEVER



(a) Apply adhesive 1324 to the 2nd and 3rd pitches from the tip of new bolt.

Text in Illustration

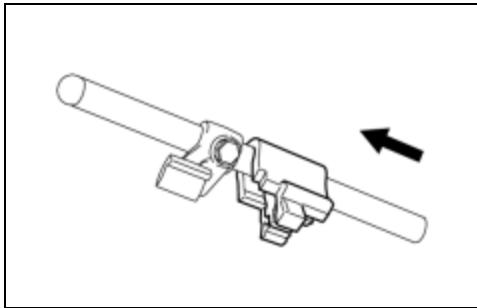
*1	Adhesive 1324
----	---------------



- (b) Install the front shift inner lever to the shift shaft with a new bolt.

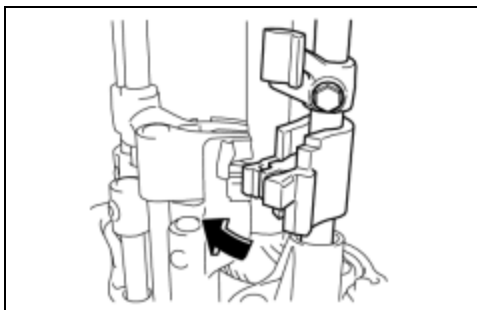
Torque: 33 N·m (340 kgf·cm, 25ft·lbf)

27. INSTALL NO. 1 SHIFT INTER LOCK BLOCK



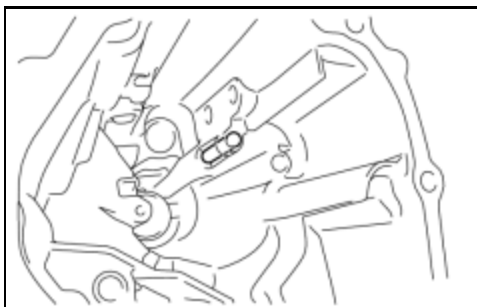
- (a) Install the No. 1 shift inter lock block to the shift shaft.

28. INSTALL SHIFT SHAFT

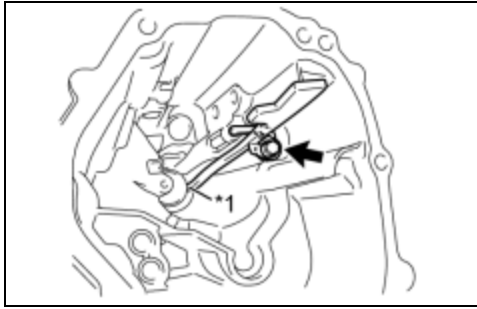


- (a) Install the shift shaft and No. 1 shift inter lock block by sliding them.

29. INSTALL NO. 1 EXTENSION HOUSING OIL RECEIVER PIPE



- (a) Install the straight pin.



- (b) Install the No. 1 extension housing oil receiver pipe and stopper plate with a new bolt.

Text in Illustration

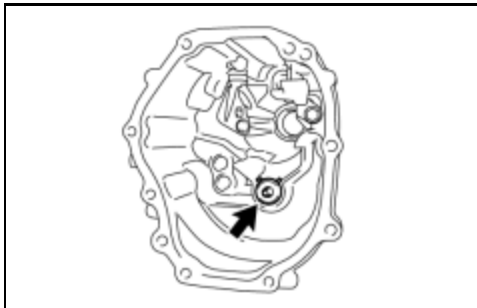
*1	No. 1 Extension Housing Oil Receiver Pipe End
----	---

Torque: 8.5 N·m (87 kgf·cm, 75in·lbf)

NOTICE:

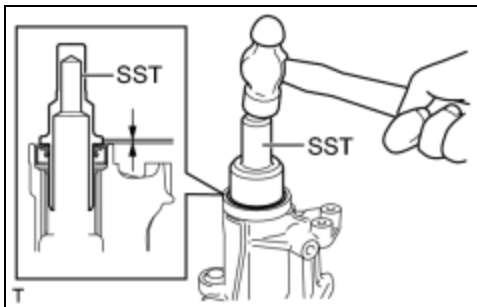
Confirm that the end of No. 1 extension housing oil receiver pipe is properly fitted in the groove.

30. INSTALL NO. 2 EXTENSION HOUSING OIL RECEIVER PIPE



- (a) Install the No. 2 extension housing oil receiver pipe.

31. INSTALL TRANSMISSION EXTENSION HOUSING OIL SEAL



- (a) Apply MP grease to the lip of the new transmission extension housing oil seal.

- (b) Using SST and a hammer, install a new transmission extension housing oil seal.

SST: 09325-20010

Installation depth:

0.1 to 1.1 mm (0.00394 to 0.0433 in.) (from the end surface of the transmission extension housing sub-assembly)

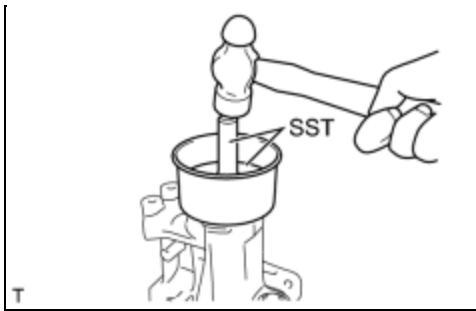
NOTICE:

Do not damage the lip of the transmission extension housing oil seal.

32. INSTALL EXTENSION HOUSING DUST DEFLECTOR

- (a) Using SST and a hammer, install a new extension housing dust deflector.

SST: 09950-60020



09951-00750

SST: 09950-70010

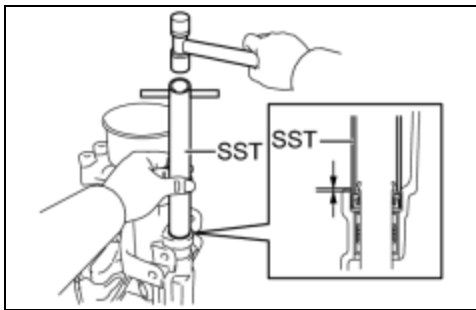
09951-07100

HINT:

Make sure to tap it until it touches the transmission extension housing sub-assembly.

33. INSTALL EXTENSION HOUSING REAR OIL SEAL

(a) Using SST and a hammer, install a new extension housing rear oil seal.



SST: 09612-70100

09612-07210

Installation depth:

1.0 to 2.0 mm (0.0394 to 0.0787 in.) (from the end surface of the transmission extension housing sub-assembly)

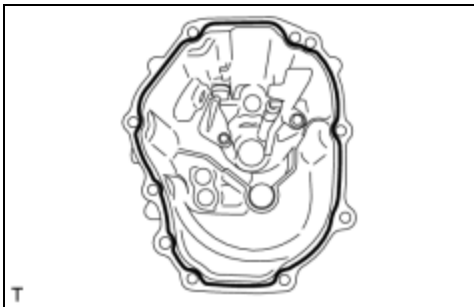
NOTICE:

Do not damage the lip of the extension housing rear oil seal.


(b) Apply MP grease to the lip of the extension housing rear oil seal.

34. INSTALL TRANSMISSION EXTENSION HOUSING SUB-ASSEMBLY

(a) Apply seal packing 1281 continuously to the transmission extension housing sub-assembly as shown in the illustration.



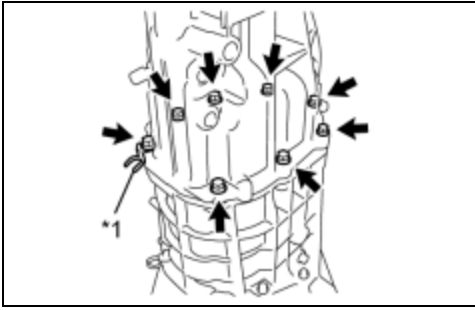
Text in Illustration

	Seal Packing 1281
---	-------------------

NOTICE:

Install it within 10 minutes of the seal packing application.

(b) Install the transmission extension housing sub-assembly and clamp with 8 new bolts.



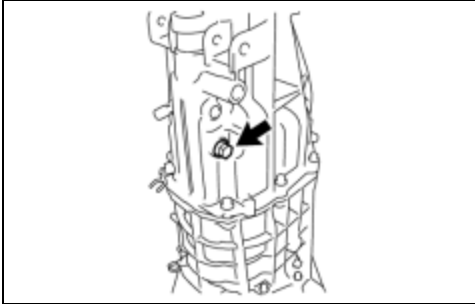
Text in Illustration

*1	clamp
----	-------

Torque: 29 N·m (296 kgf·cm, 21ft·lbf)

NOTICE:

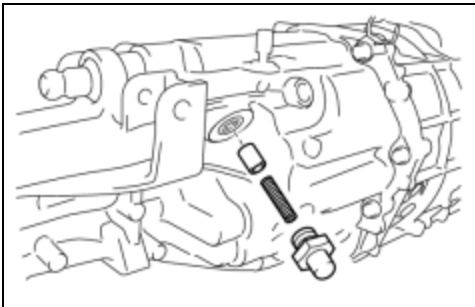
- Be sure to install the transmission extension housing sub-assembly while the transmission is in neutral.
- Make sure to align the knock pin with the hole securely.



(c) Install a new bolt.

Torque: 31 N·m (316 kgf·cm, 23ft·lbf)

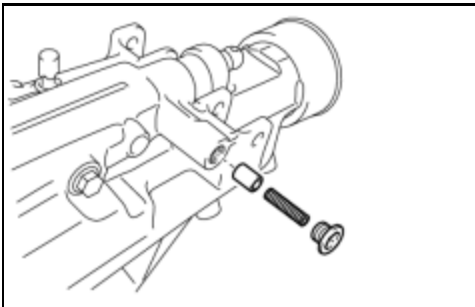
35. INSTALL HOLDER



(a) Using a 27 mm deep socket wrench, install a new holder, compression spring and lock ball pin.

Torque: 39 N·m (400 kgf·cm, 29ft·lbf)

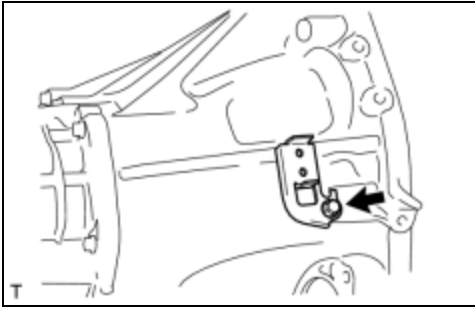
36. INSTALL LOCK BALL PIN



(a) Using a 10 mm hexagon socket wrench, install a new head straight screw plug, compression spring and lock ball pin.

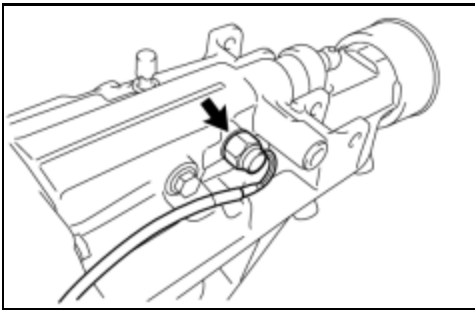
Torque: 25 N·m (250 kgf·cm, 18ft·lbf)

37. INSTALL WIRE HARNESS CLAMP BRACKET



- (a) Install the wire harness clamp bracket with a new bolt.
Torque: 7.0 N·m (71 kgf·cm, 62in·lbf)

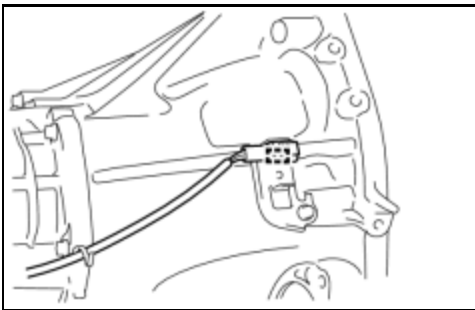
38. INSTALL NEUTRAL POSITION SWITCH ASSEMBLY



- (a) Using a 19 mm union nut wrench, install the neutral position switch assembly and a new gasket.
Torque: 32 N·m (329 kgf·cm, 24ft·lbf)

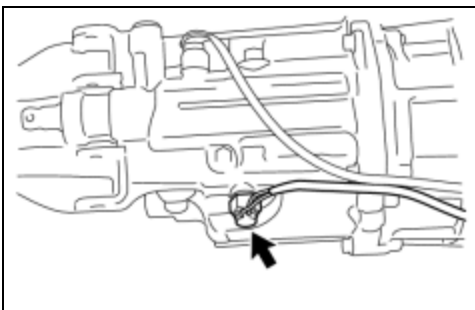
NOTICE:

Use the formula to calculate special torque values for situations where the union nut wrench is combined with a torque wrench **INFO** .



- (b) Engage the clamp and connect the neutral position switch assembly wire.

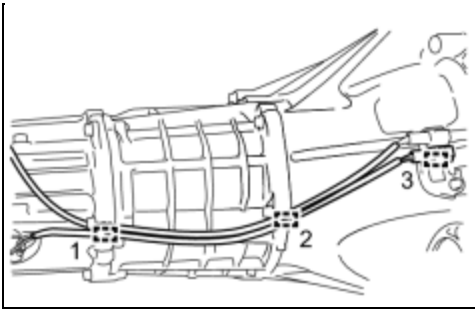
39. INSTALL BACK-UP LIGHT SWITCH ASSEMBLY



- (a) Using a 19 mm union nut wrench, install the back-up light switch assembly and a new gasket.
Torque: 32 N·m (329 kgf·cm, 24ft·lbf)

NOTICE:

Use the formula to calculate special torque values for situations where the union nut wrench is combined with a torque wrench **INFO** .

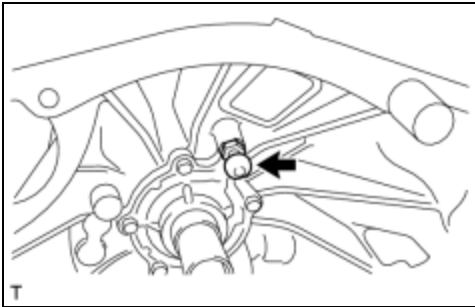


- (b) In the order indicated in the illustration, engage the 3 clamps in place, and connect the back-up light switch assembly wire and neutral position switch assembly wire.

HINT:

Install the wire harness so that there is slack on the connector side.

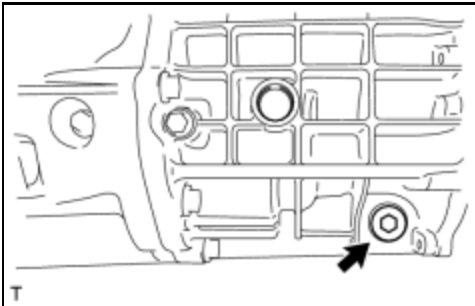
40. INSTALL RELEASE FORK SUPPORT



- (a) Using a 19 mm deep socket wrench, install the release fork support to the clutch housing.

Torque: 16 N·m (163 kgf·cm, 12ft·lbf)

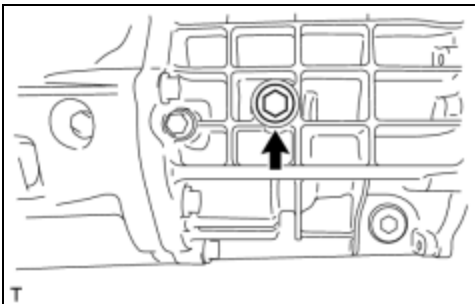
41. INSTALL MANUAL TRANSMISSION DRAIN PLUG



- (a) Install the manual transmission drain plug with a new gasket to the transmission case.

Torque: 37 N·m (377 kgf·cm, 27ft·lbf)

42. INSTALL MANUAL TRANSMISSION FILLER PLUG



- (a) Install the manual transmission filler plug with a new gasket to the transmission case.

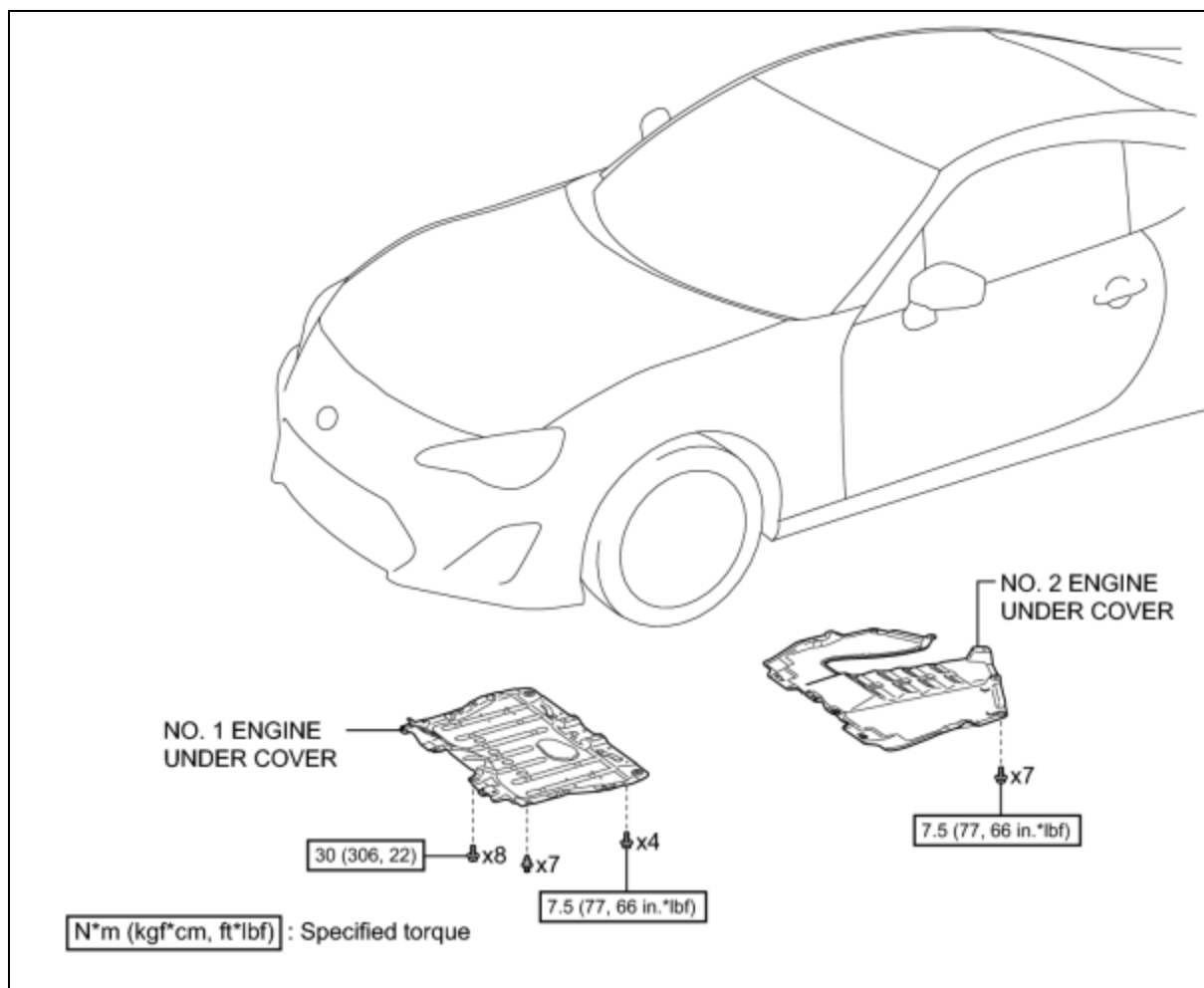
Torque: 37 N·m (377 kgf·cm, 27ft·lbf)



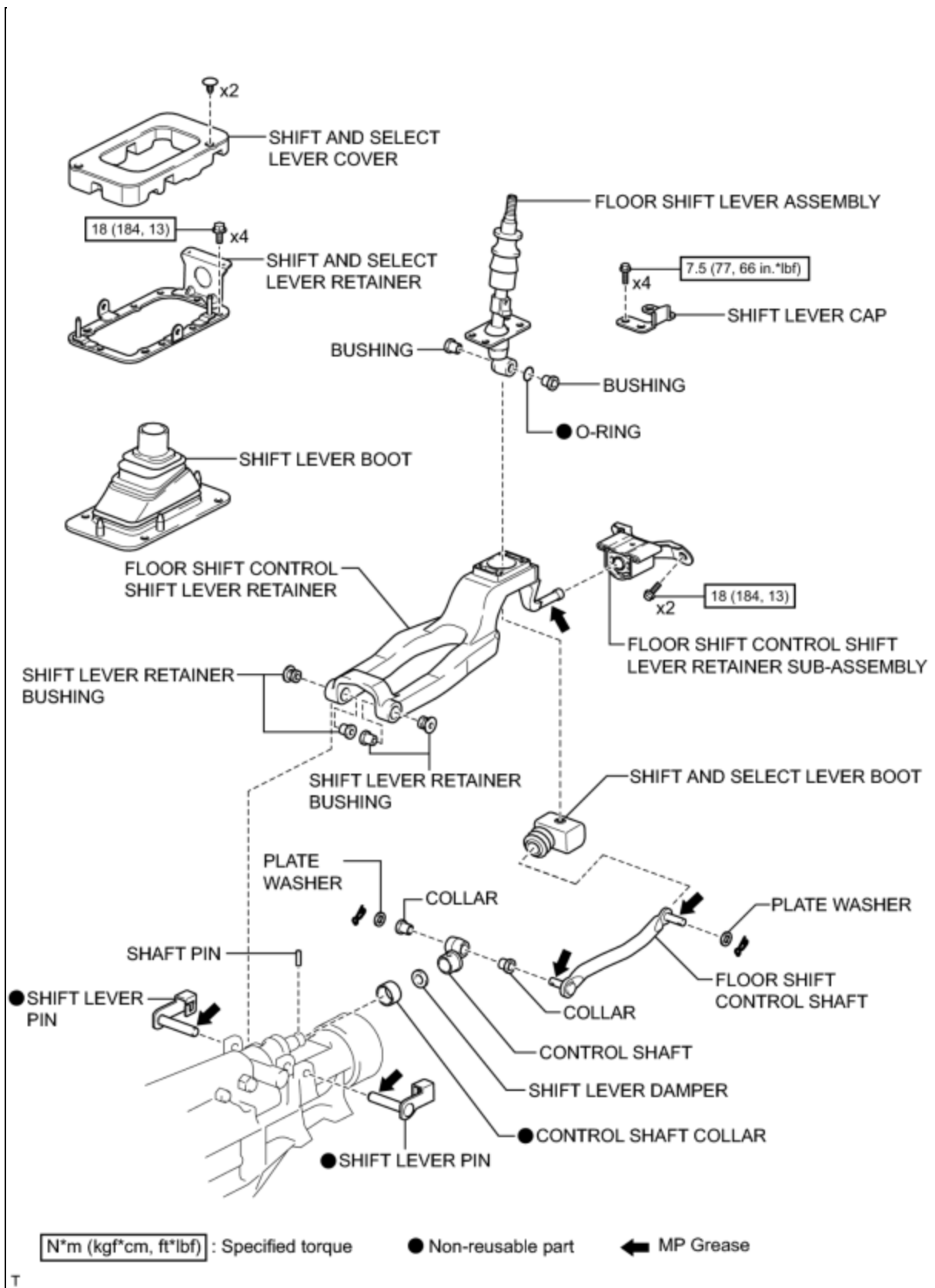
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001P1600KX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: MANUAL TRANSMISSION ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

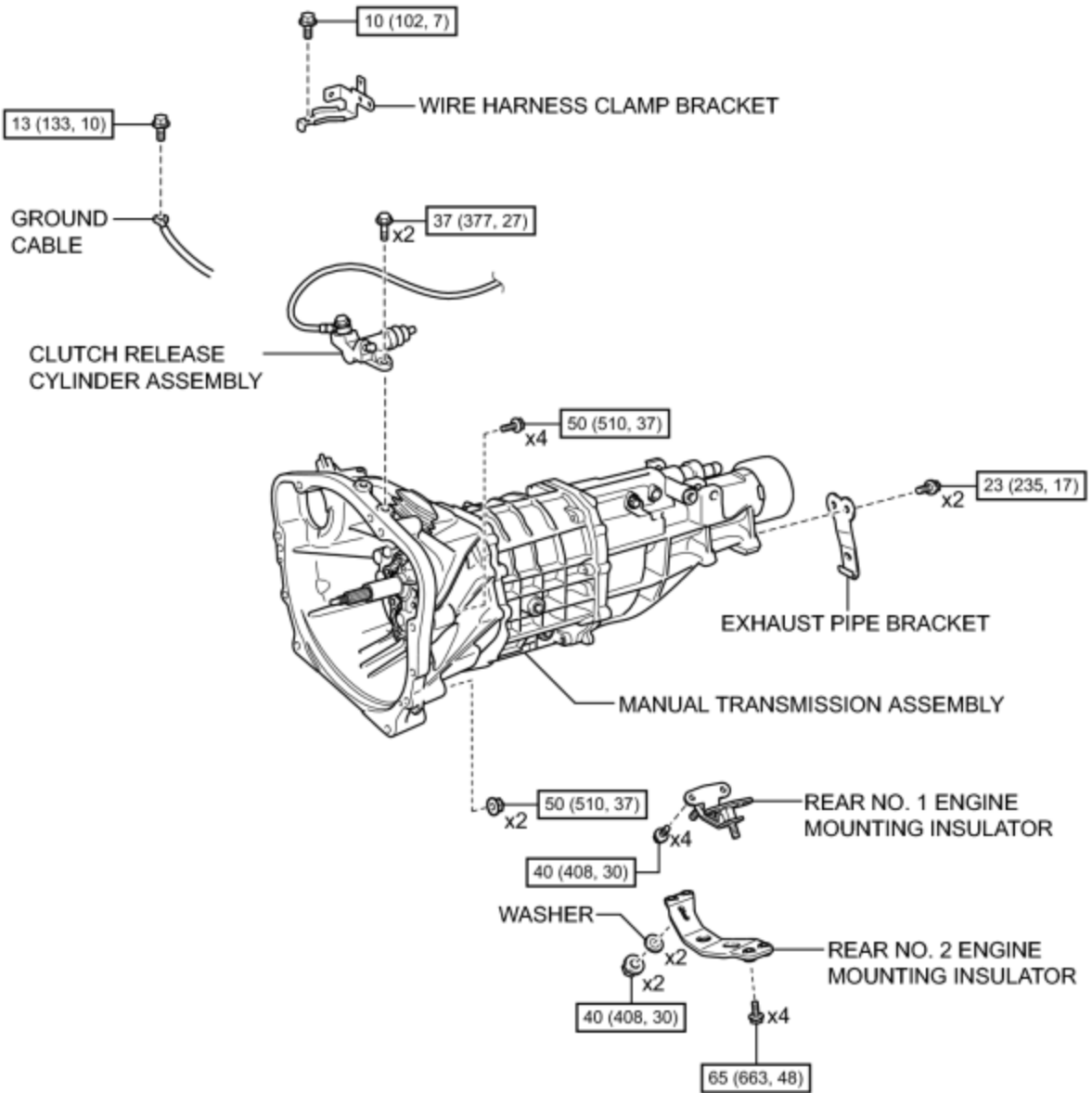
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION



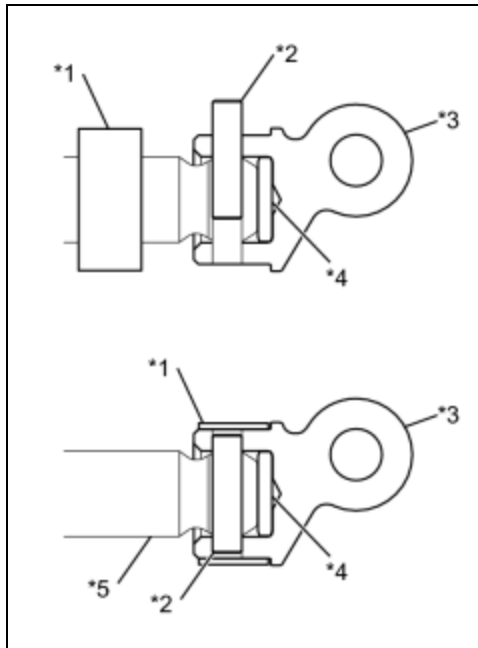
N*m (kgf*cm, ft*lb) : Specified torque

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001P1500UX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: MANUAL TRANSMISSION ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL CONTROL SHAFT

- (a) Install a new control shaft collar onto the shift shaft.
- (b) Install the shift lever damper and control shaft to the shift shaft.
- (c) Using a pin punch (5 mm (0.197 in.)) and a hammer, align the control shaft hole and the shift shaft hole with the cutout of the control shaft collar, and insert the shaft pin from above.
- (d) Slide the control shaft collar until it comes into contact with the stopper of the control shaft, then stake it to the cutout.



NOTICE:

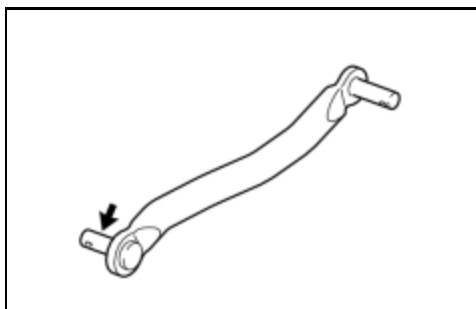
Be careful to install the floor shift control shaft in the proper direction.

Text in Illustration

*1	Control Shaft Collar
*2	Shaft Pin
*3	Control Shaft
*4	Shift Lever Damper
*5	Shift Shaft

2. INSTALL FLOOR SHIFT CONTROL SHAFT

- (a) Apply a light coat of with MP grease to the floor shift control shaft.



Text in Illustration

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MP grease

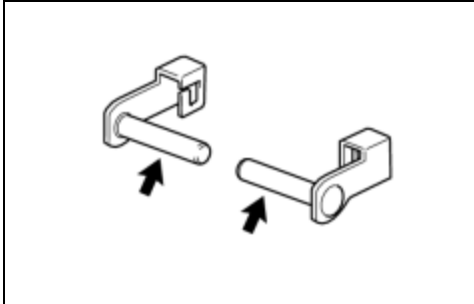
- (b) Install the 2 collars to the floor shift control shaft.
- (c) Install the plate washer and clip.

3. INSTALL SHIFT LEVER RETAINER BUSHING

- (a) Install the 4 shift lever retainer bushings.

4. INSTALL FLOOR SHIFT CONTROL SHIFT LEVER RETAINER

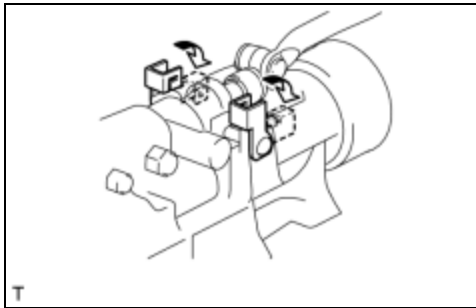
- (a) Apply a light coat of with MP grease to the new 2 shift lever pins.



Text in Illustration



MP grease

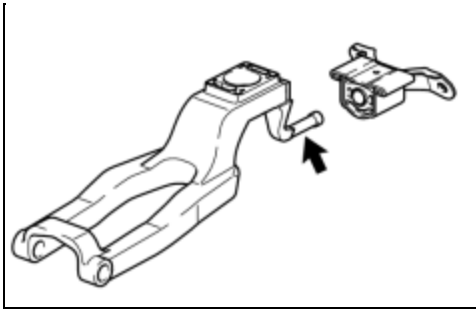


- (b) Install the floor shift control shift lever retainer with the 2 shift lever pins.


- (c) Secure the shift lever pins to the extension housing sub-assembly.

5. INSTALL FLOOR SHIFT CONTROL SHIFT LEVER RETAINER SUB-ASSEMBLY

- (a) Apply a light coat of with MP grease to the floor shift control shift lever retainer sub-assembly.



Text in Illustration

	MP grease
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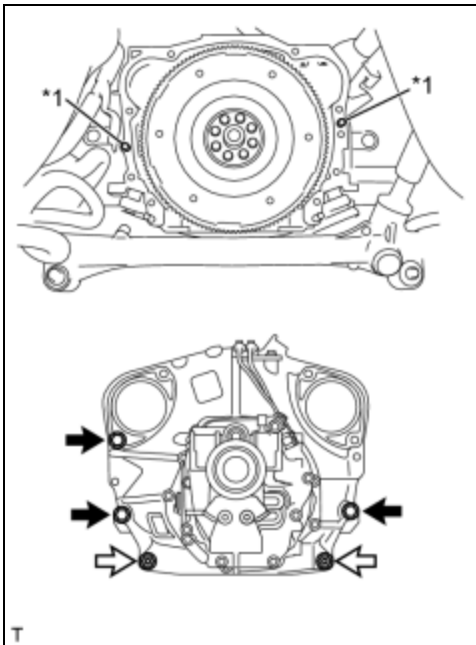
(b) Install the floor shift control shift lever retainer sub-assembly to the floor shift control shift lever retainer.

6. INSTALL REAR NO. 1 ENGINE MOUNTING INSULATOR

(a) Install the rear No. 1 engine mounting insulator to the manual transmission assembly with the 4 bolts.

Torque: 40 N·m (408 kgf·cm, 30ft·lbf)

7. INSTALL MANUAL TRANSMISSION ASSEMBLY





(a) Confirm that 2 knock pins are on the manual transmission assembly contact surface of the engine cylinder block before manual transmission assembly installation.

(b) Install the manual transmission assembly to the engine with the 3 bolts and 2 nuts.

Text in Illustration

*1	Knock Pin
	Bolt

	
	Nut

Torque: 50 N·m (510 kgf·cm, 37ft·lbf)

NOTICE:

- Do not apply excessive force to the transmission assembly as this will break the input shaft.
- Insert dowel pins into the dowel holes securely so that the end face of the transmission assembly fits close against the engine assembly before tightening the bolts.

8. INSTALL REAR NO. 2 ENGINE MOUNTING INSULATOR

- Tilt up the manual transmission assembly.
- Install the rear No. 2 engine mounting insulator to the rear No. 1 engine mounting insulator with the 2 washers and 2 nuts.

Torque: 40 N·m (408 kgf·cm, 30ft·lbf)

- Install the rear No. 2 engine mounting insulator to the body with the 4 bolts.

Torque: 65 N·m (663 kgf·cm, 48ft·lbf)

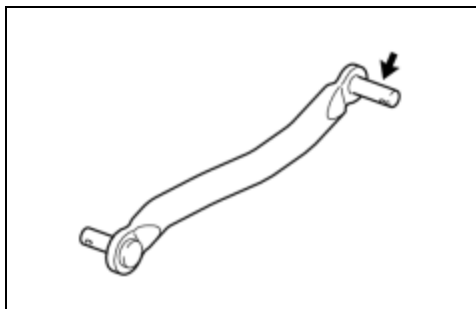
9. REMOVE EXHAUST PIPE BRACKET

- Install the exhaust pipe bracket with the 2 bolts.


Torque: 23 N·m (235 kgf·cm, 17ft·lbf)

10. INSTALL FLOOR SHIFT LEVER ASSEMBLY

- Apply a light coat of with MP grease to the floor shift control shaft.



Text in Illustration

	MP grease
---	-----------

- Install the new O-ring and 2 bushings to the shift lever assembly.
- Install the plate washer to the floor shift lever assembly.
- Install the shift lever assembly with the clip.
- Install the shift and select lever boot.

11. INSTALL SHIFT AND SELECT LEVER BOOT

- (a) Install the shift and select lever boot to the floor shift control shaft.

12. INSTALL FLOOR SHIFT CONTROL SHIFT LEVER RETAINER SUB-ASSEMBLY

- (a) Install the floor shift control shift lever retainer sub-assembly with the 2 bolts.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

13. INSTALL EXHAUST MANIFOLD

INFO

14. INSTALL MANUAL TRANSMISSION ASSEMBLY

- (a) Install the bolt to the manual transmission assembly.

Torque: 50 N·m (510 kgf·cm, 37ft·lbf)

15. INSTALL CLUTCH RELEASE CYLINDER ASSEMBLY

- (a) Install the clutch release cylinder assembly with the 2 bolts.

Torque: 37 N·m (377 kgf·cm, 27ft·lbf)

16. CONNECT WIRE HARNESS

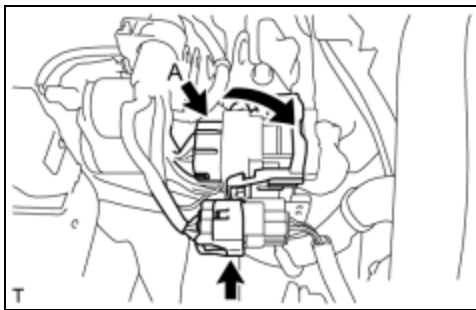
- (a) Install the wire harness clamp bracket with the bolt.

Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

- (b) Engage the wire harness clamp.
- (c) Connect the ground cable with the bolt.

Torque: 13 N·m (133 kgf·cm, 10ft·lbf)

- (d) Connect the 2 connectors.



- (e) Connect the 2 connectors.

HINT:

Press down the lever until the claw of the connector A makes a connection sound.

17. INSTALL STARTER ASSEMBLY

INFO

18. INSTALL FRONT STABILIZER BAR

INFO

19. INSTALL PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

INFO

20. INSTALL SHIFT LEVER CAP

- (a) Install the shift lever cap with the 4 bolts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

21. INSTALL SHIFT LEVER BOOT

- (a) Install the No. 1 shift and select lever boot and shift and select lever retainer with the 4 bolts.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

- (b) Connect the wire harness clamp.
(c) Install the shift and select lever cover with the 2 clips.

22. INSTALL CONSOLE BOX ASSEMBLY

INFO

23. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

24. ADD MANUAL TRANSMISSION OIL

INFO

25. INSPECT MANUAL TRANSMISSION OIL

INFO

26. INSPECT FOR MANUAL TRANSMISSION OIL LEAK

27. INSTALL NO. 2 ENGINE UNDER COVER

INFO

28. INSTALL NO. 1 ENGINE UNDER COVER

INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001P1700TX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: MANUAL TRANSMISSION ASSEMBLY: REMOVAL (2013 FR-S)		

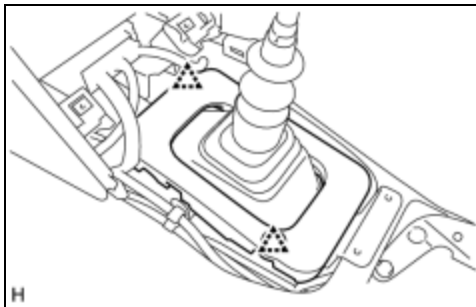
REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

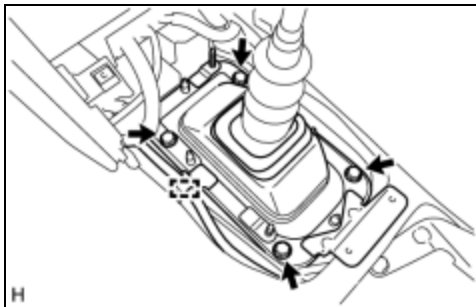
2. REMOVE CONSOLE BOX ASSEMBLY

INFO

3. REMOVE SHIFT LEVER BOOT



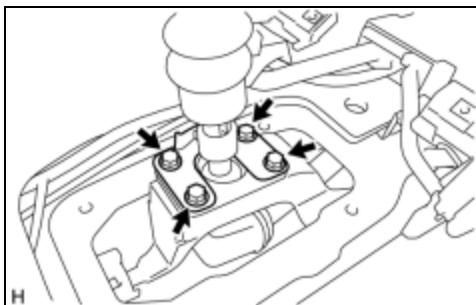
(a) Remove the 2 clips and the shift and select lever cover.



(b) Disconnect the wire harness clamp.

(c) Remove the 4 bolts, the shift and select lever retainer and the select lever boot.

4. REMOVE SHIFT LEVER CAP



(a) Remove the 4 bolts and the shift lever cap.

5. REMOVE NO. 1 ENGINE UNDER COVER **INFO**

6. REMOVE NO. 2 ENGINE UNDER COVER **INFO**

7. DRAIN MANUAL TRANSMISSION OIL **INFO**

8. REMOVE PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

INFO

9. REMOVE FRONT STABILIZER BAR

INFO

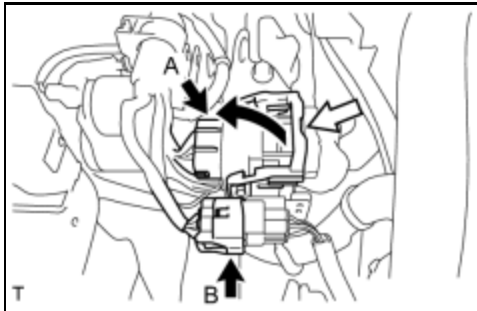
10. REMOVE STARTER ASSEMBLY

INFO

11. SEPARATE WIRE HARNESS

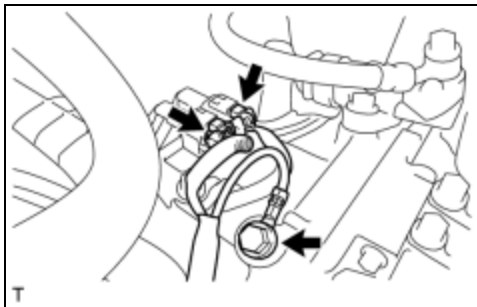
HINT:

Fix the disconnected harness components with tape to keep them out of the way.



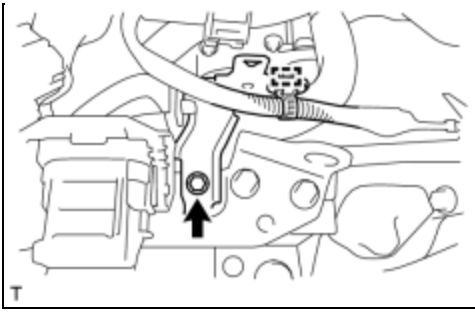
(a) Release the lock of connector (A) and disconnect the connector.

(b) Disconnect the connector (B).



(c) Disconnect the 2 connectors.

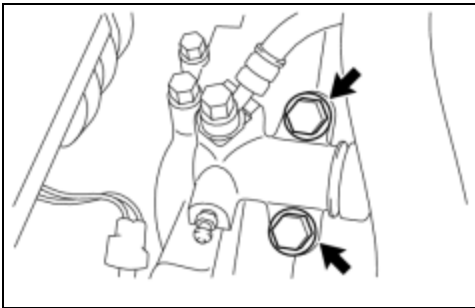
(d) Remove the bolt and disconnect the ground cable.



(e) Disengage the wire harness clamp.

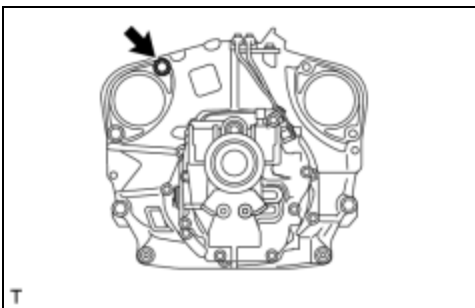
(f) Remove the bolt and the wire harness clamp bracket.

12. SEPARATE CLUTCH RELEASE CYLINDER ASSEMBLY



(a) Remove the 2 bolts and separate the clutch release cylinder assembly.

13. SEPARATE MANUAL TRANSMISSION ASSEMBLY



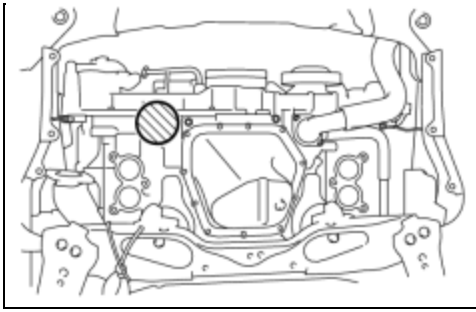
(a) Remove the bolt from the manual transmission assembly.

14. REMOVE EXHAUST MANIFOLD

INFO

15. SUSPEND ENGINE ASSEMBLY

(a) Support the engine assembly with an engine lifter so that it is stable, as shown in the illustration.



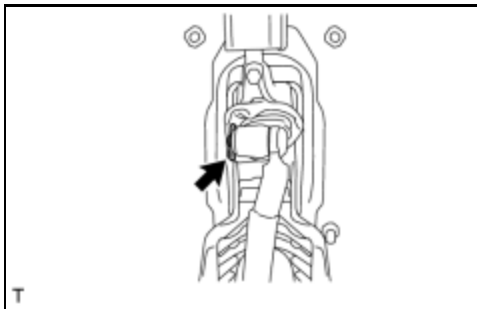
Text in Illustration

	Attachment Placement Positions
---	--------------------------------

NOTICE:

- Set the engine assembly with transmission so that it is horizontal.
- Never attach the attachment and plate lift attachment to the oil pan section of the engine assembly.

16. REMOVE FLOOR SHIFT LEVER ASSEMBLY



(a) Turn over the shift and select lever boot.

(b) Using a screwdriver, remove the clip and the floor shift lever assembly.

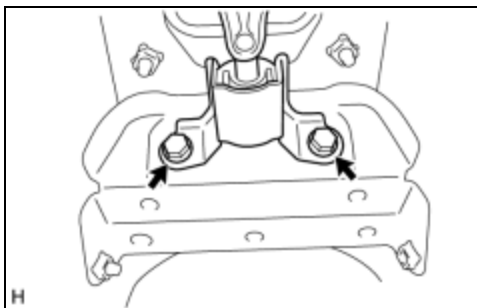
(c) Remove the plate washer from the floor shift lever assembly.

(d) Remove the 2 bushings and O-ring from the floor shift lever assembly.

17. REMOVE SHIFT LEVER BOOT

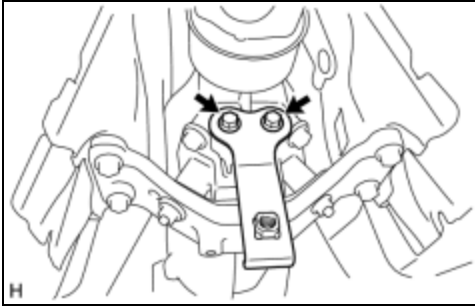
(a) Remove the shift lever boot from the floor shift lever assembly.

18. SEPARATE FLOOR SHIFT CONTROL SHIFT LEVER RETAINER SUB-ASSEMBLY



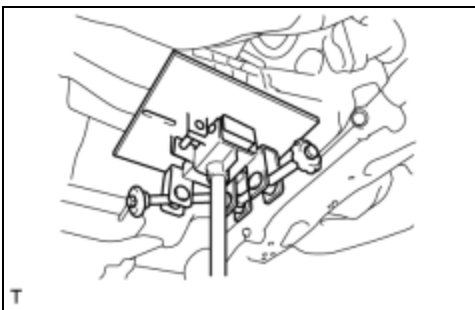
(a) Remove the 2 bolts and separate the floor shift control shift lever retainer sub-assembly.

19. REMOVE EXHAUST PIPE BRACKET



(a) Remove the 2 bolts and the exhaust pipe bracket.

20. SUPPORT MANUAL TRANSMISSION ASSEMBLY



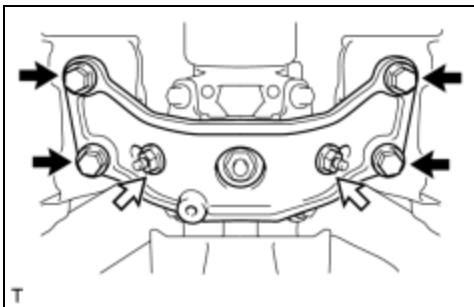
(a) Support the manual transmission assembly with a transmission jack.

NOTICE:



- Check that the manual transmission assembly is centered on the transmission jack plate.
- When removing the manual transmission assembly, support the engine assembly so that it does not tilt.

21. REMOVE REAR NO. 2 ENGINE MOUNTING INSULATOR

(a) Remove the 4 bolts, 2 washers, 2 nuts and rear No. 2 engine mounting insulator.

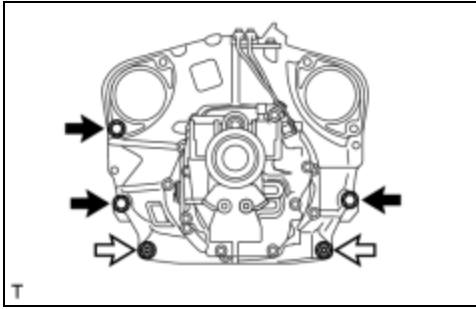


Text in Illustration

	Bolt
	Nut

22. REMOVE MANUAL TRANSMISSION ASSEMBLY

(a) Remove the 3 bolts, 2 nuts and manual transmission assembly.



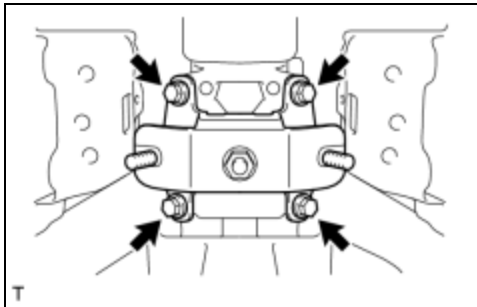
Text in Illustration

	Bolt
	Nut

NOTICE:

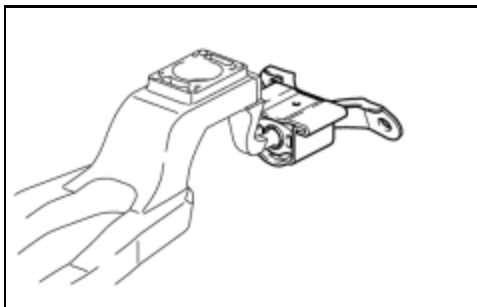
- Do not apply excessive force to the transmission assembly as this will break the input shaft.
- To prevent damage to the knock pins, do not pry between the manual transmission assembly and the engine assembly.

23. REMOVE REAR NO. 1 ENGINE MOUNTING INSULATOR



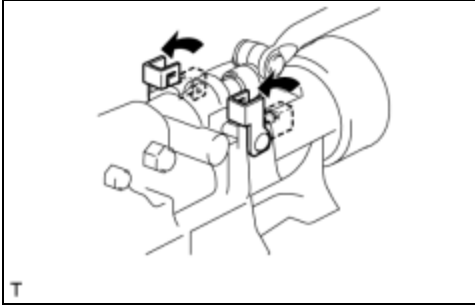
(a) Remove the 4 bolts and rear No. 1 engine mounting insulator.

24. REMOVE FLOOR SHIFT CONTROL SHIFT LEVER RETAINER SUB-ASSEMBLY



(a) Remove the floor shift control shift lever retainer sub-assembly.

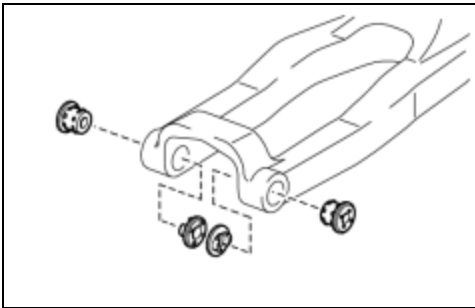
25. REMOVE FLOOR SHIFT CONTROL SHIFT LEVER RETAINER



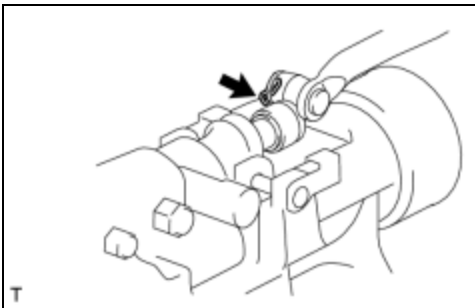
- (a) Pull up the locks of the shift lever pins, and remove the 2 shift lever pins.

- (b) Remove the floor shift control shift lever retainer.

26. REMOVE SHIFT LEVER RETAINER BUSHING



- (a) Remove the 4 shift lever retainer bushings.



27. REMOVE FLOOR SHIFT CONTROL SHAFT

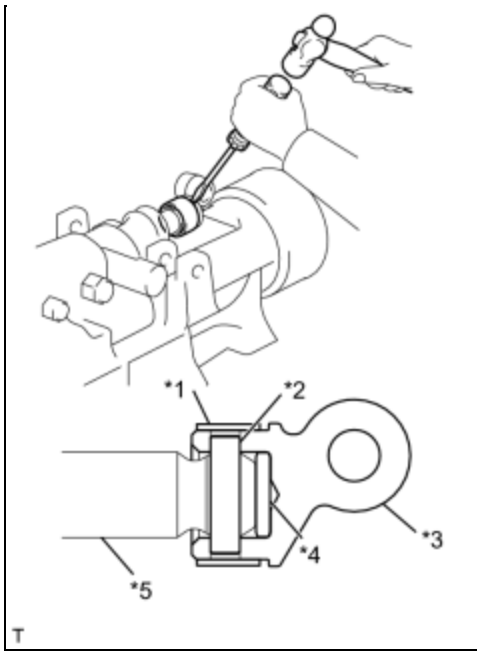
- (a) Using a screwdriver, remove the clip, plate washer and floor shift control shaft.
- (b) Remove the 2 collars from the control shaft.

28. REMOVE CONTROL SHAFT

- (a) Using a hammer and a screwdriver, cut off the control shaft collar and remove it from the shift shaft.
- (b) Using a pin punch (5 mm (0.197 in.)) and a hammer, remove the shaft pin and control shaft from the shift shaft.
- (c) Remove the shift lever damper from the floor shift control shaft.

Text in Illustration





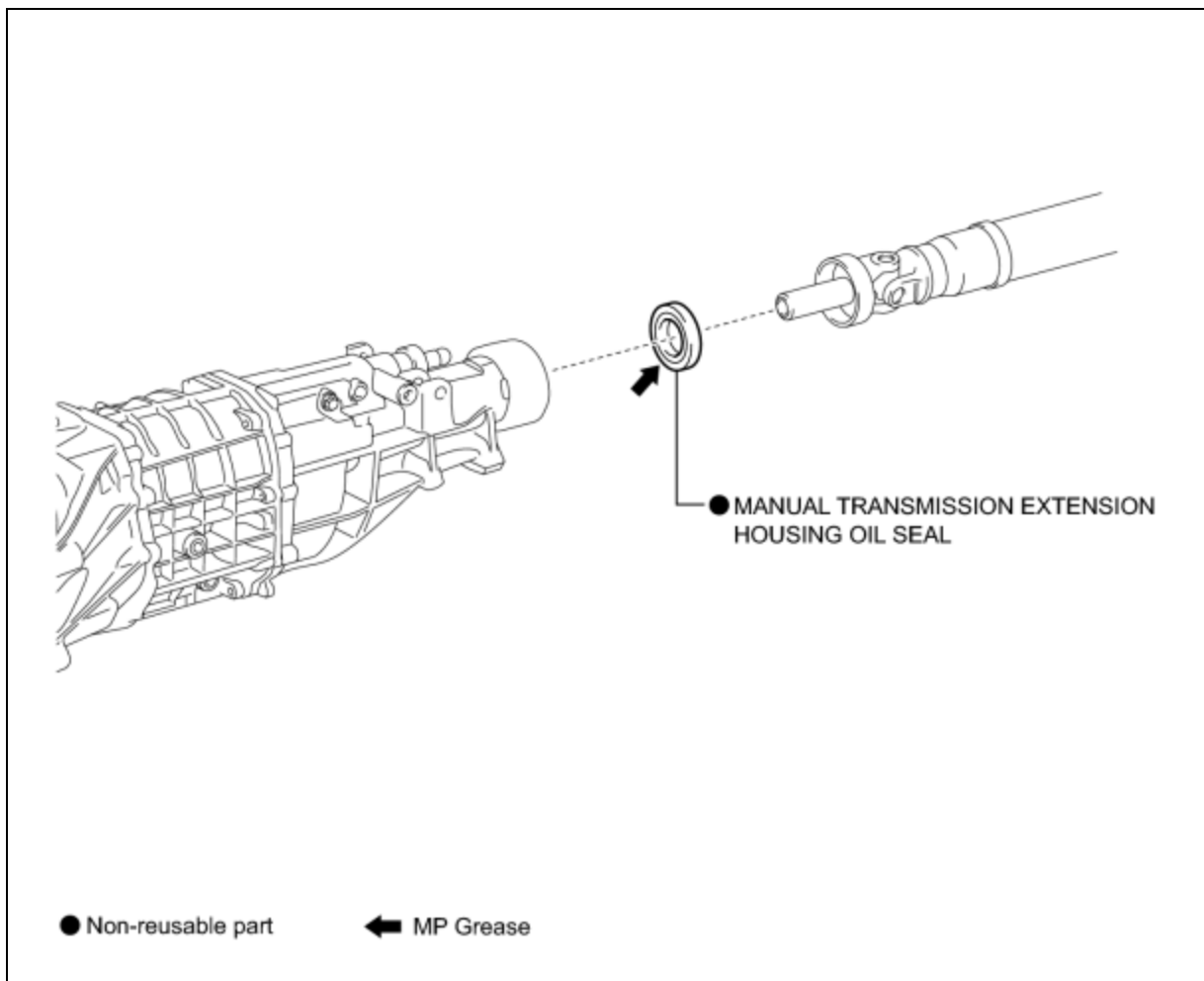
*1	Control Shaft Collar
*2	Shaft Pin
*3	Control Shaft
*4	Shift Lever Damper
*5	Shift Shaft



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001P1400HX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: MANUAL TRANSMISSION EXTENSION HOUSING OIL SEAL: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



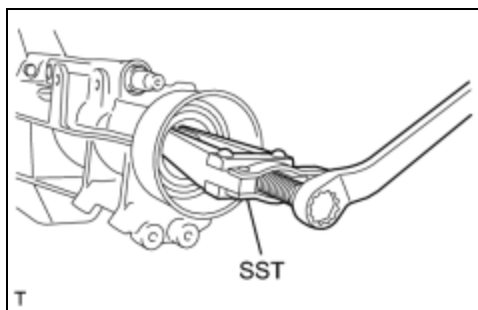
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001P1300JX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: MANUAL TRANSMISSION EXTENSION HOUSING OIL SEAL: REPLACEMENT (2013 FR-S)		

REPLACEMENT

1. REMOVE PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

INFO

2. REMOVE MANUAL TRANSMISSION EXTENSION HOUSING OIL SEAL

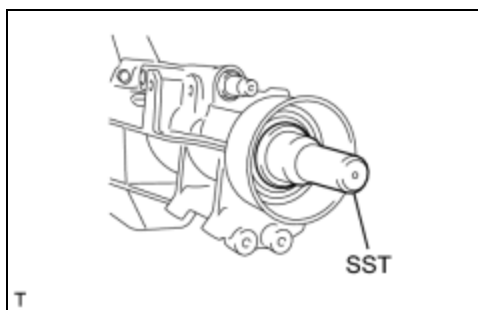


- (a) Using SST, remove the manual transmission extension housing oil seal.

SST: 09308-00010

3. INSTALL MANUAL TRANSMISSION EXTENSION HOUSING OIL SEAL

- (a) Coat the lip of a new manual transmission extension housing oil seal with MP grease.



- (b) Using SST and a hammer, tap in the manual transmission extension housing oil seal.

SST: 09325-20010

Installation depth:

0.1 to 1.1 mm (0.00394 to 0.0433 in.)

NOTICE:

- Keep the lip free of foreign matter.
- Do not tap the oil seal at an angle.

4. INSTALL PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

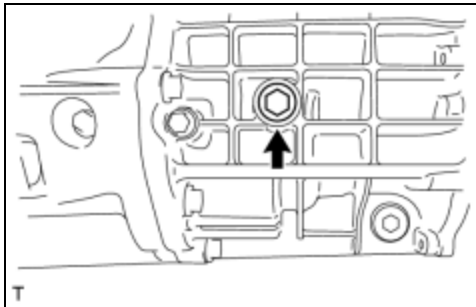
INFO

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001B3K03FX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: MANUAL TRANSMISSION OIL: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

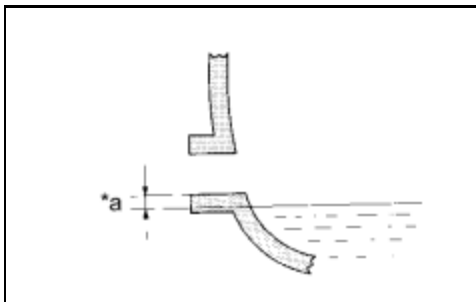
1. INSPECT MANUAL TRANSMISSION OIL

(a) Stop the vehicle in a level place.



(b) Remove the manual transmission filler plug and the gasket.

(c) Check that the oil surface is within 5 mm (0.197 in.) of the bottom of the manual transmission filler plug opening.



Text in Illustration

*a	0 to 5 mm (0 to 0.197 in.)
----	----------------------------

NOTICE:

- Excessively large or small amounts of oil may cause problems.
- After replacing the oil, drive the vehicle and check the oil level again.

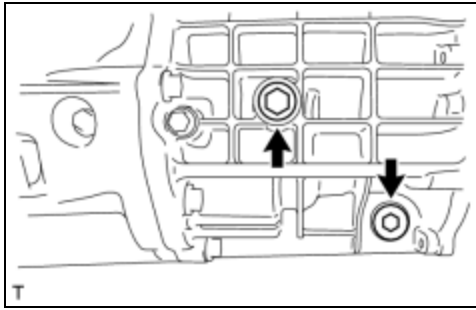
(d) Check for oil leakage when the oil level is low.

(e) Install the manual transmission filler plug and a new gasket.

Torque: 37 N·m (377 kgf·cm, 27ft·lbf)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002Z2L03AX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: MANUAL TRANSMISSION OIL: REPLACEMENT (2013 FR-S)		

REPLACEMENT



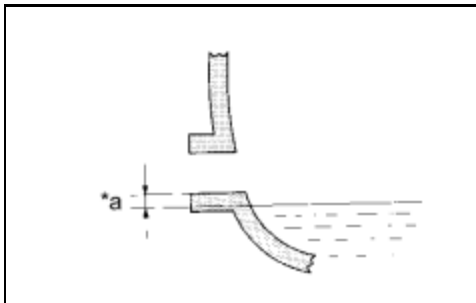
1. DRAIN MANUAL TRANSMISSION OIL

- (a) Remove the manual transmission filler plug and the gasket.
- (b) Remove the manual transmission drain plug and gasket, and then drain the manual transaxle oil.
- (c) Install a new gasket and the manual transmission drain plug.

Torque: 37 N·m (377 kgf·cm, 27ft·lbf)

2. ADD MANUAL TRANSMISSION OIL

- (a) Add manual transmission oil until the oil level is within 5 mm (0.197 in.) from the bottom of the manual transmission filler plug opening.



Text in Illustration

*a	0 to 5 mm (0 to 0.197 in.)
----	----------------------------

Standard capacity (Reference):

2.2 liters (2.3 US qts, 1.9 Imp. qts)

Gear oil type:

Toyota Genuine Manual Transmission Gear Oil "LV GL-3 and SAE 75W-90"

- (b) Check for oil leakage when the oil level is low.
- (c) Install the transmission filler plug and a new gasket.

Torque: 37 N·m (377 kgf·cm, 27ft·lbf)

3. INSPECT FOR MANUAL TRANSMISSION OIL INFO

4. INSPECT FOR MANUAL TRANSMISSION OIL LEAK

Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001P1800PX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: MANUAL TRANSMISSION SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

Manual Transmission System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Abnormal noise	Oil level (Low)	INFO
	Oil (Wrong)	INFO
	Synchronizer ring (Input shaft) (Worn or damaged)	INFO
	Synchronizer ring (Output shaft) (Worn or damaged)	INFO
	Gear (Output shaft) (Worn or damaged)	INFO
	Gear (Counter shaft) (Worn or damaged)	INFO
	Bearing (Input shaft) (Worn or damaged)	INFO
	Bearing (Output shaft) (Worn or damaged)	INFO
	Bearing (Counter shaft) (Worn or damaged)	INFO
Oil leak	Oil level (High)	INFO
	Gasket (Damaged)	INFO
	Oil seal (Worn or damaged)	INFO
Hard shifting or impossible to shift	Oil (Wrong)	INFO
	Clutch (Dragging)	INFO
	Shift fork (Input shaft) (Worn)	INFO
	Shift fork (Output shaft) (Worn)	INFO
	Shift fork (Counter shaft) (Worn)	INFO
	Synchronizer ring (Input shaft) (Worn or damaged)	INFO
	Synchronizer ring (Output shaft) (Worn or damaged)	INFO
	Synchronizer ring (Counter shaft) (Worn or damaged)	INFO

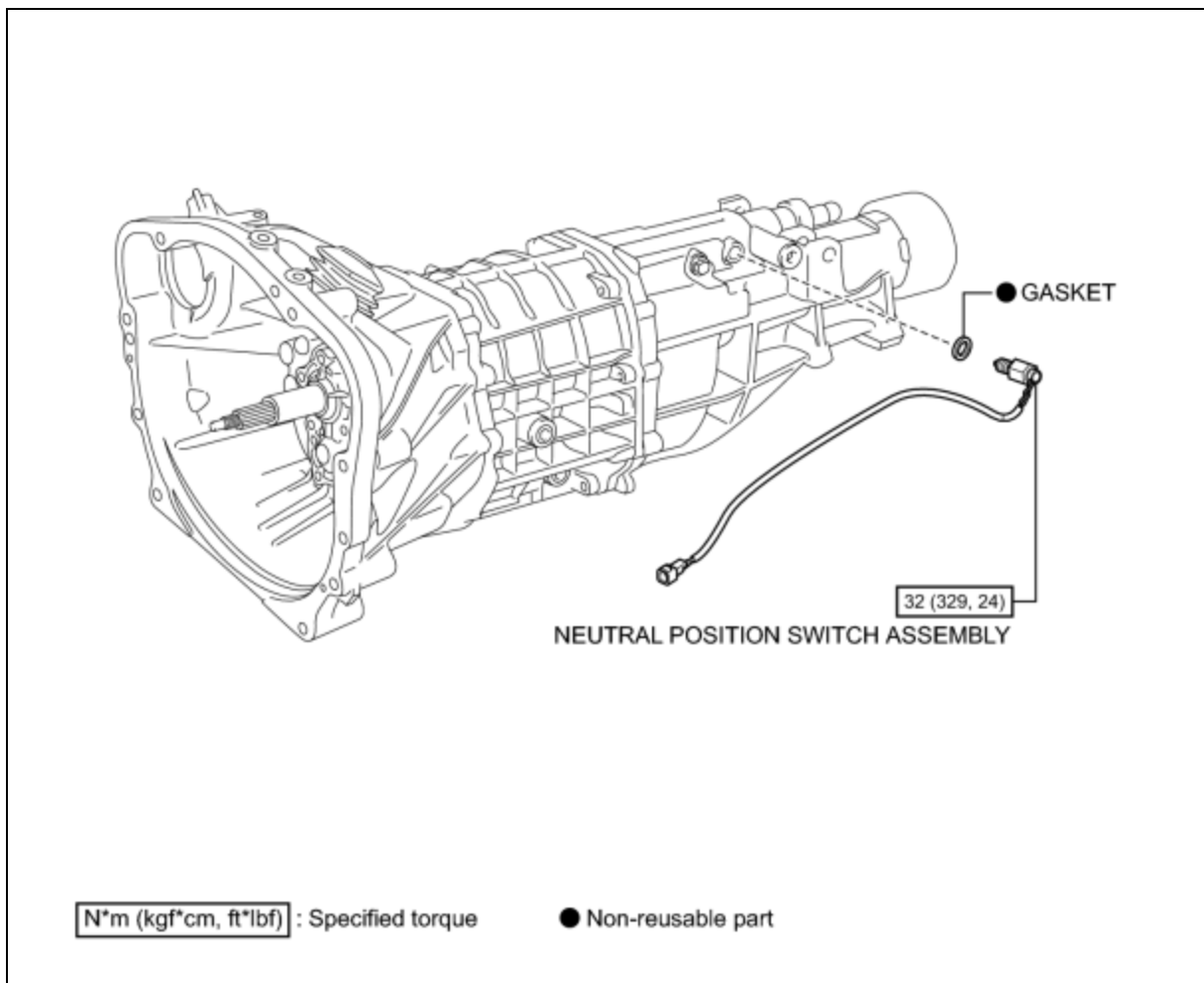
	damaged)	
	Shift key spring (Output shaft) (Worn or damaged)	INFO
	Shift key spring (Counter shaft) (Worn or damaged)	INFO
	Gear (Output shaft) (Worn or damaged)	INFO
	Gear (Counter shaft) (Worn or damaged)	INFO
	Hub sleeve (Output shaft) (Worn or damaged)	INFO
	Hub sleeve (Counter shaft) (Worn or damaged)	INFO
Jumps out of gear or shift lever moves excessively	Shift detent ball spring (Damaged)	INFO
	Shift fork (Output shaft) (Worn)	INFO
	Shift fork (Counter shaft) (Worn)	INFO
	Hub sleeve (Output shaft) (Worn or damaged)	INFO
	Hub sleeve (Counter shaft) (Worn or damaged)	INFO
	Gear (Output shaft) (Worn or damaged)	INFO
	Gear (Counter shaft) (Worn or damaged)	INFO
	Bearing (Output shaft) (Worn or damaged)	INFO
	Bearing (Counter shaft) (Worn or damaged)	INFO



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000032KE02VX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: NEUTRAL POSITION SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



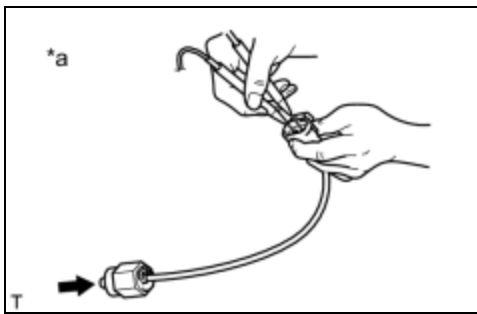
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000017MP03JX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: NEUTRAL POSITION SWITCH: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT NEUTRAL POSITION SWITCH ASSEMBLY

- (a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 - 2	Pushed	Below 1 Ω
1 - 2	Released	10 k Ω or higher

Text in Illustration

*a	Component without harness connected (Neutral Position Switch Assembly)
----	---

If the result is not as specified, replace the neutral position switch assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001YVJ04CX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: NEUTRAL POSITION SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

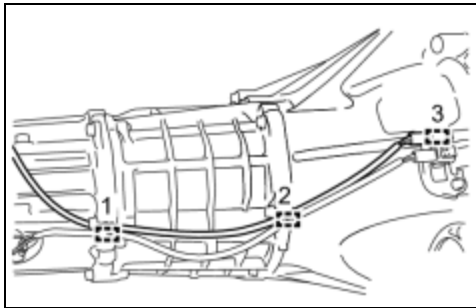
1. INSTALL NEUTRAL POSITION SWITCH ASSEMBLY

- (a) Using a 19 mm union nut wrench, install the neutral position switch assembly with a new gasket to the manual transmission assembly.

Torque: 32 N·m (329 kgf·cm, 24ft·lbf)

NOTICE:

Use the formula to calculate special torque values for situations where a union nut wrench is combined with a torque wrench [INFO](#) .



- (b) In the order indicated in the illustration, engage the 3 clamps in place, and connect the back-up light switch assembly wire and neutral position switch assembly wire.

HINT:

Install the wire harness so that there is slack on the connector side.

2. INSTALL MANUAL TRANSMISSION ASSEMBLY

[INFO](#)

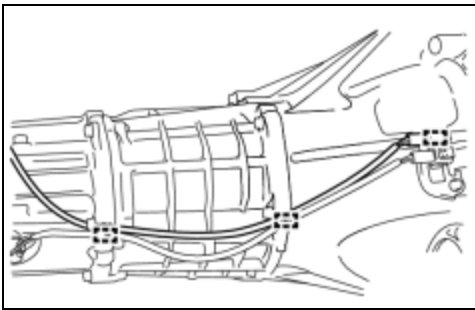
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001YVL04CX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: NEUTRAL POSITION SWITCH: REMOVAL (2013 FR-S)		

REMOVAL

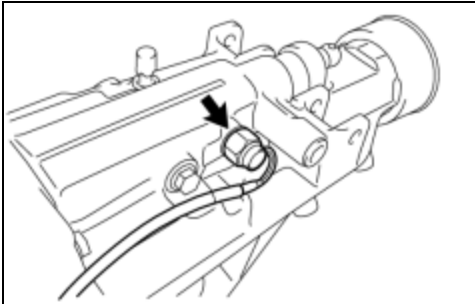
1. REMOVE MANUAL TRANSMISSION ASSEMBLY

INFO

2. REMOVE NEUTRAL POSITION SWITCH ASSEMBLY



(a) Disconnect the 3 clamps.

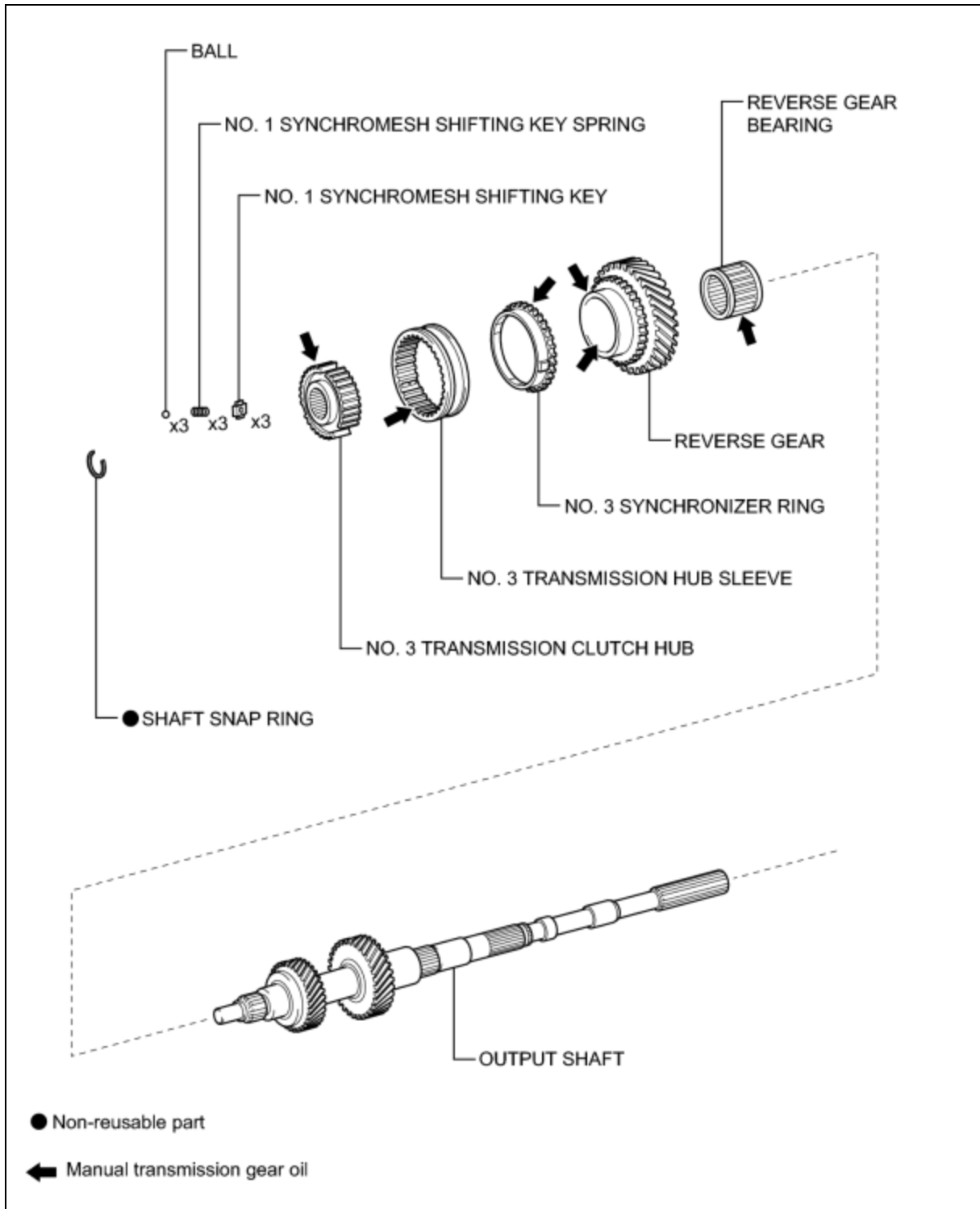


(b) Using a 19 mm union nut wrench, remove the neutral position switch assembly and gasket from the manual transmission assembly.

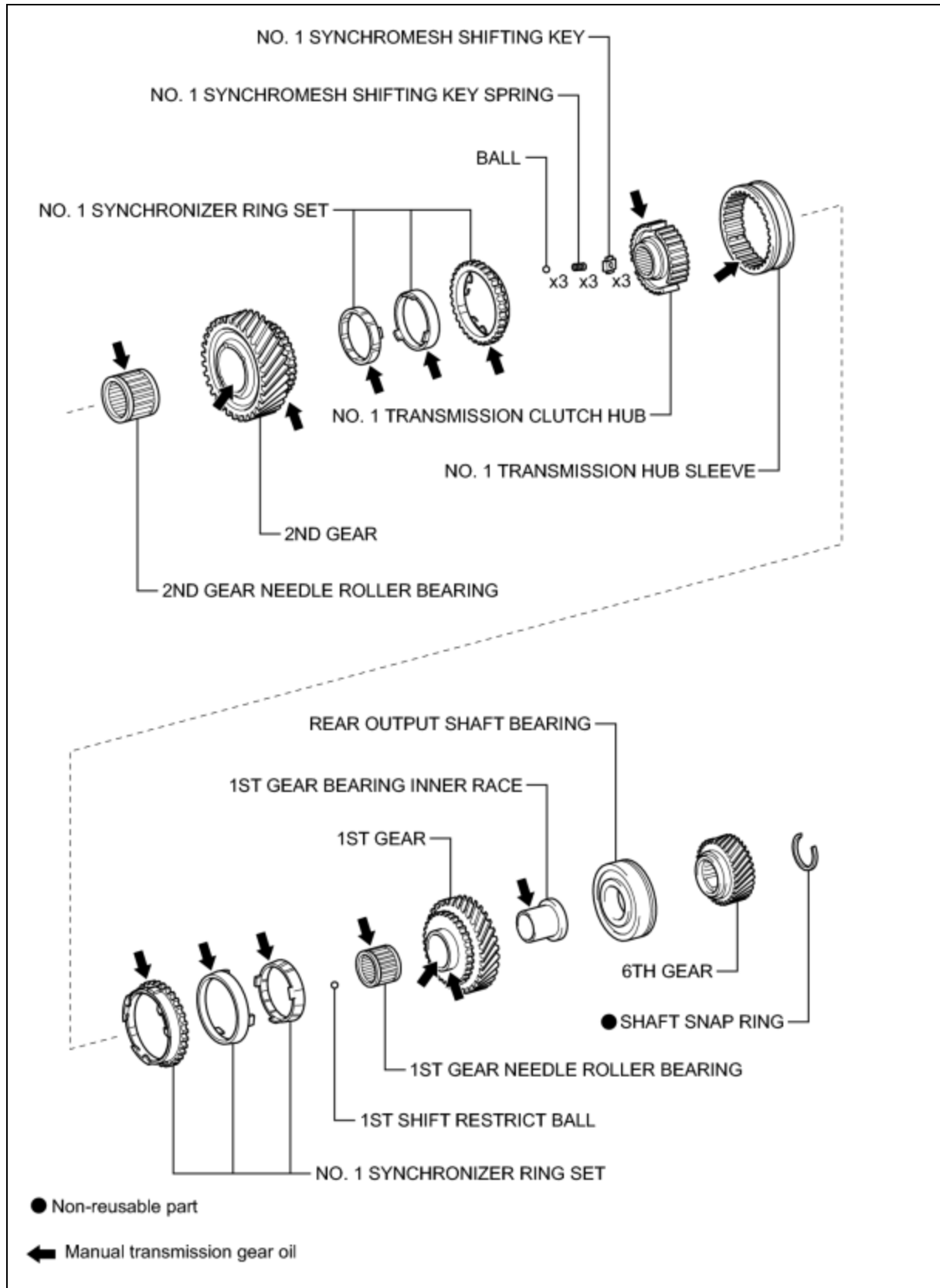
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002H8K00DX
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: OUTPUT SHAFT: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002RHY006X
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: OUTPUT SHAFT: DISASSEMBLY (2013 FR-S)		

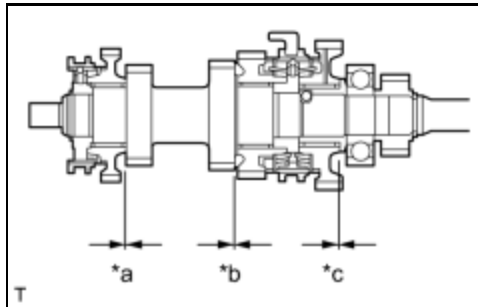
DISASSEMBLY

1. INSPECT THRUST CLEARANCE

- (a) Using a feeler gauge, measure the thrust clearance of the 1st gear, 2nd gear and reverse gear.

Text in Illustration

*a	Reverse gear thrust clearance
*b	2nd gear thrust clearance
*c	1st gear thrust clearance



Standard Clearance:

GEAR	STANDARD CLEARANCE MM (IN.)	MAXIMUM CLEARANCE MM (IN.)
1st gear	0.15 to 0.40 (0.00590 to 0.0157)	0.40 (0.0157)
2nd gear	0.10 to 0.45 (0.000394 to 0.0177)	0.45 (0.0177)
Reverse gear	0.10 to 0.45 (0.000394 to 0.0177)	0.45 (0.0177)

HINT:

If the clearance exceeds the maximum, replace the corresponding gear, transmission clutch hub, needle roller bearing and output shaft with a new ones.

2. INSPECT RADIAL CLEARANCE

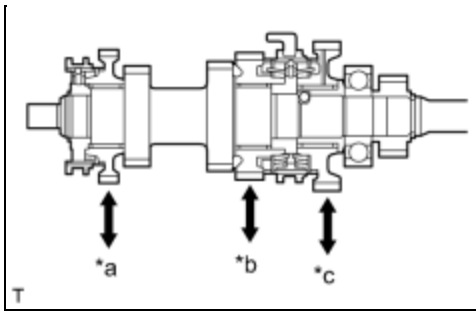
- (a) Using a dial indicator, measure the radial clearance of the 1st gear, 2nd gear and reverse gear.

Text in Illustration

*a	Reverse gear radial clearance
*b	2nd gear radial clearance
*c	1st gear radial clearance

Standard Clearance:

--	--	--

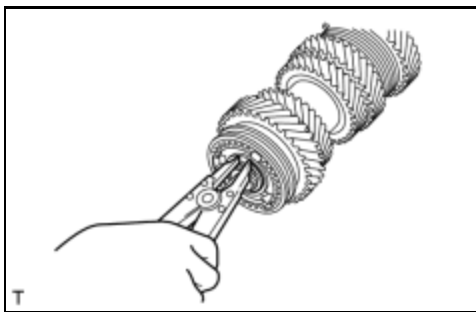


GEAR	STANDARD CLEARANCE MM (IN.)	MAXIMUM CLEARANCE MM (IN.)
1st gear	0.015 to 0.066 (0.000590 to 0.00260)	0.066 (0.00260)
2nd gear	0.015 to 0.066 (0.000590 to 0.00260)	0.066 (0.00260)
Reverse gear	0.015 to 0.066 (0.000590 to 0.00260)	0.066 (0.00260)

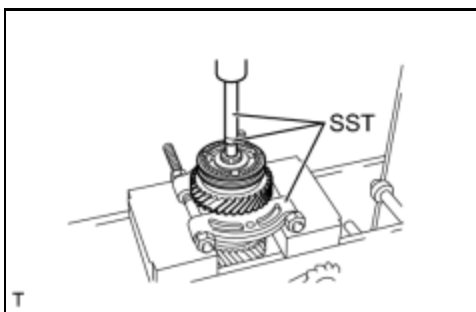
HINT:

If the clearance exceeds the maximum, replace the corresponding gear, needle roller bearing and output shaft with a new ones.

3. REMOVE REVERSE GEAR



(a) Using a snap ring expander, remove the shaft snap ring.



(b) Using SST and a press, remove the No. 3 transmission clutch hub, No. 3 transmission hub sleeve, reverse gear, No. 3 synchronizer ring and reverse gear bearing from the output shaft.

SST: 09950-00020

SST: 09950-60010

09951-00230

SST: 09950-70010

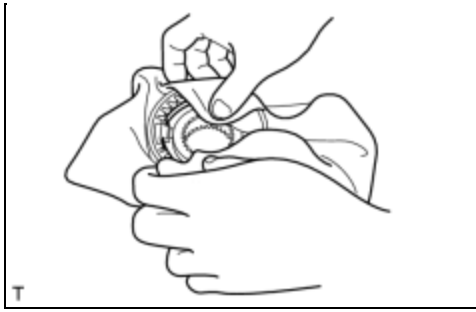
09951-07100

4. REMOVE NO. 3 TRANSMISSION HUB SLEEVE

(a) Remove the No. 3 transmission hub sleeve, and then remove the 3 No. 1 synchronmesh shifting keys, 3 No. 1 synchronmesh shifting key springs and 3 balls from the No. 3 transmission clutch hub.

NOTICE:

- Use a cloth to prevent the No. 1 synchronmesh shifting



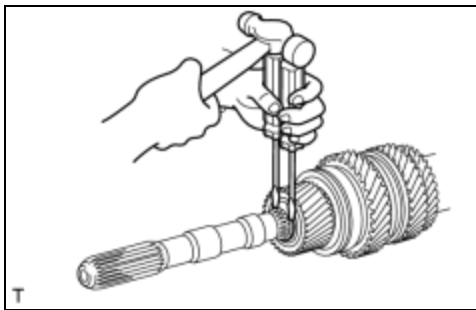
keys, No. 1 synchronesh shifting key springs and balls from popping out.

- Do not deform the No. 1 synchronesh shifting key spring.

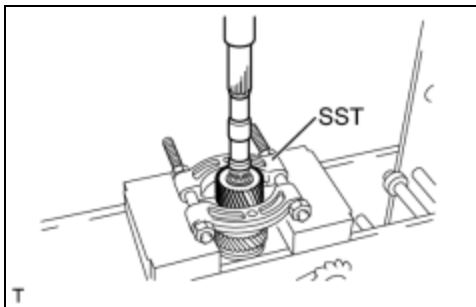
HINT:

During this operation, keep intact the No. 3 transmission clutch hub and No. 1 synchronesh shifting key.

5. REMOVE 6TH GEAR



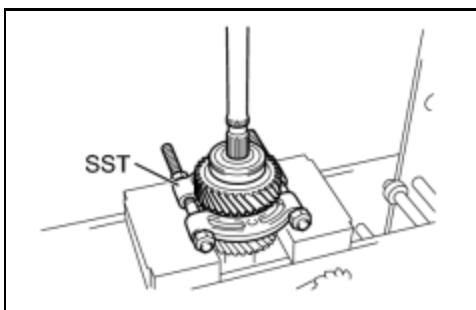
- (a) Using 2 screwdrivers and a hammer, remove the shaft snap ring.



- (b) Using SST and a press, remove the 6th gear.

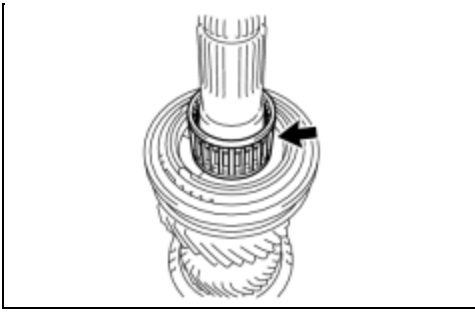
SST: 09950-00020

6. REMOVE 1ST GEAR



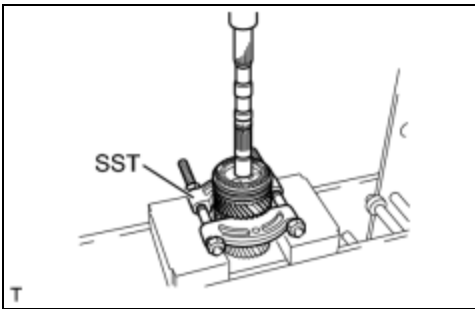
- (a) Using SST and a press, remove the rear output shaft bearing, 1st gear and 1st gear bearing inner race.

SST: 09950-00020



- (b) Remove the 1st gear needle roller bearing, 1st shift restrict ball and No. 1 synchronizer ring set.

7. REMOVE 2ND GEAR



- (a) Using SST and a press, remove the 2nd gear, No. 1 transmission clutch hub and 2nd gear needle roller bearing from the output shaft.

SST: 09950-00020

8. REMOVE NO. 1 SYNCHRONIZER RING SET

- (a) Remove the No. 1 synchronizer ring set.

9. REMOVE NO. 1 TRANSMISSION HUB SLEEVE

- (a) Remove the No. 1 transmission hub sleeve, and then remove the 3 No. 1 synchromesh shifting keys, 3 No. 1 synchromesh shifting key springs and 3 balls from the No. 1 transmission clutch hub.



NOTICE:

- Use a cloth to prevent the No. 1 synchromesh shifting keys, No. 1 synchromesh shifting key springs and balls from popping out.
- Do not deform the No. 1 synchromesh shifting key spring.

HINT:

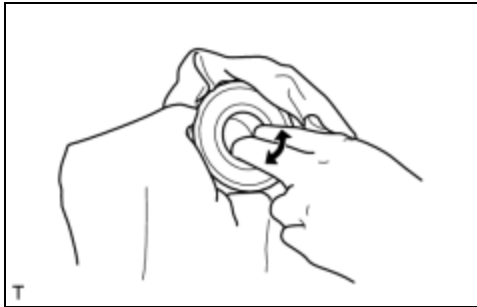
During this operation, keep the No. 1 transmission clutch hub and No. 1 synchromesh shifting key intact.



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000590T000X
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: OUTPUT SHAFT: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT REAR OUTPUT SHAFT BEARING



(a) Check the rear output shaft bearing.

Standard:

Abnormal fitting, interfering, abnormal noise, or looseness should not be found.

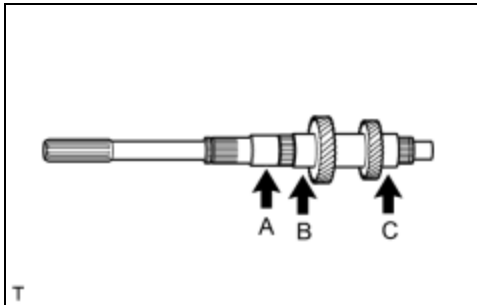
HINT:

If any abnormality is found, replace the rear output shaft bearing with a new one.

2. INSPECT OUTPUT SHAFT

(a) Using a micrometer, measure the outer diameter of each point.

Standard Outer Diameter:



PART	STANDARD OUTER DIAMETER MM (IN.)	MINIMUM OUTER DIAMETER MM (IN.)
A	31.984 to 32.000 (1.25921 to 1.25984)	31.984 (1.25921)
B	42.984 to 43.000 (1.69228 to 1.69291)	42.984 (1.69228)
C	40.984 to 41.000 (1.61354 to 1.61417)	40.984 (1.61354)

HINT:

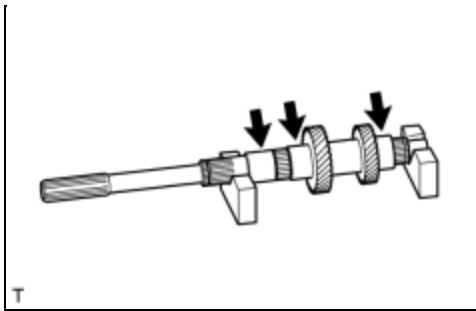
If the outer diameter is less than minimum, replace the output shaft with a new one.

(b) Using V-blocks and a dial indicator, measure the runout of each location as shown in the illustration.

Standard runout:

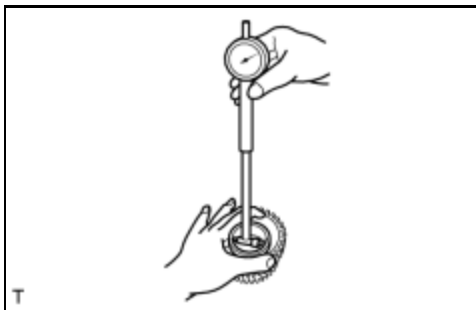
0.03 mm (0.00118 in.) or less

HINT:



If the runout is outside the specification, replace the output shaft with a new one.

3. INSPECT REVERSE GEAR



- (a) Using a cylinder gauge, measure the inner diameter of the reverse gear.

Standard inside diameter:

47.015 to 47.040 mm (1.85098 to 1.85197 in.)

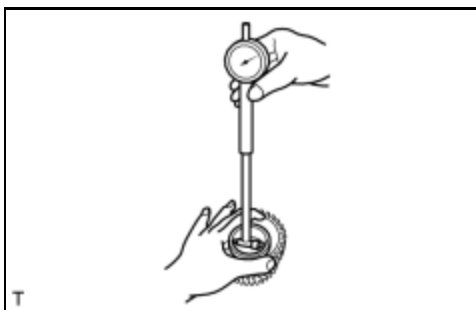
Maximum inside diameter:

47.040 mm (1.85197 in.)

HINT:

If the inner diameter exceeds the maximum, replace the reverse gear with a new one.

4. INSPECT 1ST GEAR



- (a) Using a cylinder gauge, measure the inside diameter of the 1st gear.

Standard inside diameter:

46.315 to 46.340 mm (1.82343 to 1.82441 in.)

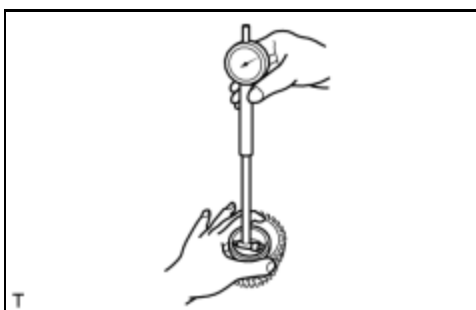
Maximum inside diameter:

46.340 mm (1.82441 in.)

HINT:

If the inside diameter exceeds the maximum, replace the 1st gear with a new one.

5. INSPECT 2ND GEAR



- (a) Using a cylinder gauge, measure the inside diameter of the 2nd gear.

Standard inside diameter:

49.015 to 49.040 mm (1.92972 to 1.93071 in.)

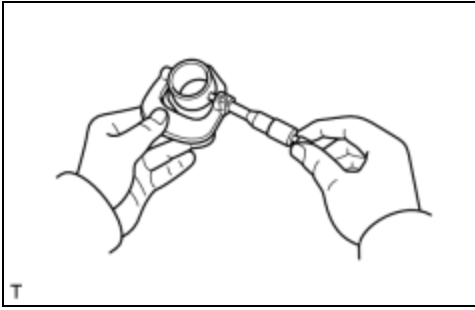
Maximum inside diameter:

49.040 mm (1.93071 in.)

HINT:

If the inside diameter exceeds the maximum, replace the 2nd gear with a new one.

6. INSPECT 1ST GEAR BEARING INNER RACE



- (a) Using a micrometer, measure the outside diameter of the 1st gear bearing inner race.

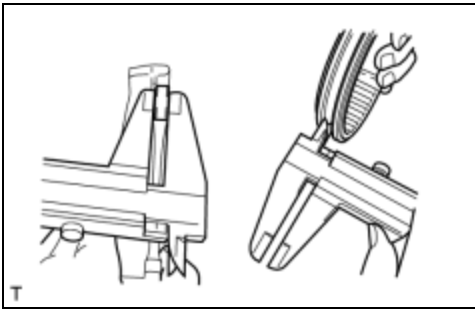
Standard outer diameter:
40.284 to 40.300 mm (1.58598 to 1.58661 in.)

Minimum outer diameter:
40.284 mm (1.58598 in.)

HINT:

If the outside diameter is less than minimum, replace the 1st gear bearing inner race with a new one.

7. INSPECT NO. 1 TRANSMISSION HUB SLEEVE CLEARANCE



- (a) Using a vernier caliper, measure the claw width of the No. 1 gear shift fork.

Standard width:
7.9 to 8.0 mm (0.311 to 0.315 in.)

Minimum width:
7.9 mm (0.311 in.)

HINT:

If the width is less than the minimum, replace the No. 1 gear shift fork with a new one.

- (b) Using a vernier caliper, measure the groove of the No. 1 transmission hub sleeve, and then calculate the clearance with the No. 1 gear shift fork.

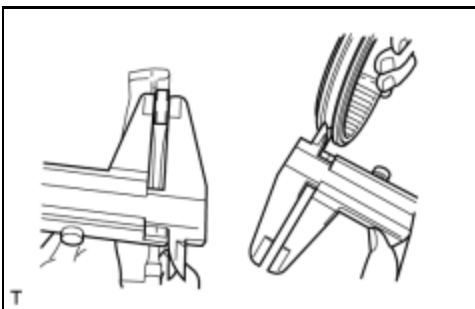
Standard clearance:
0.15 to 0.35 mm (0.00590 to 0.0138 in.)

Maximum clearance:
0.35 mm (0.0138 in.)

HINT:

If the clearance exceeds the maximum, replace both the No. 1 gear shift fork and No. 1 transmission hub sleeve with a new ones.

8. INSPECT NO. 3 TRANSMISSION HUB SLEEVE CLEARANCE



- (a) Using a vernier caliper, measure the claw width of the No. 3 gear shift fork.

Standard width:
7.9 to 8.0 mm (0.311 to 0.315 in.)

Minimum width:
7.9 mm (0.311 in.)

HINT:

If the width is less than the minimum, replace the No. 3 gear

shift fork with a new one.

- (b) Using a vernier caliper, measure the groove of the No. 3 transmission hub sleeve, and then calculate the clearance with the No. 3 gear shift fork.

Standard clearance:

0.15 to 0.35 mm (0.00590 to 0.0138 in.)

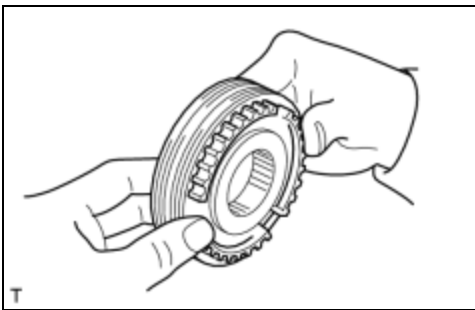
Maximum clearance:

0.35 mm (0.0138 in.)

HINT:

If the clearance exceeds the maximum, replace both the No. 3 gear shift fork and No. 3 transmission hub sleeve with a new ones.

9. INSPECT NO. 1 TRANSMISSION HUB SLEEVE



- (a) Check that the spline gear edges of the No. 1 transmission hub sleeve are not worn down.

HINT:

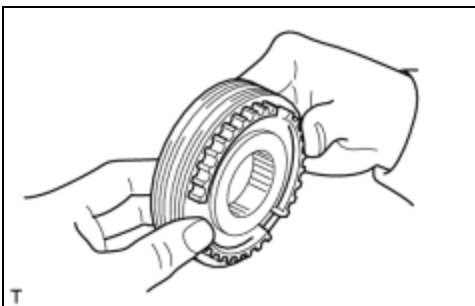
If it shows any sign of wear, replace the No. 1 transmission hub sleeve with a new one.

- (b) Install the No. 1 transmission hub sleeve to the No. 1 transmission clutch hub, and then check that it slides smoothly.

HINT:

If it does not slide smoothly, replace the No. 1 transmission hub sleeve and No. 1 transmission clutch hub with a new one.

10. INSPECT NO. 3 TRANSMISSION HUB SLEEVE



- (a) Check that the spline gear edges of the No. 3 transmission hub sleeve are not worn down.

HINT:

If it shows any sign of wear, replace the No. 3 transmission hub sleeve with a new one.

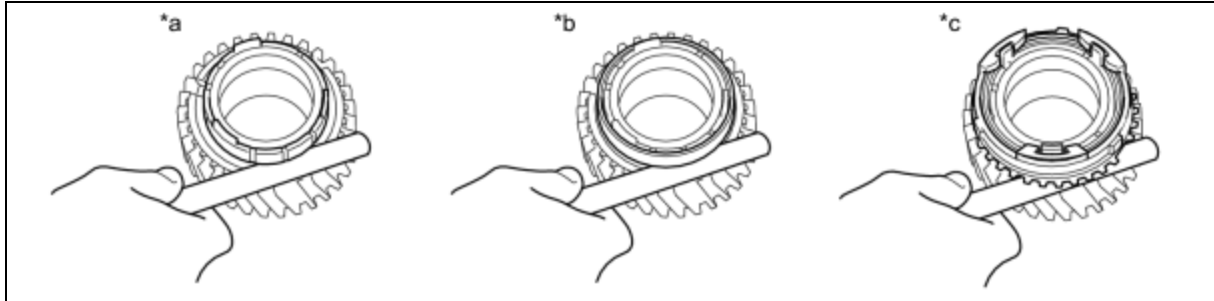
- (b) Install the No. 3 transmission hub sleeve to the No. 3 transmission clutch hub, and then check that it slides smoothly.

HINT:

If it does not slide smoothly, replace the No. 3 transmission hub sleeve and No. 3 transmission clutch hub with a new one.

11. INSPECT NO. 1 SYNCHRONIZER RING SET (for 1st Gear)

- (a) Apply manual transmission gear oil to the taper cone of the 1st gear and No. 1 synchronizer ring set, and then hold the No. 1 synchronizer ring set in position with your hand to measure the clearance between the No. 1 synchronizer ring set and the 1st gear by using a feeler gauge.



Text in Illustration

*a	Inner	*b	Middle
*c	Outer	-	-

Standard Clearance:

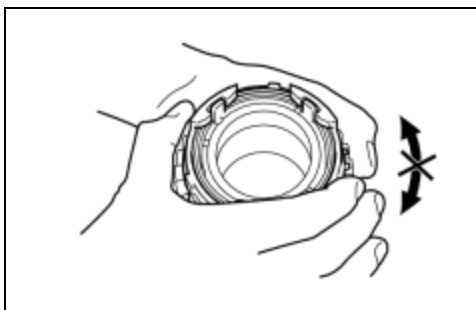
LOCATION	STANDARD CLEARANCE MM (IN.)
Inner	0.48 to 1.12 (0.0189 to 0.0441)
Middle	0.38 to 1.22 (0.0150 to 0.0480)
Outer	0.8 to 1.8 (0.0315 to 0.0709)

NOTICE:

Check the entire circumference of the gear.

HINT:

If the result is not as specified, replace the No. 1 synchronizer ring set with a new one.



- (b) Apply manual transmission gear oil to the taper cone of the 1st gear, and then hold the No. 1 synchronizer ring set in position with your hand to check that it does not slide in the circumferential direction.

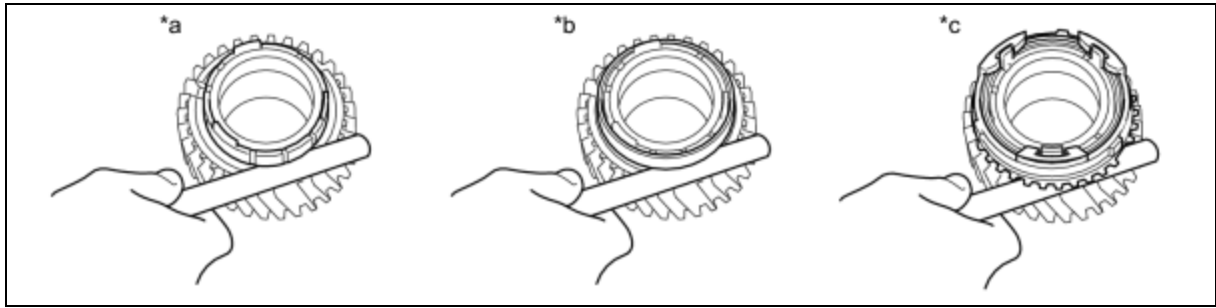
HINT:

If the No. 1 synchronizer ring set slides, replace the No. 1 synchronizer ring set with a new one.

12. INSPECT NO. 1 SYNCHRONIZER RING SET (for 2nd Gear)

- (a) Apply manual transmission gear oil to the taper cone of the 2nd gear and No. 1 synchronizer ring set, and then hold the No. 1 synchronizer ring set in position with your hand to measure the

clearance between the No. 1 synchronizer ring set and the 2nd gear by using a feeler gauge.



Text in Illustration

*a	Inner	*b	Middle
*c	Outer	-	-

Standard Clearance:

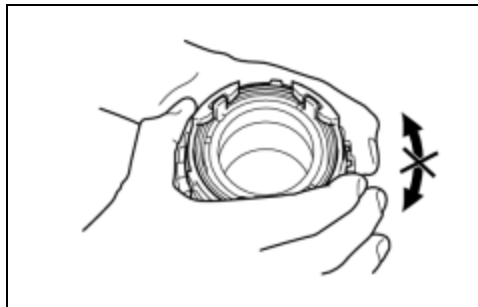
LOCATION	STANDARD CLEARANCE MM (IN.)
Inner	0.48 to 1.12 (0.0189 to 0.0441)
Middle	0.38 to 1.22 (0.0150 to 0.0480)
Outer	0.8 to 1.8 (0.0315 to 0.0709)

NOTICE:

Check the entire circumference of the gear.

HINT:

If the result is not as specified, replace the No. 1 synchronizer ring set with a new one.



(b) Apply manual transmission gear oil to the taper cone of the 2nd gear, and then hold the No. 1 synchronizer ring in position with your hand to check that it does not slide in the circumferential direction.

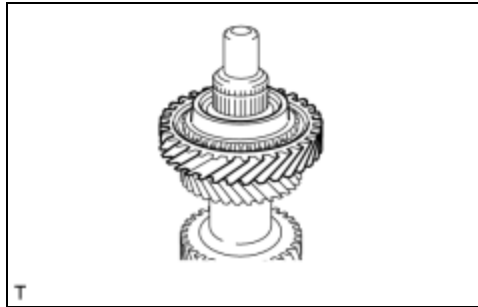
HINT:

If the No. 1 synchronizer ring set slides, replace the No. 1 synchronizer ring set with a new one.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002RHZ006X
Title: TL70 MANUAL TRANSMISSION / TRANSAXLE: OUTPUT SHAFT: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL REVERSE GEAR

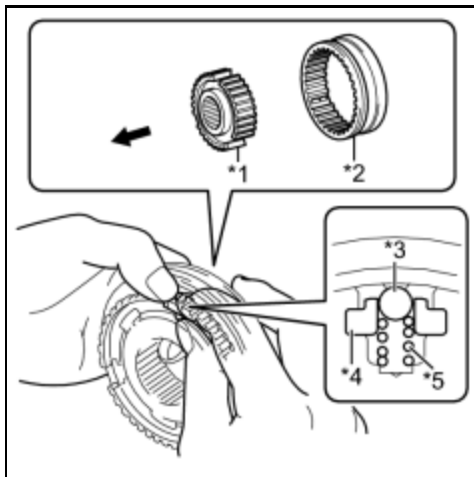


- (a) Apply manual transmission gear oil to the mounting point of the output shaft, reverse gear bearing and inside surface and taper cone of the reverse gear.

- (b) Install the reverse gear bearing and reverse gear to the output shaft.

2. INSTALL NO. 3 TRANSMISSION HUB SLEEVE

- (a) Apply manual transmission gear oil to the moving parts of the No. 3 transmission clutch hub.



Text in Illustration

*1	No. 3 Transmission Clutch Hub
*2	No. 3 Transmission Hub Sleeve
*3	Ball
*4	No. 1 Synchromesh Shifting Key
*5	No. 1 Synchromesh Shifting Key Spring
	Front Side

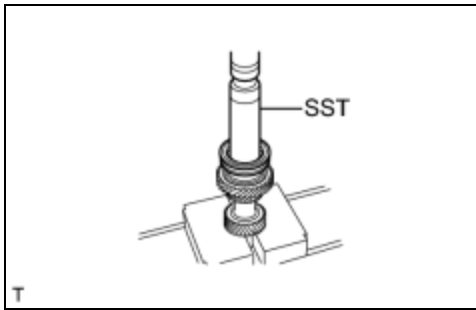


(b) As shown in the illustration, install the No. 3 transmission hub sleeve to the No. 3 transmission clutch hub. And install the 3 No. 1 synchronesh shifting keys and 3 synchronesh shifting key springs all together, and then install the 3 balls.

HINT:

- Install the ball while holding down the No. 1 synchronesh shifting key spring.
- After the installation, let the No. 1 synchronesh shifting key spring settle down.

3. INSTALL NO. 3 TRANSMISSION CLUTCH HUB



(a) Install the No. 3 synchronizer ring to the reverse gear.

(b) Using SST and a press, install the No. 3 transmission clutch hub.

SST: 09309-37010

HINT:

- Align the No. 3 transmission clutch hub and the No. 3 synchronizer ring so that they can fit together.
- After the No. 3 transmission clutch hub is installed, check that the No. 3 synchronizer ring moves in the thrust direction.
- Make sure to press fit the No. 3 transmission clutch hub until it touches the output shaft.

4. INSTALL SHAFT SNAP RING (for No. 3 transmission clutch hub)

(a) Select a shaft snap ring that is suitable to retain the specific thrust clearance between the No. 3 transmission clutch hub and shaft snap ring.

Standard clearance:

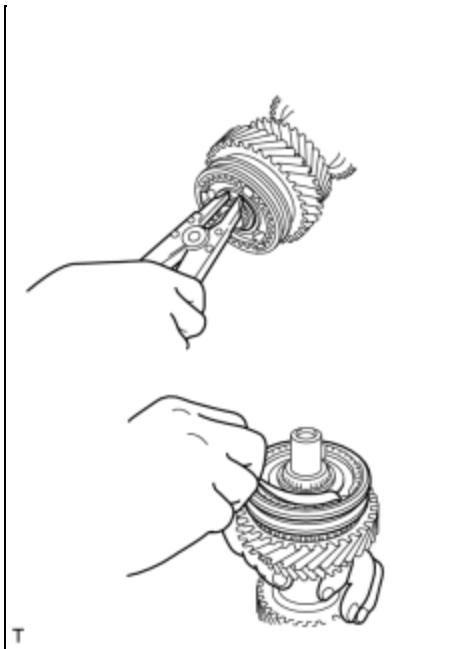
0 to 0.1 mm (0 to 0.00394 in.)

HINT:

Select the thickest shaft snap ring possible for installation.

Shaft Snap Ring Thickness

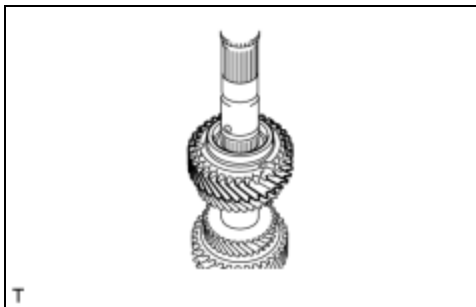
PART NO.	THICKNESS MM (IN.)	MARK
SU003-03581	1.80 (0.07086)	A
SU003-03582	1.85 (0.07283)	B



SU003-03583	1.90 (0.07480)	C
SU003-03584	1.95 (0.07677)	D
SU003-03585	2.00 (0.07874)	E
SU003-03586	2.05 (0.08070)	F

(b) Using a snap ring expander, install a new shaft snap ring to the output shaft.

5. INSTALL 2ND GEAR

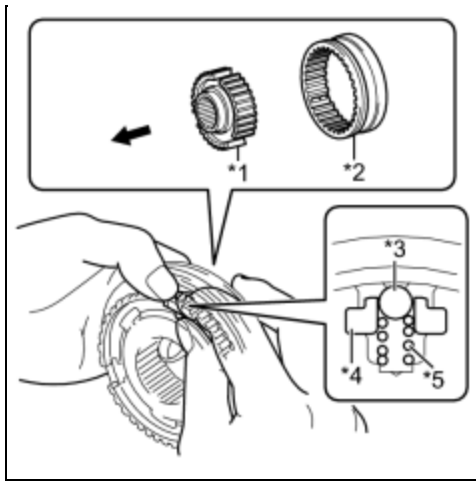


(a) Apply manual transmission gear oil to the mounting point of the output shaft, 2nd gear needle roller bearing and inside surface and taper cone of the reverse gear.


(b) Install the 2nd gear needle roller bearing and 2nd gear to the output shaft.

6. INSTALL NO. 1 TRANSMISSION HUB SLEEVE

(a) Apply manual transmission gear oil to the moving parts of the No. 1 transmission clutch hub.



Text in Illustration

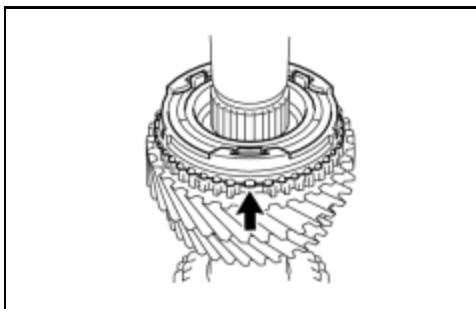
*1	No. 1 Transmission Clutch Hub
*2	No. 1 Transmission Hub Sleeve
*3	Ball
*4	No. 1 Synchronesh Shifting Key
*5	No. 1 Synchronesh Shifting Key Spring
	Front Side

(b) As shown in the illustration, install the No. 1 transmission hub sleeve to the No. 1 transmission clutch hub. And install the 3 No. 1 synchronesh shifting keys and 3 synchronesh shifting key springs all together, and then install the 3 balls.

HINT:

- Install the ball while holding down the No. 1 synchronesh shifting key spring.
- After the installation, let the No. 1 synchronesh shifting key spring settle down.

7. INSTALL NO. 1 TRANSMISSION CLUTCH HUB



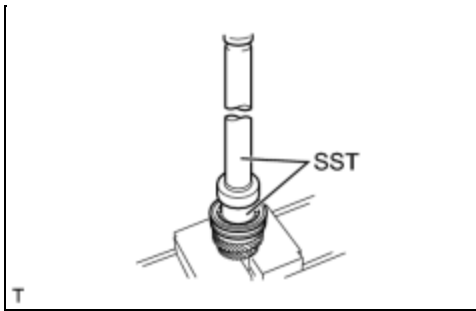
(a) Align and install the No. 1 synchronizer ring set (for 2nd gear) in the position, as shown in the illustration.

HINT:

- Align the middle ring claw with the groove in the 2nd gear.
- Align the inner ring claw with the groove in the outer ring.

(b) Using SST and a press, install the No. 1 transmission clutch hub.

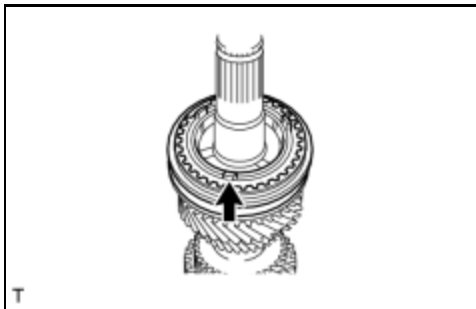
SST: 09309-35010



SST: 09631-12090

HINT:

- Align the No. 1 transmission clutch hub and the No. 1 synchronizer ring set (for 2nd gear) so that they can fit together.
- After the No. 1 transmission clutch hub is installed, check that the No. 1 synchronizer ring set (for 2nd gear) moves in the thrust direction.
- Make sure to press fit the No. 1 transmission clutch hub until it touches the output shaft.

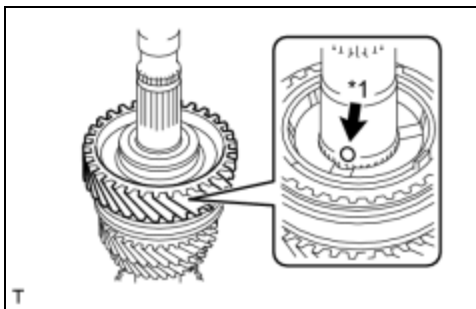


- (c) Align and install the No. 1 synchronizer ring set (for 1st gear) in the position, as shown in the illustration.

HINT:

- Align the outer ring claw with the groove in No. 1 transmission clutch hub.
- Align the inner ring claw with the groove in the outer ring.

8. INSTALL 1ST GEAR



- (a) After the output shaft is installed, apply manual transmission gear oil to the mounting point of the output shaft, needle roller bearing inner race, and inside surface and taper cone of the 1st gear.

- (b) Install the 1st shift restrict ball, 1st gear, 1st gear needle roller bearing and 1st gear bearing inner race to the output shaft.

Text in Illustration

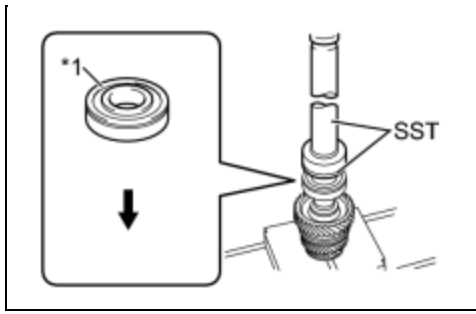
*1	1st Shift Restrict Ball
----	-------------------------

HINT:


Align the middle ring claw with the groove in the 1st gear.

9. INSTALL REAR OUTPUT SHAFT BEARING

- (a) Using SST and a press, as shown in the illustration, install the rear output shaft bearing.



Text in Illustration

*1	Rear Output Shaft Bearing
	Front Side

SST: 09309-35010

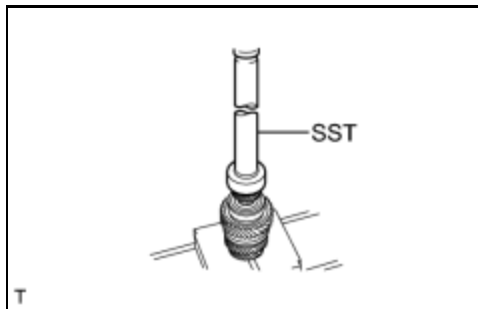
SST: 09316-60011

09316-00021

HINT:

Make sure to press fit the rear output shaft bearing until it touches the 1st gear bearing inner race.

10. INSTALL 6TH GEAR



(a) Using SST and a press, install the 6th gear.

SST: 09309-35010

HINT:

Make sure to press fit the 6th gear until it touches the rear output shaft bearing.

11. INSTALL SHAFT SNAP RING (for 6th gear)

(a) Select a shaft snap ring that is suitable to retain the specific thrust clearance between the 6th gear and shaft snap ring.

Standard clearance:

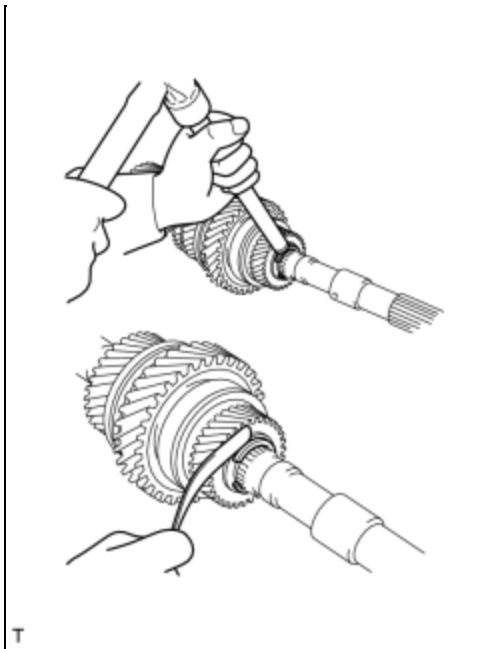
0 to 0.11 mm (0 to 0.00433 in.)

HINT:

Select the thickest shaft snap ring possible for installation.

Shaft Snap Ring Thickness

PART NO.	THICKNESS MM (IN.)	MARK
SU003-03564	2.67 (0.10511)	A



T

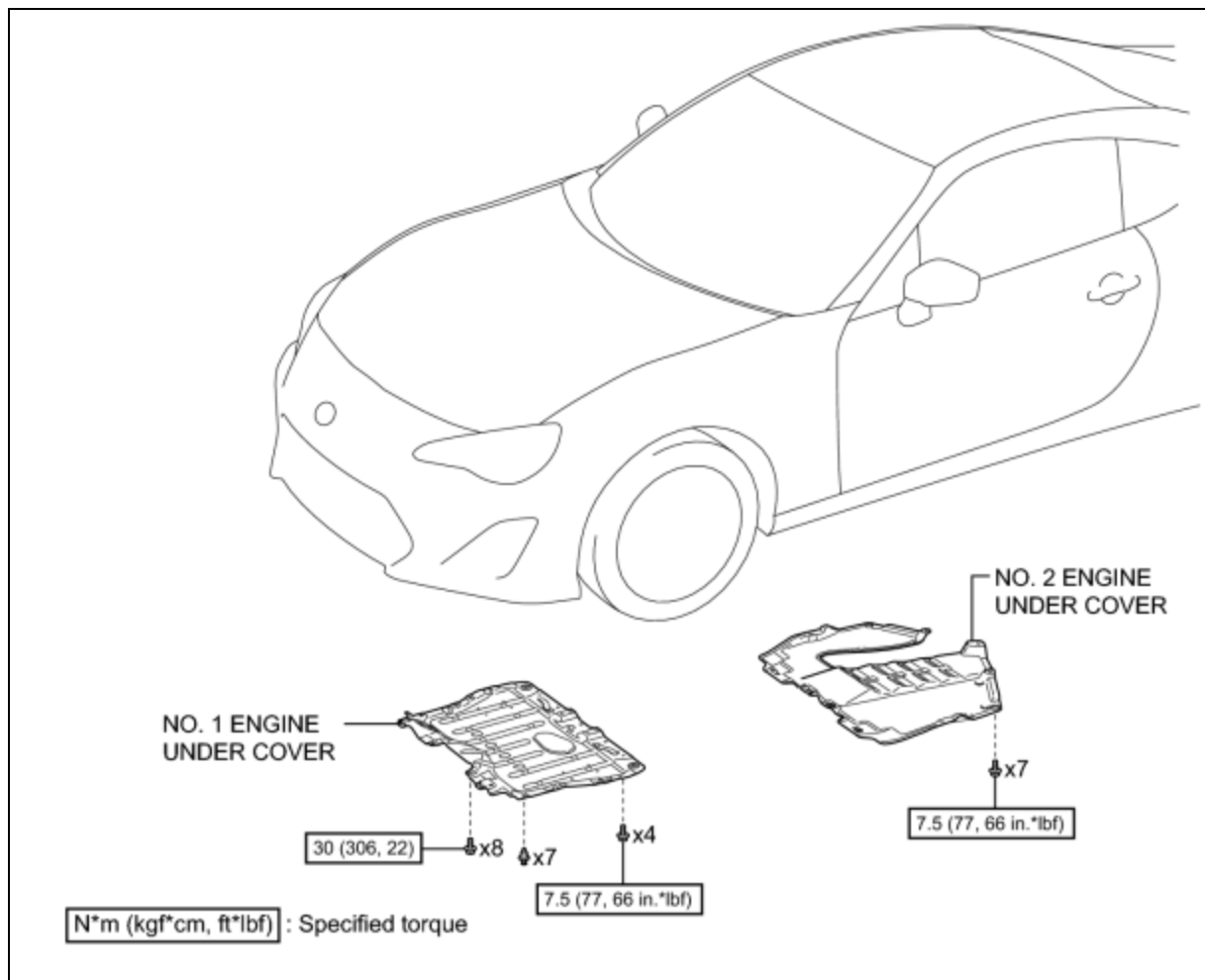
SU003-03565	2.73 (0.10748)	B
SU003-03566	2.79 (0.10984)	C
SU003-03567	2.85 (0.11220)	D
SU003-03568	2.91 (0.11456)	E
SU003-03569	2.97 (0.11692)	F
SU003-03570	3.03 (0.11929)	G
SU003-03571	3.09 (0.12165)	H
SU003-03572	3.15 (0.12401)	J
SU003-03573	3.21 (0.01053)	K
SU003-03574	3.27 (0.12874)	L

(b) Using a brass bar and hammer, install a new shaft snap ring to the output shaft.

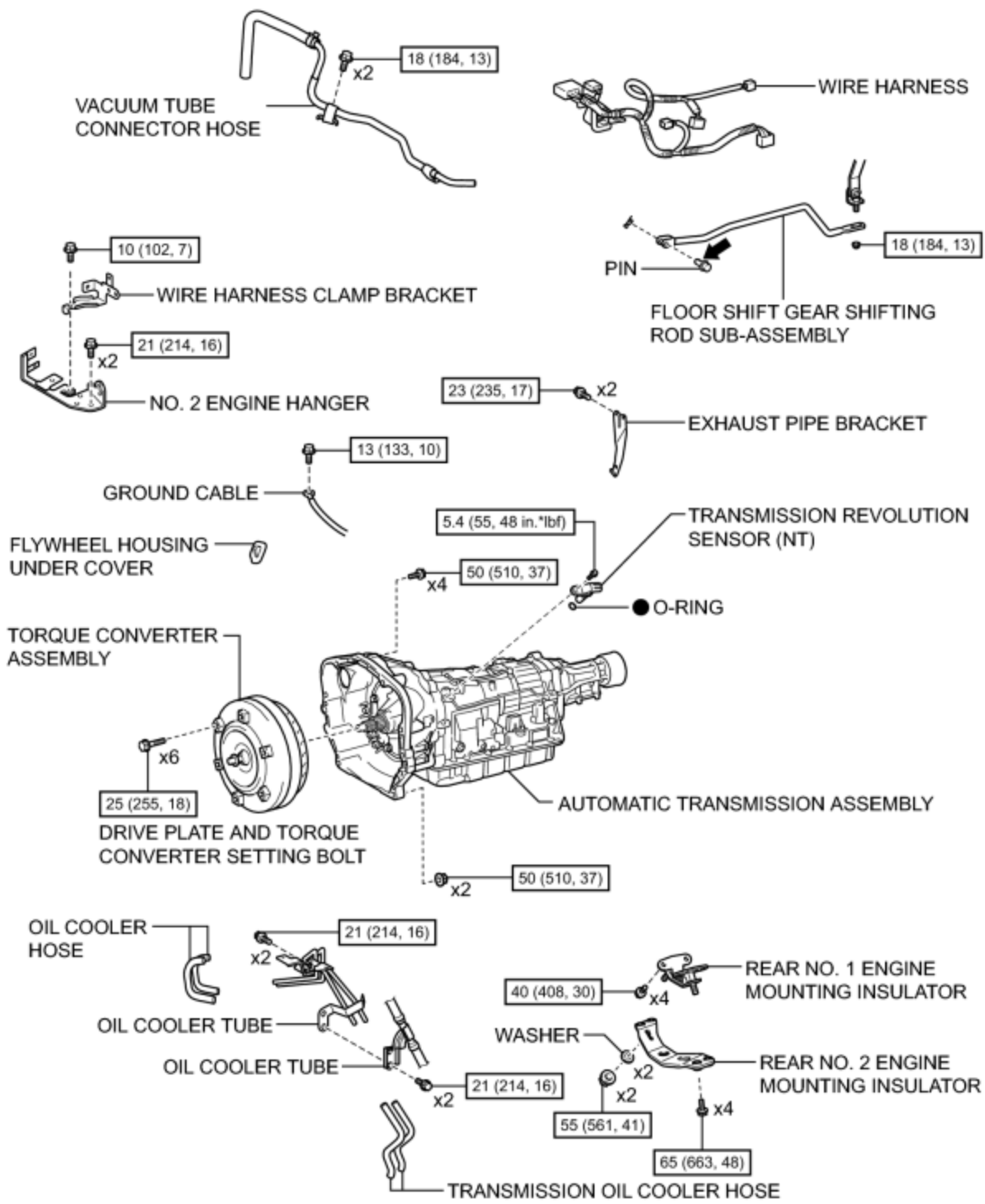
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NR9022X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION

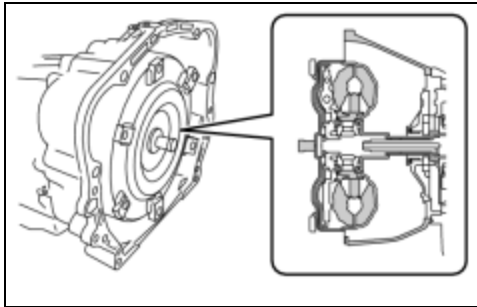


N*m (kgf*cm, ft*lb) : Specified torque
 ● Non-reusable part
 ← MP Grease

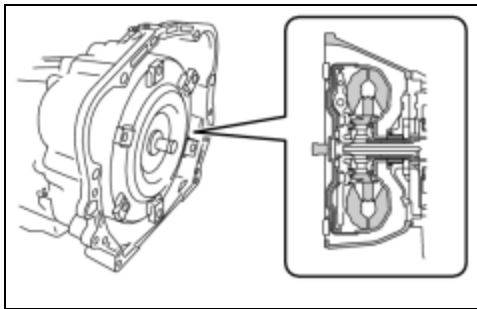
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NR8040X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL TORQUE CONVERTER ASSEMBLY



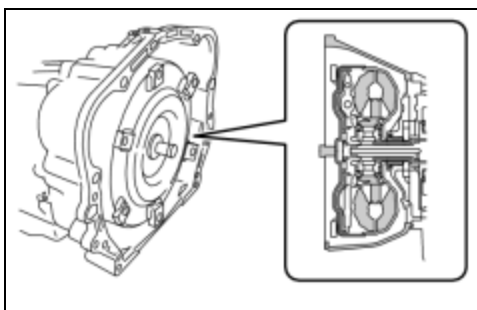
(a) Engage the splines of the input shaft and turbine runner.



(b) Engage the splines of the stator shaft and stator while turning the torque converter assembly.

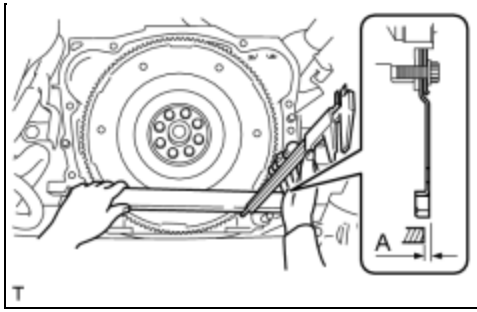
HINT:

If the stator shaft splines are difficult to engage with the stator splines, move the torque converter back approximately 10 mm (0.394 in.) and engage the splines while rotating the torque converter assembly.

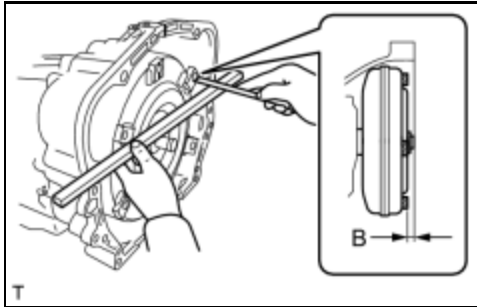


(c) Turn the torque converter assembly to engage the key of the oil pump drive gear into the slot on the torque converter assembly.

(d) Using a vernier caliper and straightedge, measure dimension A between the transmission contact surface of



the engine and the torque converter contact surface of the drive plate.



- (e) Using a vernier caliper and straightedge, measure dimension B shown in the illustration and check that dimension B is more than dimension A, which was measured in the first step.

Standard: :

$$B = A + 1 \text{ mm (0.0394 in.) or more}$$

NOTICE:

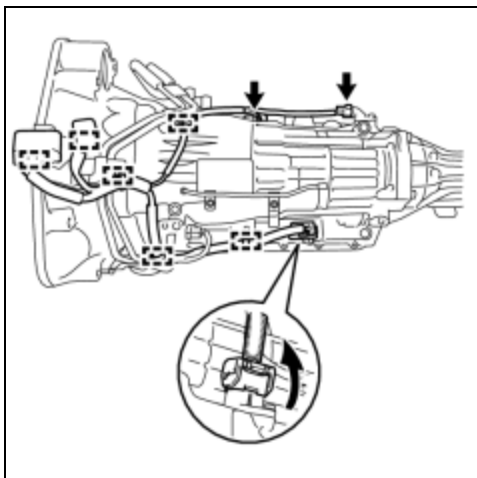
- Make sure to deduct the thickness of the straightedge.
- If the transmission is installed to the engine with the torque converter not sufficiently inserted, the torque converter may be damaged.

2. INSTALL OIL COOLER TUBE

- (a) Install the oil cooler tube with the bolt to the automatic transmission assembly.

Torque: 21 N·m (214 kgf·cm, 16ft·lbf)

- (b) Connect the 2 water by-pass hoses to the transmission oil cooler with the 4 hose clamps.



3. INSTALL WIRE HARNESS

- (a) Install the wire harness to the automatic transmission assembly with engage the 6 wire harness clamps.
- (b) Connect the park/neutral position switch connector, transmission wire connector and the transmission revolution sensor connector.

HINT:

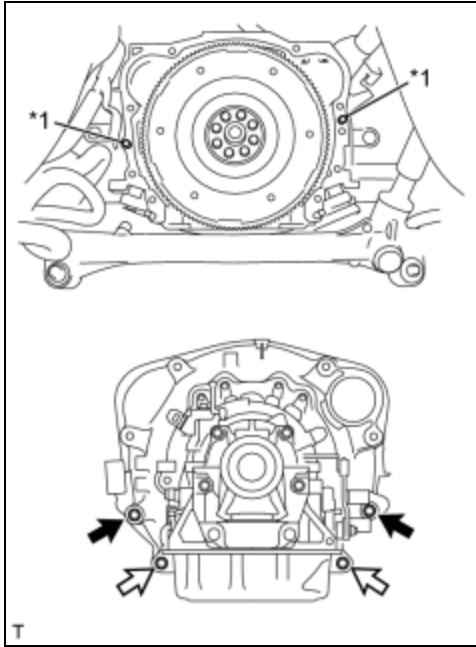
Push up the lever until the claw of the transmission wire connector makes a connection sound.

4. INSTALL REAR NO. 1 ENGINE MOUNTING INSULATOR

- (a) Install the rear No. 1 engine mounting insulator to the automatic transmission assembly with the 4 bolts.

Torque: 40 N·m (408 kgf·cm, 30ft·lbf)



5. INSTALL AUTOMATIC TRANSMISSION ASSEMBLY



- (a) Confirm that 2 knock pins are on the automatic transmission assembly contact surface of the engine cylinder block before automatic transmission assembly installation.

- (b) Keeping the engine assembly and the automatic transmission assembly in a horizontal position, align the knock pins with each hole on the automatic transmission assembly and install the 2 bolts and 2nuts.

Text in Illustration

*1	Knock Pin
	Bolt
	Nut

Torque: 50 N·m (510 kgf·cm, 37ft·lbf)

NOTICE:

- Make sure not to pinch or damage any wire harness.
- Make sure the knock pin is fully engaged with the knock pin hole.
- Do not forcibly pry the automatic transmission assembly.
- After installing the automatic transmission assembly, confirm that the torque converter assembly can be rotated by hand.

6. INSTALL REAR NO. 2 ENGINE MOUNTING INSULATOR

- (a) Install the rear No. 2 engine mounting insulator to the rear No. 1 engine mounting insulator with 2 washers and 2 nuts.

Torque: 40 N·m (408 kgf·cm, 30ft·lbf)

- (b) Install the rear No. 2 engine mounting insulator to the body with the 4 bolts.

Torque: 65 N·m (663 kgf·cm, 48ft·lbf)

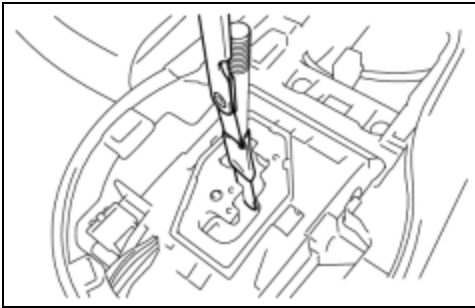
7. INSTALL EXHAUST PIPE BRACKET

- (a) Install the exhaust pipe bracket with the 2 bolts.

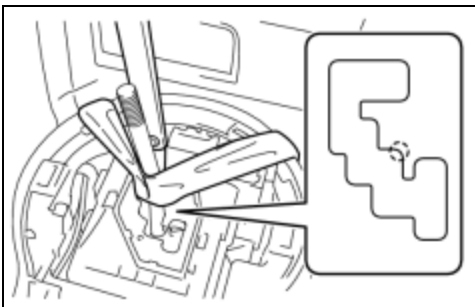
Torque: 21 N·m (214 kgf·cm, 16ft·lbf)

8. INSTALL FLOOR SHIFT GEAR SHIFTING ROD SUB-ASSEMBLY

- (a) Apply MP grease to the pin.
(b) Install the floor shift gear shifting rod sub-assembly to the transmission control shaft lever RH with the pin and a clip.
(c) While pushing the shift lock release button, move the shift lever to N.



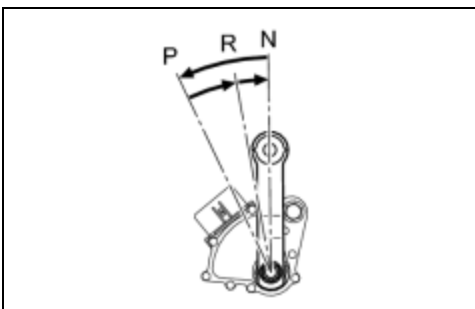
- (d) Using tape, hold a 0.3 mm feeler gauge on the floor shift control select lever.



- (e) Using tape, attach the floor shift control select lever to the console box assembly.

NOTICE:

Make sure that the feeler gauge is not on the area shown in the illustration.



- (f) Turn the transmission control shaft lever RH of the park/neutral position switch assembly counterclockwise until it stops, and turn it clockwise 2 notches to set it to the N position.

- (g) Temporarily install the floor shift gear shifting rod sub-assembly with the nut.
(h) Tighten the nut while lightly pushing the lever rearward.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

NOTICE:

Do not push the lever too hard.

9. INSTALL TRANSMISSION REVOLUTION SENSOR (NT)

INFO

10. CONNECT OIL COOLER TUBE

- (a) Fasten the oil cooler pipe with the oil cooler tube using 2 bolts.

Torque: 21 N·m (214 kgf·cm, 16ft·lbf)

11. INSTALL TRANSMISSION OIL COOLER HOSE

- (a) Install the 2 transmission oil cooler hoses to the transmission oil cooler with the 4 hose clamps.

12. INSTALL EXHAUST MANIFOLD

INFO

13. CONNECT AUTOMATIC TRANSMISSION ASSEMBLY

- (a) Install the 2 bolts to the automatic transmission assembly.

Torque: 50 N·m (510 kgf·cm, 37ft·lbf)

14. INSTALL DRIVE PLATE AND TORQUE CONVERTER SETTING BOLT

- (a) Install the 6 drive plate and torque converter setting bolt.

Torque: 25 N·m (255 kgf·cm, 18ft·lbf)

NOTICE:

- Make sure that the drive plate and torque converter setting bolts do not fall into the clutch housing.
- Make sure not to damage the drive plate and torque converter setting bolts.

15. INSTALL FLYWHEEL HOUSING UNDER COVER

- (a) Install the flywheel housing side cover.

16. CONNECT VACUUM TUBE CONNECTOR HOSE

- (a) Connect the vacuum tube connector hose with the 2 bolts.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

17. CONNECT WIRE HARNESS

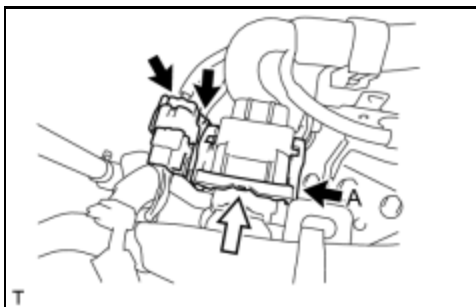
- (a) Install the No. 2 engine hanger with the 2 bolts.

Torque: 21 N·m (214 kgf·cm, 16ft·lbf)

- (b) Install the wire harness clamp bracket with the bolt.

Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

- (c) Engage the wire harness clamp.



- (d) Connect the 3 connectors.

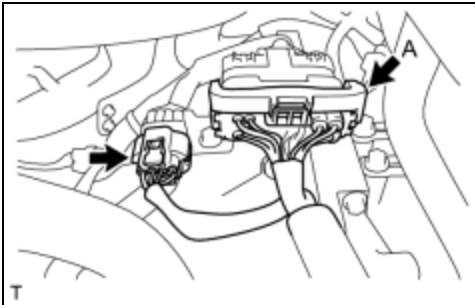
HINT:

Push down the lever until the claw of the connector (A) makes a connection sound.

(e) Engage the 4 wire harness clamps.

(f) Install the ground cable to the automatic transmission assembly with the bolt

Torque: 13 N·m (133 kgf·cm, 10ft·lbf)



(g) Connect the 2 connectors.

HINT:

Push down the lever until the claw of the connector (A) makes a connection sound.

18. INSTALL STARTER ASSEMBLY

INFO

19. INSTALL FRONT STABILIZER BAR

INFO

20. INSTALL PROPELLER WITH CENTER BEARING SHAFT ASSEMBLY

INFO

21. INSTALL NO. 2 ENGINE UNDER COVER

INFO

22. INSTALL NO. 1 ENGINE UNDER COVER

INFO

23. CONNECT BATTERY NEGATIVE TERMINAL

INFO

24. ADD ENGINE COOLANT

25. ADD AUTOMATIC TRANSMISSION FLUID

INFO

26. CHECK FOR ENGINE COOLANT LEAKS

INFO

27. INSPECT SHIFT LEVER POSITION

INFO

28. CHECK FOR EXHAUST GAS LEAKS

INFO

29. RESET CHECK RESET MEMORY

INFO

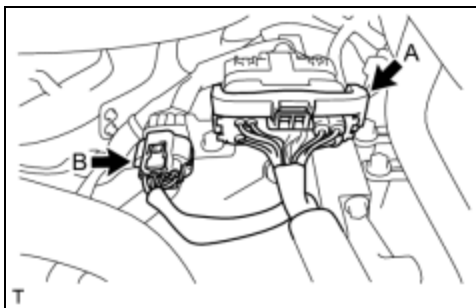
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NRA03ZX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO
2. REMOVE NO. 1 ENGINE UNDER COVER INFO
3. REMOVE NO. 2 ENGINE UNDER COVER INFO
4. DRAIN AUTOMATIC TRANSMISSION FLUID INFO
5. REMOVE PROPELLER WITH CENTER BEARING SHAFT ASSEMBLY INFO
6. REMOVE FRONT STABILIZER BAR INFO
7. REMOVE STARTER ASSEMBLY INFO
8. DISCONNECT WIRING HARNESS CONNECTOR

HINT:

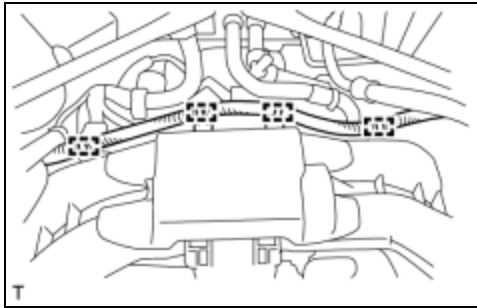
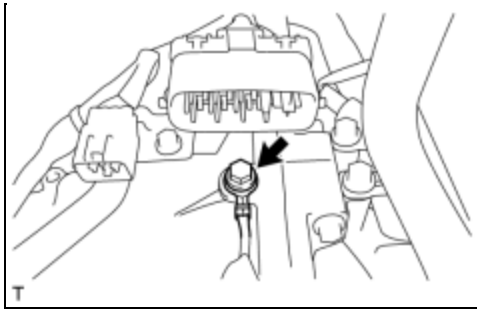
Fix disconnected harness components with tape to keep them out of the way.



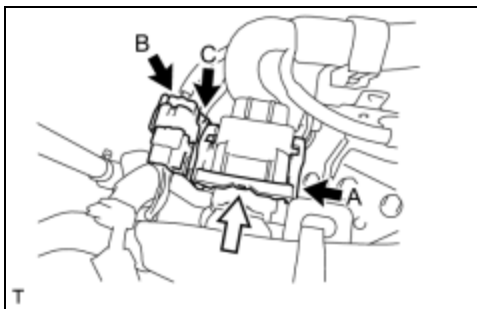
(a) Release the lock of connector (A) and disconnect the connector.

(b) Disconnect the connector (B).

(c) Remove the bolt and disconnect the ground cable.

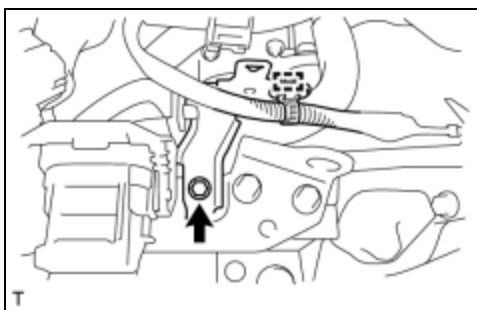


(d) Disengage the 4 wire harness clamps.



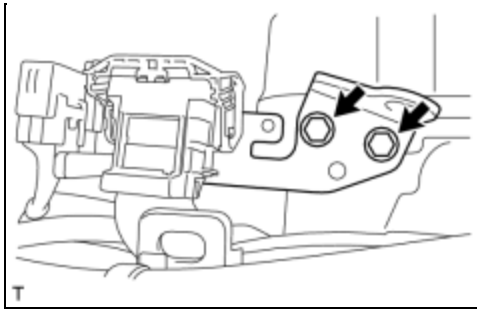
(e) Release the lock of connector (A) and disconnect the connector.

(f) Disconnect the connector (B) and (C).



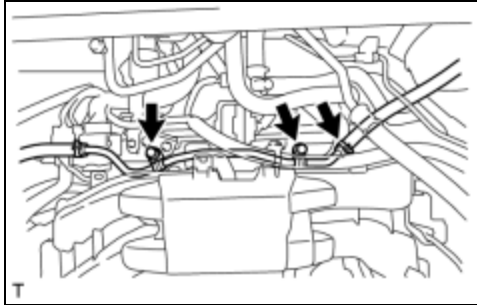
(g) Disengage the wire harness clamp.

(h) Remove the bolt and the wire harness clamp bracket.



(i) Remove the 2 bolts and the No. 2 engine hanger.

9. DISCONNECT VACUUM TUBE CONNECTOR HOSE



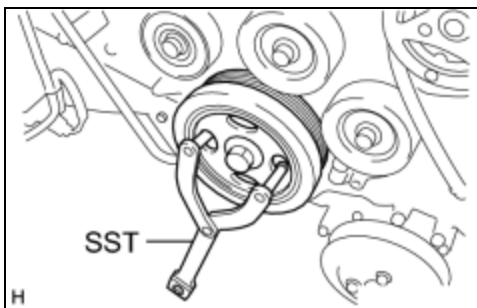
(a) Remove the 2 bolts and the disconnect the union to check valve hose.

10. REMOVE FLYWHEEL HOUSING UNDER COVER



(a) Remove the flywheel housing side cover from the automatic transmission assembly.

11. REMOVE DRIVE PLATE AND TORQUE CONVERTER SETTING BOLT

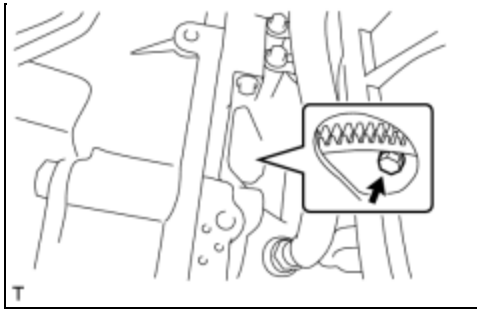


(a) Using SST, hold the crankshaft pulley.

SST: 09960-10010

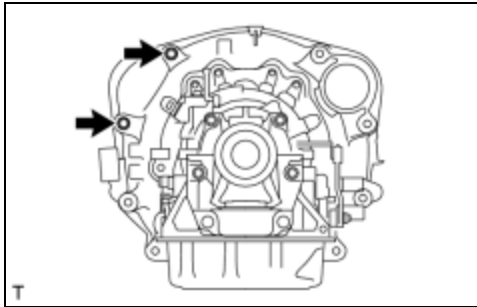
09962-01000

09963-01000



(b) Remove the 6 drive plate and torque converter setting bolt.

12. DISCONNECT AUTOMATIC TRANSMISSION ASSEMBLY



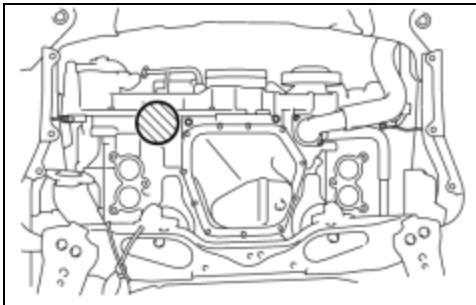
(a) Remove the 2 bolts from the automatic transmission assembly.

13. REMOVE EXHAUST MANIFOLD

INFO

14. SUSPEND ENGINE ASSEMBLY

(a) Support the engine assembly with an engine lifter so that it is stable shown in the illustration.



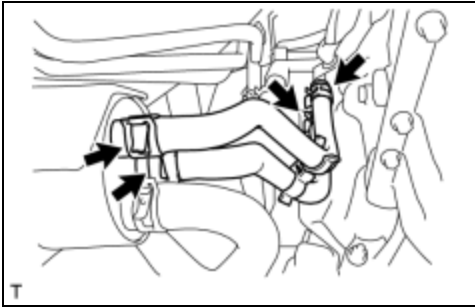
Text in Illustration

	<p>Attachment Placement Positions</p>
--	---------------------------------------

NOTICE:

- Set the engine assembly with transmission so that it is horizontal.
- Never attach the attachment and plate lift attachment to the oil pan section of the engine assembly.

15. REMOVE TRANSMISSION OIL COOLER HOSE

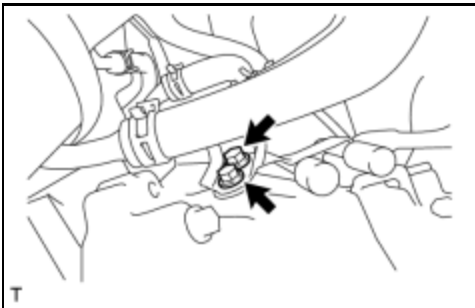


- (a) Loosen the 4 hose clamps and remove the 2 transmission oil cooler hoses.

NOTICE:

Use a container to catch any coolant which flows out of the transmission oil cooler hoses.

16. SEPARATE OIL COOLER TUBE

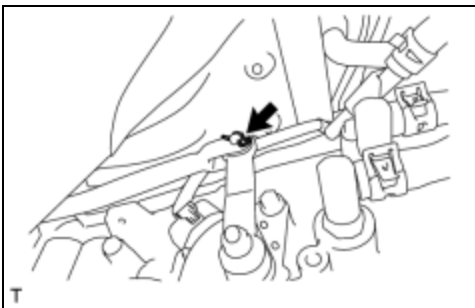


- (a) Remove the 2 bolts and separate the oil cooler tube.

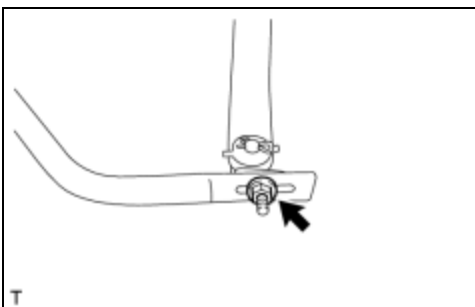
17. REMOVE TRANSMISSION REVOLUTION SENSOR (NT) INFO

18. REMOVE FLOOR SHIFT GEAR SHIFTING ROD SUB-ASSEMBLY

- (a) While pushing the shift lock release button, move the shift lever to N.

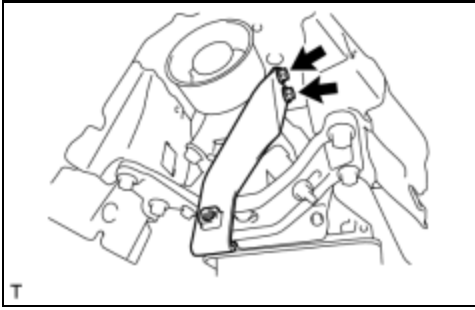


- (b) Remove the clip, pin and the floor shift gear shifting rod sub-assembly from the transmission control shaft lever RH.



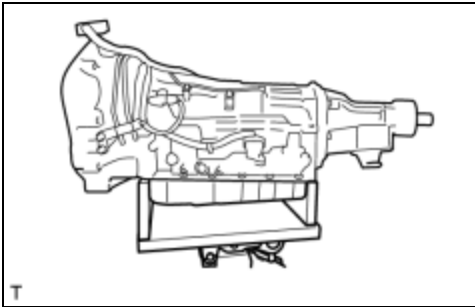
- (c) Remove the nut and disconnect the floor shift gear shifting rod sub-assembly.

19. REMOVE EXHAUST PIPE BRACKET



- (a) Remove the 2 bolts and the exhaust pipe bracket from the automatic transmission assembly.

20. SUPPORT AUTOMATIC TRANSMISSION ASSEMBLY



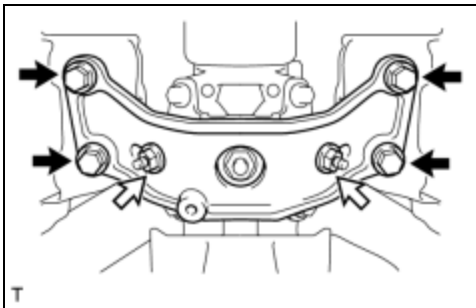
- (a) Support the automatic transmission assembly with a high transmission jack.

NOTICE:



To prevent damage to and deformation of the oil pan, never place a jack under the oil pan area of the automatic transmission assembly.

21. REMOVE REAR NO. 2 ENGINE MOUNTING INSULATOR

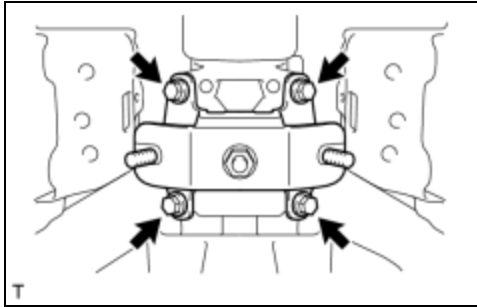
- (a) Remove the 4 bolts, 2 washers and 2 nuts and the rear No. 2 engine mounting insulator from the rear No. 1 engine mounting insulator.



Text in Illustration

	Bolt
	Nut

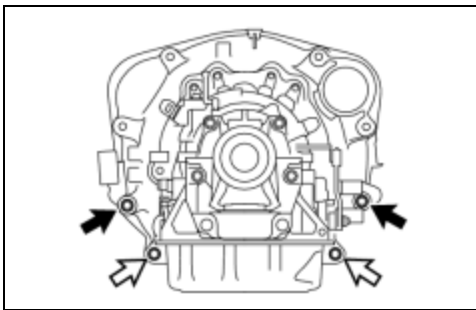
22. REMOVE REAR NO. 1 ENGINE MOUNTING INSULATOR





- (a) Remove the 4 bolts and the rear No. 1 engine mounting insulator from the automatic transmission assembly.

23. REMOVE AUTOMATIC TRANSMISSION ASSEMBLY

- (a) Remove the 2 bolts and 2 nuts and the automatic transmission assembly from the engine assembly.



Text in Illustration

	Bolt
	Nut

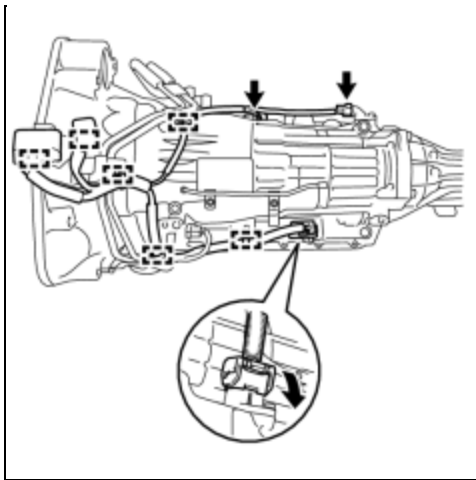
NOTICE:

- To prevent damage to the knock pins, do not pry between the automatic transmission assembly and the engine assembly.
- Do not allow the torque converter to fall off.

24. DISCONNECT WIRE HARNESS

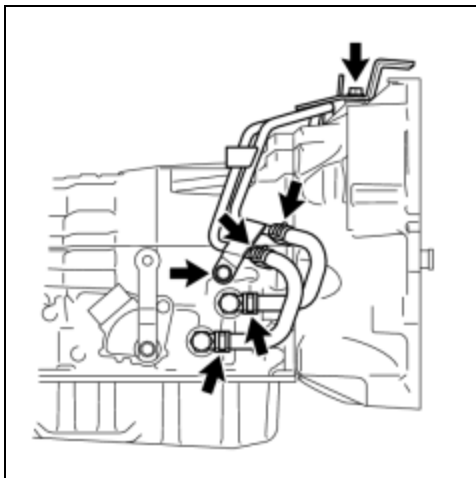
- (a) Disconnect the park/neutral position switch connector, transmission wire connector and the transmission revolution sensor connector.

HINT:



Disengage the claw, press down the lever, and disconnect the transmission wire connector.

- (b) Disengage the 6 wire harness clamps and the wire harness from the automatic transmission assembly.



25. REMOVE OIL COOLER TUBE

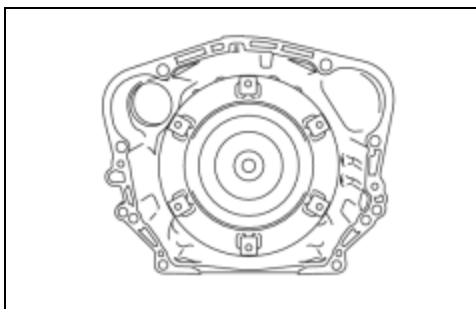
- (a) Loosen the 4 hose clamps and remove the 2 oil cooler hoses.

NOTICE:

Use a container to catch any coolant which flows out of the oil cooler hoses.

- (b) Remove the 2 bolts and the oil cooler tube from the automatic transmission assembly.

26. REMOVE TORQUE CONVERTER ASSEMBLY



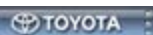
- (a) Remove the torque converter assembly from the automatic transmission assembly.

NOTICE:

Remove the torque converter assembly from the input shaft horizontally.

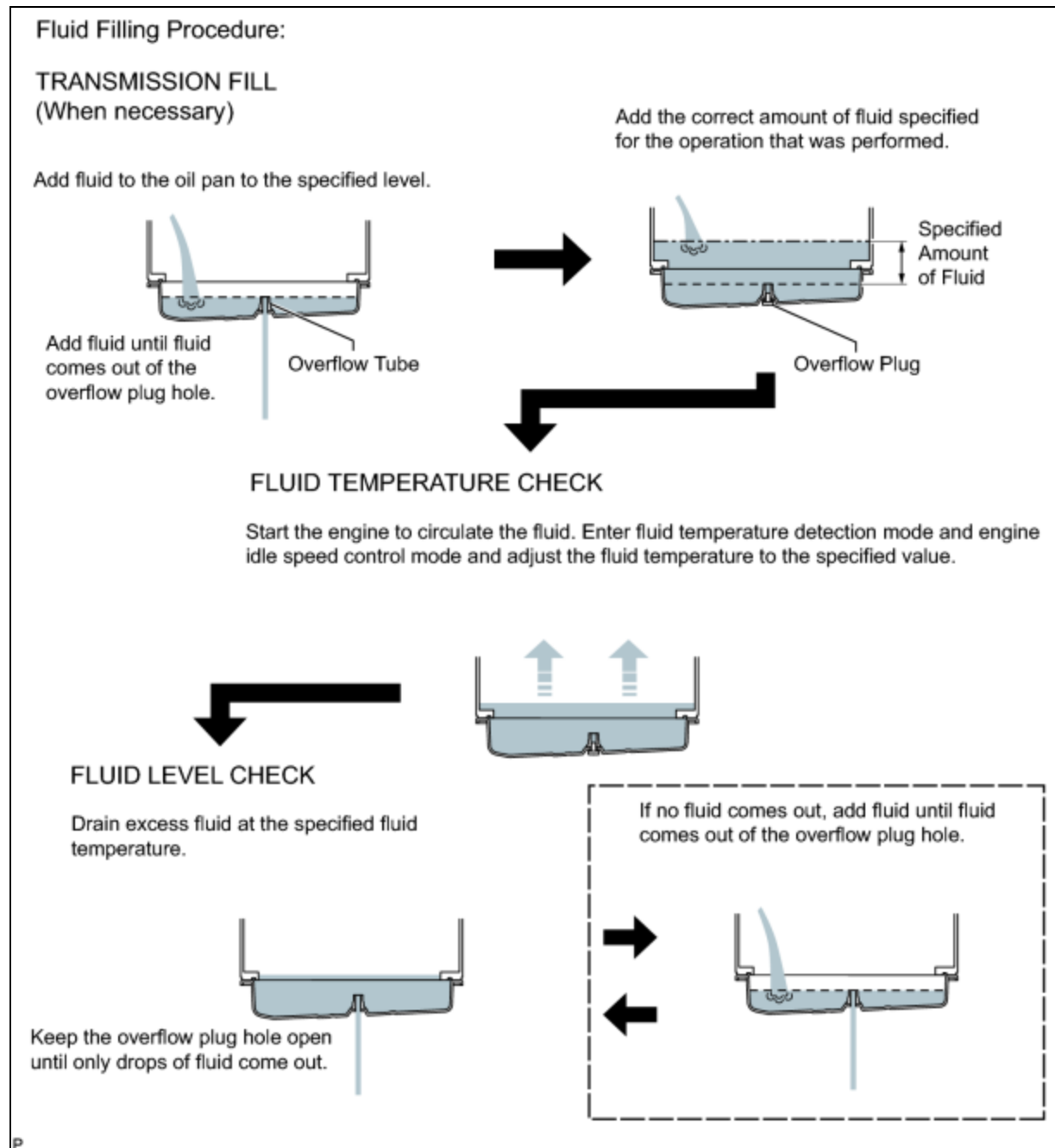
27. INSPECT TORQUE CONVERTER ASSEMBLY

INFO



Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000013BU08VX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION FLUID: ADJUSTMENT (2013 FR-S)		

ADJUSTMENT



NOTICE:

- This transmission requires Toyota Genuine ATF WS.
- After servicing the transmission, you must follow the ATF adjustment procedure.
- Maintain the vehicle in a horizontal position while adjusting the fluid level.

1. BEFORE FILLING TRANSMISSION

- When you have replaced the entire automatic transmission, automatic transmission oil pan, drain plug, transmission valve body and/or torque converter, proceed to the "TRANSMISSION FILL" procedures.
- When you have replaced the automatic transmission extension housing oil seal and/or repaired a fluid leak, proceed to the "FLUID TEMPERATURE CHECK" procedures.

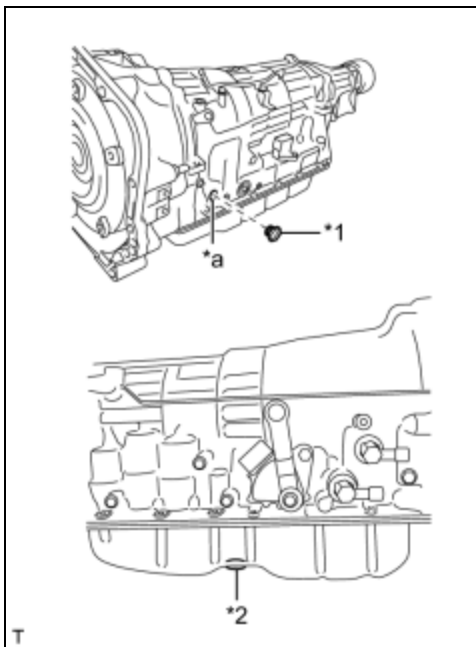
2. FILL TRANSMISSION PAN WITH FLUID

- (a) Lift the vehicle.

NOTICE:

Set the vehicle on a lift so that the vehicle is kept level when it is lifted up (make sure that the tilt angle from the front to rear of the vehicle is within $\pm 1^\circ$).

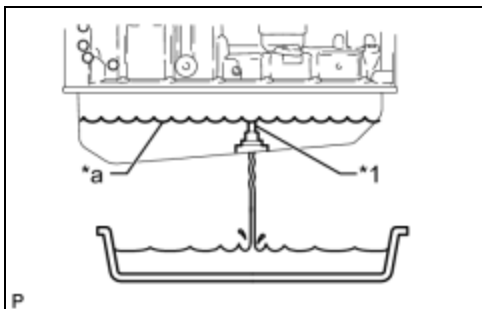
- (b) Remove the No. 2 engine under cover INFO.



- (c) Remove the refill plug with O-ring, overflow plug and gasket.

Text in Illustration

*1	Refill Plug
*2	Overflow Plug
*a	Refill Hole



- (d) Fill the transmission through the refill hole until fluid begins to trickle out of the overflow tube.

Text in Illustration

*1	Overflow Tube
*a	Specified Fluid Level

- (e) Wait until the fluid flow slows and only drops come out.
 (f) Temporarily install the overflow plug and gasket.

HINT:

Reuse the old gasket. The overflow plug will be removed again to adjust the fluid level.

(g) Fill the transmission with the amount of fluid listed in the table below.

Reference Capacity:

PERFORMED REPAIR	FILL AMOUNT
Automatic transmission oil pan and drain plug removal/installation	2.0 liters (2.1 US qts, 1.8 Imp. qts)
Transmission valve body removal/installation	3.0 liters (3.2 US qts, 2.6 Imp. qts)
Torque converter removal/installation	4.5 liters (4.8 US qts, 4.0 Imp. qts)

HINT:

If you cannot fill the listed amount of fluid, perform the following:

(1) Temporarily install the refill plug with O-ring.

HINT:

Reuse the old O-ring. The refill plug will be removed again to adjust the fluid level.

(2) Start the engine and idle it.

NOTICE:

Check that electrical systems such as the air conditioning system, audio system and lighting system are off.

(3) Slowly move the shift lever from P to M. Then return the shift lever to P.

HINT:

Slowly move the shift lever to circulate the fluid through each part of the transmission.

(4) Wait for 30 seconds with the engine idling.

(5) Stop the engine.

(6) Remove the refill plug with O-ring.

(7) Fill the transmission with the remaining fluid until the amount in the table has been filled.

(h) Temporarily install the refill plug with O-ring.

HINT:

Reuse the old O-ring. The refill plug will be removed again to adjust the fluid level.

(i) Lower the vehicle.

3. FLUID TEMPERATURE CHECK

NOTICE:

The ATF temperature can be confirmed by using the Techstream.

(a) Turn the ignition switch OFF.

(b) Connect the Techstream to the DLC3.

(c) Turn the ignition switch to ON.

(d) Enter the following menus: Powertrain / ECT / Data List / A/T Oil Temperature 1.

(e) Check the ATF temperature.

NOTICE:

If the ATF temperature is higher than 43°C (109°F), turn the ignition switch OFF and wait until the fluid temperature drops to below 43°C (109°F).

4. FLUID LEVEL CHECK

CAUTION:

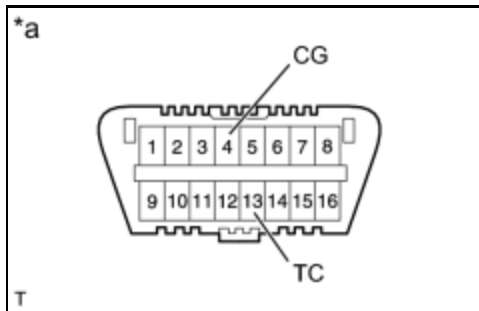
- It is necessary to change to temperature detection mode in order to idle the vehicle appropriately.
- The ATF temperature must be between 43 and 47°C (109 and 117°F) to accurately check the fluid level.

(a) When using the Techstream:

Enter the following menus: Powertrain / ECT / Active Test / Connect the TC and TE1.

Standard condition:

Indicator lights in the combination meter blink.



(b) When not using the Techstream:

Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.

Text in Illustration

*a	Front view of DLC3
----	--------------------

SST: 09843-18040

Standard condition:

Indicator lights in the combination meter blink.

(c) Start the engine and idle it.

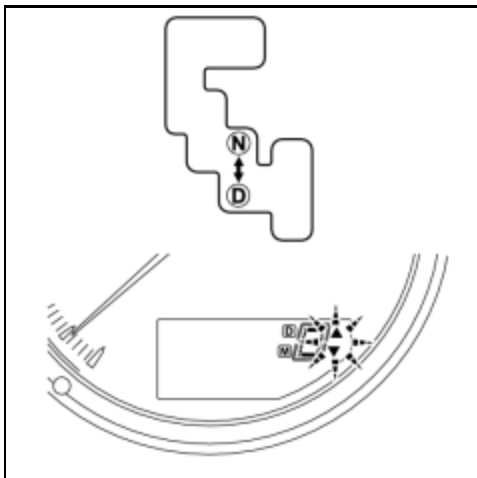
NOTICE:

Check that electrical systems such as the air conditioning system, audio system and lighting system are off.

(d) Slowly move the shift lever from P to M. Then return the shift lever to P.

HINT:

Slowly move the shift lever to circulate the fluid through each part of the transmission.



(e) Move the shift lever to D, and then quickly move it back and forth between N and D (once within 1.5 seconds) for at least 6 seconds. This will activate the fluid temperature detection mode.

Standard condition:

When switching to the oil temperature detecting mode, regardless of the shift position, the indicator lights [▲] and [▼] turn on for 2 seconds, and then go off.

(f) When using the Techstream:

Return the shift lever to P and terminate the Active Test on the Techstream.

(g) When not using the Techstream:

Return the shift lever to P and disconnect SST from the DLC3.

(h) While watching the state of the indicator lights [▲] and [▼], idle the engine to rise the oil temperature.

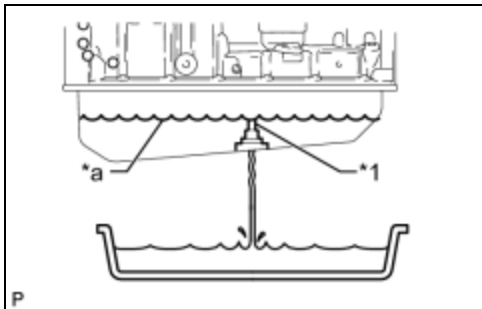
NOTICE:

If only the indicator light [▲] turns on or the indicator lights [▲] and [▼] turn on simultaneously, stop the operation. And then, wait until the fluid temperature is lowered and only the indicator light [▼] turns on in the oil temperature detecting mode.

(i) Allow the engine to idle until the fluid temperature reaches 43 to 47°C (109 to 117°F).

Indicator [D] Indication of ATF Temperature:

BELOW PROPER TEMPERATURE	PROPER TEMPERATURE	HIGHER THAN PROPER TEMPERATURE
Below 43°C (109°F)	43 to 47°C (109 to 117°F)	Higher than 47°C (117°F)
Indicator lights [▼] turns on	Indicator lights [▲] and [▼] turn on	Indicator lights [▲] turns on



(j) Remove the overflow plug and gasket with the engine idling.

Text in Illustration

*1	Overflow Tube
*a	Specified Fluid Level

(k) Wait until the overflow slows to a trickle.

NOTICE:

If the fluid does not overflow, perform the following:

- (1) Remove the refill plug with O-ring.
 - (2) Refill the transmission through the refill hole until fluid begins to trickle out of the overflow tube.
 - (3) Wait until the overflow slows to a trickle.
- (l) Install the overflow plug and a new gasket.

Torque: 20 N·m (204 kgf·cm, 15ft·lbf)

(m) Coat a new O-ring with ATF and install it to the refill plug.

(n) Install the refill plug with O-ring.

Torque: 39 N·m (400 kgf·cm, 29ft·lbf)

(o) Install the No. 2 engine under cover INFO.

(p) Lower the vehicle.

5. COMPLETE

(a) Turn the ignition switch OFF.

(b) When using the Techstream:

Disconnect the Techstream from the DLC3.

(c) Inspect for automatic transmission fluid leak.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004LXE008X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION FLUID: REPLACEMENT (2013 FR-S)		

REPLACEMENT

1. REPLACE AUTOMATIC TRANSMISSION FLUID

- (a) Lift the vehicle. [*1]

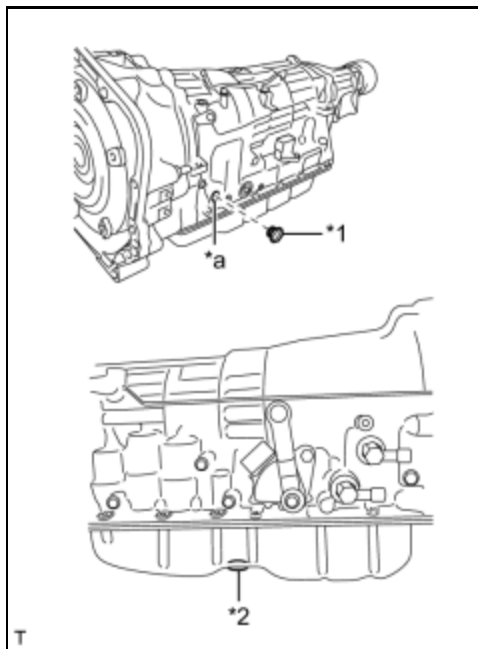
NOTICE:

Set the vehicle on a lift so that the vehicle is kept level when it is lifted up (make sure that the tilt angle from the front to rear of the vehicle is within +/- 1°).

- (b) Remove the No. 2 engine under cover INFO.
- (c) Remove the drain plug and gasket, and drain the ATF. [*2]
- (d) Temporarily install the drain plug and gasket. [*3]

HINT:

Reuse the old gasket. The drain plug will be removed again to adjust the fluid level.



- (e) Remove the refill plug with O-ring, overflow plug and gasket. [*4]

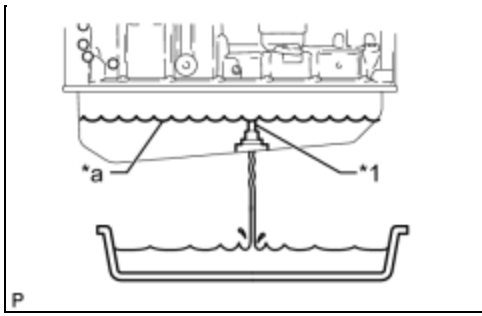
Text in Illustration

*1	Refill Plug
*2	Overflow Plug
*a	Refill Hole

- (f) Add fluid to the refill hole until it flows out of the overflow tube. [*5]

Text in Illustration

*1	Overflow Tube
*a	Specified Fluid Level



NOTICE:

Use Toyota Genuine ATF WS.

(g) Wait until the fluid flow slows and only drops come out. [*6]

(h) Temporarily install the overflow plug and gasket. [*7]

HINT:

Reuse the old gasket. The overflow plug will be removed again to adjust the fluid level.

(i) Add fluid to the refill hole using the amount of fluid specified for removal and installation of the oil pan. [*8]

HINT:

Specified amount of fluid is 2.0 liters (2.1 US qts, 1.8 Imp. qts).

(j) Temporarily install the refill plug with O-ring. [*9]

HINT:

Reuse the old O-ring. The refill plug will be removed again to adjust the fluid level.

(k) Lower the vehicle. [*10]

(l) Start the engine. [*11]

NOTICE:

Make sure that the A/C switch is off.

(m) Slowly move the shift lever from P to M. Then return the shift lever to P. [*12]

HINT:

Slowly move the shift lever to circulate the fluid through each part of the transmission.

(n) Allow the engine to idle for 30 seconds to warm it up. [*13]

(o) Turn the ignition switch off. [*14]

(p) Repeat steps [*1] to [*14].

(q) Repeat steps [*1] to [*2].

(r) Install the drain plug and a new gasket.

Torque: 20 N·m (204 kgf·cm, 15ft·lbf)

(s) Repeat steps [*4] to [*10].

(t) Adjust the fluid level INFO.

(u) Install the No. 2 engine under cover INFO.

(v) Lower the vehicle.

(w) Operation complete.



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PKP016X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: B1016: Shift Lock Circuit (2013 FR-S)		

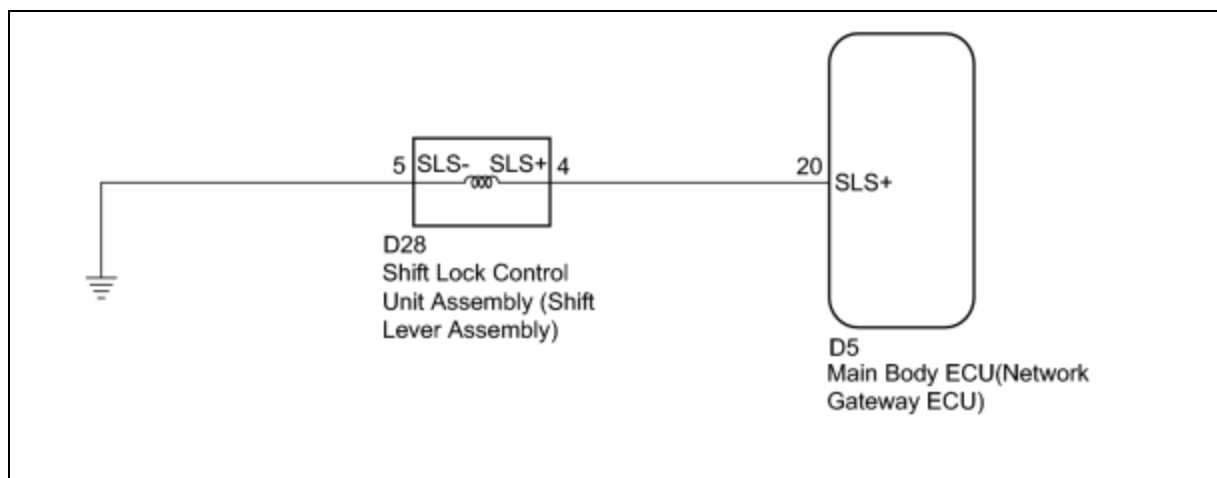
DTC	B1016	Shift Lock Circuit
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DESCRIPTION

When an IGN signal, P switch signal, and STP signal are input into the main body ECU (network gateway ECU), a signal is output to the shift lock control unit assembly.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1016	<ol style="list-style-type: none"> 1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER <ol style="list-style-type: none"> 1. Ignition switch is turned to ON 2. Shift lock circuit open, short to B+, or short to ground 3. For 3 seconds or more 4. 1-trip detection logic 	<ul style="list-style-type: none"> • Shift lock control unit assembly • Wire harness or connector • Main body ECU (Network Gateway ECU)


WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	INSPECT SHIFT LOCK CONTROL UNIT ASSEMBLY
-----------	---

(a) Perform inspection of the shift lock control unit assembly  .

NG  **REPLACE SHIFT LOCK CONTROL UNIT ASSEMBLY**

OK



2.	CHECK HARNESS AND CONNECTOR (MAIN BODY ECU - SHIFT LOCK CONTROL UNIT ASSEMBLY)
-----------	---

(a) Disconnect the D5 main body ECU (network gateway ECU) connector.

(b) Disconnect the D28 shift lock control unit assembly connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D5-20(SLS+) - D28-4(SLS+)	Always	Below 1 Ω
D5-20(SLS+) or D28-4(SLS+) - Body ground	Always	10 k Ω or higher

(d) Connect the D5 main body ECU (network gateway ECU) connector.

(e) Connect the D28 shift lock control unit assembly connector.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



3.	CHECK HARNESS AND CONNECTOR (SHIFT LOCK CONTROL UNIT ASSEMBLY - BODY GROUND)
-----------	---

(a) Disconnect the D28 shift lock control unit assembly connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D28-5(SLS-) - Body ground	Always	Below 1 Ω

(c) Connect the D28 shift lock control unit assembly connector.

NG ▶ REPAIR OR REPLACE HARNESS OR
CONNECTOR (SHIFT LOCK CONTROL UNIT
ASSEMBLY - BODY GROUND)

OK ▶ REPLACE MAIN BODY ECU (NETWORK
GATEWAY ECU)



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W780NLX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: CHECK MODE PROCEDURE (2013 FR-S)		

CHECK MODE PROCEDURE

HINT:

Check mode has a higher sensitivity to malfunctions and can detect malfunction that normal mode cannot detect. Check mode can also detect all the malfunctions that normal mode can detect. In check mode, DTCs are detected with 1-trip detection logic.

1. DTC CHECK (CHECK MODE)

HINT:

Techstream only: Compared to the normal mode, the check mode is more sensitive for detecting malfunctions. Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the check mode.

(a) Procedure for Check Mode using the Techstream.

(1) Check the initial conditions.

- Battery positive voltage 11 V or more
- Throttle valve fully closed
- Transmission in the P or N position
- A/C switch is off

(2) Turn the ignition switch off.

(3) Connect the Techstream to the DLC3.


(4) Turn the ignition switch ON and turn the Techstream main switch on.

(5) Enter the following menus: Powertrain / ECT / Utility / Check Mode.

NOTICE:

All DTCs and freeze frame data recorded will be erased if: 1) Techstream is used to change the ECM from normal mode to check mode or vice-versa; or 2) during check mode, the ignition switch is turned from the on to on (ACC) or turned OFF.

(6) Start the engine (the MIL goes off after the engine starts).

(7) Perform "MONITOR DRIVE PATTERN" for the ECT test , or simulate the conditions of the malfunction described by the customer.


NOTICE:

Leave the ignition switch ON until you have checked the DTCs, etc.

(8) After simulating malfunction conditions, use the Techstream diagnosis selector to check the DTCs and freeze frame data, etc.

(9) When you use Techstream: Enter the following menus: Powertrain / ECT / Trouble Codes.

(10) After checking the DTC, inspect the applicable circuit.

(11)  to confirm the details of the DTCs.

2. DTC CLEAR

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch ON and turn the Techstream main switch on.

(c) When you use Techstream: Enter the following menus: Powertrain / ECT / Trouble Codes / Clear.

HINT:

When operating Techstream to erase the codes, the DTCs and freeze frame data will be erased. (See the Techstream instruction book for operating instructions.)



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W7E0PNX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch ON.
- (e) Turn the Techstream on.
- (f) Enter the following menus: "Powertrain / ECT / Data List" or "Body Electrical / Main Body / Data List".
- (g) According to the display on the Techstream, read the "Data List".

"Powertrain / ECT / Data List"

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Vehicle Speed	Vehicle speed / Min.: 0 km/h (0 mph), Max.: 255 km/h (158 mph)	Actual vehicle speed	-
Engine Speed	Engine speed / Min.: 0 rpm, Max.: 16383.75 rpm	550 to 800 rpm: Idling	-
Coolant Temp	Engine coolant temperature / Min.: -40°C (-40°F), Max.: 140°C (284°F)	75 to 100°C (167 to 212°F): After warming up	<ul style="list-style-type: none"> • If value -40°C (-40°F): sensor circuit open • If value 215°C (419°F): sensor circuit shorted
Engine Run Time	Engine run time / Min.: 0 second, Max.: 65535 seconds	Time after engine start	-
Battery	Battery voltage /	11 to 14 V: Idling	-

Voltage	Min.: 0, Max.: 65.535 V		
Stop Light Switch	Stop light switch status / ON or OFF	Brake pedal is <ul style="list-style-type: none"> • ON: Depressed • OFF: Released 	-
A/C signal	A/C signal status / ON or OFF	A/C switch is: ON : OFF	-
#Codes (Include History)	# of Codes / Min.: 0, Max.: 255	-	Number of detected DTCs
MIL ON Run Distance	MIL ON run distance / Min.: 0 km (0 mile), Max.: 65535 km (40723 mile)	Distance after DTC detected	-
Running Time from MIL ON	Running time from MIL ON / Min.: 0 minute, Max.: 65535 minutes	Equivalent to running time after MIL ON	-
Time after DTC Cleared	Time after DTC cleared / Min.: 0 minute, Max.: 65535 minutes	Equivalent to time after DTCs cleared	-
Distance from DTC Cleared	Distance after DTC cleared / Min.: 0 km (0 mile) Max.: 65535 km (40723 mile)	Equivalent to time after DTCs cleared	-
Warmup Cycle Cleared DTC	Warm-up cycle after DTC cleared / Min.: 0, Max.: 255	-	Number of warm-up cycles after DTCs cleared
TC and TE1	TC and TE1 terminals of DLC3 / ON or OFF	-	Active Test support data
Engine Speed from EFI	Engine speed / Min.: 0 rpm, Max.: 16383.75 rpm	550 to 800 rpm: Idling	-
Coolant Temp from EFI	Engine coolant temperature / Min.: -40°C (-40°F), Max.: 215°C (419°F)	80 to 105°C (176 to 221°F): After warming up	<ul style="list-style-type: none"> • If value -40°C (-40°F): sensor circuit open • If value 140°C (284°F): sensor circuit shorted
Throttle Position from EFI	Throttle sensor position / Min.: 0%, Max.: 100%	<ul style="list-style-type: none"> • 0%: Accelerator pedal released • 64 to 96%: Accelerator pedal fully 	Recognition value for throttle opening angle on TCM

		depressed	
Accel Position from EFI	Absolute Accelerator Pedal Position / Min.: 0%, Max.: 100%	<ul style="list-style-type: none"> • 10 to 22%: Accelerator pedal released • 54 to 86%: Accelerator pedal fully depressed 	-
Received MIL from ECT	MIL request status/ ON : OFF	MIL request is: ON : OFF	-
Shift Position Sig from ECT	Received Shift Position Signal from ECT 1st,2nd,3rd,4th,5th,6th,7th,8th	Shift lever position is <ul style="list-style-type: none"> • On D: 1st, 2nd, 3rd, 4th, 5th or 6th • On M: 1st, 2nd, 3rd, 4th, 5th or 6th 	-
SPD(NT)	Input shaft speed/ Min.: 0 rpm Max.: 12,750 rpm	Lock-up is <ul style="list-style-type: none"> • ON (after warming up engine): Input turbine speed (NT) is equal to engine speed • OFF (idling with shift lever on N): Input turbine speed (NT) is nearly equal to engine speed 	Data is displayed in increments of 50 rpm
SPD(SP2)	Output shaft speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	Vehicle stopped: 0 km/h (0 mph) (output shaft speed is equal to vehicle speed)	-
Shift SW Status (P Range)	PNP switch status/ ON or OFF	Shift lever is: <ul style="list-style-type: none"> • On P: ON • Not on P: OFF 	When shift lever position displayed on the Techstream differs from actual position, adjustment of PNP switch or shift cable may be incorrect
		Shift lever is:	When shift lever position

Shift SW Status (R Range)	PNP switch status/ ON or OFF	<ul style="list-style-type: none"> • On R: ON • Not on R: OFF 	displayed on the Techstream differs from actual position, adjustment of PNP switch or shift cable may be incorrect
Shift SW Status (N Range)	PNP switch status/ ON or OFF	Shift lever is: <ul style="list-style-type: none"> • On N: ON • Not on N: OFF 	When shift lever position displayed on the Techstream differs from actual position, adjustment of PNP switch or shift cable may be incorrect
Sport Shift Up SW	Sport shift up switch status/ ON or OFF	<ul style="list-style-type: none"> • Continuously shift to "+" (upshift): ON • Release "+" (up-shift): OFF 	-
Sport Shift Down SW	Sport shift down switch status/ ON or OFF	<ul style="list-style-type: none"> • Continuously shift to "-" (down-shift): ON • Release "-" (down-shift): OFF 	-
Sports Mode Selection SW	Sport mode select switch status/ ON or OFF	Shift lever position is: <ul style="list-style-type: none"> • M, "+" and "-": ON • Not on M, "+" and "-": OFF 	-
Snow Switch Status	Pattern switch (ECT SNOW) status/ ON or OFF	Ignition switch is: Pushed: OFF ↓ Pattern switch (ECT SNOW) is: Pushed: ON ↓ Pattern switch (ECT SNOW) is: Pushed: OFF	-
Shift SW Status (D Range)	PNP switch status/ ON or OFF	Shift lever is: <ul style="list-style-type: none"> • On D or M: ON • Not on D or M: OFF 	When shift lever position displayed on the Techstream differs from actual position, adjustment of PNP switch or shift cable may be incorrect
		<ul style="list-style-type: none"> • After stall test: 50 to 	

A/T Oil Temperature 1	ATF temperature sensor No. 1 value/ Min.: -40°C (-40°F) Max.: 215°C (419°F)	100°C (122 to 212°F) • Equal to ambient temperature while engine is cold	If value is -40°C (-40°F) or 215°C (419°F), ATF temperature sensor No. 1 circuit is opened or short circuited
Lock Up	Lock Up Status/ ON or OFF	Lock-up is • Operating: ON • Not operating: OFF	-
SL Solenoid Status	Shift solenoid SL status/ ON or OFF	Shift solenoid SL is • Operating: ON • Not operating: OFF	-
Shift Status	TCM gear shift command/ 1st, 2nd, 3rd, 4th, 5th or 6th	Shift lever position is • On D: 1st, 2nd, 3rd, 4th, 5th or 6th • On M: 1st, 2nd, 3rd, 4th, 5th or 6th	-
MT Down Shift Indication	Shift indicator lamp down shift status/ ON or OFF	Shift indicator lamp is: ON : OFF	-
MT Up Shift Indication	Shift indicator lamp up shift status/ ON or OFF	Shift indicator lamp is: ON : OFF	-
Snow or 2nd Mode	Pattern select switch (SNOW) status/ ON or OFF	Ignition switch is: ON : OFF ↓ Pattern select switch is: Pushed : ON ↓ Pattern select switch is: Released : OFF	-

"Powertrain / ECT / Data List"

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
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Stop Light Switch	Stop light switch status/ ON or OFF	Brake pedal is <ul style="list-style-type: none"> • ON: Depressed • OFF: Released 	-
Shift P Signal	PNP switch status/ ON or OFF	Shift lever is: <ul style="list-style-type: none"> • On P: ON • Not on P: OFF 	When shift lever position displayed on the Techstream differs from actual position, adjustment of PNP switch or shift cable may be incorrect
IG Power Supply Voltage	IG Power Supply Voltage / Min.: 0, Max.: 21.4 V	11 to 14 V: Idling	-
Shift Lock Solenoid	Shift Lock Control Unit Assembly status/ ON or OFF	Shift Lock Control Unit Assembly is <ul style="list-style-type: none"> • Operating: ON • Not operating: OFF 	-

2. ACTIVE TEST

HINT:

Using Techstream to perform Active Test allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Test early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Test.

- Warm up the engine.
- Turn the ignition switch off.
- Connect the Techstream to the DLC3.
- Turn the ignition switch on position.
- Turn the Techstream on.
- Enter the following menus: "Powertrain / ECT / Active Test" or "Body Electrical / Main Body / Active Test".
- According to the display on the Techstream, perform the "Active Test".

"Powertrain / ECT / Active Test"


TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Activate the Solenoid (SLU)	Operate the shift solenoid SLU	ON or OFF	[Vehicle Condition] <ul style="list-style-type: none"> • Engine stopped • Shift lever P or N

			position
Activate the Solenoid (S1)	Operate the shift solenoid S1	ON or OFF	[Vehicle Condition] <ul style="list-style-type: none"> • Engine stopped • Shift lever P or N position
Activate the Solenoid (S2)	Operate the shift solenoid S2	ON or OFF	[Vehicle Condition] <ul style="list-style-type: none"> • Engine stopped • Shift lever P or N position
Activate the Solenoid (S3)	Operate the shift solenoid S3	ON or OFF	[Vehicle Condition] <ul style="list-style-type: none"> • Engine stopped • Shift lever P or N position
Activate the Solenoid (S4)	Operate the shift solenoid S4	ON or OFF	[Vehicle Condition] <ul style="list-style-type: none"> • Engine stopped • Shift lever P or N position
Activate the Lock Up	Control shift solenoid SLU to set automatic transmission to lock-up condition	ON or OFF	Possible to check shift solenoid valve SLU operation [Vehicle Condition] <ul style="list-style-type: none"> • Throttle valve opening angle: Less than 35% • Vehicle speed: 50 km/h (30 mph) or more
Control the Shift Position	Operate shift solenoid valve and set each shift position by yourself	<ul style="list-style-type: none"> • Press "→" button: Shift up • Press "←" button: Shift down 	Possible to check operation of shift solenoid valves [Vehicle Condition] 50 km/h (30 mph) or less
Activate the Solenoid (SR)	Operate the shift solenoid SR	ON or OFF	[Vehicle Condition] <ul style="list-style-type: none"> • Engine stopped • Shift lever P or N position
Activate the Solenoid (SL1)	Operate the shift solenoid SL1	ON or OFF	[Vehicle Condition] <ul style="list-style-type: none"> • Engine stopped • Shift lever P or N position

Activate the Solenoid (SL2)	Operate the shift solenoid SL2	ON or OFF	[Vehicle Condition] <ul style="list-style-type: none"> • Engine stopped • Shift lever P or N position
Connect the TC and TE1	Connects and disconnects TC and TE1. (transitions into the fluid temperature detection mode)	ON or OFF	The MIL will not blink when "Connect the TC and TE1 / ON" is selected.

"Body Electrical / Main Body / Active Test"

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Shift Lock	Operate the shift lock	ON or OFF	-

* : "Activate the Solenoid (SLT)" in the Active Test is performed to check the line pressure changes by connecting the SST to the automatic transmission, which is used in the HYDRAULIC TEST  as well.

HINT:

The pressure values in Active Test and HYDRAULIC TEST are different from each other.

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W710MMX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: DEFINITION OF TERMS (2013 FR-S)		

DEFINITION OF TERMS

TERM	DEFINITION
Monitor description	Description of what the TCM monitors and how it detects malfunctions (monitoring purpose and its details).
Related DTCs	Diagnostic code
Typical enabling condition	Preconditions that allow the TCM to detect malfunctions. With all preconditions satisfied, the TCM sets the DTC when the monitored value(s) exceeds the malfunction threshold(s).
Sequence of operation	The priority order that is applied to monitoring, if multiple sensors and components are used to detect the malfunction. While another sensor is being monitored, the next sensor or component will not be monitored until the previous monitoring has concluded.
Required sensor/components	The sensors and components that are used by the TCM to detect malfunctions.
Frequency of operation	The number of times that the TCM checks for malfunctions per driving cycle. "Once per driving cycle" means that the TCM detects malfunction only one time during a single driving cycle. "Continuous" means that the TCM detects malfunction every time when enabling condition is met.
Duration	The minimum time that the TCM must sense a continuous deviation in the monitored value(s) before setting a DTC. This timing begins after the "typical enabling conditions" are met.
Malfunction thresholds	Beyond this value, the TCM will conclude that there is a malfunction and set a DTC.
MIL operation	MIL illumination timing after a defect is detected. "Immediately" means that the TCM illuminates MIL the instant the TCM determines that there is a malfunction. "2 driving cycle" means that the TCM illuminates MIL if the same malfunction is detected again in the 2nd driving cycle.
Component operating range	Normal operation range of sensors and solenoids under normal driving conditions. Use these ranges as a reference. They cannot be used to judge if a sensor or solenoid is defective or not.

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W760ROX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: DIAGNOSIS SYSTEM (2013 FR-S)		

DIAGNOSIS SYSTEM

1. DESCRIPTION

When troubleshooting OBD II (On-Board Diagnostics) vehicles, an OBD II scan tool (complying with SAE J1987) must be connected to the DLC3 (Data Link Connector 3) of the vehicle. Various data in the vehicle TCM (Transmission Control Module) can be then read.

OBD II regulations require that the vehicle on-board computer illuminate the MIL (Malfunction Indicator Lamp) on the instrument panel when the computer detects a malfunction in:



- a. The emission control system components.
- b. The powertrain control components (which affect vehicle emissions).
- c. The computer itself.

In addition, the applicable DTCs prescribed by SAE J2012 are recorded in the TCM memory. If the malfunction does not recur in 3 consecutive trips, the MIL turns off automatically but the DTCs remain recorded in the TCM memory.

To check for DTCs, connect the Techstream to the DLC3. The Techstream displays DTCs, freeze frame data, and a variety of the engine data. The DTCs and freeze frame data can be cleared with the Techstream. In order to enhance OBD function on vehicles and develop the off-board diagnosis system, Controller Area Network (CAN) communication is used in this system. CAN is a network which uses a pair of data transmission lines spanning multiple computers and sensors. It allows for high speed communications between the systems and simplification of the wire harness connections.

2. NORMAL MODE AND CHECK MODE

The diagnosis system operates in normal mode during normal vehicle use. In normal mode, 2 trip detection logic is used to ensure accurate detection of malfunctions. Check mode is also available as an option for technicians. In check mode, 1 trip detection logic is used for duplicating malfunction symptoms and increasing the system's ability to detect malfunctions, including intermittent problems (the Techstream only).


3. 2 TRIP DETECTION LOGIC

When a malfunction is first detected, the malfunction is temporarily stored in the TCM memory (1st trip). If the same malfunction is detected during the subsequent driving cycle, the MIL is illuminated (2nd trip).

4. FREEZE FRAME DATA

The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was running or stopped, whether the engine was warmed up or not, whether the air fuel ratio was lean or rich, as well as other data recorded at the time of a malfunction.

5. DLC3 (Data Link Connector 3)

- (a) Check the DLC3  .

6. BATTERY VOLTAGE

Standard Voltage:
11 to 14 V

If voltage is below 11 V, replace or recharge the battery before proceeding to the next step.

7. MIL (Malfunction Indicator Lamp)

- (a) The MIL illuminates when the ignition switch is first turned on (the engine is not running).
(b) The MIL should turn off when the engine is started. If the MIL remains illuminated, the diagnosis system has detected a malfunction or abnormality in the system.

HINT:

If the MIL does not illuminate when the ignition switch is first turned on, check the MIL circuit  .



Last Modified: 3-27-2012	6.4 S	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W710L1X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: DIAGNOSTIC TROUBLE CODE CHART (2013 FR-S)		

DIAGNOSTIC TROUBLE CODE CHART

AUTOMATIC TRANSMISSION SYSTEM

DTC CODE	DETECTION ITEM	MIL	MEMORY	SEE PAGE
B1016	Shift Lock Circuit	Comes on	DTC stored	INFO
P0601	Internal Control Module Memory Check Sum Error	Comes on	DTC stored	INFO
P062F	Internal Control Module EEPROM Error	Comes on	DTC stored	INFO
P0707	Transmission Range Sensor "A" Circuit Low	Comes on	DTC stored	INFO
P0708	Transmission Range Sensor "A" Circuit High	Comes on	DTC stored	INFO
P0711	Transmission Fluid Temperature Sensor "A" Performance	Comes on	DTC stored	INFO
P0712	Transmission Fluid Temperature Sensor "A" Circuit Low Input	Comes on	DTC stored	INFO
P0713	Transmission Fluid Temperature Sensor "A" Circuit High Input	Comes on	DTC stored	INFO
P0717	Turbine Speed Sensor Circuit No Signal	Comes on	DTC stored	INFO
P0722	Output Speed Sensor Circuit No Signal	Comes on	DTC stored	INFO
P0729	Gear 6 Incorrect Ratio	Comes on	DTC stored	INFO
P0751	Shift Solenoid "A" Performance (Shift Solenoid Valve S1)	Comes on	DTC stored	INFO
P0752	Shift Solenoid "A" Stuck ON (S1 Solenoid)	Comes on	DTC stored	INFO
P0757	Shift Solenoid "B" Stuck ON (S2 Solenoid)	Comes on	DTC stored	INFO
P0756	Shift Solenoid "B" Performance (Shift Solenoid Valve S2)	Comes on	DTC stored	INFO
P0761	Shift Solenoid "C" Performance (Shift Solenoid Valve S3)	Comes on	DTC stored	INFO
P0762	Shift Solenoid "C" Stuck ON (S3 Solenoid)	Comes on	DTC stored	INFO

P0766	Shift Solenoid "D" Performance (Shift Solenoid Valve S4)	Comes on	DTC stored	INFO
P0776	Pressure Control Solenoid "B" Performance (Shift Solenoid Valve SL2)	Comes on	DTC stored	INFO
P0781	1-2 Shift (1-2 Shift Valve)	Comes on	DTC stored	INFO
P0882	TCM Power Input Signal Low	Does not come on	DTC stored	INFO
P0894	Transmission Component Slipping	Comes on	DTC stored	INFO
P0961	Pressure Control Solenoid "A" Performance (SL1 Solenoid)	Comes on	DTC stored	INFO
P0962	Pressure Control Solenoid "A" Circuit Low (SL1 Solenoid)	Comes on	DTC stored	INFO
P0963	Pressure Control Solenoid "A" Circuit High (SL1 Solenoid)	Comes on	DTC stored	INFO
P0965	Pressure Control Solenoid "B" Performance (SL2 Solenoid)	Comes on	DTC stored	INFO
P0966	Pressure Control Solenoid "B" Control Circuit Low (Shift Solenoid Valve DS2)	Comes on	DTC stored	INFO
P0967	Pressure Control Solenoid "B" Control Circuit High (Shift Solenoid Valve DS2)	Comes on	DTC stored	INFO
P0973	Shift Solenoid "A" Control Circuit Low (Shift Solenoid Valve S1)	Comes on	DTC stored	INFO
P0974	Shift Solenoid "A" Control Circuit High (Shift Solenoid Valve S1)	Comes on	DTC stored	INFO
P0976	Shift Solenoid "B" Control Circuit Low (Shift Solenoid Valve S2)	Comes on	DTC stored	INFO
P0977	Shift Solenoid "B" Control Circuit High (Shift Solenoid Valve S2)	Comes on	DTC stored	INFO
P0979	Shift Solenoid "C" Control Circuit Low (Shift Solenoid Valve S3)	Comes on	DTC stored	INFO
P0980	Shift Solenoid "C" Control Circuit High (Shift Solenoid Valve S3)	Comes on	DTC stored	INFO
P0982	Shift Solenoid "D" Control Circuit Low (Shift Solenoid Valve S4)	Comes on	DTC stored	INFO
P0983	Shift Solenoid "D" Control Circuit High (Shift Solenoid Valve S4)	Comes on	DTC stored	INFO
P0985	Shift Solenoid "E" Control Circuit Low (Shift Solenoid Valve SR)	Comes on	DTC stored	INFO
P0986	Shift Solenoid "E" Control Circuit High (Shift Solenoid Valve SR)	Comes on	DTC stored	INFO
P160A	Internal Control Module Random Access Memory (RAM) Error	Comes on	DTC stored	INFO

P1817	Manual Mode Switch Circuit Malfunction	Does not come on	DTC stored	INFO
P2714	Pressure Control Solenoid "D" Performance (Shift Solenoid Valve SLT)	Comes on	DTC stored	INFO
P2719	Pressure Control Solenoid "D" Circuit Performance (SLT Solenoid)	Comes on	DTC stored	INFO
P2720	Pressure Control Solenoid "D" Control Circuit Low	Comes on	DTC stored	INFO
P2721	Pressure Control Solenoid "D" Control Circuit High	Comes on	DTC stored	INFO
P2757	Torque Converter Clutch Pressure Control Solenoid Performance (Shift Solenoid Valve SLU)	Comes on	DTC stored	INFO
P2758	Torque Converter Pressure Control Solenoid Circuit Stuck ON / Performance (SLU / DSU Solenoid)	Comes on	DTC stored	INFO
P2762	Torque Converter Pressure Control Solenoid Circuit Performance (SLU / DSU Solenoid)	Comes on	DTC stored	INFO
P2763	Torque Converter Clutch Pressure Control Solenoid Control Circuit High (Shift Solenoid Valve DSU)	Comes on	DTC stored	INFO
P2764	Torque Converter Clutch Pressure Control Solenoid Control Circuit Low (Shift Solenoid Valve DSU)	Comes on	DTC stored	INFO
U0073	Control Module Communication Bus OFF	Comes on	DTC stored	INFO
U0100	Lost Communication with ECM / PCM "A"	Comes on	DTC stored	INFO
U0122	Lost Communication with Vehicle Dynamics Control Module	Comes on	DTC stored	INFO
U0140	Lost Communication with Body Control Module	Does not come on	DTC stored	INFO
U0155	Lost Communication with Instrument Panel Cluster Control Module (Combination Meter)	Does not come on	DTC stored	INFO
U0401	Invalid Data Received from ECM/PCM "A"	Comes on	DTC stored	INFO
U0416	Invalid Data Received from Vehicle Dynamics Control Module	Comes on	DTC stored	INFO
U0422	Invalid Data Received from Body Control Module	Does not come on	DTC stored	INFO
U0423	Invalid Data Received from Instrument Panel Cluster Control Module	Comes on	DTC stored	INFO

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Model Year: 2013	Model: FR-S	Doc ID: RM000000W770REX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: DTC CHECK / CLEAR (2013 FR-S)		

DTC CHECK / CLEAR

NOTICE:

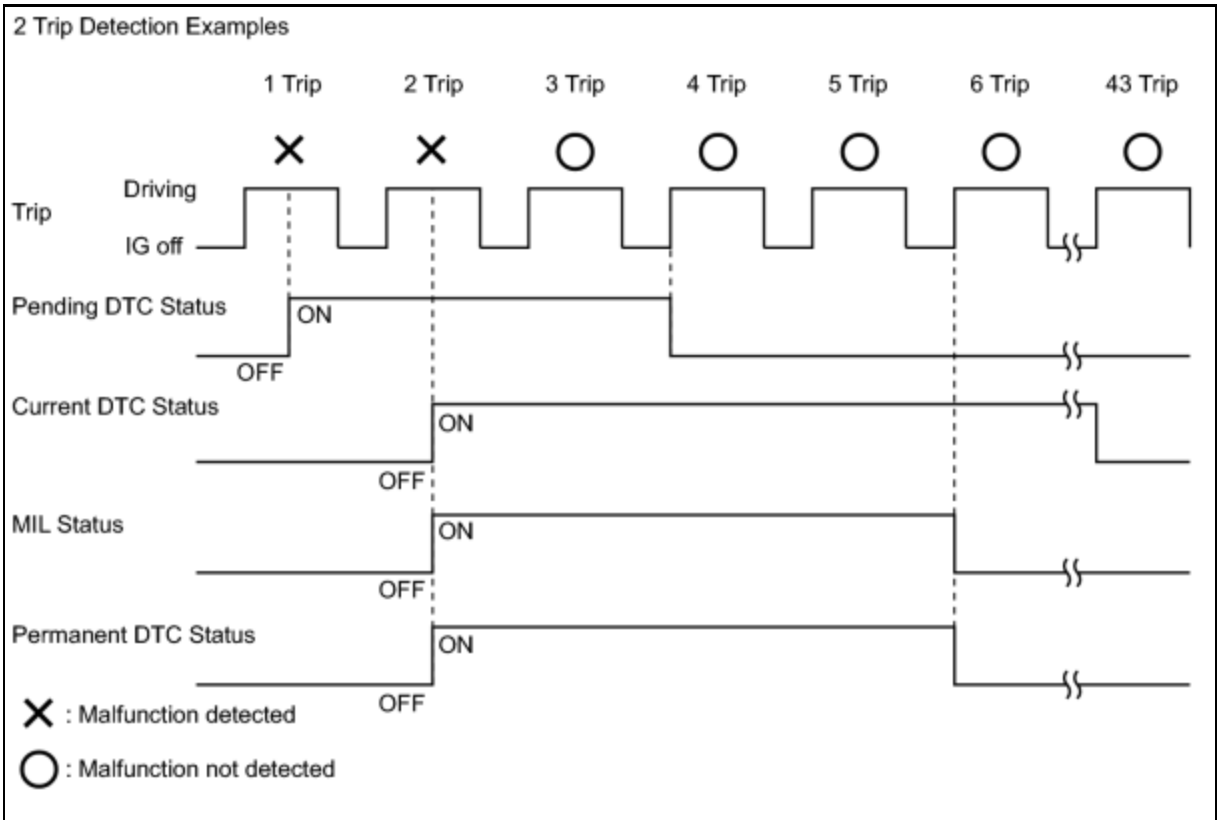
When the diagnosis system is changed from normal mode to check mode or vice versa, all DTCs and freeze frame data recorded in normal mode are cleared. Before changing modes, always check and make a note of DTCs and freeze frame data.

HINT:

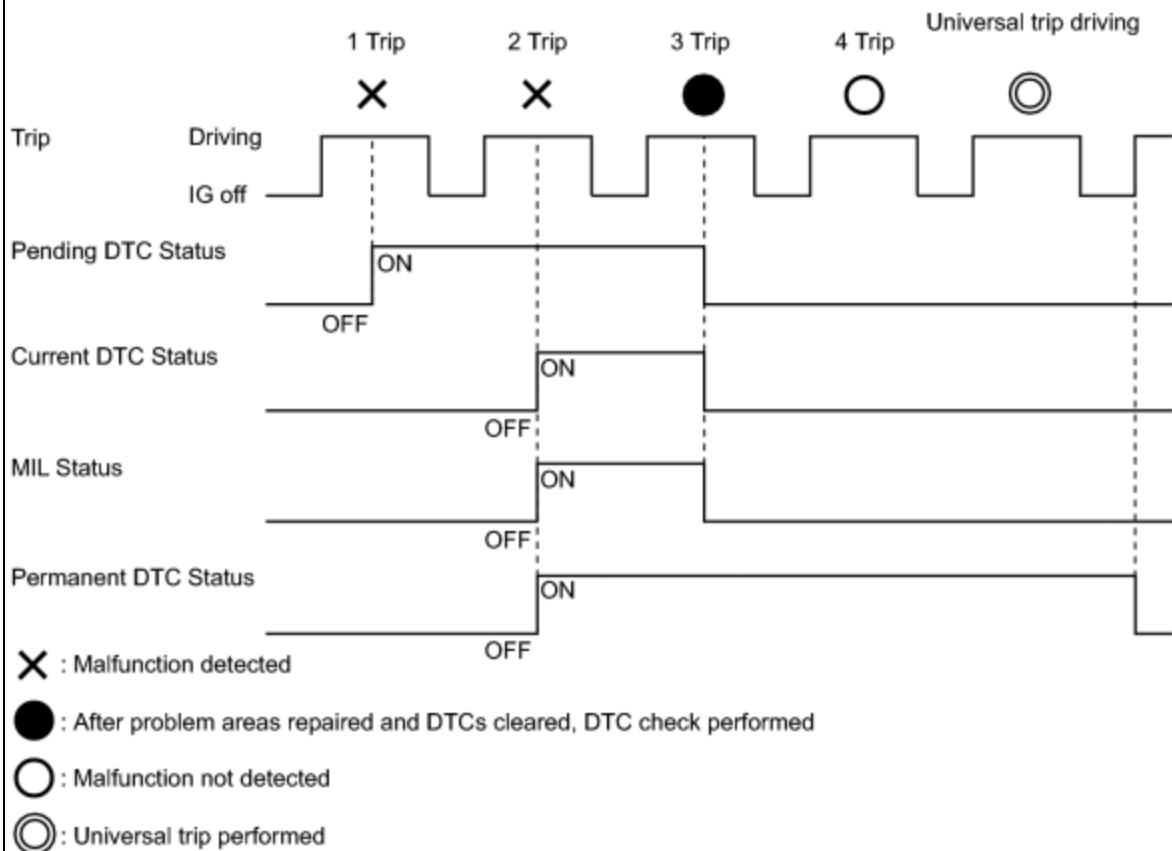
- DTCs which are stored in the ECM can be displayed on the Techstream. The Techstream can display the current, pending and permanent DTCs.
- If a malfunction is detected during the current driving cycle, current and permanent DTCs are stored.
- Some DTCs are not stored if the ECM does not detect the same malfunction again during a second consecutive driving cycle. However, such malfunctions, detected on only one occasion, are stored as pending DTCs.
- Current and pending DTCs can be cleared by using the Techstream. However, permanent DTCs cannot be cleared using either of these two methods.
- After clearing current DTCs using the Techstream, permanent DTCs can be cleared when the system is determined to be normal for the relevant DTCs and then the universal trip is performed.

2 Trip Detection Examples

Pending DTC	Store condition	Malfunction detected
	Clear condition	System determined to be normal or DTCs cleared using Techstream or Cable disconnected from negative battery terminal
Current DTC	Store condition	Malfunction detected (2nd trip)
	Clear condition	No malfunctions in 40 driving cycles or DTCs cleared using Techstream
Permanent DTC	Store condition	Malfunction detected (2nd trip)
	Clear condition	One trip is confirmed with no abnormality after no malfunction is detected in 3 consecutive driving cycles or After DTCs cleared using Techstream, malfunction not detected when universal trip driving performed
MIL	ON	Malfunction detected (2nd trip)
	OFF	One trip is confirmed with no abnormality after no malfunction is detected in 3 consecutive driving cycles or



2 Trip Detection Examples (Instance when DTCs were cleared midway through by using the Techstream)



1. CHECK DTC

- Connect the Techstream to the DLC3.
- Turn the ignition switch ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / ECT / Trouble Codes.
- Check the DTC(s) and freeze frame data, and then write them down.
- Check the details of the DTC(s) **INFO** .

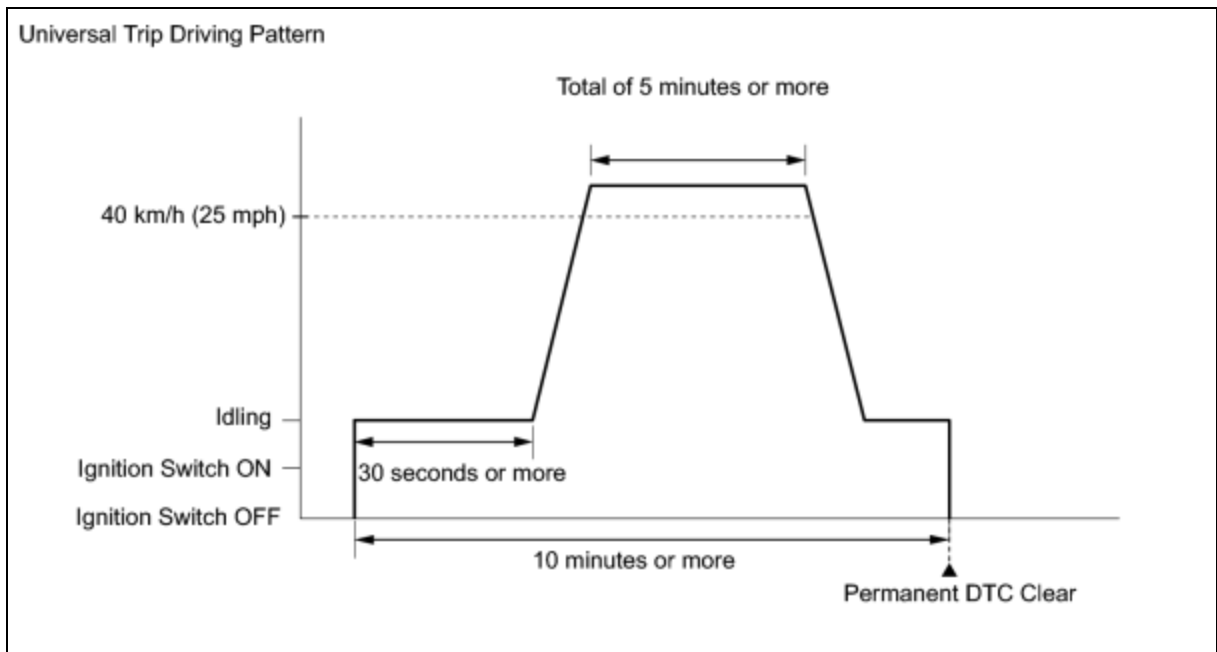
2. CLEAR DTC (Pending and Current DTC)

- Connect the Techstream to the DLC3.
- Turn the ignition switch ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / ECT / Trouble Codes.
- Clear the DTCs.

3. CLEAR PERMANENT DTC

HINT:

Even if the following procedure is not performed, permanent DTCs are cleared if no malfunction are detected during 3 consecutive driving cycles.



- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / ECT / Trouble Codes.
- (e) Check if permanent DTCs are stored.

HINT:

If permanent DTCs are not output, it is not necessary to continue this procedure.

- (f) Clear DTCs.
- (g) Perform the universal trip.
 1. Idle the engine for 30 seconds or more.
 2. Drive the vehicle at 40 km/h (25 mph) or more for a total of 5 minutes or more.

HINT:

- It is possible to complete the drive pattern even if the vehicle decelerates to less than 40 km/h (25 mph) during the driving cycle provided that the vehicle is driven at 40 km/h (25 mph) or more for a total of 5 minutes.
 - When accelerating through the gears, make sure the vehicle is driven so all gears are used in order and no gears are skipped.
3. Allow 10 minutes or more to elapse from the time the engine is started.
- (h) Turn the ignition switch off.
 - (i) Wait 15 seconds.
 - (j) Turn the ignition switch ON.
 - (k) Enter the following menus: Powertrain / ECT / Trouble Codes.
 - (l) Check that the permanent DTCs have been cleared.

HINT:

- If the permanent DTCs have not been cleared, perform the universal trip again.
- The permanent DTCs are cleared when the universal trip is completed.



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Model Year: 2013	Model: FR-S	Doc ID: RM00000008LOMHX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: FAIL-SAFE CHART (2013 FR-S)		

FAIL-SAFE CHART

1. FAIL-SAFE CHART

This function minimizes the loss of the ECT functions when any malfunction occurs in each sensor or solenoid.

MALFUNCTION PART	FUNCTION
DTC P0717: Input Speed Sensor NT	During an input speed sensor malfunction, shift control is effected through the output speed sensor signal SP2. During an input speed sensor malfunction, up-shift to the 5th and 6th, AI-SHIFT *1 and flex lock-up clutch control are prohibited.
DTC P0722: Output Speed Sensor SP2	During an output speed sensor malfunction, shift control is effected through the input speed sensor signal NT. During an output speed sensor malfunction, up-shift to the 5th and 6th, AI-SHIFT *1 and flex lock-up clutch control are prohibited.
DTC P0711, P0712, P0713: ATF Temperature Sensor	During an ATF temperature sensor malfunction, up-shift to the 5th and 6th and flex lock-up clutch control are prohibited.
Shift Solenoid Valve S1, S2, S3, S4 and SR	The current to the failed solenoid valve is cut off and control is effected by operating the other solenoid valves. Shift control is effected depending on the failed solenoid as described in the table on the next page.
DTC P0776, P0961, P0962, P0963, P0965, P0966, P0967: Shift Solenoid Valve SL1 and SL2	During a solenoid valve SL1 or SL2 malfunction, up-shift to the 5th and 6th and flex lock-up clutch control are prohibited.
DTC P2757, P2758, P2762, P2763, P2764: Shift Solenoid Valve SLU	During a solenoid valve SLU malfunction, the current to the solenoid valve is stopped. This stops lock-up control and flex lock-up control, fuel economy decreases.
DTC P2714, P2719, P2720, P2721: Shift Solenoid Valve SLT	During a solenoid valve SLT malfunction, the current to the solenoid valve is stopped. This stops line pressure optimal control, the shift shock increases. However, shifting is effected through normal clutch pressure control.

*: AI (Artificial Intelligence) -SHIFT control

In addition to the switching of the shift pattern through the pattern select switch, the AI-SHIFT control enables the ECM to estimate the road conditions and the driver's intention in order to automatically select

the optimal shift pattern. As a result, a comfortable ride has been realized.

(a) Fail-safe operation for electronically malfunctioning shift solenoid valve (S1, S2, S3, S4 and SR):

HINT:

Fail-safe operation in the event of an electric system malfunction.

Fail safe function:

If either of the shift solenoid valve circuits has an open or short failure, the ECM turns the other shift solenoid "ON" and "OFF" in order to shift into the gear positions shown in the table below.

In case of a short circuit, the ECM stops sending current to the short circuited solenoid.

Even if starting the engine again in the fail-safe mode, the gear position remains in the same position.

Operating Condition of Shift Solenoid Valves

SHIFT LEVER POSITION OR SHIFT RANGE	GEAR POSITION	SHIFT SOLENOID VALVE								
		S1	S2	S3	S4	SR	SL1	SL2	SLU	
P	Park	Off	On	On	On	On	Off	On	Off	
R*	Reverse	Off	On	On	On	On	On	On	Off	
N	Neutral	Off	On	On	On	On	On	On	Off	
D, M6	1st	Off	On	On	Off	On	Off	On	Off	
	2nd	On	On	On	On	On	Off	Off	On	
	3rd	On	Off	On	Off	On	Off	Off	On	
	4th*	On	Off	Off	Off	On	Off	On	On	
	5th*	On	Off	Off	On	Off	On	Off	On	
	6th*	On	On	Off	On	Off	On	Off	On	
M5	1st	Off	On	On	Off	On	Off	On	Off	
	2nd	On	On	On	On	On	Off	Off	On	
	3rd	On	Off	On	Off	On	Off	Off	On	
	4th*	On	Off	Off	Off	On	Off	On	On	
	5th*	On	Off	Off	On	Off	On	Off	On	
M4	1st	Off	On	On	Off	On	Off	On	Off	
	2nd	On	On	On	On	On	Off	Off	On	
	3rd	On	Off	On	Off	On	Off	Off	On	
	4th*	On	Off	Off	Off	On	Off	On	On	
M3	1st	Off	On	On	Off	On	Off	On	Off	
	2nd	On	On	On	On	On	Off	Off	Off	
	3rd*	On	Off	On	Off	On	Off	Off	Off	
M2	1st	Off	On	On	Off	On	Off	On	On	
	2nd*	On	On	On	On	On	Off	Off	Off	
M1	1st*	Off	On	On	Off	On	Off	Off	Off	

HINT:

*: Engine braking occurs

(b) Fail-safe operation for mechanically malfunction:

HINT:

Fail-safe operation in the event of a mechanical system malfunction.

Fail safe function:

The ECM controls the gear position as shown in the table below when malfunctions occur.

Fail-safe chart for mechanical malfunction:

DTC	CONDITION	GEAR *1					
		1st	2nd	3rd	4th	5th	6th
-	Normal	1st	2nd	3rd	4th	5th	6th
P0751	Shift solenoid valve S1: Stuck OFF malfunction	1st *2	2nd	↑	3rd	3rd	3rd
P0762	Shift solenoid S3: Stuck ON malfunction	1st	2nd	↑	3rd	3rd	3rd
P0766	Shift solenoid valve S4, Shift solenoid valve SL2 or Valve body (Brake control valve): Malfunction	1st	2nd	↑	3rd	3rd	3rd
P0781	Valve body (1-2 shift valve): Malfunction	1st *2	2nd	↑	3rd	3rd	3rd
P0729	Valve body (Sequence valve): Malfunction	1st	2nd	↑	4th	5th	5th

HINT:

- *1: Actual gear shift (gear position) under fail-safe operation
- *2: Under engine braking, downshifting to 1st or 2nd gear is prohibited.



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Model Year: 2013	Model: FR-S	Doc ID: RM000000W6Z0TVX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- The TCM of this system is connected to the CAN and multiplex communication system. Therefore, before starting troubleshooting, make sure to check that there is no trouble in the CAN and multiplex communication systems.
- *: Use Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	CUSTOMER PROBLEM ANALYSIS
-----------	----------------------------------

NEXT



3.	INSPECT BATTERY VOLTAGE
-----------	--------------------------------

Standard voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT




4.	CONNECT TECHSTREAM TO DLC3*
-----------	------------------------------------

NEXT



5. CHECK AND CLEAR DTCS AND FREEZE FRAME DATA*

(a) Refer to the DTC CHECK/CLEAR  .

NEXT



6. VISUAL INSPECTION

NEXT



7. SETTING CHECK MODE DIAGNOSIS*

(a) Refer to the CHECK MODE PROCEDURE  .

NEXT



8. PROBLEM SYMPTOM CONFIRMATION

(a) Refer to the ROAD TEST  .

Result:


RESULT	PROCEED TO
Symptom does not occur	A
Symptom occurs	B

B  **GO TO STEP 10**

A




9. SYMPTOM SIMULATION

(a) Refer to the ELECTRONIC CIRCUIT INSPECTION PROCEDURE  .

NEXT



10.	DTC CHECK*
------------	-------------------

(a) Refer to the DTC CHECK / CLEAR  .

Result:

RESULT	PROCEED TO
DTC is not output	A
DTC is output	B

B  GO TO STEP 18

A



11.	BASIC INSPECTION
------------	-------------------------

(a) Refer to the PARK/NEUTRAL POSITION SWITCH  .

(b) Refer to the SHIFT LEVER ASSEMBLY  .

NG  GO TO STEP 21

OK



12.	MECHANICAL SYSTEM TEST
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(a) Refer to the MECHANICAL SYSTEM TEST  .

NG  GO TO STEP 17

OK



13.	HYDRAULIC TEST
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(a) Refer to the HYDRAULIC TEST  .

NG  **GO TO STEP 17**

OK



14.	MANUAL SHIFTING TEST
------------	-----------------------------


(a) Refer to the MANUAL SHIFTING TEST  .

NG  **GO TO STEP 16**

OK



15.	PROBLEM SYMPTOMS TABLE CHAPTER 1
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(a) Refer to the PROBLEM SYMPTOMS TABLE  .

NG  **GO TO STEP 19**

OK



16.	PROBLEM SYMPTOMS TABLE CHAPTER 2
------------	---

(a) Refer to the PROBLEM SYMPTOMS TABLE  .

NEXT



17. PART INSPECTION

NEXT ► GO TO STEP 21

18. DTC CHART

(a) Refer to the DIAGNOSTIC TROUBLE CODE CHART [INFO](#) .

NEXT



19. CIRCUIT INSPECTION

NEXT



20. IDENTIFICATION OF PROBLEM

NEXT



21. REPAIR OR REPLACE

NEXT



22. CONFIRMATION TEST

NEXT ► END

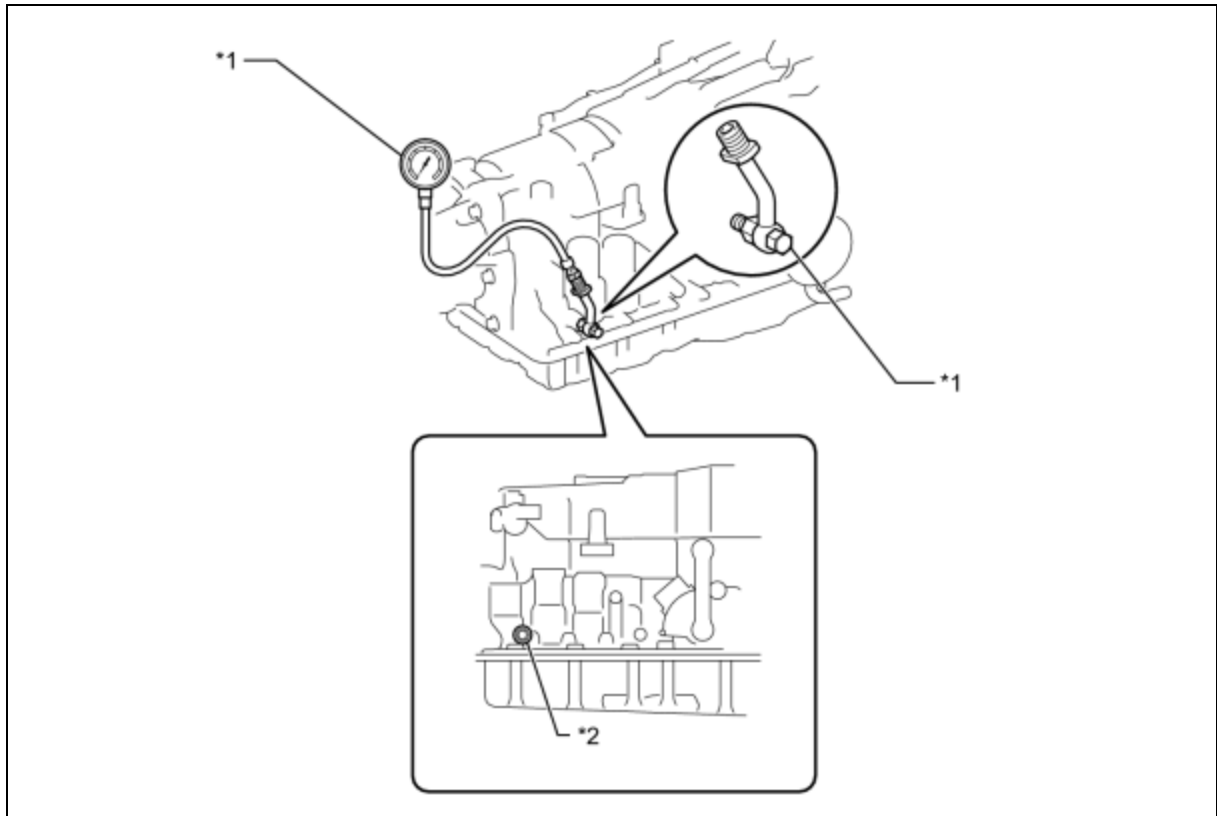


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Model Year: 2013	Model: FR-S	Doc ID: RM000000W7B0MWX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: HYDRAULIC TEST (2013 FR-S)		

HYDRAULIC TEST

1. PERFORM HYDRAULIC TEST

- (a) Measure the line pressure.



Text in Illustration

*1	SST	*2	Test Plug
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NOTICE:

- Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature: 60 to 90°C (140 to 194°F)
- The line pressure test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is performing the test.
- Be careful to prevent SST hose from interfering with the exhaust pipe.
- This Check must be conducted after checking and adjusting engine.
- Perform under condition that A/C is OFF.
- When conducting stall test, do not continue more than 5 seconds.

(1) Warm up the ATF (Automatic Transmission Fluid).

(2) Lift the vehicle up.

(3) Remove the test plug on the transmission case center right side and connect SST.

SST: 09992-00095

09992-00231

09992-00271

- (4) Lower the vehicle.
- (5) Fully apply the parking brake and check the 4 wheels.
- (6) Start the engine and check idling speed.
- (7) Keep your left foot pressing firmly on the brake pedal and shift into D position.
- (8) Measure the line pressure when the engine is idling.
- (9) Depress the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.
- (10) In the same manner, do the test in R position.

Specified line pressure:

CONDITION	D POSITION KPA (KGF / CM ² , PSI)	R POSITION KPA (KGF / CM ² , PSI)
Idling	350 to 430 kPa (3.6 to 4.4 kgf/cm ² , 51 to 62 psi)	760 to 950 kPa (7.7 to 9.7 kgf/cm ² , 110 to 138 psi)
Stall test	1200 to 1380 kPa (12.5 to 14.0 kgf/cm ² , 174 to 200 psi)	1410 to 1630 kPa (14.4 to 16.6 kgf/cm ² , 204 to 236 psi)

Evaluation:

PROBLEM	POSSIBLE CAUSE
If the measured values at all position are higher	<ul style="list-style-type: none"> • Shift solenoid valve SLT defective • Regulator valve defective
If the measured values at all position are lower	<ul style="list-style-type: none"> • Shift solenoid valve SLT defective • Regulator valve defective • Oil pump defective
If pressure is low in the D position only	<ul style="list-style-type: none"> • D position circuit fluid leak • Clutch No.1 (C₁) defective
If pressure is low in the R position only	<ul style="list-style-type: none"> • R position circuit fluid leak • Clutch No.3 (C₃) defective • Brake No.4 (B₄) defective



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Model Year: 2013	Model: FR-S	Doc ID: RM000000W7F0KYX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: INITIALIZATION (2013 FR-S)		

INITIALIZATION

1. RESET MEMORY

NOTICE:

- Perform the RESET MEMORY (AT initialization) when replacing the automatic transmission assembly, valve body, engine assembly or TCM.
- The RESET MEMORY can be performed only with the Techstream.

HINT:

The TCM memorizes the condition that the ECT controls the automatic transmission assembly and engine assembly according to those characteristics. Therefore, when the automatic transmission assembly, valve body, transmission wire, engine assembly, or TCM has been replaced, it is necessary to reset the memory so that the TCM can memorize the new information.

Reset procedure is as follows.

- Turn the ignition switch off.
- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON position.
- Turn the Techstream main switch on.
- Enter the following menu: Powertrain / ECT / Utility / Reset Memory. Then, press "Next".
- Perform the reset memory procedure from the main menu.

CAUTION:

After performing the RESET MEMORY, be sure to perform the ROAD TEST  described earlier.

HINT:

The TCM is learned by performing the ROAD TEST.



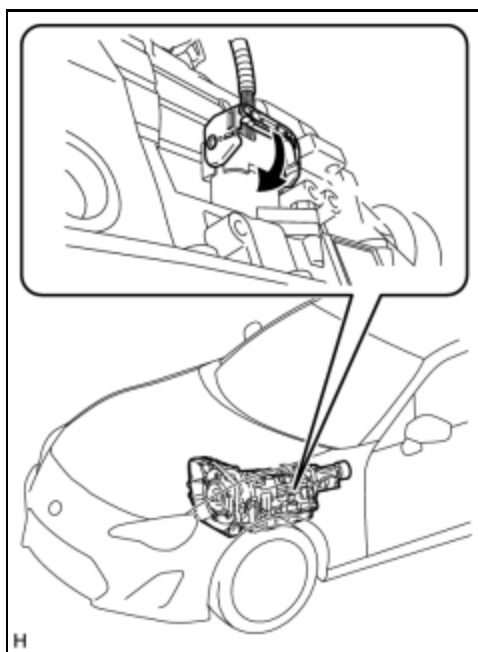
Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W7C0Q5X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: MANUAL SHIFTING TEST (2013 FR-S)		

MANUAL SHIFTING TEST

1. PERFORM MANUAL SHIFTING TEST

HINT:

- With this test, it can be determined whether the trouble occurs in the electrical circuit or is a mechanical problem in the transmission.
- If any abnormalities are found in the following test, the problem is in the transmission itself.



(a) Disconnect the connector of the transmission wire.

(b) Drive with the transmission wire disconnected.

Shifting the shift lever to the D position to check whether the shifting condition changes the table below.

SHIFT POSITION	SHIFTING CONDITION
D	No Shift (Not Change)

HINT:

When driving with the transmission wire disconnected, the gear position will be as follows:

- When the shift lever is in the D position, the gear is held in the 4th position.
- When the shift lever is in the R or the P position, the gear is also in the R or the P position respectively.

(c) Connect the connector of the transmission wire.

(d) Clear the DTC  .



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Model Year: 2013	Model: FR-S	Doc ID: RM000000W7AONMX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: MECHANICAL SYSTEM TESTS (2013 FR-S)		

MECHANICAL SYSTEM TESTS

1. PERFORM MECHANICAL SYSTEM TESTS

(a) Measure the stall speed.

The object of this test is to check the overall performance of the transmission and engine by measuring the stall speeds in the D position.

NOTICE:

- Driving test should be done on a paved road (a nonskid road).
- Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature 60 to 90°C (140 to 194°F).
- Do not continuously run this test for longer than 5 seconds.
- To ensure safety, do this test in a wide, clear level area which provides good traction.
- The stall test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is doing the test.
- Be sure to perform a road test after inspecting and adjusting the engine.

(1) Check the 4 wheels.

(2) Connect the Techstream to the DLC3.

(3) Fully apply the parking brake.

(4) Keep your left foot pressed firmly on the brake pedal.

(5) Start the engine.

(6) Shift into the D position. Press all the way down on the accelerator pedal with your right foot.

(7) Quickly read the stall speed at this time.

Stall speed:

2350 +- 250 rpm

Evaluation:

PROBLEM	POSSIBLE CAUSE
(a) Stall engine speed is low in D position	<ul style="list-style-type: none"> • Engine power output may be insufficient • Stator one-way clutch not operating properly <p>HINT:</p> <p>If the value is less than the specified value by 600 rpm or more, the torque converter could be faulty.</p>
(b) Stall engine speed is high in D position	<ul style="list-style-type: none"> • Line pressure is too low • Clutch No. 1 (C₁) slipping • One-way clutch No. 3 (F₃) not operating properly • One-way clutch No. 4 (F₄) not operating properly • Improper fluid level

(b) Measure the time lag.

(1) When the shift lever is shifted while the engine is idling, there will be a certain time lapse or lag before the shock can be felt. This is used for checking the condition of the clutch, and brake.

NOTICE:

- Be sure to perform a road test after inspecting and adjusting the engine.
- Fully apply the parking brake and chock the 4 wheels.
- Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature: 60 to 90°C (140 to 194°F).
- Be sure to allow 1 minute interval between tests.
- Perform the test three times, and measure the time lags. Calculate the average value of the three time lags.

(2) Connect the Techstream to the DLC3.

(3) Fully apply the parking brake.

(4) Start and warm up the engine and check idle speed.

Idle speed:

approx. 700 rpm (In N position and A/C OFF)

(5) Shift the lever from N to D position. Using a stop watch, measure the time from when the lever is shifted until the shock is felt.

Time lag:

N → D less than 1.2 seconds

(6) In the same way, measure the time lag for N → R.

Time lag:

N → R less than 1.5 seconds

Evaluation (If N → D or N → R time lag is longer than the specified):

PROBLEM	POSSIBLE CAUSE
N → D time lag is longer	<ul style="list-style-type: none">• Line pressure is too low• Clutch No.1 (C₁) worn• One-way clutch No. 3 (F₃) not operating properly• One-way clutch No. 4 (F₄) not operating properly
N → R time lag is longer	<ul style="list-style-type: none">• Line pressure is too low• Clutch No. 3 (C₃) worn• Brake No. 4 (B₄) worn• One-way clutch No. 1 (F₁) not operating properly

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W7KOMRX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: MONITOR DRIVE PATTERN (2013 FR-S)		

MONITOR DRIVE PATTERN

1. MONITOR DRIVE PATTERN FOR ECT TEST

- (a) Perform this drive pattern as one method to simulate the detection conditions of the ECT malfunctions. (The DTCs may not be detected due the actual driving conditions. And some codes may not be detected through this drive pattern.)

HINT:

Preparation for driving

- Warm up the engine sufficiently. (Engine coolant temperature is 60°C (140°F) or higher)

Notice in driving

- Drive the vehicle through all gears.

Stop → 1st → 2nd → 3rd → 4th → 5th → 6th → 6th (lock-up ON).

- Perform engine brake test in the M position.

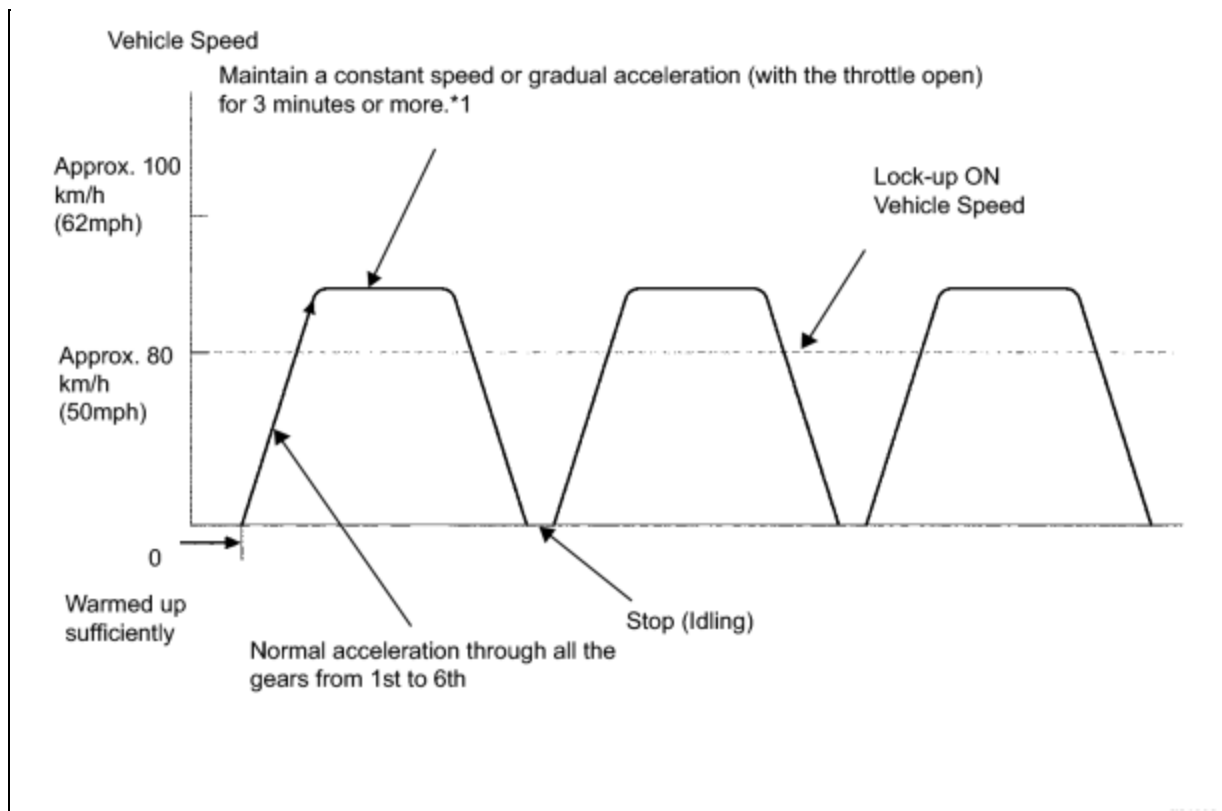
While driving in the 6(M) position and 6th gear lock-up, shift into the "-" position and down-shift from 6th to 5th, 5th to 4th, 4th to 3rd, 3rd to 2nd, 2nd to 1st.

Check that the engine brake performs properly whenever down-shift takes place.

- Repeat the above driving pattern three times or more.

NOTICE:

- The monitor status can be checked using Techstream. When using Techstream, monitor status can be found in the "Powertrain / ECT / Data List".
- In the event that the drive pattern must be interrupted (possibly due to traffic conditions or other factors), the drive pattern can be resumed and, in most cases, the monitor can be completed.
- Perform this drive pattern on a level road as much as possible and strictly observe the posted speed limits and traffic laws while driving.



HINT:

*1: Drive at such a speed in the uppermost gear, to engage lock-up. The vehicle can be driven at a speed lower than that in the above diagram under the lock-up condition.

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003Q3G03PX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P062F: Internal Control Module EEPROM Error (2013 FR-S)		

DTC	P062F	Internal Control Module EEPROM Error
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DESCRIPTION

When the ignition switch is turned from off to ON, the TCM calculates the integrated values within the TCM, and if these do not match the values stored within the TCM, the DTC is stored.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER	
P062F	1. Ignition switch is turned to ON 2. TCM internal error 3. - 4. 1-trip detection logic	TCM

MONITOR DESCRIPTION

The TCM monitors its internal operation. If the internal operation is malfunctioning, the TCM illuminates the MIL and sets a DTC.

MONITOR STRATEGY

Related DTCs	P062F: Non Volatile Memory (EEPROM)
Required sensors/Components	TCM
Frequency of operation	Once per driving cycle
Duration	1 time
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not present	None
Ignition switch changed from OFF to ON	Yes

TYPICAL MALFUNCTION THRESHOLDS

Calculated sum value of EEPROM	Not (Sum value stored in EEPROM)
--------------------------------	----------------------------------

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs **INFO** .
- There is a possibility that the DTC P062F is issued from the ECUs of the TCM. Use Techstream to conduct a health check to confirm which ECU the DTC is issued from and then inspect the related system.

PROCEDURE

1.	REPLACE TCM
-----------	--------------------

(a) Replace the TCM **INFO** .

NEXT ► **PERFORM THE RESET MEMORY**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XP108MX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P160A: Internal Control Module Random Access Memory (RAM) Error (2013 FR-S)		

DTC	P160A	Internal Control Module Random Access Memory (RAM) Error
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DESCRIPTION

This compares values calculated by the TCM with the data recorded after calculations when the ignition switch is turned to ON, and if these do not match, then the DTC is stored, and the power is cut to all solenoids (fixed to 4th).

DTC NO.	DTC DETECTION CONDITION		TROUBLE AREA
	1.	DIAGNOSIS CONDITION	
	2.	MALFUNCTION STATUS	
	3.	MALFUNCTION TIME	
	4.	OTHER	
P160A	1.	Ignition switch is turned to ON	TCM
	2.	TCM internal malfunction. When the information recorded inside the TCM differs from that in the same trip while the ignition switch is ON.	
	3.	-	
	4.	1-trip detection logic	

MONITOR DESCRIPTION

The TCM monitors its internal operation. If the internal operation is malfunctioning, the TCM illuminates the MIL and sets a DTC.

MONITOR STRATEGY

Related DTCs	P160A: Random Access Memory (RAM)
Required sensors/Components	TCM
Frequency of operation	Once per driving cycle
Duration	1 time
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

Ignition switch	OFF to ON
-----------------	-----------

TYPICAL MALFUNCTION THRESHOLDS

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The value that is written to a RAM is different from the value that is read.

Yes

INSPECTION PROCEDURE

NOTICE:

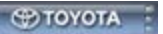
- Perform the universal trip to clear permanent DTCs **INFO** .
- There is a possibility that the DTC P062F is issued from the ECUs of the TCM. Use Techstream to conduct a health check to confirm which ECU the DTC is issued from and then inspect the related system.

PROCEDURE

1.	REPLACE TCM
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(a) Replace the TCM **INFO** .

NEXT ► **PERFORM THE RESET MEMORY**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W8E08YX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0601: Internal Control Module Memory Check Sum Error (2013 FR-S)		

DTC	P0601	Internal Control Module Memory Check Sum Error
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DESCRIPTION

This compares values calculated by the TCM with the data stored within the TCM when the ignition switch is turned to ON, and if these do not match 2 times in series, then prohibits learning. If this continues further, power is cut to all solenoids (fixed to 4th).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER	
P0601	1. Ignition switch is turned to ON 2. TCM internal malfunction 3. - 4. 1-trip detection logic	TCM

MONITOR DESCRIPTION

The TCM monitors its internal operation. If the internal operation is malfunctioning, the TCM illuminates the MIL and sets a DTC.

MONITOR STRATEGY

Related DTCs	P0601: Flash ROM
Required sensors/Components	TCM
Frequency of operation	Turning ignition switch ON or off, or clearing DTC requested
Duration	2 times
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

One of the following conditions is met: Condition (A) or (B)

Condition (A)

Monitor runs whenever following DTCs not present	None
Ignition switch changed from OFF to ON	Yes

Condition (B)


Monitor runs whenever following DTCs not present	None
Clear DTC request from diagnostic tool was received	Yes

TYPICAL MALFUNCTION THRESHOLDS

Calculated sum data of Flash ROM	Not (Check sum data of Flash ROM)
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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs  .
- There is a possibility that the DTC P062F is issued from the ECUs of the ECM and TCM. Use Techstream to conduct a health check to confirm which ECU the DTC is issued from and then inspect the related system.

PROCEDURE

1.	REPLACE TCM
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(a) Replace the TCM  .

NEXT  **PERFORM THE RESET MEMORY**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W840V6X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0707,P0708: Transmission Range Sensor "A" Circuit Low (2013 FR-S)		

DTC	P0707	Transmission Range Sensor "A" Circuit Low
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DTC	P0708	Transmission Range Sensor "A" Circuit High
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DESCRIPTION

A signal from the park/neutral position switch assembly input into the TCM detects the shift position. The engine can only be started when the shift lever is in P or N.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	<ol style="list-style-type: none"> 1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER 	
P0707	<ol style="list-style-type: none"> 1. The output speed sensor SP2 is normal, not learning control prohibited status, and the vehicle speed is 30 km/h or more Not learning control prohibited status 2. All contacts for shift position P, R, N, and D are off 3. Continues for 30 sec. 4. 2-trip detection logic 	<ul style="list-style-type: none"> • Open or short in park/neutral position switch circuit • Park/neutral position switch • TCM
P0708	<ol style="list-style-type: none"> 1. Not learning control prohibited status 2. 2 or more shift positions are detected at the same time 3. Continues for 10 sec. 4. 1-trip detection logic 	<ul style="list-style-type: none"> • Open or short in park/neutral position switch circuit • Park/neutral position switch • TCM

MONITOR DESCRIPTION

These DTCs indicate a problem with the park/neutral position switch and the wire harness in the park/neutral position switch circuit.

The park/neutral position switch detects the shift lever position and sends a signal to the TCM.

For security, the park/neutral position switch detects the shift lever position so that engine can be started only when the shift lever is in the P or N position.

The park/neutral position switch sends a signal to the TCM according to the shift position (P, R, N, D, or M). The TCM determines that there is a problem with the switch or related parts if it receives more than 1

position signal simultaneously. The TCM will turn on the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P0707: Range switch (Open/GND Short) P0708: Range switch (Battery Short)
Required sensors/Components	Park/neutral position switch
Frequency of operation	Continuous
Duration	P0707: 2 sec. x 15 times P0708: 2 sec. x 5 times
MIL operation	P0707: 2 driving cycles P0708: Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

P0707: Range switch (Open/GND Short)

Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Vehicle speed sensor (P0722)	No failure

P0708: Range switch (Battery Short)

Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active

TYPICAL MALFUNCTION THRESHOLDS

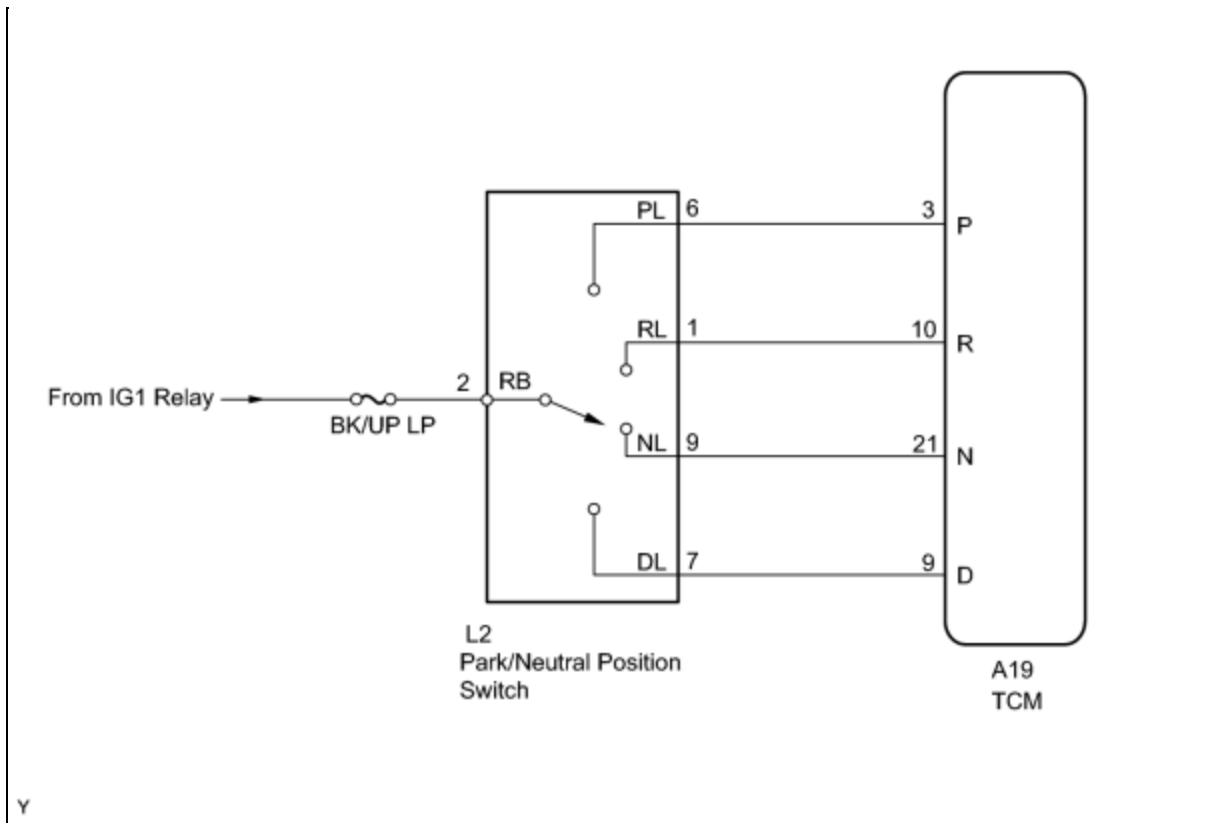
P0707: Range switch (Open/GND Short)

The number of range switch signal input	0
Vehicle speed	18.6 mph or more

P0708: Range switch (Battery Short)

The number of range switch signal input	2 or more
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WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs INFO.

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch on position.
- (e) Turn the Techstream on.
- (f) Enter the following menus: Powertrain / ECT / Data List.
- (g) According to the display on the Techstream, read the "Data List".

ITEM	MEASUREMENT ITEM/ RANGE (DISPLAY)	NORMAL CONDITION	DIAGNOSTIC NOTE

Shift SW Status (R Range)	PNP switch status/ ON or OFF	Shift lever position is; R: ON Except R: OFF	When shift lever position displayed on the Techstream differs from actual position, adjustment of PNP switch or shift cable may be incorrect
Shift SW Status (P Range)	PNP switch status/ ON or OFF	Shift lever position is; P: ON Except P: OFF	↑
Shift SW Status (N Range)	PNP switch status/ ON or OFF	Shift lever position is; N: ON Except N: OFF	↑
Shift SW Status (D Range)	PNP switch status/ ON or OFF	Shift lever position is; D and M: ON Except D and M: OFF	↑
Sports Mode Selection SW	Sport mode select switch status/ ON or OFF	Shift lever position is; M, "+" and "-": ON Except M, "+" and "- ": OFF	-

NOTICE:

Inspect the fuses circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	INSPECT PARK/NEUTRAL POSITION SWITCH ASSEMBLY
-----------	--

- (a) Disconnect the A19 TCM connector.
- (b) Measure resistance according to the value(s) in the table below when the shift lever is moved to each position.

Standard resistance:

TESTER CONNECTION	SHIFT POSITION	SPECIFIED CONDITION
A19-3(P) - L2-2(RB)	P	Below 1 Ω
	Except P	10 kΩ or higher
A19-10(R) - L2-2(RB)	R	Below 1 Ω
	Except R	10 kΩ or higher

A19-21(N) - L2-2(RB)	N	Below 1 Ω
	Except N	10 k Ω or higher
A19-9(D) - L2-2(RB)	D	Below 1 Ω
	Except D	10 k Ω or higher

(c) Connect the A19 TCM connector.

NG  **CHECK HARNESS AND CONNECTOR (PARK/NEUTRAL POSITION SWITCH - TCM)**

OK



2.	CHECK PARK / NEUTRAL POSITION SWITCH
-----------	---

(a) Disconnect the L2 park/neutral position switch connector.

(b) Turn the ignition switch on.

(c) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
L2-2(RB) - Body ground	Ignition Switch ON	11 to 14 V

(d) Connect the L2 park/neutral position switch connector.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



3.	REPLACE TCM
-----------	--------------------

(a) Replace the TCM  .

NEXT  **PERFORM THE RESET MEMORY**

4.	CHECK HARNESS AND CONNECTOR (PARK/NEUTRAL POSITION SWITCH - TCM)
-----------	---

- (a) Disconnect the A19 TCM connector.
- (b) Disconnect the L2 park/neutral position switch connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	SHIFT POSITION	SPECIFIED CONDITION
A19-3(P) - L2-6(PL)	Always	Below 1 Ω
A19-10(R) - L2-1(RL)	Always	Below 1 Ω
A19-21(N) - L2-9(NL)	Always	Below 1 Ω
A19-9(D) - L2-7(DL)	Always	Below 1 Ω
A19-3(P) - Body ground()	Always	10 k Ω or higher
A19-10(R) - Body ground	Always	10 k Ω or higher
A19-21(N) - Body ground	Always	10 k Ω or higher
A19-9(D) - Body ground	Always	10 k Ω or higher

- (d) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
A19-3(P) - Body ground	Ignition Switch ON	Below 1 V
A19-10(R) - Body ground	Ignition Switch ON	Below 1 V
A19-21(N) - Body ground	Ignition Switch ON	Below 1 V
A19-9(D) - Body ground	Ignition Switch ON	Below 1 V

- (e) Connect the TCM connector.
- (f) Connect the L2 park/neutral position switch connector.

NG ► **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ► **REPLACE PARK/NEUTRAL POSITION SWITCH ASSEMBLY**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W7Z0K0X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0711: Transmission Fluid Temperature Sensor "A" Performance (2013 FR-S)		

DTC	P0711	Transmission Fluid Temperature Sensor "A" Performance
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DESCRIPTION

The oil temperature sensor within the valve body detects the oil temperature within the transmission hydraulic control circuit, and inputs into the TCM a signal corresponding to the oil temperature.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	<ol style="list-style-type: none"> 1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER 	
P0711	<ol style="list-style-type: none"> 1. Detects that the park/neutral position switch assembly is normal, the shift position sensor is in D, the ATF temperature with ignition switch ON is less than 20°C (68°F) , the present ATF temperature is less than 20°C (68°F) , and the vehicle speed is 40 km/h or more 2. If any of the following conditions are met: <ol style="list-style-type: none"> a. While diagnostic conditions are satisfied, the variation in oil temperature sensor input voltage is 0.05V or less after the ignition switch is turned to on b. While diagnostic conditions are satisfied, the variation in oil temperature sensor input voltage is 0.05V or less 3. Continues for 600 sec. 4. 2-trip detection logic 	<ul style="list-style-type: none"> • Transmission wire (ATF temperature sensor) • Harness and connector

MONITOR DESCRIPTION

This DTC indicates that there is a problem with output from the automatic transmission fluid (ATF) temperature sensor and that the sensor itself is defective. The ATF temperature sensor converts the ATF temperature to an electrical resistance value. Based on the resistance, the TCM determines the ATF temperature and detects an opens or shorts in the ATF temperature circuit or a fault of the ATF temperature sensor.

After running the vehicle for a certain period, the ATF temperature should increase. If the ATF temperature is below 20°C (68°F) after running the vehicle for a certain period, the TCM interprets this as a fault, and turns on the MIL.

MONITOR STRATEGY

Related DTCs	P0711: ATF Temperature Sensor (Stuck)
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Required sensors/Components	ATF temperature sensor
Frequency of operation	Continuous
Duration	10 min.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

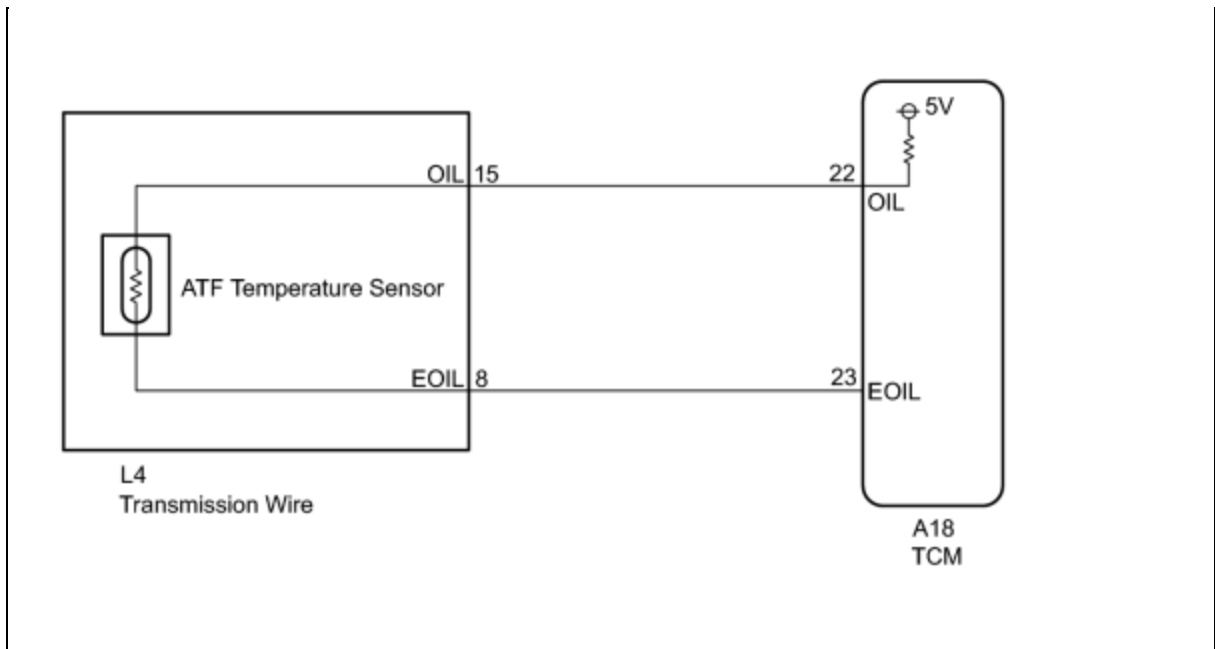
ALL:

Battery voltage	10.2 V or more
Engine speed	400 rpm or more
CAN BUS OFF (U0073)	No failure
ECM NO ID (U0100)	No failure
Above condition satisfied for	2 sec. or more
ATF temperature sensor output voltage	0.049 V or more and 4.932 V or less
Range switch (P0707,P0708)	No failure
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Range position	D (If range position changes to P, R or N, timer is held.)
Transmission oil temperature	20°C (68°F) or less
Vehicle speed (If the vehicle speed condition is once satisfied, it is effective while satisfying the malfunction criteria.)	24.9 mph or more

TYPICAL MALFUNCTION THRESHOLDS

Absolute change of output voltage	0.049 V or less
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WIRING DIAGRAM



INSPECTION PROCEDURE

1. DATA LIST

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO.
- In the table below, the value listed under "Normal Condition" are reference values.

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

- Warm up the engine.
- Turn the ignition switch off.
- Connect the Techstream to the DLC3.
- Turn the ignition switch on position.
- Turn the Techstream on.
- Enter the following menus: Powertrain / ECT / Data List.
- According to the display on the Techstream, read the "Data List".

ITEM	MEASUREMENT ITEM/ RANGE (DISPLAY)	NORMAL CONDITION
A/T Oil Temperature 1	ATF Temp. Sensor Value/ min.: -40°C (-40°F) max.: 215°C (419°F)	<ul style="list-style-type: none"> • After Stall Test; Approx. 80°C (176°F) • Equal to ambient temperature when cold soak

HINT:

When DTC P0712 is output and Techstream output is -40°C (-40°F), there is a short circuit.

When DTC P0713 is output and Techstream output is 171°C (340°F), there is an open circuit.

TEMPERATURE DISPLAYED	MALFUNCTION
171°C (340°F)	Open circuit
-40°C (-40°F) or more	Short circuit

PROCEDURE

1.	CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0711)
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- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch on position and push the Techstream main switch ON.
- (c) When you use Techstream:
Enter the following menus: Powertrain / ECT / Trouble Codes.
- (d) Read the DTCs using the Techstream.

Result:

DISPLAY (DTC OUTPUT)	PROCEED TO
Only "P0711" is output	A
"P0711" and other DTCs	B

HINT:

If any other codes besides "P0711" are output, perform troubleshooting for those DTCs first.

B ► GO TO DTC CHART

A



2.	CHECK TRANSMISSION FLUID LEVEL
-----------	---------------------------------------

OK:
Automatic transmission fluid level is correct.

NG ► ADD FLUID

OK ► REPLACE TRANSMISSION WIRE



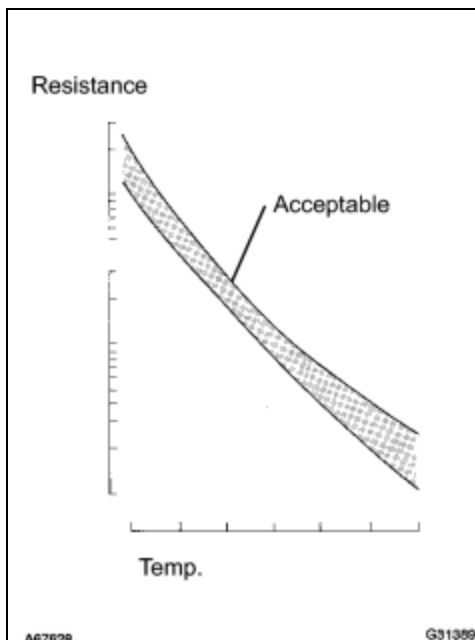
Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W850LRX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0712,P0713: Transmission Fluid Temperature Sensor "A" Circuit Low Input (2013 FR-S)		

DTC	P0712	Transmission Fluid Temperature Sensor "A" Circuit Low Input
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DTC	P0713	Transmission Fluid Temperature Sensor "A" Circuit High Input
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DESCRIPTION

The oil temperature sensor within the valve body detects the oil temperature within the transmission hydraulic control circuit, and inputs into the TCM a signal corresponding to the oil temperature.



DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	<ol style="list-style-type: none"> 1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER 	
P0712	<ol style="list-style-type: none"> 1. Not learning control prohibited status 2. The oil temperature sensor input voltage is 0.05 V or less 3. Detects a malfunction that continues for 10 seconds 6 times consecutively 4. 1-trip detection logic 	<ul style="list-style-type: none"> • Transmission wire (ATF temperature sensor) • Harness and connector • TCM
	<ol style="list-style-type: none"> 1. Park/neutral position switch assembly is normal, 	

P0713	and shift lever is in D or R for 1 min. or more	<ul style="list-style-type: none"> • Transmission wire (ATF temperature sensor) • Harness and connector • TCM
	Not learning control prohibited status	
	2. The oil temperature sensor input voltage is 4.94 V or more	
	3. Detects a malfunction that continues for 1 second 12 times consecutively	
	4. 1-trip detection logic	

MONITOR DESCRIPTION

These DTCs indicate an open or short in the automatic transmission fluid (ATF) temperature sensor circuit. The automatic transmission fluid (ATF) temperature sensor converts ATF temperature to an electrical resistance value. Based on the resistance, the TCM determines the ATF temperature, and the TCM detects an open or short in the ATF temperature circuit. If the resistance value of the ATF temperature is less than 0.049 V or more than 4.932 V, the TCM interprets this as a fault in the ATF sensor or wiring. The TCM will turn on the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P0712: ATF Temperature Sensor (GND Short) P0713: ATF Temperature Sensor (Battery Short/Open)
Required sensors/Components	ATF temperature sensor
Frequency of operation	Continuous
Duration	P0712: 10 sec. x 6 times P0713: 1 sec. x 12 times
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

P0712: ATF temperature sensor (GND Short)

Battery voltage	10.2 V or more
Engine speed	400 rpm or more
CAN BUS OFF (U0073)	No failure
ECM NO ID (U0100)	No failure
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active

P0713: ATF temperature sensor (Battery Short/Open)

Battery voltage	10.2 V or more
Engine speed	400 rpm or more
CAN BUS OFF (U0073)	No failure
ECM NO ID (U0100)	No failure
Above condition satisfied for	2 sec. or more

Fail-safe mode (Solenoids power supply is shut down.)	Not active
---	------------

The following conditions are satisfied.

After ignition switch ON, above condition satisfied for	1 min. or more
Range position	D or R
Range switch (P0707,P0708)	No failure

TYPICAL MALFUNCTION THRESHOLDS

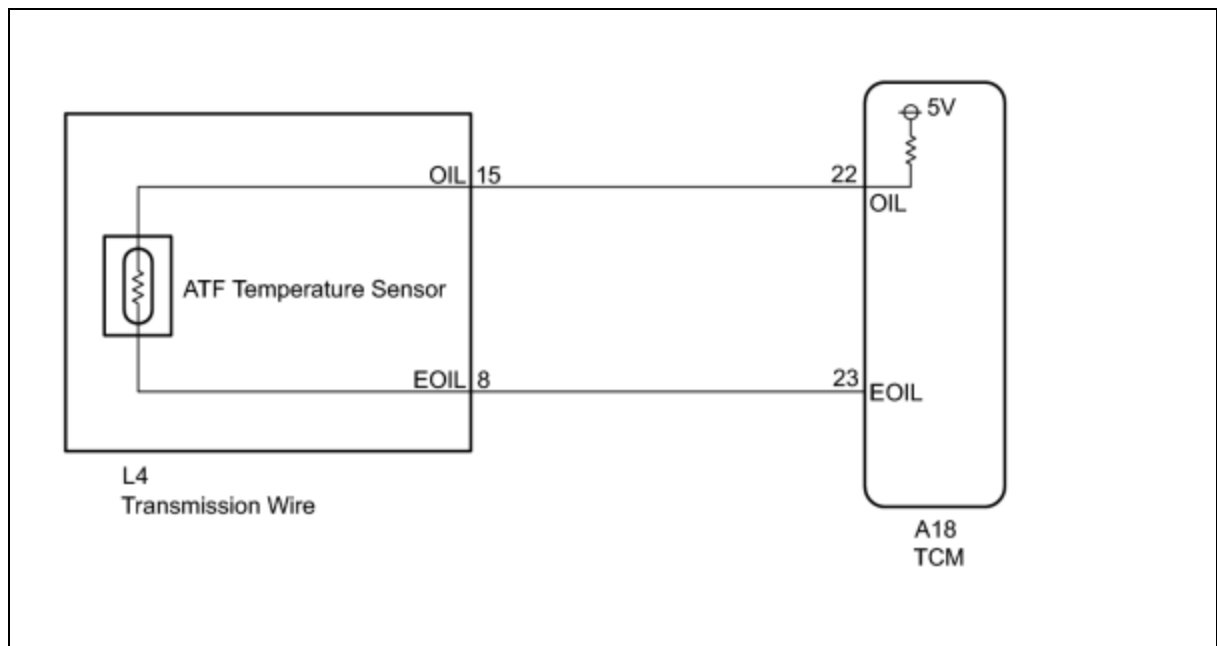
P0712: Range check (Low resistance)

Output voltage	0.049 V or less
----------------	-----------------

P0713: Range check (High resistance)

Output voltage	4.932 V or more
----------------	-----------------

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs INFO.

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed.

Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch on position.
- (e) Turn the Techstream on.
- (f) Enter the following menus: Powertrain / ECT / Data List.
- (g) According to the display on the Techstream, read the "Data List".

ITEM	MEASUREMENT ITEM/ RANGE (DISPLAY)	NORMAL CONDITION
A/T Oil Temperature 1	ATF Temp. Sensor Value/ min.: -40°C (-40°F) max.: 215°C (419°F)	<ul style="list-style-type: none"> • After Stall Test; Approx. 80°C (176°F) • Equal to ambient temperature when cold soak

HINT:

When DTC P0712 is output and Techstream output is -40°C (-40°F) or more, there is a short circuit.

When DTC P0713 is output and Techstream output is 171°C (340°F), there is an open circuit.

TEMPERATURE DISPLAYED	MALFUNCTION
171°C (340°F)	Open circuit
-40°C (-40°F) or more	Short circuit

PROCEDURE

1.	INSPECT TRANSMISSION WIRE (ATF TEMPERATURE SENSOR)
-----------	---

- (a) Disconnect the A18 TCM connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance:


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-22(OIL) - A18-23(EOIL)	Always	79 Ω to 156 kΩ

- (c) Connect the A18 TCM connector.

OK



2.	REPLACE TCM
-----------	--------------------

(a) Replace the TCM  .

NEXT  **PERFORM THE RESET MEMORY**

3.	CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - TCM)
-----------	--

- (a) Disconnect the A18 TCM connector.
- (b) Disconnect the L4 transmission wire connector.
- (c) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
L4-8(EOIL) - Body ground	Ignition switch on	Below 1 V
L4-15(OIL) - Body ground	Ignition switch on	Below 1 V

(d) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-22(OIL) - L4-15(OIL)	Always	Below 1 Ω
A18-23(EOIL) - L4-8(EOIL)	Always	Below 1 Ω
L4-8(EOIL) - Body ground	Always	10 k Ω or higher
L4-15(OIL) - Body ground	Always	10 k Ω or higher

- (e) Connect the A18 TCM connector.
- (f) Connect the L4 transmission wire connector.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **REPAIR OR REPLACE TRANSMISSION WIRE**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W7Y08RX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0717: Turbine Speed Sensor Circuit No Signal (2013 FR-S)		

DTC	P0717	Turbine Speed Sensor Circuit No Signal
------------	--------------	---

DESCRIPTION

The input speed sensor NT inputs signal into the TCM as a signal of the input axis revolutions.

The TCM carries out shift timing control based upon signals from the input speed sensor NT and the output speed sensor SP2.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	<ol style="list-style-type: none"> 1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER 	
P0717	<ol style="list-style-type: none"> 1. The shift solenoid valve (S1, S2, S3, S4, SR, SL1, SL2, SLT), output speed sensor SP2 and shift position sensor are normal. While the vehicle is driven with shift lever in D, when the input speed sensor NT revolutions calculated from the shift solenoid valve SP2 are 550 rpm or more. (2.5 seconds or more have elapsed after moving the shift lever to D. However, if there is a malfunction with the oil temperature sensor, or the oil temperature is 20°C (68°F) or less, then 10 seconds or more after moving the shift lever to D) 2. While the shift solenoid valve SP2 outputs 12 pulses, the input speed sensor NT does not detect even 1 pulse. 3. Detected 500 times consecutively. 4. 1-trip detection logic 	<ul style="list-style-type: none"> • Input speed sensor NT • TCM • Harness and connector

MONITOR DESCRIPTION

This DTC indicates that pulse is not output from the input speed sensor NT or is output only little. The input speed sensor NT terminal of the TCM detects the revolving signal from input speed sensor NT (input RPM). The TCM outputs a gearshift signal comparing the input speed sensor NT with the output speed sensor SP2.

While the vehicle is operating in the shift position of D, the output shaft revolution is 550rpm or more ^{*}, the TCM detects the trouble, illuminates the MIL and stores the DTC.

*: The engine speed is 400 rpm or more.

MONITOR STRATEGY

Related DTCs	P0717: Turbine Shaft Speed Sensor
Required sensors/Components	Speed sensor (NT)

Frequency of operation	Continuous
Duration	500 count
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

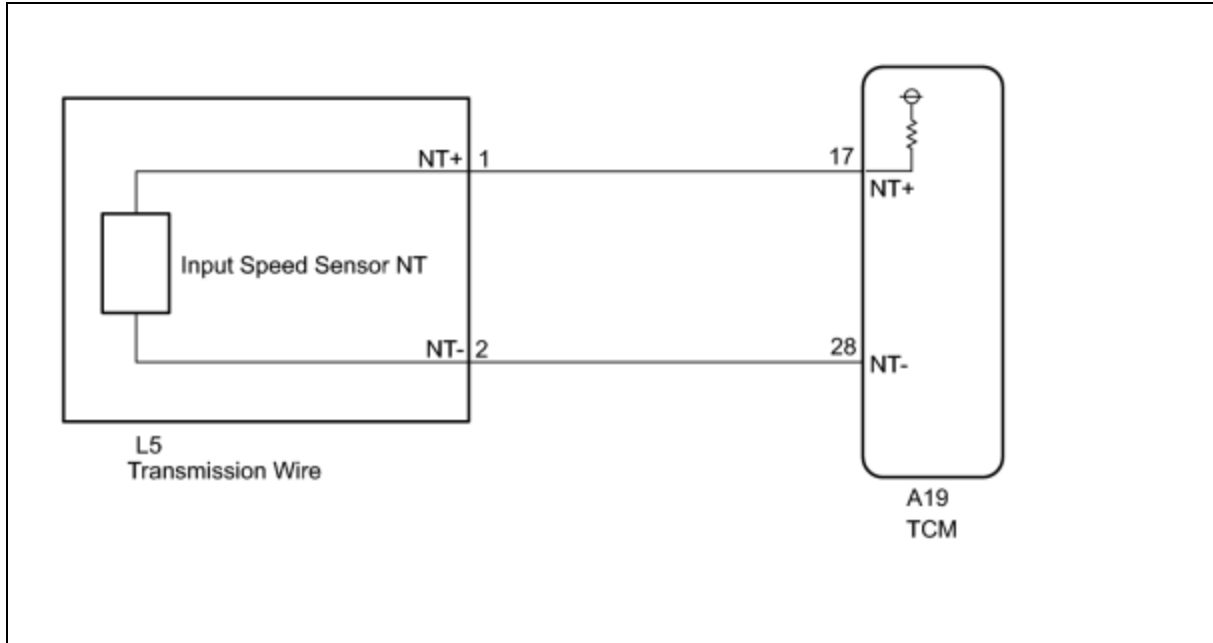
Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more
Engine speed	400 rpm or more
CAN BUS OFF (U0073)	No failure
ECM NO ID (U0100)	No failure
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Vehicle speed sensor (P0722)	No failure
Range switch (P0707,P0708)	No failure
Range position	D
Turbine shaft speed calculated from vehicle speed.	550 rpm or more
Transmission is not in the shift control.	Yes
Transmission is not in the gear shift control.	Yes
Transmission is not in the diagnostic service control.	Yes
Linear solenoid 1 (P0961,P0962,P0963)	No failure
Linear solenoid 2 (P0965,P0966,P0967)	No failure
Line pressure linear solenoid (P2720,P2721,P2719)	No failure
Shift solenoid 1 (P0973,P0974)	No failure
Shift solenoid 2 (P0976,P0977)	No failure
Shift solenoid 3 (P0979,P0980)	No failure
Shift solenoid 4 (P0982,P0983)	No failure
SR solenoid (P0985,P0986)	No failure
Engine torque signal	No failure
Elapsed time after selecting D range.	10 sec. or more (at ATF temperature is 20°C (68°F) or less, or ATF temperature sensor is failure)
	2.5 sec. or more (at ATF temperature is 20°C (68°F) or more, and ATF temperature sensor is no failure)

TYPICAL MALFUNCTION THRESHOLDS

Turbine shaft speed sensor pulse while detecting vehicle speed sensor signal 12 pulse.

0 pulse

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs INFO.

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch on position.
- (e) Turn the Techstream on.
- (f) Enter the following menus: Powertrain / ECT / Data List.
- (g) According to the display on the Techstream, read the "Data List".

ITEM	MEASUREMENT ITEM/ RANGE (DISPLAY)	NORMAL CONDITION
SPD (NT)	Input shaft speed/ Min.: 0 rpm Max.: 12,750 rpm	<p>HINT:</p> <p>Lock-up is</p> <ul style="list-style-type: none"> • ON (after warming up engine): Input turbine speed (NT) is equal to engine speed • OFF (idling with shift lever on N): Input turbine speed (NT) is nearly equal to engine speed

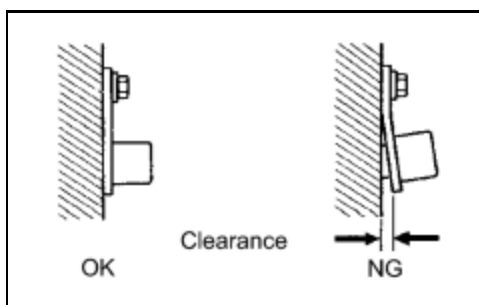
HINT:

- SPD (NT) is always 0 while driving:
 - Open or short in the sensor or circuit.
- SPD (NT) is always more than 0 and less than 300 rpm while driving the vehicle at 50 km/h (31 mph) or more:
 - Sensor trouble, improper installation, or intermittent connection trouble of the circuit.

PROCEDURE

1.	INSPECT SPEED SENSOR INSTALLATION
-----------	--

INFO



(a) Check the input speed sensor NT installation.

OK:


The installation bolt is tightened properly and there is no clearance between the sensor and transmission case.

NG ► **SECURELY INSTALL SPEED SENSOR OR
REPLACE SPEED SENSOR**

OK



2.	INSPECT INPUT SPEED SENSOR NT
-----------	--------------------------------------

- (a) Disconnect the L5 speed sensor connector.
- (b) Perform inspection of the input speed sensor NT. 
- (c) Connect the L5 speed sensor connector.

NG  **REPLACE SPEED SENSOR (NT)**

OK


3.	CHECK HARNESS AND CONNECTOR (SPEED SENSOR - TCM)
-----------	---

- (a) Disconnect the A19 TCM connector.
- (b) Disconnect the L5 speed sensor connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
L5-1(NT+) - A19-17(NT+)	Always	Below 1 Ω
L5-2(NT-) - A19-28(NT-)	Always	Below 1 Ω
L5-1(NT+) - Body ground	Always	10 k Ω or higher
L5-2(NT-) - Body ground	Always	10 k Ω or higher

- (d) Connect the A19 TCM connector.
- (e) Connect the L5 speed sensor connector.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK


4.	REPLACE TCM
-----------	--------------------

- (a) Replace the TCM  .

PERFORM THE RESET MEMORY

NEXT ▶



TOYOTA

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W8800GX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0722: Output Speed Sensor Circuit No Signal (2013 FR-S)		

DTC	P0722	Output Speed Sensor Circuit No Signal
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DESCRIPTION

The output speed sensor SP2 inputs signal into the TCM as a signal of the output axis revolutions.

The TCM carries out shift timing control based upon signals from the output speed sensor SP2 and the input speed sensor NT.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER	
P0722	1. The shift solenoid valve (S1, S2, S3, S4, SR, SL1, SL2, SLT), input speed sensor NT and shift position sensor are normal With the shift lever is in D, driving in 1st gear 6 km/h or more, in 2nd gear 9 km/h or more, in 3rd gear 13 km/h or more, in 4th gear 18 km/h or more, in 5th gear 25 km/h or more, and in 6th gear, 30 km/h or more. (2.5 seconds or more have elapsed after moving the shift lever to D. However, if there is a malfunction with the oil temperature sensor, or the oil temperature is 20°C (68°F) or less, then 10 seconds or more after moving the shift lever to D) 2. While the input speed sensor NT outputs 12 pulses, the output speed sensor SP2 does not detect even 1 pulse. 3. Detected 500 times consecutively. 4. 1-trip detection logic	<ul style="list-style-type: none"> • Open or short in output speed sensor SP2 circuit • Output speed sensor SP2 • TCM • Harness and connector

MONITOR DESCRIPTION

This DTC indicates that pulse is not output from the input speed sensor NT or is output only little. The input speed sensor NT terminal of the TCM detects the revolving signal from input speed sensor NT. The TCM outputs a gearshift signal comparing the input speed sensor NT with the output speed sensor SP2.

While the vehicle is operating in the shift position of D, the output shaft revolution is 300 rpm or more ^{*}, the TCM detects the trouble, illuminates the MIL and stores the DTC.

*: The engine speed is 400 rpm or more.

MONITOR STRATEGY

Related DTCs	P0722: Vehicle Speed Sensor
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Required sensors/Components	Speed sensor (SP2)
Frequency of operation	Continuous
Duration	500 count
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

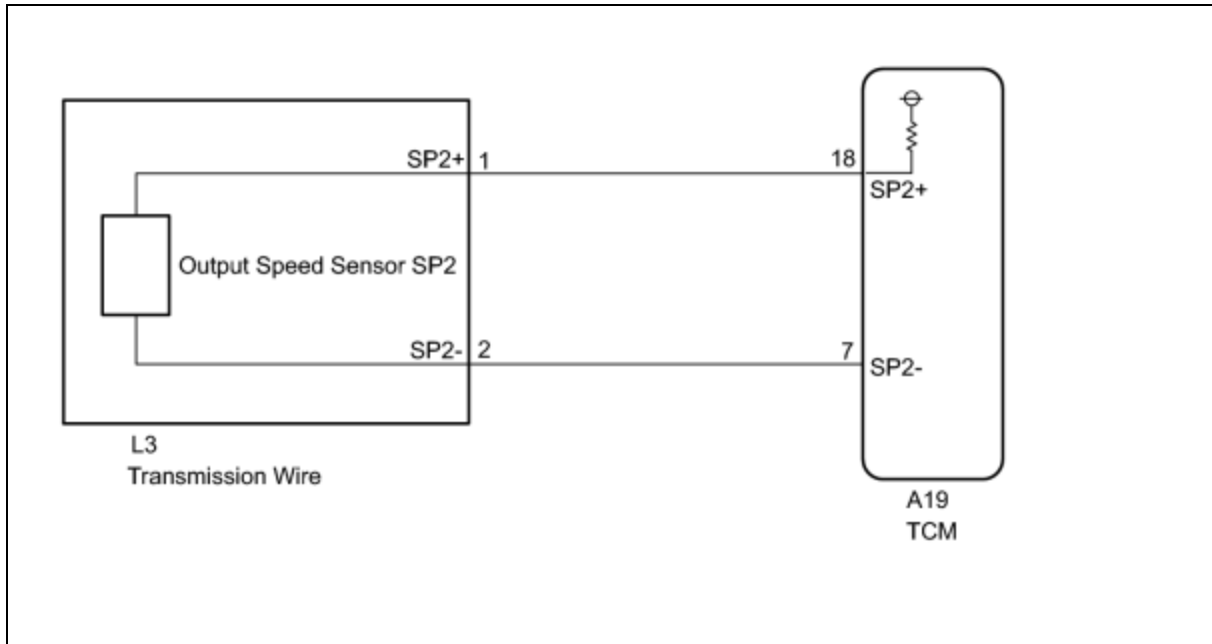
Battery voltage	10.2 V or more
Engine speed	400 rpm or more
CAN BUS OFF (U0073)	No failure
ECM NO ID (U0100)	No failure
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Turbine shaft speed sensor (P0717)	No failure
Transmission output speed calculated from turbine shaft speed.	300 rpm or more
Range switch (P0707,P0708)	No failure
Range position	D
Transmission is not in the shift control.	No
Transmission is not in the gear shift control.	No
Transmission is not in the diagnostic service control.	No
Linear solenoid 1 (P0961,P0962,P0963)	No failure
Linear solenoid 2 (P0965,P0966,P0967)	No failure
Line pressure linear solenoid (P2719,P2720,P2721)	No failure
Shift solenoid 1 (P0973,P0974)	No failure
Shift solenoid 2 (P0976,P0977)	No failure
Shift solenoid 3 (P0979,P0980)	No failure
Shift solenoid 4 (P0982,P0983)	No failure
SR solenoid (P0985,P0986)	No failure
Engine torque signal	No failure
Elapsed time after selecting D range.	10 sec. or more (at ATF temperature is 20°C (68°F) or less, or ATF temperature sensor is failure)
	2.5 sec. or more (at ATF temperature is 20°C (68°F) or more, and ATF temperature sensor is no failure)

TYPICAL MALFUNCTION THRESHOLDS

Vehicle speed sensor pulse while detecting turbine shaft speed sensor signal 12 pulse.

0 pulse

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs  .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Warm up the engine.
- (b) Turn the ignition switch OFF.
- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch to ON position.
- (e) Turn the Techstream on.
- (f) Enter the following menus: Powertrain / ECT / Data List.
- (g) According to the display on the Techstream, read the "Data List".

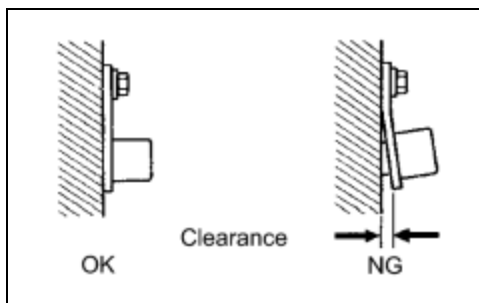
ITEM	MEASUREMENT ITEM/ RANGE (DISPLAY)	NORMAL CONDITION
SPD (SP2)	Output shaft speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	HINT: Vehicle stopped: 0 km/h (0 mph) (output shaft speed is equal to vehicle speed)

HINT:

- SPD (SP2) is always 0 while driving:
 - Open or short in the sensor or circuit.
- SPD (SP2) is always more than 0 and less than 300 rpm while driving the vehicle at 50 km/h (31 mph) or more:
 - Sensor trouble, improper installation, or intermittent connection trouble of the circuit.

PROCEDURE

1. INSPECT SPEED SENSOR INSTALLATION



(a) Check the output speed sensor SP2 installation.

OK:

The installation bolt is tightened properly and there is no clearance between the sensor and transmission case.

NG ► **SECURELY INSTALL SPEED SENSOR OR REPLACE SPEED SENSOR**

OK



2. INSPECT OUTPUT SPEED SENSOR SP2

- Disconnect the speed sensor connector.
- Perform inspection of the output speed sensor SP2 INFO.
- Connect the speed sensor connector.

REPLACE OUTPUT SPEED SENSOR SP2

NG 

OK



3. CHECK HARNESS AND CONNECTOR (OUTPUT SPEED SENSOR SP2 - TCM)

- (a) Disconnect the A19 TCM connector.
- (b) Disconnect the L3 output speed sensor SP2 connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
L3-1(SP2+) - A19-18(SP2+)	Always	Below 1 Ω
L3-2(SP2-) - A19-7(SP2-)	Always	Below 1 Ω
A19-18(SP2+) - Body ground	Always	10 k Ω or higher
A19-7(SP2-) - Body ground	Always	10 k Ω or higher

- (d) Connect the A19 TCM connector.
- (e) Connect the L3 output speed sensor SP2 connector.

**REPAIR OR REPLACE HARNESS OR
NG  CONNECTOR**

OK



4. REPLACE TCM

- (a) Replace the TCM  .

NEXT  PERFORM THE RESET MEMORY



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W8I05FX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0729: Gear 6 Incorrect Ratio (2013 FR-S)		

DTC	P0729	Gear 6 Incorrect Ratio
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SYSTEM DESCRIPTION

The TCM uses signals from the output speed sensor SP2 and input speed sensor NT to detect the actual gear position (1st, 2nd, 3rd, 4th, 5th or 6th gear). Then the TCM compares the actual gear with the shift schedule in the TCM memory to detect mechanical problems of the shift solenoid valves, valve body or automatic transmission (clutch, brake or gear, etc.).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER	
P0729	<ol style="list-style-type: none"> While driving with the shift lever in D, the ATF temperature 20°C (68°F) or more, and coolant temperature 40°C (104°F) or more. (However, abnormalities with the shift solenoid valve S1, S2, S3, S4, SR, SL1, SL2, SLT), input speed sensor NT, output speed sensor SP2, park/neutral position switch, CAN bus, ECM communication, coolant temperature sensor, air flow sensor, electronically control throttle, and accelerator pedal sensor are not detected) If any of the following conditions are met: <ol style="list-style-type: none"> When the TCM commands shifting to 5th, the actual gear position is also switched to 5th. When the TCM commands 6th gear, the actual position is switched to 4th. - 1-trip detection logic 	<ul style="list-style-type: none"> Transmission valve body assy Shift solenoid valve SLT

HINT:

- Gear positions in the event of a solenoid valve mechanical problem:

TCM command gearshift	1st	2nd	3rd	4th	5th	6th
Actual gear position under malfunction	↑	↑	↑	↑	↑	4th

- Gear position during fail-safe operation:

If any malfunction is detected, the TCM changes into the fail-safe mode to shift into the gear positions as shown in the table below.

Gear position under normal conditions	1st	2nd	3rd	4th	5th	6th
---------------------------------------	-----	-----	-----	-----	-----	-----

MONITOR DESCRIPTION

The TCM commands gear shifts by turning the shift solenoid valves "ON/OFF" and switching oil pressure to the valves in the valve body.

The DTC indicates that the sequence valve is locked in the direction the spring stretches and that shifting to the 6th gear is impossible.

MONITOR STRATEGY

Related DTCs	P0729: 6th Error
Required sensors/Components	Sequence valve
Frequency of operation	Continuous
Duration	1 count
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The following items are common to all conditions below.

Battery voltage	10.5 V or more
Engine speed	400 rpm or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Above condition satisfied for	2 sec. or more
Turbine shaft speed sensor(P0717)	No failure
Vehicle speed sensor(P0722)	No failure
Shift solenoid 1 (P0973,P0974)	No failure
Shift solenoid 2 (P0976,P0977)	No failure
Shift solenoid 3 (P0979,P0980)	No failure
Shift solenoid 4 (P0982,P0983)	No failure
SR solenoid (P0985,P0986)	No failure
Linear solenoid 1 (P0961,P0962,P0963)	No failure
Linear solenoid 2 (P0965,P0966,P0967)	No failure
Line pressure linear solenoid (P2720, P2721,P2719)	No failure
ATF temperature sensor (P0711,P0712,P0713)	No failure
Range switch (P0707,P0708)	No failure
CAN BUS OFF(U0073)	No failure
ECM NO ID(U0100)	No failure
Engine coolant temperature sensor	No failure

Engine torque signal	No failure
Throttle position sensor	No failure
Accelerator pedal position sensor	No failure
Range position	D
Elapsed time after selecting D range	4 sec. or more
Engine coolant temperature	40°C(104°F) or more
ATF temperature	20°C(68°F) or more

TYPICAL MALFUNCTION THRESHOLDS

Compare target gear instructed from TCM and gear ratio calculated from turbine shaft speed and vehicle speed.

Both of the following condition are met: Condition (A) and (B)

Condition (A)

Shift position	D position
Target gear position.	5th
Gear ratio calculated from turbine shaft speed and vehicle speed.	5th

Condition (B)

Shift position	D position
Target gear position.	6th
Gear ratio calculated from turbine shaft speed and vehicle speed.	4th

Both of the following condition are met: Condition (C) and (D)

Condition (C)

Shift position	M position
Target gear position.	5th
Gear ratio calculated from turbine shaft speed and vehicle speed.	5th

Condition (D)

Shift position	M position
Target gear position.	6th
Gear ratio calculated from turbine shaft speed and vehicle speed.	4th


INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs  .

PROCEDURE

1. CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0729)

- Connect the Techstream to the DLC3.
- Turn the ignition switch on position and push the Techstream main switch ON.
- Read the DTCs using the Techstream  .

Result:

DISPLAY (DTC OUTPUT)	PROCEED TO
Only "P0729 and P2714" are output	A
"P0729 and P0714" and other DTCs	B

B  **GO TO DTC CHART**

A



2. CHECK THE GEAR POSITION

- Drive the vehicle with shift lever in the M.
- Check the shift position.

TCM gearshift	1st	2nd	3rd	4th	5th	6th
Actual gear position under malfunction	↑	↑	↑	↑	↑	4th

HINT:

- Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature: 60 to 90°C (140 to 194°F)
- Perform under condition that A/C is OFF.

OK:

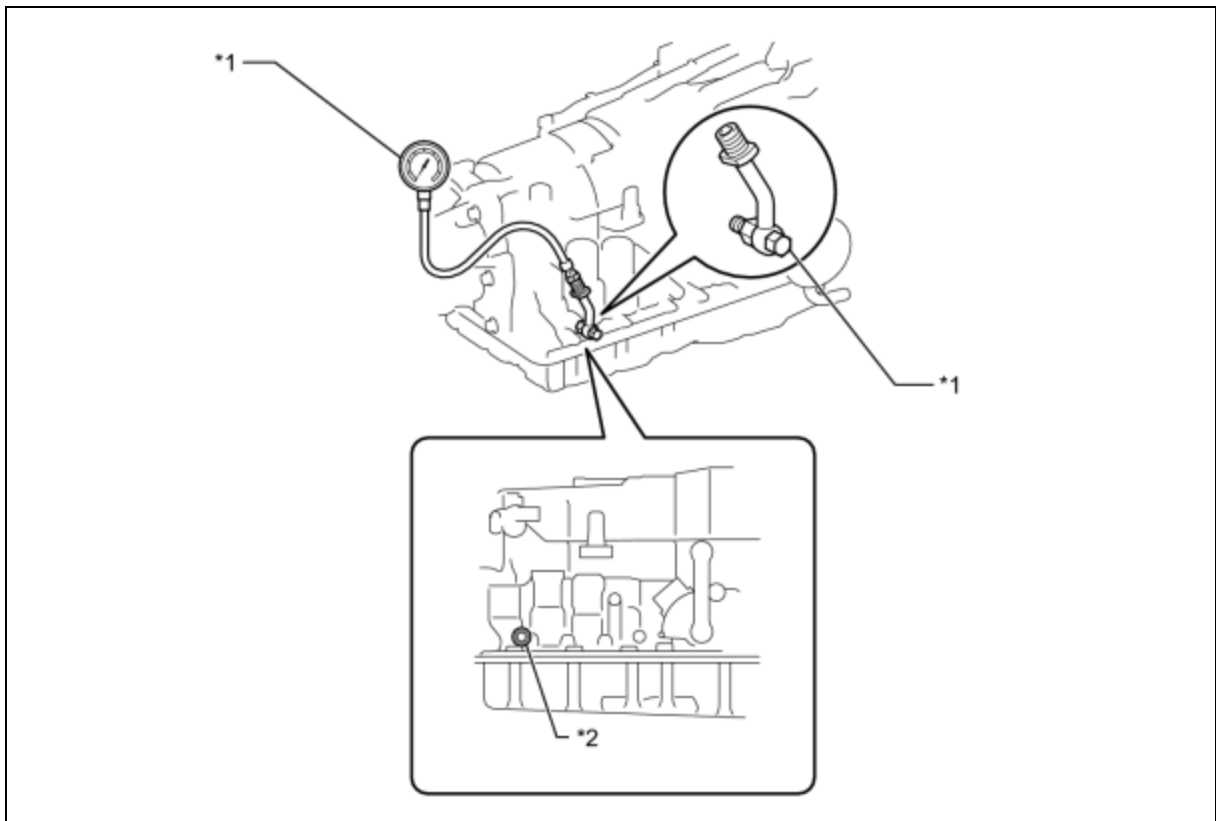
Gear position changes.

NG  **REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK



3. HYDRAULIC TEST



Text in Illustration

*1	SST	*2	Test Plug
----	-----	----	-----------

NOTICE:

- Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature: 60 to 90°C (140 to 194°F)
- The line pressure test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is performing the test.
- Be careful to prevent SST hose from interfering with the exhaust pipe.
- This Check must be conducted after checking and adjusting engine.
- Perform under condition that A/C is OFF.
- When conducting stall test, do not continue more than 5 seconds.

(a) Warm up the ATF (Automatic Transmission Fluid).

(b) Lift the vehicle up.

(c) Remove the test plug on the transmission case center right side and connect SST.

SST: 09992-00095

09992-00231

09992-00271

(d) Lower the vehicle.

(e) Fully apply the parking brake and check the 4 wheels.

(f) Start the engine and check idling speed.

- (g) Keep your left foot pressing firmly on the brake pedal and shift into D position.
- (h) Measure the line pressure when the engine is idling.
- (i) Depress the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.
- (j) In the same manner, do the test in R position.

Specified line pressure:

CONDITION	D POSITION KPA (KGF / CM ² , PSI)	R POSITION KPA (KGF / CM ² , PSI)
Idling	350 to 430 kPa (3.6 to 4.4 kgf/cm ² , 51 to 62 psi)	760 to 950 kPa (7.7 to 9.7 kgf/cm ² , 110 to 138 psi)
Stall test	1200 to 1380 kPa (12.5 to 14.0 kgf/cm ² , 174 to 200 psi)	1410 to 1630 kPa (14.4 to 16.6 kgf/cm ² , 204 to 236 psi)

NG ► REPLACE SHIFT SOLENOID VALVE SLT

OK



4.	CLEAR THE DTC AND RUNNING TEST
-----------	---------------------------------------

- (a) Clear the DTC, and check DTC again after conducting the "MONITOR DRIVE PATTERN FOR ECT TEST" INFO .

OK:
No DTC code

NG ► REPLACE TRANSMISSION VALVE BODY ASSEMBLY

OK ► END

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W8JOADX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0751,P0752: Shift Solenoid "A" Performance (Shift Solenoid Valve S1) (2013 FR-S)		

DTC	P0751	Shift Solenoid "A" Performance (Shift Solenoid Valve S1)
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DTC	P0752	Shift Solenoid "A" Stuck ON (S1 Solenoid)
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SYSTEM DESCRIPTION

The TCM carries out detection of the gear position based upon signals from the input speed sensor NT and the output speed sensor SP2. Subsequently, if the gear position as detected by the TCM is different to the commanded gear position, then a related solenoid valve, valve body, or automatic transmission mechanical problem is detected.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	<ol style="list-style-type: none"> 1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER 	
P0751	<ol style="list-style-type: none"> 1. While driving with the shift lever in D, the ATF temperature 20°C (68°F) or more, and coolant temperature 40°C (104°F) or more. (However, abnormalities with the shift solenoid valve S1, S2, S3, S4, SR, SL1, SL2, SLT), input speed sensor NT, output speed sensor SP2, park/neutral position switch, CAN bus, ECM communication, coolant temperature sensor, air flow sensor, electronically control throttle, and accelerator pedal sensor are not detected) 2. The following conditions are met: <ol style="list-style-type: none"> a. When the TCM commands shifting to 5th, the actual gear position is also switched to 5th. b. When the TCM commands shifting to 6th gear, the engine overruns (in neutral) 3. - 4. 2-trip detection logic 	<ul style="list-style-type: none"> • Shift solenoid valve S1 • Harness or connector • Transmission wire • TCM
P0752	<ol style="list-style-type: none"> 1. While driving with the shift lever in D, the ATF temperature 20°C (68°F) or more, and coolant temperature 40°C (104°F) or more. (However, abnormalities with the shift solenoid valve S1, S2, S3, S4, SR, SL1, SL2, SLT), input speed sensor NT, output speed sensor SP2, park/neutral position switch, CAN bus, ECM communication, coolant temperature sensor, air flow sensor, electronically control throttle, and accelerator pedal sensor are not detected) 2. The following conditions are met: <ol style="list-style-type: none"> a. - During driving with the shaft lever in D, when 	<ul style="list-style-type: none"> • Shift solenoid valve S1 • Harness or connector • Transmission

<p>the TCM commands shifting to 1st gear, the actual gear position is shifted to 2nd.</p> <p>b. - When the TCM commands shifting to 5th gear, the actual gear position is also shifted to 5th</p> <p>3. -</p> <p>4. 2-trip detection logic</p>	<p>wire</p> <ul style="list-style-type: none"> • TCM
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HINT:

- Gear positions in the event of a solenoid valve mechanical problem:

TCM command gearshift	1st	2nd	3rd	4th	5th	6th
*1: Actual gear position under S1 stuck ON malfunction	2nd	2nd	↑	↑	↑	↑
2: Actual gear position under S1 stuck OFF malfunction	1st	2nd	↑	↑	↑	N

N*: Neutral

- Gear position during fail-safe operation:

If any malfunction is detected, the TCM changes into the fail-safe mode to shift into the gear positions as shown in the table below.

Gear position under normal conditions	1st	2nd	3rd	4th	5th	6th
*1: Actual gear position under fail safe mode when S1 stuck ON malfunction	2nd	2nd	↑	↑	↑	↑
*2: Actual gear position under fail safe mode when S1 stuck OFF malfunction	1st *3	2nd *3	↑	3rd	3rd	3rd

*3: Under engine braking downshifting to 1st or 2nd gear is prohibited.

MONITOR DESCRIPTION

This DTC indicates "stuck ON malfunction" or "stuck OFF malfunction" of the shift solenoid valve S1.

The TCM commands gear shifts by turning the shift solenoid valves "ON/OFF". When the gear position commanded by the TCM and the actual gear position are not the same, the TCM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0751: Shift Solenoid 1 (OFF Stuck) P0752: Shift Solenoid 1 (ON Stuck)
Required sensors/Components	Shift solenoid valve S1
Frequency of operation	Continuous
Duration	1 count
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The following items are common to all conditions below.

Battery voltage	10.5 V or more
Engine speed	400 rpm or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Turbine shaft speed sensor (P0717)	No failure
Vehicle speed sensor (P0722)	No failure
Shift solenoid 1 (P0973,P0974)	No failure
Shift solenoid 2 (P0976,P0977)	No failure
Shift solenoid 3 (P0979,P0980)	No failure
Shift solenoid 4 (P0982,P0983)	No failure
SR solenoid (P0985,P0986)	No failure
Linear solenoid 1 (P0961,P0962,P0963)	No failure
Linear solenoid 2 (P0965,P0966,P0967)	No failure
Line pressure linear solenoid (P2720,P2721,P2719)	No failure
ATF temperature sensor (P0711,P0712,P0713)	No failure
Range switch (P0707,P0708)	No failure
CAN BUS OFF (U0073)	No failure
ECM NO ID (U0100)	No failure
Engine coolant temperature sensor	No failure
Engine torque signal	No failure
Throttle position sensor	No failure
Accelerator pedal position sensor	No failure
Range position	D
Elapsed time after selecting D range	4 sec. or more
Engine coolant temperature	40°C (104°F) or more
ATF temperature	20°C (68°F) or more

TYPICAL MALFUNCTION THRESHOLDS

P0751: Shift solenoid 1 (OFF Stuck)

Compare target gear instructed from TCM and gear ratio calculated from turbine shaft speed and vehicle speed.

Both of the following condition are met: Condition (A) and (B)

Condition (A)

Shift position	D position
Target gear position.	5th
Gear ratio calculated from turbine shaft speed and vehicle speed.	5th

Condition (B)

Shift position	D position
Target gear position.	6th
Gear ratio calculated from turbine shaft speed and vehicle speed.	Neutral

Both of the following condition are met: Condition (C) and (D)

Condition (C)

Shift position	M position
Target gear position.	5th
Gear ratio calculated from turbine shaft speed and vehicle speed.	5th

Condition (D)

Shift position	M position
Target gear position.	6th
Gear ratio calculated from turbine shaft speed and vehicle speed.	Neutral

P0752: Shift solenoid 1 (ON Stuck)

Compare target gear instructed from TCM and gear ratio calculated from turbine shaft speed and vehicle speed.

Both of the following condition are met: Condition (A) and (B)

Condition (A)

Shift position	D position
Target gear position.	1st
Gear ratio calculated from turbine shaft speed and vehicle speed.	2nd

Condition (B)

Shift position	D position
Target gear position.	5th
Gear ratio calculated from turbine shaft speed and vehicle speed.	5th

Both of the following condition are met: Condition (C) and (D)

Condition (C)

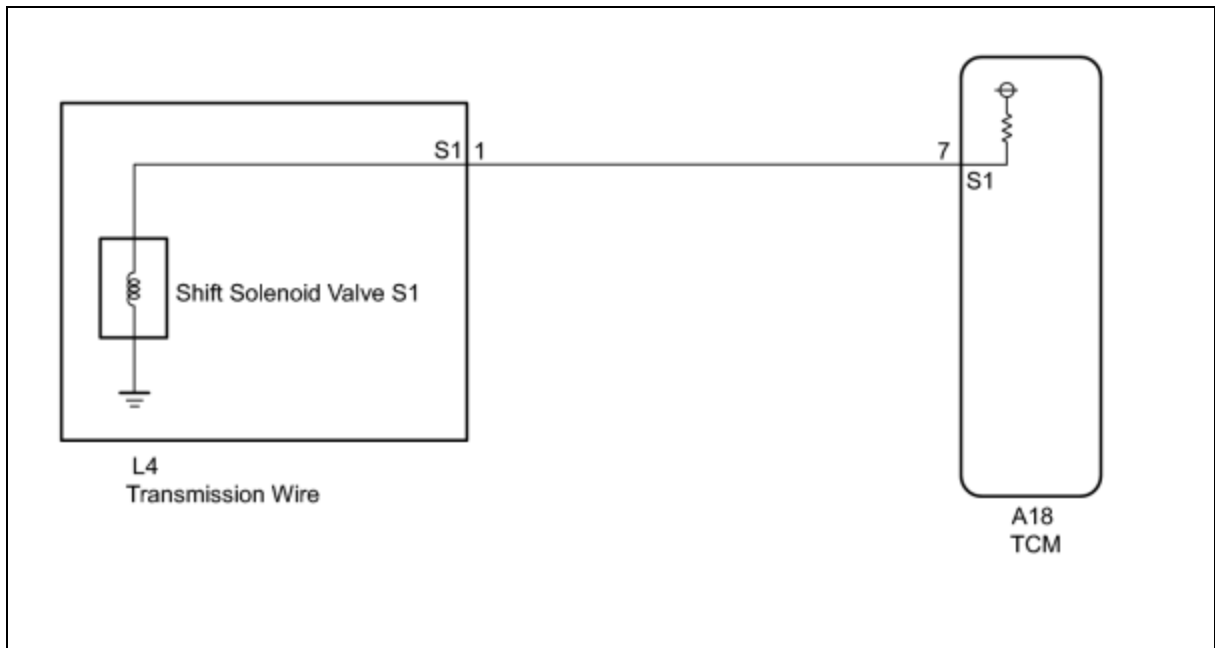
Shift position	M position
Target gear position.	1st
Gear ratio calculated from turbine shaft speed and vehicle speed.	2nd

Condition (D)

Shift position	M position
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Target gear position.	5th
Gear ratio calculated from turbine shaft speed and vehicle speed.	5th

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs INFO.

1. CHECK THE SHIFT POSITION

- (a) Drive the vehicle with shift lever in the M.
- (b) Check the shift position.

HINT:

- The shift solenoid valve S1 is turned on/off normally when the shift lever is in the D position:

TCM command gearshift	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve S1	OFF	ON	ON	ON	ON	ON

PROCEDURE

1.	CHECK OTHER DTCS OUTPUT
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- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch on position and push the Techstream main switch ON.
- (c) Read the DTCs using the Techstream INFO.

Result:

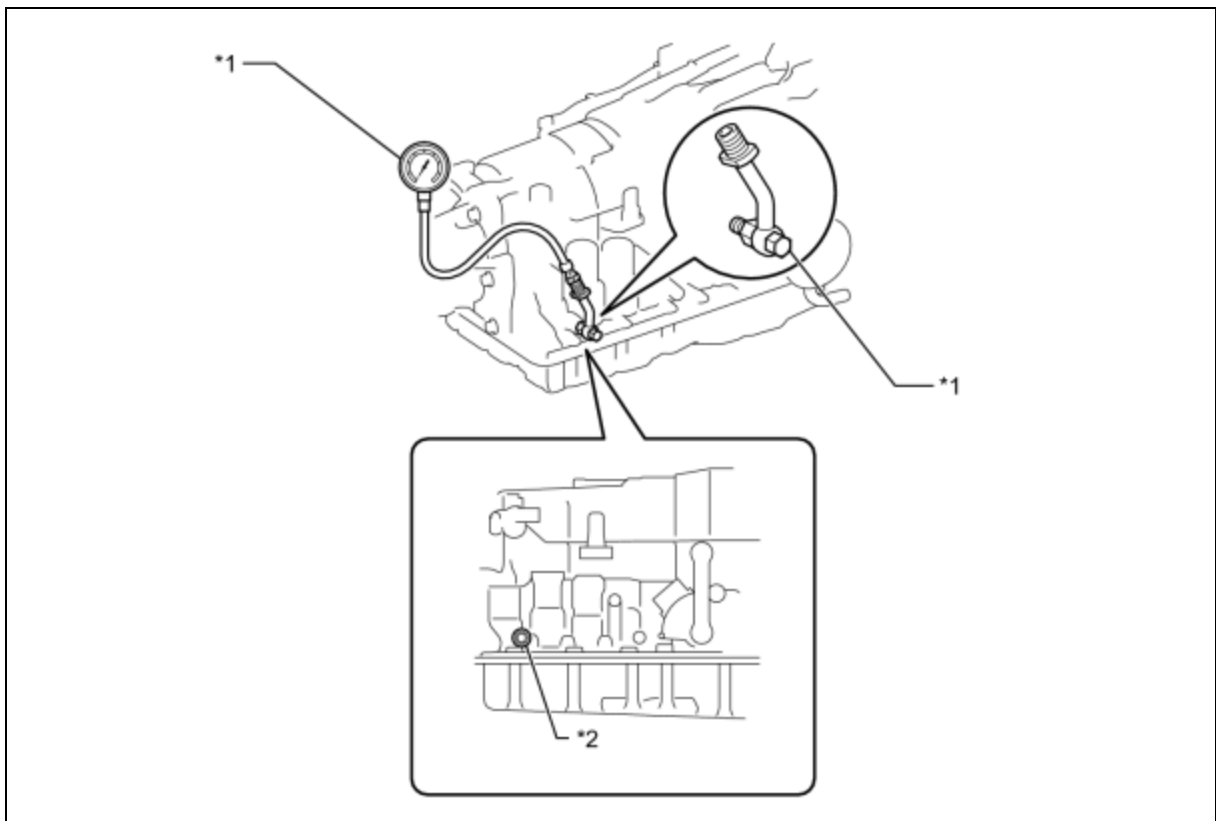
DISPLAY (DTC OUTPUT)	PROCEED TO
"P0751 and P2714" or "P0752 and P0767" are output	A
"P0751 and P2714" or "P0752 and P0767" and other DTCs	B

B ► GO TO DTC CHART

A



2.	HYDRAULIC TEST
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Text in Illustration

*1	SST	*2	Test Plug
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NOTICE:

- Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature: 60 to 90°C (140 to 194°F)
- The line pressure test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is performing the test.
- Be careful to prevent SST hose from interfering with the exhaust pipe.

- This Check must be conducted after checking and adjusting engine.
- Perform under condition that A/C is OFF.
- When conducting stall test, do not continue more than 5 seconds.

(a) Warm up the ATF (Automatic Transmission Fluid).

(b) Lift the vehicle up.

(c) Remove the test plug on the transmission case center right side and connect SST.

SST: 09992-00095

09992-00231

09992-00271

(d) Lower the vehicle.

(e) Fully apply the parking brake and check the 4 wheels.

(f) Start the engine and check idling speed.

(g) Keep your left foot pressing firmly on the brake pedal and shift into D position.

(h) Measure the line pressure when the engine is idling.

(i) Depress the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.

(j) In the same manner, do the test in R position.

Specified line pressure:

CONDITION	D POSITION KPA (KGF / CM ² , PSI)	R POSITION KPA (KGF / CM ² , PSI)
Idling	350 to 430 kPa (3.6 to 4.4 kgf/cm ² , 51 to 62 psi)	760 to 950 kPa (7.7 to 9.7 kgf/cm ² , 110 to 138 psi)
Stall test	1200 to 1380 kPa (12.5 to 14.0 kgf/cm ² , 174 to 200 psi)	1410 to 1630 kPa (14.4 to 16.6 kgf/cm ² , 204 to 236 psi)

NG  **REPLACE SHIFT SOLENOID VALVE SLT**

OK



3.	INSPECT SHIFT SOLENOID VALVE S1
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(a) Remove the shift solenoid valve S1  .


(b) Perform inspection of the shift solenoid valve S1  .

NG  **REPLACE SHIFT SOLENOID VALVE S1**

OK



4. INSPECT TRANSMISSION VALVE BODY ASSEMBLY

(a) Perform inspection of the transmission valve body assembly  .

OK:

There are no foreign objects on each valve.

NG  **REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK  **REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**



TOYOTA

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W800A5X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0756,P0757: Shift Solenoid "B" Performance (Shift Solenoid Valve S2) (2013 FR-S)		

DTC	P0756	Shift Solenoid "B" Performance (Shift Solenoid Valve S2)
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DTC	P0757	Shift Solenoid "B" Stuck ON (S2 Solenoid)
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SYSTEM DESCRIPTION

The TCM carries out detection of the gear position based upon signals from the input speed sensor NT and the output speed sensor SP2. Subsequently, if the gear position as detected by the TCM is different to the commanded gear position, then a related solenoid valve, valve body, or automatic transmission mechanical problem is detected.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	<ol style="list-style-type: none"> 1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER 	
P0756	<ol style="list-style-type: none"> 1. While driving with the shift lever in D, the ATF temperature 20°C (68°F) or more, and coolant temperature 40°C (104°F) or more. (However, abnormalities with the shift solenoid valve S1, S2, S3, S4, SR, SL1, SL2, SLT), input speed sensor NT, output speed sensor SP2, park/neutral position switch, CAN bus, ECM communication, coolant temperature sensor, air flow sensor, electronically control throttle, and accelerator pedal sensor are not detected) 2. The following conditions are met: <ol style="list-style-type: none"> a. When the TCM commands shifting to 1st, the actual gear position is shifted to 3rd. b. When the TCM commands shifting to 6th, the actual gear position is shifted to 5th. 3. - 4. 2-trip detection logic 	<ul style="list-style-type: none"> • Shift solenoid valve S2 • Transmission wire • Harness and connector • TCM
P0757	<ol style="list-style-type: none"> 1. While driving with the shift lever in D, the ATF temperature 20°C (68°F) or more, and coolant temperature 40°C (104°F) or more. (However, abnormalities with the shift solenoid valve S1, S2, S3, S4, SR, SL1, SL2, SLT), input speed sensor NT, output speed sensor SP2, park/neutral position switch, CAN bus, ECM communication, coolant temperature sensor, air flow sensor, electronically control throttle, and accelerator pedal sensor are not detected) 2. The following conditions are met: <ol style="list-style-type: none"> a. When the TCM commands shifting to 5th, the 	<ul style="list-style-type: none"> • Shift solenoid valve S2 • Transmission wire • Harness and

<p>actual gear position is shifted to 6th.</p> <p>b. When the TCM commands shifting to 6th, the actual gear position is shifted to 6th.</p> <p>3. -</p> <p>4. 2-trip detection logic</p>	<p>connector</p> <ul style="list-style-type: none"> TCM
--	--

HINT:

- Gear positions in the event of a solenoid valve mechanical problem:

TCM command gearshift	1st	2nd	3rd	4th	5th	6th
*1: Actual gear position under S2 stuck ON malfunction	↑	↑	2nd	↑	6th	↑
*2: Actual gear position under S2 stuck OFF malfunction	3rd	3rd	3rd	↑	5th	5th

MONITOR DESCRIPTION

This DTC indicates "stuck ON malfunction" or "stuck OFF malfunction" of the shift solenoid valve S2.

The TCM commands gear shifts by turning the shift solenoid valves "ON/OFF". When the gear position commanded by the TCM and the actual gear position are not the same, the TCM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0756: Shift Solenoid 2 (OFF Stuck) P0757: Shift Solenoid 2 (ON Stuck)
Required sensors/Components	Shift solenoid valve S2
Frequency of operation	Continuous
Duration	1 count
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The following items are common to all conditions below.

Battery voltage	10.5 V or more
Engine speed	400 rpm or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Turbine shaft speed sensor(P0717)	No failure
Vehicle speed sensor(P0722)	No failure
Shift solenoid 1 (P0973,P0974)	No failure
Shift solenoid 2 (P0976,P0977)	No failure
Shift solenoid 3 (P0979,P0980)	No failure
Shift solenoid 4 (P0982,P0983)	No failure

SR solenoid (P0985,P0986)	No failure
Linear solenoid 1 (P0961,P0962,P0963)	No failure
Linear solenoid 2 (P0965,P0966,P0967)	No failure
Line pressure linear solenoid (P2720,P2721,P2719)	No failure
ATF temperature sensor (P0711,P0712,P0713)	No failure
Range switch (P0707,P0708)	No failure
CAN BUS OFF (U0073)	No failure
ECM NO ID (U0100)	No failure
ECM Communication Counter (U0401)	No failure
Engine coolant temperature sensor	No failure
Engine torque signal	No failure
Throttle position sensor	No failure
Accelerator pedal position sensor	No failure
Range position	D
Elapsed time after selecting D range	4 sec. or more
Engine coolant temperature	40°C (104°F) or more
ATF temperature	20°C (68°F) or more

TYPICAL MALFUNCTION THRESHOLDS

P0756: Shift solenoid 2 (OFF Stuck)

Compare target gear instructed from TCM and gear ratio calculated from turbine shaft speed and vehicle speed.

Both of the following condition are met: Condition (A) and (B)

Condition (A)

Shift position	D position
Target gear position.	1st
Gear ratio calculated from turbine shaft speed and vehicle speed.	3rd

Condition (B)

Shift position	D position
Target gear position.	6th
Gear ratio calculated from turbine shaft speed and vehicle speed.	5th

Both of the following condition are met: Condition (C) and (D)

Condition (C)

Shift position	M position
Target gear position.	1st

Gear ratio calculated from turbine shaft speed and vehicle speed.	3rd
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Condition (D)

Shift position	M position
Target gear position.	6th
Gear ratio calculated from turbine shaft speed and vehicle speed.	5th

P0757: Shift solenoid 2 (ON Stuck)

Compare target gear instructed from TCM and gear ratio calculated from turbine shaft speed and vehicle speed.

Both of the following condition are met: Condition (A) and (B)

Condition (A)

Shift position	D position
Target gear position.	5th
Gear ratio calculated from turbine shaft speed and vehicle speed.	6th

Condition (B)

Shift position	D position
Target gear position.	6th
Gear ratio calculated from turbine shaft speed and vehicle speed.	6th

Both of the following condition are met: Condition (C) and (D)

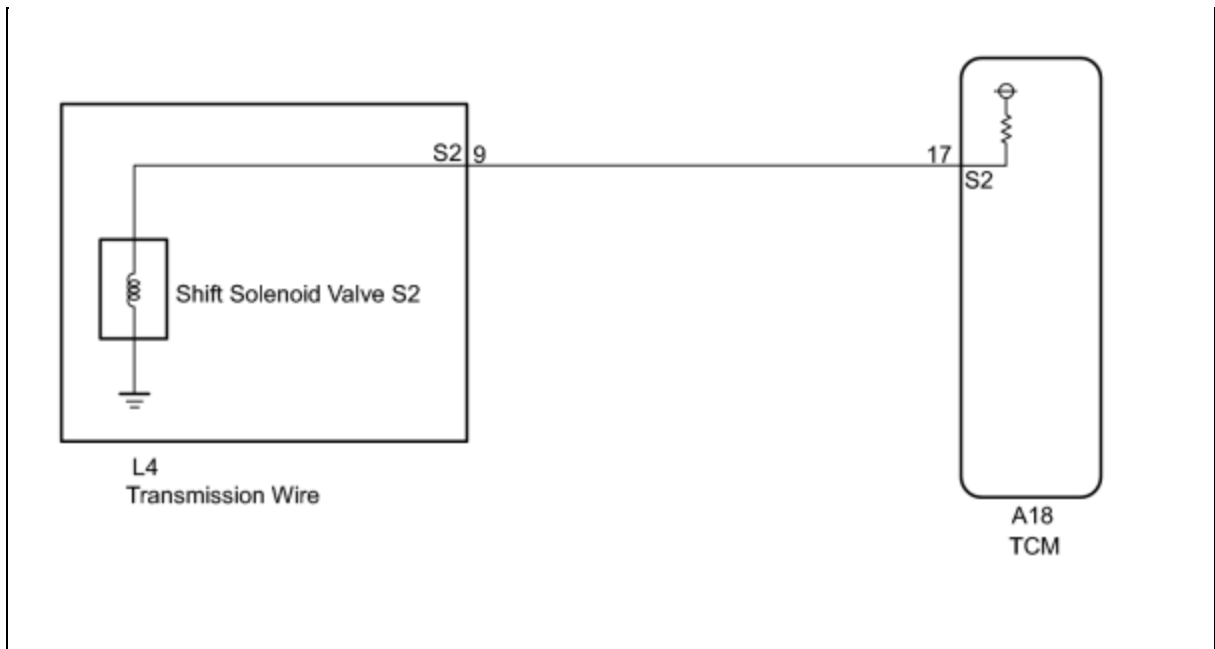
Condition (C)

Shift position	M position
Target gear position.	5th
Gear ratio calculated from turbine shaft speed and vehicle speed.	6th

Condition (D)

Shift position	M position
Target gear position.	6th
Gear ratio calculated from turbine shaft speed and vehicle speed.	6th

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs [INFO](#) .

1. CHECK THE SHIFT POSITION

- (a) Drive the vehicle with shift lever in the M.
- (b) Check the shift position.

HINT:

- The shift solenoid valve S2 is turned on/off normally when the shift lever is in the D position:

TCM command gearshift	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve S2	ON	ON	OFF	OFF	OFF	ON

PROCEDURE

1. CHECK OTHER DTCS OUTPUT

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and push the Techstream main switch ON.
- (c) Read the DTCs using the Techstream [INFO](#) .

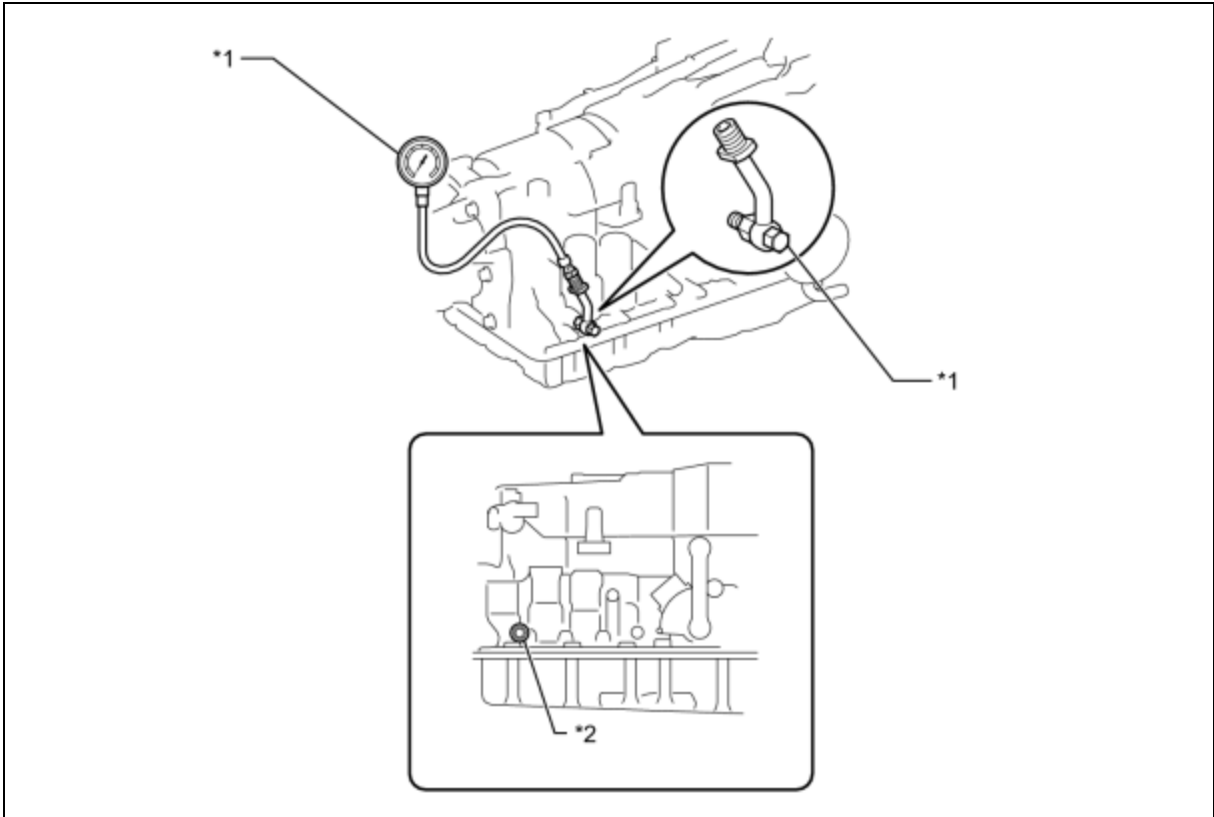
Result:

DISPLAY (DTC OUTPUT)	PROCEED TO
Only "P0756 and P2714" or "P0757" is output	A
"P0756 and P2714" or "P0757" and other DTCs	B

A



2.	HYDRAULIC TEST
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Text in Illustration

*1	SST	*2	Test Plug
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NOTICE:

- Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature: 60 to 90°C (140 to 194°F)
- The line pressure test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is performing the test.
- Be careful to prevent SST hose from interfering with the exhaust pipe.
- This Check must be conducted after checking and adjusting engine.
- Perform under condition that A/C is OFF.
- When conducting stall test, do not continue more than 5 seconds.

(a) Warm up the ATF (Automatic Transmission Fluid).

(b) Lift the vehicle up.

(c) Remove the test plug on the transmission case center right side and connect SST.

SST: 09992-00095

09992-00231

09992-00271

(d) Lower the vehicle.

(e) Fully apply the parking brake and check the 4 wheels.

(f) Start the engine and check idling speed.

(g) Keep your left foot pressing firmly on the brake pedal and shift into D position.

(h) Measure the line pressure when the engine is idling.

(i) Depress the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.

(j) In the same manner, do the test in R position.

Specified line pressure:

CONDITION	D POSITION KPA (KGF / CM ² , PSI)	R POSITION KPA (KGF / CM ² , PSI)
Idling	350 to 430 kPa (3.6 to 4.4 kgf/cm ² , 51 to 62 psi)	760 to 950 kPa (7.7 to 9.7 kgf/cm ² , 110 to 138 psi)
Stall test	1200 to 1380 kPa (12.5 to 14.0 kgf/cm ² , 174 to 200 psi)	1410 to 1630 kPa (14.4 to 16.6 kgf/cm ² , 204 to 236 psi)

NG ► REPLACE SHIFT SOLENOID VALVE SLT

OK



3.	INSPECT SHIFT SOLENOID VALVE S2
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(a) Remove the shift solenoid valve S2.


(b) Perform inspection of the shift solenoid valve S2 **INFO** .

NG ► REPLACE SHIFT SOLENOID VALVE S2

OK



4.	INSPECT TRANSMISSION VALVE BODY ASSEMBLY
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(a) Perform inspection of the transmission valve body assembly  .

OK:

There are no foreign objects on each valve.

NG  **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK  **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W8105FX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0761,P0762,P0781: Shift Solenoid "C" Performance (Shift Solenoid Valve S3) (2013 FR-S)		

DTC	P0761	Shift Solenoid "C" Performance (Shift Solenoid Valve S3)
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DTC	P0762	Shift Solenoid "C" Stuck ON (S3 Solenoid)
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DTC	P0781	1-2 Shift (1-2 Shift Valve)
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SYSTEM DESCRIPTION

The TCM carries out detection of the gear position based upon signals from the input speed sensor NT and the output speed sensor SP2. Subsequently, if the gear position as detected by the TCM is different to the commanded gear position, then a related solenoid valve, valve body, or automatic transmission mechanical problem is detected.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	<ol style="list-style-type: none"> 1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER 	
P0761	<ol style="list-style-type: none"> 1. While driving with the shift lever in D, the ATF temperature 20°C (68°F) or more, and coolant temperature 40°C (104°F) or more. (However, abnormalities with the shift solenoid valve (S1, S2, S3, S4, SR, SL1, SL2, SLT), input speed sensor NT, output speed sensor SP2, park/neutral position switch, CAN bus, ECM communication, coolant temperature sensor, air flow sensor, electronically control throttle, and accelerator pedal sensor are not detected) 2. If any of the following conditions are met: <ol style="list-style-type: none"> a. The following conditions are all met: <ol style="list-style-type: none"> i. When the TCM commands shifting to 1st, the actual gear position is also switched to 3rd. ii. When the TCM commands shifting to 6th, the actual gear position is also switched to 6th. b. The following conditions are all met: <ol style="list-style-type: none"> i. When the TCM commands shifting to 2nd, the actual gear position is shifted to 6th. ii. When the TCM commands shifting to 3rd, the actual gear position is shifted 	<ul style="list-style-type: none"> • Shift solenoid valve S3 remains open • Transmission wire • Harness and connector • TCM

	<p style="text-align: center;">to 4th.</p> <p>3. -</p> <p>4. 2-trip detection logic</p>	
P0762	<p>1. While driving with the shift lever in D, the ATF temperature 20°C (68°F) or more, and coolant temperature 40°C (104°F) or more. (However, abnormalities with the shift solenoid valve (S1, S2, S3, S4, SR, SL1, SL2, SLT), input speed sensor NT, output speed sensor SP2, park/neutral position switch, CAN bus, ECM communication, coolant temperature sensor, air flow sensor, electronically control throttle, and accelerator pedal sensor are not detected)</p> <p>2. The following conditions are met:</p> <p style="margin-left: 40px;">a. When the TCM commands shifting to 4th, the actual gear position is also switched to 3rd.</p> <p style="margin-left: 40px;">b. When the TCM commands shifting to 5th, the actual gear position is shifted to N.</p> <p>3. -</p> <p>4. 2-trip detection logic</p>	<ul style="list-style-type: none"> • Shift solenoid valve S3 remains open • Transmission wire • Harness and connector • TCM
P0781	<p>1. While driving with the shift lever in D, the ATF temperature 20°C (68°F) or more, and coolant temperature 40°C (104°F) or more. (However, abnormalities with the shift solenoid valve (S1, S2, S3, S4, SR, SL1, SL2, SLT), input speed sensor NT, output speed sensor SP2, park/neutral position switch, CAN bus, ECM communication, coolant temperature sensor, air flow sensor, electronically control throttle, and accelerator pedal sensor are not detected)</p> <p>2. The following conditions are met:</p> <p style="margin-left: 40px;">a. When the TCM commands shifting to 4th, the actual gear position is also switched to 3rd.</p> <p style="margin-left: 40px;">b. When the TCM commands shifting to 5th, the actual gear position is shifted to N.</p> <p>3. -</p> <p>4. 2-trip detection logic</p>	<ul style="list-style-type: none"> • Shift solenoid valve S3 remains open • Transmission wire • Harness and connector • TCM

HINT:

- Gear positions in the event of a solenoid valve mechanical problem:

TCM command gearshift	1st	2nd	3rd	4th	5th	6th
1: Actual gear position under S3 stuck ON malfunction	↑	↑	↑	3rd	N	N*
*2: Actual gear position under S3 stuck OFF malfunction	3rd	6th	4th	4th	5th	6th

N*: Neutral

- Gear position during fail-safe operation:

If any malfunction is detected, the TCM changes into the fail-safe mode to shift into the gear positions as shown in the table below.

Gear position under normal conditions	1st	2nd	3rd	4th	5th	6th
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*1: Actual gear position under fail safe mode when S3 stuck ON malfunction	↑	↑	↑	3rd	3rd	3rd
*2: Actual gear position under fail safe mode when S3 stuck OFF malfunction	3rd	6th	4th	4th	5th	6th

MONITOR DESCRIPTION

This DTC indicates "stuck ON malfunction" or "stuck OFF malfunction" of the shift solenoid valve S3.

The TCM commands gear shifts by turning the shift solenoid valves "ON/OFF". When the gear position commanded by the TCM and the actual gear position are not same, the TCM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0761: Shift solenoid 3 (OFF Stuck) P0762: Shift solenoid 3 (ON Stuck) P0781: 1-2 Shift Valve (Shrinking of Spring)
Required sensors/Components	Shift solenoid valve S3
Frequency of operation	Continuous
Duration	1 count
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

Battery voltage	10.5 V or more
Engine speed	400 rpm or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Turbine shaft speed sensor(P0717)	No failure
Vehicle speed sensor(P0722)	No failure
Shift solenoid 1 (P0973,P0974)	No failure
Shift solenoid 2 (P0976,P0977)	No failure
Shift solenoid 3 (P0979,P0980)	No failure
Shift solenoid 4 (P0982,P0983)	No failure
SR solenoid (P0985,P0986)	No failure
Linear solenoid 1 (P0961,P0962,P0963)	No failure
Linear solenoid 2 (P0965,P0966,P0967)	No failure
Line pressure linear solenoid (P2720,P2721,P2719)	No failure
ATF temperature sensor (P0711,P0712,P0713)	No failure
Range switch (P0707,P0708)	No failure
CAN BUS OFF (U0073)	No failure
ECM NO ID (U0100)	No failure

Engine coolant temperature sensor	No failure
Engine torque signal	No failure
Throttle position sensor	No failure
Accelerator pedal position sensor	No failure
Range position	D
Elapsed time after selecting D range	4 sec. or more
Engine coolant temperature	40°C (104°F) or more
ATF temperature	20°C (68°F) or more

TYPICAL MALFUNCTION THRESHOLDS

P0761: Shift solenoid 3 (OFF Stuck)

Compare target gear instructed from TCM and gear ratio calculated from turbine shaft speed and vehicle speed.

Both of the following condition are met: Condition (A) and (B)

Condition (A)

Shift position	D position
Target gear position.	1st
Gear ratio calculated from turbine shaft speed and vehicle speed.	3rd

Condition (B)

Shift position	D position
Target gear position.	6th
Gear ratio calculated from turbine shaft speed and vehicle speed.	6th

Both of the following condition are met: Condition (C) and (D)

Condition (C)

Shift position	D position
Target gear position.	2nd
Gear ratio calculated from turbine shaft speed and vehicle speed.	6th

Condition (D)

Shift position	D position
Target gear position.	3rd
Gear ratio calculated from turbine shaft speed and vehicle speed.	4th

Both of the following condition are met: Condition (E) and (F)

Condition (E)

--	--

Shift position	M position
Target gear position.	2nd
Gear ratio calculated from turbine shaft speed and vehicle speed.	6th

Condition (F)

Shift position	M position
Target gear position.	3rd
Gear ratio calculated from turbine shaft speed and vehicle speed.	4th

P0762: Shift solenoid 3 (ON Stuck)

Compare target gear instructed from TCM and gear ratio calculated from turbine shaft speed and vehicle speed.

Both of the following condition are met: Condition (A) and (B)

Condition (A)

Shift position	D position
Target gear position.	4th
Gear ratio calculated from turbine shaft speed and vehicle speed.	3rd

Condition (B)

Shift position	D position
Target gear position.	5th
Gear ratio calculated from turbine shaft speed and vehicle speed.	Neutral

Both of the following condition are met: Condition (C) and (D)

Condition (C)

Shift position	M position
Target gear position.	4th
Gear ratio calculated from turbine shaft speed and vehicle speed.	3rd

Condition (D)

Shift position	M position
Target gear position.	5th
Gear ratio calculated from turbine shaft speed and vehicle speed.	Neutral

P0781: 1-2 Shift Valve (Shrinking of Spring)

Compare target gear instructed from TCM and gear ratio calculated from turbine shaft speed and vehicle speed.

Both of the following condition are met: Condition (A) and (B)

Condition (A)

Shift position	D position
Target gear position.	4th
Gear ratio calculated from turbine shaft speed and vehicle speed.	3rd

Condition (B)

Shift position	D position
Target gear position.	5th
Gear ratio calculated from turbine shaft speed and vehicle speed.	Neutral

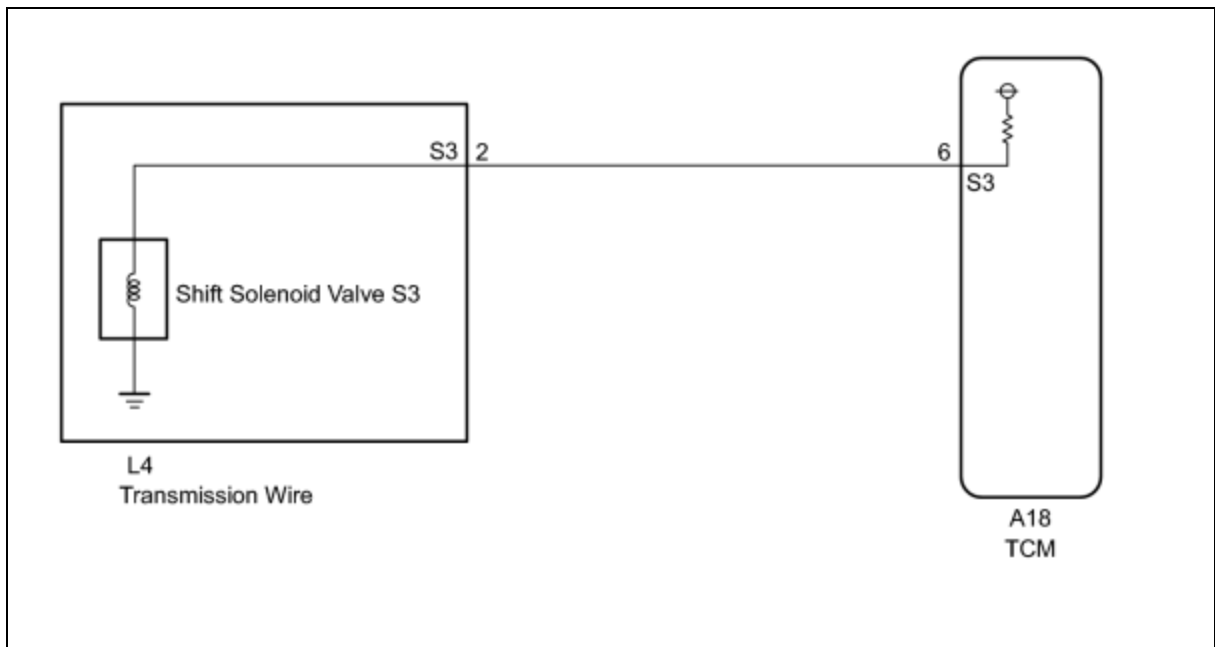
Both of the following condition are met: Condition (C) and (D)

Condition (C)

Shift position	M position
Target gear position.	4th
Gear ratio calculated from turbine shaft speed and vehicle speed.	3rd

Condition (D)

Shift position	M position
Target gear position.	5th
Gear ratio calculated from turbine shaft speed and vehicle speed.	Neutral

WIRING DIAGRAM**INSPECTION PROCEDURE**

NOTICE:

Perform the universal trip to clear permanent DTCs  .

1. CHECK THE SHIFT POSITION

- (a) Drive the vehicle with shift lever in the M.
- (b) Check the shift position.


HINT:

- The shift solenoid valve S3 is turned on/off normally when the shift lever is in the D position:

TCM command gearshift	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve S3	ON	ON	ON	OFF	OFF	OFF

PROCEDURE

1.	CHECK OTHER DTCS OUTPUT
-----------	--------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and push the Techstream main switch ON.
- (c) Read the DTCs using the Techstream  .

Result:

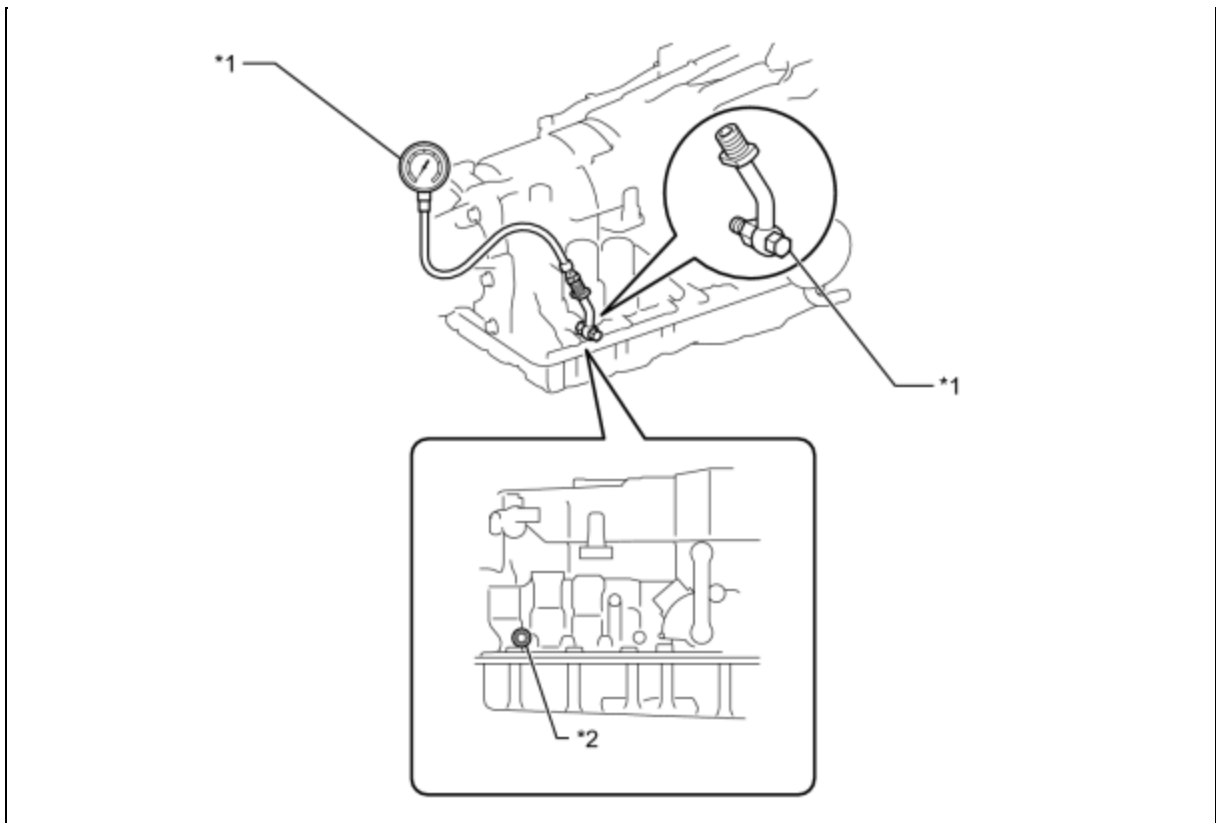
DISPLAY (DTC OUTPUT)	PROCEED TO
Only "P0761" or "P0762, P0781 and P2714" are output	A
"P0761" or "P0762, P0781 and P2714" and other DTCs	B

B  **GO TO DTC CHART**

A



2.	HYDRAULIC TEST
-----------	-----------------------



Text in Illustration

*1	SST	*2	Test Plug
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NOTICE:

- Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature: 60 to 90°C (140 to 194°F)
- The line pressure test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is performing the test.
- Be careful to prevent SST hose from interfering with the exhaust pipe.
- This Check must be conducted after checking and adjusting engine.
- Perform under condition that A/C is OFF.
- When conducting stall test, do not continue more than 5 seconds.

- (a) Warm up the ATF (Automatic Transmission Fluid).
- (b) Lift the vehicle up.
- (c) Remove the test plug on the transmission case center right side and connect SST.

SST: 09992-00095

09992-00231

09992-00271

- (d) Lower the vehicle.
- (e) Fully apply the parking brake and check the 4 wheels.
- (f) Start the engine and check idling speed.
- (g) Keep your left foot pressing firmly on the brake pedal and shift into D position.
- (h) Measure the line pressure when the engine is idling.

(i) Depress the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.

(j) In the same manner, do the test in R position.

Specified line pressure:

CONDITION	D POSITION KPA (KGF / CM ² , PSI)	R POSITION KPA (KGF / CM ² , PSI)
Idling	350 to 430 kPa (3.6 to 4.4 kgf/cm ² , 51 to 62 psi)	760 to 950 kPa (7.7 to 9.7 kgf/cm ² , 110 to 138 psi)
Stall test	1200 to 1380 kPa (12.5 to 14.0 kgf/cm ² , 174 to 200 psi)	1410 to 1630 kPa (14.4 to 16.6 kgf/cm ² , 204 to 236 psi)

NG ▶ REPLACE SHIFT SOLENOID VALVE SLT

OK



3.	INSPECT SHIFT SOLENOID VALVE S3
-----------	--

(a) Remove the shift solenoid valve S3.


(b) Perform inspection of the shift solenoid valve S3  .

NG ▶ REPLACE SHIFT SOLENOID VALVE S3

OK



4.	INSPECT TRANSMISSION VALVE BODY ASSEMBLY
-----------	---

(a) Perform inspection of the transmission valve body assembly  .

OK:

There are no foreign objects on each valve.

NG ▶ REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY

OK ▶ REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W8209XX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0766,P0767,P0776: Shift Solenoid "D" Performance (Shift Solenoid Valve S4) (2013 FR-S)		

DTC	P0766	Shift Solenoid "D" Performance (Shift Solenoid Valve S4)
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DTC	P0767	Shift Solenoid "D" Stuck ON (S4 Solenoid)
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DTC	P0776	Pressure Control Solenoid "B" Performance (Shift Solenoid Valve SL2)
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DESCRIPTION

The TCM carries out detection of the gear position based upon signals from the input speed sensor NT and the output speed sensor SP2. Subsequently, if the gear position as detected by the TCM is different to the commanded gear position, then a related solenoid valve, valve body, or automatic transmission mechanical problem is detected.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER	
P0766	1. While driving with the shift lever in D, the ATF temperature 20°C (68 °F) or more, and coolant temperature 40°C (104°F) or more. (However, abnormalities with the shift solenoid valve (S1, S2, S3, S4, SR, SL1, SL2, SLT), input speed sensor NT, output speed sensor SP2, park/neutral position switch, CAN bus, ECM communication, coolant temperature sensor, air flow sensor, electronically control throttle, and accelerator pedal sensor are not detected) 2. The following conditions are met: <ol style="list-style-type: none"> When the TCM commands shifting to 5th, the actual gear position is switched to 4th. When the TCM commands shifting to 6th, the actual gear position is shifted to 4th. 3. - 4. 2-trip detection logic	<ul style="list-style-type: none"> Shift solenoid valve S4 Shift solenoid valve SL2 Transmission wire Harness and connector TCM
	1. While driving with the shift lever in D, the ATF temperature 20°C (68 °F) or more, and coolant temperature 40°C (104°F) or more. (However, abnormalities with the shift solenoid valve (S1, S2, S3, S4, SR, SL1, SL2, SLT), input speed sensor NT, output speed sensor SP2, park/neutral position switch, CAN bus, ECM communication, coolant temperature sensor,	<ul style="list-style-type: none"> Shift solenoid valve S4 Shift

P0767	<p>air flow sensor, electronically control throttle, and accelerator pedal sensor are not detected)</p> <ol style="list-style-type: none"> 2. The following conditions are met: <ol style="list-style-type: none"> a. When the TCM commands shifting to 1st, the actual gear position is switched to 2nd. b. When the TCM commands shifting to 5th, the actual gear position is also shifted to 5th. 3. - 4. 2-trip detection logic 	<p>solenoid valve SL2</p> <ul style="list-style-type: none"> • Transmission wire • Harness and connector • TCM
P0776	<ol style="list-style-type: none"> 1. While driving with the shift lever in D, the ATF temperature 20°C (68 °F) or more, and coolant temperature 40°C (104°F) or more. (However, abnormalities with the shift solenoid valve (S1, S2, S3, S4, SR, SL1, SL2, SLT), input speed sensor NT, output speed sensor SP2, park/neutral position switch, CAN bus, ECM communication, coolant temperature sensor, air flow sensor, electronically control throttle, and accelerator pedal sensor are not detected) 2. The following conditions are met: <ol style="list-style-type: none"> a. When the TCM commands shifting to 5th, the actual gear position is switched to 4th. b. When the TCM commands shifting to 6th, the actual gear position is shifted to 4th. 3. - 4. 2-trip detection logic 	<ul style="list-style-type: none"> • Shift solenoid valve S4 • Shift solenoid valve SL2 • Transmission wire • Harness and connector • TCM

HINT:

- Gear positions in the event of a solenoid valve mechanical problem:

TCM command gearshift	1st	2nd	3rd	4th	5th	6th
*: Actual gear position under malfunction	1st	2nd	3rd	4th	4th	4th

- Gear positions in the event of a shift solenoid valve S4 ON stuck with M position:

TCM command gearshift	1st	2nd	3rd	4th	5th	6th
*: Actual gear position under malfunction	2nd	2nd	3rd	4th	5th	6th

- Gear position during fail-safe operation:

If any malfunction is detected, the TCM changes into the fail-safe mode to shift into the gear positions as shown in the table below.

Gear position under normal conditions	1st	2nd	3rd	4th	5th	6th
*: Actual gear position under fail-safe mode	1st	2nd	3rd	3rd	3rd	3rd

MONITOR DESCRIPTION

This DTC indicates "stuck OFF malfunction" of the shift solenoid valve S4, "stuck ON malfunction" of the shift solenoid valve SL2, or brake control valve malfunction. The TCM commands gear shifts by turning the shift solenoid valves "ON/OFF". When the gear position commanded by the TCM and the actual gear

position are not same, the TCM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0766: Shift Solenoid 4 (OFF Stuck) P0767: Shift Solenoid 4 (ON Stuck) P0776: Linear Solenoid 2 (ON Stuck)
Required sensors/Components	Shift solenoid valve S4, Shift solenoid valve SL2
Frequency of operation	Continuous
Duration	1 count
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The following items are common to all conditions below.

Battery voltage	10.5 V or more
Engine speed	400 rpm or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Turbine shaft speed sensor(P0717)	No failure
Vehicle speed sensor(P0722)	No failure
Shift solenoid 1 (P0973,P0974)	No failure
Shift solenoid 2 (P0976,P0977)	No failure
Shift solenoid 3 (P0979,P0980)	No failure
Shift solenoid 4 (P0982,P0983)	No failure
SR solenoid (P0985,P0986)	No failure
Linear solenoid 1 (P0961,P0962,P0963)	No failure
Linear solenoid 2 (P0965,P0966,P0967)	No failure
Line pressure linear solenoid (P2720,P2721,P2719)	No failure
ATF temperature sensor (P0711,P0712,P0713)	No failure
Range switch (P0707,P0708)	No failure
CAN BUS OFF (U0073)	No failure
ECM NO ID (U0100)	No failure
ECM Communication Counter (U0401)	No failure
Engine coolant temperature sensor	No failure
Engine torque signal	No failure
Throttle position sensor	No failure
Accelerator pedal position sensor	No failure
Range position	D
Elapsed time after selecting D range	4 sec. or more

Engine coolant temperature	40°C (104°F) or more
ATF temperature	20°C (68°F) or more

TYPICAL MALFUNCTION THRESHOLDS

P0766: Shift Solenoid 4 (OFF Stuck)

Compare target gear instructed from TCM and gear ratio calculated from turbine shaft speed and vehicle speed.

Both of the following condition are met: Condition (A) and (B)

Condition (A)

Shift position	D position
Target gear position.	5th
Gear ratio calculated from turbine shaft speed and vehicle speed.	4th

Condition (B)

Shift position	D position
Target gear position.	6th
Gear ratio calculated from turbine shaft speed and vehicle speed.	4th

Both of the following condition are met: Condition (C) and (D)

Condition (C)

Shift position	M position
Target gear position.	5th
Gear ratio calculated from turbine shaft speed and vehicle speed.	4th

Condition (D)

Shift position	M position
Target gear position.	6th
Gear ratio calculated from turbine shaft speed and vehicle speed.	4th

P0767: Shift Solenoid 4 (ON Stuck)

Compare target gear instructed from TCM and gear ratio calculated from turbine shaft speed and vehicle speed.

Both of the following condition are met: Condition (A) and (B)

Condition (A)

Shift position	M position
Target gear position.	1st
Gear ratio calculated from turbine shaft speed and vehicle speed.	2nd

Condition (B)

Shift position	M position
Target gear position.	5th
Gear ratio calculated from turbine shaft speed and vehicle speed.	5th

P0776: Linear Solenoid 2 (ON Stuck)

Compare target gear instructed from TCM and gear ratio calculated from turbine shaft speed and vehicle speed.

Both of the following condition are met: Condition (A) and (B)

Condition (A)

Shift position	D position
Target gear position.	5th
Gear ratio calculated from turbine shaft speed and vehicle speed.	4th

Condition (B)

Shift position	D position
Target gear position.	6th
Gear ratio calculated from turbine shaft speed and vehicle speed.	4th

Both of the following condition are met: Condition (C) and (D)

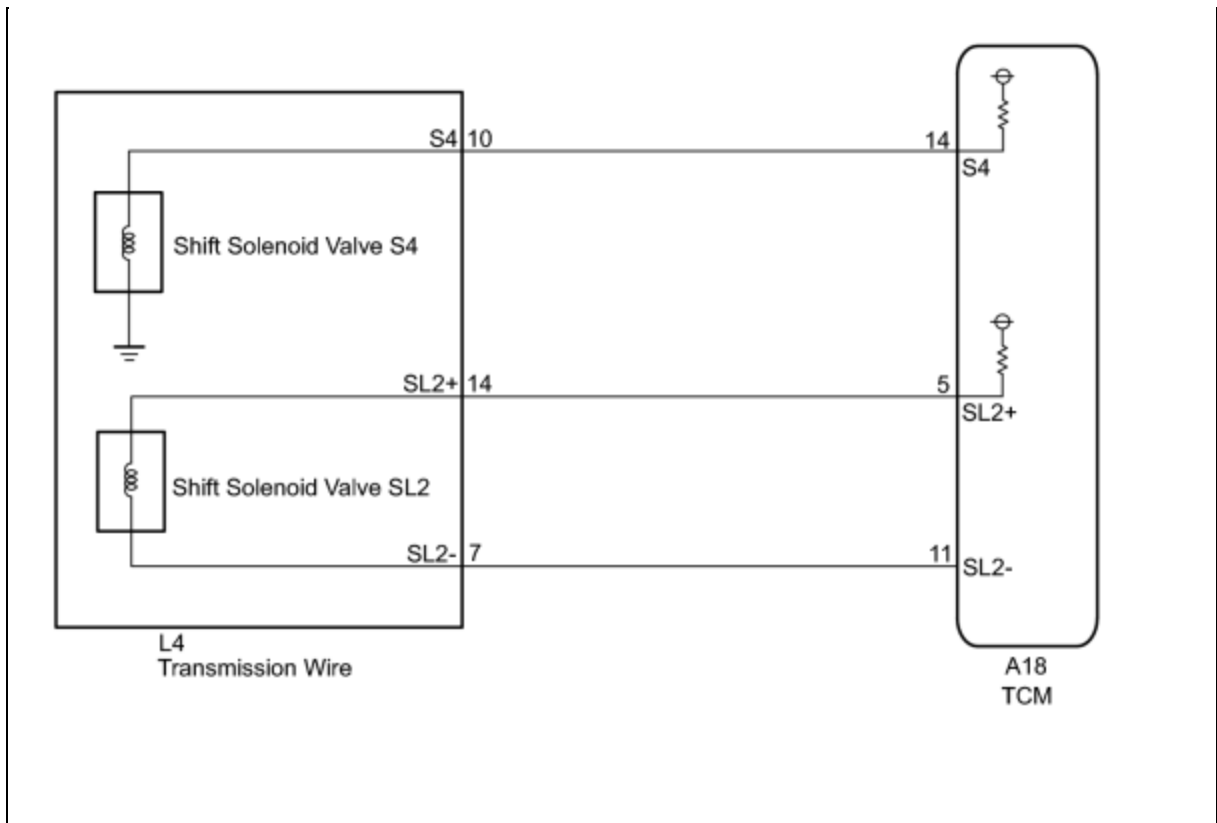
Condition (C)

Shift position	M position
Target gear position.	5th
Gear ratio calculated from turbine shaft speed and vehicle speed.	4th

Condition (D)

Shift position	M position
Target gear position.	6th
Gear ratio calculated from turbine shaft speed and vehicle speed.	4th

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs INFO.

1. ACTIVE TEST

- (a) Drive the vehicle with shift lever in the M.
- (b) Check the shift position.

HINT:

- The shift solenoid valve S4 and SL2 are turned on/off normally when the shift lever is in the D position:

TCM command gearshift	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve S4	OFF	ON	OFF	OFF	ON	ON
Shift solenoid valve SL2	ON	ON	ON	ON	OFF	OFF

PROCEDURE

1.	CHECK OTHER DTCS OUTPUT
-----------	--------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and push the Techstream main switch ON.
- (c) Read the DTCs using the Techstream INFO.

Result:

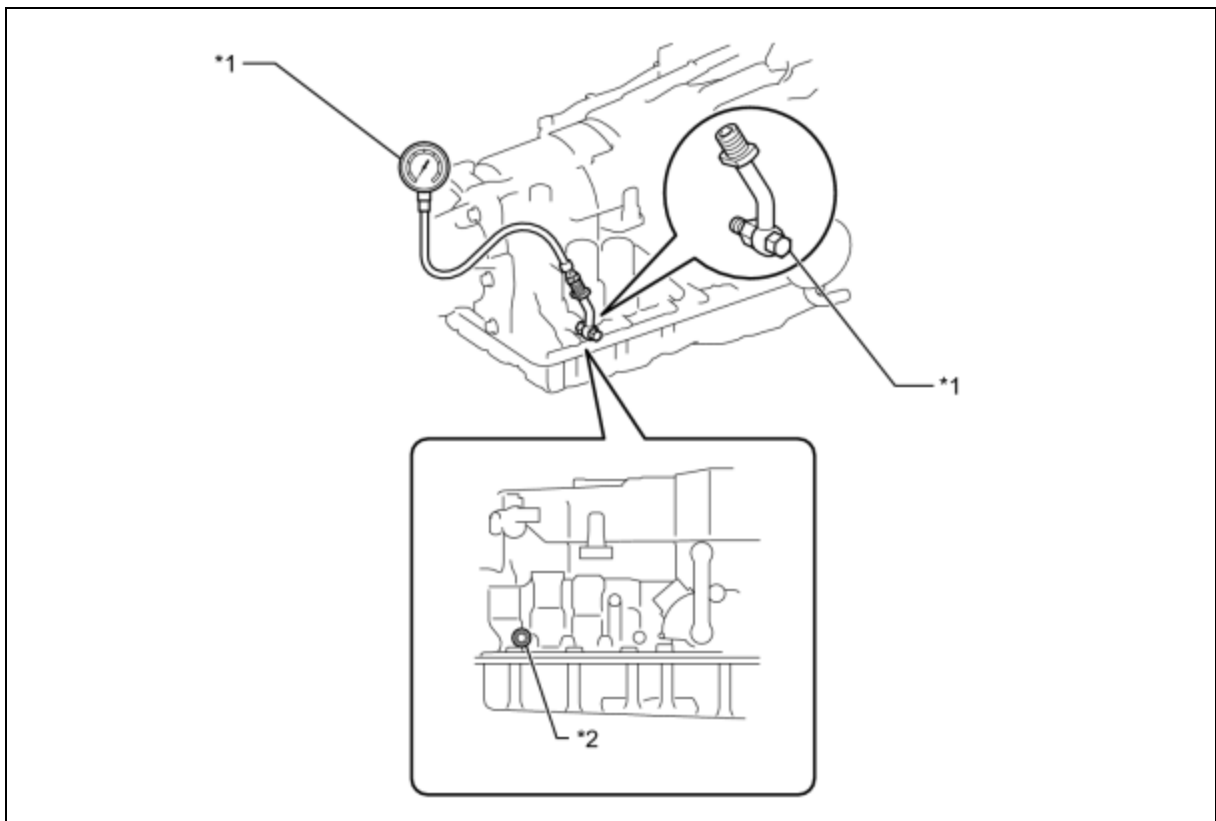
DISPLAY (DTC OUTPUT)	PROCEED TO
Only "P0766, P0776 and P2714" or "P0752 and P0767" is output	A
"P0766, P0776 and P2714" or "P0752 and P0767" and other DTCs are output	B

B ► GO TO DTC CHART

A



2.	HYDRAULIC TEST
-----------	-----------------------



Text in Illustration

*1	SST	*2	Test Plug
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NOTICE:

- Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature: 60 to 90°C (140 to 194°F)
- The line pressure test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is performing the test.
- Be careful to prevent SST hose from interfering with the exhaust pipe.

- This Check must be conducted after checking and adjusting engine.
- Perform under condition that A/C is OFF.
- When conducting stall test, do not continue more than 5 seconds.

(a) Warm up the ATF (Automatic Transmission Fluid).

(b) Lift the vehicle up.

(c) Remove the test plug on the transmission case center right side and connect SST.

SST: 09992-00095

09992-00231

09992-00271

(d) Lower the vehicle.

(e) Fully apply the parking brake and check the 4 wheels.

(f) Start the engine and check idling speed.

(g) Keep your left foot pressing firmly on the brake pedal and shift into D position.

(h) Measure the line pressure when the engine is idling.

(i) Depress the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.

(j) In the same manner, do the test in R position.

Specified line pressure:

CONDITION	D POSITION KPA (KGF / CM ² , PSI)	R POSITION KPA (KGF / CM ² , PSI)
Idling	350 to 430 kPa (3.6 to 4.4 kgf/cm ² , 51 to 62 psi)	760 to 950 kPa (7.7 to 9.7 kgf/cm ² , 110 to 138 psi)
Stall test	1200 to 1380 kPa (12.5 to 14.0 kgf/cm ² , 174 to 200 psi)	1410 to 1630 kPa (14.4 to 16.6 kgf/cm ² , 204 to 236 psi)

NG  **REPLACE SHIFT SOLENOID VALVE SLT**

OK



3.	INSPECT SHIFT SOLENOID VALVE S4
-----------	--

(a) Remove the shift solenoid valve S4  .



(b) Perform inspection of the shift solenoid valve S4  .

NG  **REPLACE SHIFT SOLENOID VALVE S4**

OK



4. INSPECT SHIFT SOLENOID VALVE SL2


- (a) Remove the shift solenoid valve S4  .
- (b) Perform inspection of the shift solenoid valve S4  .

NG  **REPLACE SHIFT SOLENOID VALVE SL2**

OK



5. INSPECT TRANSMISSION VALVE BODY ASSEMBLY

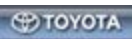
- (a) Check the transmission valve body assembly  .

OK:

There are no foreign objects on each valve.

NG  **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK  **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000T8P0ZSX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0882: TCM Power Input Signal Low (2013 FR-S)		

DTC	P0882	TCM Power Input Signal Low
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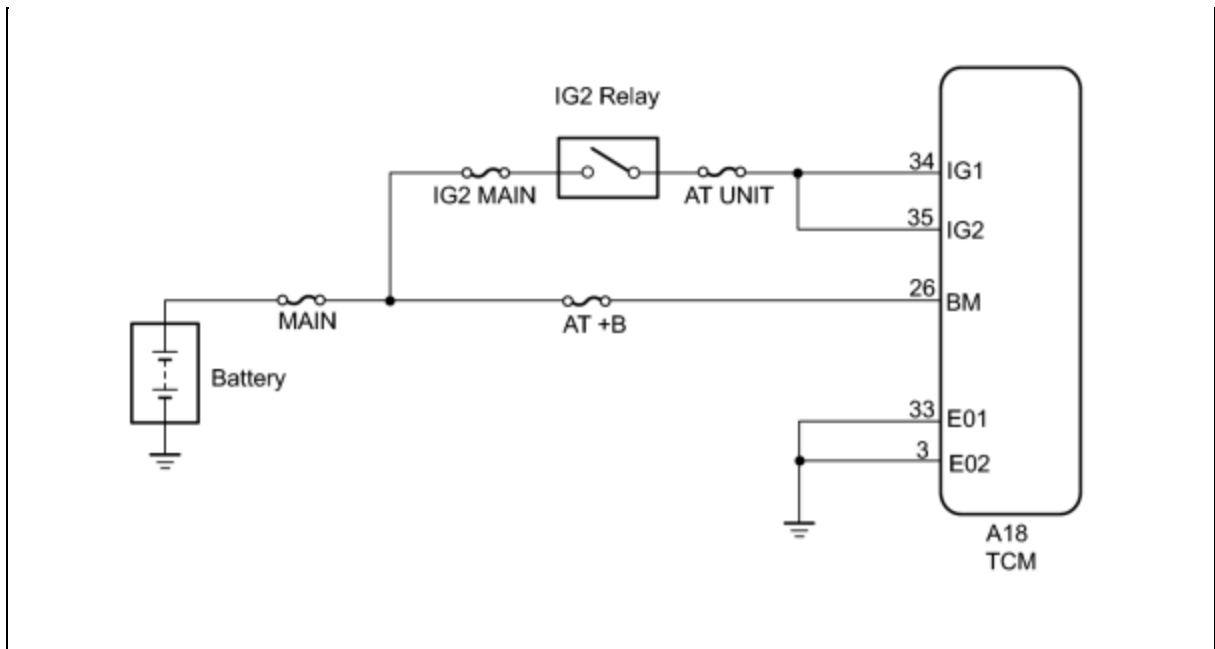
DESCRIPTION

TCM detects a reduction in power supply voltage, and depending on status, implements the following fail-safe.

- Learning control prohibition (when detection conditions 1 or 2 are met)
- Slip control, lock-up control, manual mode, shift paddle operation prohibition, torque up prohibition, and prohibition on shifting to 5th or 6th. If this continues further, power is cut to all solenoids (fixed to 4th).

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
	1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER	
P0882	1. The engine speed and input speed sensor NT are 400 rpm or more, and the CAN communication and input speed NT are normal 2. Ignition voltage is 9.0 V or less 3. Continues for 20 sec. 4. 1-trip detection logic	<ul style="list-style-type: none"> • IG circuit • Harness and connector • TCM

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. CHECK TCM (POWER SOURCE, GROUND)

- (a) Disconnect the A18 TCM connector.
- (b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-34(IG1) - Body ground	Ignition switch ON	11 to 14 V
A18-35(IG2) - Body ground	Ignition switch ON	11 to 14 V

- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-3(E02) - Body ground	Always	Below 1 Ω
A18-33(E01) - Body ground	Always	Below 1 Ω


- (d) Connect the A18 TCM connector.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR (TCM - BATTERY, BODY GROUND)**

OK



2.	REPLACE TCM
----	-------------

(a) Replace the TCM  .

NEXT  **PERFORM THE RESET MEMORY**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W830HBX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0894,P2714: Transmission Component Slipping (2013 FR-S)		

DTC	P0894	Transmission Component Slipping
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DTC	P2714	Pressure Control Solenoid "D" Performance (Shift Solenoid Valve SLT)
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DESCRIPTION

The shift solenoid valve SLT is controlled by the duty ratio as determined in advance by the transmission control computer, based upon signals from the accelerator position sensor, input speed sensor NT and output speed sensor SP2. In this way, the line pressure is adjusted to match the throttle valve opening angle and engine output. The TCM uses the revolution signals from the input speed sensor NT and output speed sensor SP2 to detect clutch and other slipping.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER	
P0894	1. While driving with the shift lever in D, the ATF temperature 10°C or more, and coolant temperature 40°C or more. (However, abnormalities with the shift solenoid valve (S1, S2, S3, S4, SR, SL1, SL2, SLT), input speed sensor NT, output speed sensor SP2, park/neutral position switch, CAN bus, ECM communication, coolant temperature sensor, air flow sensor, electronically control throttle, and accelerator pedal sensor are not detected) 2. The C1 clutch total heating power is the predetermined value or more. 3. - 4. 2-trip detection logic	<ul style="list-style-type: none"> • Shift solenoid valve SLT • Valve body assembly • Torque converter clutch assembly • Automatic transmission
P2714	1. While driving with the shift lever in D, the ATF temperature 10°C or more, and coolant temperature 40°C or more. (However, abnormalities with the shift solenoid valve (S1, S2, S3, S4, SR, SL1, SL2, SLT), input speed sensor NT, output speed sensor SP2, park/neutral position switch, CAN bus, ECM communication, coolant temperature sensor, air flow sensor, electronically control throttle, and accelerator pedal sensor are not detected) 2. The following conditions are met: <ol style="list-style-type: none"> a. The C1 clutch total heating power is the predetermined value or more. b. The C2 clutch total heating power is the 	<ul style="list-style-type: none"> • Shift solenoid valve S1, S2, S3, S4, SLT • Valve body assembly • Torque converter clutch assembly

predetermined value or more.	• Automatic transmission
3. -	
4. 2-trip detection logic	

MONITOR DESCRIPTION

The TCM calculates the amount of heat absorbed by the friction material based on the difference in revolution (clutch slippage) between the turbine and output shaft. The TCM illuminates the MIL and outputs this DTC when the amount of heat absorption exceeds the specified value.

NOTICE:

If you continue driving under these conditions, the clutch will burn out and the vehicle will no longer be drivable.

MONITOR STRATEGY

Related DTCs	P0894: Line Pressure Linear Solenoid (AT Slip) P2714: Line Pressure Linear Solenoid (ON Stuck)
Required sensors/Components	Shift solenoid valve SLT
Frequency of operation	Continuous
Duration	1 count
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The following items are common to all conditions below.

Battery voltage	10.5 V or more
Engine speed	400 rpm or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Turbine shaft speed sensor(P0717)	No failure
Vehicle speed sensor(P0722)	No failure
Shift solenoid 1 (P0973,P0974)	No failure
Shift solenoid 2 (P0976,P0977)	No failure
Shift solenoid 3 (P0979,P0980)	No failure
Shift solenoid 4 (P0982,P0983)	No failure
SR solenoid (P0985,P0986)	No failure
Linear solenoid 1 (P0961,P0962,P0963)	No failure
Linear solenoid 2 (P0965,P0966,P0967)	No failure
Line pressure linear solenoid (P2720,P2721,P2719)	No failure
ATF temperature sensor (P0711,P0712,P0713)	No failure
Range switch (P0707,P0708)	No failure
CAN BUS OFF (U0073)	No failure

ECM NO ID (U0100)	No failure
ECM Communication Counter (U0401)	No failure
Engine coolant temperature sensor	No failure
Engine torque signal	No failure
Throttle position sensor	No failure
Accelerator pedal position sensor	No failure
Range position	D
Elapsed time after selecting D range	4 sec. or more
Engine coolant temperature	40°C (104°F) or more

TYPICAL MALFUNCTION THRESHOLDS

[P0894: AT slip]

When either condition below is met: ON malfunction (A) or (B)

AT slip (A)

Summation of C1 clutch heat generations	Specified value
---	-----------------

AT slip (B)

Summation of C2 clutch heat generations	Specified value
Actual gear for SLT fail judgement	Not determined

[P2714: ON malfunction]

One of the following conditions is met: ON malfunction (A), (B), (C), (D), (E), (F), (G) (H) or (I)

ON malfunction (A)

Summation of C1 clutch heat generations	Specified value
---	-----------------

ON malfunction (B)

6th Error	Detected
-----------	----------

ON malfunction (C)

Shift Solenoid 1 (OFF Stuck)	Detected
------------------------------	----------

ON malfunction (D)

Shift Solenoid 2 (OFF Stuck)	Detected
------------------------------	----------

ON malfunction (E)

Shift Solenoid 3 (ON Stuck)	Detected
-----------------------------	----------

ON malfunction (F)

Shift Solenoid 4 (OFF Stuck)	Detected
------------------------------	----------

ON malfunction (G)

1-2 Shift Valve (Shrinking of Spring)	Detected
---------------------------------------	----------

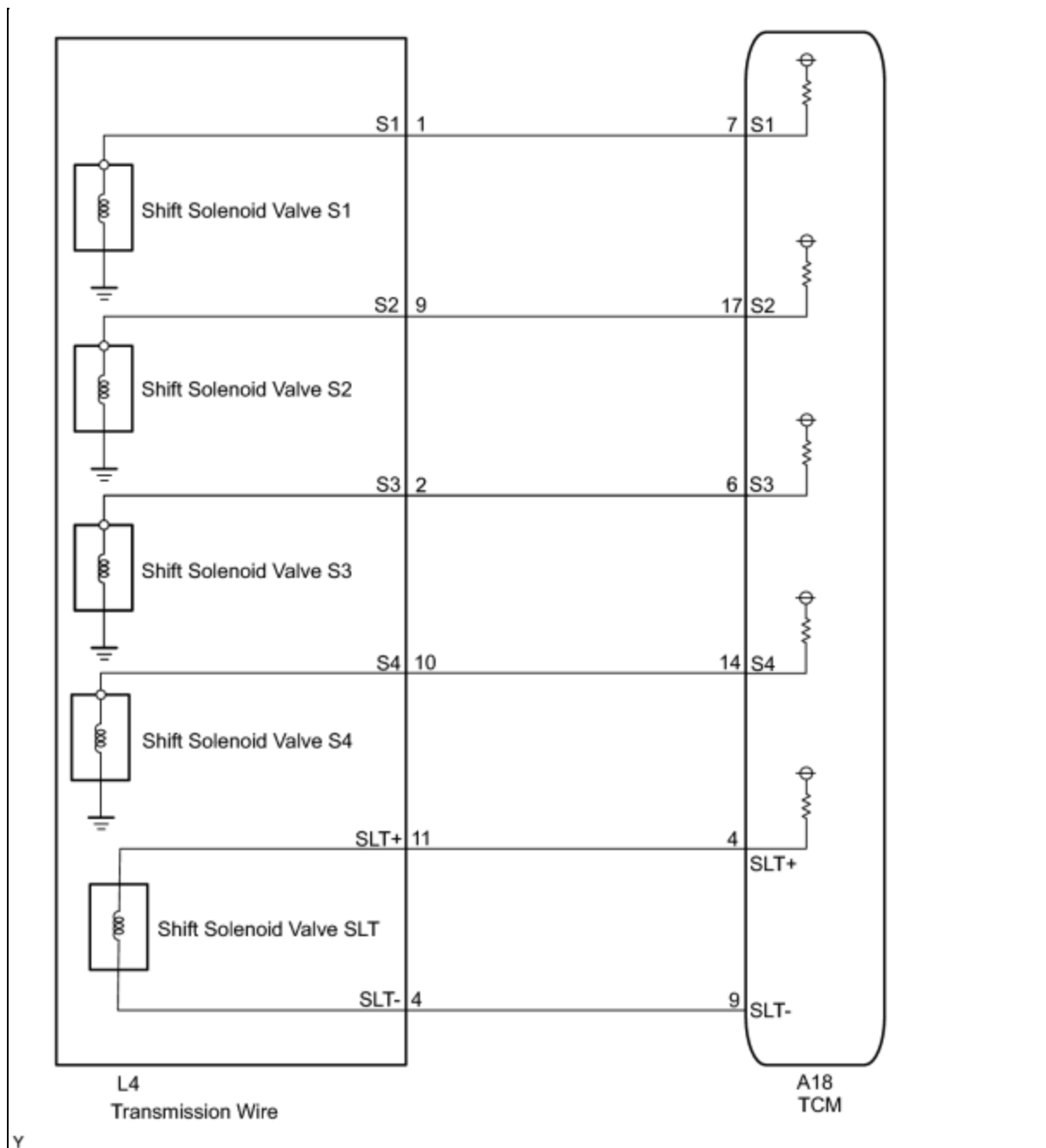
ON malfunction (H)

Line Pressure Linear Solenoid (AT Slip)	Detected
---	----------

ON malfunction (I)

Linear Solenoid 2 (ON Stuck)	Detected
------------------------------	----------

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs [INFO](#) .

PROCEDURE

1. CHECK OTHER DTC OUTPUT (IN ADDITION TO DTC P0894 AND P2714)

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON and push the Techstream main switch ON.
- Read the DTCs using the Techstream [INFO](#) .

Result:

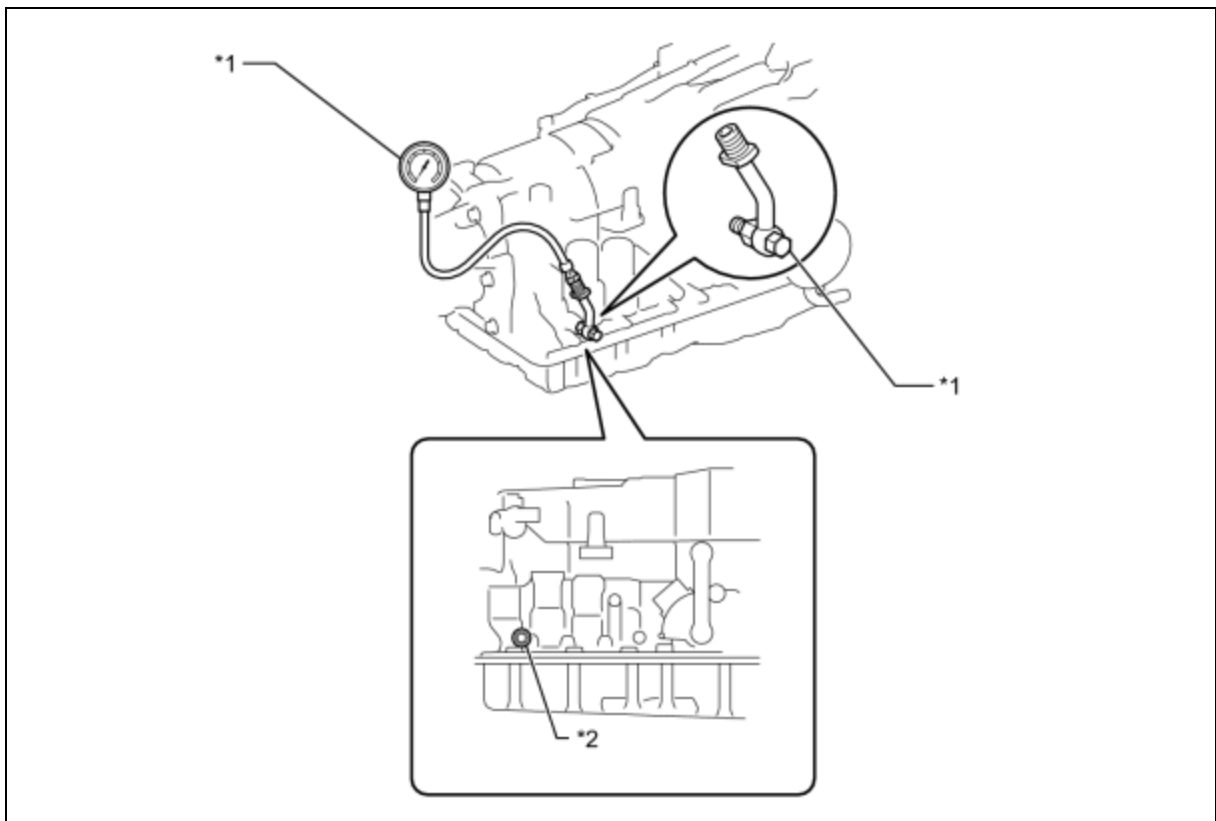
DISPLAY (DTC OUTPUT)	PROCEED TO
Only "P0894 and P2714" or "P0894" is output	A
"P0894 and P2714" or "P0894" and other DTCs are output	B

B ► GO TO DTC CHART

A



2.	HYDRAULIC TEST
-----------	-----------------------



Text in Illustration

*1	SST	*2	Test Plug
----	-----	----	-----------

NOTICE:

- Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature: 60 to 90°C (140 to 194°F)
- The line pressure test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is performing the test.
- Be careful to prevent SST hose from interfering with the exhaust pipe.

- This Check must be conducted after checking and adjusting engine.
- Perform under condition that A/C is OFF.
- When conducting stall test, do not continue more than 5 seconds.

(a) Warm up the ATF (Automatic Transmission Fluid).

(b) Lift the vehicle up.

(c) Remove the test plug on the transmission case center right side and connect SST.

SST: 09992-00095

09992-00231

09992-00271

(d) Lower the vehicle.

(e) Fully apply the parking brake and check the 4 wheels.

(f) Start the engine and check idling speed.

(g) Keep your left foot pressing firmly on the brake pedal and shift into D position.

(h) Measure the line pressure when the engine is idling.

(i) Depress the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.

(j) In the same manner, do the test in R position.

Specified line pressure:

CONDITION	D POSITION KPA (KGF / CM ² , PSI)	R POSITION KPA (KGF / CM ² , PSI)
Idling	350 to 430 kPa (3.6 to 4.4 kgf/cm ² , 51 to 62 psi)	760 to 950 kPa (7.7 to 9.7 kgf/cm ² , 110 to 138 psi)
Stall test	1200 to 1380 kPa (12.5 to 14.0 kgf/cm ² , 174 to 200 psi)	1410 to 1630 kPa (14.4 to 16.6 kgf/cm ² , 204 to 236 psi)

NG  **INSPECT SHIFT SOLENOID VALVE SLT**

OK



3.	CHECK THE GEAR POSITION
-----------	--------------------------------

(a) Drive the vehicle with shift lever in the M.

(b) Check the shift position.

HINT:

- Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature: 60 to 90°C (140 to 194°F)

- Perform under condition that A/C is OFF.

OK:

Gear position changes.

TCM GEAR SHIFT COMMAND			1ST	2ND	3RD	4TH	5TH	6TH	PROCEED TO	
Actual gear position under malfunction	Shift solenoid S1	Stuck ON	2nd	2nd	3rd	4th	5th	6th	A	
		Stuck OFF	1st	2nd	3rd	4th	5th	N*2		
	Shift solenoid S2	Stuck ON	1st	2nd	2nd	4th	6th	6th	B	
		Stuck OFF	3rd	3rd	3rd	4th	5th	5th		
	Shift solenoid S3	Stuck ON	1st	2nd	3rd	3rd	N*1	N*1	C	
		Stuck OFF	3rd	6th	4th	4th	5th	6th		
	Shift solenoid S4	Stuck ON*2	1st	2nd	3rd	4th	5th	6th	D	
		Stuck OFF	1st	2nd	3rd	4th	4th	4th	E	
	Normal			1st	2nd	3rd	4th	5th	6th	D

HINT:

- *1: Neutral
- *2: When shift solenoid S4 is stuck ON, gear shifting is normal.

B ► INSPECT SHIFT SOLENOID VALVE S2

C ► INSPECT SHIFT SOLENOID VALVE S3

D ► INSPECT SHIFT SOLENOID VALVE SLT

E ► INSPECT SHIFT SOLENOID VALVE S4

A



4.	INSPECT SHIFT SOLENOID VALVE S1
-----------	--



(a) Remove the shift solenoid valve S1 INFO .

(b) Perform inspection of the shift solenoid valve S1 INFO .


NG ► REPLACE SHIFT SOLENOID VALVE S1

OK ► Go to step 9



5. INSPECT SHIFT SOLENOID VALVE S2

- (a) Remove the shift solenoid valve S2  .
- (b) Perform inspection of the shift solenoid valve S2  .

NG  **REPLACE SHIFT SOLENOID VALVE S2**

OK  **Go to step 9**



6. INSPECT SHIFT SOLENOID VALVE S3

- (a) Remove the shift solenoid valve S3  .
- (b) Perform inspection of the shift solenoid valve S3  .


NG  **REPLACE SHIFT SOLENOID VALVE S3**

OK  **Go to step 9**



7. INSPECT SHIFT SOLENOID VALVE S4

- (a) Remove the shift solenoid valve S4  .
- (b) Perform inspection of the shift solenoid valve S4  .

NG  **REPLACE SHIFT SOLENOID VALVE S4**

OK  **Go to step 9**

8. INSPECT SHIFT SOLENOID VALVE SLT


- (a) Remove the shift solenoid valve SLT  .
- (b) Perform inspection of the shift solenoid valve SLT  .

NG  **REPLACE SHIFT SOLENOID VALVE SLT**

OK



9. INSPECT TRANSMISSION VALVE BODY ASSEMBLY

(a) Check the transmission valve body assembly  .

OK:

There are no foreign objects on each valve.

NG  **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK



10. INSPECT TORQUE CONVERTER CLUTCH ASSEMBLY

(a) Check the torque converter clutch assembly  .

OK:

The torque converter clutch operates normally.

NG  **REPLACE TORQUE CONVERTER CLUTCH ASSEMBLY**

OK  **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W8F0E7X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0961-P0963: Pressure Control Solenoid "A" Performance (SL1 Solenoid) (2013 FR-S)		

DTC	P0961	Pressure Control Solenoid "A" Performance (SL1 Solenoid)
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DTC	P0962	Pressure Control Solenoid "A" Circuit Low (SL1 Solenoid)
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DTC	P0963	Pressure Control Solenoid "A" Circuit High (SL1 Solenoid)
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DESCRIPTION

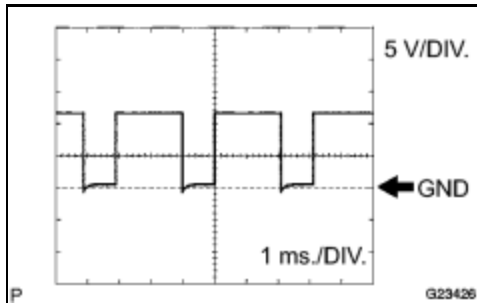
Based upon a signal from the TCM, the combination of shift solenoid valve (S1, S2, S3, S4, SR, SL1, SL2) changes the gear position from 1st to 6th. As a fail-safe function if the solenoid valve system is open or shorted, the TCM cuts power to all solenoids, leaving just the mechanical hydraulic circuit, requiring manual shifting.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER	
P0961	1. Not learning control prohibited status Not open or short in the shift solenoid valve SL1 circuit 2. The difference between the shift solenoid valve SL1 operational feedback current is 12 A or more in total. 3. Detects "2.Malfunction Status" 2 times consecutively. 4. 1-trip detection logic	<ul style="list-style-type: none"> • Shift solenoid valve SL1 • Transmission wire • Harness and connector • TCM
P0962	1. Not learning control prohibited status 1 second or more has elapsed after turning shift solenoid valve SL1 off. 2. The shift solenoid valve SL1 operational feedback voltage is 0.018 V or less. 3. Detects malfunction that continues for 100 ms or more 5 times consecutively. 4. 1-trip detection logic	<ul style="list-style-type: none"> • Shift solenoid valve SL1 • Transmission wire • Harness and connector • TCM
	1. Not learning control prohibited status 1 second or more has elapsed after turning shift solenoid valve SL1 on. 2. The shift solenoid valve SL1 operational feedback voltage is	<ul style="list-style-type: none"> • Shift solenoid valve SL1 • Transmission

P0963	<p>0.257 V or more.</p> <p>3. Detects malfunction that continues for 100 ms or more 5 times consecutively.</p> <p>4. 1-trip detection logic</p>	<p>wire</p> <ul style="list-style-type: none"> • Harness and connector • TCM
-------	---	--

Reference (Using an oscilloscope):

Check the waveform between the terminals SL1+ and SL1- of the TCM connector



Standard:
Refer to the illustration.

Terminal	SL1+ - SL1-
Tool setting	5 V/DIV., 1 ms./DIV.
Vehicle condition	5th or 6th gear

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL1 circuit. The TCM commands gearshift by turning the shift solenoid valves "ON/OFF". When there is an open or short circuit in any shift solenoid valve circuit, the TCM detects the problem and illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0961: Linear Solenoid 1 (Feedback Stuck) P0962: Linear Solenoid 1 (GND Short/Open) P0963: Linear Solenoid 1 (Battery Short)
Required sensors/Components	Shift solenoid valve SL1
Frequency of operation	Continuous
Duration	P0961: 2 count P0962: 0.1 sec. x 5 times P0963: 0.1 sec. x 5 times
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

P0961: Linear Solenoid 1 (Feedback Stuck)

Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Linear solenoid 1 (P0962,P0963)	No failure
Check the feedback terminal voltage	0.257 V or less
Battery voltage	10.5 V or more
Above condition (Battery voltage) satisfied for	0.5 sec. or more

P0962: Linear Solenoid 1 (GND Short/Open)

Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Linear solenoid 1 (P0961)	No failure

P0963: Linear Solenoid 1 (Battery Short)

Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Linear solenoid 1 (P0961)	No failure

TYPICAL MALFUNCTION THRESHOLDS

P0961: Linear Solenoid 1 (Feedback Stuck)

The accumulation of difference between target current and feedback current (Sum_ie).	12 A or more
Sum_ie is cleared when at least one of the following conditions is satisfied.	
<ol style="list-style-type: none"> 1. Enable conditions are not satisfied. 2. Difference between target current and feedback current (ie) is between -50 mA and 50 mA. 3. Plus and minus of ie is turned over. 	

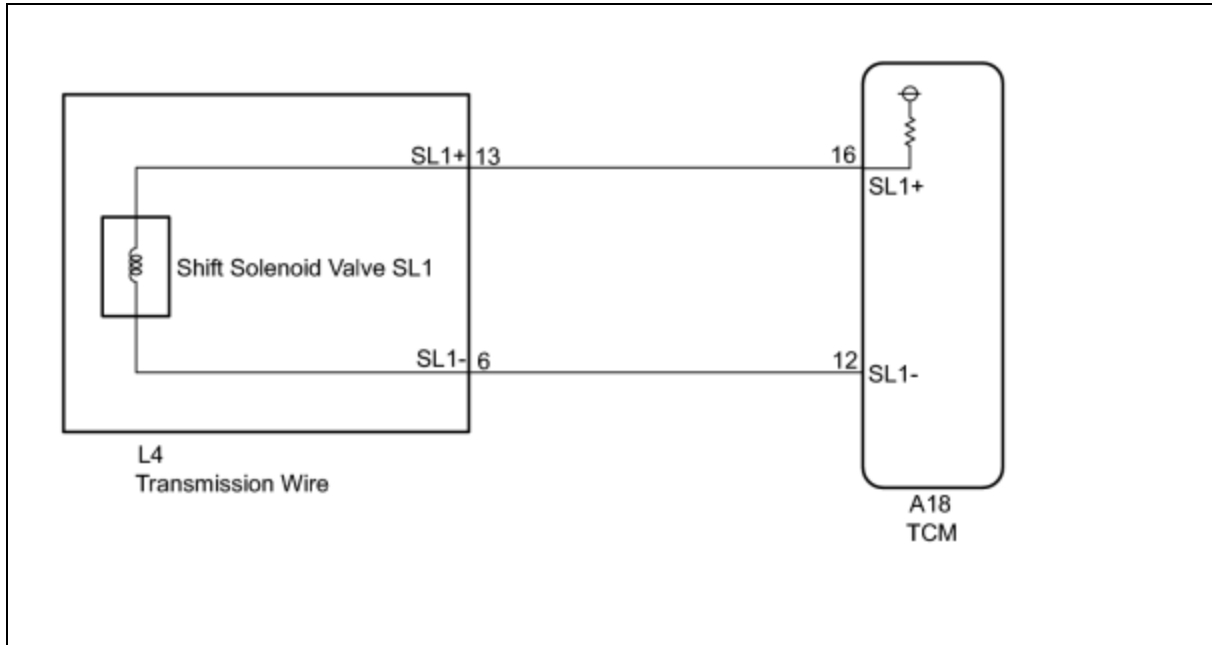
P0962: Linear Solenoid 1 (GND Short/Open)

Check the feedback terminal voltage.	0.018 V or less
Elapsed time after recovering from Battery Short.	1 sec. or more

P0963: Linear Solenoid 1 (Battery Short)

Check the feedback terminal voltage.	0.257 V or more

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs INFO.

HINT:

- The shift solenoid valve SL1 is turned on/off normally when the shift lever is in the D position:

TCM command gearshift	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve SL1	OFF	OFF	OFF	OFF	ON	ON

PROCEDURE

1. INSPECT TRANSMISSION WIRE (SL1)

- Disconnect the L4 transmission wire connector.
- Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
L4-13(SL1+) - L4-6(SL1-)	20°C(68°F)	5.0 to 5.6 Ω
L4-13(SL1+) - Body ground	Always	10 kΩ or higher
L4-6(SL1-) - Body ground	Always	10 kΩ or higher

(c) Connect the L4 transmission wire connector.

NG  **INSPECT SHIFT SOLENOID VALVE SL1**

OK



2.	CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - TCM)
-----------	--

(a) Disconnect the A18 TCM connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-16(SL1+) - A18-12(SL1-)	20°C(68°F)	5.0 to 5.6 Ω
A18-16(SL1+) - Body ground	Always	10 kΩ or higher
A18-12(SL1-) - Body ground	Always	10 kΩ or higher

(c) Connect the A18 TCM connector.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK




3.	REPLACE TCM
-----------	--------------------

(a) Replace the TCM  .

NEXT  **PERFORM THE RESET MEMORY**

4.	INSPECT SHIFT SOLENOID VALVE SL1
-----------	---

(a) Remove the shift solenoid valve SL1  .

(b) Perform inspection of the shift solenoid valve SL1  .

NG  **REPLACE SHIFT SOLENOID VALVE SL1**

OK ► REPAIR OR REPLACE TRANSMISSION WIRE



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W8G0D9X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0965-P0967: Pressure Control Solenoid "B" Performance (SL2 Solenoid) (2013 FR-S)		

DTC	P0965	Pressure Control Solenoid "B" Performance (SL2 Solenoid)
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DTC	P0966	Pressure Control Solenoid "B" Control Circuit Low (Shift Solenoid Valve DS2)
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DTC	P0967	Pressure Control Solenoid "B" Control Circuit High (Shift Solenoid Valve DS2)
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DESCRIPTION

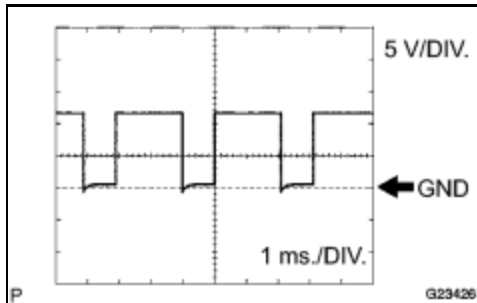
Based upon a signal from the TCM, the combination of shift solenoid valve (S1, S2, S3, S4, SR, SL1, SL2) changes the gear position from 1st to 6th. As a fail-safe function if the c.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER	
P0965	1. Not learning control prohibited status 2. The difference between the shift solenoid valve SL2 operational specified current and operational feedback current is 12 A or more in total. 3. Detects "2.Malfunction Status" 2 times consecutively. 4. 1-trip detection logic	<ul style="list-style-type: none"> • Shift solenoid valve SL2 • Transmission wire • Harness and connector • TCM
P0966	1. Not learning control prohibited status 1 second or more has elapsed after turning shift solenoid valve SL2 off 2. The shift solenoid valve SL1 operational feedback voltage is 0.018 V or less. 3. Detects malfunction that continues for 100 ms or more 5 times consecutively. 4. 1-trip detection logic	<ul style="list-style-type: none"> • Shift solenoid valve SL2 • Transmission wire • Harness and connector • TCM
	1. Not learning control prohibited status 1 second or more has elapsed after turning shift solenoid valve SL2 on 2. The shift solenoid valve SL1 operational feedback voltage is	<ul style="list-style-type: none"> • Shift solenoid valve SL2 • Transmission

P0967	<p>0.257 V or more.</p> <p>3. Detects malfunction that continues for 100 ms or more 5 times consecutively.</p> <p>4. 1-trip detection logic</p>	<p>wire</p> <ul style="list-style-type: none"> • Harness and connector • TCM
-------	---	--

Reference (Using an oscilloscope):

Check the waveform between the terminals SL2+ and SL2- of the TCM connector



Standard:
Refer to the illustration.

Terminal	SL2+ - SL2-
Tool setting	5 V/DIV., 1 ms./DIV.
Vehicle condition	Engine idle speed

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL2 circuit. The TCM commands gear shifts by turning the shift solenoid valves "ON/OFF". When there is an open or short circuit in any shift solenoid valve circuit, the TCM detects the problem and illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0965: Linear Solenoid 2 (Feedback Stuck) P0966: Linear Solenoid 2 (GND Short/Open) P0967: Linear Solenoid 2 (Battery Short)
Required sensors/Components	Shift solenoid valve SL2
Frequency of operation	Continuous
Duration	P0965: 2 count P0966: 0.1 sec. x 5 times P0967: 0.1 sec. x 5 times
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

P0965: Linear Solenoid 2 (Feedback Stuck)

Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Linear solenoid 2 (P0965,P0966)	No failure
Check the feedback terminal voltage	0.257 V or less
Battery voltage	10.5 V or more
Above condition (Battery voltage) satisfied for	0.5 sec. or more

P0966: Linear Solenoid 2 (GND Short/Open)

Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Linear solenoid 2 (P0965)	No failure

P0967: Linear Solenoid 2 (Battery Short)

Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Linear solenoid 2 (P0965)	No failure

TYPICAL MALFUNCTION THRESHOLDS

P0965: Linear Solenoid 2 (Feedback Stuck)

The accumulation of difference between target current and feedback current (Sum_ie).	12 A or more
Sum_ie is renewed every 25msec. Sum_ie is cleared when at least one of the following conditions is satisfied. <ol style="list-style-type: none"> 1. Enable conditions are not satisfied. 2. Difference between target current and feedback current (ie) is between -50 mA and 50 mA. 3. Plus and minus of ie is turned over. 	

P0966: Linear Solenoid 2 (GND Short/Open)

Voltage of the feedback terminal	0.018 V or less
Elapsed time after recovering from Battery Short.	1 sec. or more

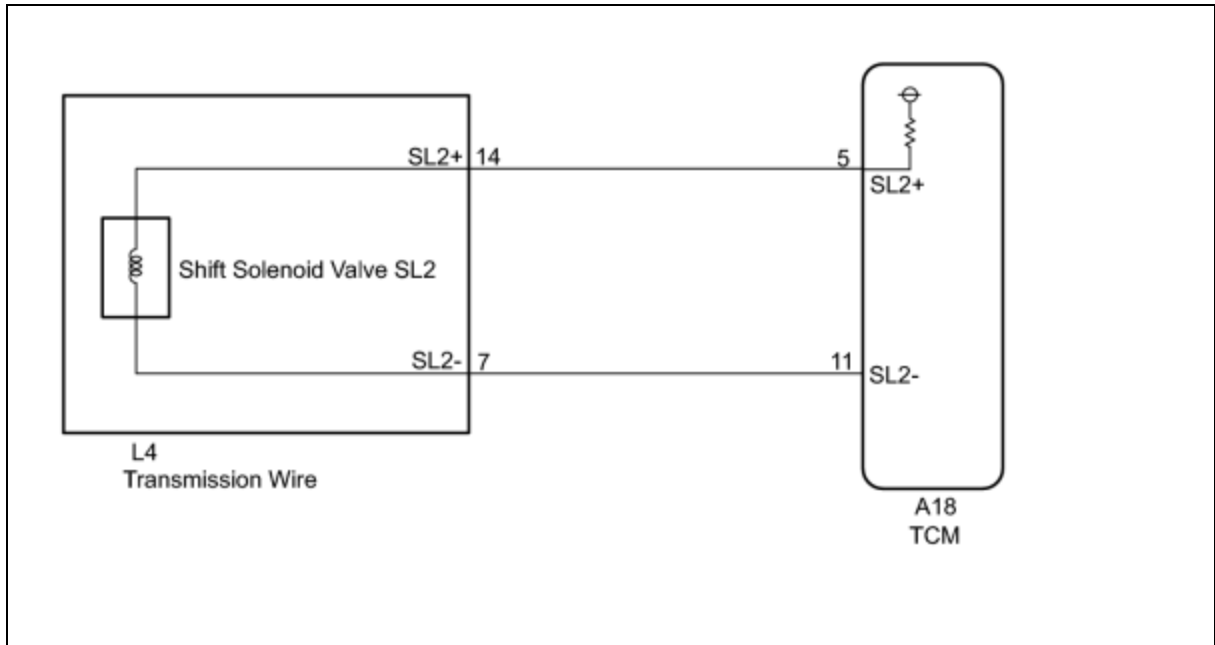
P0967: Linear Solenoid 2 (Battery Short)

Voltage of the feedback terminal	0.257 V or more
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Elapsed time after recovering from GND short/open.

1 sec. or more

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs INFO.

HINT:

- The shift solenoid valve SL2 is turned on/off normally when the shift lever is in the D position:

TCM command gearshift	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve SL2	ON	OFF	OFF	ON	OFF	OFF

PROCEDURE

1. INSPECT TRANSMISSION WIRE (SL2)

- Disconnect the L4 transmission wire connector.
- Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
L4-14(SL2+) - L4-7(SL2-)	20°C(68°F)	5.0 to 5.6 Ω
L4-14(SL2+) - Body ground	Always	10 kΩ or higher
L4-7(SL2-) - Body ground	Always	10 kΩ or higher

(c) Connect the L4 transmission wire connector.

NG ▶ **INSPECT SHIFT SOLENOID SL2**

OK



2.	CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - TCM)
-----------	--

(a) Disconnect the TCM connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-5(SL2+) - A18-11(SL2-)	20°C(68°F)	5.0 to 5.6 Ω
A18-5(SL2+) - Body ground	Always	10 kΩ or higher
A18-11(SL2-) - Body ground	Always	10 kΩ or higher

(c) Connect the TCM connector.

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK




3.	REPLACE TCM
-----------	--------------------

(a) Replace the TCM  .

NEXT ▶ **THE RESET MEMORY**

4.	INSPECT SHIFT SOLENOID SL2
-----------	-----------------------------------

(a) Remove the shift solenoid valve SL2  .

(b) Perform inspection of the shift solenoid valve SL2  .

NG ▶ REPLACE SHIFT SOLENOID SL2

OK ▶ REPAIR OR REPLACE TRANSMISSION WIRE



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W860B0X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0973,P0974: Shift Solenoid "A" Control Circuit Low (Shift Solenoid Valve S1) (2013 FR-S)		

DTC	P0973	Shift Solenoid "A" Control Circuit Low (Shift Solenoid Valve S1)
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DTC	P0974	Shift Solenoid "A" Control Circuit High (Shift Solenoid Valve S1)
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DESCRIPTION

Based upon a signal from the TCM, the combination of shift solenoid valve (S1, S2, S3, S4, SR, SL1, SL2) changes the gear position from 1st to 6th. As a fail-safe function if the solenoid valve system is open or shorted, the TCM cuts power to all solenoids, leaving just the mechanical hydraulic circuit, requiring manual shifting.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER	
P0973	1. Not learning control prohibited status 2. During shift solenoid valve S1 on signal is output, the TCM S1 output monitor value is "off". 3. Continues for 500ms or more. 4. 1-trip detection logic	<ul style="list-style-type: none"> • Shift solenoid valve S1 • Transmission wire • Harness and connector • TCM
P0974	1. Not learning control prohibited status 2. During shift solenoid valve S1 off signal is output, the TCM S1 output monitor value is "on". 3. Continues for 500ms or more. 4. 1-trip detection logic	<ul style="list-style-type: none"> • Shift solenoid valve S1 • Transmission wire • Harness and connector • TCM

MONITOR DESCRIPTION

These DTCs indicate an open or short in the shift solenoid valve S1 circuit. When there is an open or short circuit in any shift solenoid valve circuit, the TCM detects the problem and illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0973: Shift Solenoid 1 (GND Short) P0974: Shift Solenoid 1 (Open/Battery Short)
Required sensors/Components	Shift solenoid valve S1
Frequency of operation	Continuous
Duration	0.5 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active

TYPICAL MALFUNCTION THRESHOLDS

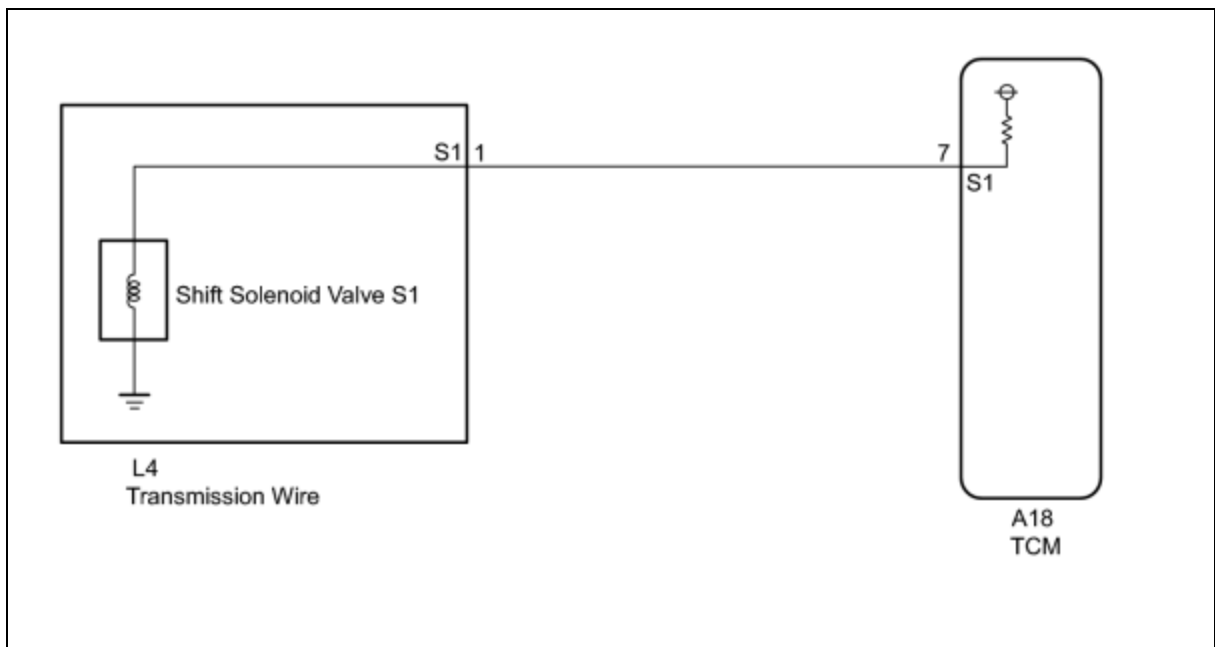
P0973: Shift Solenoid 1 (GND Short)

Status of output monitor when TCM outputs ON signal	OFF
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P0974: Shift Solenoid 1 (Open/Battery Short)

Status of output monitor when TCM outputs OFF signal	ON
--	----

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs  .

HINT:

The shift solenoid valve S1 is turned on/off normally when the shift lever is in the D position:

TCM command gearshift	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve S1	OFF	ON	ON	ON	ON	ON

PROCEDURE

1. INSPECT TRANSMISSION WIRE (S1)

- (a) Disconnect the A18 TCM connector.
- (b) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-7(S1) - Body ground	Ignition switch ON	Below 1 V

- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-7(S1) - Body ground	20°C(68°F)	11 to 15 Ω


- (d) Connect the A18 TCM connector.

NG  **CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - TCM)**

OK



2. REPLACE TCM

- (a) Replace the TCM  .

NEXT  **PERFORM THE RESET MEMORY**

3. CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - TCM)

- (a) Disconnect the A18 TCM connector.
- (b) Disconnect the L4 transmission wire connector.
- (c) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
L4-1(S1) - Body ground	Ignition switch ON	Below 1 V

- (d) Measure the resistance according to the value(s) in the table below.

Standard resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
L4-1(S1) - A18-7(S1)	Always	Below 1 Ω
L4-1(S1) and A18-7(S1) - Body ground	Always	10 k Ω or higher

- (e) Connect the A18 TCM connector.
- (f) Connect the L4 transmission wire connector.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK


4.	INSPECT SHIFT SOLENOID VALVE S1
-----------	--

- (a) Remove the shift solenoid valve S1  .
- (b) Perform inspection of the shift solenoid valve S1  .

NG  **REPLACE SHIFT SOLENOID VALVE S1**

OK  **REPAIR OR REPLACE TRANSMISSION WIRE**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W870ASX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0976,P0977: Shift Solenoid "B" Control Circuit Low (Shift Solenoid Valve S2) (2013 FR-S)		

DTC	P0976	Shift Solenoid "B" Control Circuit Low (Shift Solenoid Valve S2)
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DTC	P0977	Shift Solenoid "B" Control Circuit High (Shift Solenoid Valve S2)
------------	--------------	--

DESCRIPTION

Based upon a signal from the TCM, the combination of shift solenoid valve (S1, S2, S3, S4, SR, SL1, SL2) changes the gear position from 1st to 6th. As a fail-safe function if the solenoid valve system is open or shorted, the TCM cuts power to all solenoids, leaving just the mechanical hydraulic circuit, requiring manual shifting.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER	
P0976	1. Not learning control prohibited status 2. During shift solenoid valve S2 on signal is output, the TCM's S2 output monitor value is "off". 3. Continues for 500ms or more. 4. 1-trip detection logic	<ul style="list-style-type: none"> • Shift solenoid valve S2 • Transmission wire • Harness and connector • TCM
P0977	1. Not learning control prohibited status 2. During shift solenoid valve S2 off signal is output, the TCM's S2 output monitor value is "on". 3. Continues for 500ms or more. 4. 1-trip detection logic	<ul style="list-style-type: none"> • Shift solenoid valve S2 • Transmission wire • Harness and connector • TCM

MONITOR DESCRIPTION

These DTCs indicate an open or short in the shift solenoid valve S2 circuit. When there is an open or short circuit in any shift solenoid valve circuit, the TCM detects the problem and illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0976: Shift Solenoid2 (GND Short) P0977: Shift Solenoid2 (Open/Battery Short)
Required sensors/Components	Shift solenoid valve S2
Frequency of operation	Continuous
Duration	0.5 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active

TYPICAL MALFUNCTION THRESHOLDS

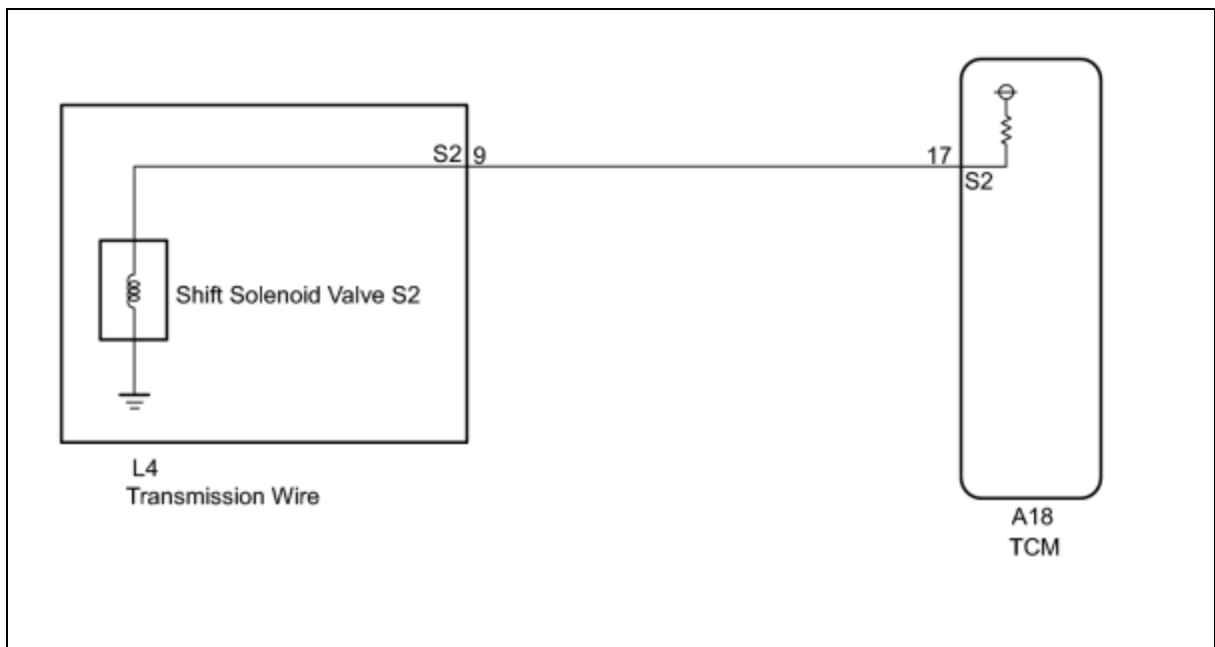
P0976: Shift Solenoid2 (GND Short)

Status of output monitor when TCM outputs ON signal	OFF
---	-----

P0977: Shift Solenoid2 (Open/Battery Short)

Status of output monitor when TCM outputs OFF signal	ON
--	----

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs  .

HINT:

- The shift solenoid valve S2 is turned on/off normally when the shift lever is in the D position:

TCM command gearshift	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve S2	ON	ON	OFF	OFF	OFF	ON

PROCEDURE

1. INSPECT TRANSMISSION WIRE (S2)

- (a) Disconnect the A18 TCM connector.
(b) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-17(S2) - Body ground	Ignition switch ON	Below 1 V

- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-17(S2) - Body ground	20°C(68°F)	11 to 15 Ω


- (d) Connect the A18 TCM connector.

NG  **CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - TCM)**

OK



2. REPLACE TCM

- (a) Replace the TCM  .

NEXT  **PERFORM THE RESET MEMORY**

3. CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - TCM)

- (a) Disconnect the A18 TCM connector.
- (b) Disconnect the L4 transmission wire connector.
- (c) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
L4-9(S2) - Body ground	Ignition switch ON	Below 1 V

- (d) Measure the resistance according to the value(s) in the table below.

Standard resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
L4-9(S2) - A18-17(S2)	Always	Below 1 Ω
L4-9(S2) and A18-17(S2) - Body ground	Always	10 k Ω or higher

- (e) Connect the A18 TCM connector.
- (f) Connect the L4 transmission wire connector.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK


4.	INSPECT SHIFT SOLENOID VALVE S2
-----------	--

- (a) Remove the shift solenoid valve S2  .
- (b) Perform inspection of the shift solenoid valve S2  .

NG  **REPLACE SHIFT SOLENOID VALVE S2**

OK  **REPAIR OR REPLACE TRANSMISSION WIRE**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W8B05BX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0979,P0980: Shift Solenoid "C" Control Circuit Low (Shift Solenoid Valve S3) (2013 FR-S)		

DTC	P0979	Shift Solenoid "C" Control Circuit Low (Shift Solenoid Valve S3)
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DTC	P0980	Shift Solenoid "C" Control Circuit High (Shift Solenoid Valve S3)
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DESCRIPTION

Based upon a signal from the TCM, the combination of shift solenoid valve (S1, S2, S3, S4, SR, SL1, SL2) changes the gear position from 1st to 6th. As a fail-safe function if the solenoid valve system is open or shorted, the TCM cuts power to all solenoids, leaving just the mechanical hydraulic circuit, requiring manual shifting.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER	
P0979	1. Not learning control prohibited status 2. During shift solenoid valve S3 on signal is output, the TCM's S3 output monitor value is "off". 3. Continues for 500ms or more. 4. 1-trip detection logic	<ul style="list-style-type: none"> • Shift solenoid valve S3 • Transmission wire • Harness and connector • TCM
P0980	1. Not learning control prohibited status 2. During shift solenoid valve S3 off signal is output, the TCM's S3 output monitor value is "on". 3. Continues for 500ms or more. 4. 1-trip detection logic	<ul style="list-style-type: none"> • Open in shift solenoid valve S3 circuit • Shift solenoid valve S3 • TCM

MONITOR DESCRIPTION

These DTCs indicate an open or short in the shift solenoid valve S3 circuit. When there is an open or short circuit in any shift solenoid valve circuit, the TCM detects the problem and illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0979: Shift Solenoid 3 (GND Short) P0980: Shift Solenoid 3 (OPEN/Battery Short)

Required sensors/Components	Shift solenoid valve S3
Frequency of operation	Continuous
Duration	0.5 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active

TYPICAL MALFUNCTION THRESHOLDS

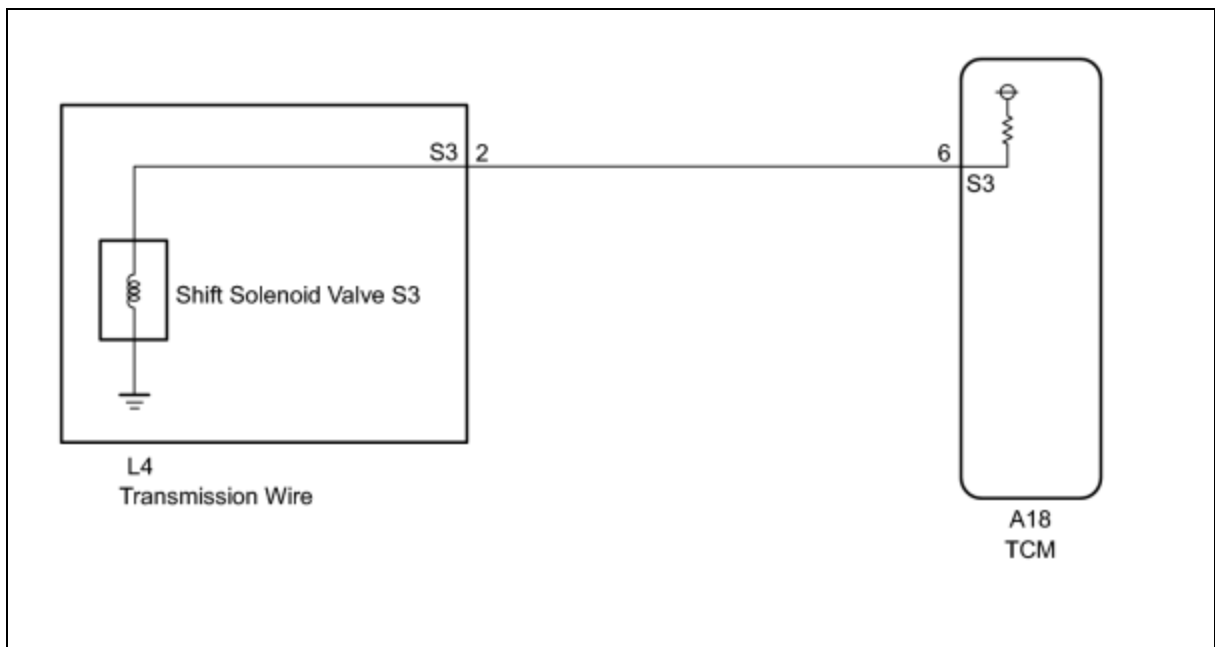
P0979: Shift Solenoid 3 (GND Short)

Status of output monitor when TCM outputs ON signal	OFF
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P0980: Shift Solenoid 3 (OPEN/Battery Short)

Status of output monitor when TCM outputs OFF signal	ON
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WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs INFO .

HINT:

- The shift solenoid valve S3 is turned on/off normally when the shift lever is in the D position:

TCM command gearshift	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve S3	ON	ON	ON	OFF	OFF	OFF

PROCEDURE

1. INSPECT TRANSMISSION WIRE (S3)

- (a) Disconnect the A18 TCM connector.
- (b) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-6(S3) - Body ground	Ignition switch ON	Below 1 V

- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-6(S3) - Body ground	20°C(68°F)	11 to 15 Ω

- (d) Connect the A18 TCM connector.

NG  **CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - TCM)**

OK



2. REPLACE TCM

- (a) Replace the TCM  .

NEXT  **PERFORM THE RESET MEMORY**

3. CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - TCM)

- (a) Disconnect the A18 TCM connector.
- (b) Disconnect the L4 transmission wire connector.

(c) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
L4-2(S3) - Body ground	Ignition switch ON	Below 1 V

(d) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
L4-2(S3) - A18-6(S3)	Always	Below 1 Ω
L4-2(S3) or A18-6(S3) - Body ground	Always	10 k Ω or higher

(e) Connect the A18 TCM connector.


(f) Connect the L4 transmission wire connector.


NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



4.	INSPECT SHIFT SOLENOID VALVE S3
-----------	--

(a) Remove the shift solenoid valve S3  .

(b) Perform inspection of the shift solenoid valve S3  .

NG  **REPLACE SHIFT SOLENOID VALVE S3**

OK  **REPAIR OR REPLACE TRANSMISSION WIRE**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W8C06ZX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P0982,P0983: Shift Solenoid "D" Control Circuit Low (Shift Solenoid Valve S4) (2013 FR-S)		

DTC	P0982	Shift Solenoid "D" Control Circuit Low (Shift Solenoid Valve S4)
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DTC	P0983	Shift Solenoid "D" Control Circuit High (Shift Solenoid Valve S4)
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DESCRIPTION

Based upon a signal from the TCM, the combination of shift solenoid valve (S1, S2, S3, S4, SR, SL1, SL2) changes the gear position from 1st to 6th. As a fail-safe function if the solenoid valve system is open or shorted, the TCM cuts power to all solenoids, leaving just the mechanical hydraulic circuit, requiring manual shifting.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER	
P0982	1. Not learning control prohibited status 2. During shift solenoid valve S4 on signal is output, the TCM's S4 output monitor value is "off". 3. Continues for 500ms or more. 4. 1-trip detection logic	<ul style="list-style-type: none"> • Shift solenoid valve S4 • Transmission wire • Harness and connector • TCM
P0983	1. Not learning control prohibited status 2. During shift solenoid valve S4 off signal is output, the TCM's S4 output monitor value is "on". 3. Continues for 500ms or more. 4. 1-trip detection logic	<ul style="list-style-type: none"> • Shift solenoid valve S4 • Transmission wire • Harness and connector • TCM

MONITOR DESCRIPTION

These DTCs indicate an open or short in the shift solenoid valve S4 circuit. When there is an open or short circuit in any shift solenoid valve circuit, the TCM detects the problem and illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0982: Shift Solenoid 4 (GND Short) P0983: Shift Solenoid 4 (Open/Battery Short)
Required sensors/Components	Shift solenoid valve S4
Frequency of operation	Continuous
Duration	0.5 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active

TYPICAL MALFUNCTION THRESHOLDS

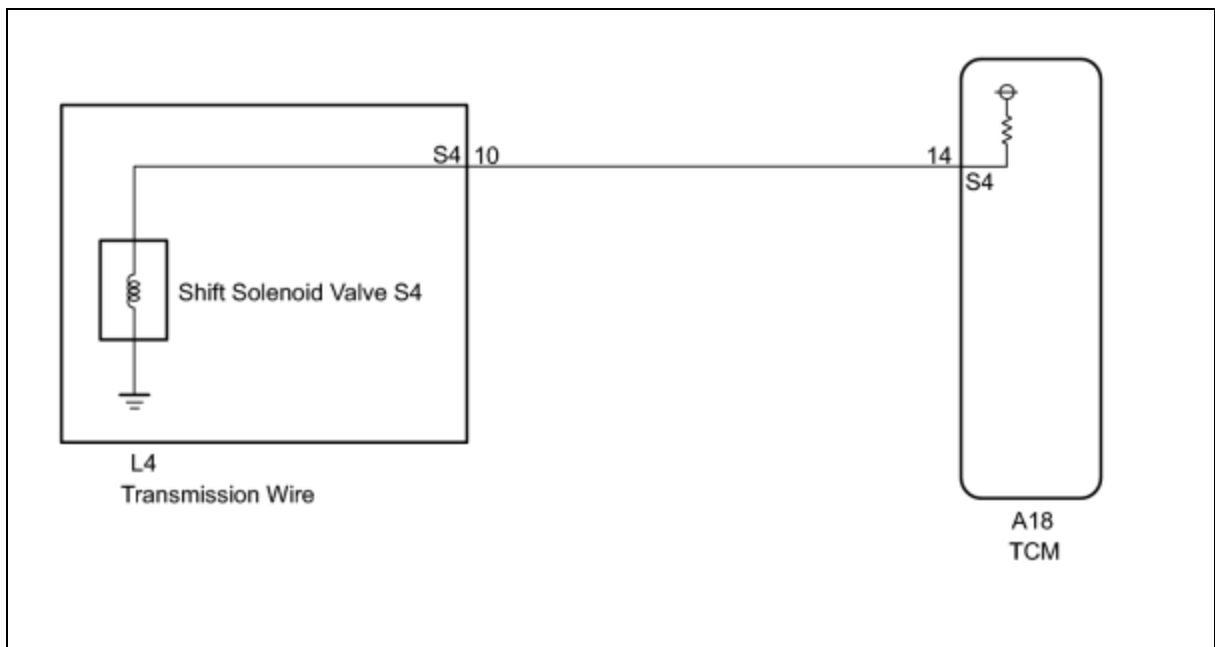
P0982: Shift Solenoid 4 (GND Short)

Status of output monitor when TCM outputs ON signal	OFF
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P0983: Shift Solenoid 4 (Open/Battery Short)

Status of output monitor when TCM outputs OFF signal	ON
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WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs  .

HINT:

- The shift solenoid valve S4 is turned on/off normally when the shift lever is in the D position:

TCM command gearshift	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve S4	OFF	ON	OFF	OFF	ON	ON

PROCEDURE

1. INSPECT TRANSMISSION WIRE (S4)

- (a) Disconnect the A18 TCM connector.
- (b) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-14(S4) - Body ground	Ignition switch ON	Below 1 V

- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-14(S4) - Body ground	20°C(68°F)	11 to 15 Ω

- (d) Connect the A18 TCM connector.

NG  **CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - TCM)**

OK



2. REPLACE TCM

- (a) Replace the TCM  .

NEXT  **PERFORM THE RESET MEMORY**

3. CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - TCM)

- (a) Disconnect the A18 TCM connector.
- (b) Disconnect the L4 transmission wire connector.
- (c) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
L4-10(S4) - Body ground	Ignition switch ON	Below 1 V

- (d) Measure the resistance according to the value(s) in the table below.

Standard resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
L4-10(S4) - A18-14(S4)	Always	Below 1 Ω
L4-10(S4) and A18-14(S4) - Body ground	Always	10 k Ω or higher

- (e) Connect the A18 TCM connector.
- (f) Connect the L4 transmission wire connector.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK


4.	INSPECT SHIFT SOLENOID VALVE S4
-----------	--

- (a) Remove the shift solenoid valve S4  .
- (b) Perform inspection of the shift solenoid valve S4  .

NG  **REPLACE SHIFT SOLENOID VALVE S4**

OK  **REPAIR OR REPLACE TRANSMISSION WIRE**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000TA0125X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P1817: Manual Mode Switch Circuit Malfunction (2013 FR-S)		

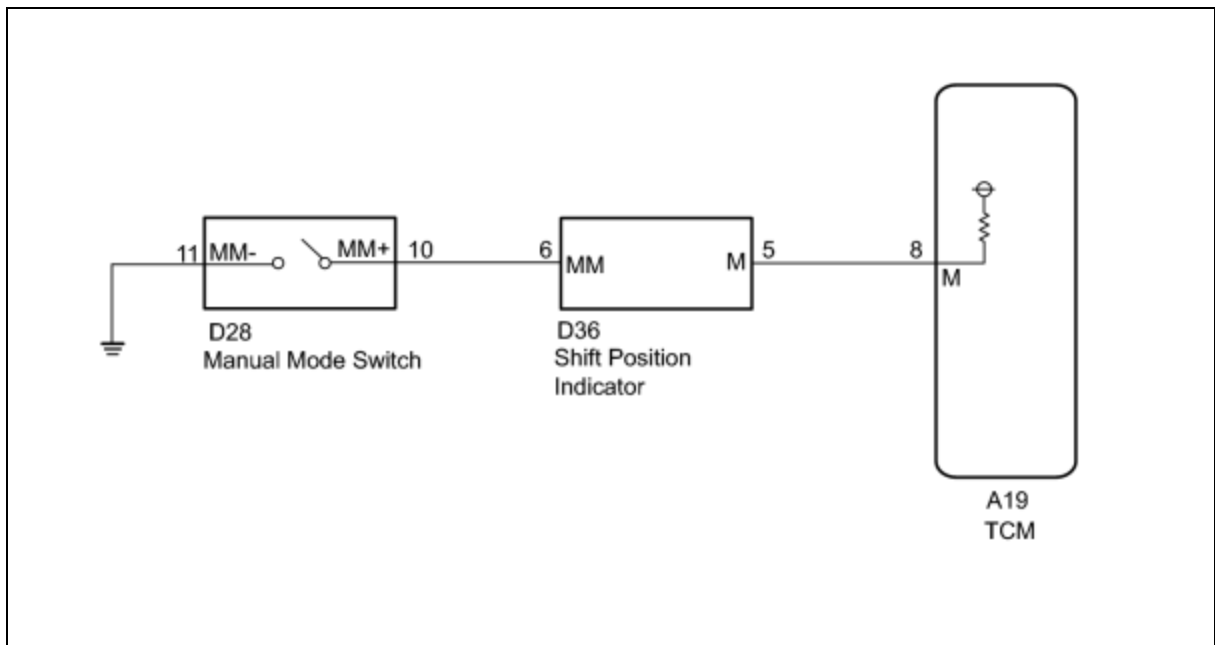
DTC	P1817	Manual Mode Switch Circuit Malfunction
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DESCRIPTION

A signal from the manual mode switch assembly input into the TCM detects the M position.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
	1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER	
P1817	1. Shift position sensor is normal, and not in learning control prohibited status. 2. The shift lever is in P, N, or R, and the M switch is on. 3. Continues for 2 sec. 4. 1-trip detection logic	<ul style="list-style-type: none"> Manual mode switch Harness and connector TCM

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	CHECK MANUAL MODE SWITCH
-----------	---------------------------------

- (a) Disconnect the A19 TCM connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SHIFT POSITION	SPECIFIED CONDITION
A19-8(M) - Body ground	M	Below 1 Ω
A19-8(M) - Body ground	Except M	10 k Ω or higher

- (c) Connect the A19 TCM connector.

NG ► **CHECK HARNESS AND CONNECTOR (MANUAL MODE SWITCH - SHIFT POSITION INDICATOR)**

OK
▼

2.	REPLACE TCM
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- (a) Replace the TCM INFO.

NEXT ► **PERFORM THE RESET MEMORY**

3.	CHECK HARNESS AND CONNECTOR (MANUAL MODE SWITCH - SHIFT POSITION INDICATOR)
-----------	--

- (a) Disconnect the D36 shift position indicator connector.
- (b) Disconnect the D28 manual mode switch connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D36-6(MM) - D28-10(MM+)	Always	Below 1 Ω
D36-6(MM) - Body ground	Always	10 k Ω or higher
D28-10(MM+) - Body ground	Always	10 k Ω or higher

- (d) Connect the D36 shift position indicator connector.

(e) Connect the D28 manual mode switch connector.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



4.	INSPECT MANUAL MODE SWITCH
-----------	-----------------------------------

(a) Disconnect the D28 manual mode switch connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SHIFT POSITION	SPECIFIED CONDITION
D28-10(MM+) - D28-11(MM-)	M	Below 1 Ω
	Except M	10 k Ω or higher

(c) Disconnect the D28 manual mode switch connector.

NG  **REPLACE MANUAL MODE SWITCH**

OK



5.	CHECK HARNESS AND CONNECTOR (TCM - SHIFT POSITION INDICATOR)
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(a) Disconnect the A19 TCM connector.

(b) Disconnect the D36 shift position indicator connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D36-5(M) - A19-8(M)	Always	Below 1 Ω
D36-5(M) - Body ground	Always	10 k Ω or higher
A19-8(M) - Body ground	Always	10 k Ω or higher

(d) Connect the A19 TCM connector.

(e) Connect the D36 shift position indicator connector.

NG ▶ REPAIR OR REPLACE HARNESS OR
CONNECTOR

OK ▶ REPLACE SHIFT POSITION INDICATOR



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W8AOGAX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P2719,P2720,P2721: Pressure Control Solenoid "D" Circuit Performance (SLT Solenoid) (2013 FR-S)		

DTC	P2719	Pressure Control Solenoid "D" Circuit Performance (SLT Solenoid)
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DTC	P2720	Pressure Control Solenoid "D" Control Circuit Low
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DTC	P2721	Pressure Control Solenoid "D" Control Circuit High
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DESCRIPTION

The shift solenoid valve SLT is controlled by the duty ratio as determined in advance by the transmission control computer, based upon signals from the accelerator position sensor, input speed sensor NT and output speed sensor SP2. In this way, the line pressure is adjusted to match the throttle valve opening angle and engine output. The TCM uses the revolution signals from the input speed sensor NT and output speed sensor SP2 to detect clutch and other slipping.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER	
P2719	1. Not learning control prohibited status 2. The difference between the shift solenoid valve SLT operational specified current and operational feedback current is 12 A or more in total. 3. Detects "2.Malfunction Status" 2 times consecutively. 4. 1-trip detection logic	<ul style="list-style-type: none"> • Shift solenoid valve SLT • Transmission wire • Harness and connector • TCM
P2720	1. Not learning control prohibited status 2. 1 second or more has elapsed after turning shift solenoid valve SLT off. The shift solenoid valve SLT operational feedback voltage is 0.018 V or less. 3. Detects malfunction that continues for 100 ms or more 5 times consecutively. 4. 1-trip detection logic	<ul style="list-style-type: none"> • Shift solenoid valve SLT • Transmission wire • Harness and connector • TCM
	1. Not learning control prohibited status 2. 1 second or more has elapsed after turning shift solenoid valve SLT on.	<ul style="list-style-type: none"> • Shift solenoid valve SLT

P2721	<p>The shift solenoid valve SLT operational feedback voltage is 0.257 V or more.</p> <ol style="list-style-type: none"> 3. Detects malfunction that continues for 100 ms or more 5 times consecutively. 4. 1-trip detection logic 	<ul style="list-style-type: none"> • Transmission wire • Harness and connector • TCM
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MONITOR DESCRIPTION

When an open or short in the shift solenoid valve SLT circuit is detected, the TCM interprets this as a fault. The TCM will turn on the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P2719: Line Pressure Linear Solenoid (Feedback Stuck) P2720: Line Pressure Linear Solenoid (GND Short/Open) P2721: Line Pressure Linear Solenoid (Battery Short)
Required sensors/Components	Shift solenoid valve SLT
Frequency of operation	Continuous
Duration	P2719: 2 count P2720: 0.1 sec. x 5 times P2721: 0.1 sec. x 5 times
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

P2719: Line Pressure Linear Solenoid (Feedback Stuck)

Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Line pressure linear solenoid(P2720,P2721)	No failure
Check the feedback terminal voltage	0.257 V or less
Battery voltage	10.5 V or more
Above condition (Battery voltage) is satisfied for	0.5 sec. or more

P2720: Line Pressure Linear Solenoid (GND Short/Open)

Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Line pressure linear solenoid(P2719)	No failure

P2721: Line Pressure Linear Solenoid (Battery Short)

Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Line pressure linear solenoid(P2719)	No failure

TYPICAL MALFUNCTION THRESHOLDS

P2719: Line Pressure Linear Solenoid (Feedback Stuck)

The accumulation of difference between target current and feedback current (Sum_ie).	12 A or more
<p>Sum_ie is renewed every 25msec. Sum_ie is cleared when at least one of the following conditions is satisfied.</p> <ol style="list-style-type: none"> 1. Enable conditions are not satisfied. 2. Difference between target current and feedback current (ie) is between -50 mA and 50 mA. 3. Plus and minus of ie is turned over. 	

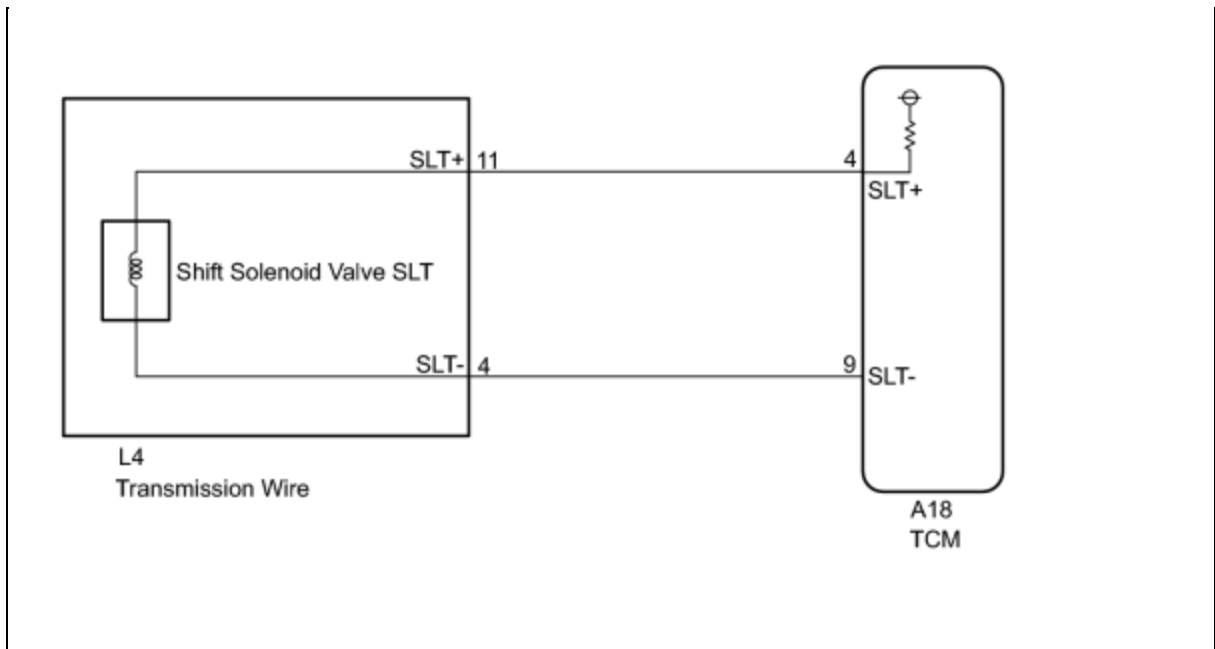
P2720: Line Pressure Linear Solenoid (GND Short/Open)

Check the feedback terminal voltage.	0.018 V or less
Elapsed time after recovering from Battery Short.	1 sec. or more

P2721: Line Pressure Linear Solenoid (Battery Short)

Check the feedback terminal voltage.	0.257 V or more
Elapsed time after recovering from Battery Short.	1 sec. or more

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs INFO.

PROCEDURE

1.	CHECK HARNESS AND CONNECTOR
-----------	------------------------------------

- (a) Disconnect the A18 TCM connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-4(SLT+) - A18-9(SLT-)	20°C(68°F)	5.0 to 5.6 Ω

- (c) Disconnect the A18 TCM connector.

NG ▶ **CHECK HARNESS AND CONNECTOR
(TRANSMISSION WIRE - TCM)**

OK



2.	REPLACE TCM
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(a) Replace the TCM  .

NEXT  **PERFORM THE RESET MEMORY**

3. CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - TCM)

- (a) Disconnect the A18 TCM connector.
- (b) Disconnect the L4 transmission wire connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-4(SLT+) - L4-11(SLT+)	Always	Below 1 Ω
A18-9(SLT-) - L4-4(SLT-)	Always	Below 1 Ω

- (d) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-4(SLT+) - Body ground	Ignition switch ON	Below 1 V
A18-9(SLT-) - Body ground	Ignition switch ON	Below 1 V



- (e) Connect the A18 TCM connector.
- (f) Connect the L4 transmission wire connector.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



4. INSPECT SHIFT SOLENOID VALVE SLT

- (a) Remove the shift solenoid valve SLT  .
- (b) Perform inspection of the shift solenoid valve SLT  .

NG  **REPLACE SHIFT SOLENOID VALVE SLT**

OK  **REPAIR OR REPLACE TRANSMISSION WIRE**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W8D0DAX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P2757,P2758: Torque Converter Clutch Pressure Control Solenoid Performance (Shift Solenoid Valve SLU) (2013 FR-S)		

DTC	P2757	Torque Converter Clutch Pressure Control Solenoid Performance (Shift Solenoid Valve SLU)
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DTC	P2758	Torque Converter Pressure Control Solenoid Circuit Stuck ON / Performance (SLU / DSU Solenoid)
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SYSTEM DESCRIPTION

The shift solenoid valve SLT is controlled by the duty ratio as determined in advance by the transmission control computer, based upon signals from the accelerator position sensor, input speed sensor NT and output speed sensor SP2. In this way, the line pressure is adjusted to match the throttle valve opening angle and engine output. The TCM uses the revolution signals from the input speed sensor NT and output speed sensor SP2 to detect clutch and other slipping.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	<ol style="list-style-type: none"> 1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER 	
P2757	<ol style="list-style-type: none"> 1. The following conditions are met: <ol style="list-style-type: none"> a. Not learning control prohibited status b. 4 seconds or more have elapsed after moving the shift lever to D. c. Coolant temperature is 40°C (104°F) or more. d. ATF temperature is 20°C (68 °F) or more. e. 4th or higher gears f. Abnormalities with the shift solenoid valve (S1, S2, S3, S4, SR, SLT, SLU), input speed sensor NT, output speed sensor SP2, park/neutral position switch, CAN bus, ECM communication, coolant temperature, electronically control throttle and accelerator pedal sensor are not detected. 2. The following conditions are met: <ol style="list-style-type: none"> a. The shift solenoid SLU hydraulic command value is more than the specified value for 3 seconds or more. b. The engine speed is 70 rpm or more faster than the turbine revolutions. c. 4th or higher gear d. The throttle valve opening angle is the specified angle or more. 	<ul style="list-style-type: none"> • Transmission wire • Shift solenoid valve SLU • Torque converter clutch • TCM

	<p>e. Vehicle speed is 22 km/h or more.</p> <p>3. All conditions in (b) have passed for 2 seconds or more.</p> <p>4. 2-trip detection logic</p>	
P2758	<p>1. The following conditions are met:</p> <ul style="list-style-type: none"> a. Not learning control prohibited status b. 4 seconds or more have elapsed after moving the shift lever to D. c. Coolant temperature is 40°C (104°F) or more. d. ATF temperature is 20°C (68 °F) or more. e. 4th or higher gears f. Abnormalities with the shift solenoid valve (S1, S2, S3, S4, SR, SLT, SLU), input speed sensor NT, output speed sensor SP2, park/neutral position switch, CAN bus, ECM communication, coolant temperature, electronically control throttle and accelerator pedal sensor are not detected. <p>2. The following conditions are met:</p> <ul style="list-style-type: none"> a. The shift solenoid SLU hydraulic command value is less than the specified value for 3 seconds or more. b. The difference between the engine speed and the turbine speed is 35 rpm or less. c. 4th or higher gear d. The throttle valve opening angle is the specified angle or more. e. Vehicle speed is 22 km/h or more. <p>3. All conditions in "2. Malfunction status" have passed for 2 seconds or more.</p> <p>4. 2-trip detection logic</p>	<ul style="list-style-type: none"> • Transmission wire • Shift solenoid valve SLU • Torque converter clutch • TCM

MONITOR DESCRIPTION

Torque converter lock-up is controlled by the TCM based on the input speed sensor NT, output speed sensor SP2, engine rpm, engine load, engine temperature, vehicle speed, transmission temperature, and gear selection. The TCM determines the lock-up status of the torque converter by comparing the engine rpm (NE) to the input turbine rpm (NT). The TCM calculates the actual transmission gear by comparing input turbine rpm (NT) to output shaft rpm (SP2). When conditions are appropriate, the TCM requests "lock-up" by applying control voltage to the shift solenoid SLU. When the SLU is turned on, it applies pressure to the lock-up relay valve and locks the torque converter clutch.

If the TCM detects no lock-up after lock-up has been requested or if it detects lock-up when it is not requested, the TCM interprets this as a fault in the shift solenoid valve SLU or lock-up system performance.

The TCM will turn on the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	<p>P2757: Lock up Control Solenoid (OFF Stuck)</p> <p>P2758: Lock up Control Solenoid (ON Stuck)</p>

Required sensors/Components	Shift solenoid valve SLU
Frequency of operation	Continuous
Duration	P2757: 2 sec. P2758: 1.8 sec., 2count (After 1 count, detect failure again after vehicle speed is less than 10km/h (6mph).)
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The following items are common to all conditions below.

Battery voltage	10.5 V or more
Engine speed	400 rpm or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Turbine shaft speed sensor (P0717)	No failure
Vehicle speed sensor (P0722)	No failure
Shift solenoid 1 (P0973,P0974)	No failure
Shift solenoid 2 (P0976,P0977)	No failure
Shift solenoid 3 (P0979,P0980)	No failure
Shift solenoid 4 (P0982,P0983)	No failure
SR solenoid (P0985,P0986)	No failure
Linear solenoid 1 (P0962,P0963,P0961)	No failure
Linear solenoid 2 (P0966,P0967,P0965)	No failure
Line pressure linear solenoid (P2720,P2721,P2719)	No failure
Lock up control solenoid (P2762,P2763,P2764)	No failure
Range switch (P0707,P0708)	No failure
ATF temperature sensor (P0711,P0712,P0713)	No failure
CAN BUS OFF (U0073)	No failure
ECM NO ID (U0100)	No failure
ECM Communication Counter (U0401)	No failure
Engine coolant temperature sensor	No failure
Engine torque signal	No failure
Throttle position sensor	No failure
Accelerator pedal position sensor	No failure
Range position	D
Elapsed time after selecting D range	4 sec. or more
Engine coolant temperature	40°C (104°F) or more

Target gear position	4th, 5th or 6th
ATF temperature	20°C (68°F) or more

TYPICAL MALFUNCTION THRESHOLDS

P2757: Lock up Control Solenoid (OFF Stuck)

Lock up control solenoid instruction value	513 kPa or more
Above condition is satisfied for	3 sec. or more
Engine speed - Turbine shaft speed	70 rpm or more
Gear ratio calculated from turbine shaft speed and vehicle speed.	4th, 5th or 6th
Throttle position	See MAP A
Vehicle speed	13.7 mph or more

MAP A

Turbine shaft speed (rpm)	1200	1500	3500	5100	5200
Throttle (%)	12.9	13.4	26	39.6	100

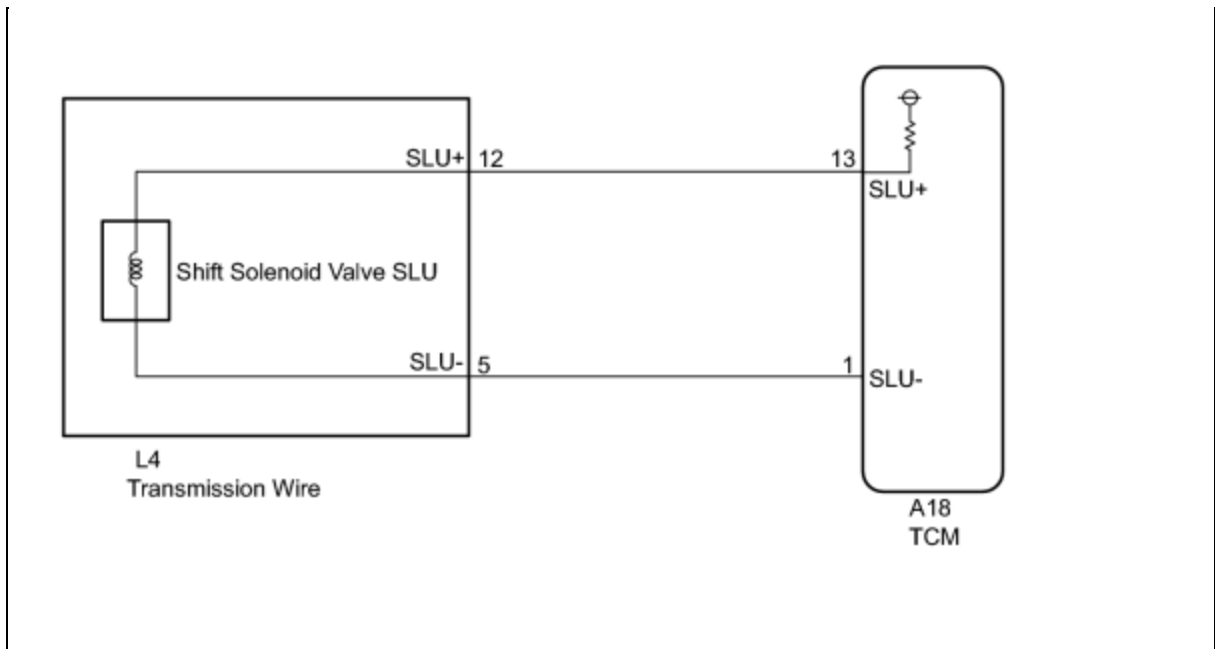
P2758: Lock up Control Solenoid (ON Stuck)

Lock up control solenoid instruction value	4 kPa or less
Above condition is satisfied for	3 sec. or more
Engine speed - Turbine shaft speed	35 rpm or less
Gear ratio calculated from turbine shaft speed and vehicle speed.	4th, 5th or 6th
Throttle position	See MAP B
Vehicle speed	13.7 mph or more

MAP B

Turbine shaft speed (rpm)	1200	1500	2000	5800	5900
Throttle (%)	8.1	8.2	10	40	100

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs INFO.

1. ACTIVE TEST

HINT:

Using the Techstream to perform Active Test allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Test early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Test.

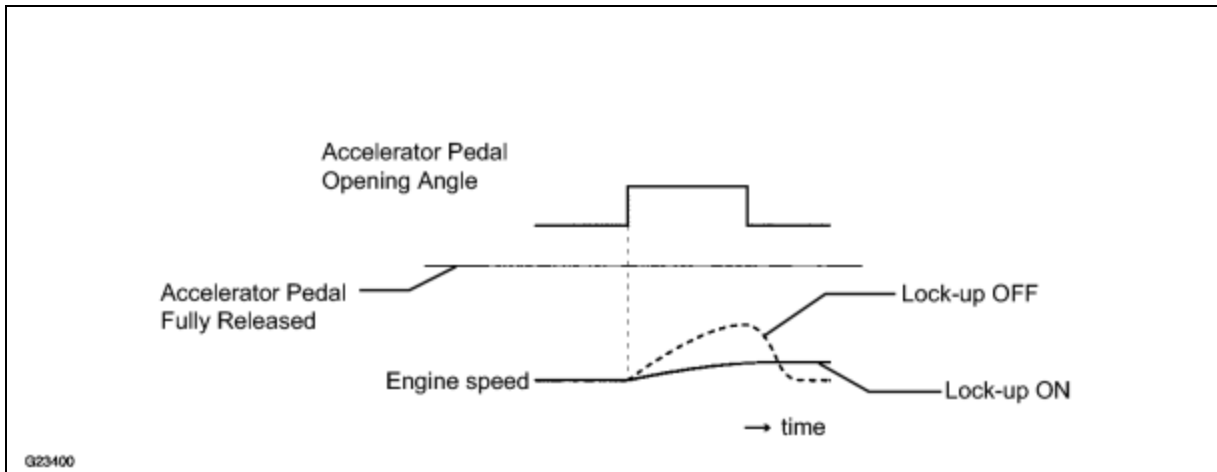
- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch to ON.
- (e) Turn the Techstream on.
- (f) Enter the following menus: Powertrain / ECT / Data List.
- (g) According to the display on the Techstream, perform the "Active Test".

ITEM	TEST DETAILS	DIAGNOSTIC NOTE
Activate the Lock Up	[Test Details] Control the shift solenoid SLU to set the automatic transmission to the lock-up condition. [Vehicle Condition] <ul style="list-style-type: none"> Throttle valve opening angle: Less than 35 % Vehicle Speed: 50 km/h (30 mph) or more 	Possible to check the SLU operation.

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (30 mph) or more.
- This test can be conducted with the 5th or 6th gear.

(h) Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.



HINT:

- When changing the accelerator pedal opening angle while driving, if the engine speed does not change, lock-up is on.
- Slowly release, but not fully, the accelerator pedal in order to decelerate. (Fully releasing the pedal will close the throttle valve and lock-up may be turned off automatically.)

PROCEDURE

1.	CHECK OTHER DTCS OUTPUT
-----------	--------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and push the Techstream main switch ON.
- (c) Read the DTCs using the Techstream INFO.

Result:



DISPLAY (DTC OUTPUT)	PROCEED TO
Only "P2757" or "P2758" is output	A
"P2757" or "P2758" and other DTCs	B

B ▶ **GO TO DTC CHART**

A
▼

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2. INSPECT SHIFT SOLENOID VALVE SLU


- (a) Remove the shift solenoid valve SLU  .
- (b) Perform inspection of the shift solenoid valve SLU  .

NG  REPLACE SHIFT SOLENOID VALVE SLU

OK



3. INSPECT TRANSMISSION VALVE BODY ASSEMBLY

- (a) Perform inspection of the transmission valve body assembly  .

OK:

There are no foreign objects on each valve.

NG  REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY

OK



4. INSPECT TORQUE CONVERTER ASSEMBLY

- (a) Check the torque converter assembly  .

OK:

The torque converter clutch operates normally.

NG  REPLACE TORQUE CONVERTER ASSEMBLY

OK  REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W890E5X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: P2762-P2764: Torque Converter Pressure Control Solenoid Circuit Performance (SLU / DSU Solenoid) (2013 FR-S)		

DTC	P2762	Torque Converter Pressure Control Solenoid Circuit Performance (SLU / DSU Solenoid)
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DTC	P2763	Torque Converter Clutch Pressure Control Solenoid Control Circuit High (Shift Solenoid Valve DSU)
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DTC	P2764	Torque Converter Clutch Pressure Control Solenoid Control Circuit Low (Shift Solenoid Valve DSU)
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DESCRIPTION

The shift solenoid valve SLU is controlled by the duty ratio as determined in advance by the TCM. In this way, it carries out lock-up and flex lock-up control.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER	
P2762	1. Not learning control prohibited status. Not open or short in the shift solenoid valve SLU/DSU circuit. 2. The difference between the shift solenoid valve SLU operational specified current and operational feedback current is 12 A or more in total. 3. Detects "2.Malfunction Status" 5 times consecutively. 4. 1-trip detection logic	<ul style="list-style-type: none"> • Shift solenoid valve SLU • Transmission wire • Harness and connector • TCM
P2763	1. Not learning control prohibited status Not malfunction with the shift solenoid valve SLU/DSU circuit performance. 2. 1 second or more has elapsed after turning shift solenoid valve SLU off. The shift solenoid valve SLU operational feedback voltage is 0.018 V or less. 3. Detects malfunction that continues for 100 ms or more 5 times consecutively. 4. 1-trip detection logic	<ul style="list-style-type: none"> • Shift solenoid valve SLU • Transmission wire • Harness and connector • TCM

P2764	<ol style="list-style-type: none"> 1. Not learning control prohibited status Not malfunction with the shift solenoid valve SLU/DSU circuit performance. 2. 1 second or more has elapsed after turning shift solenoid valve SLU on. The shift solenoid valve SLU operational feedback voltage is 0.257 V or more. 3. Detects malfunction that continues for 100 ms or more 5 times consecutively. 4. 1-trip detection logic 	<ul style="list-style-type: none"> • Shift solenoid valve SLU • Transmission wire • Harness and connector • TCM
-------	--	---

MONITOR DESCRIPTION

When an open or short in a shift solenoid valve SLU circuit is detected, the TCM determines there is a malfunction. The TCM will turn on the MIL and store this DTC.

MONITOR STRATEGY

Related DTCs	P2762: Lock up Control Solenoid (Feedback Stuck) P2763: Lock up Control Solenoid (Battery Short) P2764: Lock up Control Solenoid (GND Short/Open)
Required sensors/Components	Shift solenoid valve SLU
Frequency of operation	Continuous
Duration	P2762: 2 count P2763: 0.1 sec. x 5 times P2764: 0.1 sec. x 5 times
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

P2762: Lock up Control Solenoid (Feedback Stuck)

Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Lock up control solenoid (P2764,P2763)	No failure
Check the feedback terminal voltage	0.257 V or less
Battery voltage	10.5 V or more
Above condition (Battery voltage) is satisfied for	0.5 sec. or more

P2763: Lock up Control Solenoid (Battery Short)

Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more

Fail-safe mode (Solenoids power supply is shut down.)	Not active
Lock up control solenoid (P2762)	No failure

P2764: Lock up Control Solenoid (GND Short/Open)

Battery voltage	10.2 V or more
Above condition satisfied for	2 sec. or more
Fail-safe mode (Solenoids power supply is shut down.)	Not active
Lock up control solenoid (P2762)	No failure

TYPICAL MALFUNCTION THRESHOLDS

P2762: Lock up Control Solenoid (Feedback Stuck)

The accumulation of difference between target current and feedback current (Sum_ie).	12 A or more
<p>Sum_ie is renewed every 25msec. Sum_ie is cleared when at least one of the following conditions is satisfied.</p> <ol style="list-style-type: none"> 1. Enable conditions are not satisfied. 2. Difference between target current and feedback current (ie) is between -50 mA and 50 mA. 3. Plus and minus of ie is turned over. 	

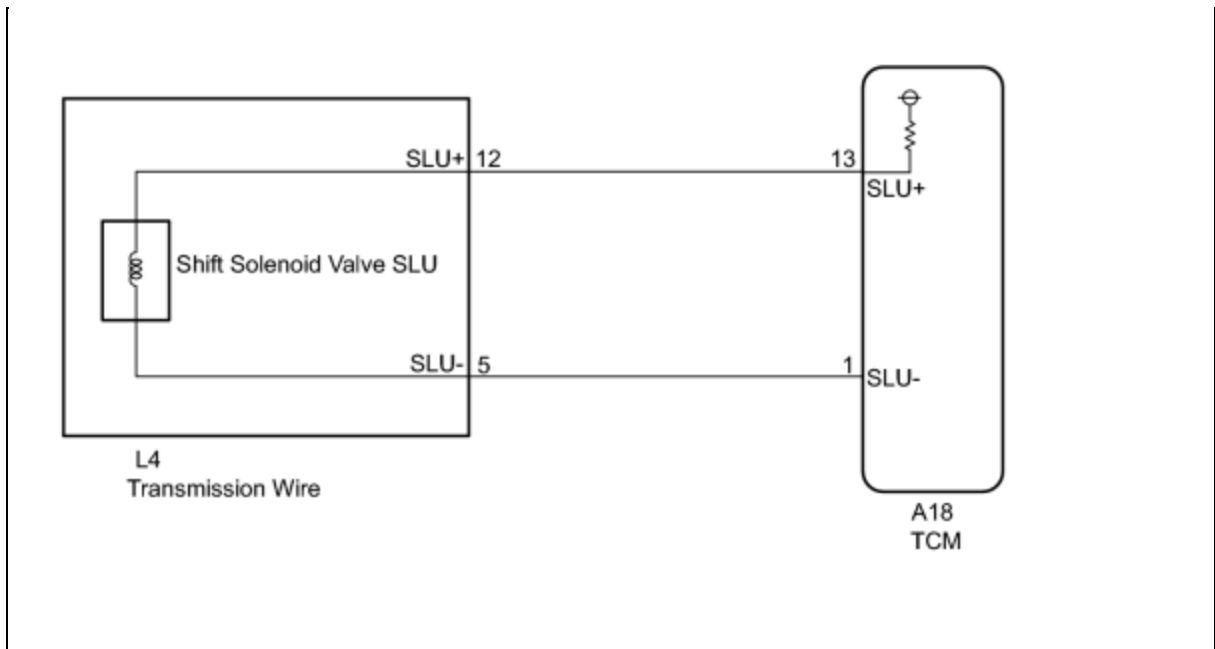
P2763: Lock up Control Solenoid (Battery Short)

Check the feedback terminal voltage.	0.257 V or more
Elapsed time after recovering from GND short/open.	1 sec. or more

P2764: Lock up Control Solenoid (GND Short/Open)

Check the feedback terminal voltage.	0.018 V or less
Elapsed time after recovering from Battery Short.	1 sec. or more

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs INFO.

PROCEDURE

1. INSPECT TRANSMISSION WIRE (SLU)

- (a) Disconnect the L4 transmission wire connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
L4-12(SLU+) - L4-5(SLU-)	20°C(68°F)	5.0 to 5.6 Ω
L4-12(SLU+) - Body ground	Always	10 kΩ or higher
L4-5(SLU-) - Body ground	Always	10 kΩ or higher

- (c) Connect the L4 transmission wire connector.

NG ▶ **INSPECT SHIFT SOLENOID VALVE SLU**

OK



2. CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - TCM)

(a) Disconnect the A18 TCM connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-13(SLU+) - A18-1(SLU-)	20°C(68°F)	5.0 to 5.6 Ω
A18-13(SLU+) - Body ground	Always	10 kΩ or higher
A18-1(SLU-) - Body ground	Always	10 kΩ or higher

(c) Connect the A18 TCM connector.

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK




3.	REPLACE TCM
-----------	--------------------

(a) Replace the TCM  .

NEXT ► PERFORM THE RESET MEMORY

4.	INSPECT SHIFT SOLENOID VALVE SLU
-----------	---

(a) Remove the shift solenoid valve SLU  .

(b) Perform inspection of the shift solenoid valve SLU  .

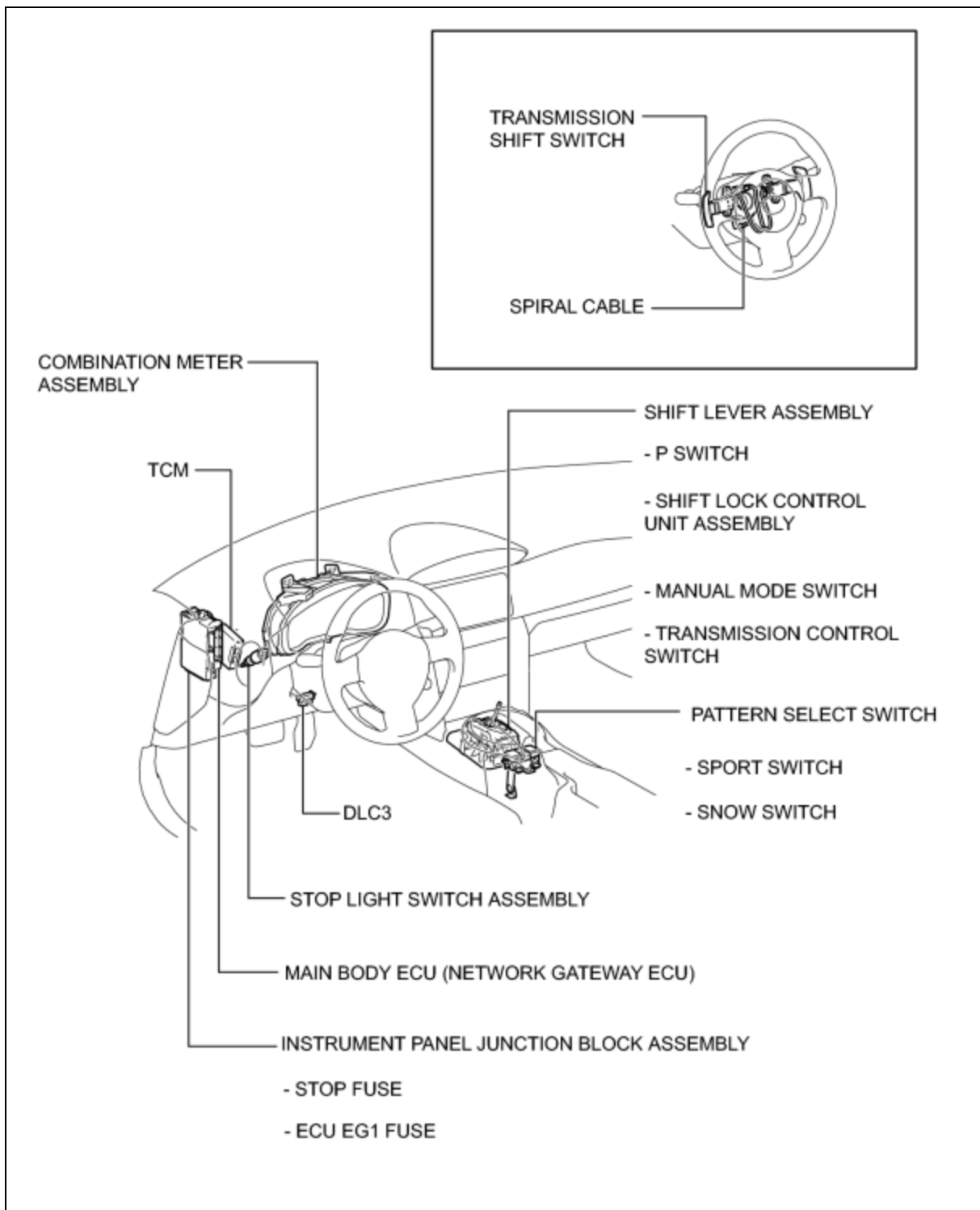
NG ► REPLACE SHIFT SOLENOID VALVE SLU

OK ► REPAIR OR REPLACE TRANSMISSION WIRE

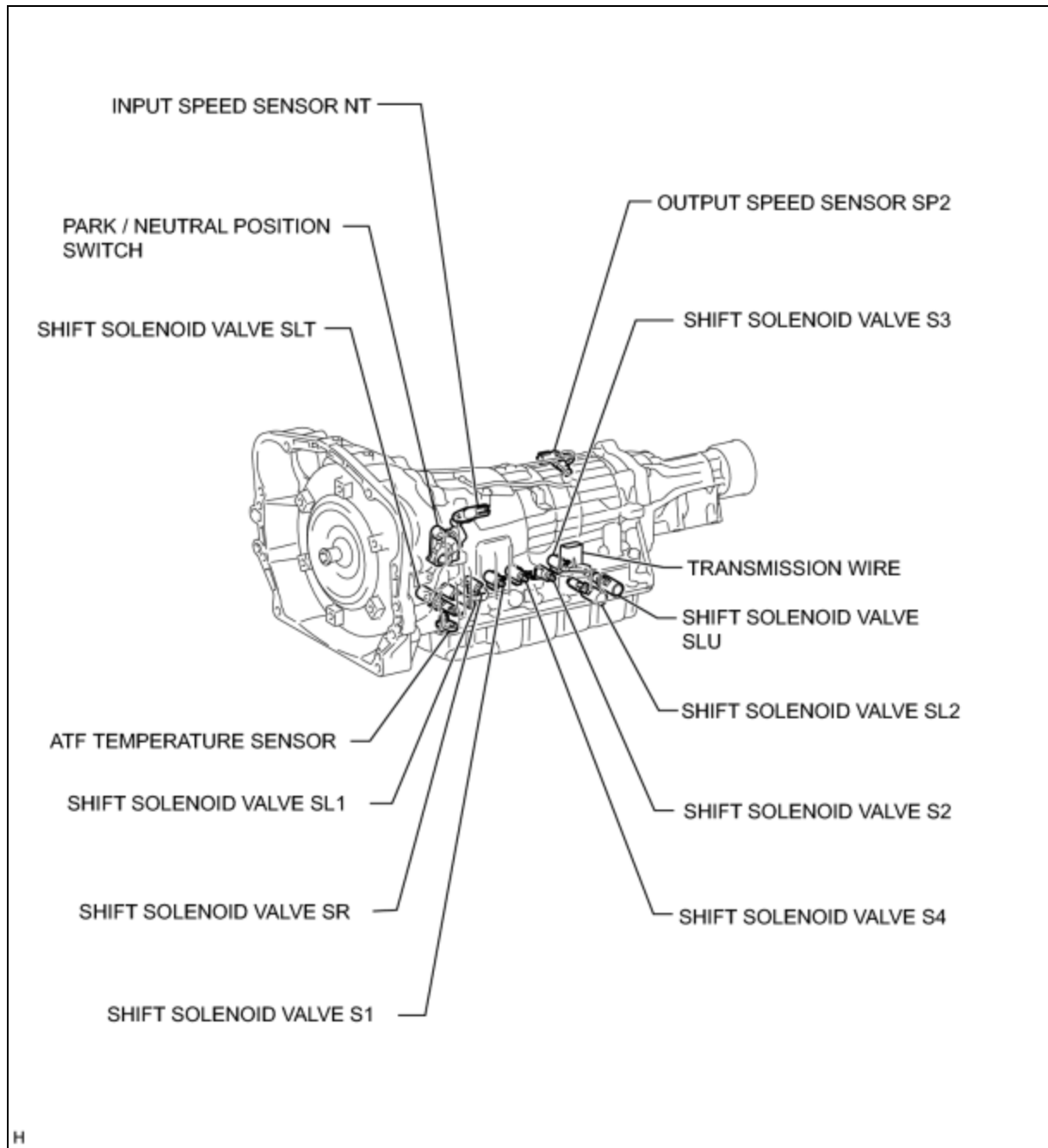
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W720GZX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



ILLUSTRATION



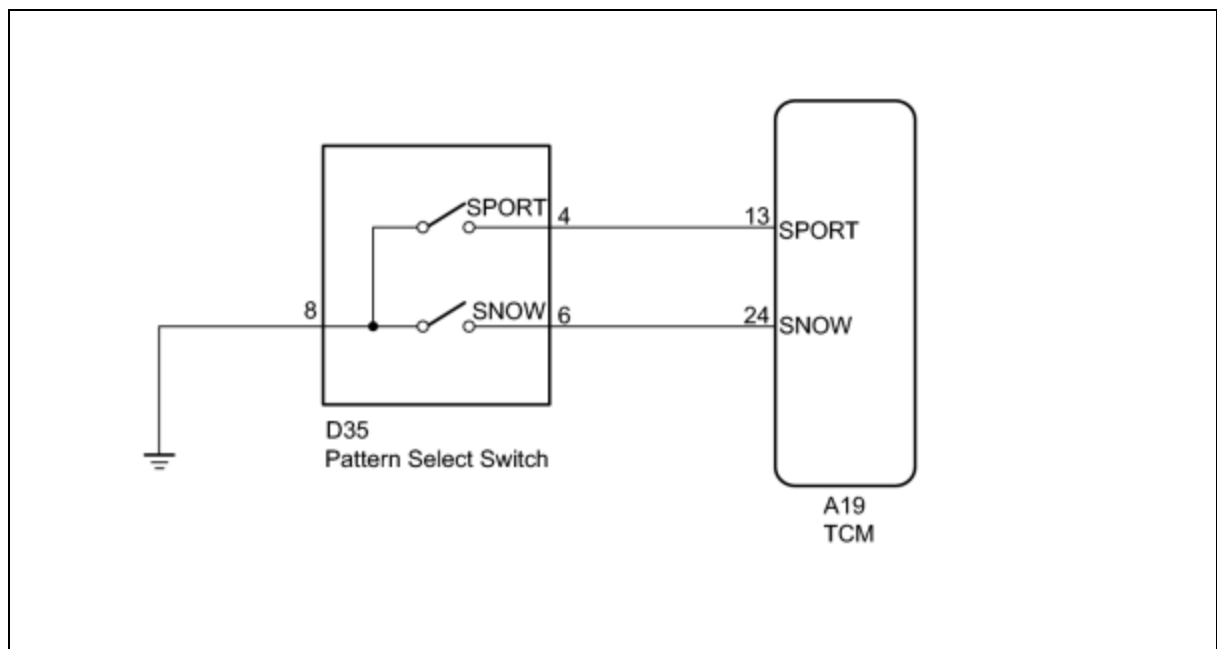
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000YTGO4NX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: Pattern Select Switch Circuit (2013 FR-S)		

Pattern Select Switch Circuit

DESCRIPTION

A signal from the pattern select switch assembly input into the TCM enables switching of the mode.

WIRING DIAGRAM



HINT:

(*) Pattern Select Switch (ECT SNOW Switch)

When the ECT SNOW switch is pushed, the switch contact is made and the ECT SNOW mode is selected.

To cancel the ECT SNOW mode, push the ECT SNOW switch once again.

The ECT SNOW mode is automatically cancelled out when the ignition switch is turned "off".

INSPECTION PROCEDURE

PROCEDURE

1.	READ VALUE USING TECHSTREAM
-----------	------------------------------------

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Read the value displayed on the Techstream.

OK

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Sport Switch Status	Pattern switch (ECT SPORT) status/ ON or OFF	Ignition switch is: ON: off ↓ Pattern switch (ECT SPORT) is: Pushed: ON ↓ Pattern switch (ECT SPORT) is: Pushed: OFF	-

NG ▶ **INSPECT PATTERN SELECT SWITCH ASSEMBLY**

OK



2.	READ VALUE USING TECHSTREAM
-----------	------------------------------------

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Read the value displayed on the Techstream.


OK

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Snow Switch Status	Pattern switch (ECT SNOW) status/ ON or OFF	Ignition switch is: ON: off ↓ Pattern switch (ECT SNOW) is: Pushed: ON ↓ Pattern switch (ECT SNOW) is: Pushed: OFF	-

NG ▶ **INSPECT PATTERN SELECT SWITCH ASSEMBLY**

OK ▶ **GO TO PROBLEM SYMPTOMS TABLE**

3.	INSPECT PATTERN SELECT SWITCH ASSEMBLY
-----------	---

(a) Perform inspection of the pattern select switch  .

NG ▶ **REPLACE PATTERN SELECT SWITCH ASSEMBLY**

OK
▼

4.	CHECK HARNESS AND CONNECTOR (PATTERN SELECT SWITCH ASSEMBLY - TCM - BODY GROUND)
-----------	---

(a) Disconnect the TCM connector.

(b) Disconnect the pattern select switch assembly connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
A19-13(SPORT) - D35-4(SPORT)	Always	Below 1 Ω
D35-8 - Body ground	Always	Below 1 Ω
A19-3(SPORT) - Body ground	Always	10 k Ω or higher

(d) Connect the TCM connector.

(e) Connect the pattern select switch assembly connector.

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK
▼

5.	REPLACE TCM
-----------	--------------------

(a) Replace the TCM  .

NEXT  **PERFORM THE RESET MEMORY**

6.	INSPECT PATTERN SELECT SWITCH ASSEMBLY
-----------	---

(a) Perform inspection of the pattern select switch  .

NG  **REPLACE PATTERN SELECT SWITCH ASSEMBLY**

OK



7.	CHECK HARNESS AND CONNECTOR (PATTERN SELECT SWITCH - TCM - BODY GROUND)
-----------	--

- (a) Disconnect the TCM connector.
- (b) Disconnect the pattern select switch assembly connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
A19-24(SNOW) - D35-6	Always	Below 1 Ω
D35-8 - Body ground	Always	Below 1 Ω
A19-24(SNOW) - Body ground	Always	10 k Ω or higher


- (d) Connect the TCM connector.
- (e) Connect the pattern select switch assembly connector.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



8.	REPLACE TCM
-----------	--------------------

(a) Replace the TCM  .


NEXT  **PERFORM THE RESET MEMORY**



Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000007H0C0X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

NOTICE:

Perform the **RESET MEMORY (AT initialization)** when replacing the automatic transmission assembly, engine assembly, valve body assembly or TCM  .

HINT:

RESET MEMORY can not be completed by only disconnecting the battery cable.

1. REMOVAL AND INSTALLATION PROCEDURE PRECAUTIONS

- (a) The automatic transmission is composed of highly precision-finished parts which need careful inspection before reassembly. Even a small nick could cause fluid leakage or affect the performance. The instructions here are organized so that you work on only one component group at a time. This will help avoid confusion caused by similar-looking parts of different sub-assemblies being on your workbench at the same time. The component groups are inspected and repaired from the converter housing side. Complete the inspection, repair and reassembly before proceeding to the next component group as much as possible. If a defect is found in a certain component group during reassembly, inspect and repair this group immediately. If a component group cannot be assembled because some parts are being ordered, be sure to keep all parts of the group in a separate container while proceeding with disassembly, inspection, repair and reassembly of other component groups. Recommended: Toyota Genuine ATF WS
- (b) All disassembled parts should be washed clean and any fluid passages and holes should be blown through with compressed air.
- (c) Dry all parts with compressed air. Never use a shop rag or a piece of cloth to dry them.
- (d) When using compressed air, always aim away from yourself to prevent accidentally spraying ATF or kerosene in your face.
- (e) Only recommended automatic transmission fluid or kerosene should be used for cleaning.
- (f) After cleaning, the parts should be arranged in the correct order for efficient inspection, repair, and reassembly.
- (g) When disassembling a valve body, be sure to match each valve together with the corresponding spring.
- (h) New discs for the brakes and clutches that are to be used for replacement must be soaked in ATF for at least 15 minutes before reassembly.
- (i) All oil seal rings, clutch discs, clutch plates, rotating parts, and sliding surfaces should be coated with ATF prior to reassembly.
- (j) All gaskets and rubber O-rings should be replaced with new ones.
- (k) Do not apply adhesive cements to gaskets and similar parts.
- (l) Make sure that the ends of a snap ring are not aligned with one of the cutouts and are installed in the groove correctly.
- (m) When replacing a worn bushing, the sub-assembly containing the bushing must also be replaced.
- (n) Check thrust bearings and races for wear or damage. Replace them as necessary.
- (o) When working with FIPG material, you must observe the following:

- Using a razor blade and a gasket scraper, remove all the old packing (FIPG) material from the gasket surface.
- Thoroughly clean all components to remove any loose material.
- Clean both sealing surfaces with a non-residue solvent.
- Parts must be reassembled within 10 minutes of application. Otherwise, the packing (FIPG) material must be removed and reapplied.



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W730S7X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

If a normal code is displayed during the diagnostic trouble code check although the trouble still occurs, check the electrical circuits for each symptom in the order given in the charts on the following pages and proceed to the page given for troubleshooting.

The Matrix Chart is divided into 2 chapters.

Chapter 1:

Refer to the table below when the trouble cause is considered to be electrical.

If the instruction "Proceed to next circuit inspection shown on matrix chart" is given in the flow chart of each circuit, proceed to the circuit with the next highest number in the table to continue the check.

If the trouble still occurs even though there are no abnormalities in any of the other circuits, check and replace the TCM.

1. Chapter 1: Electronic Circuit Matrix Chart

SYMPTOM	SUSPECTED AREA	SEE PAGE
No up-shift (1st -> 2nd)	1. Shift solenoid valve S1 circuit *1	INFO
	2. TCM	INFO
No up-shift (2nd -> 3rd)	1. Shift solenoid valve S2 circuit *1	INFO
	2. TCM	INFO
No up-shift (3rd -> 4th)	1. Shift solenoid valve S3 circuit *1	INFO
	2. Engine coolant temperature sensor circuit *1	INFO
	3. TCM	INFO
No up-shift (4th -> 5th)	1. Shift solenoid valve S4 circuit *1	INFO
	2. Shift solenoid valve SR circuit *1	INFO
	3. Shift solenoid valve SL) circuit *1	INFO
	4. Shift solenoid valve SL2 circuit *1	INFO
	2. Engine coolant temperature sensor circuit *1	INFO
	5. TCM	INFO
	1. Park/neutral position switch circuit *1	INFO
	2. Engine coolant temperature sensor	INFO

No up-shift (5th -> 6th)	circuit *1	
	3. Shift solenoid valve S2 circuit *1	INFO
	4. TCM	INFO
No down-shift (6th -> 5th)	1. Park/neutral position switch circuit *1	INFO
	2. Shift solenoid valve S2 circuit *1	INFO
	3. TCM	INFO
No down-shift (5th -> 4th)	1. Shift solenoid valve S4 circuit *1	INFO
	2. Shift solenoid valve SR circuit *1	INFO
	3. Shift solenoid valve SL1 circuit *1	INFO
	4. Shift solenoid valve SL2 circuit *1	INFO
	5. TCM	INFO
No down-shift (4th -> 3rd)	1. Shift solenoid valve S3 circuit *1	INFO
	2. TCM	INFO
No down-shift (3rd -> 2nd)	1. Shift solenoid valve S2 circuit *1	INFO
	2. TCM	INFO
No down-shift (2nd -> 1st)	1. Shift solenoid valve S1 circuit *1	INFO
	2. TCM	INFO
No lock-up or No lock-up off	1. Shift solenoid valve SLU circuit *1	INFO
	2. Engine coolant temperature sensor circuit *1	INFO
	3. Stop light switch circuit *1	INFO
	4. Input speed sensor NT circuit *1	INFO
	5. TCM	INFO
Shift point too high or too low	1. Shift solenoid valve SLT circuit *1	INFO
	2. Input speed sensor NT circuit *1	INFO
	3. Output speed sensor SP2 circuit *1	INFO
	4. Throttle position sensor circuit *1	INFO
	5. Pattern select SPORT switch circuit	INFO
	6. ATF temperature sensor circuit *1	INFO
	7. TCM	INFO
	8. Park/Neutral position switch	INFO
Up-shift to 6th while engine is cold	1. Engine coolant temperature sensor circuit *1	INFO
	2. TCM	INFO
	1. Transmission control switch circuit	INFO

No gear change by shifting into "+" or "-" while the shifting lever	2. Shift paddle switch circuit	INFO
	3. TCM	INFO
Harsh engagement (N -> D)	1. Shift solenoid valve SLT circuit *1	INFO
	3. TCM	INFO
Harsh engagement (Lock-up)	1. Input speed sensor NT circuit *1	INFO
	2. Output speed sensor SP2 circuit *1	INFO
	3. Shift solenoid valve SLU circuit *1	INFO
	4. TCM	INFO
Harsh engagement (Any driving position)	1. Throttle position sensor circuit *1	INFO
	2. Shift solenoid valve SL1 circuit *1	INFO
	3. Shift solenoid valve SL2 circuit *1	INFO
	4. Shift solenoid valve SLU circuit *1	INFO
	5. Shift solenoid valve SLT circuit *1	INFO
	6. Input speed sensor NT circuit *1	INFO
	7. TCM	INFO
Poor acceleration	1. Shift solenoid valve SLT circuit *1	INFO
	2. Pattern select (SNOW) switch circuit	INFO
	3. TCM	INFO
ECT SNOW does not operate	1. Shift solenoid valve SLT circuit *1	INFO
	2. Pattern select (SNOW) switch circuit	INFO
	3. TCM	INFO
ECT SPORT does not operate	1. Shift solenoid valve SLT circuit *1	INFO
	2. Pattern select (SPORT) switch circuit	INFO
	3. TCM	INFO
Harsh engagement (1st -> 2nd -> 3rd -> 4th -> 5th)	Shift solenoid valve SR circuit *1	INFO
Slip or shudder (5th -> 6th and 6th -> 5th)	Shift solenoid valve SR circuit *1	INFO
	Shift solenoid valve SLT circuit *1	INFO

HINT:

*1: When the circuit is detective, a DTC may be output.

2. Chapter 2: On-Vehicle Repair and Off-Vehicle Repair

SYMPTOM	SUSPECTED AREA	SEE PAGE
	1. Transmission control rod	INFO
	2. Manual valve	INFO

Vehicle does not move in any forward position and reverse positions	3. Parking lock pawl	INFO
	4. Rear planetary gear unit	INFO
	5. Torque converter clutch	INFO
Vehicle does not move in R position	1. Valve body assembly	INFO
	2. Brake No. 4 (B4)	INFO
No up-shift (1st -> 2nd)	1. Valve body assembly	INFO
	2. Brake No. 3 (B3)	INFO
	3. One-way clutch No. 1 (F1)	INFO
	4. One-way clutch No. 2 (F2)	INFO
No up-shift (2nd -> 3rd)	1. Valve body assembly	INFO
	2. Clutch No. 3 (C3)	INFO
No up-shift (3rd -> 4th)	1. Valve body assembly	INFO
	2. Clutch No. 2 (C2)	INFO
No up-shift (4th -> 5th)	1. Valve body assembly	INFO
	2. Brake No. 1 (B1)	INFO
No up-shift (5th -> 6th)	1. Valve body assembly	INFO
	2. Brake No. 2 (B2)	INFO
No down-shift (6th -> 5th)	Valve body assembly	INFO
No down-shift (5th -> 4th)	Valve body assembly	INFO
No down-shift (4th -> 3rd)	Valve body assembly	INFO
No down-shift (3rd -> 2nd)	Valve body assembly	INFO
No down-shift (2nd -> 1st)	Valve body assembly	INFO
No lock-up or No lock-up off	1. Valve body assembly	INFO
	2. Torque converter clutch	INFO
Harsh engagement (N -> D)	1. Valve body assembly	INFO
	2. C1 accumulator	INFO
	3. Clutch No. 1 (C1)	INFO
	4. One-way clutch No. 3 (F3)	INFO
	5. One-way clutch No. 4 (F4)	INFO
Harsh engagement (Lock-up)	1. Valve body assembly	INFO
	2. Torque converter clutch	INFO
	1. Valve body assembly	INFO

Harsh engagement (N -> R)	2. C3 accumulator	INFO
	3. Clutch No. 3 (C3)	INFO
	4. Brake No. 4 (B4)	INFO
	5. One-way clutch No. 1 (F1)	INFO
Harsh engagement (1st -> 2nd -> 3rd -> 4th -> 5th -> 6th)	Valve body assembly	INFO
Harsh engagement (1st -> 2nd)	1. Valve body assembly	INFO
	2. B3 accumulator	INFO
	3. Brake No. 3 (B3)	INFO
	4. One-way clutch No. 1 (F1)	INFO
	5. One-way clutch No. 2 (F2)	INFO
Harsh engagement (2nd -> 3rd)	1. Valve body assembly	INFO
	2. C3 accumulator	INFO
	3. Clutch No. 3 (C3)	INFO
Harsh engagement (3rd -> 4th)	1. Valve body assembly	INFO
	2. C2 accumulator	INFO
	3. Clutch No. 2 (C2)	INFO
Harsh engagement (4th -> 5th)	1. Valve body assembly	INFO
	2. B1 accumulator	INFO
	3. Brake No. 1 (B1)	INFO
Harsh engagement (5th -> 6th)	1. Valve body assembly	INFO
	2. B2 accumulator	INFO
	3. Brake No. 2 (B2)	INFO
Harsh engagement (6th -> 5th)	1. Valve body assembly	INFO
	2. C3 accumulator	INFO
	3. Clutch No. 3 (C3)	INFO
Slip or shudder (Forward and reverse: After warm-up)	1. Valve body assembly	INFO
	2. Oil strainer	INFO
	3. One-way clutch No. 1 (F1)	INFO
	4. Clutch No. 3 (C3)	INFO
	5. Torque converter clutch	INFO
Slip or shudder (Particular position: Just after engine starts)	Torque converter clutch	INFO
	1. Brake No. 4 (B4)	INFO

Slip or shudder (R position)	2. One-way clutch No. 1 (F1)	INFO
	3. Clutch No. 3 (C3)	INFO
Slip or shudder (1st)	1. Clutch No. 1 (C1)	INFO
	2. One-way clutch No. 3 (F3)	INFO
	3. One-way clutch No. 4 (F4)	INFO
Slip or shudder (2nd)	1. Clutch No. 1 (C1)	INFO
	2. Brake No. 3 (B3)	INFO
	3. One-way clutch No. 1 (F1)	INFO
	4. One-way clutch No. 2 (F2)	INFO
	5. One-way clutch No. 4 (F4)	INFO
Slip or shudder (3rd)	1. Clutch No. 1 (C1)	INFO
	2. Clutch No. 3 (C3)	INFO
	3. One-way clutch No. 1 (F1)	INFO
	4. One-way clutch No. 4 (F4)	INFO
Slip or shudder (4th)	1. Clutch No. 1 (C1)	INFO
	2. Clutch No. 2 (C2)	INFO
	3. One-way clutch No. 4 (F4)	INFO
Slip or shudder (5th)	1. Clutch No. 2 (C2)	INFO
	2. Clutch No. 3 (C3)	INFO
	3. Brake No. 1 (B1)	INFO
Slip or shudder (6th)	1. Clutch No. 2 (C2)	INFO
	2. Brake No. 2 (B2)	INFO
No engine braking (1st +- 4th: S position)	Clutch No. 4 (C4)	INFO
No engine braking (1st: 1 position)	1. Valve body assembly	INFO
	2. Brake No. 4 (B4)	INFO
No engine braking (2nd: 2 position)	1. Valve body assembly	INFO
	2. Brake No. 2 (B2)	INFO
No engine braking (3rd: 3 position)	1. Valve body assembly	INFO
	2. Brake No. 1 (B1)	INFO
No engine braking (4th: 4 position)	Valve body assembly	

		INFO
No kick-down	Valve body assembly	INFO
Shift point too high or too low	Valve body assembly	INFO
Poor acceleration (All positions)	1. Valve body assembly	INFO
	2. Torque converter clutch	INFO
Poor acceleration (6th)	1. Brake No. 2 (B2)	INFO
	2. Clutch No. 2 (C2)	INFO
	3. Front planetary gear unit	INFO
Engine stalls when starting off or stopping	1. Valve body assembly	INFO
	2. Torque converter clutch	INFO

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Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: ROAD TEST (2013 FR-S)		

ROAD TEST

1. PROBLEM SYMPTOM CONFIRMATION

- (a) Based on the result of the customer problem analysis, try to reproduce the symptoms. If the problem is that the transaxle does not shift up, shift down, or the shift point is too high or too low, conduct the following road test referring to the automatic shift schedule and simulate the problem symptoms.

2. ROAD TEST

- (a) Perform a road test.

CAUTION:

Check for safety before performing any tests.

NOTICE:

- Be sure to inspect and adjust the engine before performing these tests.
- Perform the road test with the engine coolant temperature between 60 and 90°C (140 and 194°F) and the ATF temperature between 40 and 110°C (104 and 230°F).
- Perform these tests with the air conditioning and cruise control off.

INSPECTION	PROCEDURE
Transmission Control Switch Test	With the vehicle stationary and the shift lever in D, move the shift lever to M and return it to D. Check that the meter display changes from D to the appropriate M position and then back again.
M Position Test	With the vehicle stationary and the shift lever in M, move the shift lever to "+" and "-". Check that the meter display changes between M position properly.
D Position Shift Test	While driving the vehicle normally, check that the transmission shifts up and down through each gear properly.
Lock-up Function	While driving on a level surface at a constant speed in the lock-up range (50 km/h (30 mph) or more) with the shift lever in D, lightly depress the accelerator pedal and check that the engine speed does not change abruptly.
P Position Test	Stop the vehicle on an incline (approximately 5° or more). Then move the shift lever to P and release the parking brake. Check that the parking lock pawl holds the vehicle in place.
Abnormal Noise and Vibration	Check for abnormal noise and vibration while driving the vehicle forward and backward, and during shift operations.
Fluid Leakage	After performing all other road test inspections, check for fluid leakage.

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Model Year: 2013	Model: FR-S	Doc ID: RM000001SM002VX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: Shift Paddle Switch Circuit (2013 FR-S)		

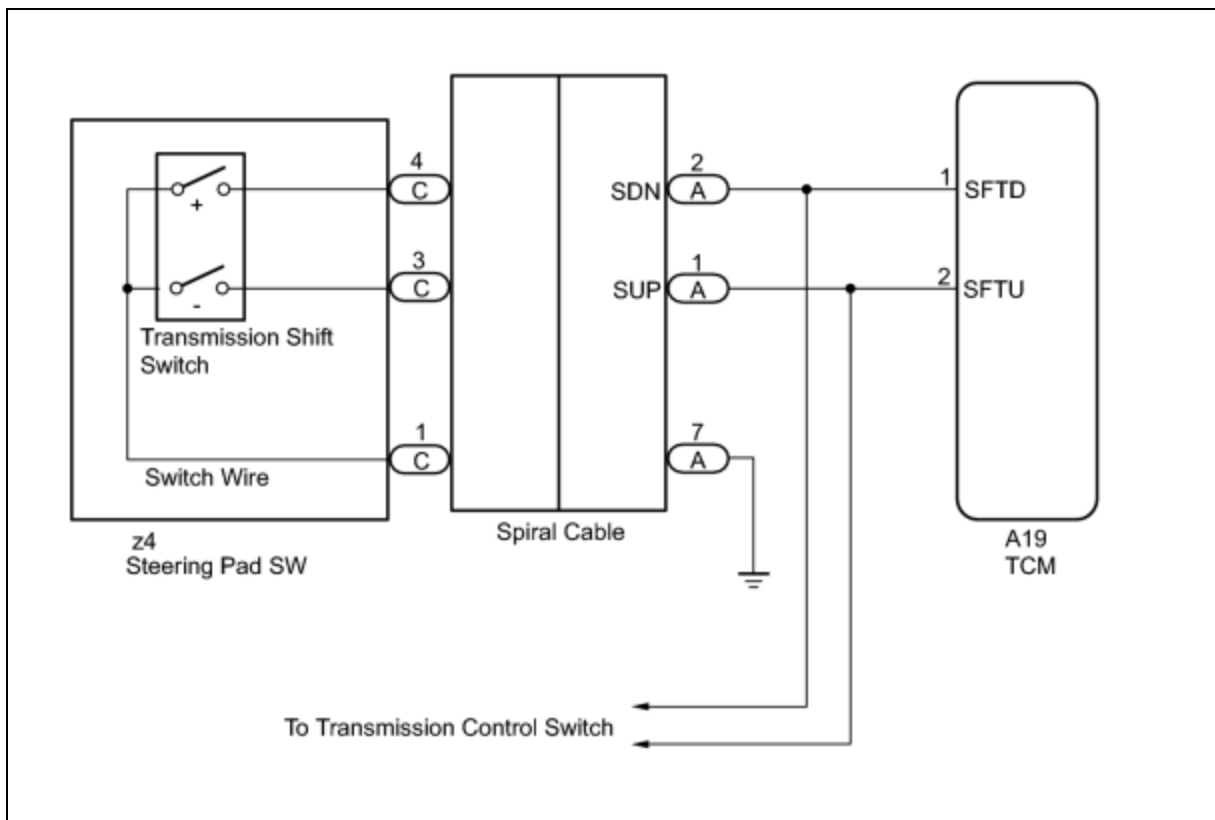
Shift Paddle Switch Circuit

DESCRIPTION

When the shift lever is in M, it is possible to change into any gear using the steering assembly transmission shift switch.

Additionally, when the vehicle is being driving with the shift lever in D, operating the steering assembly transmission shift switch changes to selection of gears with the shift lever in D, enabling shifting to any gear.

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	READ VALUE USING TECHSTREAM
----	-----------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Read the value displayed on the Techstream.

OK

TESTER DISPLAY	CONDITION	STANDARD
Sport Shift Up SW	Continuously shift to "+" (upshift): ON Release "+" (up-shift): OFF	-
Sport Shift Down SW	Continuously shift to "-" (down-shift): ON Release "-" (down-shift): OFF	-

NG ► **CHECK HARNESS AND CONNECTOR
(TRANSMISSION SHIFT SWITCH - TCM)**

OK ► **CHECK INTERMITTENT PROBLEMS**

2.	CHECK HARNESS AND CONNECTOR (TRANSMISSION SHIFT SWITCH - TCM)
-----------	--

- (a) Disconnect the TCM connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A19-1(SFTD) - Body ground	Pull continuously "+" (Up shift)	Below 1 Ω
	Release "+" or "-"	10 kΩ or higher
A19-2(SFTU) - Body ground	Pull continuously "-" (Down shift)	Below 1 Ω
	Release "+" or "-"	10 kΩ or higher

- (c) Connect the TCM connector.

NG ► **CHECK HARNESS AND CONNECTOR (SPIRAL
CABLE - BODY GROUND)**

OK
▼

--	--

3. REPLACE TCM

(a) Replace the TCM .

NEXT  **PERFORM THE RESET MEMORY**

4. CHECK HARNESS AND CONNECTOR (SPIRAL CABLE - BODY GROUND)

- (a) Disconnect the spiral cable connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A-7 - Body ground	Always	Below 1 Ω

(c) Connect the spiral cable connector.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



5. CHECK HARNESS AND CONNECTOR (SPIRAL CABLE - TCM)

- (a) Disconnect the TCM connector.
(b) Disconnect the spiral cable connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A19-1(SFTD) - A-2	Always	Below 1 Ω
A19-2(SFTU) - A-1	Always	Below 1 Ω
A19-1(SFTD) or A-2 - Body ground	Always	10 k Ω or higher
A19-2(SFTU) or A-1 - Body ground	Always	10 k Ω or higher

- (d) Connect the TCM connector.
(e) Connect the spiral cable connector.

OK



6.	CHECK TRANSMISSION SHIFT SWITCH (TRANSMISSION SHIFT SWITCH - SPIRAL CABLE)
-----------	---

- (a) Disconnect the spiral cable connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance:


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C-4 - C-1	Pull continuously "+" (Up shift)	Below 1 Ω
	Release "+" or "-"	10 kΩ or higher
C-3 - C-1	Pull continuously "-" (Down shift)	Below 1 Ω
	Release "+" or "-"	10 kΩ or higher

- (c) Connect the spiral cable connector.

NG ▶ **INSPECT TRANSMISSION SHIFT SWITCH ASSEMBLY**

OK ▶ **INSPECT SPIRAL CABLE SUB-ASSEMBLY**

7.	INSPECT TRANSMISSION SHIFT SWITCH ASSEMBLY
-----------	---

- (a) Inspect the transmission shift switch assembly  .

NG ▶ **REPLACE TRANSMISSION SHIFT SWITCH ASSEMBLY**

OK ▶ **REPLACE SWITCH NO.1 WIRE**

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Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

(a) The ECT (Electronic controlled automatic transmission) is an automatic transmission that electronically controls shift timing using the TCM. The TCM detects electrical signals that indicate engine and driving conditions, and controls the shift point, based on driver habits and road conditions. As a result, fuel efficiency and power transmission performance are improved.

Shift shock has been reduced by controlling the engine and transmission simultaneously.

In addition, the ECT has features such as follows:

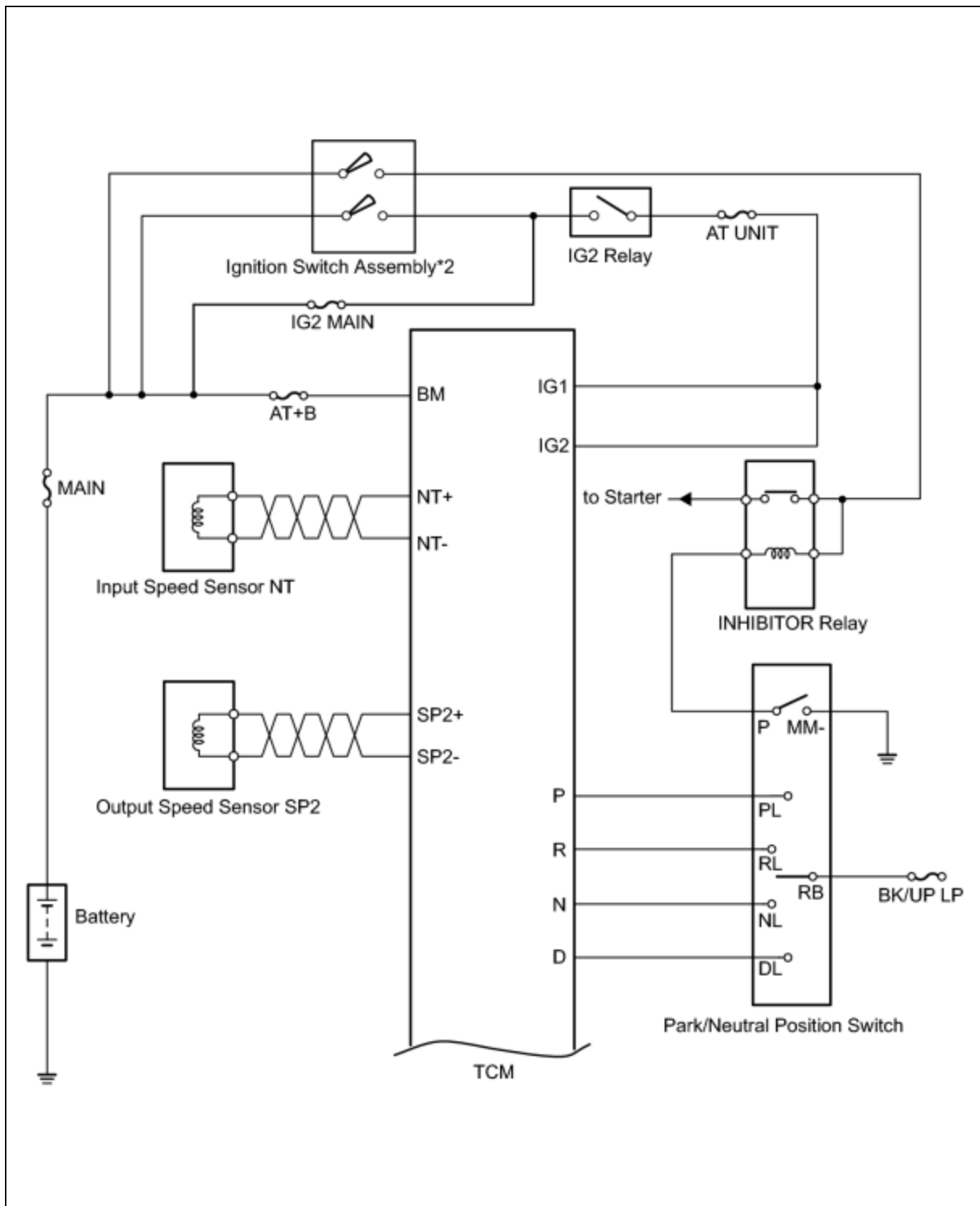
- Diagnostic function.
- Fail-safe function when a malfunction occurs.

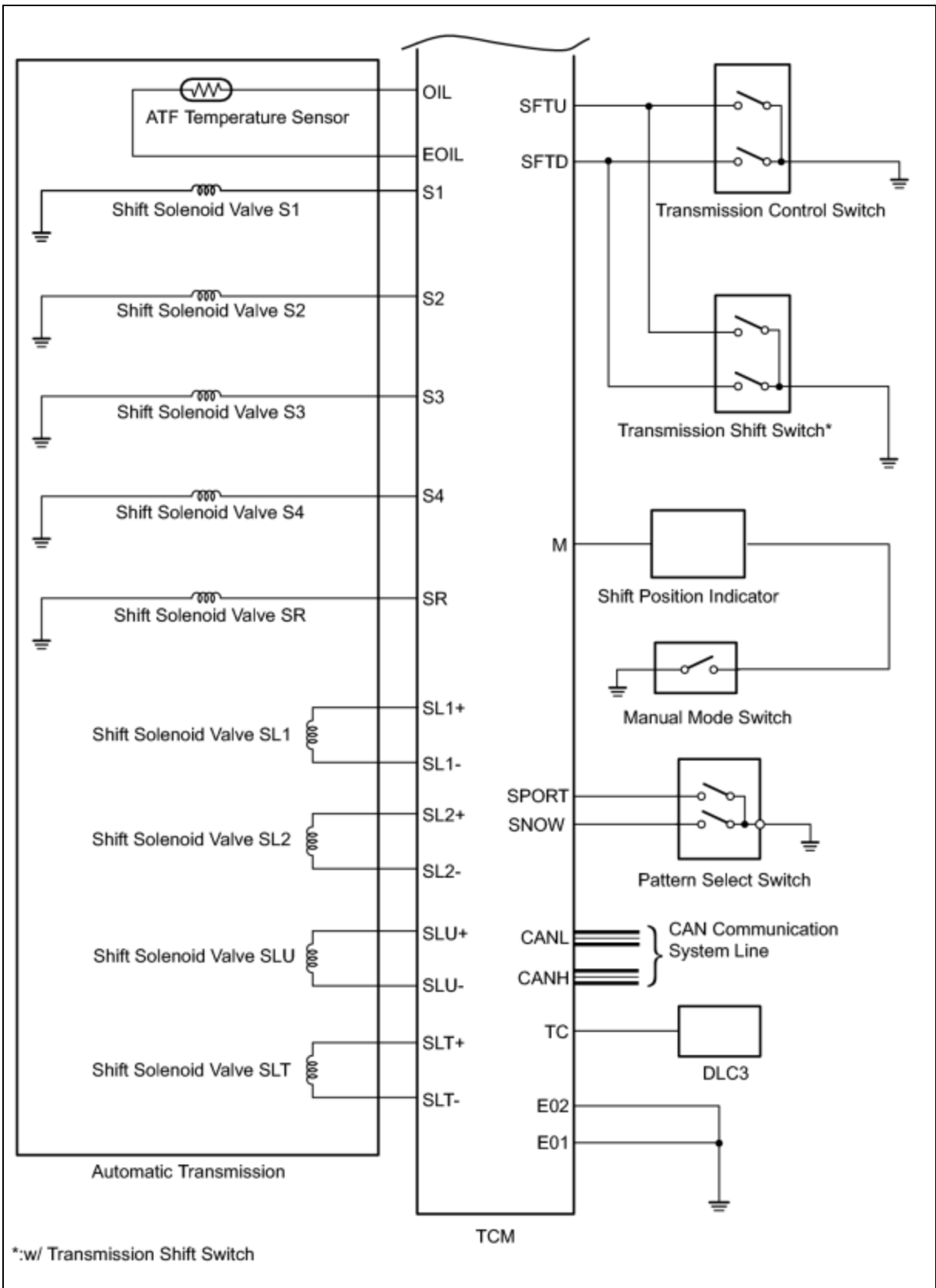


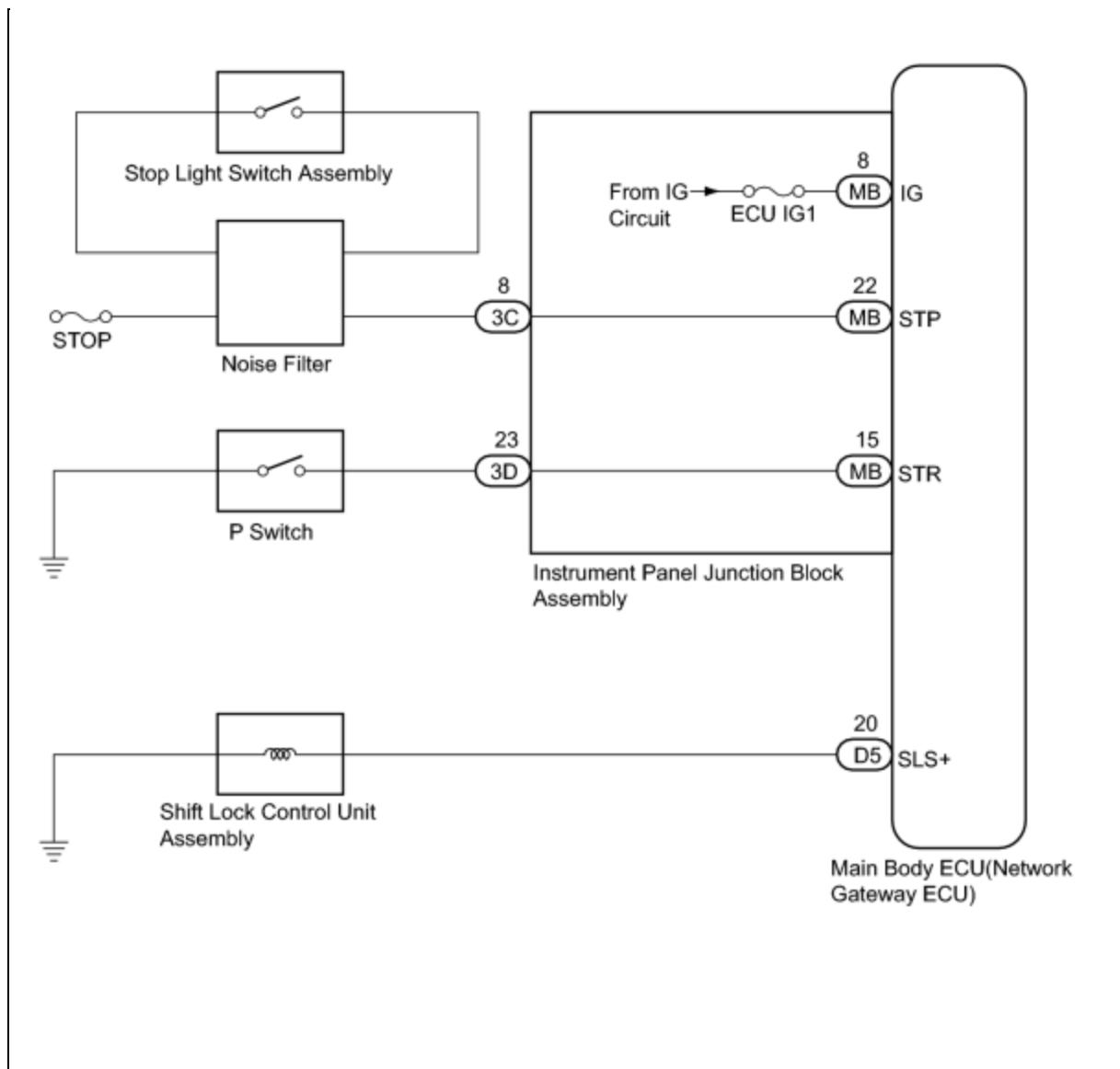
Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W7D0GUX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM

The configuration of the electronic control system in the A960E automatic transmission is as shown in the following chart.



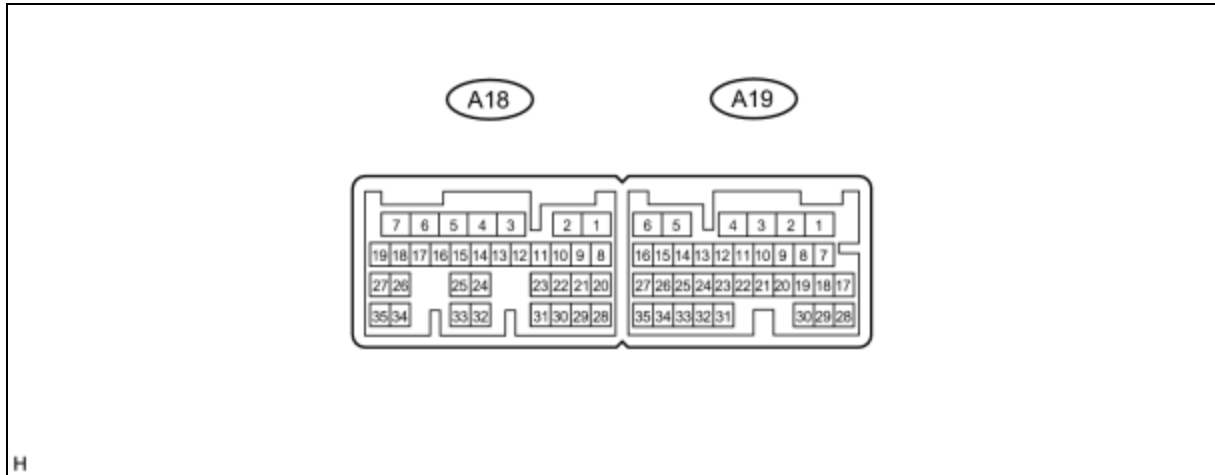




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Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. TCM



HINT:

Each TCM terminal's standard voltage is shown in the table below.

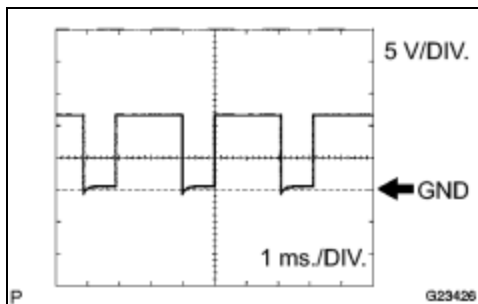
In the table, first follow the information under "Condition". Look under "Symbols (Terminal No.)" for the terminals to be inspected. The standard voltage between the terminals is shown under "Specific Condition".

Use the illustration above as a reference for the TCM terminals.

TERMINALS NO. (SYMBOLS)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A19-9(D) - A18-33(E01)	BR - B-Y	D shift position switch signal	Ignition switch ON and shift lever in D and M	11 to 14 V
			Ignition switch ON and shift lever except in D and M	Below 1 V
A19-10(R) - A18-33(E01)	V - B-Y	R shift position switch signal	Ignition switch ON and shift lever in R	11 to 14 V
			Ignition switch ON and shift lever except in R	Below 1 V
A19-1(SFTD) - A18-33(E01)	BE - B-Y	Down shift switch signal	Ignition switch ON and shift lever in "-" (Down shift)	Below 1 V
A19-2(SFTU) - A18-33(E02)	SB - B-Y	Up shift switch signal	Ignition switch ON and shift lever in "+" (Up shift)	Below 1 V
A19-8(M) - A18-33(E01)	O-B - B-Y	M shift position switch signal	Ignition switch ON and shift lever in M	11 to 14 V
			Ignition switch ON and shift lever except in M	Below 1 V

A19-3(P) - A18-33(E01)	BR - B-Y	Park position switch signal	Ignition switch ON and shift lever in P	11 to 14 V
			Ignition switch ON and shift lever except in P	Below 1 V
A19-21(N) - A18-33(E01)	B-G - B-Y	Neutral position switch signal	Ignition switch ON and shift lever in N	11 to 14 V
			Ignition switch ON and shift lever except in N	Below 1 V
A18-13(SLU+) - A18-1(SLU-)	LG - LG-Y	SLU solenoid signal	2nd, 3rd, 4th, 5th or 6th gear (each gear lock-up, M position)	Pulse generation (See waveform 2)
A18-15(SR) - A18-33(E01)	R-B - B-Y	SR solenoid signal	1st, 2nd, 3rd or 4th gear	11 to 14 V
			5th or 6th gear	Below 1 V
A18-14(S4) - A18-33(E01)	L-W - B-Y	S4 solenoid signal	2nd, 5th or 6th gear	11 to 14 V
			1st, 3rd or 4th gear	Below 1 V
A18-6(S3) - A18-33(E01)	L-Y - B-Y	S3 solenoid signal	1st, 2nd or 3rd gear	11 to 14 V
			4th, 5th or 6th gear	Below 1 V
A18-17(S2) - A18-33(E01)	L-O - B-Y	S2 solenoid signal	1st, 2nd or 6th gear	11 to 14 V
			3rd, 4th or 5th gear	Below 1 V
A18-7(S1) - A18-33(E01)	Y - B-Y	S1 solenoid signal	1st gear	Below 1 V
			Except 1st gear	11 to 14 V
A18-5(SL2+) - A18-11(SL2-)	BR-A - BR-B	SL2 solenoid signal	Engine idle speed	Pulse generation (See waveform 3)
A18-16(SL1+) - A18-12(SL1-)	BR - BR-Y	SL1 solenoid signal	5th or 6th gear	Pulse generation (See waveform 4)
A19-18(SP2+) - A19-7(SP2-)	B - W	Output speed sensor SP2 signal	Vehicle speed 20 km/h (12 mph)	Pulse generation (See waveform 6)
A19-17(NT+) - A19-28(NT-)	G - L	Input speed sensor NT signal	Engine idle speed (P or N position)	Pulse generation (See waveform 5)
A18-4(SLT+) - A18-9(SLT-)	L-R - R-W	SLT solenoid signal	Engine idle speed	Pulse generation (See waveform 1)
A18-22(OIL) - A18-23(EOIL)	R - G-B	ATF temperature sensor signal	ATF temperature: 115°C (239°F) or more	Below 1 V
A18-33(E01) -	B-Y - Body	Ground	Always	Below 1 Ω

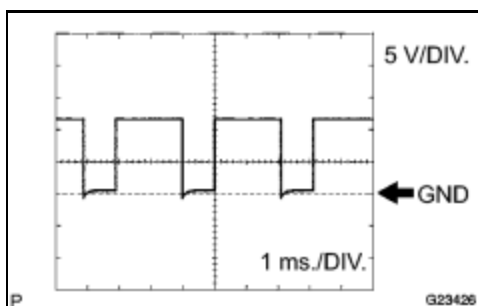
Body ground	ground			
A18-3(E02) - Body ground	B-Y - Body ground	Ground	Always	Below 1 Ω
A18-29(CANH) - A18-33(E01)	B-W - B-Y	CAN communication line	Ignition switch ON	Pulse generation (See waveform 7)
A18-28(CANL) - A18-33(E01)	L - B-Y	CAN communication line	Ignition switch ON	Pulse generation (See waveform 8)
A18-34(IG1) - A18-33(E01)	P - B-Y	Starter signal	Ignition switch ON	11 to 14 V
A18-35(IG2) - A18-33(E01)	P - B-Y	Starter signal	Ignition switch ON	11 to 14 V
A18-26(BM) - A18-33(E01)	Y-R - B-Y	Battery	Always	11 to 14 V
A19-13(SPORT) - Body ground	L - B-Y	SPORT switch signal	Ignition switch ON and pattern select switch pressed continuously (SPORT)	11 to 14 V
			Ignition switch ON and pattern select switch released (SPORT)	Below 1 V
A19-24(SNOW) - Body ground	W-R - B-Y	SNOW switch signal	Ignition switch ON and pattern select switch pressed continuously (SNOW)	11 to 14 V
			Ignition switch ON and pattern select switch released (SNOW)	Below 1 V



(a) Waveform 1

Reference:

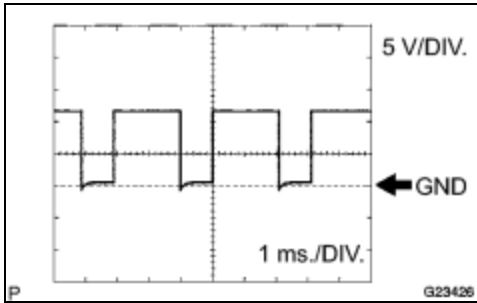
Terminal	A18-4(SLT) - A18-9(SLT-)
Tool setting	5 V/DIV., 1 ms./DIV.
Vehicle condition	Engine idle speed



(b) Waveform 2

Reference:

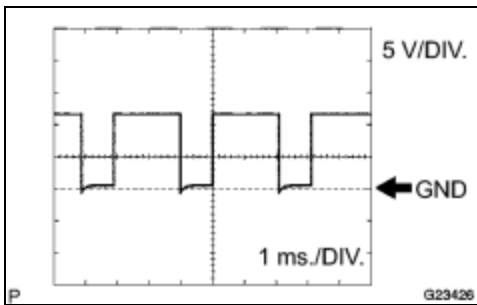
Terminal	A18-13(SLU+) - A18-1(SLU-)
Tool setting	5 V/DIV., 1 ms./DIV.
Vehicle condition	2nd, 3rd, 4th, 5th or 6th gear (each gear lock-up, M position)



(c) Waveform 3

Reference:

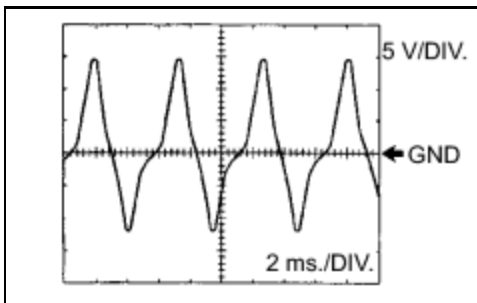
Terminal	A18-5(SL2+) - A18-11(SL2-)
Tool setting	5 V/DIV., 1 ms./DIV.
Vehicle condition	Engine idle speed



(d) Waveform 4

Reference:

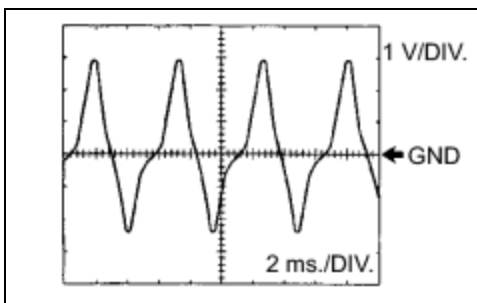
Terminal	A18-16(SL1+) - A18-12(SL1-)
Tool setting	5 V/DIV., 1 ms./DIV.
Vehicle condition	5th or 6th gear



(e) Waveform 5

Reference:

Terminal	A19-17(NT+) - A19-28(NT-)
Tool setting	5 V/DIV., 2 ms./DIV.
Vehicle condition	Engine idle speed (P or N position)



(f) Waveform 6

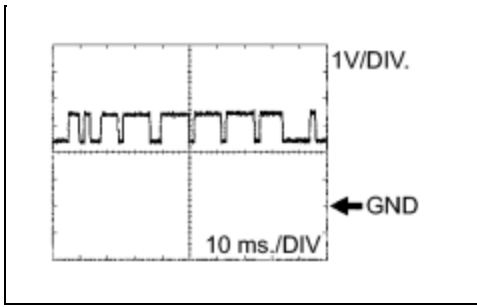
Reference:

Terminal	A19-18(SP2+) - A19-7(SP2-)
Tool setting	1 V/DIV., 2 ms./DIV.
Vehicle condition	Vehicle speed 20 km/h (12 mph)

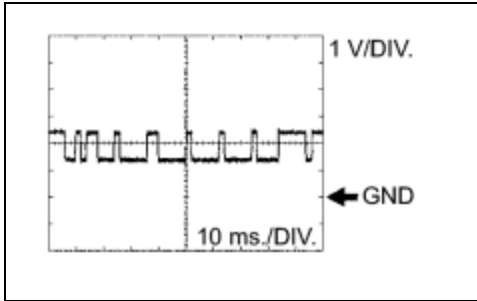
(g) Waveform 7

Reference:

Terminal	A18-29(CANH) - A18-33(E01)
Tool setting	1V/DIV., 10 ms./DIV.



Vehicle condition	Ignition switch ON



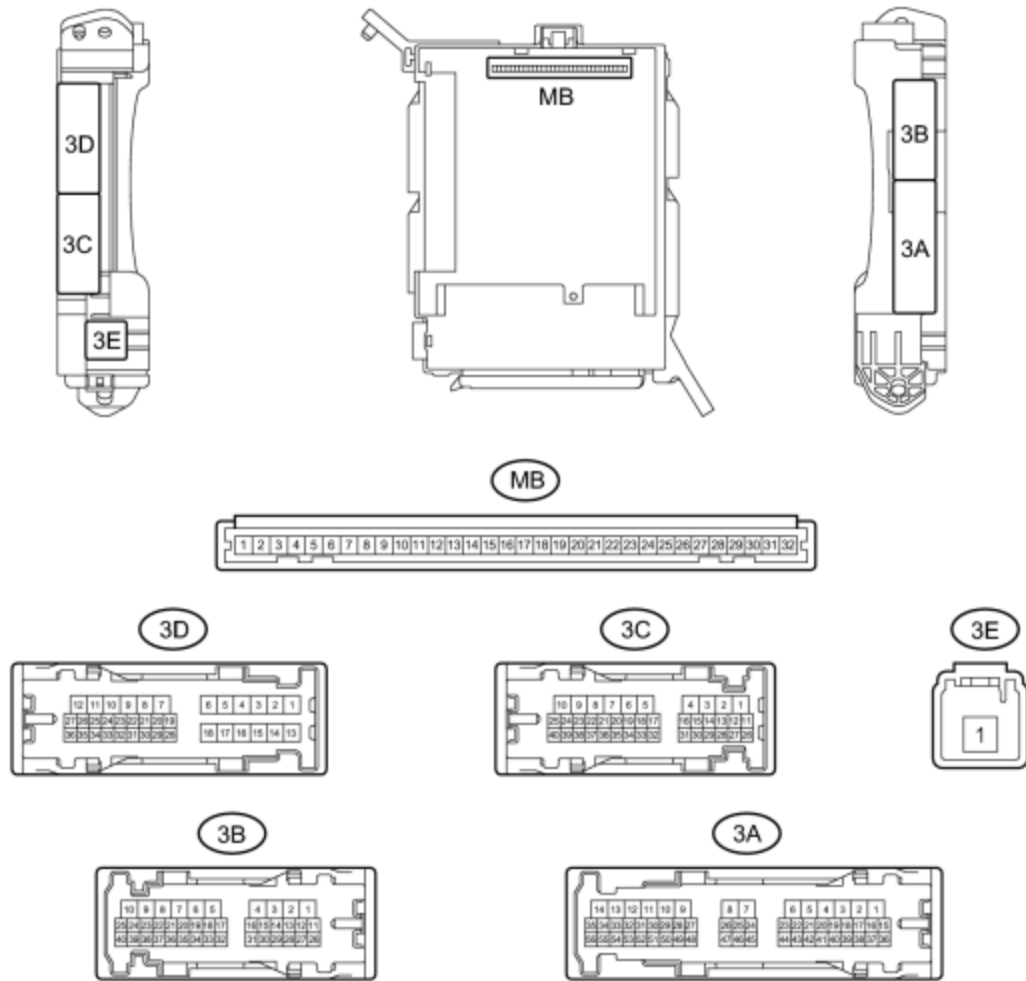
(h) Waveform 8

Reference:

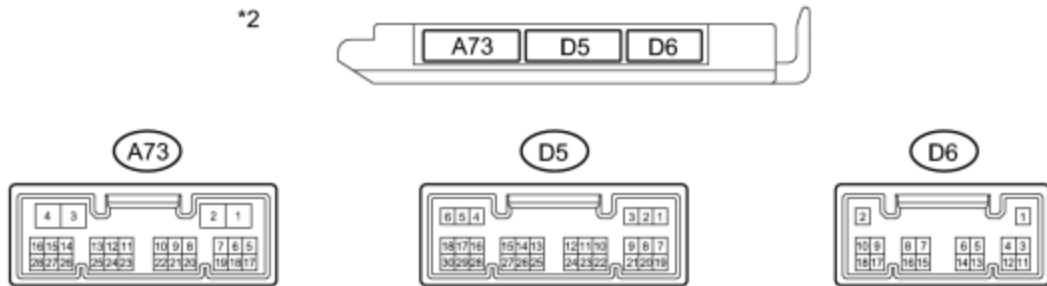
Terminal	A18-28(CANL) - A18-33(E01)
Tool setting	1V/DIV., 10 ms./DIV.
Vehicle condition	Ignition switch ON

2. Main Body ECU RH (Cowl Side Junction Block RH)

*1



*2



*1	Instrument Panel Junction Block Assembly	*2	Main Body ECU (Network Gateway ECU)
----	--	----	-------------------------------------

HINT:

Each ECU terminal's standard voltage is shown in the table below.

In the table, first follow the information under "Condition". Look under "Symbols (Terminal No.)" for the terminals to inspected. The standard voltage between the terminals is shown under "Specific Condition".

Use the illustration above as a reference for the ECU terminals.

TERMINALS NO. (SYMBOLS)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
D5-20(SLS+) - Body ground	R	Shift lock control unit assembly signal	Ignition switch ON, Shift lever P position, and Stop light switch ON	11 to 14 V
			Ignition switch ON, Shift lever P position, and Stop light switch OFF	Below 1 V
3C-8 - Body ground	R	Stop light switch signal	Stop light switch ON	11 to 14 V
			Stop light switch OFF	Below 1 V
3D-23 - Body ground	WL	Park position switch signal	Shift lever except P position	11 to 14 V
			Shift lever P position	Below 1 V

HINT:

***1: Voltage is input intermittently as this is an intermittent circuit. (Voltage varies between a peak of 7.5 to 14 V and a low of 0 to 1.5 V.)**



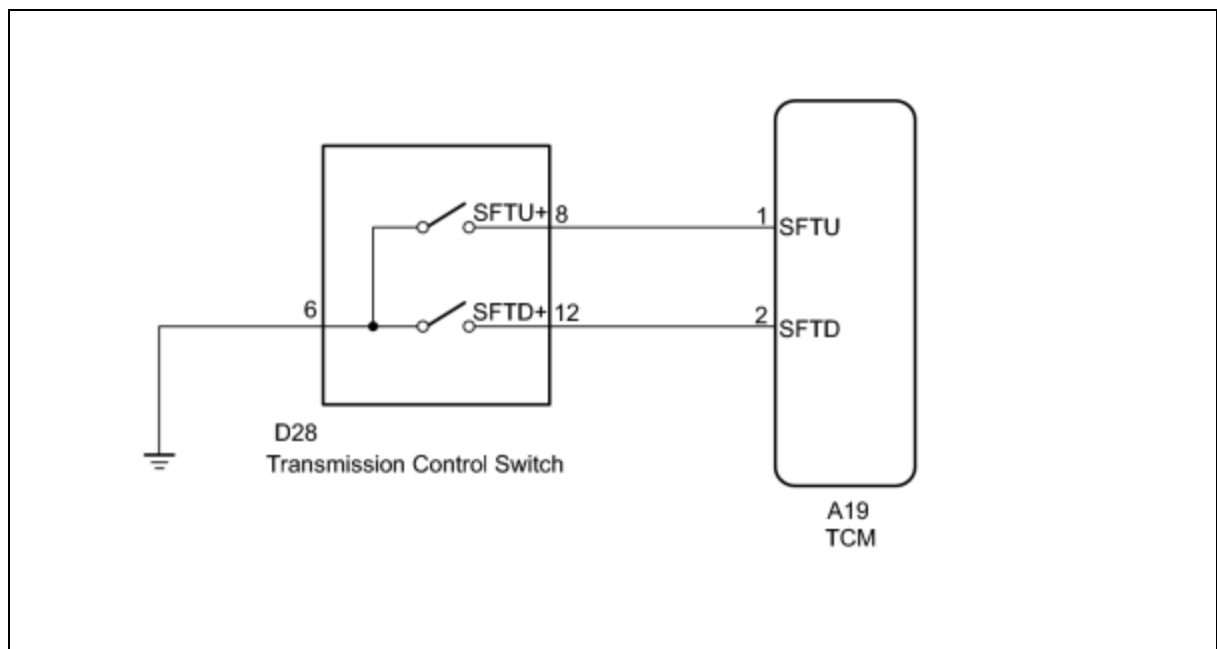
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WP10COX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: Transmission Control Switch Circuit (2013 FR-S)		

Transmission Control Switch Circuit

DESCRIPTION

When the shift lever is in M, it is possible to change into any gear using the floor shift lever assembly sequential gate.

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	INSPECT TRANSMISSION CONTROL SWITCH
-----------	--

(a) Disconnect the D28 transmission control switch connector.

(b) Perform inspection of the transmission control switch INFO.

NG ▶ **REPLACE TRANSMISSION CONTROL SWITCH**

OK



2.	CHECK HARNESS AND CONNECTOR (TRANSMISSION CONTROL SWITCH - TCM)
-----------	--

(a) Disconnect the A19 TCM connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	SHIFT POSITION	SPECIFIED CONDITION
A19-1(SFTU) - Body ground	Press continuously "+" (Up shift)	Below 1 Ω
	M	10 k Ω or higher
A19-2(SFTD) - Body ground	Press continuously "-" (Down shift)	Below 1 Ω
	M	10 k Ω or higher

(c) Connect the A19 TCM connector.

**REPAIR OR REPLACE HARNESS OR
NG CONNECTOR**

OK



3.	REPLACE TCM
-----------	--------------------

(a) Replace the TCM .

NEXT PERFORM THE RESET MEMORY

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000057Y4000X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: U0073,U0401,U0416,U0422,U0423: Control Module Communication Bus OFF (2013 FR-S)		

DTC	U0073	Control Module Communication Bus OFF
------------	--------------	---

DTC	U0401	Invalid Data Received from ECM/PCM "A"
------------	--------------	---

DTC	U0416	Invalid Data Received from Vehicle Dynamics Control Module
------------	--------------	---

DTC	U0422	Invalid Data Received from Body Control Module
------------	--------------	---

DTC	U0423	Invalid Data Received from Instrument Panel Cluster Control Module
------------	--------------	---

DESCRIPTION

HINT:

- Problems on the CAN bus (communication line) can be detected from the DLC3 connector (Except when the DLC3 branch line is open).
- By using the Techstream, it is possible to check CAN communication DTC.
- The DLC3 is connected to the CAN communication line, but the CAN communication is unable to detect problems on the DLC3 branch line.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER	
U0073	1. Ignition voltage is 9 V or more, and this condition continues for 1 second or more. 2. Data reception and transmission are not possible 3. 500 ms 4. 1-trip detection logic	CAN communication system
U0401	1. CAN bus is normal. 2. Reception of malfunction signal from the ECM. 3. 50 times 4. 1-trip detection logic	CAN communication system
	1. CAN bus is normal. 2. Reception of malfunction signal from the skid control ECU	

U0416	(brake actuator assembly). 3. 40 times 4. 1-trip detection logic	CAN communication system
U0422	1. CAN bus is normal. 2. Reception of malfunction signal from the main body ECU (network gateway ECU). 3. 40 times 4. 1-trip detection logic	CAN communication system
U0423	1. CAN bus is normal. 2. Reception of malfunction signal from the combination meter assembly. 3. 40 times 4. 1-trip detection logic	CAN communication system

MONITOR STRATEGY

Related DTCs	U0073: CAN Bus Off U0401: TCM Communication Counter U0416: VSC Communication Counter
Required Sensors/Components	U0073: TCM U0401: TCM U0406: Skid Control ECU
Frequency of Operation	Continuous
Duration	1 count
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

U0073: CAN Bus Off

Battery voltage	9.0 V or more
Above condition satisfied for	1 sec. or more

U0401: TCM Communication Counter

Battery voltage	9.0 V or more
Above condition satisfied for	1 sec. or more
CAN BUS OFF(U0073)	No failure

U0416: VSC Communication Counter

Battery voltage	9.0 V or more
Above condition satisfied for	1 sec. or more

CAN BUS OFF(U0073)	No failure
--------------------	------------

TYPICAL MALFUNCTION THRESHOLDS

U0073: CAN Bus Off

The CAN controller performs confirmation of bus by 50 msec. period and becomes bus off consecutively.	1 count or more
---	-----------------

U0401: TCM Communication Counter

Communication counter is not count up (Check communication counter value by 10ms period)	50 count
---	----------

U0416: VSC Communication Counter

Communication counter is not count up (Check communication counter value by 10ms period)	40 count
---	----------


INSPECTION PROCEDURE

NOTICE:

Perform the universal trip to clear permanent DTCs  .

PROCEDURE

1.	CHECK DTC OUTPUT
-----------	-------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and push the Techstream main switch ON.
- (c) Read the DTCs using the Techstream  .

NEXT  **GO TO CAN COMMUNICATION SYSTEM**



TOYOTA

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001RRQ05JX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION SYSTEM: U0100,U0122,U0140,U0155: Lost Communication with ECM / PCM "A" (2013 FR-S)		

DTC	U0100	Lost Communication with ECM / PCM "A"
------------	--------------	--

DTC	U0122	Lost Communication with Vehicle Dynamics Control Module
------------	--------------	--

DTC	U0140	Lost Communication with Body Control Module
------------	--------------	--

DTC	U0155	Lost Communication with Instrument Panel Cluster Control Module (Combination Meter)
------------	--------------	--

DESCRIPTION

The TCM receives and transmits signals from each ECU using CAN communication.

HINT:

- Problems on the CAN bus (communication line) can be detected from the DLC3 connector (Except when the DLC3 branch line is open).
- By using the Techstream, it is possible to check CAN communication DTC.
- The DLC3 is connected to the CAN communication line, but the CAN communication is unable to detect problems on the DLC3 branch line.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
	1. DIAGNOSIS CONDITION 2. MALFUNCTION STATUS 3. MALFUNCTION TIME 4. OTHER	
U0100	1. CAN bus is normal. 2. Signal from the ECM is interrupted. 3. 500 ms, 800 ms, 2000 ms (differs depending on ID) 4. 1-trip detection logic	CAN communication system
U0122	1. CAN bus is normal. 2. Signal from the skid control ECU (brake actuator assembly) is interrupted. 3. 800 ms 4. 1-trip detection logic	CAN communication system
U0140	1. CAN bus is normal. 2. Signal from the main body ECU (network gateway ECU) is interrupted.	CAN communication

	<ul style="list-style-type: none"> 3. 800 ms, 20000 ms (differs depending on ID) 4. 1-trip detection logic 	system
U0155	<ul style="list-style-type: none"> 1. CAN bus is normal. 2. Signal from combination meter assembly is interrupted. 3. 2000 ms 4. 1-trip detection logic 	CAN communication system

MONITOR STRATEGY

Related DTCs	U0100: Lost Communication with TCM U0122: Lost Communication with VSC
Required Sensors/Components	U0100: TCM U0122: Skid Control ECU
Frequency of Operation	Continuous
Duration	1 count
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Battery voltage	9.0 V or more
Above condition satisfied for	1 sec. or more
CAN BUS OFF(U0073)	No failure

TYPICAL MALFUNCTION THRESHOLDS

U0100: Lost Communication with TCM

Frame ID	Lost communication with TCM
----------	-----------------------------

U0122: Lost Communication with VSC

Frame ID	Lost communication with VSC
----------	-----------------------------

INSPECTION PROCEDURE

NOTICE:


Perform the universal trip to clear permanent DTCs INFO .

PROCEDURE

1.	CHECK OTHER DTC OUTPUT
----	-------------------------------

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON and push the Techstream main switch ON.

(c) Read the DTCs using the Techstream  .

Result:

DISPLAY (DTC OUTPUT)	PROCEED TO
U0100, U0122, U0140 or U0155	A
U0100, U0122, U0140 or U0155 and P160A	B

B  **GO TO P160A**


A



2.	CHECK DTC OUTPUT
-----------	-------------------------

(a) Connect the Techstream to the DLC3.

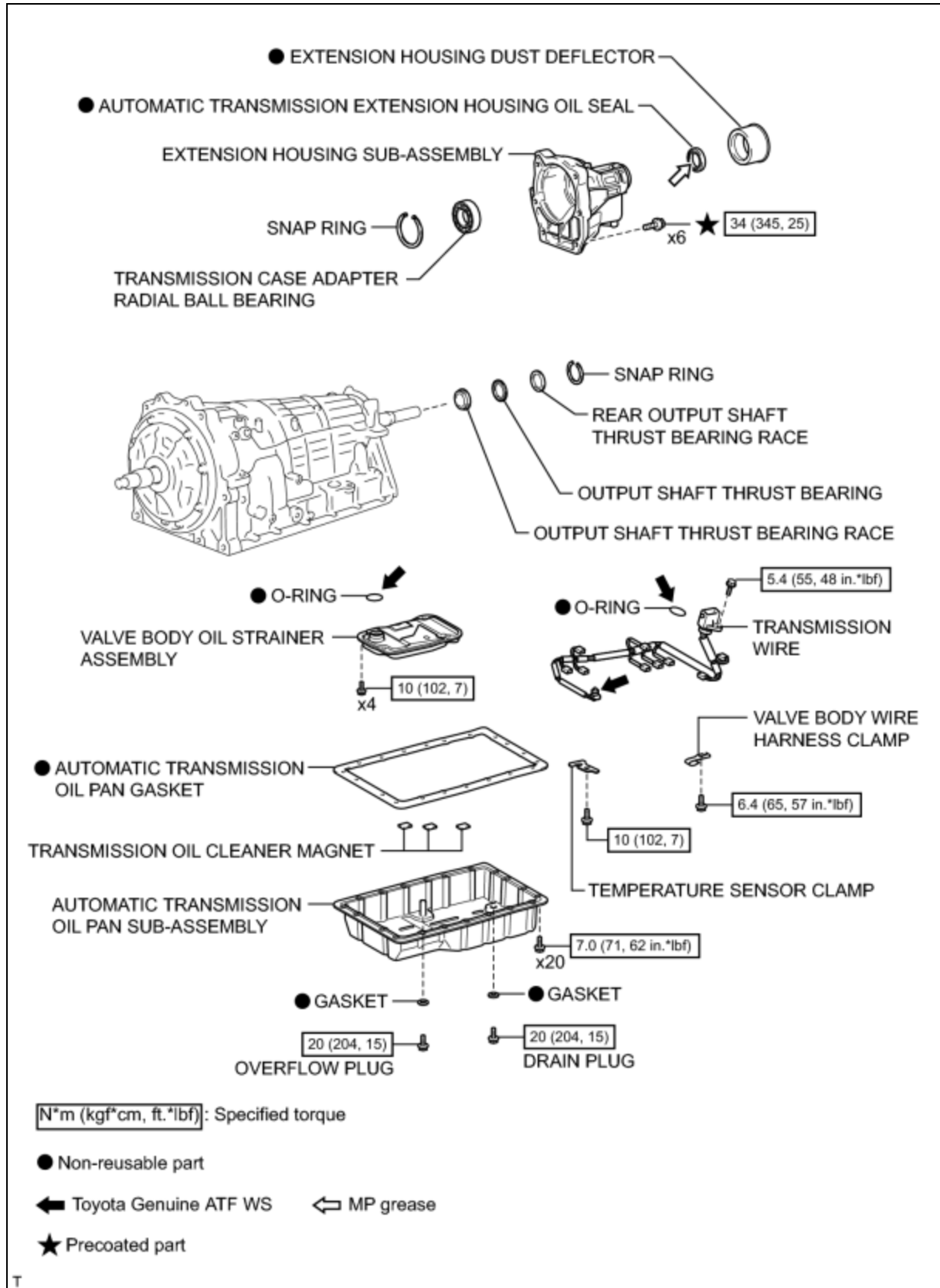
(b) Turn the ignition switch to ON and push the Techstream main switch ON.

(c) Read the DTCs using the Techstream  .

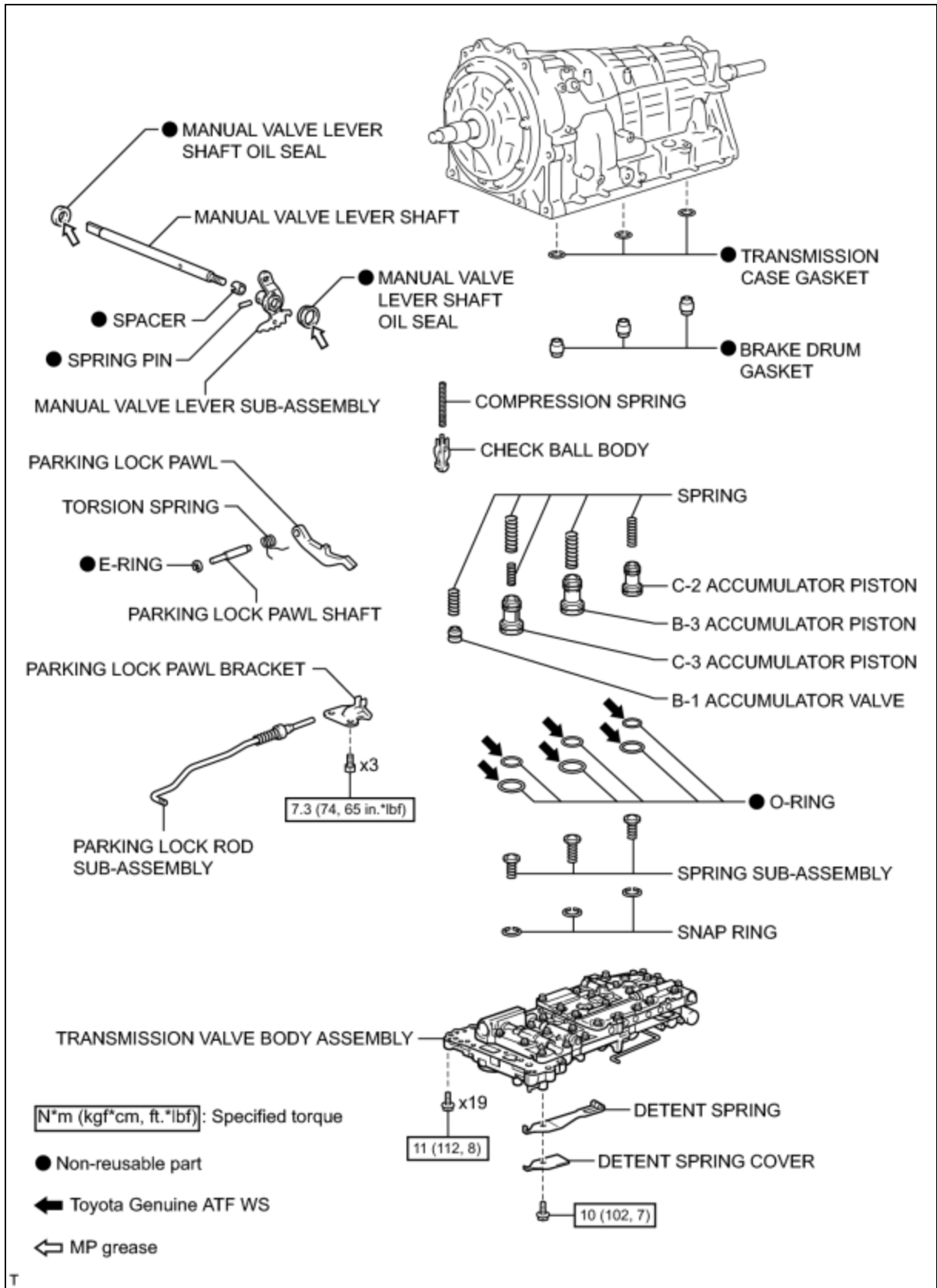
NEXT  **GO TO CAN COMMUNICATION SYSTEM**



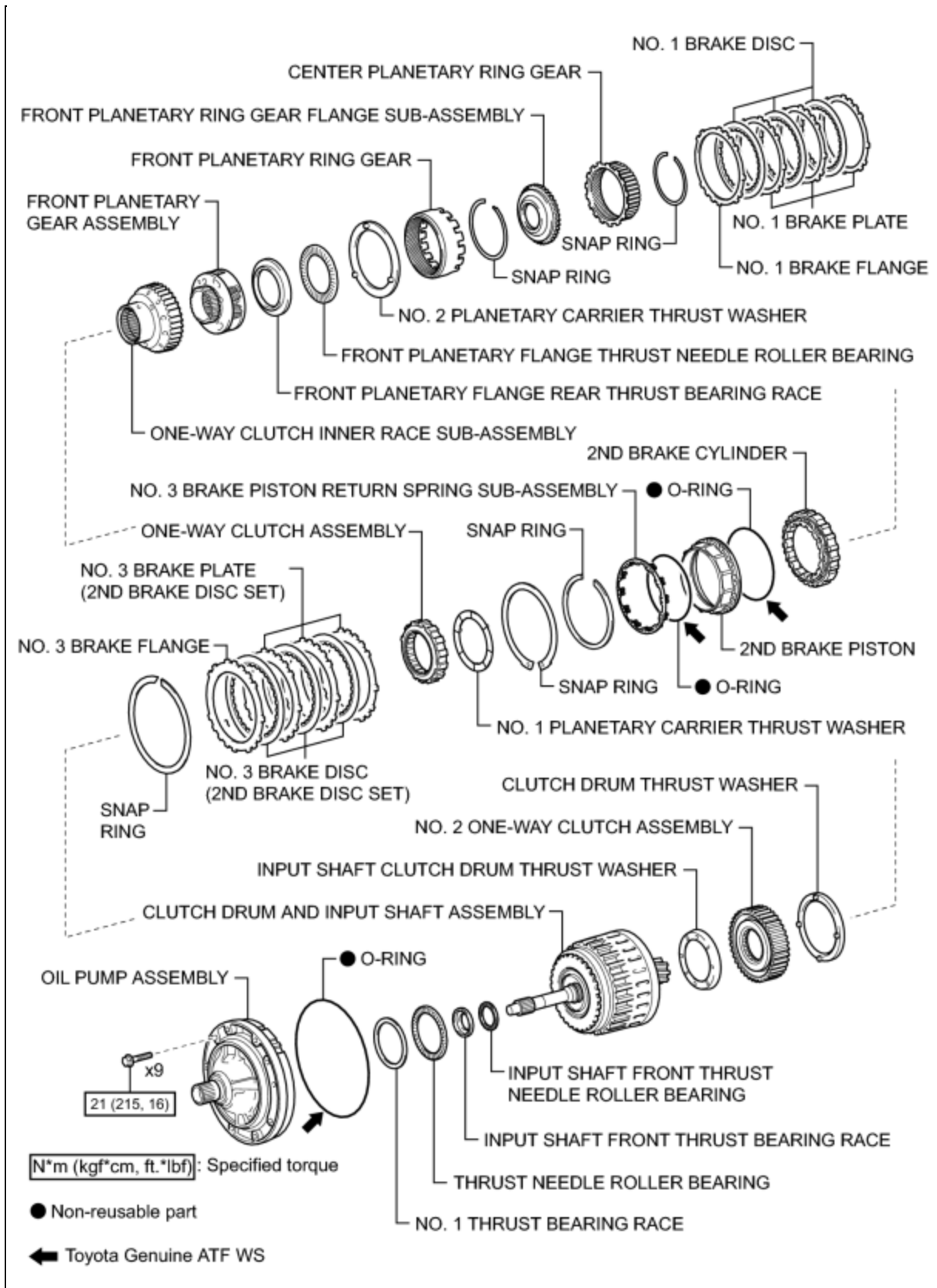
ILLUSTRATION



ILLUSTRATION

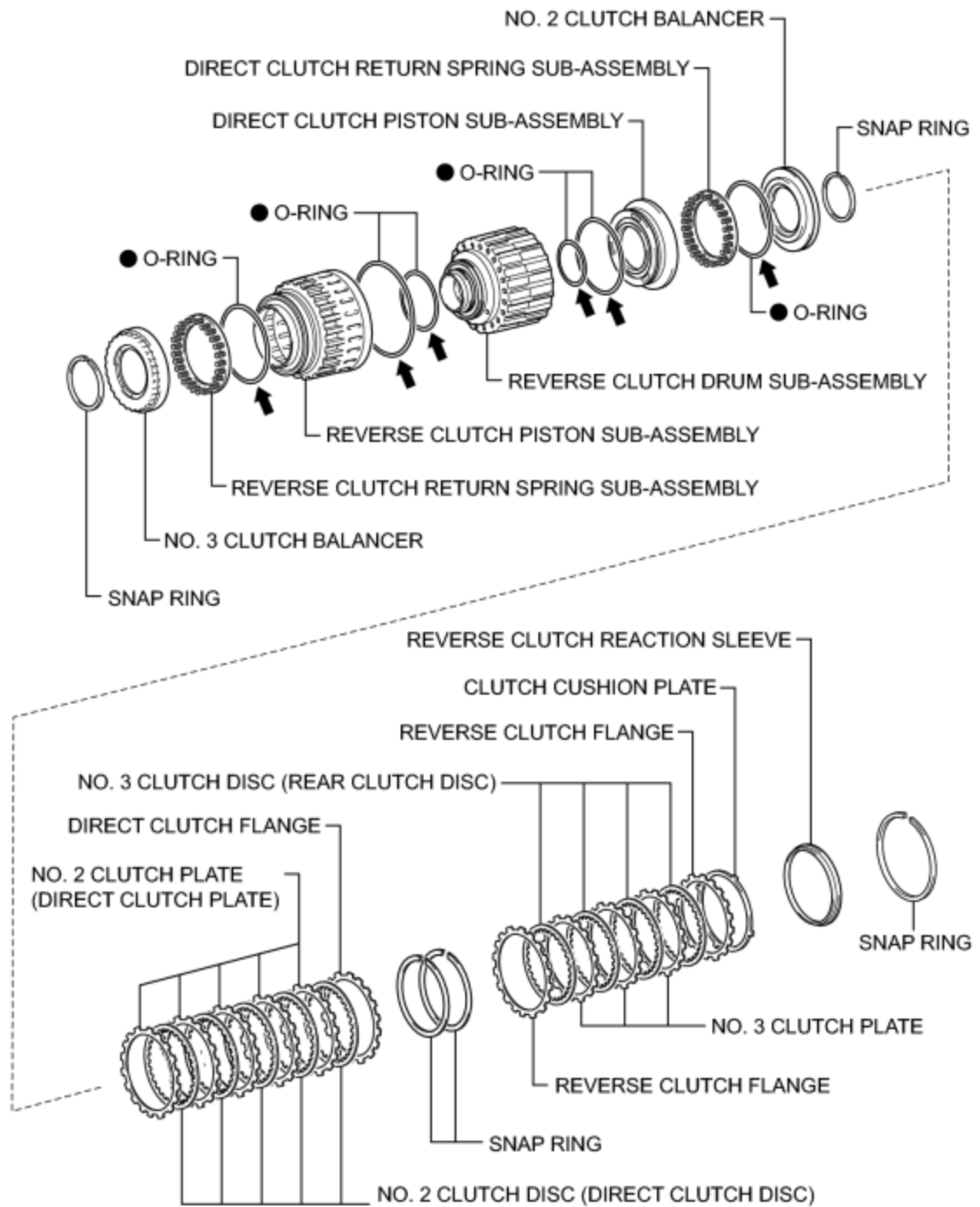


ILLUSTRATION



ILLUSTRATION

CLUTCH DRUM AND INPUT SHAFT ASSEMBLY:

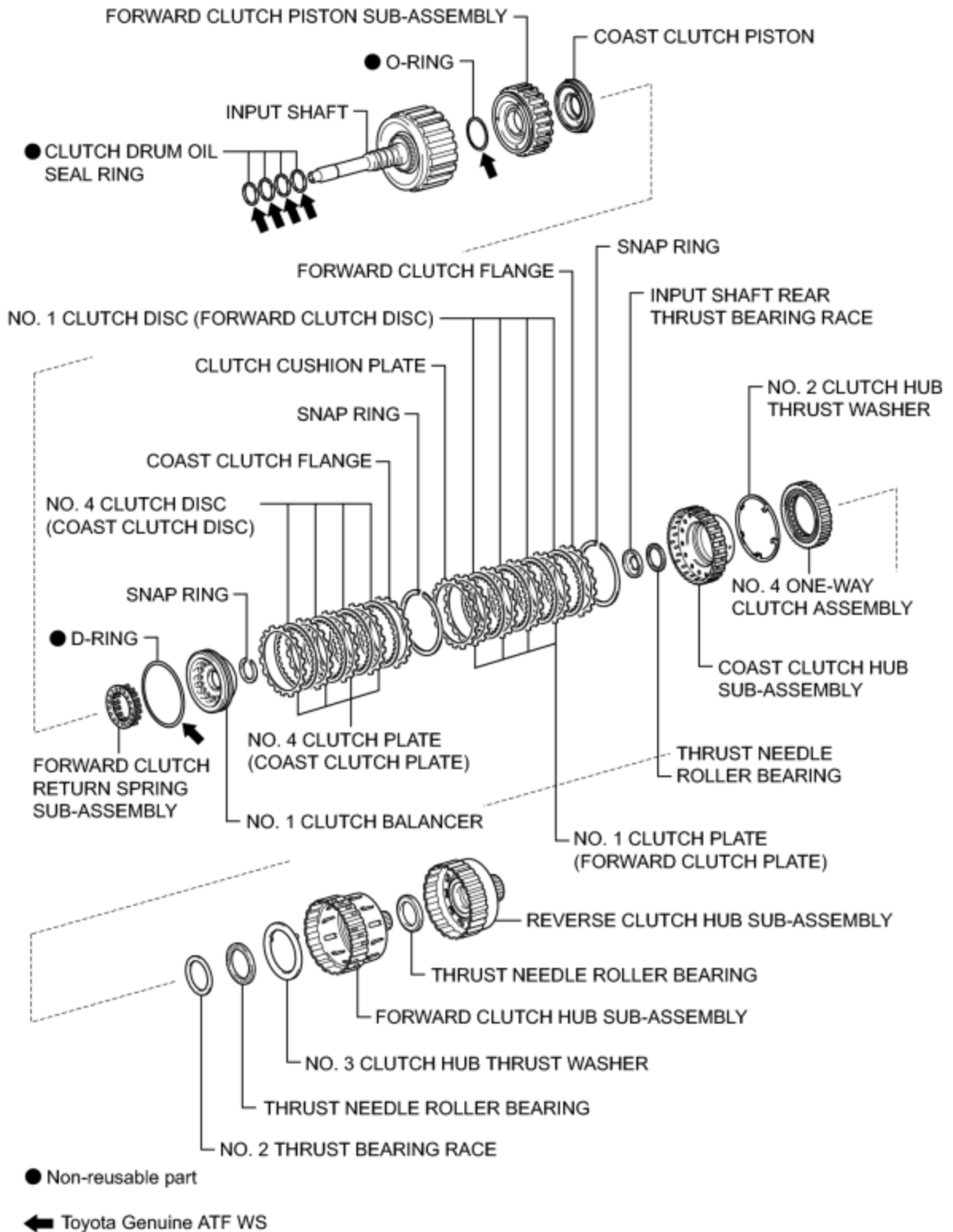


● Non-reusable part

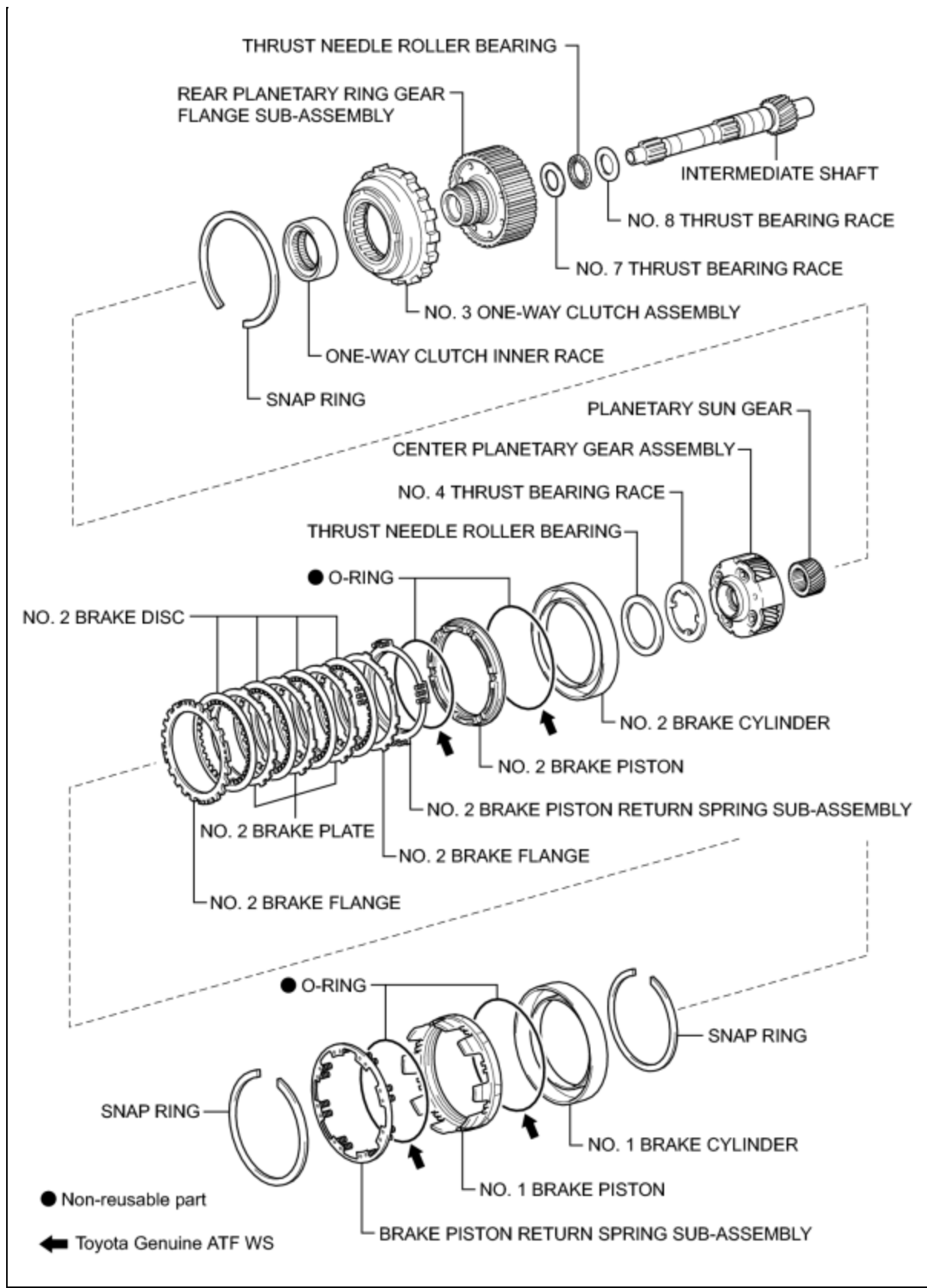
← Toyota Genuine ATF WS

ILLUSTRATION

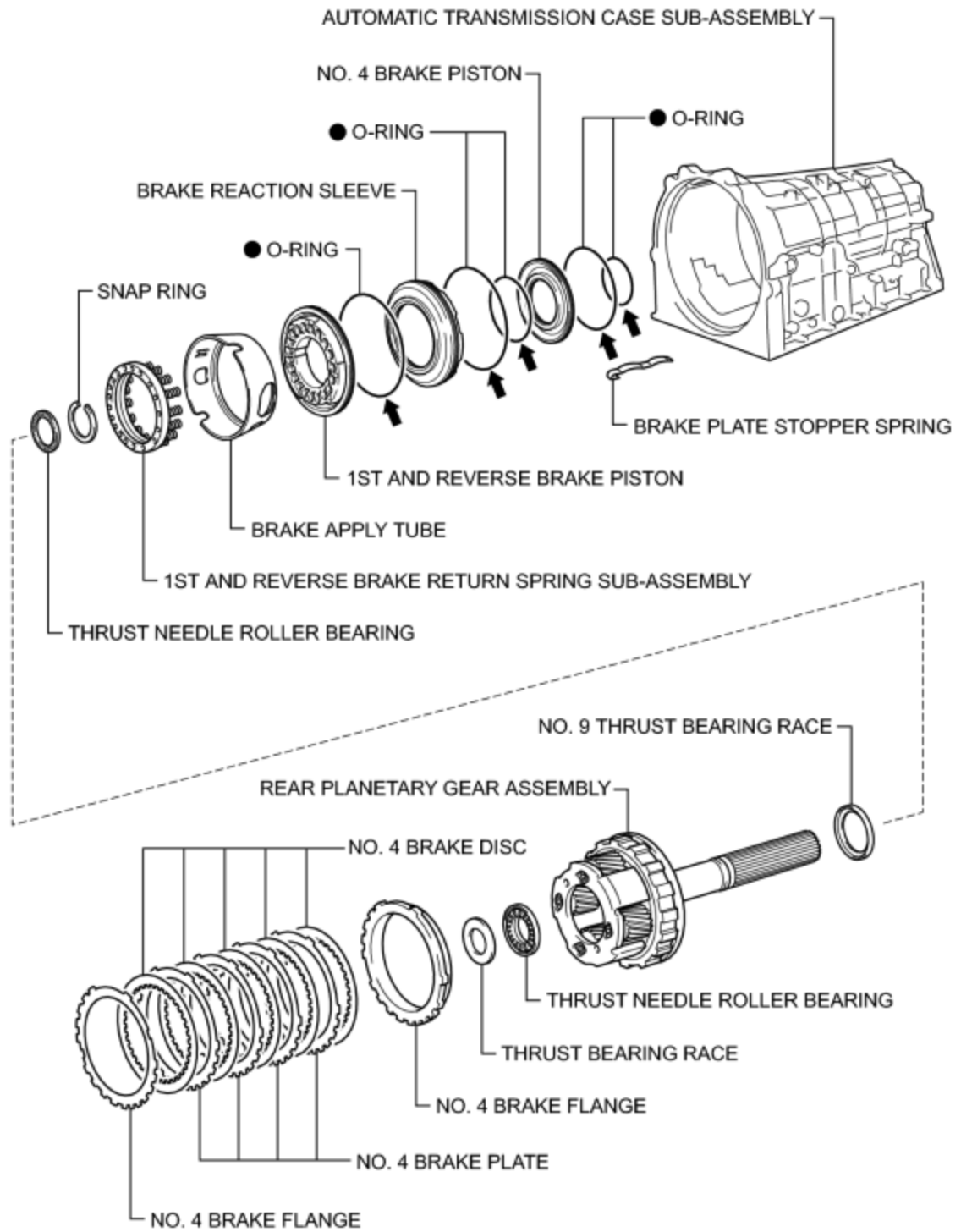
CLUTCH DRUM AND INPUT SHAFT ASSEMBLY:



ILLUSTRATION



ILLUSTRATION



● Non-reusable part

← Toyota Genuine ATF WS



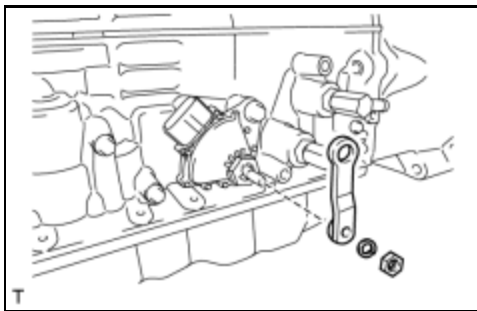
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000O9Z03PX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION UNIT: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. REMOVE REFILL PLUG

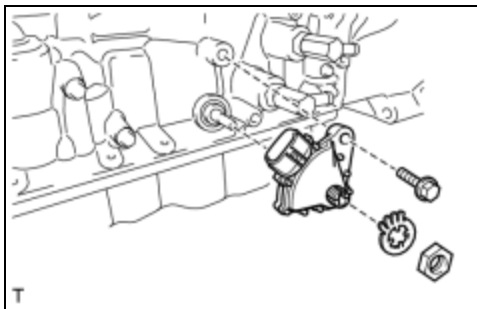
- (a) Remove the refill plug.
- (b) Remove the O-ring from the refill plug.

2. REMOVE TRANSMISSION CONTROL SHAFT LEVER RH



- (a) Remove the nut, spring washer and the transmission control shaft lever RH from the park/neutral position switch assembly.

3. REMOVE PARK/NEUTRAL POSITION SWITCH ASSEMBLY



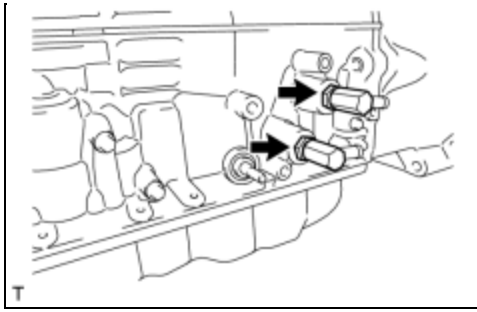
- (a) Using a screwdriver, bend the tabs of the lock washer.

- (b) Remove the nut and the lock washer.
- (c) Remove the bolt and the park/neutral position switch assembly from the automatic transmission case sub-assembly.

HINT:

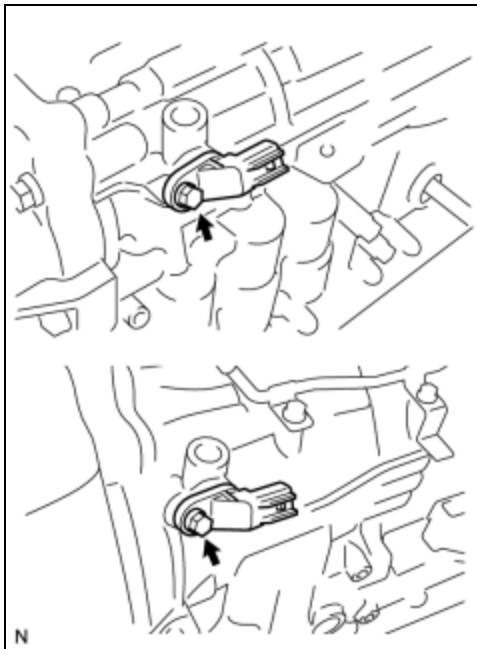
Make sure that the manual valve lever shaft has not been rotated prior to installing the park/neutral position switch assembly as the detent spring may become detached from the manual valve lever shaft.

4. REMOVE OIL COOLER TUBE UNION



- (a) Remove the 2 oil cooler tube union from the automatic transmission case sub-assembly.

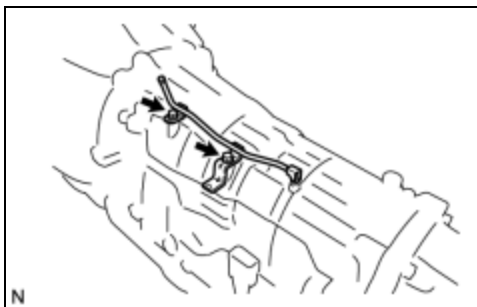
5. REMOVE TRANSMISSION REVOLUTION SENSOR



- (a) Remove the 2 bolts and the 2 transmission revolution sensors from the automatic transmission case sub-assembly.

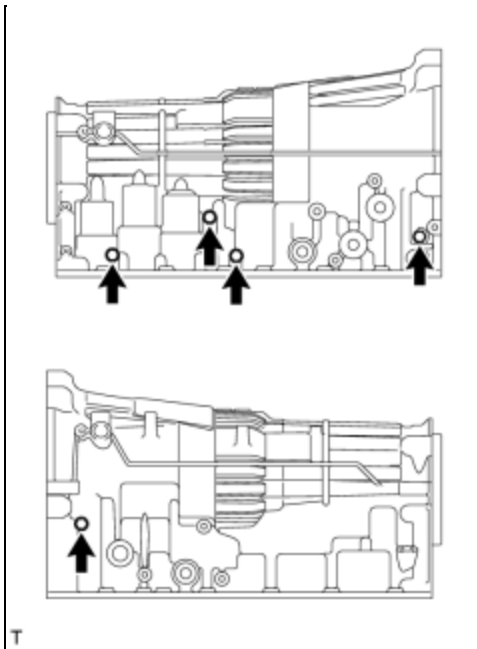
- (b) Remove the 2 O-rings from the 2 transmission revolution sensors.

6. REMOVE AUTOMATIC TRANSMISSION BREATHER TUBE



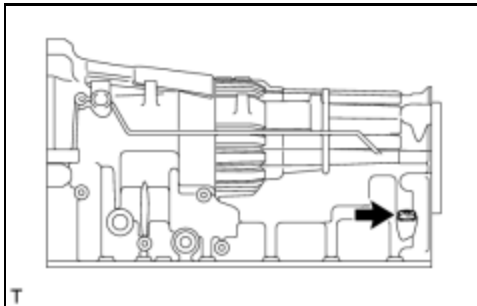
- (a) Remove the 2 bolts and the automatic transmission breather tube from the automatic transmission case sub-assembly.

7. REMOVE AUTOMATIC TRANSMISSION CASE PLUG



(a) Remove the 5 automatic transmission case plugs from the automatic transmission case sub-assembly.

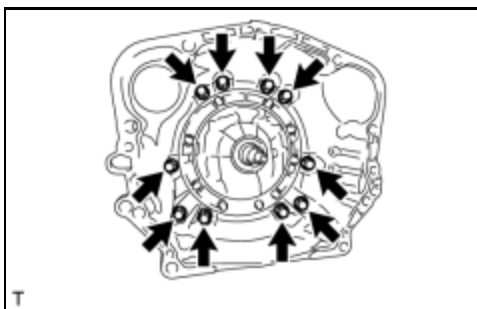
(b) Remove the 5 O-rings from the 5 automatic transmission case plugs.



(c) Using "TORX" socket wrench T55, remove the automatic transmission case plug from the automatic transmission case sub-assembly.

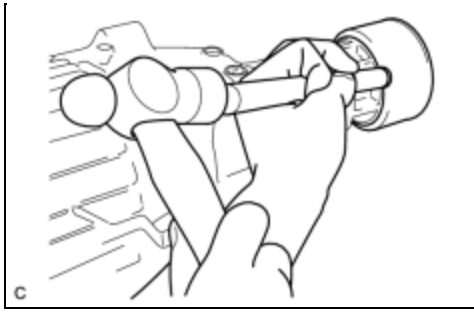
(d) Remove the O-ring from the automatic transmission case plug.

8. REMOVE AUTOMATIC TRANSMISSION HOUSING



(a) Remove the 10 bolts and the automatic transmission housing from the automatic transmission case sub-assembly.

9. REMOVE EXTENSION HOUSING DUST DEFLECTOR

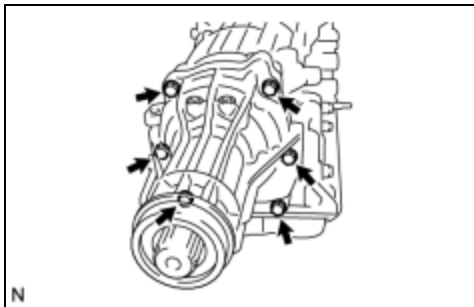


- (a) Using a brass bar and a hammer, tap out the extension housing dust deflector from the extension housing sub-assembly.

NOTICE:

Be careful not to damage the extension housing sub-assembly.

10. REMOVE EXTENSION HOUSING SUB-ASSEMBLY

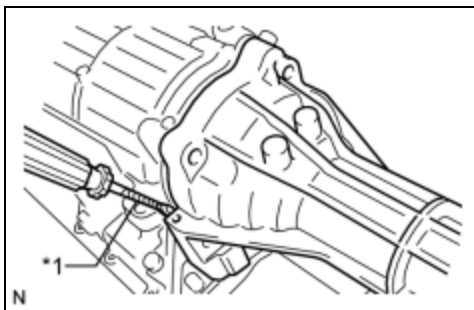


- (a) Remove the 6 bolts.

- (b) Using a screwdriver, remove the extension housing sub-assembly from the automatic transmission case sub-assembly.

Text in Illustration

*1	Protective Tape
----	-----------------



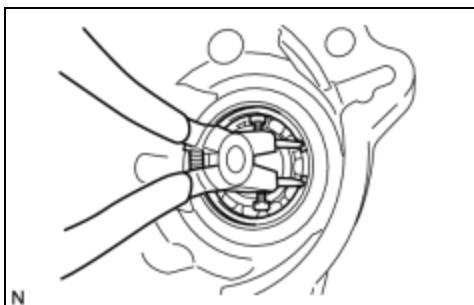
NOTICE:

Do not pry the surface where the extension housing sub-assembly contacts the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

11. REMOVE TRANSMISSION CASE ADAPTER RADIAL BALL BEARING

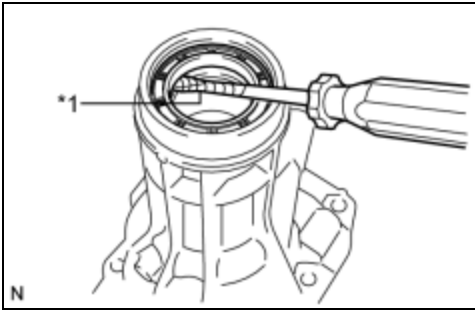


- (a) Using snap ring pliers, remove the snap ring from the extension housing sub-assembly.

- (b) Remove the transmission case adapter radial ball bearing from the extension housing sub-assembly.

12. REMOVE AUTOMATIC TRANSMISSION EXTENSION HOUSING OIL SEAL

- (a) Using a screwdriver, pry out the automatic transmission extension housing oil seal from the extension housing sub-assembly.



Text in Illustration

*1	Protective Tape
----	-----------------

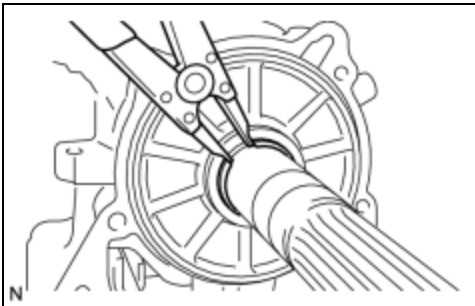
NOTICE:

Be careful not to damage the extension housing sub-assembly.

HINT:

Tape the screwdriver tip before use.

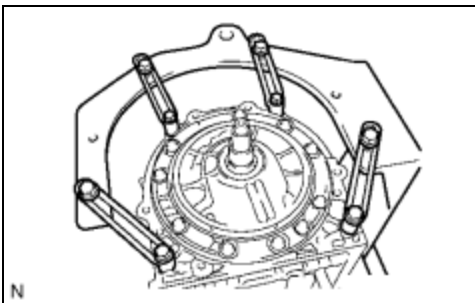
13. REMOVE OUTPUT SHAFT THRUST BEARING



- (a) Using a snap ring expander, remove the snap ring from the output shaft of the rear planetary gear assembly.

- (b) Remove the rear output shaft thrust bearing race, output shaft thrust bearing and the output shaft thrust bearing race.

14. SECURE AUTOMATIC TRANSMISSION CASE SUB-ASSEMBLY



- (a) Install the automatic transmission case sub-assembly to an overhaul attachment.

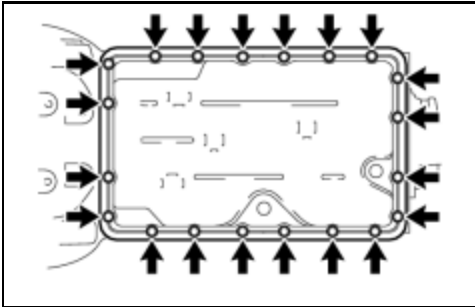
15. REMOVE AUTOMATIC TRANSMISSION OIL PAN SUB-ASSEMBLY

NOTICE:

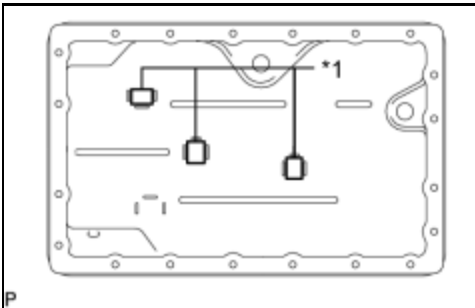
Do not turn the transmission over as this will contaminate the valve body with foreign matter

located at the bottom of the oil pan.

- (a) Using a socket hexagon wrench 5 mm, remove the overflow plug and gasket.
- (b) Remove the drain plug and gasket.



- (c) Remove the 20 bolts, automatic transmission oil pan sub-assembly and the automatic transmission oil pan gasket.



- (d) Remove the 3 transmission oil cleaner magnets from the automatic transmission oil pan sub-assembly.

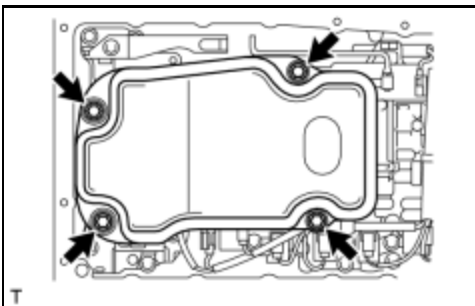
Text in Illustration

*1	Transmission Oil Cleaner Magnet
----	---------------------------------

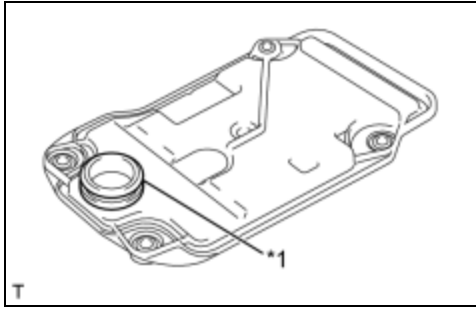
- (e) Examine the particles in the automatic transmission oil pan sub-assembly.
 - (1) Collect any steel chips with the removed transmission oil cleaner magnets. Carefully inspect the foreign matter and particles in the automatic transmission oil pan sub-assembly and on the transmission oil cleaner magnets to anticipate the type of wear you will find in the automatic transmission assembly.
 - Steel (magnetic): bearing, gear and clutch plate wear
 - Brass (non-magnetic): bush wear

16. REMOVE VALVE BODY OIL STRAINER ASSEMBLY

- (a) Turn over the automatic transmission case sub-assembly.



- (b) Remove the 4 bolts and the valve body oil strainer assembly from the transmission valve body assembly.

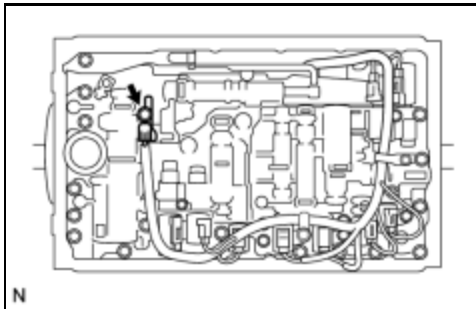


(c) Remove the O-ring from the valve body oil strainer assembly.

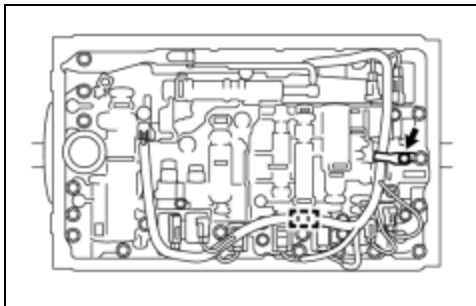
Text in Illustration

*1	O-ring
----	--------

17. REMOVE TRANSMISSION WIRE

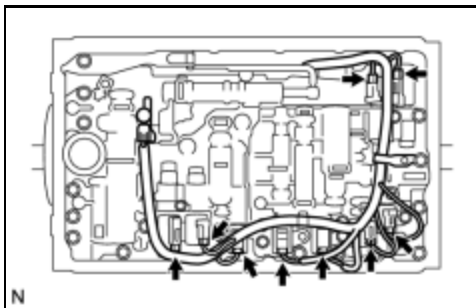


(a) Remove the bolt and the temperature sensor clamp, and separate the ATF temperature sensor.

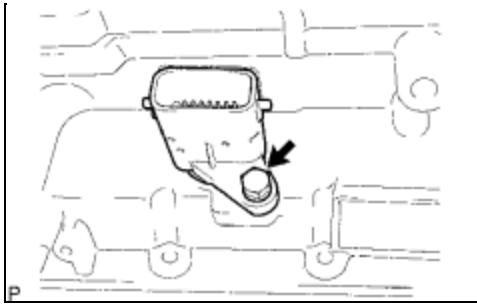


(b) Remove the bolt and the valve body wire harness clamp.

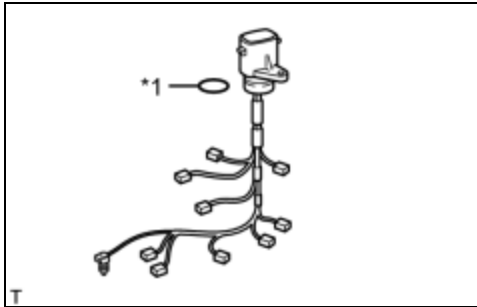
(c) Disengage the wire harness clamp.



(d) Disconnect the 9 solenoid valve connectors.



(e) Remove the bolt and pull out the transmission wire.

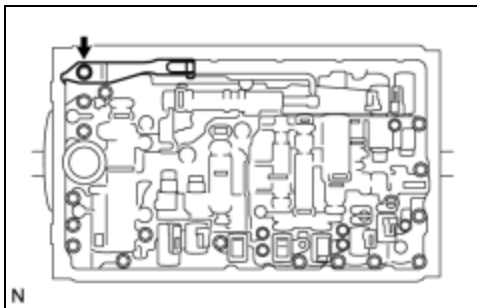


(f) Remove the O-ring from the transmission wire.

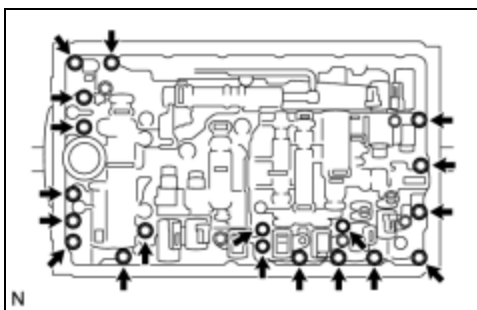
Text in Illustration

*1	O-ring
----	--------

18. REMOVE TRANSMISSION VALVE BODY ASSEMBLY



(a) Remove the bolt, detent spring cover and the detent spring from the transmission valve body assembly.

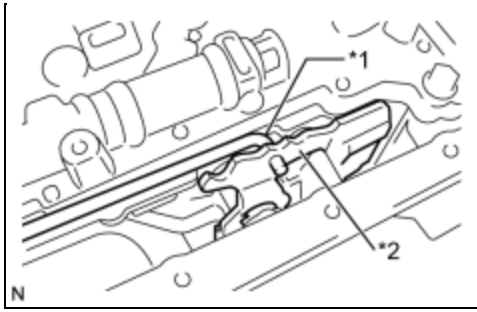


(b) Remove the 19 bolts and the transmission valve body assembly from the automatic transmission case sub-assembly.

(c) Disconnect the manual valve connecting rod sub-assembly from the manual valve lever sub-assembly.

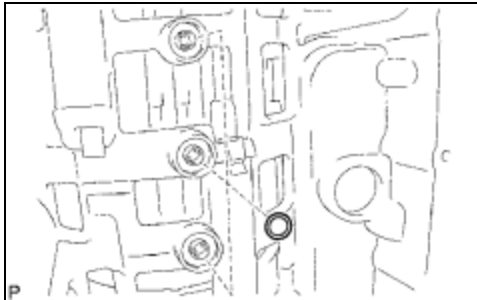
Text in Illustration





*1	Manual Valve Connecting Rod Sub-assembly
*2	Manual Valve Lever Sub-assembly

19. REMOVE TRANSMISSION CASE GASKET



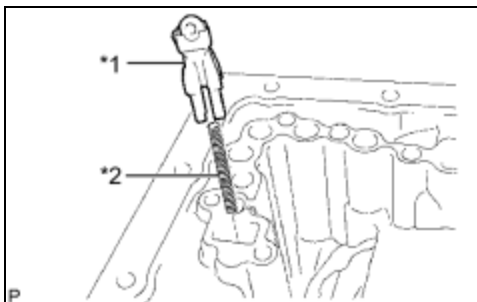
- (a) Remove the 3 transmission case gaskets from the automatic transmission case sub-assembly.

20. REMOVE BRAKE DRUM GASKET



- (a) Remove the 3 brake drum gaskets from the automatic transmission case sub-assembly.

21. REMOVE CHECK BALL BODY

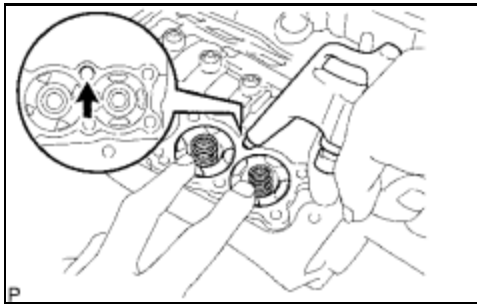


- (a) Remove the check ball body and the compression spring from the automatic transmission case sub-assembly.

Text in Illustration

*1	Check Ball Body
*2	Compression Spring

22. REMOVE C-2 ACCUMULATOR PISTON



- (a) While blowing compressed air into the oil hole, remove the C-2 accumulator piston and the spring from the automatic transmission case sub-assembly.

NOTICE:

Take care as the C-3 and B-3 accumulator pistons may jump out.

- (b) Remove the 2 O-rings from the C-2 accumulator piston.



- (c) Using a screwdriver, remove the snap ring and the spring sub-assembly from the C-2 accumulator piston.

NOTICE:

Be careful not to damage the C-2 accumulator piston.

HINT:

Tape the screwdriver tip before use.

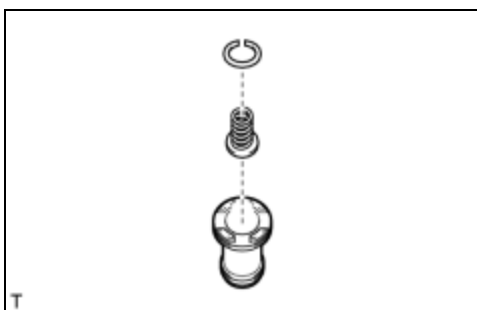
23. REMOVE B-3 ACCUMULATOR PISTON

- (a) While blowing compressed air into the oil hole, remove the B-3 accumulator piston and the spring from the automatic transmission case sub-assembly.

NOTICE:

Take care as the C-3 accumulator piston may jump out.

- (b) Remove the 2 O-rings from the B-3 accumulator piston.



- (c) Using a screwdriver, remove the snap ring and the spring sub-assembly from the B-3 accumulator piston.

NOTICE:

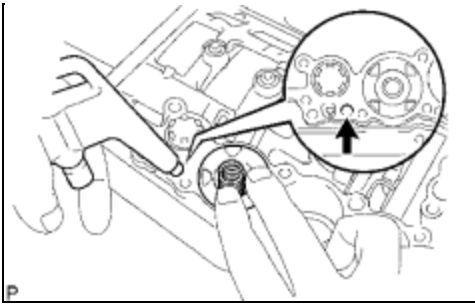
Be careful not to damage the B-3 accumulator piston.

HINT:

Tape the screwdriver tip before use.

24. REMOVE C-3 ACCUMULATOR PISTON

- (a) While blowing compressed air into the oil hole, remove



the C-3 accumulator piston and the 2 springs from the automatic transmission case sub-assembly.

(b) Remove the 2 O-rings from the C-3 accumulator piston.



(c) Using a screwdriver, remove the snap ring and the spring sub-assembly from the C-3 accumulator piston.

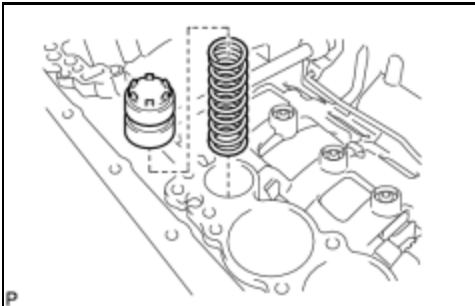
NOTICE:

Be careful not to damage the C-3 accumulator piston.

HINT:

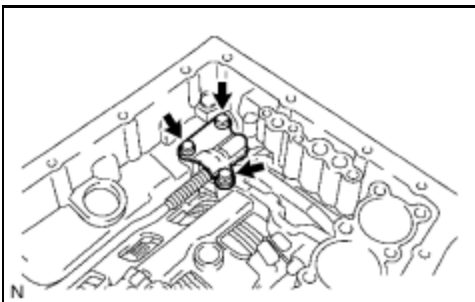
Tape the screwdriver tip before use.

25. REMOVE B-1 ACCUMULATOR VALVE



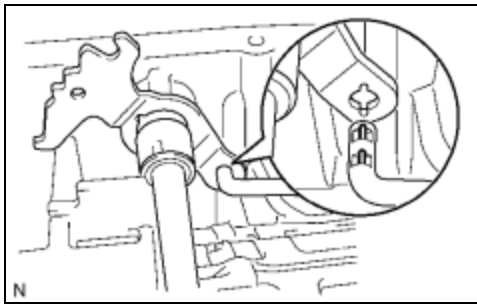
(a) Remove the B-1 accumulator valve and the spring from the automatic transmission case sub-assembly.

26. REMOVE PARKING LOCK PAWL BRACKET



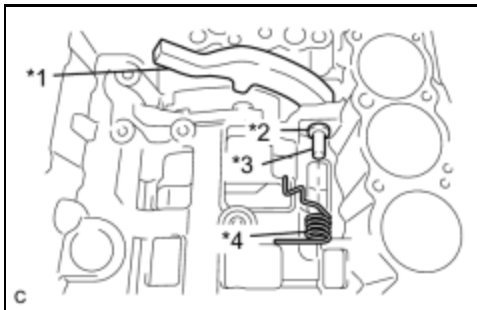
(a) Remove the 3 bolts and the parking lock pawl bracket from the automatic transmission case sub-assembly.

27. REMOVE PARKING LOCK ROD SUB-ASSEMBLY



- (a) Remove the parking lock rod sub-assembly from the manual valve lever sub-assembly.

28. REMOVE PARKING LOCK PAWL SHAFT



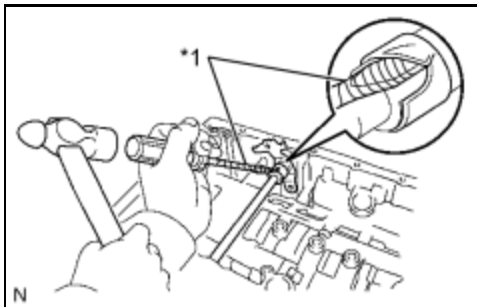
- (a) Pull out the parking lock pawl shaft from the front side, and remove the parking lock pawl and the torsion spring.

Text in Illustration

*1	Parking Lock Pawl
*2	E-ring
*3	Parking Lock Pawl Shaft
*4	Torsion Spring

- (b) Remove the E-ring from the parking lock pawl shaft.

29. REMOVE MANUAL VALVE LEVER SUB-ASSEMBLY



- (a) Using a screwdriver and a hammer, cut off the spacer and remove it from the manual valve lever shaft.

Text in Illustration

*1	Protective Tape
----	-----------------

NOTICE:

Be careful not to damage the manual valve lever shaft.

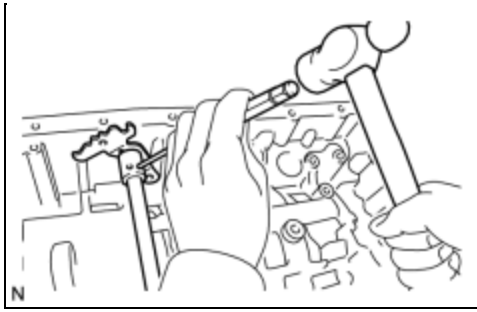
HINT:

Tape the screwdriver tip before use.

- (b) Using a pin punch 3 mm and a hammer, drive out the spring pin.

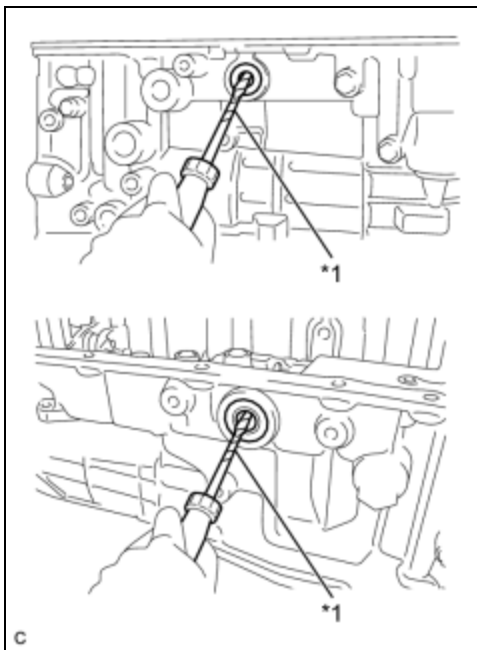
HINT:

Slowly drive out the spring pin so that it does not fall into the automatic transmission case sub-assembly.



(c) Pull the manual valve lever shaft out through the case and remove the manual valve lever sub-assembly.

30. REMOVE MANUAL VALVE LEVER SHAFT OIL SEAL



(a) Using a screwdriver, pry out the 2 manual valve lever shaft oil seals from the automatic transmission case sub-assembly.

Text in Illustration

*1	Protective Tape
----	-----------------

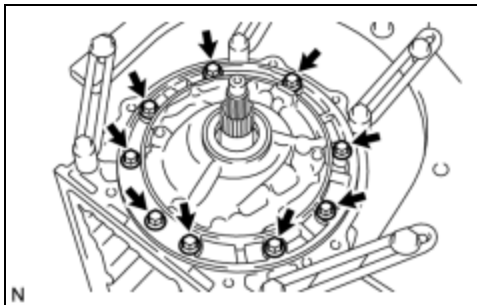
NOTICE:

Be careful not to damage the automatic transmission case sub-assembly.

HINT:

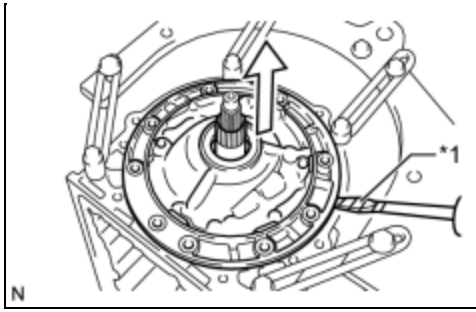
Tape the screwdriver tip before use.

31. REMOVE OIL PUMP ASSEMBLY



(a) Remove the 9 bolts.

(b) Using a screwdriver, pull out the oil pump assembly from the automatic transmission case sub-assembly.



Text in Illustration

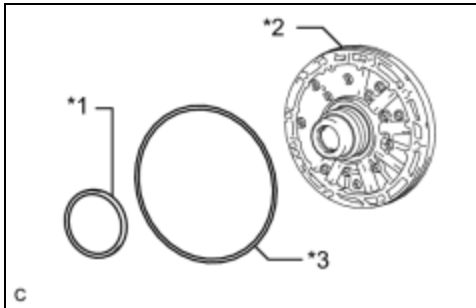
*1	Protective Tape
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NOTICE:

Be careful not to damage the oil pump assembly or automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.



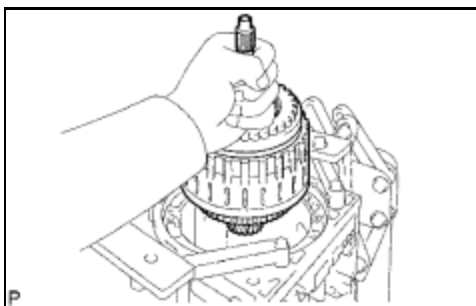
(c) Remove the No. 1 thrust bearing race from the oil pump assembly.

Text in Illustration

*1	No. 1 Thrust Bearing Race
*2	Oil Pump Assembly
*3	O-ring

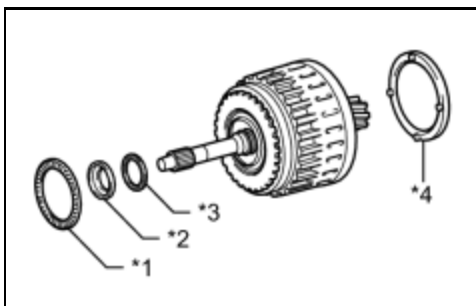
(d) Remove the O-ring from the oil pump assembly.

32. REMOVE CLUTCH DRUM AND INPUT SHAFT ASSEMBLY



(a) Remove the clutch drum and input shaft assembly from the automatic transmission case sub-assembly.

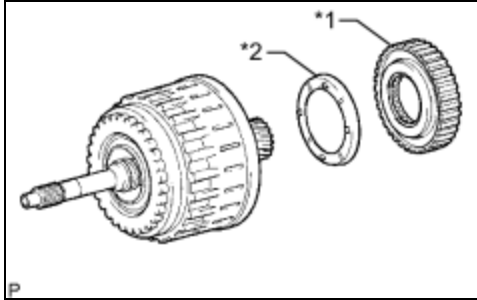
(b) Remove the clutch drum thrust washer, thrust needle roller bearing, input shaft front thrust bearing race and the input shaft front thrust needle roller bearing from the clutch drum and input shaft assembly.



Text in Illustration

*1	Thrust Needle Roller Bearing
*2	Input Shaft Front Thrust Bearing Race
*3	Input Shaft Front Thrust Needle Roller Bearing
*4	Clutch Drum Thrust Washer

33. REMOVE NO. 2 ONE-WAY CLUTCH ASSEMBLY

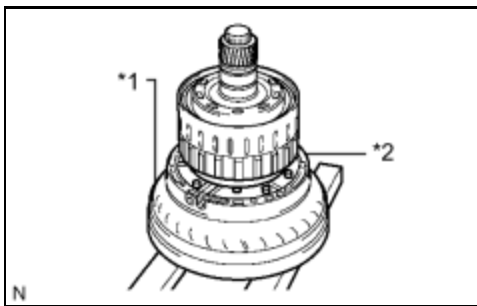


- (a) Remove the No. 2 one-way clutch assembly and the input shaft clutch drum thrust washer from the clutch drum and input shaft assembly.

Text in Illustration

*1	No. 2 One-way Clutch Assembly
*2	Input Shaft Clutch Drum Thrust Washer

34. SUPPORT CLUTCH DRUM AND INPUT SHAFT ASSEMBLY

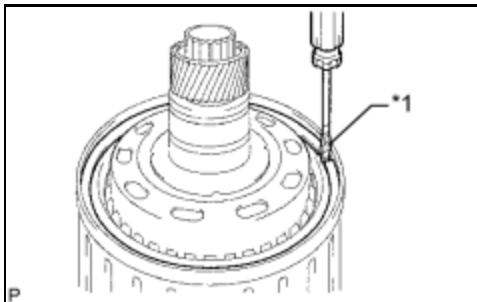


- (a) Place the oil pump assembly onto the torque converter assembly, and then place the clutch drum and input shaft assembly onto the oil pump assembly.

Text in Illustration

*1	Torque Converter Assembly
*2	Oil Pump Assembly

35. REMOVE REVERSE CLUTCH HUB SUB-ASSEMBLY



- (a) Using a screwdriver, remove the snap ring from the reverse clutch piston sub-assembly.

Text in Illustration

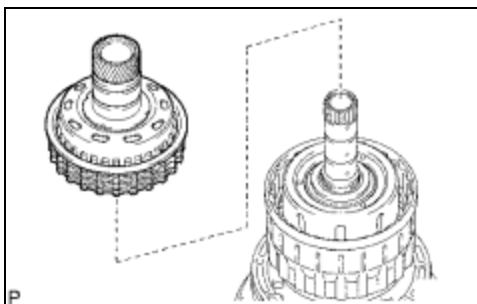
*1	Protective Tape
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NOTICE:

Be careful not to damage the reverse clutch piston sub-assembly.

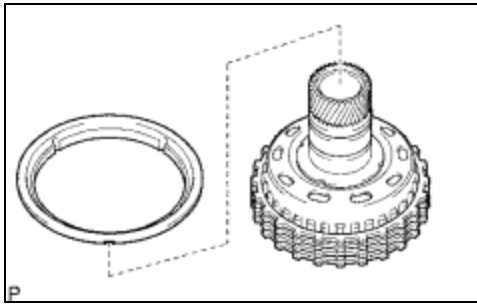
HINT:

Tape the screwdriver tip before use.



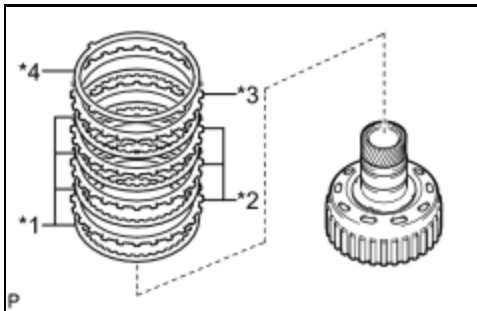
- (b) Remove the reverse clutch hub sub-assembly from the reverse clutch drum sub-assembly.

36. REMOVE REVERSE CLUTCH REACTION SLEEVE



- (a) Remove the reverse clutch reaction sleeve from the reverse clutch hub sub-assembly.

37. REMOVE NO. 3 CLUTCH DISC (REAR CLUTCH DISC)

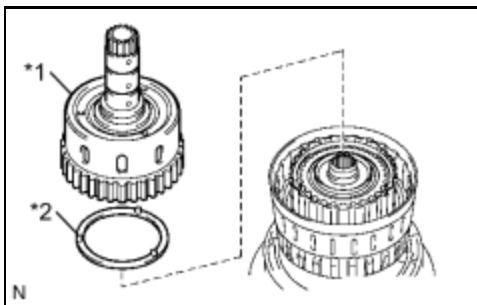


- (a) Remove the clutch cushion plate, reverse clutch flange, 4 No. 3 clutch discs and the 3 No. 3 clutch plates from the reverse clutch hub sub-assembly.

Text in Illustration

*1	No. 3 Clutch Disc
*2	No. 3 Clutch Plate
*3	Reverse Clutch Flange
*4	Clutch Cushion Plate

38. REMOVE FORWARD CLUTCH HUB SUB-ASSEMBLY



- (a) Remove the forward clutch hub sub-assembly and the No. 3 clutch hub thrust washer from the reverse clutch drum sub-assembly.

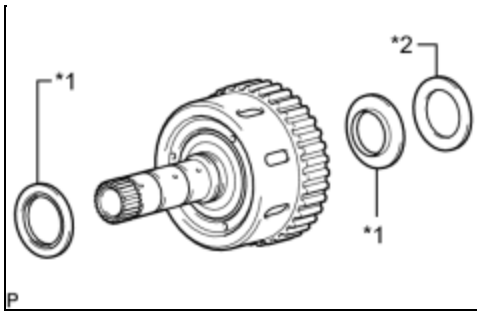
Text in Illustration

*1	Forward Clutch Hub Sub-assembly
*2	No. 3 Clutch Hub Thrust Washer

- (b) Remove the 2 thrust needle roller bearings and the No. 2 thrust bearing race from the forward clutch hub sub-assembly.

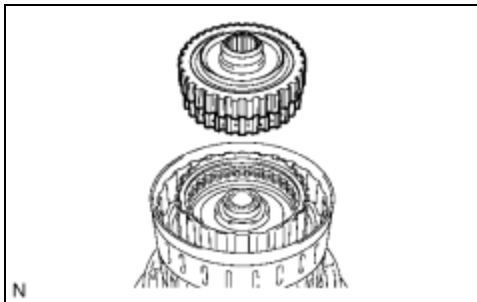
Text in Illustration

*1	Thrust Needle Roller Bearing
----	------------------------------



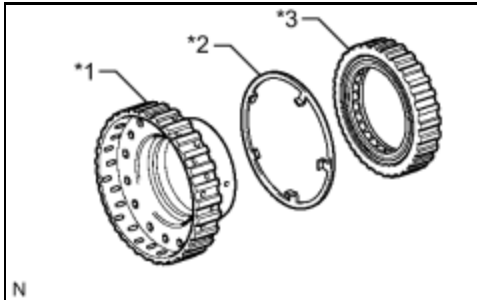
*2	No. 2 Thrust Bearing Race

39. REMOVE COAST CLUTCH HUB SUB-ASSEMBLY



- (a) Remove the coast clutch hub sub-assembly from the reverse clutch drum sub-assembly.

40. REMOVE NO. 4 ONE-WAY CLUTCH ASSEMBLY



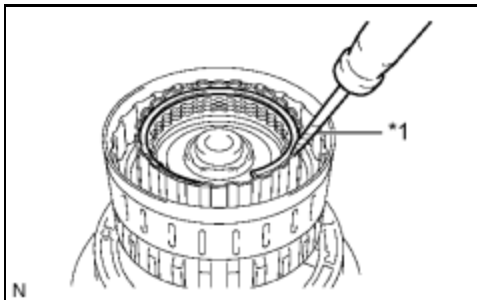
- (a) Remove the No. 4 one-way clutch assembly and the No. 2 clutch hub thrust washer from the coast clutch hub sub-assembly.

Text in Illustration

*1	Coast Clutch Hub Sub-assembly
*2	No. 2 Clutch Hub Thrust Washer
*3	No. 4 One-way Clutch Assembly

41. REMOVE NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC)

- (a) Using a screwdriver, remove the snap ring.



Text in Illustration

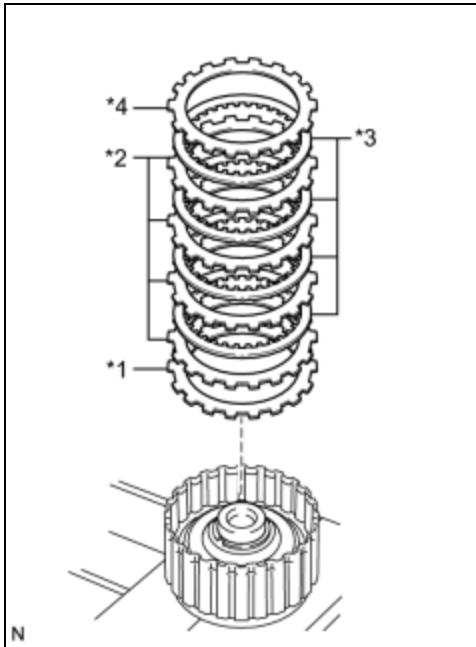
*1	Protective Tape
----	-----------------

NOTICE:

Be careful not to damage the input shaft.

HINT:

Tape the screwdriver tip before use.



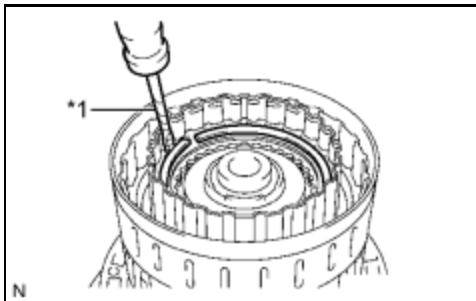
(b) Remove the forward clutch flange, 4 No. 1 clutch discs, 4 No. 1 clutch plates and the clutch cushion plate from the input shaft.

Text in Illustration

*1	Clutch Cushion Plate
*2	No. 1 Clutch Plate
*3	No. 1 Clutch Disc
*4	Forward Clutch Flange

42. REMOVE NO. 4 CLUTCH DISC (COAST CLUTCH DISC)

(a) Using a screwdriver, remove the snap ring.



Text in Illustration

*1	Protective Tape
----	-----------------

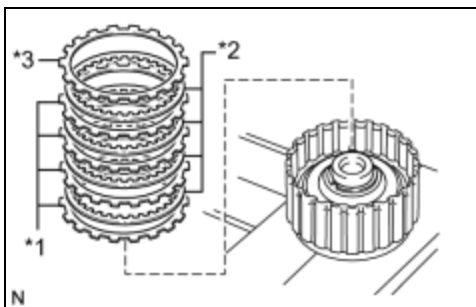
NOTICE:

Be careful not to damage the forward clutch piston sub-assembly.

HINT:

Tape the screwdriver tip before use.

(b) Remove the coast clutch flange, 4 No. 4 clutch discs and the 4 No. 4 clutch plates from the forward clutch piston sub-assembly.

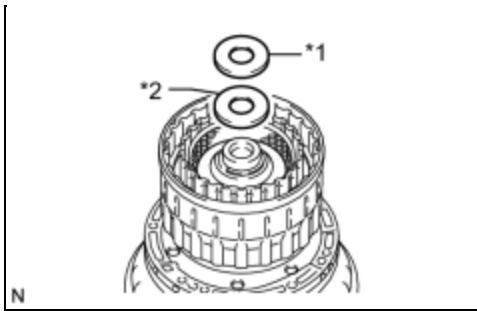


Text in Illustration

*1	No. 4 Clutch Plate
*2	No. 4 Clutch Disc
*3	Coast Clutch Flange

43. REMOVE INPUT SHAFT

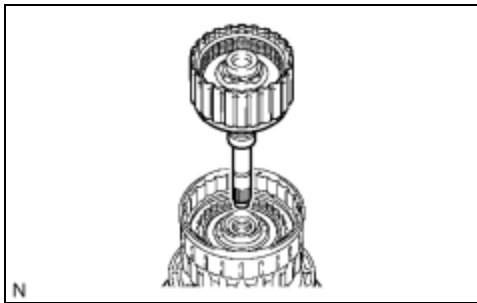
(a) Remove the thrust needle roller bearing and the input



shaft rear thrust bearing race from the input shaft.

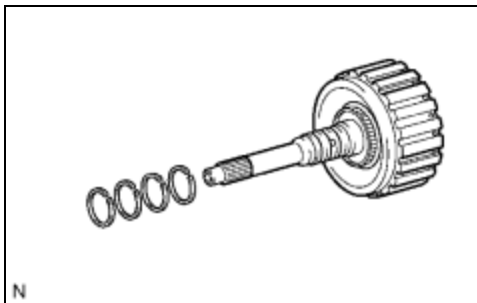
Text in Illustration

*1	Thrust Needle Roller Bearing
*2	Input Shaft Rear Thrust Bearing Race



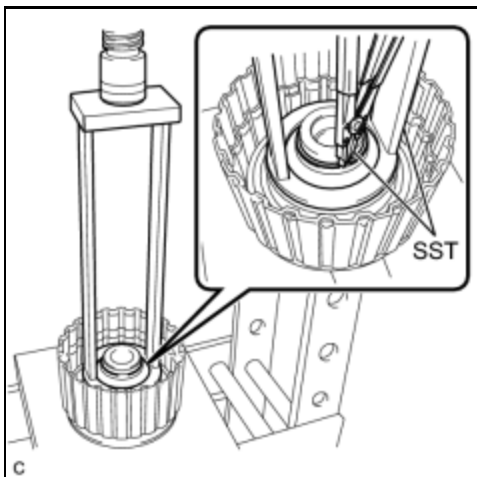
(b) Remove the input shaft from the reverse clutch drum sub-assembly.

44. REMOVE CLUTCH DRUM OIL SEAL RING



(a) Remove the 4 clutch drum oil seal rings from the input shaft.

45. REMOVE NO. 1 CLUTCH BALANCER



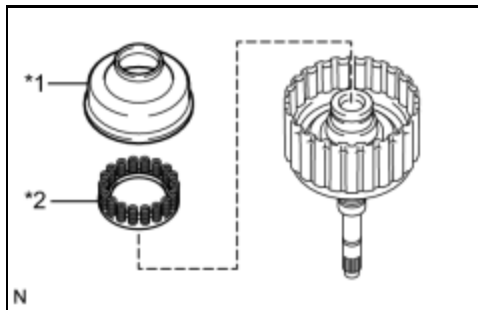
(a) Place SST on the No. 1 clutch balancer, and compress the forward clutch return spring sub-assembly with a press.

SST: 09387-00110

(b) Using SST, remove the snap ring.

SST: 09350-30020

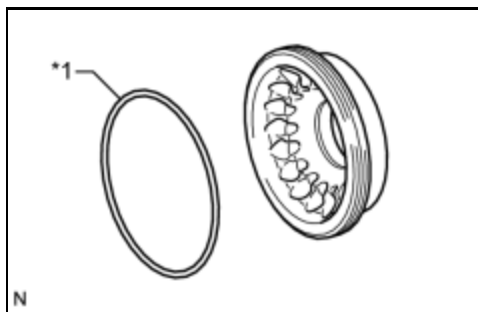
09350-07070



(c) Remove the No. 1 clutch balancer and the forward clutch return spring sub-assembly from the input shaft.

Text in Illustration

*1	No. 1 Clutch Balancer
*2	Forward Clutch Return Spring Sub-assembly

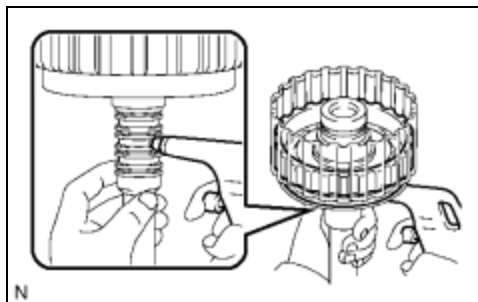


(d) Remove the D-ring from the No. 1 clutch balancer.

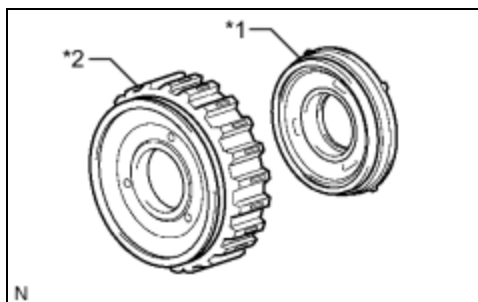
Text in Illustration

*1	D-ring
----	--------

46. REMOVE FORWARD CLUTCH PISTON SUB-ASSEMBLY



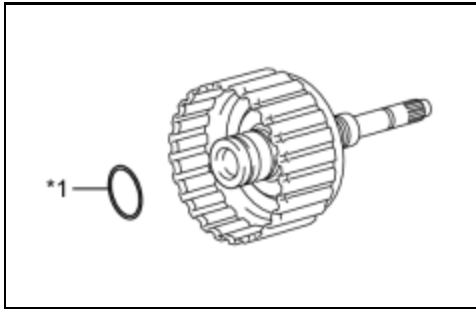
(a) Hold the forward clutch piston sub-assembly and apply compressed air (392 kPa, 4.0 kgf/cm², 57 psi) to the input shaft to remove the forward clutch piston sub-assembly.



(b) Remove the coast clutch piston from the forward clutch piston sub-assembly.

Text in Illustration

*1	Coast Clutch Piston
*2	Forward Clutch Piston Sub-assembly

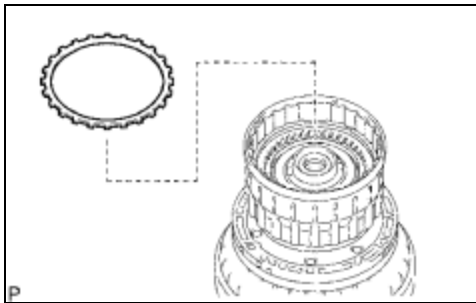


(c) Remove the O-ring from the input shaft.

Text in Illustration

*1	O-ring
----	--------

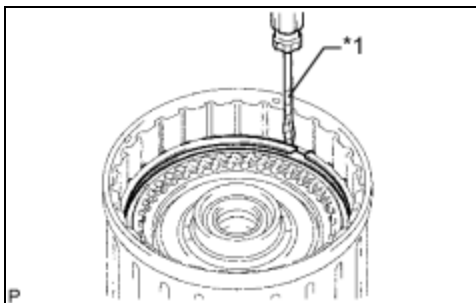
47. REMOVE REVERSE CLUTCH FLANGE



(a) Remove the reverse clutch flange from the reverse clutch drum sub-assembly.

48. REMOVE NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC)

(a) Using a screwdriver, remove the 2 snap rings from the reverse clutch drum sub-assembly.



Text in Illustration

*1	Protective Tape
----	-----------------

NOTICE:

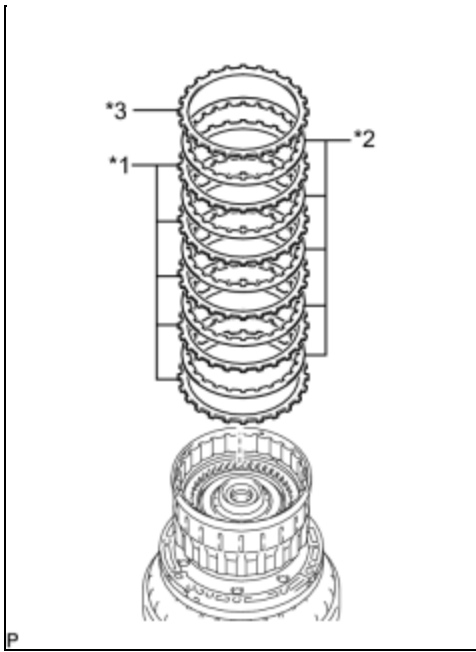
Be careful not to damage the reverse clutch drum sub-assembly.

HINT:

Tape the screwdriver tip before use.

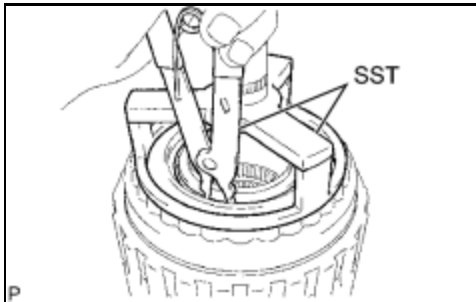
(b) Remove the direct clutch flange, 5 No. 2 clutch discs and the 5 No. 2 clutch plates from the reverse clutch drum sub-assembly.

Text in Illustration



*1	No. 2 Clutch Plate
*2	No. 2 Clutch Disc
*3	Direct Clutch Flange

49. REMOVE NO. 3 CLUTCH BALANCER



- (a) Place SST on the No. 3 clutch balancer, and compress the reverse clutch return spring sub-assembly with a press.

SST: 09387-00070

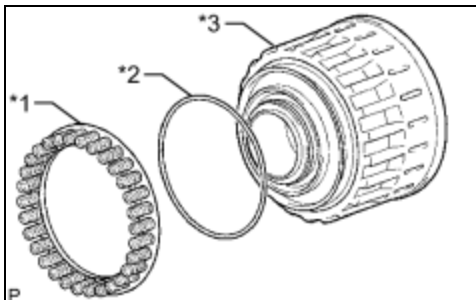
- (b) Using SST, remove the snap ring.

SST: 09350-30020

09350-07070

- (c) Remove the No. 3 clutch balancer.

50. REMOVE REVERSE CLUTCH RETURN SPRING SUB-ASSEMBLY

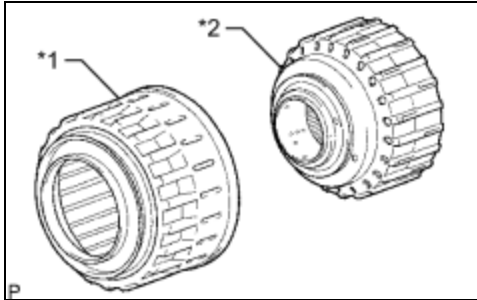


- (a) Remove the reverse clutch return spring sub-assembly and O-ring from the reverse clutch piston sub-assembly.

Text in Illustration

*1	Reverse Clutch Return Spring Sub-assembly
*2	O-ring
*3	Reverse Clutch Piston Sub-assembly

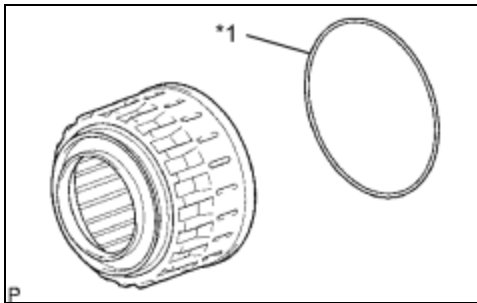
51. REMOVE REVERSE CLUTCH PISTON SUB-ASSEMBLY



- (a) Remove the reverse clutch piston sub-assembly from the reverse clutch drum sub-assembly.

Text in Illustration

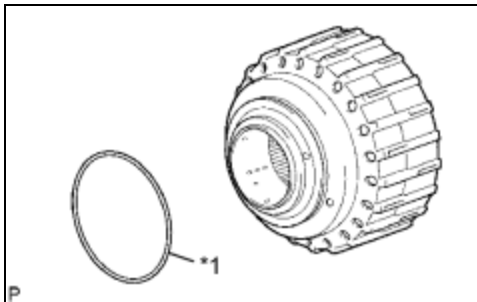
*1	Reverse Clutch Piston Sub-assembly
*2	Reverse Clutch Drum Sub-assembly



- (b) Remove the O-ring from the reverse clutch piston sub-assembly.

Text in Illustration

*1	O-ring
----	--------



- (c) Remove the O-ring from the reverse clutch drum sub-assembly.

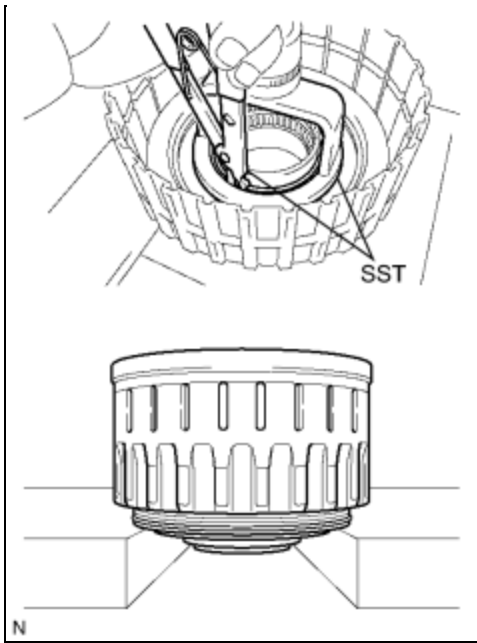
Text in Illustration

*1	O-ring
----	--------

52. REMOVE DIRECT CLUTCH PISTON SUB-ASSEMBLY

- (a) Place SST on the No. 2 clutch balancer, and compress the direct clutch return spring sub-assembly with a press.

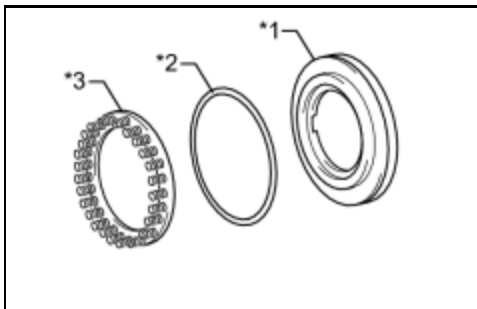
SST: 09320-89010



(b) Using SST, remove the snap ring.

SST: 09350-30020

09350-07070



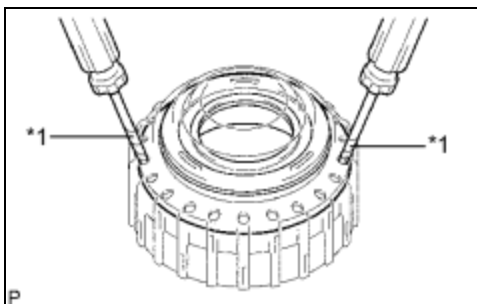
(c) Remove the No. 2 clutch balancer and the direct clutch return spring sub-assembly.

Text in Illustration

*1	No. 2 Clutch Balancer
*2	O-ring
*3	Direct Clutch Return Spring Sub-assembly

(d) Remove the O-ring from the No. 2 clutch balancer.

(e) Using 2 screwdrivers, remove the direct clutch piston sub-assembly from the reverse clutch drum sub-assembly.



Text in Illustration

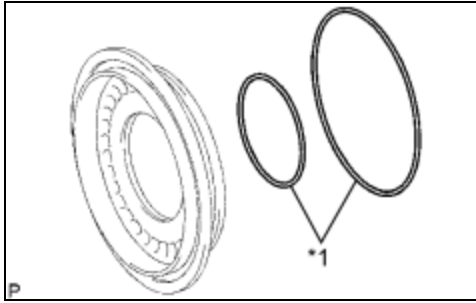
*1	Protective Tape
----	-----------------

NOTICE:

Be careful not to damage the direct clutch piston sub-assembly.

HINT:

Tape the screwdriver tip before use.



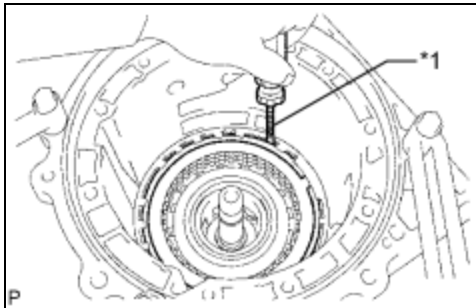
(f) Remove the 2 O-rings from the direct clutch piston sub-assembly.

Text in Illustration

*1	O-ring
----	--------

53. REMOVE NO. 3 BRAKE DISC (2ND BRAKE DISC SET)

(a) Using a screwdriver, remove the snap ring from the automatic transmission case sub-assembly.



Text in Illustration

*1	Protective Tape
----	-----------------

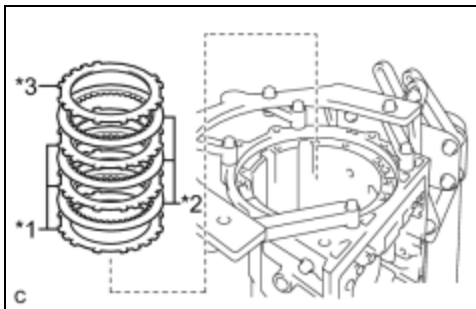
NOTICE:

Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

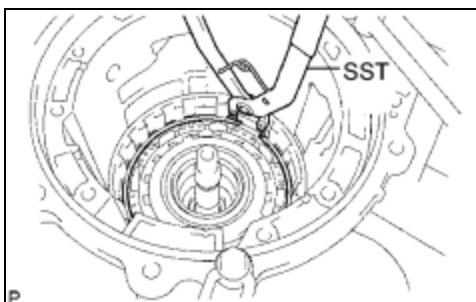
(b) Remove the No. 3 brake flange, 3 No. 3 brake discs and the 3 No. 3 brake plates from the automatic transmission case sub-assembly.



Text in Illustration

*1	No. 3 Brake Plate
*2	No. 3 Brake Disc
*3	No. 3 Brake Flange

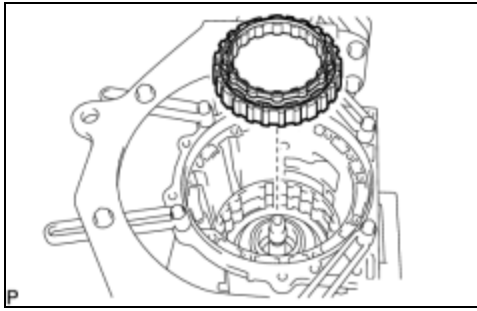
54. REMOVE 2ND BRAKE CYLINDER



(a) Using SST, remove the snap ring from the automatic transmission case sub-assembly.

SST: 09350-30020

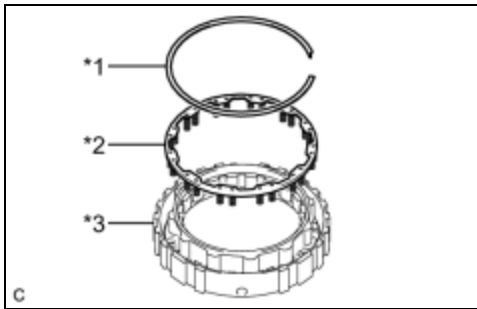
09350-07060



(b) Remove the 2nd brake cylinder from the automatic transmission case sub-assembly.

55. REMOVE 2ND BRAKE PISTON

(a) Using a screwdriver, remove the snap ring and the No. 3 brake piston return spring sub-assembly from the 2nd brake cylinder.



Text in Illustration

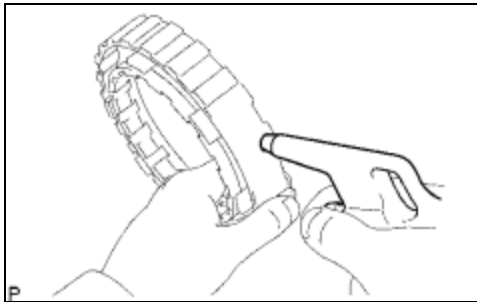
*1	Snap Ring
*2	No. 3 Brake Piston Return Spring Sub-assembly
*3	2nd Brake Cylinder

NOTICE:

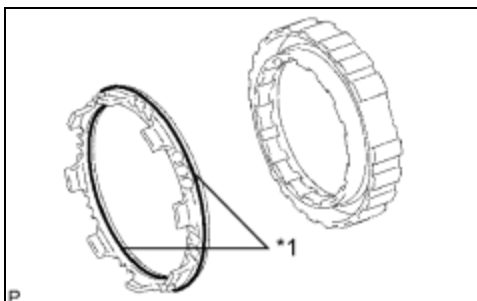
Be careful not to damage the 2nd brake cylinder.

HINT:

Tape the screwdriver tip before use.



(b) Hold the 2nd brake piston and apply compressed air (392 kPa, 4.0 kgf/cm², 57 psi) to the 2nd brake cylinder to remove the 2nd brake piston.

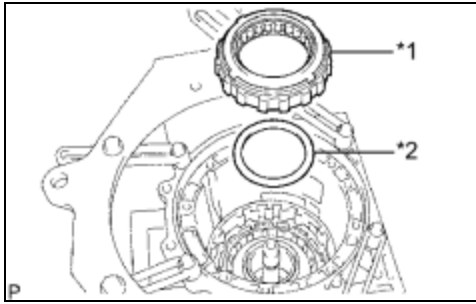


(c) Remove the 2 O-rings from the 2nd brake piston.

Text in Illustration

*1	O-ring
----	--------

56. REMOVE ONE-WAY CLUTCH ASSEMBLY

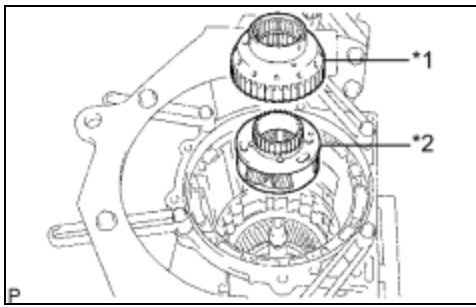


- (a) Remove the one-way clutch assembly and the No. 1 planetary carrier thrust washer from the automatic transmission case sub-assembly.

Text in Illustration

*1	One-way Clutch Assembly
*2	No. 1 Planetary Carrier Thrust Washer

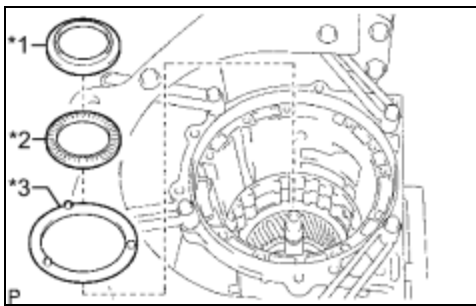
57. REMOVE FRONT PLANETARY GEAR ASSEMBLY



- (a) Remove the front planetary gear assembly and the one-way clutch inner race sub-assembly from the automatic transmission case sub-assembly.

Text in Illustration

*1	One-way Clutch Inner Race Sub-assembly
*2	Front Planetary Gear Assembly



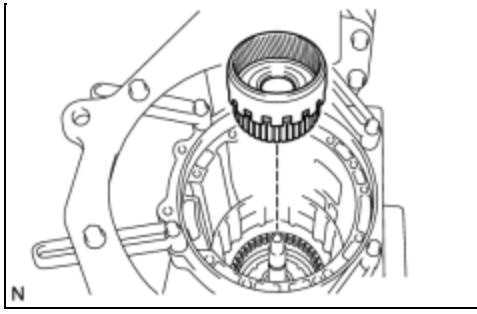
- (b) Remove the front planetary flange rear thrust bearing race, front planetary flange thrust needle roller bearing and the No. 2 planetary carrier thrust washer from the automatic transmission case sub-assembly.

Text in Illustration

*1	Front Planetary Flange Rear Thrust Bearing Race
*2	Front Planetary Flange Thrust Needle Roller Bearing
*3	No. 2 Planetary Carrier Thrust Washer

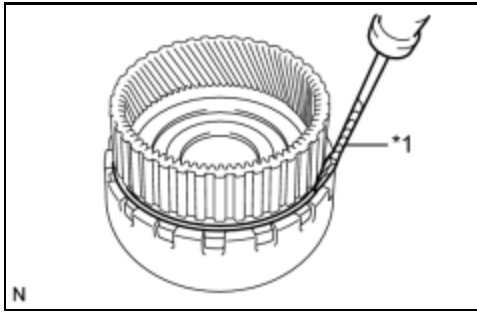
58. REMOVE FRONT PLANETARY RING GEAR

- (a) Remove the front planetary ring gear from the automatic transmission case sub-assembly.



59. REMOVE CENTER PLANETARY RING GEAR

(a) Using a screwdriver, remove the snap ring.



Text in Illustration

*1	Protective Tape
----	-----------------

NOTICE:

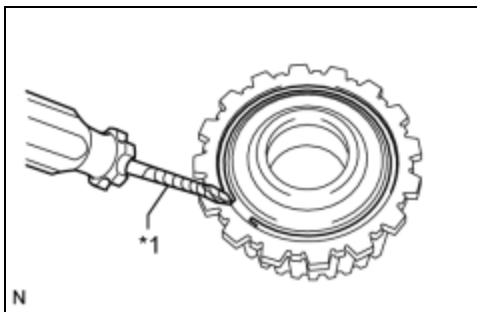
Be careful not to damage the front planetary ring gear.

HINT:

Tape the screwdriver tip before use.

(b) Remove the center planetary ring gear from the front planetary ring gear.

(c) Using a screwdriver, remove the snap ring.



Text in Illustration

*1	Protective Tape
----	-----------------

NOTICE:

Be careful not to damage the center planetary ring gear.

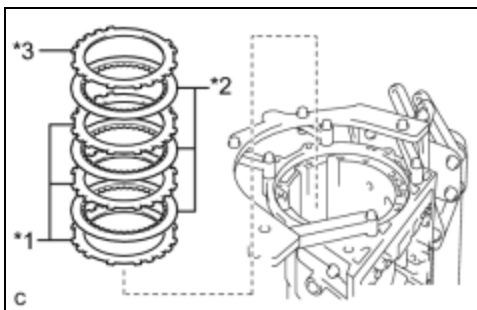
HINT:

Tape the screwdriver tip before use.

(d) Remove the front planetary ring gear flange sub-assembly from the center planetary ring gear.

60. REMOVE NO. 1 BRAKE DISC

(a) Remove the No. 1 brake flange, 3 No. 1 brake discs and the 3 No. 1 brake plates from the automatic transmission case sub-assembly.

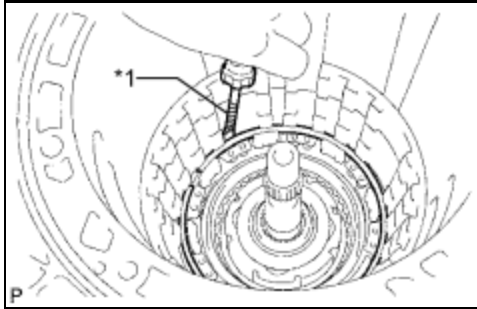


Text in Illustration

*1	No. 1 Brake Plate
*2	No. 1 Brake Disc
*3	No. 1 Brake Flange

61. REMOVE BRAKE PISTON RETURN SPRING SUB-ASSEMBLY

- (a) Using a screwdriver, remove the snap ring from the automatic transmission case sub-assembly.



Text in Illustration

*1	Protective Tape
----	-----------------

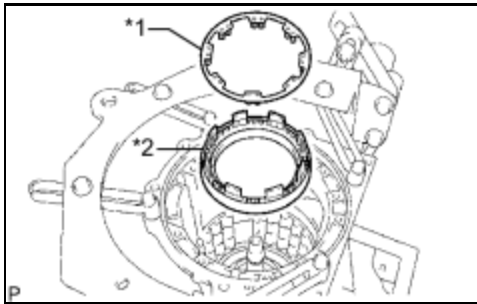
NOTICE:

Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

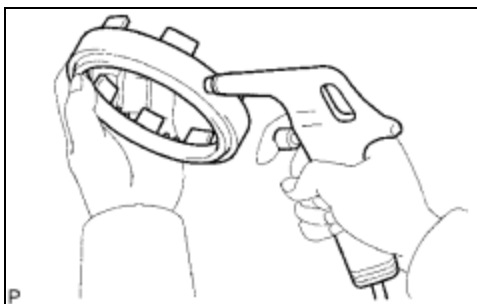
- (b) Remove the brake piston return spring sub-assembly and the No. 1 brake cylinder from the automatic transmission case sub-assembly.



Text in Illustration

*1	Brake Piston Return Spring Sub-assembly
*2	No. 1 Brake Cylinder

62. REMOVE NO. 1 BRAKE PISTON



- (a) Hold the No. 1 brake piston and apply compressed air (392 kPa, 4.0 kgf/cm², 57 psi) to the No. 1 brake cylinder to remove the No. 1 brake piston.

HINT:

If the piston does not pop out with compressed air, lift the piston out with needle-nose pliers.

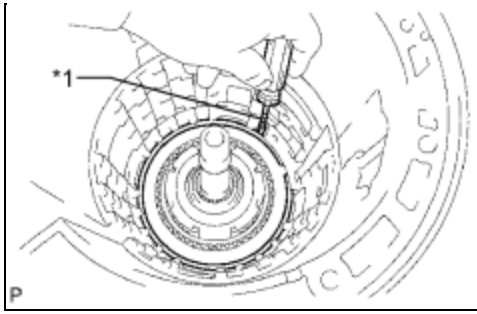
- (b) Remove the 2 O-rings from the No. 1 brake piston.

63. REMOVE NO. 2 BRAKE DISC

- (a) Using a screwdriver, remove the snap ring from the automatic transmission case sub-assembly.

Text in Illustration

*1	Protective Tape
----	-----------------



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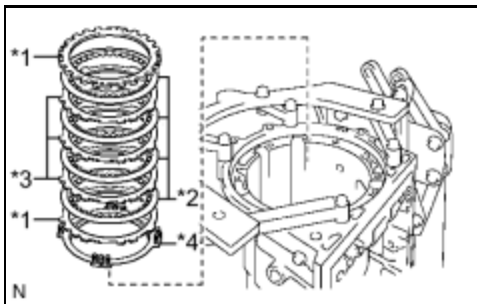
NOTICE:

Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

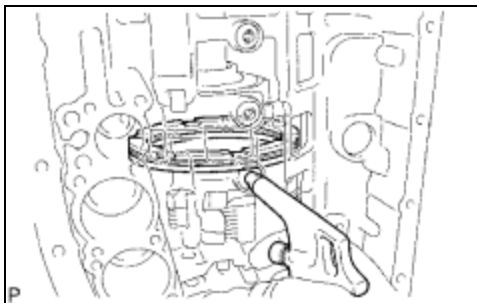
- (b) Remove the 2 No. 2 brake flanges, 4 No. 2 brake discs, 3 No. 2 brake plates and the No. 2 brake piston return spring sub-assembly from the automatic transmission case sub-assembly.



Text in Illustration

*1	No. 2 Brake Flange
*2	No. 2 Brake Disc
*3	No. 2 Brake Plate
*4	No. 2 Brake Piston Return Spring Sub-assembly

64. REMOVE NO. 2 BRAKE PISTON



- (a) Hold the No. 2 brake piston and apply compressed air (392 kPa, 4.0 kgf/cm², 57 psi) to the transmission case to remove the No. 2 brake piston and the No. 2 brake cylinder.

HINT:

If the piston does not pop out with compressed air, lift the piston out with needle-nose pliers.

- (b) Remove the No. 2 brake piston from the No. 2 brake cylinder.

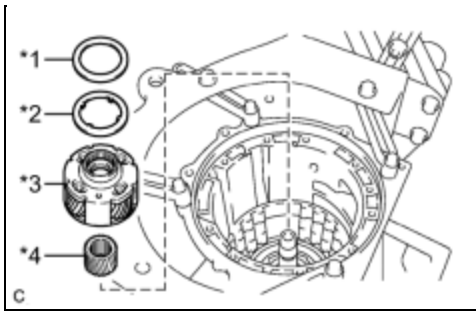
- (c) Remove the 2 O-rings from the No. 2 brake piston.

65. REMOVE CENTER PLANETARY GEAR ASSEMBLY

- (a) Remove the center planetary gear assembly, planetary sun gear, thrust needle roller bearing and the No. 4 thrust bearing race from the automatic transmission case sub-assembly.

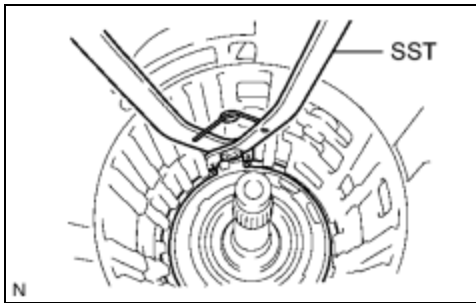
Text in Illustration

*1	Thrust Needle Roller Bearing



*2	No. 4 Thrust Bearing Race
*3	Center Planetary Gear Assembly
*4	Planetary Sun Gear

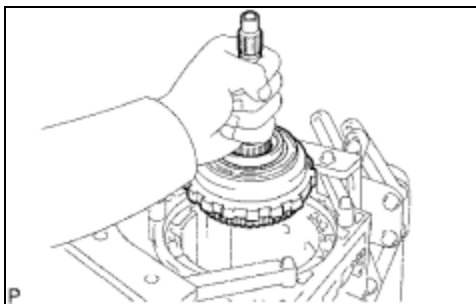
66. REMOVE INTERMEDIATE SHAFT



- (a) Using SST, remove the snap ring from the automatic transmission case sub-assembly.

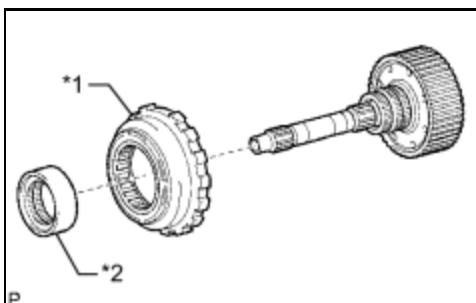
SST: 09350-30020

09350-07060



- (b) Remove the intermediate shaft together with the No. 3 one-way clutch assembly from the automatic transmission case sub-assembly.

67. REMOVE NO. 3 ONE-WAY CLUTCH ASSEMBLY



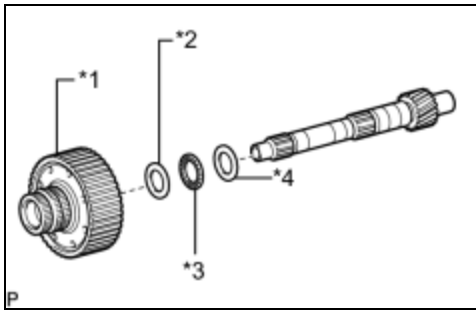
- (a) Remove the No. 3 one-way clutch assembly and the one-way clutch inner race from the intermediate shaft.

Text in Illustration

*1	No. 3 One-way Clutch Assembly
*2	One-way Clutch Inner Race

68. REMOVE REAR PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

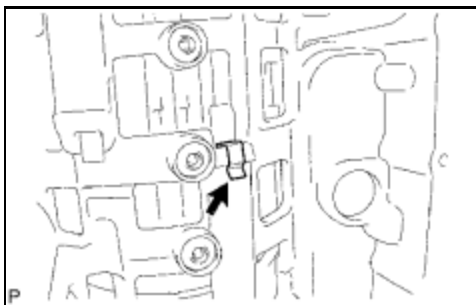
- (a) Remove the rear planetary ring gear flange sub-assembly, No. 7 thrust bearing race, thrust needle roller bearing and the No. 8 thrust bearing race from the intermediate shaft.



Text in Illustration

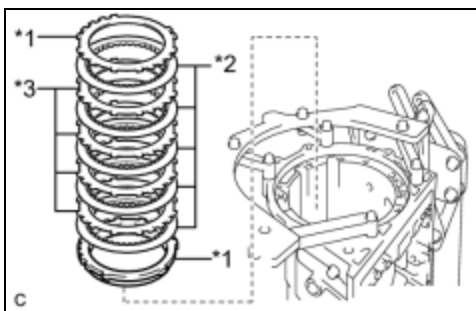
*1	Rear Planetary Ring Gear Flange Sub-assembly
*2	No. 7 Thrust Bearing Race
*3	Thrust Needle Roller Bearing
*4	No. 8 Thrust Bearing Race

69. REMOVE BRAKE PLATE STOPPER SPRING



- (a) Remove the brake plate stopper spring from the automatic transmission case sub-assembly.

70. REMOVE NO. 4 BRAKE DISC

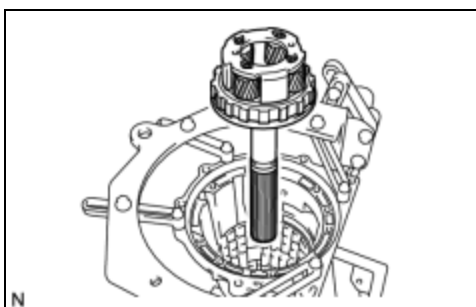


- (a) Remove the 2 No. 4 brake flanges, 5 No. 4 brake discs and the 4 No. 4 brake plates from the automatic transmission case sub-assembly.

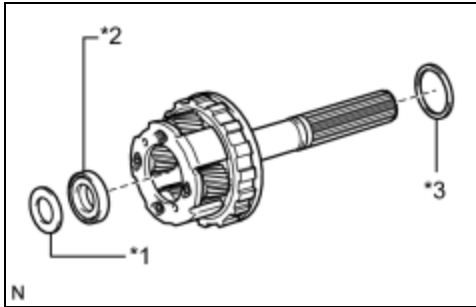
Text in Illustration

*1	No. 4 Brake Flange
*2	No. 4 Brake Disc
*3	No. 4 Brake Plate

71. REMOVE REAR PLANETARY GEAR ASSEMBLY



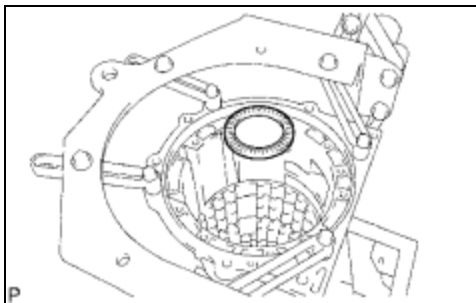
- (a) Remove the rear planetary gear assembly from the automatic transmission case sub-assembly.



(b) Remove the thrust bearing race, thrust needle roller bearing and the No. 9 thrust bearing race from the rear planetary gear assembly.

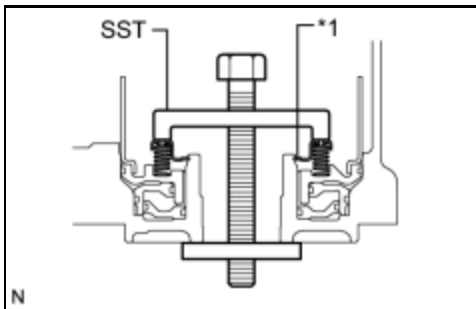
Text in Illustration

*1	Thrust Bearing Race
*2	Thrust Needle Roller Bearing
*3	No. 9 Thrust Bearing Race



(c) Remove the thrust needle roller bearing from the automatic transmission case sub-assembly.

72. REMOVE 1ST AND REVERSE BRAKE RETURN SPRING SUB-ASSEMBLY



(a) Place SST on the 1st and reverse brake return spring sub-assembly and compress the 1st and reverse brake return spring sub-assembly.

Text in Illustration

*1	Snap Ring
----	-----------

SST: 09350-30020

09350-07050

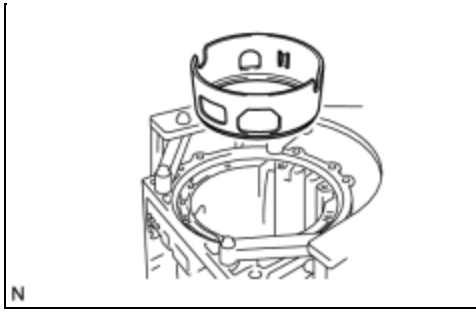
(b) Using SST, remove the snap ring and the 1st and reverse brake return spring sub-assembly.

SST: 09350-30020

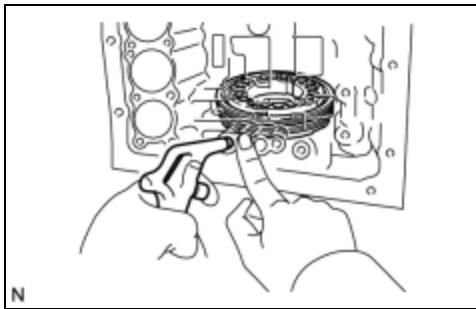
09350-07070

73. REMOVE BRAKE APPLY TUBE

(a) Remove the brake apply tube from the automatic transmission case sub-assembly.



74. REMOVE 1ST AND REVERSE BRAKE PISTON



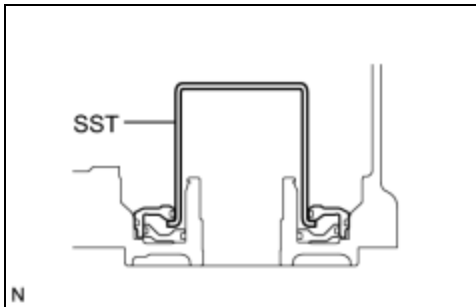
- (a) Hold the 1st and reverse brake piston and apply compressed air (392 kPa, 4.0 kgf/cm², 57 psi) to the transmission case to remove the 1st and reverse brake piston.

HINT:

If the piston does not pop out with compressed air, lift the piston out with needle-nose pliers.

- (b) Remove the O-ring from the 1st and reverse brake piston.

75. REMOVE BRAKE REACTION SLEEVE



- (a) Using SST, remove the brake reaction sleeve from the automatic transmission case sub-assembly.

SST: 09350-30020

09350-07080

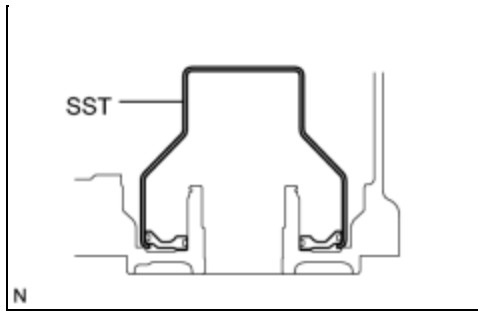
- (b) Remove the 2 O-rings from the brake reaction sleeve.

76. REMOVE NO. 4 BRAKE PISTON

- (a) Using SST, remove the No. 4 brake piston from the automatic transmission case sub-assembly.

SST: 09350-30020

09350-07090

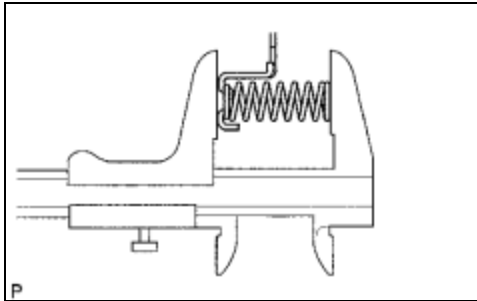


(b) Remove the 2 O-rings from the No. 4 brake piston.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000009W03YX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION UNIT: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT 1ST AND REVERSE BRAKE RETURN SPRING SUB-ASSEMBLY

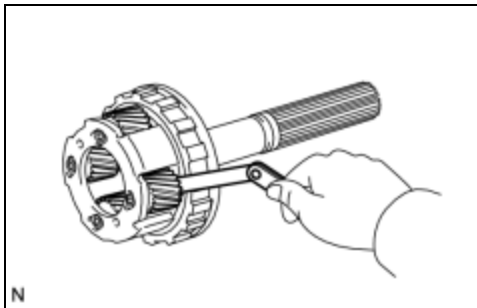


- (a) Using a vernier caliper, measure the free length of the spring together with the spring seat.

Standard free length:
23.74 mm (0.935 in.)

If the free length is shorter than the standard free length, replace the 1st and reverse brake return spring sub-assembly.

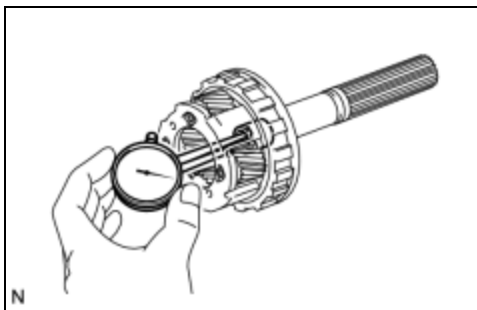
2. INSPECT REAR PLANETARY GEAR ASSEMBLY



- (a) Using a feeler gauge, measure the rear planetary gear pinion thrust clearance.

Standard clearance:
0.2 to 0.6 mm (0.00788 to 0.0236 in.)

If the clearance is more than the standard clearance, replace the rear planetary gear assembly.

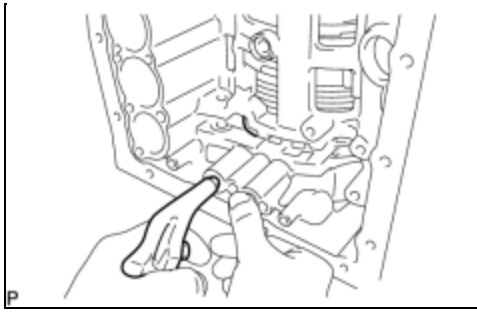


- (b) Using a caliper gauge, measure the inside diameter of the rear planetary gear bushing.

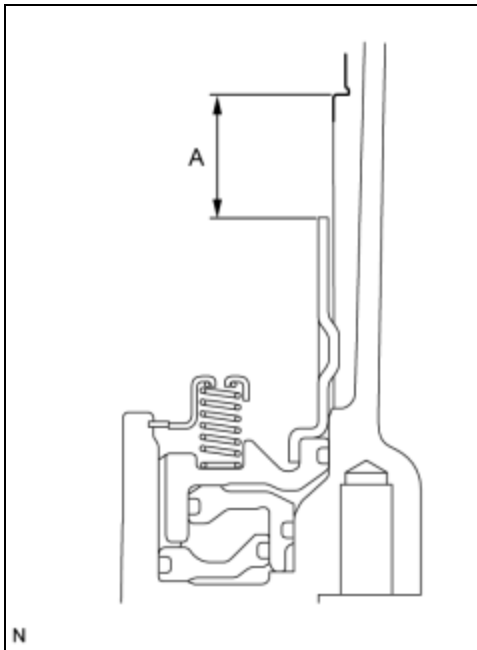
Standard inside diameter:
18.025 mm (0.710 in.)

If the inside diameter is more than the standard inside diameter, replace the rear planetary gear assembly.

3. INSPECT PACK CLEARANCE OF NO. 4 BRAKE



- (a) Make sure that the 1st and reverse brake piston moves smoothly when applying and releasing compressed air (392 kPa, 4.0 kgf/cm², 57 psi).



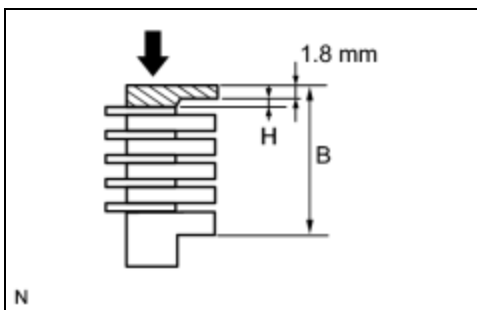
- (b) Using a vernier caliper, measure the level difference (dimension A) between the upper surface of the brake apply tube and the contact surface of the No. 4 brake flange at both ends across the 1st and reverse brake piston diameter, and calculate the average.

NOTICE:

The 1st and reverse brake piston must be securely installed to the end face of the transmission case.

HINT:

Dimension A = 23.32 to 24.18 mm (0.919 to 0.951 in.)



- (c) Using a vernier caliper, and while applying compression of 4.9 N (0.5 kgf, 1.1 lbf) or less, measure the thickness (dimension B) of the 2 No. 4 brake flanges, 4 No. 4 brake plates and the 5 No. 4 brake discs altogether at both ends across a diameter, and calculate the average.

HINT:

Dimension B = 23.64 to 26.00 mm (0.931 to 1.023 in.)

Pack clearance = Dimension A - Dimension B - 0.18 mm (0.00709 in.) + 1.8 mm (0.0709 in.)

Pack clearance:

0.5 to 0.8 mm (0.0197 to 0.0314 in.)

- (d) If the pack clearance is outside the standard range, select and install a No. 4 brake flange that brings the pack clearance to be within the standard range.

HINT:

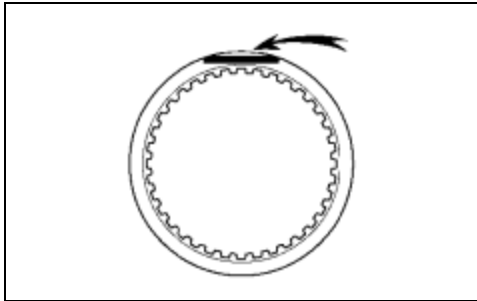
There are 8 types of No. 4 brake flanges that can be used to adjust the pack clearance. Select the one

with the most appropriate thickness.

Thickness H:

PART NO.	MARK	THICKNESS H
SU003-03786	0	0 mm (0 in.)
SU003-03787	2	0.2 mm (0.00787 in.)
SU003-03788	4	0.4 mm (0.0157 in.)
SU003-03789	6	0.6 mm (0.0236 in.)
SU003-03790	8	0.8 mm (0.0315 in.)
SU003-03791	10	1.0 mm (0.0394 in.)
SU003-03792	12	1.2 mm (0.0472 in.)
SU003-03793	14	1.4 mm (0.0551 in.)

4. INSPECT NO. 4 BRAKE DISC



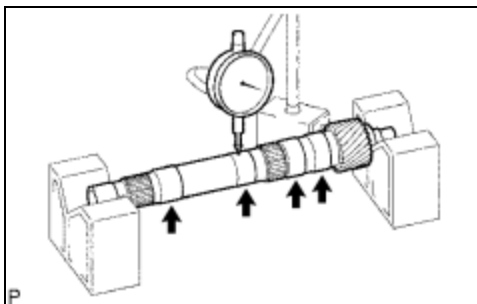
(a) Check whether the sliding surfaces of the discs, plates and the flanges are worn or burnt.

If necessary, replace them.

NOTICE:

- If the linings of the discs are peeled off or discolored, or if any part of the printed numbers is damaged, replace all the discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.

5. INSPECT INTERMEDIATE SHAFT



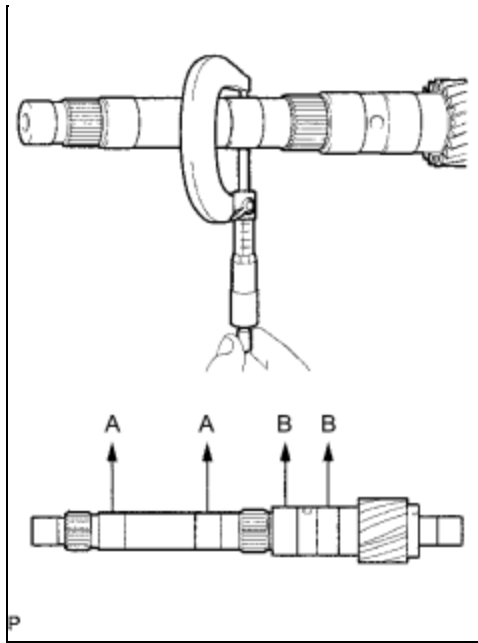
(a) Using a dial indicator, check the intermediate shaft runout.

Standard runout:
0.03 mm (0.00118 in.)

If the runout is more than the standard, replace the intermediate shaft with a new one.

(b) Using a micrometer, check the outer diameter of the intermediate shaft at each point shown in the illustration.

Standard diameter:



A

22.962 to 22.975 mm (0.9041 to 0.9045 in.)

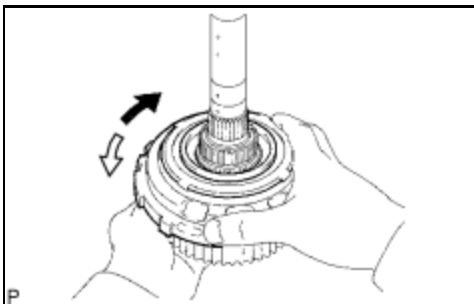
B

27.759 to 27.775 mm (1.0929 to 1.0935 in.)



If the outer diameter is less than the standard, replace the intermediate shaft with a new one.

6. INSPECT NO. 3 ONE-WAY CLUTCH ASSEMBLY

- (a) Hold the rear planetary ring gear flange sub-assembly and turn the No. 3 one-way clutch assembly.



Text in Illustration

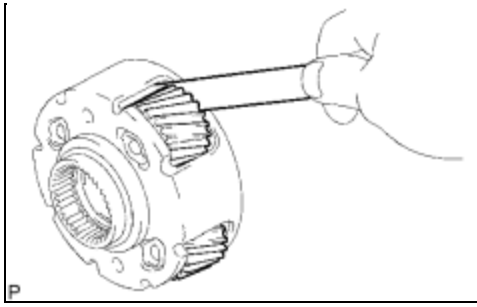
	Lock
	Free

- (b) Check that the No. 3 one-way clutch assembly turns freely when turned counterclockwise and locks when turned clockwise.

If there is a problem with the No. 3 one-way clutch assembly, replace it.

7. INSPECT CENTER PLANETARY GEAR ASSEMBLY

- (a) Using a feeler gauge, measure the center planetary gear



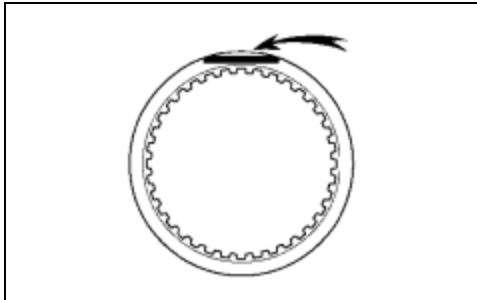
pinion thrust clearance.

Standard clearance:

0.12 to 0.68 mm (0.00473 to 0.0267 in.)

If the clearance is more than the standard clearance, replace the center planetary gear assembly.

8. INSPECT NO. 2 BRAKE DISC



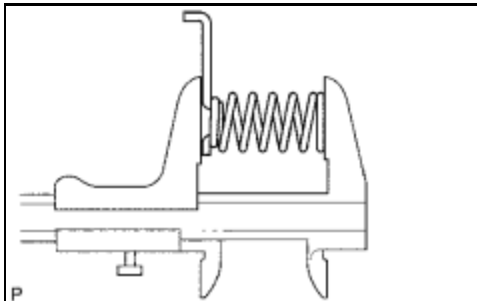
(a) Check whether the sliding surfaces of the discs, plates and the flanges are worn or burnt.

If necessary, replace them.

NOTICE:

- If the linings of the discs are peeled off or discolored, or if any part of the printed numbers is damaged, replace all the discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.

9. INSPECT NO. 2 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY



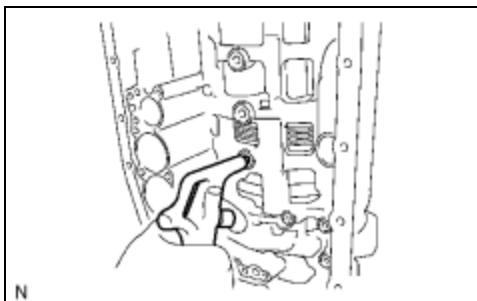
(a) Using a vernier caliper, measure the free length of the spring together with the spring seat.

Standard free length:

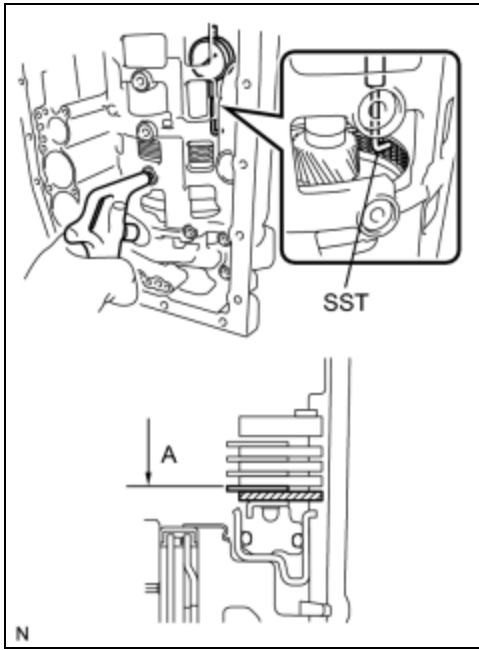
22.66 mm (0.892 in.)

If the free length is shorter than the standard free length, replace the No. 2 brake piston return spring sub-assembly.

10. INSPECT PISTON STROKE OF NO. 2 BRAKE PISTON



(a) Make sure that the No. 2 brake piston moves smoothly when applying and releasing compressed air (392 kPa, 4.0 kgf/cm², 57 psi).



(b) Using SST and a dial indicator, measure the moving distance (distance A) of the No. 2 brake disc at both ends across a diameter while blowing air (392 kPa, 4.0 kgf/cm², 57 psi) into the oil hole as shown in the illustration, and calculate the average.

SST: 09350-30020

09350-06120

Piston stroke:

0.6 to 0.9 mm (0.0237 to 0.0354 in.)

(c) If the piston stroke is outside the standard range, select and install a No. 2 brake flange that brings the piston stroke within the standard range.

HINT:

There are 8 types of No. 2 brake flanges that can be used to adjust the piston stroke. Select one with the most appropriate thickness.

Flange Thickness:

PART NO.	MARK	THICKNESS
SU003-03771	0	2.0 mm (0.0787 in.)
SU003-03772	1	2.1 mm (0.0827 in.)
SU003-03773	2	2.2 mm (0.0866 in.)
SU003-03774	3	2.3 mm (0.0906 in.)
SU003-03775	4	2.4 mm (0.0945 in.)
SU003-03776	5	2.5 mm (0.0984 in.)
SU003-03777	6	2.6 mm (0.102 in.)
SU003-03778	7	2.7 mm (0.106 in.)

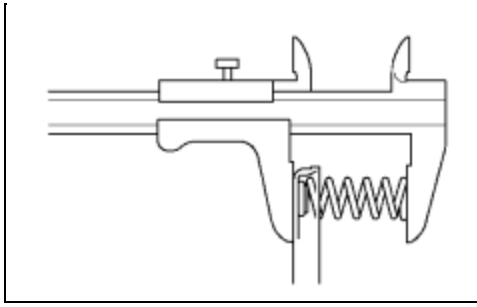
11. INSPECT BRAKE PISTON RETURN SPRING SUB-ASSEMBLY

(a) Using a vernier caliper, measure the free length of the spring together with the spring seat.

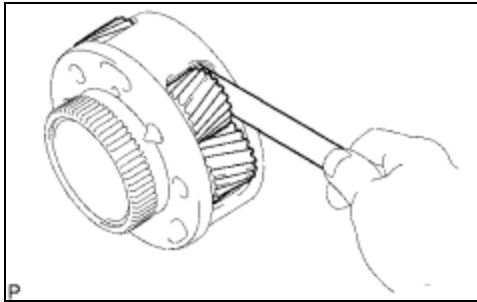
Standard free length:

17.05 mm (0.671 in.)

If the free length is shorter than the standard free length, replace the brake piston return spring sub-assembly.



12. INSPECT FRONT PLANETARY GEAR ASSEMBLY

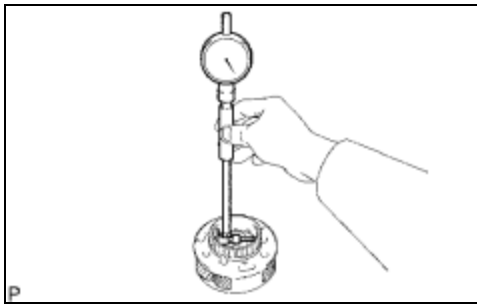


- (a) Using a feeler gauge, measure the front planetary gear pinion thrust clearance.

Standard clearance:

0.20 to 0.60 mm (0.00788 to 0.0236 in.)

If the clearance is more than the standard clearance, replace the front planetary gear assembly.



- (b) Using a cylinder gauge, measure the inside diameter of the front planetary gear bushing.

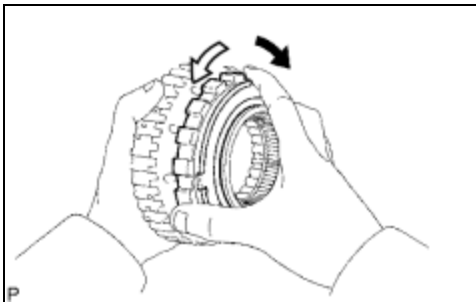
Standard inside diameter:

48.78 mm (1.92 in.)



If the inside diameter is more than the standard inside diameter, replace the front planetary gear assembly.

13. INSPECT ONE-WAY CLUTCH ASSEMBLY

- (a) Install the one-way clutch assembly to the one-way clutch inner race sub-assembly.

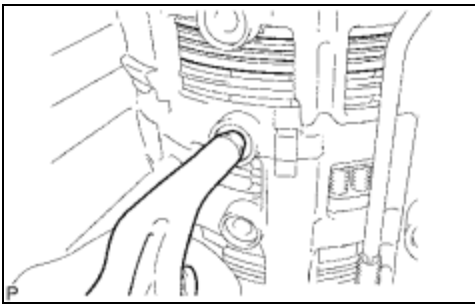


Text in Illustration

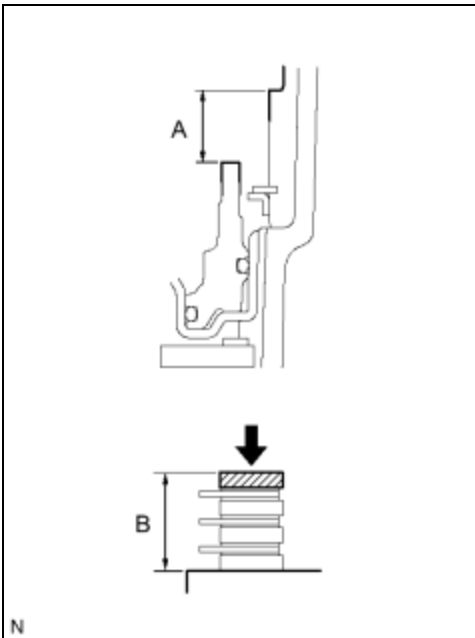
	
	Free

- (b) Hold the one-way clutch inner race sub-assembly and turn the one-way clutch assembly.
- (c) Check that the one-way clutch assembly turns freely when turned counterclockwise and locks when turned clockwise.
If there is a problem with the one-way clutch assembly, replace it.
- (d) Remove the one-way clutch assembly from the one-way clutch inner race sub-assembly.

14. INSPECT PISTON STROKE OF NO. 1 BRAKE PISTON



- (a) Make sure that the No. 1 brake piston moves smoothly when applying and releasing compressed air (392 kPa, 4.0 kgf/cm², 57 psi).



- (b) Using a vernier caliper, and while applying compression of 4.9 N (0.5 kgf, 1.1 lbf) or less, measure the level difference (dimension A) between the upper surface of the No. 1 brake piston and the contact surface of the No. 1 brake flange at both ends across the No. 1 brake piston diameter.

- (c) Using a vernier caliper, measure the thickness (dimension B) of the No. 1 brake flange, 3 No. 1 brake plates and the 3 No. 1 brake discs altogether at both ends across a diameter, and calculate the average.

HINT:

Dimension A = 15.27 to 15.92 mm (0.602 to 0.626 in.)

Dimension B = 14.50 to 15.54 mm (0.571 to 0.611 in.)

Piston stroke = Dimension A - Dimension B

Piston stroke:

0.42 to 0.72 mm (0.0166 to 0.0283 in.)

- (d) If the piston stroke is outside the standard range, parts may have been assembled incorrectly, so check and reassemble them again.
- (e) If the piston stroke is still outside the standard range, select another No. 1 brake flange that brings the piston stroke within the standard range.

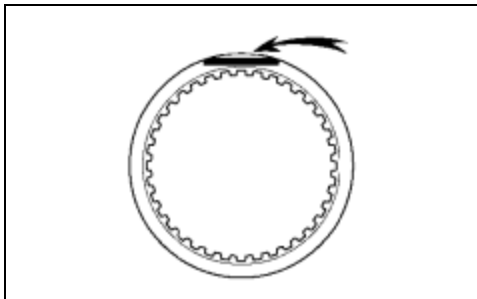
HINT:

There are 4 types of No. 1 brake flanges that can be used to adjust the piston stroke. Select one with the most appropriate thickness.

Flange Thickness:

PART NO.	MARK	THICKNESS
SU003-03765	0	2.0 mm (0.0787 in.)
SU003-03766	1	2.2 mm (0.0866 in.)
SU003-03767	2	2.4 mm (0.0945 in.)
SU003-03768	3	2.6 mm (0.102 in.)

15. INSPECT NO. 1 BRAKE DISC



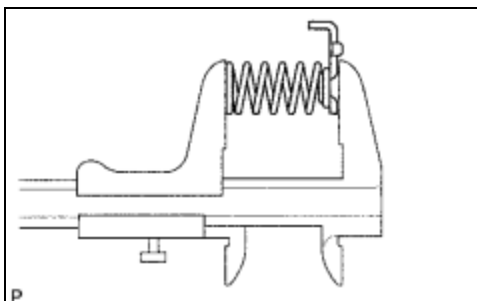
- (a) Check whether the sliding surfaces of the discs, plates and the flange are worn or burnt.

If necessary, replace them.

NOTICE:

- If the linings of the discs are peeled off or discolored, or if any part of the groove is damaged, replace all the discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.

16. INSPECT NO. 3 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY



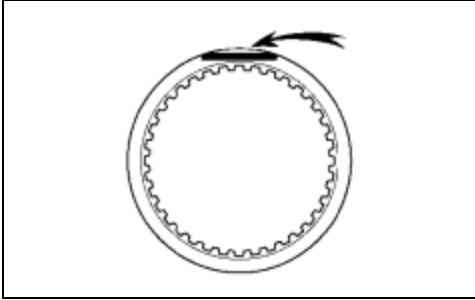
- (a) Using a vernier caliper, measure the free length of the spring together with the spring seat.

Standard free length:

15.72 mm (0.619 in.)

If the free length is shorter than the standard free length, replace the No. 3 brake piston return spring sub-assembly.

17. INSPECT NO. 3 BRAKE DISC (2ND BRAKE DISC SET)



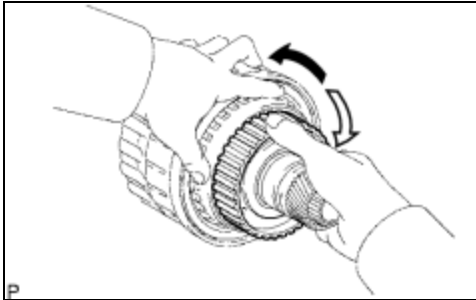
- (a) Check whether the sliding surfaces of the discs, plates and the flange are worn or burnt.
If necessary, replace them.

NOTICE:

- If the linings of the discs are peeled off or discolored, or if any part of the printed numbers is damaged, replace all the discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.

18. INSPECT NO. 2 ONE-WAY CLUTCH ASSEMBLY

- (a) Hold the reverse clutch hub sub-assembly and turn the No. 2 one-way clutch assembly.



Text in Illustration

	Lock
	Free

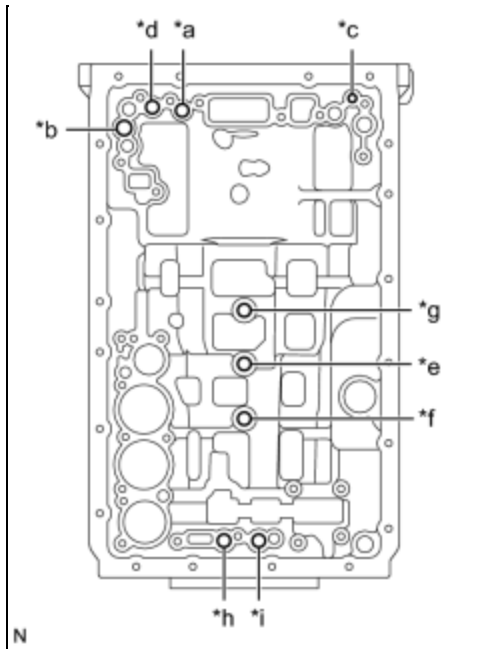
- (b) Check that the No. 2 one-way clutch assembly turns freely when turned clockwise and locks when turned counterclockwise.
If there is a problem with the No. 2 one-way clutch assembly, replace it.

19. INSPECT INDIVIDUAL PISTON OPERATION

- (a) Check the operating sound while applying compressed air into the oil holes indicated in the illustration.

Text in Illustration

*a	No. 1 Clutch
*b	No. 2 Clutch
*c	No. 3 Clutch
*d	No. 4 Clutch



*e	No. 1 Brake
*f	No. 2 Brake
*g	No. 3 Brake
*h	No. 4 Brake (In)
*i	No. 4 Brake (Out)

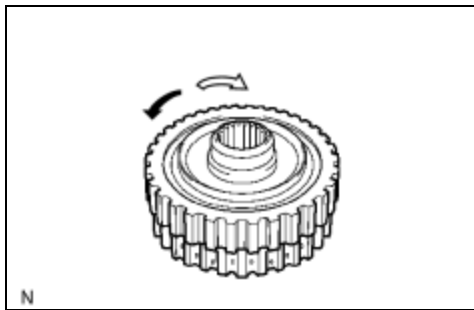
HINT:

When inspecting the direct clutch, check the operating sound with the C3 accumulator piston hole closed.

If there is no sound, disassemble the parts and check the installation condition of the parts.

20. INSPECT NO. 4 ONE-WAY CLUTCH ASSEMBLY

(a) Hold the coast clutch hub sub-assembly and turn the No. 4 one-way clutch assembly.



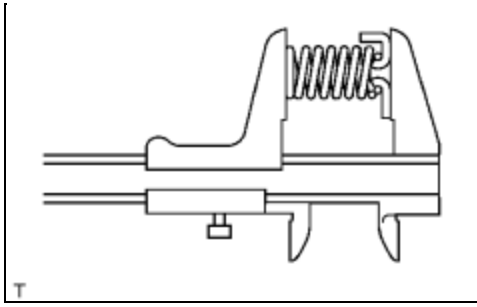
Text in Illustration

	Lock
	Free

(b) Check that the No. 4 one-way clutch assembly turns freely when turned clockwise and locks when turned counterclockwise.

If there is a problem with the No. 4 one-way clutch assembly, replace it.

21. INSPECT DIRECT CLUTCH RETURN SPRING SUB-ASSEMBLY

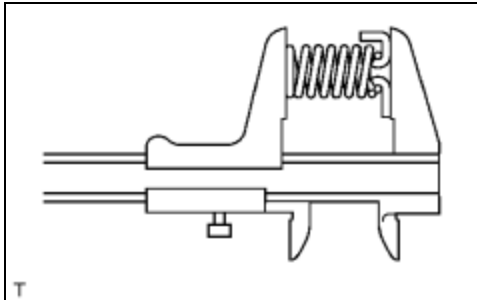


- (a) Using a vernier caliper, measure the free length of the spring together with the spring seat.

Standard free length:
20.02 mm (0.788 in.)

If the free length is shorter than the standard free length, replace the direct clutch return spring sub-assembly.

22. INSPECT REVERSE CLUTCH RETURN SPRING SUB-ASSEMBLY

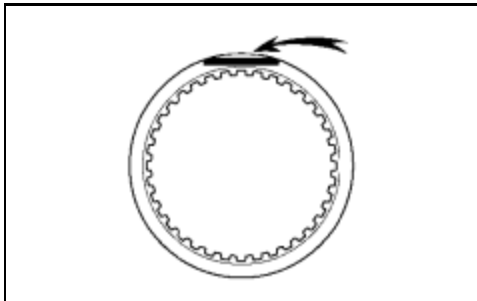


- (a) Using a vernier caliper, measure the free length of the spring together with the spring seat.

Standard free length:
21.03 mm (0.828 in.)

If the free length is shorter than the standard free length, replace the reverse clutch return spring sub-assembly.

23. INSPECT NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC)



- (a) Check whether the sliding surfaces of the discs, plates and the flange are worn or burnt.

If necessary, replace them.

NOTICE:

- If the linings of the discs are peeled off or discolored, or even a part of the printed numbers is damaged, replace all the discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.

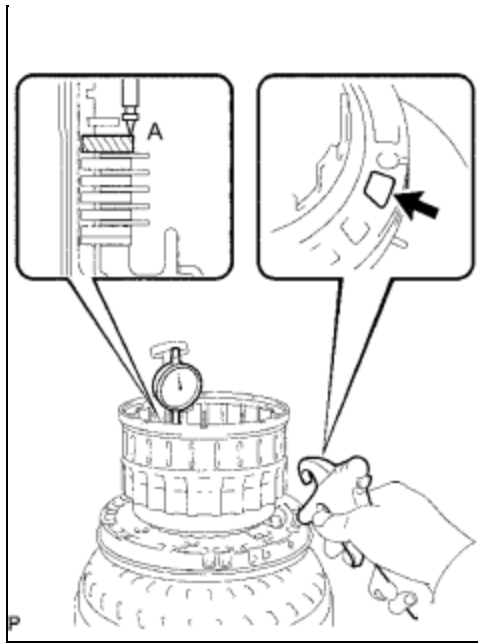
24. INSPECT PACK CLEARANCE OF NO. 2 CLUTCH

- (a) Using a dial indicator, measure the moving distance (distance A) of the direct clutch flange at both ends across a diameter while blowing air (392 kPa, 4.0 kgf/cm², 57 psi) into the oil hole as shown in the illustration, and calculate the average.

HINT:

Flange moving distance A = 0.24 to 1.12 mm (0.00944 to 0.0440 in.)

Pack clearance = Flange moving distance A - 0.03 mm (0.00118 in.)



Pack clearance:
0.5 to 0.8 mm (0.0197 to 0.0314 in.)

NOTICE:

When measuring the moving distance, install a standard flange {thickness: 3.4 mm (0.134 in.)} to the position indicated by the shaded area in the illustration.

- (b) If the pack clearance is outside the standard range, select and install a direct clutch flange that brings the pack clearance within the standard range.

HINT:

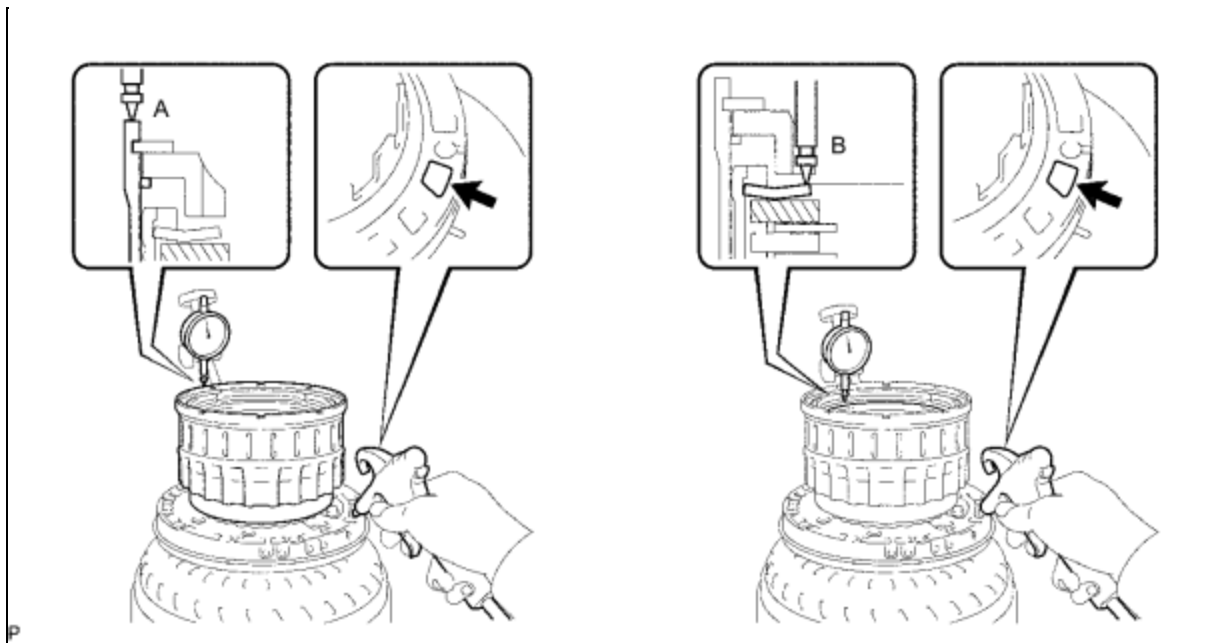
There are 9 types of direct clutch flanges that can be used to adjust the pack clearance. Select the one with the most appropriate thickness.

Flange Thickness:

PART NO.	MARK	THICKNESS
SU003-03756	0	3.0 mm (0.118 in.)
SU003-03757	1	3.1 mm (0.122 in.)
SU003-03758	2	3.2 mm (0.126 in.)
SU003-03759	3	3.3 mm (0.130 in.)
SU003-03760	4	3.4 mm (0.134 in.)
SU003-03761	5	3.5 mm (0.138 in.)
SU003-03762	6	3.6 mm (0.142 in.)
SU003-03763	7	3.7 mm (0.146 in.)
SU003-03764	8	3.8 mm (0.150 in.)

25. INSPECT PACK CLEARANCE OF NO. 3 CLUTCH

- (a) Using a dial indicator, measure the reverse clutch piston stroke (distance A) and the moving distance (distance B) of the reverse clutch flange at both ends across a diameter while blowing air (392 kPa, 4.0 kgf/cm², 57 psi) into the oil hole as shown in the illustration, and calculate the average.



HINT:

Piston stroke A = 1.62 to 2.68 mm (0.0638 to 0.105 in.)

Flange moving distance B = 1.22 to 1.67 mm (0.0481 to 0.0657 in.)

Pack clearance = Piston stroke A - Flange moving distance B - 0.02 mm (0.000787 in.)

Pack clearance:

0.4 to 0.7 mm (0.0158 to 0.0275 in.)

NOTICE:

When measuring the moving distance, install a standard flange {thickness: 2.8 mm (0.110 in.)} to the position indicated by the shaded area in the illustration.

(b) If the pack clearance is outside the standard range, select and install a reverse clutch flange that brings the pack clearance within the standard range.

HINT:

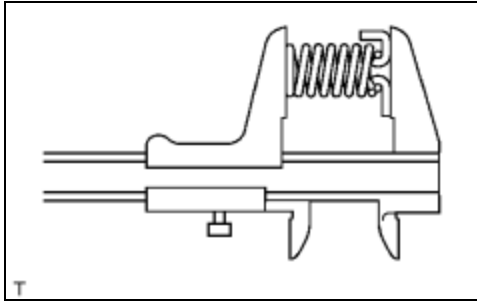
There are 12 types of reverse clutch flanges that can be used to adjust the pack clearance. Select the one with the most appropriate thickness.

Flange Thickness:

PART NO.	MARK	THICKNESS
SU003-03725	0	2.4 mm (0.0945 in.)
SU003-03726	1	2.5 mm (0.0984 in.)
SU003-03727	2	2.6 mm (0.102 in.)
SU003-03728	3	2.7 mm (0.106 in.)
SU003-03729	4	2.8 mm (0.110 in.)
SU003-03730	5	2.9 mm (0.114 in.)
SU003-03731	6	3.0 mm (0.118 in.)
SU003-03732	7	3.1 mm (0.122 in.)

SU003-03733	8	3.2 mm (0.126 in.)
SU003-03734	9	3.3 mm (0.130 in.)
SU003-03735	A	3.4 mm (0.134 in.)
SU003-03736	B	3.5 mm (0.138 in.)

26. INSPECT FORWARD CLUTCH RETURN SPRING SUB-ASSEMBLY

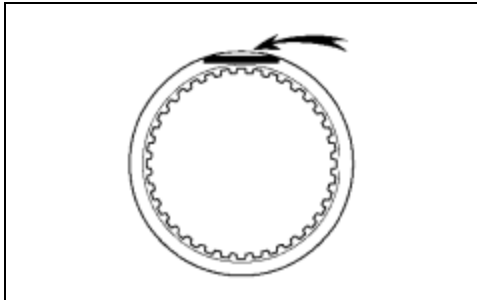


- (a) Using a vernier caliper, measure the free length of the spring together with the spring seat.

Standard free length:
26.29 mm (1.04 in.)

If the free length is shorter than the standard free length, replace the forward clutch return spring sub-assembly.

27. INSPECT NO. 4 CLUTCH DISC (COAST CLUTCH DISC)



- (a) Check whether the sliding surfaces of the discs, plates and the flange are worn or burnt.

If necessary, replace them.

NOTICE:

- If the linings of the discs are peeled off or discolored, or even a part of the printed numbers is damaged, replace all the discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.

28. INSPECT PACK CLEARANCE OF NO. 1 CLUTCH

- (a) Using a dial indicator, measure the moving distance (distance A) of the forward clutch flange at both ends across a diameter while blowing air (196 kPa, 2.0 kgf/cm², 28 psi) into the oil hole as shown in the illustration, and calculate the average.

HINT:

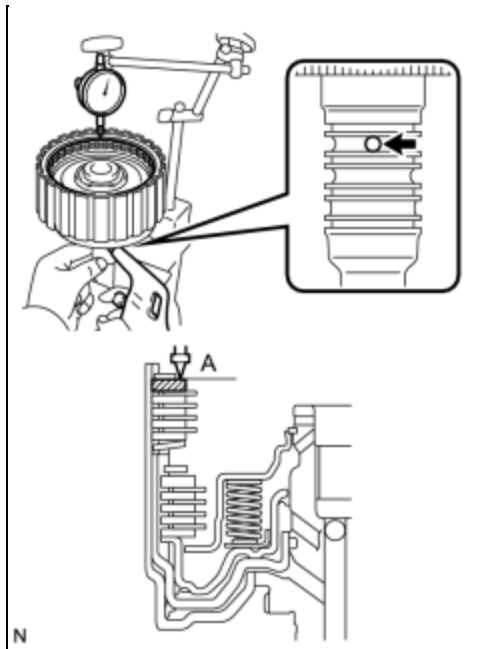
Flange moving distance A = 0.14 to 0.17 mm (0.00552 to 0.00669 in.)

Pack clearance = Flange moving distance A - 0.01 mm (0.000394 in.)

Pack clearance:

0.56 to 0.86 mm (0.0221 to 0.0338 in.)

NOTICE:



When measuring the moving distance, install a standard flange {thickness: 3.5 mm (0.138 in.)} to the position indicated by the shaded area in the illustration.

- (b) If the pack clearance is outside the standard range, select and install a forward clutch flange that brings the pack clearance within the standard range.

HINT:

There are 10 types of forward clutch flanges that can be used to adjust the pack clearance. Select the one with the most appropriate thickness.

Flange Thickness:

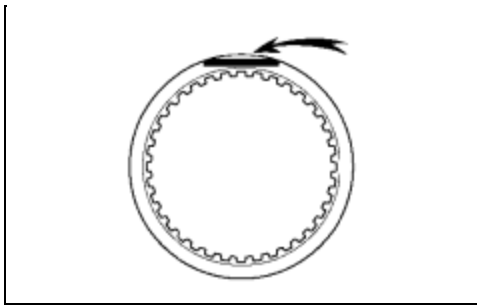
PART NO.	MARK	THICKNESS
SU003-03712	0	3.0 mm (0.118 in.)
SU003-03713	1	3.1 mm (0.122 in.)
SU003-03714	2	3.2 mm (0.126 in.)
SU003-03715	3	3.3 mm (0.130 in.)
SU003-03716	4	3.4 mm (0.134 in.)
SU003-03717	5	3.5 mm (0.138 in.)
SU003-03718	6	3.6 mm (0.142 in.)
SU003-03719	7	3.7 mm (0.146 in.)
SU003-03720	8	3.8 mm (0.150 in.)
SU003-03721	9	3.9 mm (0.154 in.)

29. INSPECT NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC)

- (a) Check whether the sliding surfaces of the discs, plates and the flange are worn or burnt.

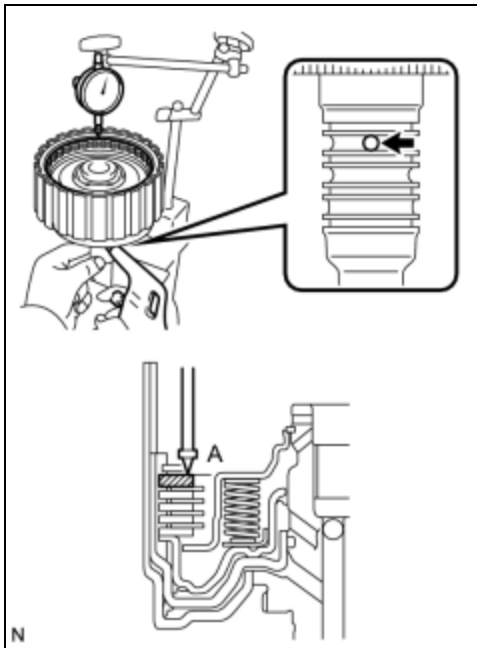
If necessary, replace them.

NOTICE:



- If the linings of the discs are peeled off or discolored, or even a part of the printed numbers is damaged, replace all the discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.

30. INSPECT PACK CLEARANCE OF NO. 4 CLUTCH



- (a) Using a dial indicator, measure the moving distance (distance A) of the coast clutch flange at both ends across a diameter while blowing air (196 kPa, 2.0 kgf/cm², 28 psi) into the oil hole as shown in the illustration, and calculate the average.

HINT:

Flange moving distance A = 0.02 to 1.01 mm (0.000787 to 0.0397 in.)

Pack clearance = Flange moving distance A - 0.01 mm (0.000394 in.)

Pack clearance:

0.4 to 0.7 mm (0.0158 to 0.0275 in.)

NOTICE:

When measuring the moving distance, install a standard flange {thickness: 3.5 mm (0.138 in.)} to the position indicated by the shaded area in the illustration.

- (b) If the pack clearance is outside the standard range, select and install a coast clutch flange that brings the pack clearance within the standard range.

HINT:

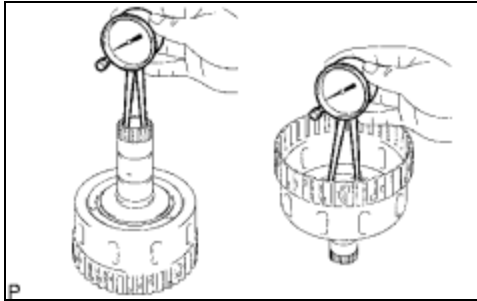
There are 10 types of coast clutch flanges that can be used to adjust the pack clearance. Select the one with the most appropriate thickness.

Flange Thickness:

PART NO.	MARK	THICKNESS
SU003-03746	0	3.0 mm (0.118 in.)
SU003-03747	1	3.1 mm (0.122 in.)
SU003-03748	2	3.2 mm (0.126 in.)
SU003-03749	3	3.3 mm (0.130 in.)
SU003-03750	4	3.4 mm (0.134 in.)
SU003-03751	5	3.5 mm (0.138 in.)

SU003-03752	6	3.6 mm (0.142 in.)
SU003-03753	7	3.7 mm (0.146 in.)
SU003-03754	8	3.8 mm (0.150 in.)
SU003-03755	9	3.9 mm (0.154 in.)

31. INSPECT FORWARD CLUTCH HUB SUB-ASSEMBLY



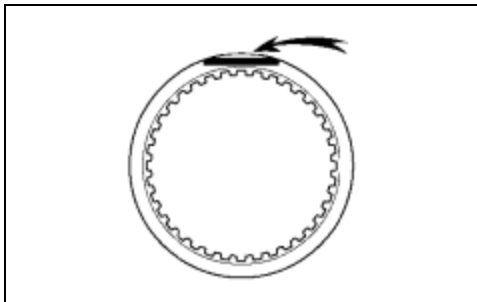
- (a) Using a caliper gauge, measure the inside diameter of the forward clutch hub bushing.

Standard inside diameter:

23.037 to 23.062 mm (0.9070 to 0.9079 in.)

If the inside diameter is more than the standard inside diameter, replace the forward clutch hub sub-assembly.

32. INSPECT NO. 3 CLUTCH DISC (REAR CLUTCH DISC)



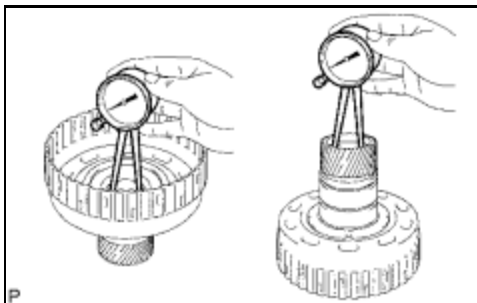
- (a) Check whether the sliding surfaces of the discs, plates and the flange are worn or burnt.

If necessary, replace them.

NOTICE:

- If the linings of the discs are peeled off or discolored, or even a part of the printed numbers is damaged, replace all the discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.

33. INSPECT REVERSE CLUTCH HUB SUB-ASSEMBLY



- (a) Using a caliper gauge, measure the inside diameter of the reverse clutch hub bushing.

Standard inside diameter:

33.312 to 33.337 mm (1.3115 to 1.3124 in.)

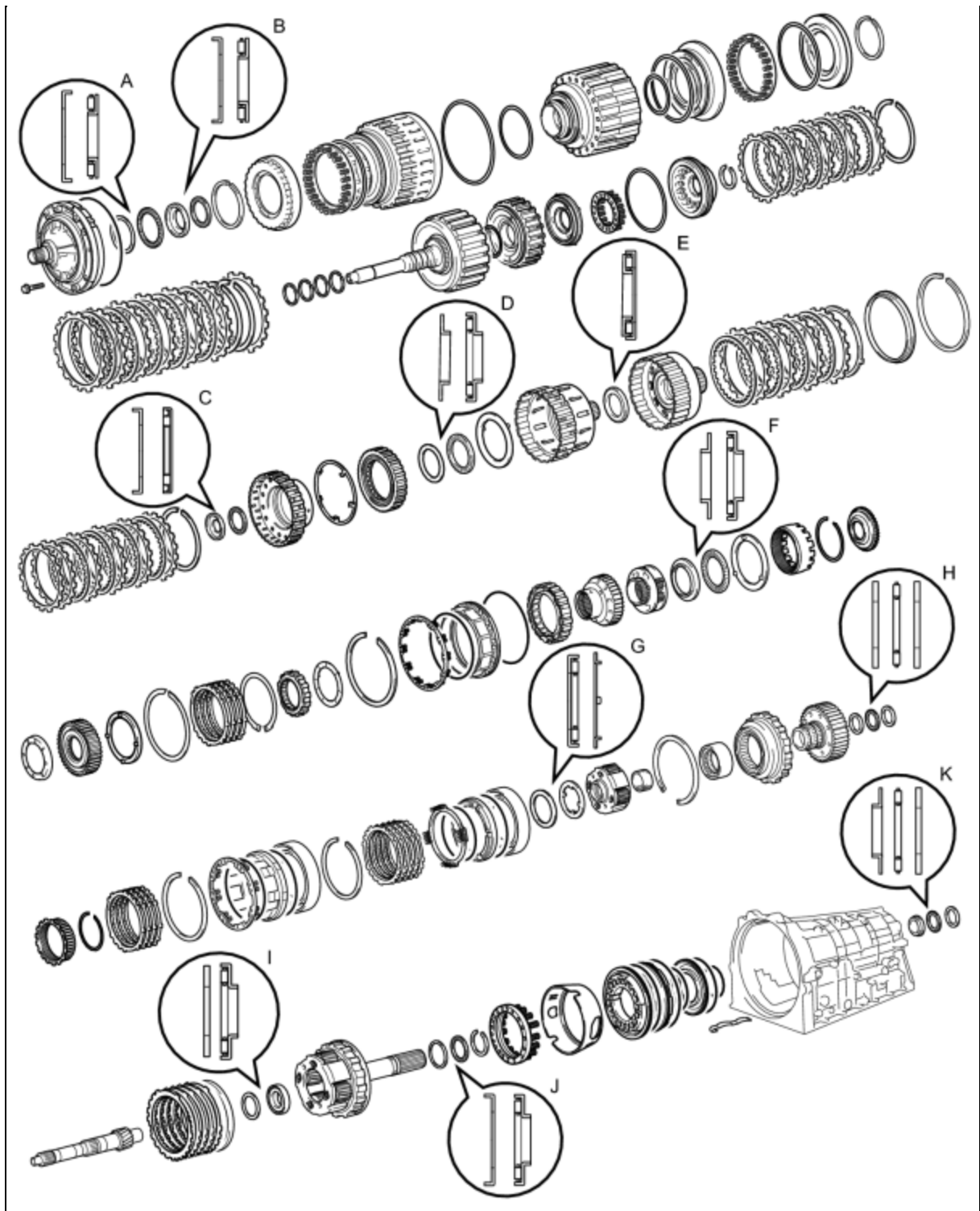
If the inside diameter is more than the standard inside diameter, replace the reverse clutch hub sub-assembly.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000000A003RX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: AUTOMATIC TRANSMISSION UNIT: REASSEMBLY (2013 FR-S)		

REASSEMBLY

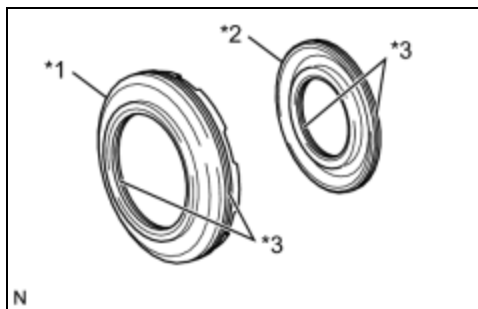
1. BEARING POSITION



MARK	FRONT RACE DIAMETER INSIDE / OUTSIDE	THRUST BEARING DIAMETER INSIDE / OUTSIDE	REAR RACE DIAMETER INSIDE / OUTSIDE
A	74.2 mm (2.921 in.) / 87.7 mm (3.453 in.)	71.9 mm (2.831 in.) / 85.6 mm (3.370 in.)	-
B	37.0 mm (1.457 in.) / 51.2 mm (2.016 in.)	33.5 mm (1.319 in.) / 48.0 mm (1.890 in.)	-
C	20.0 mm (0.787 in.) / 35.6 mm (1.402 in.)	20.0 mm (0.787 in.) / 41.0 mm (1.614 in.)	-

D	31.0 mm (1.220 in.) / 48.0 mm (1.890 in.)	33.3 mm (1.311 in.) / 51.2 mm (2.016 in.)	-
E	-	42.5 mm (1.673 in.) / 61.2 mm (2.409 in.)	-
F	34.9 mm (1.374 in.) / 50.8 mm (1.999 in.)	38.6 mm (1.520 in.) / 53.1 mm (2.091 in.)	-
G	-	58.5 mm (2.303 in.) / 73.5 mm (2.894 in.)	55.2 mm (2.173 in.) / 71.2 mm (2.803 in.)
H	29.6 mm (1.165 in.) / 44.9 mm (1.768 in.)	27.8 mm (1.095 in.) / 43.8 mm (1.726 in.)	27.8 mm (1.095 in.) / 43.7 mm (1.721 in.)
I	19.0 mm (0.748 in.) / 35.0 mm (1.378 in.)	20.8 mm (0.819 in.) / 38.5 mm (1.516 in.)	-
J	43.3 mm (1.705 in.) / 56.7 mm (2.232 in.)	40.6 mm (1.598 in.) / 58.0 mm (2.284 in.)	-
K	37.0 mm (1.457 in.) / 51.2 mm (2.016 in.)	36.1 mm (1.421 in.) / 52.5 mm (2.067 in.)	36.1 mm (1.421 in.) / 51.0 mm (2.007 in.)

2. INSTALL NO. 4 BRAKE PISTON



(a) Coat 2 new O-ring with ATF, and install them to the brake reaction sleeve.

Text in Illustration

*1	Brake Reaction Sleeve
*2	No. 4 Brake Piston
*3	O-ring

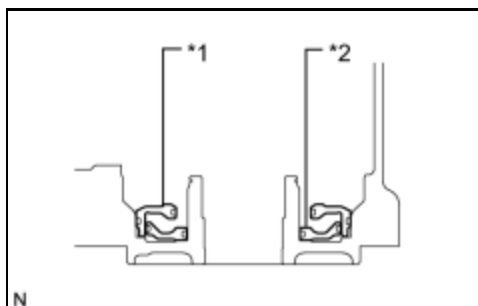
(b) Coat 2 new O-rings with ATF, and install them to the No. 4 brake piston.

(c) Install the No. 4 brake piston to the brake reaction sleeve.

NOTICE:

Be careful not to damage the O-rings.

3. INSTALL BRAKE REACTION SLEEVE



(a) With the No. 4 brake piston underneath (the rear side), install the brake reaction sleeve and the No. 4 brake piston to the automatic transmission case sub-assembly.

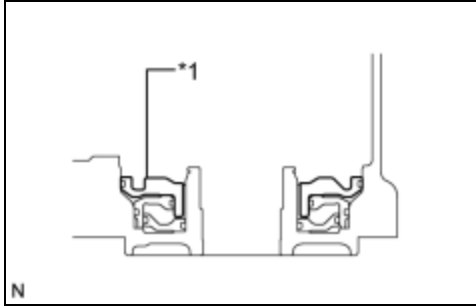
Text in Illustration

*1	Brake Reaction Sleeve
*2	No. 4 Brake Piston

NOTICE:

Be careful not to damage the O-rings.

4. INSTALL 1ST AND REVERSE BRAKE PISTON



- (a) Coat a new O-rings with ATF, and install it to the 1st and reverse brake piston.

Text in Illustration

*1	1st and Reverse Brake Piston
----	------------------------------

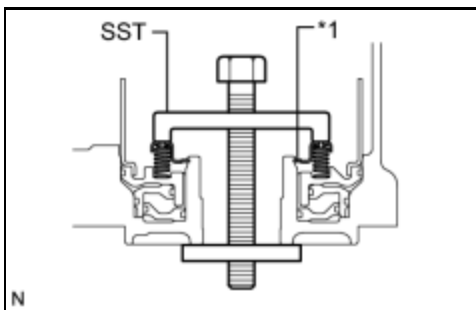
- (b) With the spring seat of the 1st and reverse brake piston facing upwards (the front side), place the 1st and reverse brake piston in the automatic transmission case sub-assembly.

NOTICE:

Be careful not to damage the O-ring.

5. INSTALL 1ST AND REVERSE BRAKE RETURN SPRING SUB-ASSEMBLY

- (a) Place the 1st and reverse brake return spring sub-assembly onto the 1st and reverse brake piston.



- (b) Place SST on the 1st and reverse brake return spring sub-assembly, and compress the 1st and reverse brake return spring sub-assembly.

Text in Illustration

*1	Snap Ring
----	-----------

SST: 09350-30020

09350-07050

- (c) Using SST, install the snap ring.

SST: 09350-30020

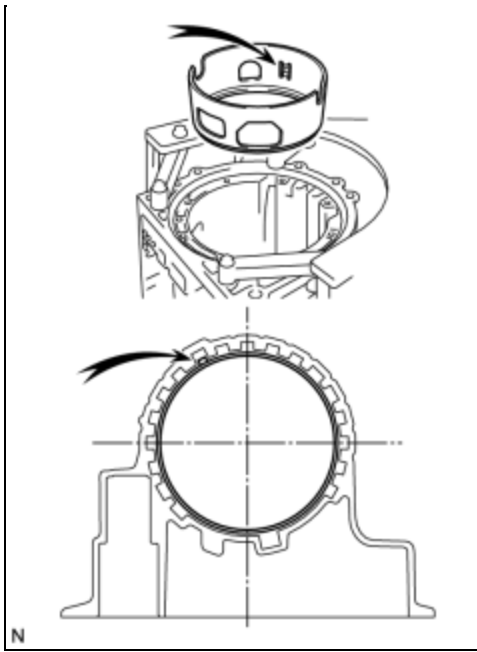
09350-07070

6. INSTALL BRAKE APPLY TUBE

- (a) Install the brake apply tube with its protruding part fitting into the groove of the automatic transmission case sub-assembly as shown in the illustration.

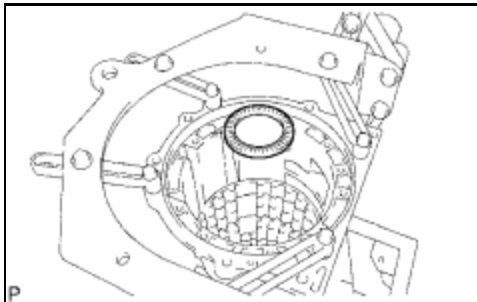
NOTICE:

Engage the 1st and reverse brake piston claw with the



protrusion of the brake apply tube.

7. INSTALL REAR PLANETARY GEAR ASSEMBLY



- (a) Install the thrust needle roller bearing to the automatic transmission case sub-assembly.

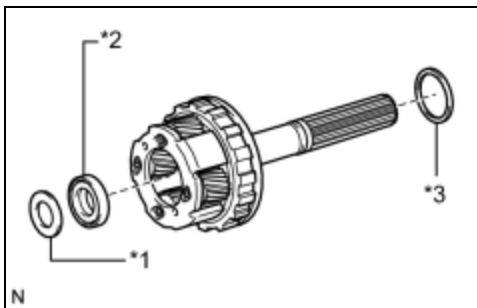
Bearing Diameter

ITEM	INSIDE	OUTSIDE
Thrust needle roller bearing	40.6 mm (1.598 in.)	58.0 mm (2.284 in.)

- (b) Install the thrust needle roller bearing to the rear planetary gear assembly.

Text in Illustration

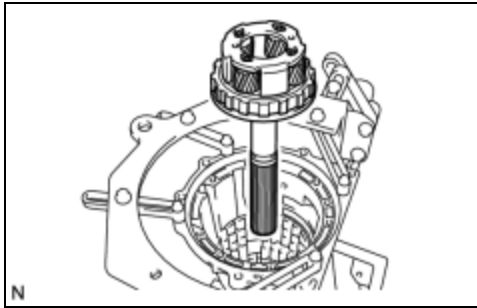
*1	Thrust Bearing Race
*2	Thrust Needle Roller Bearing
*3	No. 9 Thrust Bearing Race



Bearing and Race Diameter

ITEM	INSIDE	OUTSIDE
Thrust needle roller bearing	20.8 mm (0.819 in.)	38.5 mm (1.516 in.)
Thrust bearing race	19.0 mm (0.748 in.)	35.0 mm (1.378 in.)
No. 9 thrust bearing	43.3 mm (1.705 in.)	56.7 mm (2.232 in.)

(c) Coat the No. 9 thrust bearing race and the thrust bearing race with petroleum jelly, and install them onto the rear planetary gear assembly.

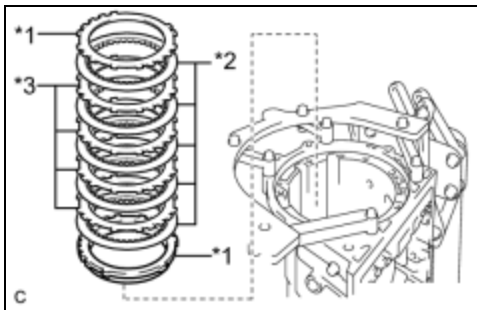


(d) Install the rear planetary gear assembly to the automatic transmission case sub-assembly.

8. INSPECT PACK CLEARANCE OF NO. 4 BRAKE INFO

9. INSTALL NO. 4 BRAKE DISC

(a) Install the 2 No. 4 brake flanges, 5 No. 4 brake discs and the 4 No. 4 brake plates to the automatic transmission case sub-assembly.



Text in Illustration

*1	No. 4 Brake Flange
*2	No. 4 Brake Disc
*3	No. 4 Brake Plate

Installation order:

*1 - *2 - *3 - *2 - *3 - *2 - *3 - *2 - *3 - *2 - *1

NOTICE:

Make sure that the discs, plates and the flanges are installed in the correct order.

10. INSTALL BRAKE PLATE STOPPER SPRING

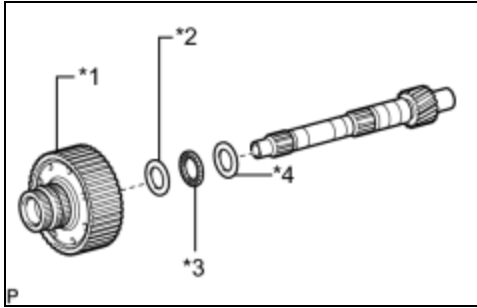


(a) Install the brake plate stopper spring to the automatic transmission case sub-assembly.

11. INSTALL REAR PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

- (a) Install the No. 8 thrust bearing race, thrust needle roller bearing, No. 7 thrust bearing race and the rear planetary ring gear flange sub-assembly to the intermediate shaft.

Text in Illustration



*1	Rear Planetary Ring Gear Flange Sub-assembly
*2	No. 7 Thrust Bearing Race
*3	Thrust Needle Roller Bearing
*4	No. 8 Thrust Bearing Race

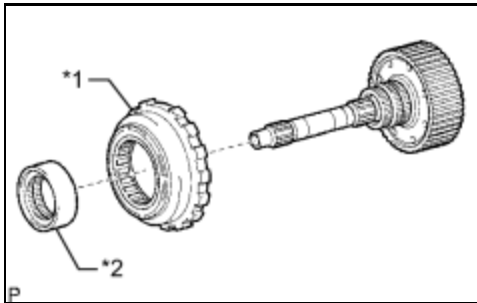
Bearing and Race Diameter

ITEM	INSIDE	OUTSIDE
No. 7 thrust bearing race	29.6 mm (1.165 in.)	44.9 mm (1.768 in.)
Thrust needle roller bearing	27.8 mm (1.095 in.)	43.8 mm (1.726 in.)
No. 8 thrust bearing race	27.8 mm (1.095 in.)	43.7 mm (1.721 in.)

12. INSTALL NO. 3 ONE-WAY CLUTCH ASSEMBLY

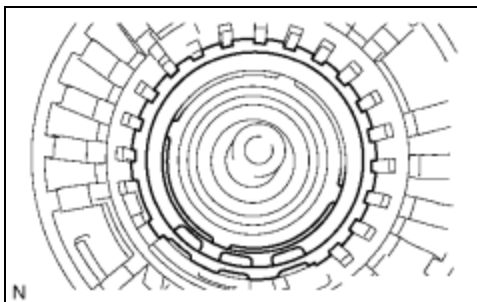
- (a) Install the No. 3 one-way clutch assembly and the one-way clutch inner race to the intermediate shaft.

Text in Illustration

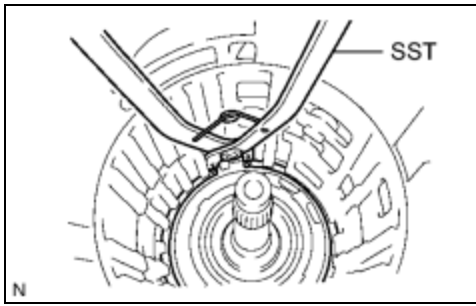


*1	No. 3 One-way Clutch Assembly
*2	One-way Clutch Inner Race

13. INSTALL INTERMEDIATE SHAFT



- (a) Install the intermediate shaft together with the No. 3 one-way clutch assembly to the automatic transmission case sub-assembly.



(b) Using SST, install the snap ring to the automatic transmission case sub-assembly.

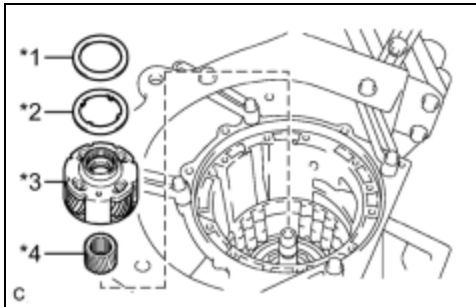
SST: 09350-30020

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14. INSTALL CENTER PLANETARY GEAR ASSEMBLY

(a) Install the center planetary gear assembly and the planetary sun gear to the automatic transmission case sub-assembly.

Text in Illustration



*1	Thrust Needle Roller Bearing
*2	No. 4 Thrust Bearing Race
*3	Center Planetary Gear Assembly
*4	Planetary Sun Gear

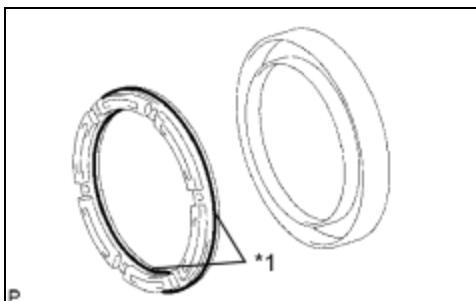
Bearing and Race Diameter

ITEM	INSIDE	OUTSIDE
Thrust needle roller bearing	58.5 mm (2.303 in.)	73.5 mm (2.894 in.)
No. 4 thrust bearing race	55.2 mm (2.173 in.)	71.2 mm (2.803 in.)

(b) Coat the No. 4 thrust bearing race with petroleum jelly, and install it onto the center planetary gear assembly.

(c) Install the thrust needle roller bearing to the center planetary gear assembly.

15. INSTALL NO. 2 BRAKE PISTON



(a) Coat 2 new O-rings with ATF, and install them to the No. 2 brake piston.

Text in Illustration

*1	O-ring
----	--------

(b) Press the No. 2 brake piston into the No. 2 brake cylinder.

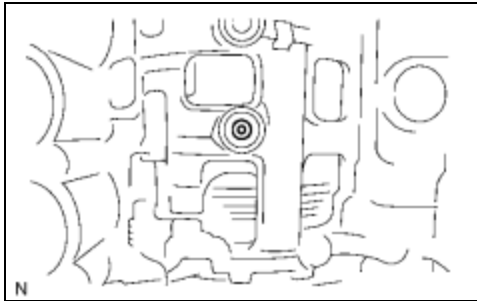
NOTICE:

Be careful not to damage the O-rings.

(c) Install the No. 2 brake piston to the automatic transmission case sub-assembly.

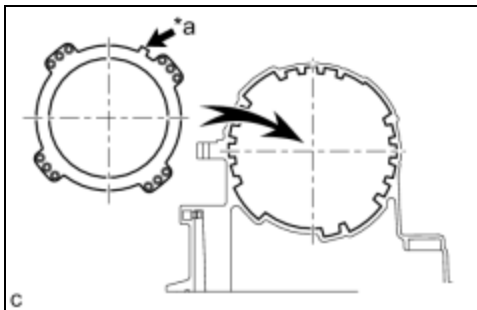
HINT:

Install the No. 2 brake cylinder so that the projection protrudes from the upside of the automatic transmission case sub-assembly.



(d) Check that the oil pressure apply hole of the No. 2 brake cylinder aligns with the oil pressure apply hole of the automatic transmission case sub-assembly.

16. INSTALL NO. 2 BRAKE DISC



(a) Install the No. 2 brake piston return spring sub-assembly to the automatic transmission case sub-assembly as shown in the illustration.

Text in Illustration

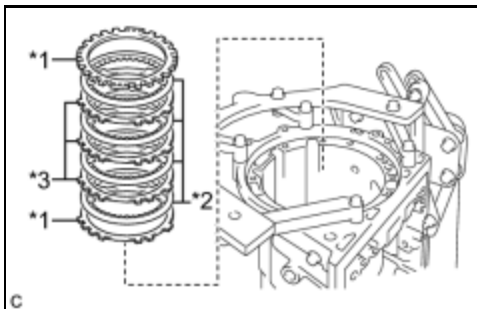
*a	Identification shape
----	----------------------

NOTICE:

Make sure that the identification shape of the No. 2 brake piston return spring sub-assembly faces the upper right side as shown in the illustration.

(b) Install the 2 No. 2 brake flanges, 4 No. 2 brake discs and the 3 No. 2 brake plates to the automatic transmission case sub-assembly.

Text in Illustration



*1	No. 2 Brake Flange
*2	No. 2 Brake Disc
*3	No. 2 Brake Plate

Installation order:

*1 - *2 - *3 - *2 - *3 - *2 - *3 - *2 - *1

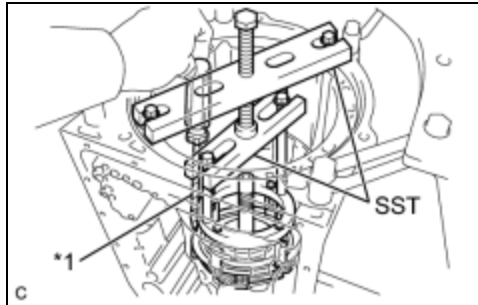
NOTICE:

Make sure that the discs, plates and the flanges are installed in the correct order.

- (c) Using SST and a screwdriver, compress the No. 2 brake piston return spring sub-assembly and install the snap ring to the automatic transmission case sub-assembly.

Text in Illustration

*1	Protective Tape
----	-----------------



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SST: 09380-60010

09381-06030

09381-06050

09381-06080

09381-06090

09381-06100

09381-06110

NOTICE:

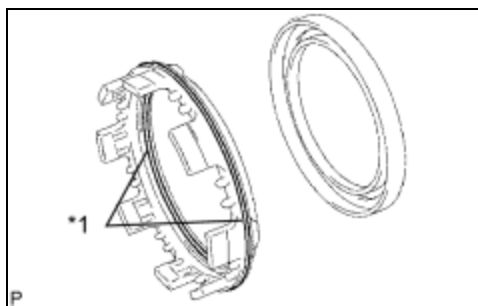
Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

17. INSPECT PISTON STROKE OF NO. 2 BRAKE PISTON INFO

18. INSTALL NO. 1 BRAKE PISTON



- (a) Coat 2 new O-rings with ATF, and install them to the No. 1 brake piston.

Text in Illustration

*1	O-ring
----	--------

- (b) Press the No. 1 brake piston into the No. 1 brake cylinder.

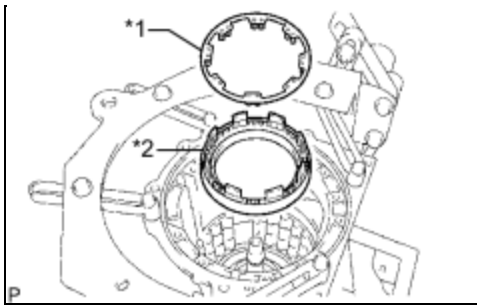
NOTICE:

Be careful not to damage the O-rings.

19. INSTALL BRAKE PISTON RETURN SPRING SUB-ASSEMBLY

- (a) Install the brake piston return spring sub-assembly and the No. 1 brake cylinder to the automatic transmission case sub-assembly.

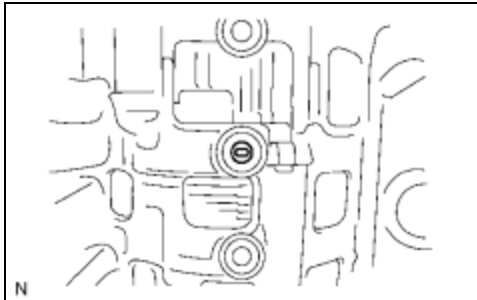
Text in Illustration



*1	Brake Piston Return Spring Sub-assembly
*2	No. 1 Brake Cylinder

HINT:

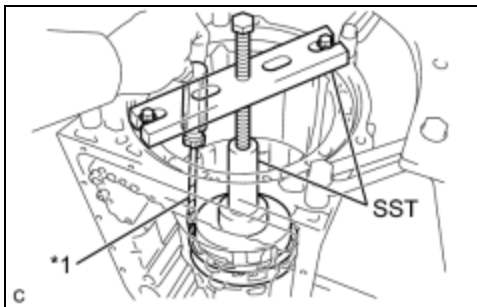
Install the No. 1 brake cylinder so that the projection protrudes from the upside of the automatic transmission case sub-assembly.



- (b) Check that the oil pressure apply hole of the No. 1 brake cylinder aligns with the oil pressure apply hole of the automatic transmission case sub-assembly.

- (c) Using SST and a screwdriver, compress the brake piston return spring sub-assembly and install the snap ring to the automatic transmission case sub-assembly.

Text in Illustration



*1	Protective Tape
----	-----------------

SST: 09350-30020

09350-07020

SST: 09351-40010

09351-04010

09351-04020

NOTICE:

Be careful not to damage the automatic transmission case sub-assembly.

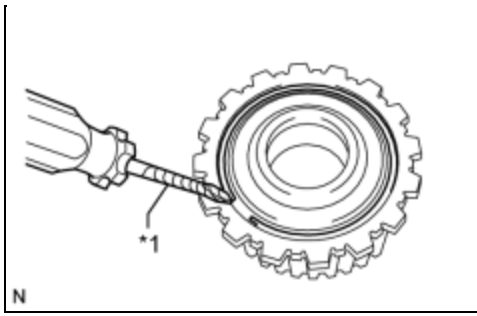
HINT:

Tape the screwdriver tip before use.

20. INSTALL CENTER PLANETARY RING GEAR

- (a) Install the front planetary ring gear flange sub-assembly to the center planetary ring gear.

Text in Illustration



*1	Protective Tape
----	-----------------

(b) Using a screwdriver, install the snap ring.

NOTICE:

Be careful not to damage the center planetary ring gear.

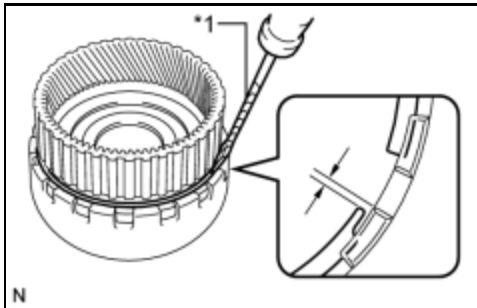
HINT:

Tape the screwdriver tip before use.

(c) Install the center planetary ring gear to the front planetary ring gear.

(d) Using a screwdriver, install the snap ring.

Text in Illustration



*1	Protective Tape
----	-----------------

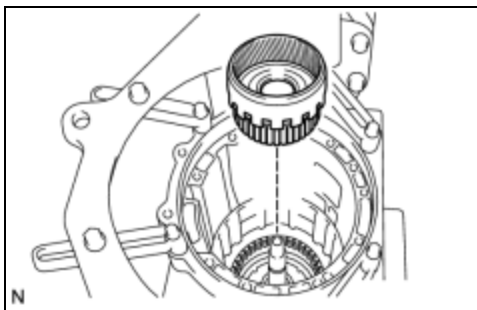
NOTICE:

- Be careful not to damage the front planetary ring gear.
- Install the snap ring to the front planetary ring gear so that both ends of the snap ring come to the center of a protrusion on the front planetary ring gear.

HINT:

Tape the screwdriver tip before use.

21. INSTALL FRONT PLANETARY RING GEAR



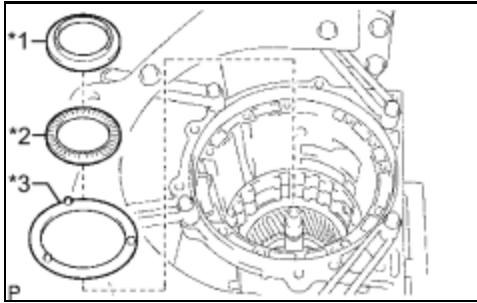
(a) Install the front planetary ring gear to the automatic transmission case sub-assembly.

22. INSTALL FRONT PLANETARY GEAR ASSEMBLY

(a) Install the No. 2 planetary carrier thrust washer and the

front planetary flange thrust needle roller bearing.

Text in Illustration

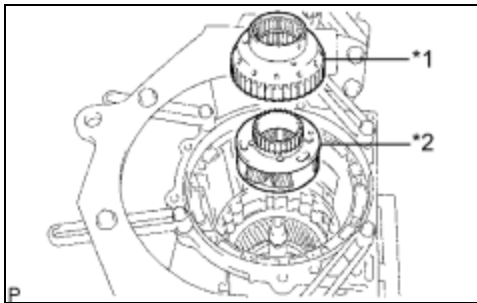


*1	Front Planetary Flange Rear Thrust Bearing Race
*2	Front Planetary Flange Thrust Needle Roller Bearing
*3	No. 2 Planetary Carrier Thrust Washer

Bearing and Race Diameter

ITEM	INSIDE	OUTSIDE
Front planetary flange thrust needle roller bearing	38.6 mm (1.520 in.)	53.1 mm (2.091 in.)
Front planetary flange rear thrust bearing race	34.9 mm (1.374 in.)	50.8 mm (1.999 in.)

(b) Coat the front planetary flange rear thrust bearing race with petroleum jelly, and install it onto the front planetary ring gear.



(c) Install the front planetary gear assembly and the one-way clutch inner race sub-assembly to the automatic transmission case sub-assembly.

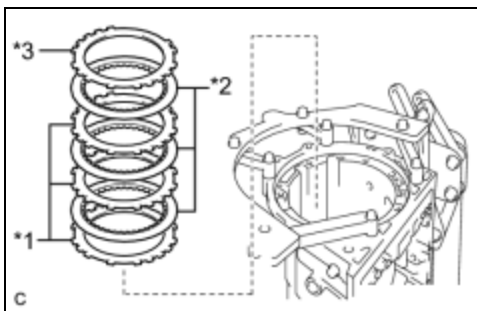
Text in Illustration

*1	One-way Clutch Inner Race Sub-assembly
*2	Front Planetary Gear Assembly

23. INSPECT PISTON STROKE OF NO. 1 BRAKE PISTON INFO

24. INSTALL NO. 1 BRAKE DISC

(a) Install the No. 1 brake flange, 3 No. 1 brake discs and the 3 No. 1 brake plates to the automatic transmission case sub-assembly.



Text in Illustration

*1	No. 1 Brake Plate
*2	No. 1 Brake Disc
*3	No. 1 Brake Flange

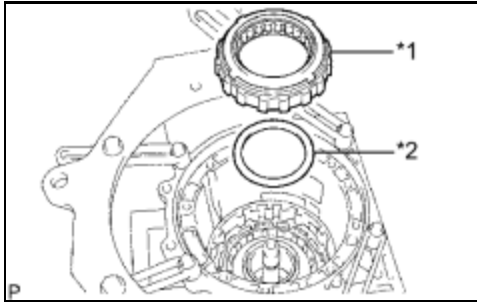
Installation order:

*1 - *2 - *1 - *2 - *1 - *2 - *3

NOTICE:

Make sure that the discs, plates and the flange are installed in the correct order.

25. INSTALL ONE-WAY CLUTCH ASSEMBLY

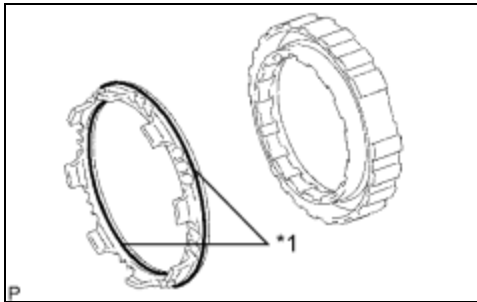


- (a) Install the No. 1 planetary carrier thrust washer and the one-way clutch assembly to the automatic transmission case sub-assembly.

Text in Illustration

*1	One-way Clutch Assembly
*2	No. 1 Planetary Carrier Thrust Washer

26. INSTALL 2ND BRAKE PISTON



- (a) Coat 2 new O-rings with ATF, and install them to the 2nd brake piston.

Text in Illustration

*1	O-ring
----	--------

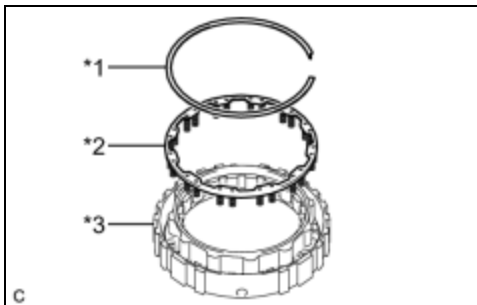
- (b) Press the 2nd brake piston into the 2nd brake cylinder.

NOTICE:

Be careful not to damage the O-rings.

- (c) Using a screwdriver, install the No. 3 brake piston return spring sub-assembly to the 2nd brake cylinder with the snap ring.

Text in Illustration



*1	Snap Ring
*2	No. 3 Brake Piston Return Spring Sub-assembly
*3	2nd Brake Cylinder

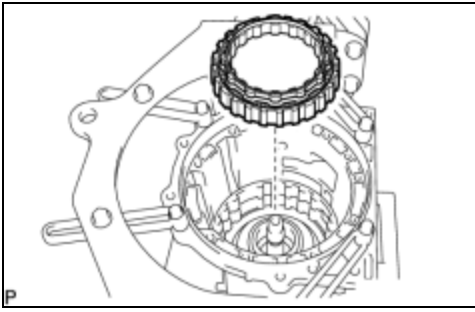
NOTICE:

- Be sure that the end gap of the snap ring is not aligned with the spring retainer claw.
- Be careful not to damage the 2nd brake cylinder.

HINT:

Tape the screwdriver tip before use.

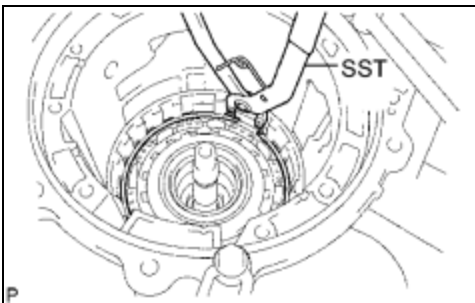
27. INSTALL 2ND BRAKE CYLINDER



- (a) Install the 2nd brake cylinder to the automatic transmission case sub-assembly.



- (b) Check that the oil pressure apply hole of the 2nd brake cylinder aligns with the oil pressure apply hole of the automatic transmission case sub-assembly.



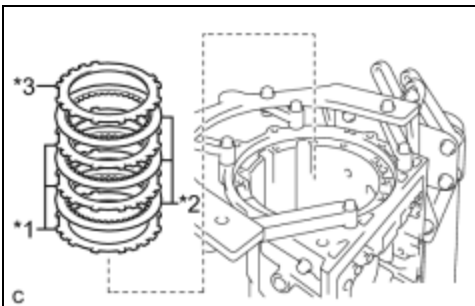
- (c) Using SST, install the snap ring to the automatic transmission case sub-assembly.

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28. INSTALL NO. 3 BRAKE DISC (2ND BRAKE DISC SET)

- (a) Install the No. 3 brake flange, 3 No. 3 brake discs and the 3 No. 3 brake plates to the automatic transmission case sub-assembly.



Text in Illustration

*1	No. 3 Brake Plate
*2	No. 3 Brake Disc
*3	No. 3 Brake Flange

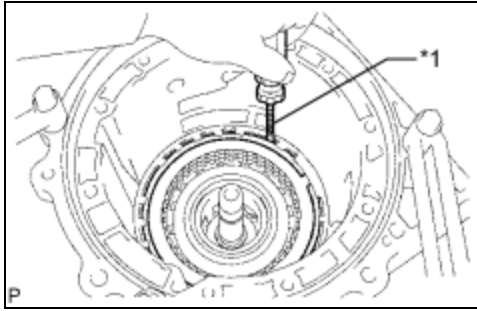
Installation order:

*1 - *2 - *1 - *2 - *1 - *2 - *3

NOTICE:

Make sure that the discs, plates and the flange are installed in the correct order.

(b) Using a screwdriver, install the snap ring to the automatic transmission case sub-assembly.



Text in Illustration

*1	Protective Tape
----	-----------------

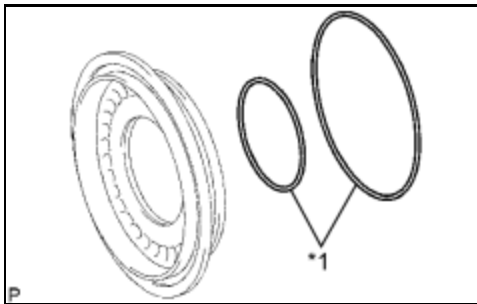
NOTICE:

Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

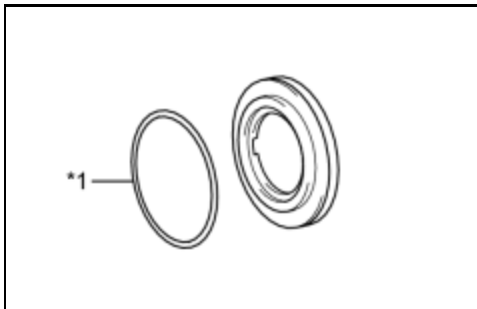
29. INSTALL DIRECT CLUTCH PISTON SUB-ASSEMBLY



(a) Coat 2 new O-rings with ATF, and install them to the direct clutch piston sub-assembly.

Text in Illustration

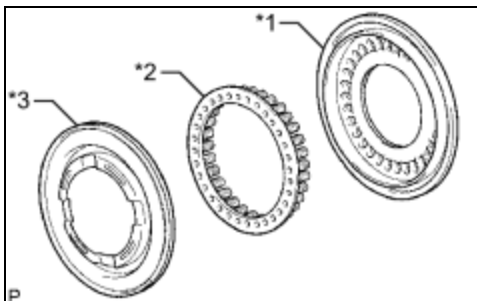
*1	O-ring
----	--------



(b) Coat a new O-ring with ATF, and install it to the No. 2 clutch balancer.

Text in Illustration

*1	O-ring
----	--------



(c) Install the No. 2 clutch balancer and the direct clutch return spring sub-assembly to the direct clutch piston sub-assembly.

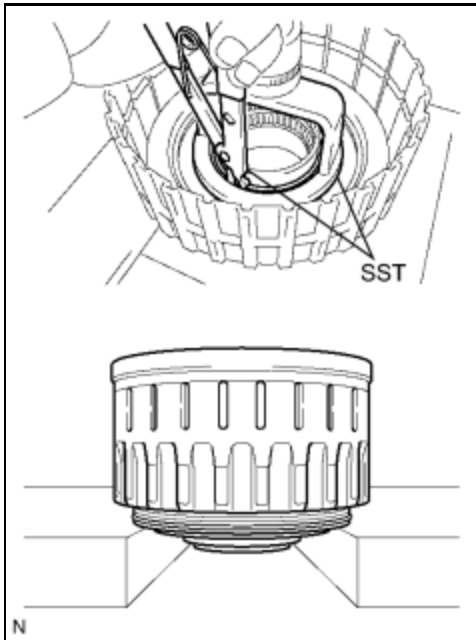
Text in Illustration

*1	Direct Clutch Piston Sub-assembly
*2	Direct Clutch Return Spring Sub-assembly
*3	No. 2 Clutch Balancer

(d) Press the direct clutch piston sub-assembly into the reverse clutch drum sub-assembly by hands.

NOTICE:

Be careful not to damage the O-rings.



(e) Place SST on the No. 2 clutch balancer, and compress the direct clutch return spring sub-assembly with a press.

SST: 09320-89010

NOTICE:

Stop pressing when the spring sheet is lowered to the place 1 to 2 mm (0.0394 to 0.0787 in.) from the snap ring groove to prevent the spring sheet from being deformed.

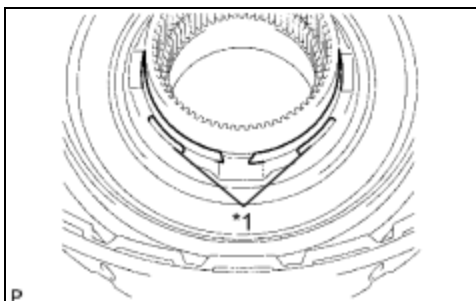
(f) Using SST, install the snap ring.

SST: 09350-30020

09350-07070

NOTICE:

- Be sure that the end gap of the snap ring is not aligned with the spring retainer claw.
- Do not expand the snap ring excessively.



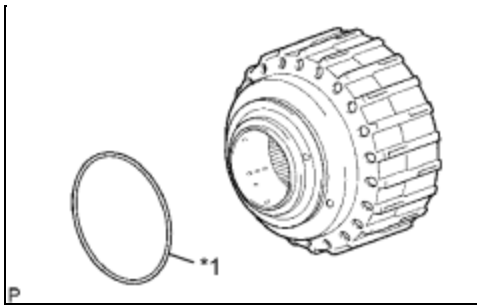
(g) Set the end gap of the snap ring in the No. 2 clutch balancer as shown in the illustration.

Text in Illustration

*1	Stopper
----	---------

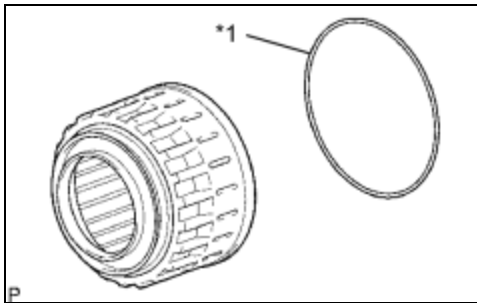
30. INSTALL REVERSE CLUTCH PISTON SUB-ASSEMBLY

(a) Coat a new O-ring with ATF, and install it to the reverse clutch drum sub-assembly.



Text in Illustration

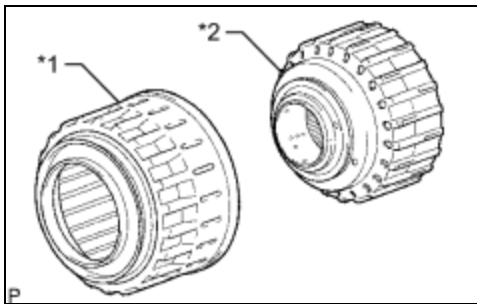
*1	O-ring
----	--------



(b) Coat a new O-ring with ATF, and install it to the reverse clutch piston sub-assembly.

Text in Illustration

*1	O-ring
----	--------



(c) Press the reverse clutch drum sub-assembly into the reverse clutch piston sub-assembly with both hands.

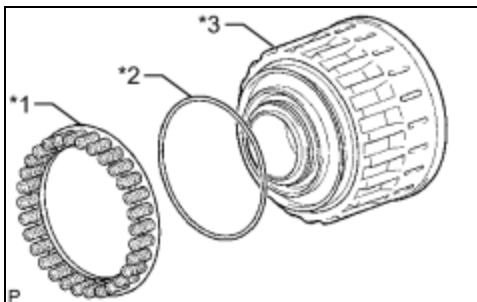
Text in Illustration

*1	Reverse Clutch Piston Sub-assembly
*2	Reverse Clutch Drum Sub-assembly

NOTICE:

Be careful not to damage the O-rings.

31. INSTALL REVERSE CLUTCH RETURN SPRING SUB-ASSEMBLY



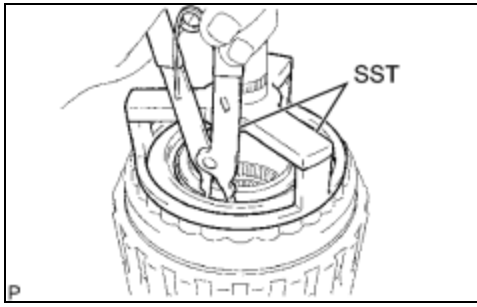
(a) Coat a new O-ring with ATF, and install it to the reverse clutch piston sub-assembly.

Text in Illustration

*1	Reverse Clutch Return Spring Sub-assembly
*2	O-ring
*3	Reverse Clutch Piston Sub-assembly

(b) Install the reverse clutch return spring sub-assembly to the reverse clutch piston sub-assembly.

32. INSTALL NO. 3 CLUTCH BALANCER



(a) Install the No. 3 clutch balancer to the reverse clutch return spring sub-assembly.

(b) Place SST on the No. 3 clutch balancer, and compress the reverse clutch return spring sub-assembly with a press.

SST: 09387-00070

NOTICE:

Stop pressing when the spring sheet is lowered to the place 1 to 2 mm (0.0394 to 0.0787 in.) from the snap ring groove to prevent the spring sheet from being deformed.

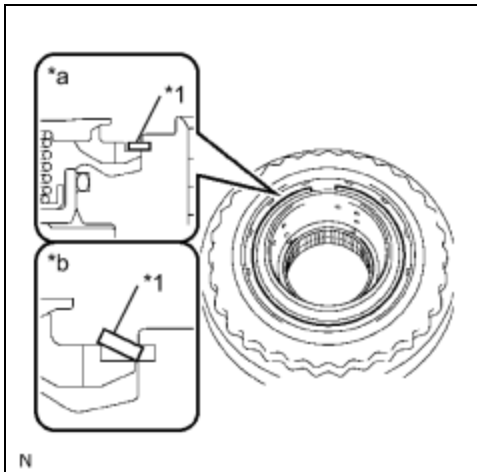
(c) Using SST, install the snap ring.

SST: 09350-30020

09350-07070

NOTICE:

- Be sure that the end gap of the snap ring is not aligned with the spring retainer claw.
- Do not expand the snap ring excessively.



(d) Set the end gap of the snap ring in the No. 3 clutch balancer as shown in the illustration.

Text in Illustration

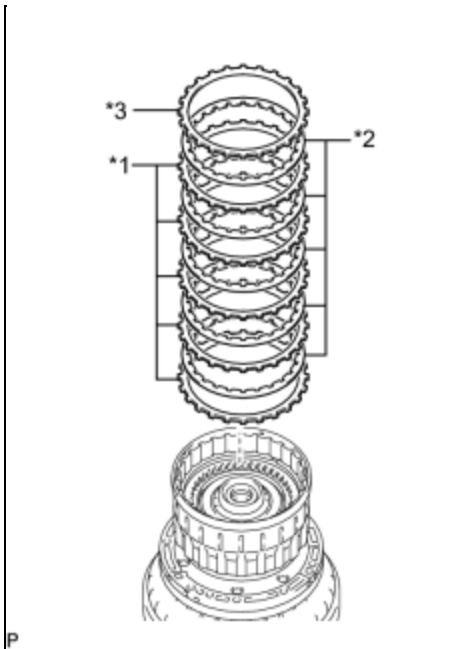
*1	Snap Ring
*a	Correct
*b	Incorrect

33. INSTALL NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC)

(a) Install the direct clutch flange, 5 No. 2 clutch discs and the 5 No. 2 clutch plates to the reverse clutch drum sub-assembly.

Text in Illustration

*1	No. 2 Clutch Plate
----	--------------------



*2	No. 2 Clutch Disc
*3	Direct Clutch Flange

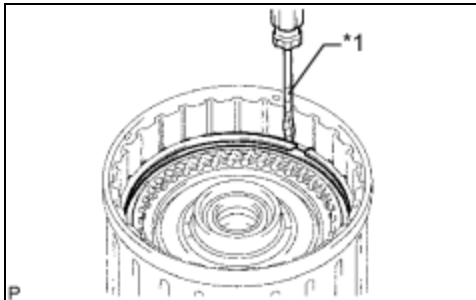
Installation order:

*1 - *2 - *1 - *2 - *1 - *2 - *1 - *2 - *1 - *2 - *3

NOTICE:

Make sure that the discs, plates and the flange are installed in the correct order.

(b) Using a screwdriver, install the 2 snap rings to the reverse clutch drum sub-assembly.



Text in Illustration

*1	Protective Tape
----	-----------------

NOTICE:

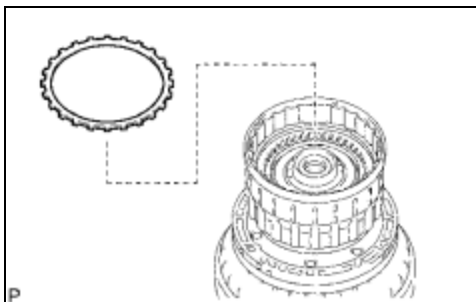
Be careful not to damage the reverse clutch drum sub-assembly.

HINT:

Tape the screwdriver tip before use.

34. INSPECT PACK CLEARANCE OF NO. 2 CLUTCH INFO

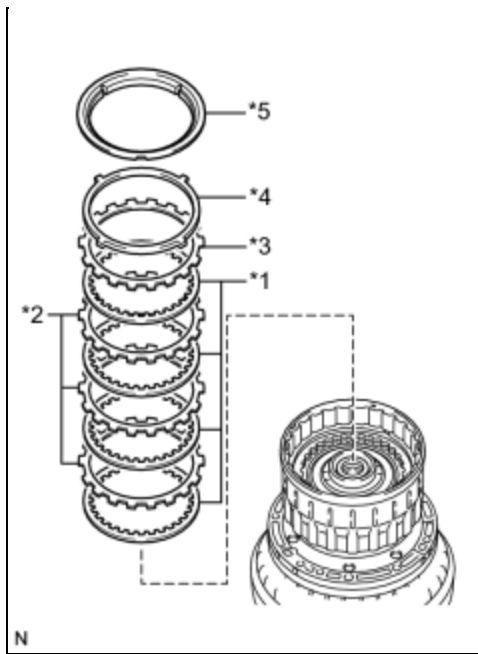
35. INSTALL REVERSE CLUTCH FLANGE



(a) Install the reverse clutch flange to the reverse clutch drum sub-assembly.

36. INSTALL REVERSE CLUTCH REACTION SLEEVE

(a) Install the clutch cushion plate, reverse clutch flange, 4



No. 3 clutch discs, 3 No. 3 clutch plates and the reverse clutch reaction sleeve to the reverse clutch drum sub-assembly.

Text in Illustration

*1	No. 3 Clutch Disc
*2	No. 3 Clutch Plate
*3	Reverse Clutch Flange
*4	Clutch Cushion Plate
*5	Reverse Clutch Reaction Sleeve

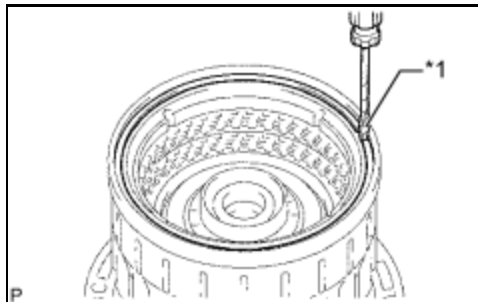
Installation order:

*1 - *2 - *1 - *2 - *1 - *2 - *1 - *3 - *4 - *5

NOTICE:

Make sure that the discs, plates, flange, sleeve and the cushion plate are installed in the correct order.

(b) Using a screwdriver, install the snap ring to the reverse clutch piston sub-assembly.



Text in Illustration

*1	Protective Tape
----	-----------------

NOTICE:

Be careful not to damage the reverse clutch piston sub-assembly.

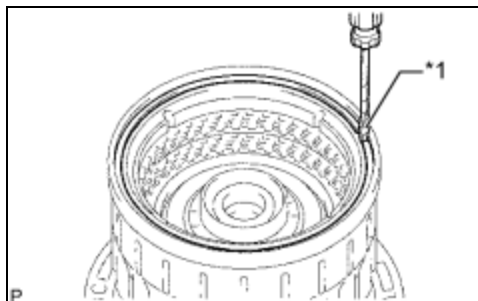
HINT:

Tape the screwdriver tip before use.

37. INSPECT PACK CLEARANCE OF NO. 3 CLUTCH INFO

38. REMOVE REVERSE CLUTCH REACTION SLEEVE

(a) Using a screwdriver, remove the snap ring from the reverse clutch piston sub-assembly.



Text in Illustration

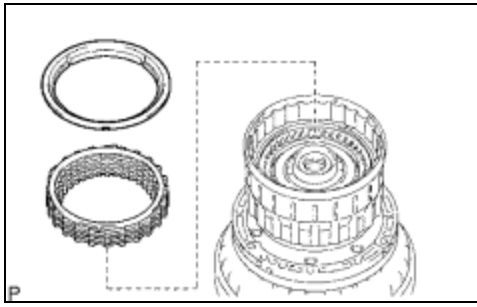
*1	Protective Tape
----	-----------------

NOTICE:

Be careful not to damage the reverse clutch piston sub-assembly.

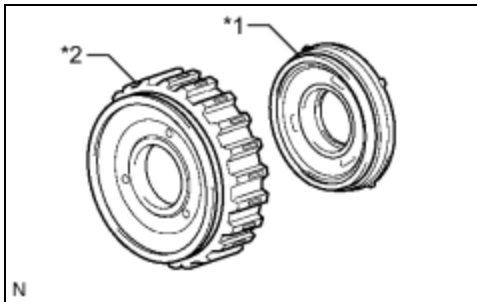
HINT:

Tape the screwdriver tip before use.



(b) Remove the reverse clutch reaction sleeve, clutch cushion plate, reverse clutch flange, 4 No. 3 clutch discs and the 3 No. 3 clutch plates from the reverse clutch drum sub-assembly.

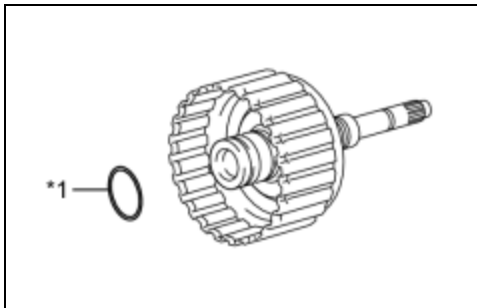
39. INSTALL FORWARD CLUTCH PISTON SUB-ASSEMBLY



(a) Install the coast clutch piston to the forward clutch piston sub-assembly.

Text in Illustration

*1	Coast Clutch Piston
*2	Forward Clutch Piston Sub-assembly



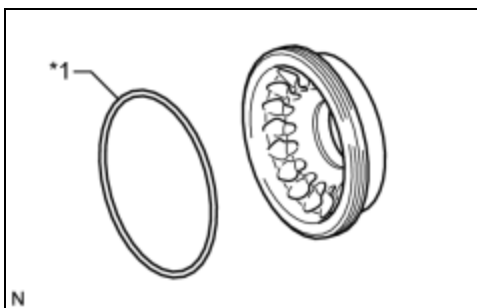
(b) Coat a new O-ring with ATF, and install it to the input shaft.

Text in Illustration

*1	O-ring
----	--------

(c) Install the forward clutch piston sub-assembly to the input shaft.

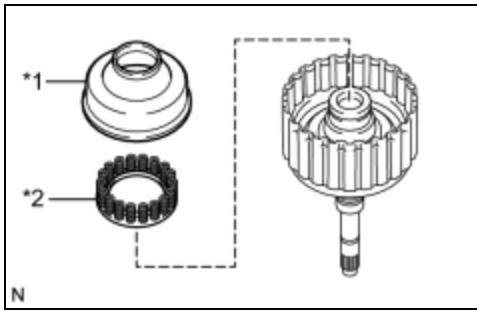
40. INSTALL NO. 1 CLUTCH BALANCER



(a) Coat a new D-ring with ATF, and install it to the No. 1 clutch balancer.

Text in Illustration

*2	D-ring
----	--------



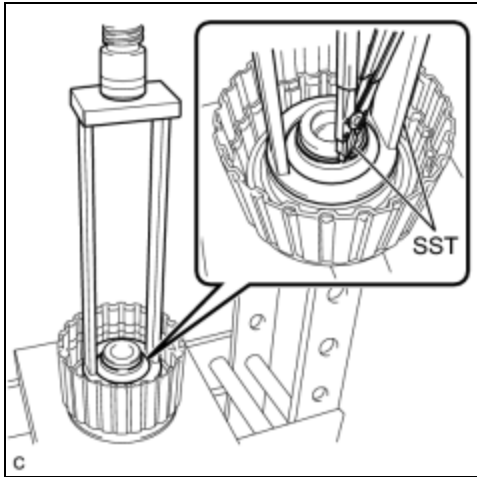
(b) Install the No. 1 clutch balancer and the forward clutch return spring sub-assembly to the input shaft.

Text in Illustration

*1	No. 1 Clutch Balancer
*2	Forward Clutch Return Spring Sub-assembly

NOTICE:

Be careful not to damage the D-ring.



(c) Place SST on the No. 1 clutch balancer, and compress the forward clutch return spring sub-assembly with a press.

SST: 09387-00110

NOTICE:

Stop pressing when the spring sheet is lowered to the place 1 to 2 mm (0.0394 to 0.0787 in.) from the snap ring groove to prevent the spring sheet from being deformed.

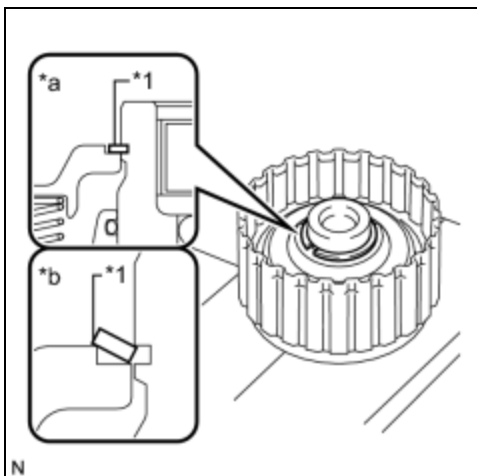
(d) Using SST, Install the snap ring.

SST: 09350-30020

09350-07070

NOTICE:

- Be sure that the end gap of the snap ring is not aligned with the spring retainer claw.
- Do not expand the snap ring excessively.



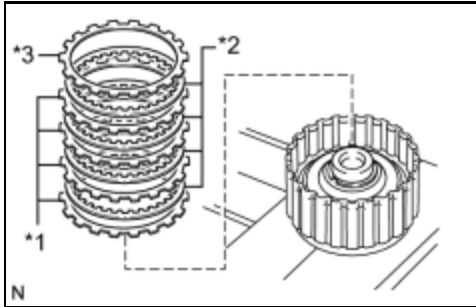
(e) Set the end gap of the snap ring in the No. 1 clutch balancer as shown in the illustration.

Text in Illustration

*1	Snap Ring
*a	Correct
*b	Incorrect

41. INSTALL NO. 4 CLUTCH DISC (COAST CLUTCH DISC)

- (a) Install the coast clutch flange, 4 No. 4 clutch discs and the 4 No. 4 clutch plates to the forward clutch piston sub-assembly.



Text in Illustration

*1	No. 4 Clutch Plate
*2	No. 4 Clutch Disc
*3	Coast Clutch Flange

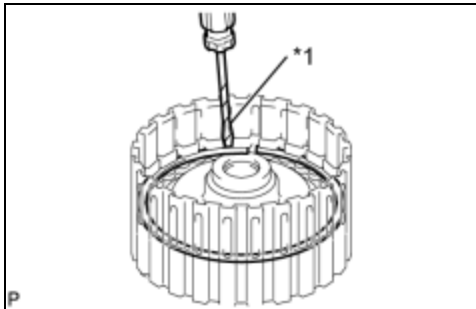
Installation order:

*1 - *2 - *1 - *2 - *1 - *2 - *1 - *2 - *3

NOTICE:

Make sure that the discs, plates and the flange are installed in the correct order.

- (b) Using a screwdriver, install the snap ring.



Text in Illustration

*1	Protective Tape
----	-----------------

NOTICE:

Be careful not to damage the forward clutch piston sub-assembly.

HINT:

Tape the screwdriver tip before use.

42. INSPECT PACK CLEARANCE OF NO. 4 CLUTCH INFO

43. INSTALL NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC)

- (a) Install the forward clutch flange, 4 No. 1 clutch discs, 4 No. 1 clutch plates and the clutch cushion plate to the input shaft.

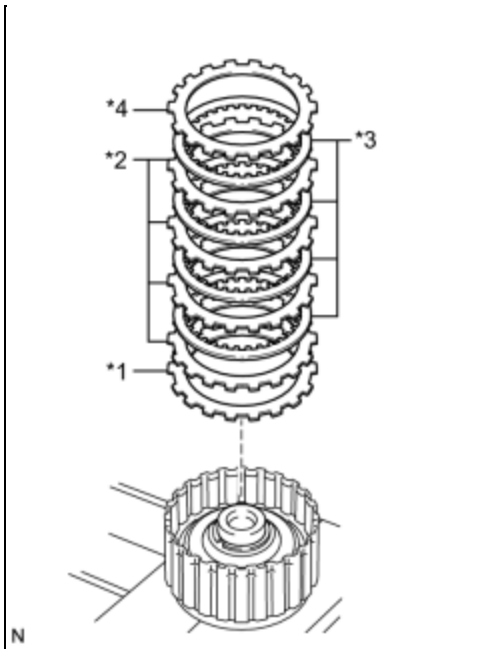
Text in Illustration

*1	Clutch Cushion Plate
*2	No. 1 Clutch Plate
*3	No. 1 Clutch Disc
*4	Forward Clutch Flange

Installation order:

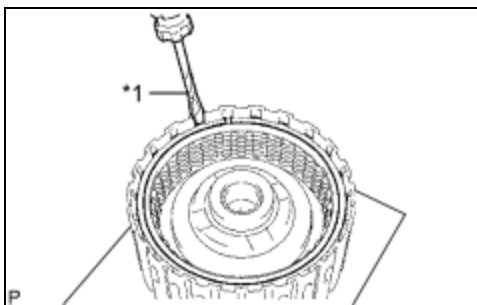
*1 - *2 - *3 - *2 - *3 - *2 - *3 - *2 - *3 - *4

NOTICE:



Make sure that the discs, plates, flange and the cushion plate are installed in the correct order.

(b) Using a screwdriver, install the snap ring.



Text in Illustration

*1	Protective Tape
----	-----------------

NOTICE:

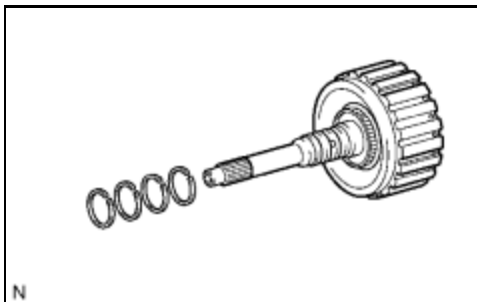
Be careful not to damage the input shaft.

HINT:

Tape the screwdriver tip before use.

44. INSPECT PACK CLEARANCE OF NO. 1 CLUTCH INFO

45. INSTALL CLUTCH DRUM OIL SEAL RING



(a) Coat 4 new clutch drum oil seal rings with ATF.

(b) Squeeze the ends of the 4 clutch drum oil seal rings together, and install them to the input shaft groove.

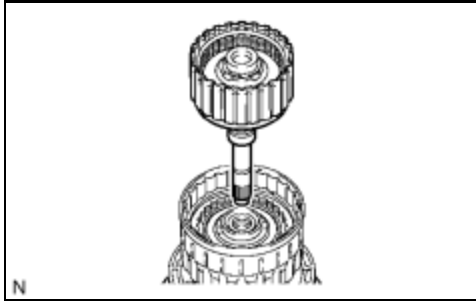
NOTICE:

Do not expand the ring ends excessively.

HINT:

After installing the clutch drum oil seal rings, check that they rotate smoothly.

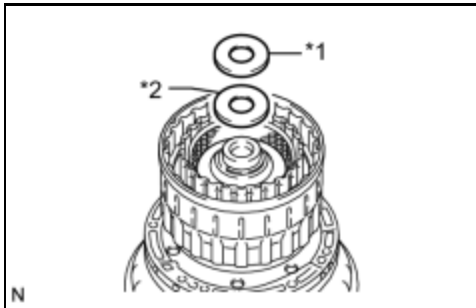
46. INSTALL INPUT SHAFT



(a) Install the input shaft to the reverse clutch drum sub-assembly.

(b) Install the input shaft rear thrust bearing race and the thrust needle roller bearing to the input shaft.

Text in Illustration

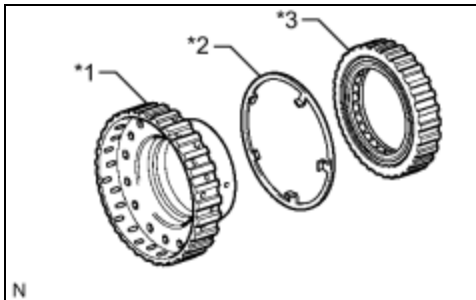


*1	Thrust Needle Roller Bearing
*2	Input Shaft Rear Thrust Bearing Race

Bearing and Race Diameter

ITEM	INSIDE	OUTSIDE
Thrust needle roller bearing	20.0 mm (0.787 in.)	41.0 mm (1.614 in.)
Input shaft rear thrust bearing race	20.0 mm (0.787 in.)	35.6 mm (1.402 in.)

47. INSTALL NO. 4 ONE-WAY CLUTCH ASSEMBLY

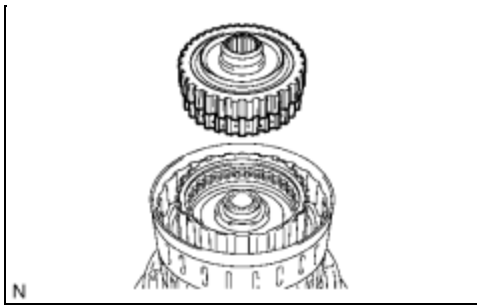


(a) Install the No. 2 clutch hub thrust washer and the No. 4 one-way clutch assembly to the coast clutch hub sub-assembly.

Text in Illustration

*1	Coast Clutch Hub Sub-assembly
*2	No. 2 Clutch Hub Thrust Washer
*3	No. 4 One-way Clutch Assembly

48. INSTALL COAST CLUTCH HUB SUB-ASSEMBLY

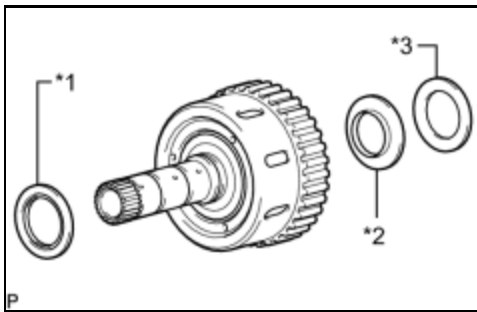


- (a) Install the coast clutch hub sub-assembly to the reverse clutch drum sub-assembly.

49. INSTALL FORWARD CLUTCH HUB SUB-ASSEMBLY

- (a) Install the 2 thrust needle roller bearings and the No. 2 thrust bearing race to the forward clutch hub sub-assembly.

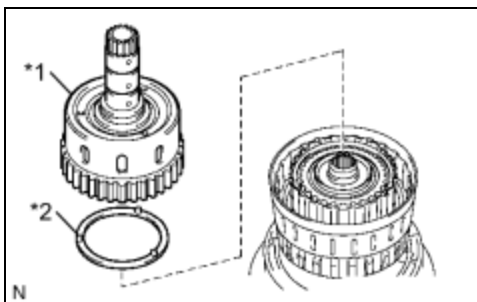
Text in Illustration



*1	Thrust Needle Roller Bearing A
*2	Thrust Needle Roller Bearing B
*3	No. 2 Thrust Bearing Race

Bearing and Race Diameter

ITEM	INSIDE	OUTSIDE
Thrust needle roller bearing A	42.5 mm (1.673 in.)	61.2 mm (2.409 in.)
Thrust needle roller bearing B	33.3 mm (1.311 in.)	51.2 mm (2.016 in.)
No. 2 thrust bearing race	31.0 mm (1.220 in.)	48.0 mm (1.890 in.)



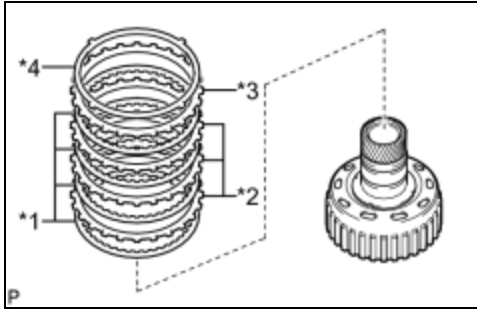
- (b) Install the No. 3 clutch hub thrust washer and the forward clutch hub sub-assembly to the reverse clutch drum sub-assembly.

Text in Illustration

*1	Forward Clutch Hub Sub-Assembly
*2	No. 3 Clutch Hub Thrust Washer

50. INSTALL NO. 3 CLUTCH DISC (REAR CLUTCH DISC)

- (a) Install the clutch cushion plate, reverse clutch flange, 4 No. 3 clutch discs and the 3 No. 3 clutch plates to the reverse clutch hub sub-assembly.



Text in Illustration

*1	No. 3 Clutch Disc
*2	No. 3 Clutch Plate
*3	Reverse Clutch Flange
*4	Clutch Cushion Plate

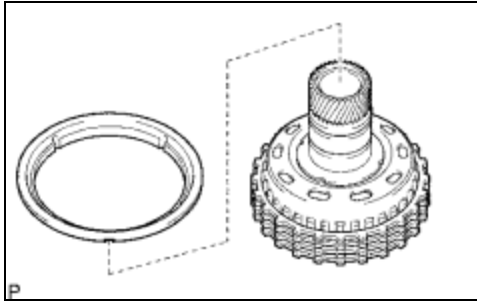
Installation order:

*1 - *2 - *1 - *2 - *1 - *2 - *1 - *3 - *4

NOTICE:

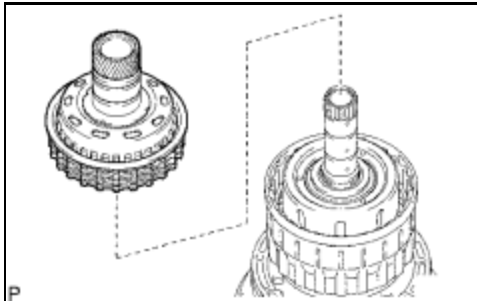
Make sure that the discs, plates, flange and the cushion plate are installed in the correct order.

51. INSTALL REVERSE CLUTCH REACTION SLEEVE



- (a) Install the reverse clutch reaction sleeve to the reverse clutch hub.

52. INSTALL REVERSE CLUTCH HUB SUB-ASSEMBLY



- (a) Install the reverse clutch hub sub-assembly to the reverse clutch drum sub-assembly.

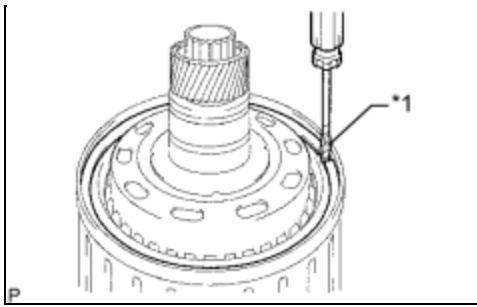
- (b) Using a screwdriver, install the snap ring to the reverse clutch piston sub-assembly.

Text in Illustration

*1	Protective Tape
----	-----------------

NOTICE:

Be careful not to damage the reverse clutch piston sub-assembly.

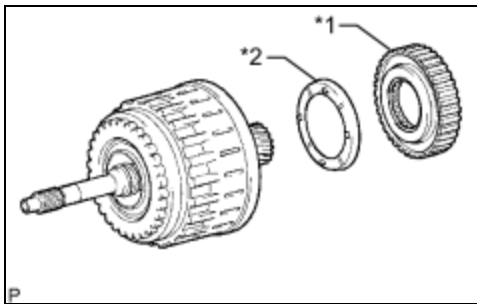


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HINT:

Tape the screwdriver tip before use.

53. INSTALL NO. 2 ONE-WAY CLUTCH ASSEMBLY



- (a) Install the input shaft clutch drum thrust washer and the No. 2 one-way clutch assembly to the clutch drum and input shaft assembly.

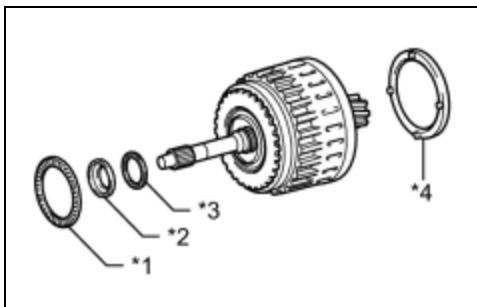
Text in Illustration

*1	No. 2 One-way Clutch Assembly
*2	Input Shaft Clutch Drum Thrust Washer

54. INSTALL CLUTCH DRUM AND INPUT SHAFT ASSEMBLY

- (a) Install the input shaft front thrust needle roller bearing and the thrust needle roller bearing to the clutch drum and input shaft assembly.

Text in Illustration



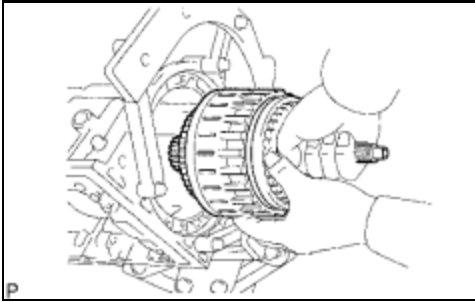
*1	Thrust Needle Roller Bearing
*2	Input Shaft Front Thrust Bearing Race
*3	Input Shaft Front Thrust Needle Roller Bearing
*4	Clutch Drum Thrust Washer

Bearing and Race Diameter

ITEM	INSIDE	OUTSIDE
Thrust needle roller bearing	71.9 mm (2.831 in.)	85.6 mm (3.370 in.)
Input shaft front thrust bearing race	37.0 mm (1.457 in.)	51.2 mm (2.016 in.)
Input shaft front thrust needle roller bearing	33.5 mm (1.319 in.)	48.0 mm (1.890 in.)

- (b) Coat the input shaft front thrust bearing race and the clutch drum thrust washer with petroleum

jelly, and install them onto the clutch drum and input shaft assembly.

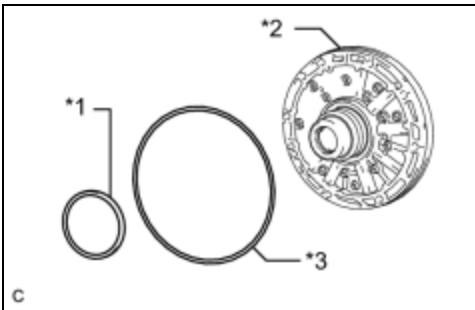


(c) Install the clutch drum and input shaft assembly to the automatic transmission case sub-assembly.

55. INSTALL OIL PUMP ASSEMBLY

(a) Install the No. 1 thrust bearing race to the oil pump assembly.

Text in Illustration



*1	No. 1 Thrust Bearing Race
*2	Oil Pump Assembly
*3	O-ring

Race Diameter

ITEM	INSIDE	OUTSIDE
No. 1 thrust bearing race	74.2 mm (2.921 in.)	87.7 mm (3.453 in.)

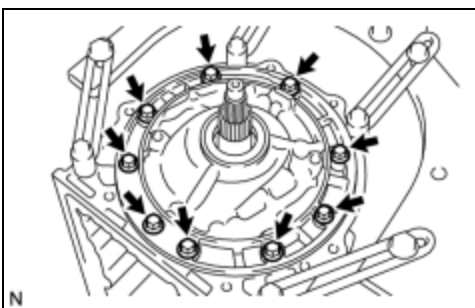
(b) Coat a new O-ring with ATF, and install it to the oil pump assembly.

(c) Place the oil pump assembly through the input shaft, and align the bolt holes of the oil pump assembly with the automatic transmission case sub-assembly.

NOTICE:

Be careful not to damage the O-ring.

(d) Hold the input shaft, and lightly press the oil pump assembly to slide the clutch drum oil seal rings into the clutch drum and input shaft assembly.

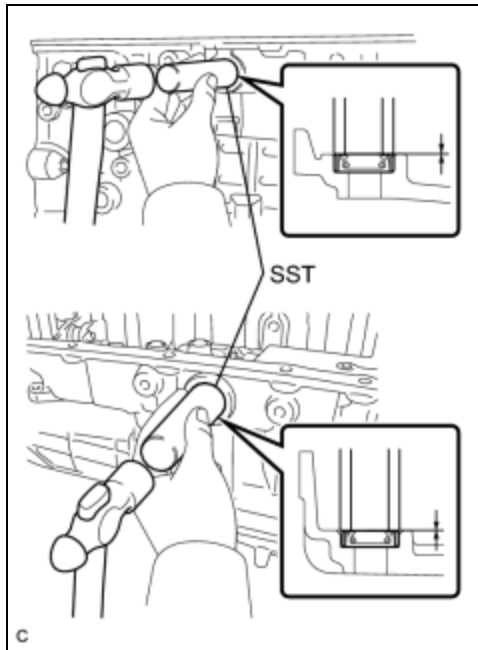


(e) Install the 9 bolts.

Torque: 21 N·m (215 kgf·cm, 16ft·lbf)

56. INSPECT INDIVIDUAL PISTON OPERATION INFO

57. INSTALL MANUAL VALVE LEVER SHAFT OIL SEAL



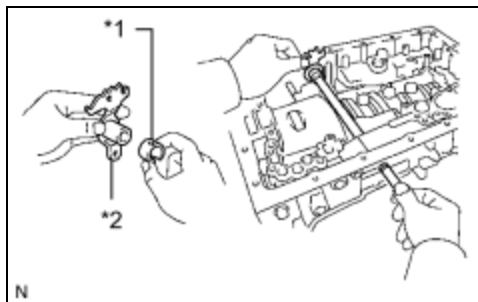
- (a) Using SST and a hammer, drive in 2 new manual valve lever shaft oil seals to the automatic transmission case sub-assembly.

SST: 09350-30020

09350-07110

- (b) Coat the manual valve lever shaft oil seal lips with MP grease.

58. INSTALL MANUAL VALVE LEVER SUB-ASSEMBLY

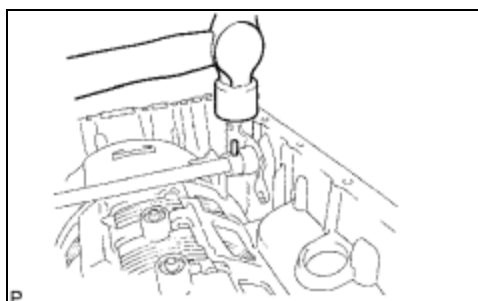


- (a) Install a new spacer to the manual valve lever sub-assembly.

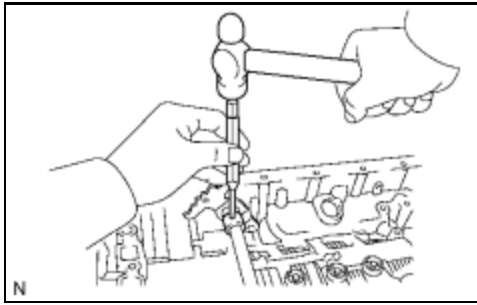
Text in Illustration

*1	Spacer
*2	Manual Valve Lever Sub-assembly

- (b) Install the manual valve lever shaft to the automatic transmission case sub-assembly through the manual valve lever sub-assembly.



- (c) Using a hammer, drive in a new spring pin.

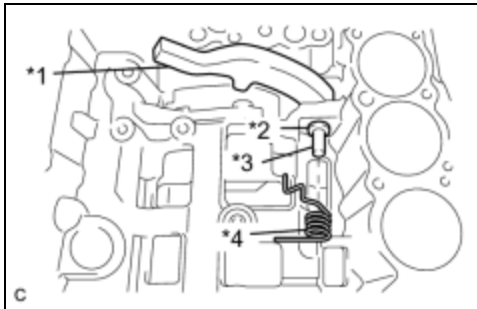


(d) Align the manual valve lever indentation with the spacer hole, and stake them together with a punch.

(e) Make sure that the shaft rotates smoothly.

59. INSTALL PARKING LOCK PAWL SHAFT

(a) Install a new E-ring to the parking lock pawl shaft.

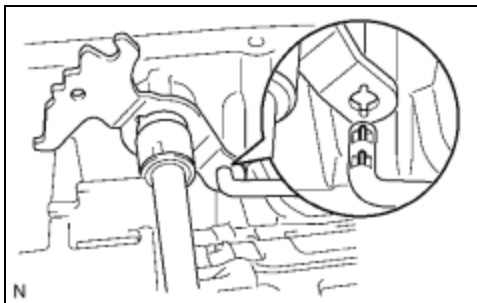


(b) Install the parking lock pawl, parking lock pawl shaft and the torsion spring to the automatic transmission case sub-assembly.

Text in Illustration

*1	Parking Lock Pawl
*2	E-ring
*3	Parking Lock Pawl Shaft
*4	Torsion Spring

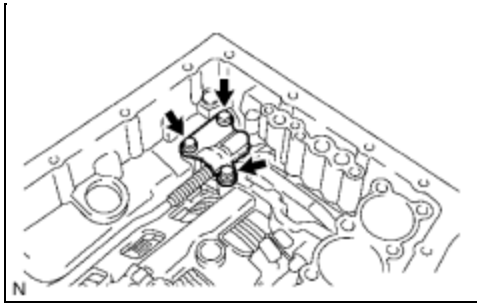
60. INSTALL PARKING LOCK ROD SUB-ASSEMBLY



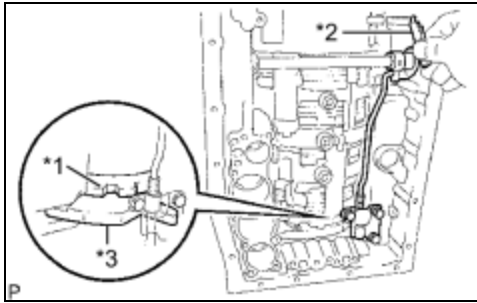
(a) Install the parking lock rod sub-assembly to the manual valve lever sub-assembly.

61. INSTALL PARKING LOCK PAWL BRACKET

(a) Install the parking lock pawl bracket to the automatic transmission case sub-assembly with the 3 bolts.



Torque: 7.3 N·m (74 kgf·cm, 65in·lbf)

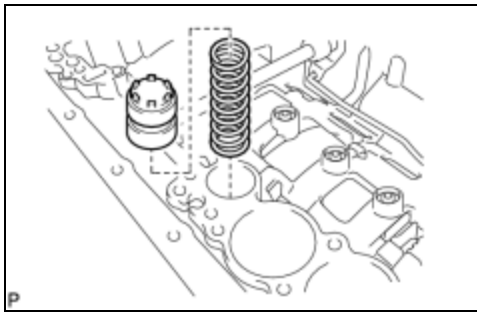


- (b) Shift the manual valve lever sub-assembly to the P position, and confirm that the rear planetary gear is correctly locked by the parking lock pawl.

Text in Illustration

*1	Rear Planetary Gear
*2	Manual Valve Lever Sub-assembly
*3	Parking Lock Pawl

62. INSTALL B-1 ACCUMULATOR VALVE



- (a) Install the spring and the B-1 accumulator valve to the hole.

B-1 Accumulator Spring

FREE LENGTH	OUTER DIAMETER	COLOR
46.36 mm (1.825 in.)	17.1 mm (0.673 in.)	Natural

63. INSTALL C-3 ACCUMULATOR PISTON



- (a) Using a screwdriver, install the spring sub-assembly to the C-3 accumulator piston with the snap ring.

C-3 Accumulator Spring Sub-assembly

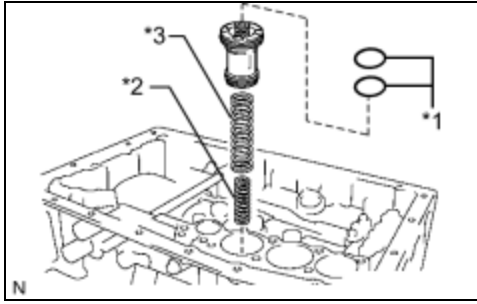
FREE LENGTH	COIL OUTER DIAMETER	COLOR
23.0 mm (0.906 in.)	14.0 mm (0.551 in.)	Pink

NOTICE:

Be careful not to damage the C-3 accumulator piston.

HINT:

Tape the screwdriver tip before use.



(b) Coat 2 new O-rings with ATF, and install them to the C-3 accumulator piston.

Text in Illustration

*1	O-ring
*2	Inner Spring
*3	Outer Spring

(c) Install the 2 springs and the C-3 accumulator piston to the hole.

C-3 Accumulator Spring

SPRING	FREE LENGTH	OUTER DIAMETER	COLOR
Inner	44.0 mm (1.732 in.)	14.0 mm (0.551 in.)	Yellow
Outer	76.65 mm (3.018 in.)	20.1 mm (0.791 in.)	White

64. INSTALL B-3 ACCUMULATOR PISTON

(a) Using a screwdriver, install the spring sub-assembly to the B-3 accumulator piston with the snap ring.



B-3 Accumulator Spring Sub-assembly

FREE LENGTH	COIL OUTER DIAMETER	COLOR
30.0 mm (1.181 in.)	16.2 mm (0.638 in.)	White

NOTICE:

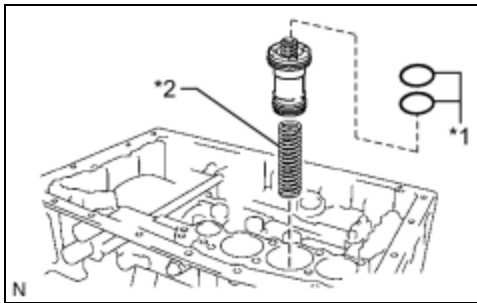
Be careful not to damage the B-3 accumulator piston.

HINT:

Tape the screwdriver tip before use.

(b) Coat 2 new O-rings with ATF, and install them to the B-3 accumulator piston.

Text in Illustration



*1	O-ring
*2	Spring

(c) Install the spring and the B-3 accumulator piston to the hole.

B-3 Accumulator Spring

--	--	--

FREE LENGTH	OUTER DIAMETER	COLOR
64.50 mm (2.539 in.)	19.5 mm (0.768 in.)	Orange

65. INSTALL C-2 ACCUMULATOR PISTON

- (a) Using a screwdriver, install the spring sub-assembly to the C-2 accumulator piston with the snap ring.



C-2 Accumulator Spring Sub-assembly

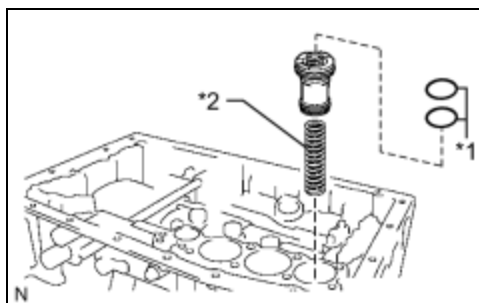
FREE LENGTH	COIL OUTER DIAMETER	COLOR
18.50 mm (0.728 in.)	14.0 mm (0.551 in.)	Green

NOTICE:

Be careful not to damage the C-2 accumulator piston.

HINT:

Tape the screwdriver tip before use.



- (b) Coat 2 new O-rings with ATF, and install them to the C-2 accumulator piston.

Text in Illustration

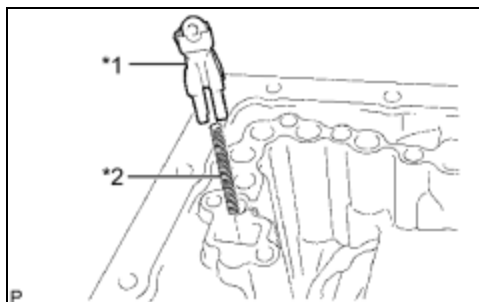
*1	O-ring
*2	Spring

- (c) Install the spring and the C-2 accumulator piston to the hole.

C-2 Accumulator Spring

FREE LENGTH	OUTER DIAMETER	COLOR
65.07 mm (2.562 in.)	16.2 mm (0.638 in.)	Pink

66. INSTALL CHECK BALL BODY



- (a) Install the check ball body and the compression spring to the automatic transmission case sub-assembly.

Text in Illustration

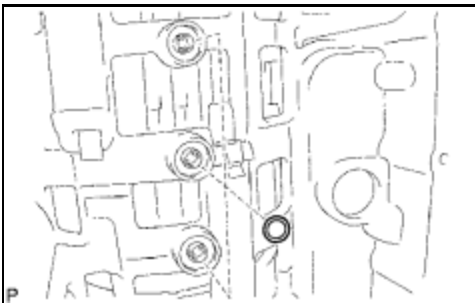
*1	Check Ball Body
*2	Compression Spring

67. INSTALL BRAKE DRUM GASKET



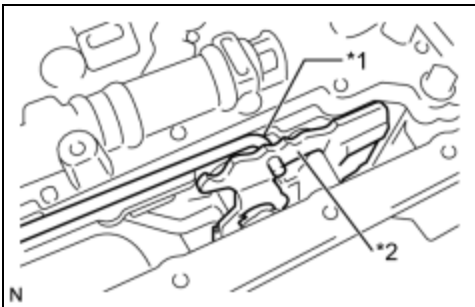
- (a) Install 3 new brake drum gaskets to the automatic transmission case sub-assembly.

68. INSTALL TRANSMISSION CASE GASKET



- (a) Install 3 new transmission case gaskets to the automatic transmission case sub-assembly.

69. INSTALL TRANSMISSION VALVE BODY ASSEMBLY



- (a) Connect the manual valve connecting rod sub-assembly to the manual valve lever sub-assembly.

Text in Illustration

*1	Manual Valve Connecting Rod Sub-assembly
*2	Manual Valve Lever Sub-assembly

- (b) Install the transmission valve body assembly to the automatic transmission case sub-assembly with the 19 bolts.

Torque: 11 N·m (112 kgf·cm, 8ft·lbf)

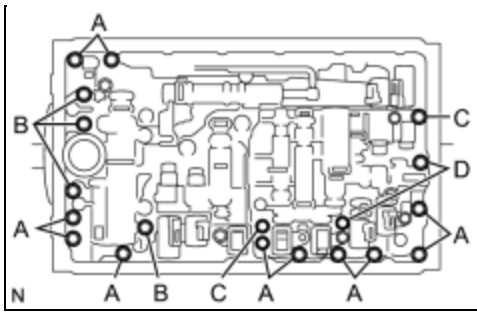
HINT:

Each bolt length is indicated below.

Bolt length:

Bolt A

25 mm (0.984 in.)



Bolt B

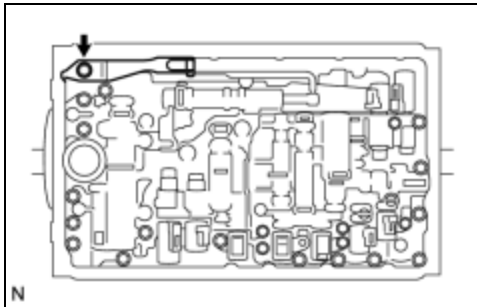
36 mm (1.42 in.)

Bolt C

45 mm (1.77 in.)

Bolt D

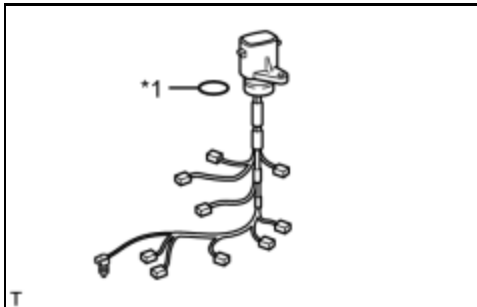
50 mm (1.97 in.)



- (c) Install the detent spring and the detent spring cover to the transmission valve body assembly with the bolt.

Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

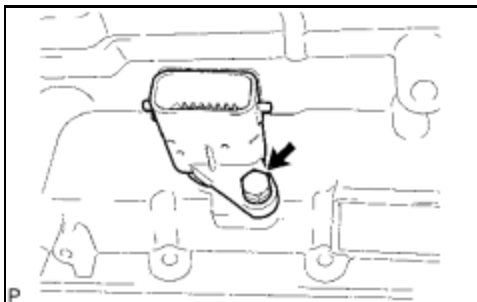
70. INSTALL TRANSMISSION WIRE



- (a) Coat a new O-ring with ATF, and install it to the transmission wire.

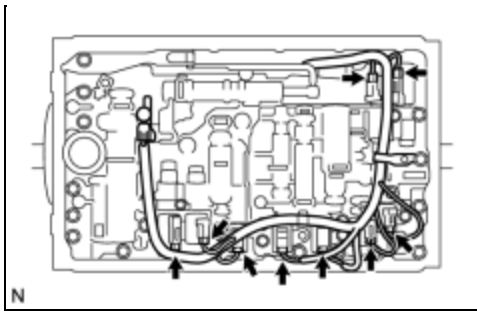
Text in Illustration

*1	O-ring
----	--------



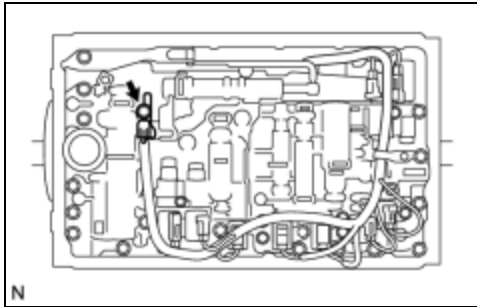
- (b) Install the transmission wire with the bolt.

Torque: 5.4 N·m (55 kgf·cm, 48in·lbf)



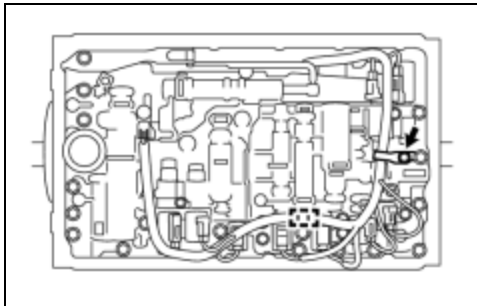
(c) Connect the 9 solenoid valve connectors.

(d) Coat the ATF temperature sensor O-ring with ATF.



(e) Install the ATF temperature sensor and the temperature sensor clamp with the bolt.

Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

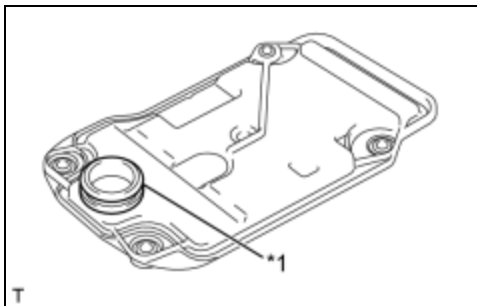


(f) Install the valve body wire harness clamp with the 2 bolt.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

(g) Engage the wire harness clamp.

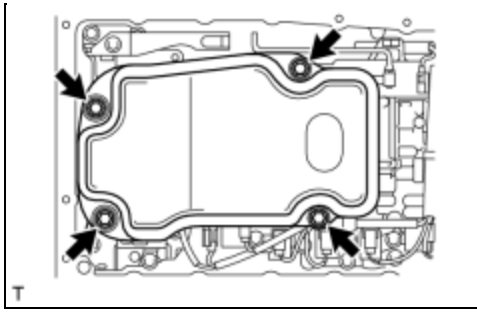
71. INSTALL VALVE BODY OIL STRAINER ASSEMBLY



(a) Coat a new O-ring with ATF, and install it to the valve body oil strainer assembly.

Text in Illustration

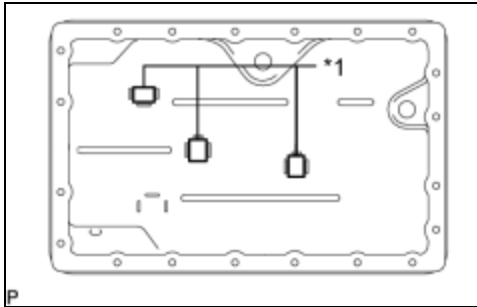
*1	O-ring
----	--------



- (b) Install the valve body oil strainer assembly to the transmission valve body assembly with the 4 bolts.

Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

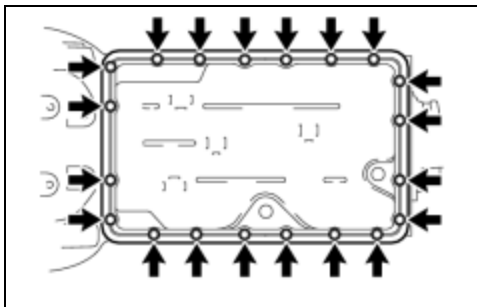
72. INSTALL AUTOMATIC TRANSMISSION OIL PAN SUB-ASSEMBLY



- (a) Install the 3 transmission oil cleaner magnets to the automatic transmission oil pan sub-assembly.

Text in Illustration

*1	Transmission Oil Cleaner Magnet
----	---------------------------------



- (b) Install a new automatic transmission oil pan gasket and the automatic transmission oil pan sub-assembly with the 20 bolts.

Torque: 7.0 N·m (71 kgf·cm, 62in·lbf)

- (c) Install the drain plug and a new gasket.

Torque: 20 N·m (204 kgf·cm, 15ft·lbf)

- (d) Using a socket hexagon wrench 5 mm, install the overflow plug and a new gasket.

Torque: 20 N·m (204 kgf·cm, 15ft·lbf)

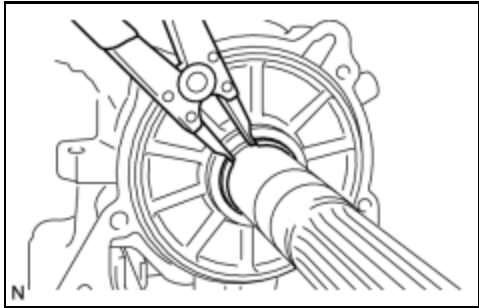
73. INSTALL OUTPUT SHAFT THRUST BEARING

- (a) Install the output shaft thrust bearing race, output shaft thrust bearing and the rear output shaft thrust bearing race to the output shaft of the rear planetary gear assembly.

Bearing and Race Diameter

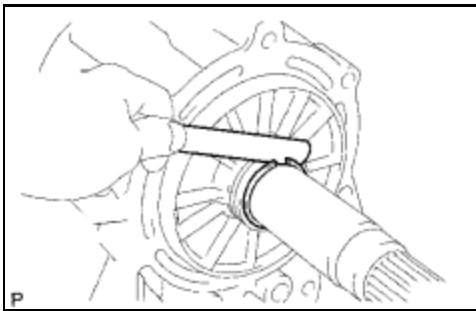
ITEM	INSIDE	OUTSIDE
Output shaft thrust bearing race	37.0 mm (1.457 in.)	51.2 mm (2.016 in.)
Output shaft thrust bearing	36.1 mm (1.421 in.)	52.5 mm (2.067 in.)

Rear output shaft thrust bearing race	36.1 mm (1.421 in.)	51.0 mm (2.007 in.)
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(b) Using a snap ring expander, install the snap ring.

(c) Using a feeler gauge, measure the clearance between the snap ring and the rear output shaft thrust bearing race.



Standard clearance:




0.02 to 0.12 mm (0.000787 to 0.00472 in.)










If the clearance is outside the standard range, select another rear output shaft thrust bearing race that brings the clearance within the standard range.

HINT:

There are 12 different thicknesses for the rear output shaft thrust bearing race.

Race Thickness

PART NO.	MARK	THICKNESS
SU003-03819		3.80 mm (0.150 in.)
SU003-03820		3.85 mm (0.152 in.)
SU003-03821		3.90 mm (0.154 in.)

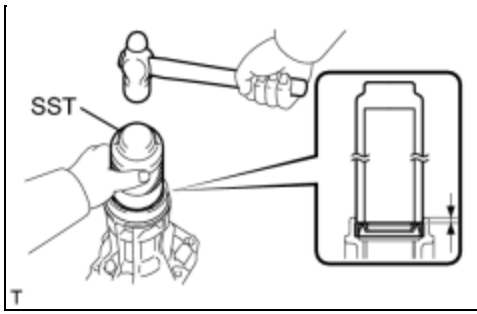
SU003-03822		3.95 mm (0.156 in.)
SU003-03823		4.00 mm (0.157 in.)
SU003-03824		4.05 mm (0.159 in.)
SU003-03825		4.10 mm (0.161 in.)
SU003-03826		4.15 mm (0.163 in.)
SU003-03827		4.20 mm (0.165 in.)
SU003-03828		4.25 mm (0.167 in.)
SU003-03829		4.30 mm (0.169 in.)
SU003-0383		4.35 mm (0.171 in.)

74. INSTALL AUTOMATIC TRANSMISSION EXTENSION HOUSING OIL SEAL

- (a) Using SST and a hammer, drive in the automatic transmission extension housing oil seal to the extension housing sub-assembly.

SST: 09309-37010

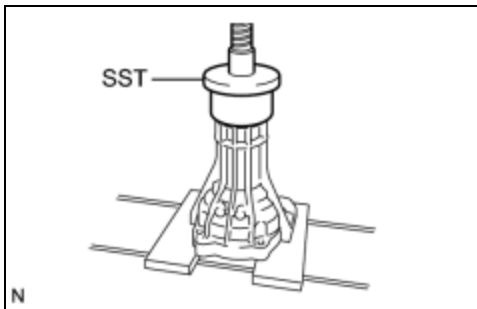
Drive in depth:



5.4 to 5.8 mm (0.213 to 0.228 in.)

(b) Coat the lip of a new automatic transmission extension housing oil seal with MP grease.

75. INSTALL EXTENSION HOUSING DUST DEFLECTOR

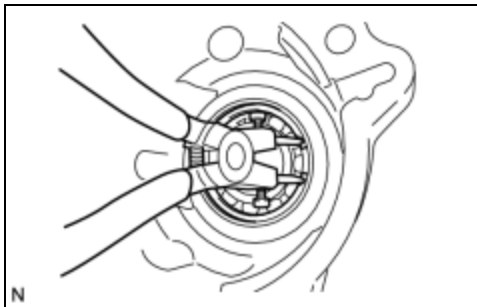


(a) Using SST and a press, install a new extension housing dust deflector to the extension housing sub-assembly.

SST: 09950-60020

09951-01030

76. INSTALL TRANSMISSION CASE ADAPTER RADIAL BALL BEARING



(a) Install the transmission case adapter radial ball bearing to the extension housing sub-assembly.

(b) Using snap ring pliers, install the snap ring to the extension housing sub-assembly.

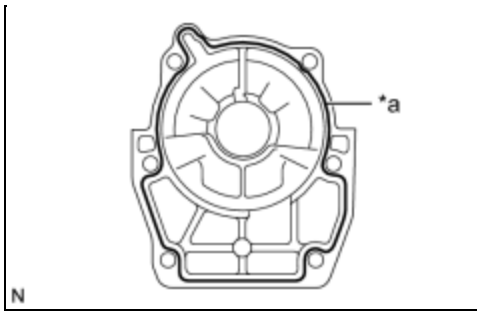
77. INSTALL EXTENSION HOUSING SUB-ASSEMBLY

(a) Clean and degrease the threads of the 6 bolts and the contact surfaces of the case and the housing with non-residue solvent.

(b) Apply seal packing to the extension housing sub-assembly as shown in the illustration.

Text in Illustration

*a	Seal Packing (Seal Diameter: 1.2 mm (0.0472 in.))
----	--

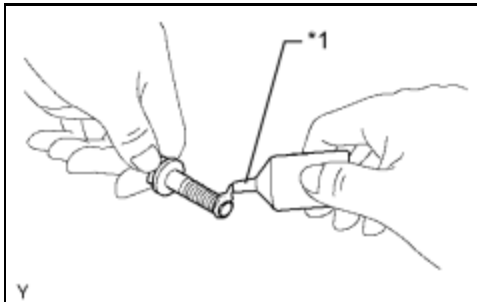


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Seal packing:
Toyota Genuine Seal Packing 1281, Three Bond 1281 or equivalent

NOTICE:

Assemble the extension housing sub-assembly within 10 minutes after the seal packing application.



(c) Apply adhesive to 2 or 3 threads on the end of the 6 bolts.

Text in Illustration

*1	Adhesive
----	----------

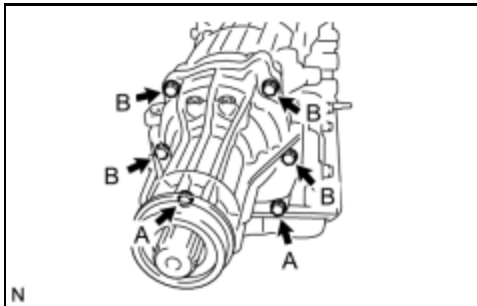
Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

(d) Install the extension housing sub-assembly to the automatic transmission case sub-assembly with the 6 bolts.

Torque: 34 N·m (345 kgf·cm, 25ft·lbf)

HINT:

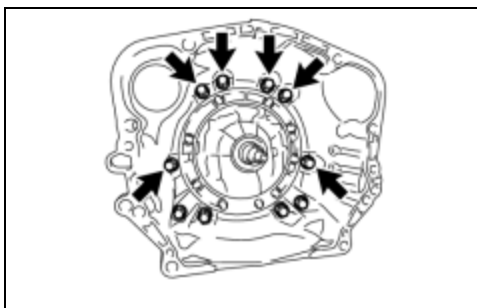
Each bolt length is indicated below.



Bolt length:
for Bolt A
35 mm (1.378 in.)
for Bolt B
45 mm (1.772 in.)

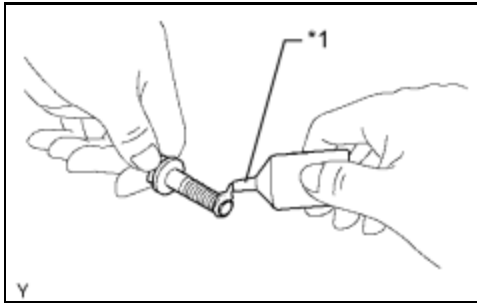
78. INSTALL AUTOMATIC TRANSMISSION HOUSING

(a) Clean and degrease the bolts and the bolt holes with non-residue solvent.



(b) Install the automatic transmission housing to the automatic transmission case sub-assembly with the 6 bolts.

Torque: 34 N·m (345 kgf·cm, 25ft·lbf)



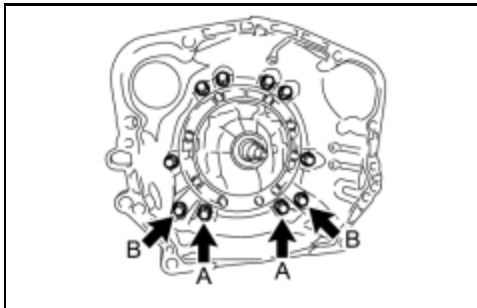
(c) Apply adhesive to 2 or 3 threads on the end of the 4 bolts.

Text in Illustration

*1	Adhesive
----	----------

Adhesive:

Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

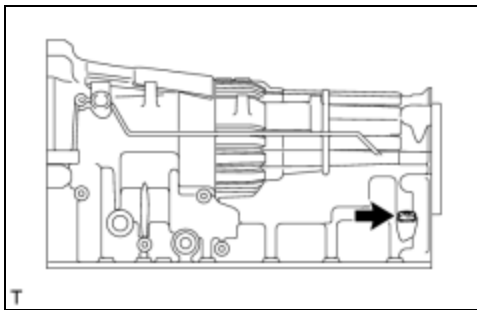


(d) Install the automatic transmission housing to the automatic transmission case sub-assembly with the 4 bolts.

Bolt A (M10 bolt) - Torque: 34 N·m (345 kgf·cm, 25ft·lbf)

Bolt B (M12 bolt) - Torque: 57 N·m (579 kgf·cm, 42ft·lbf)

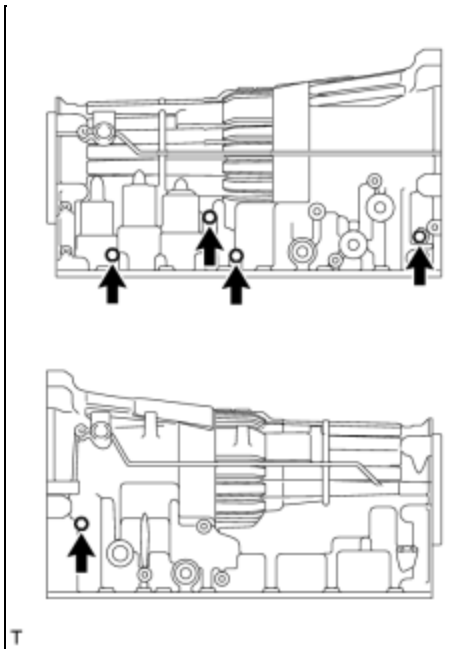
79. INSTALL AUTOMATIC TRANSMISSION CASE PLUG



(a) Coat a new O-ring with ATF, and install it to the automatic transmission case plug.

(b) Using "TORX" socket wrench T55, install the automatic transmission case plug to the automatic transmission case sub-assembly.

Torque: 39 N·m (400 kgf·cm, 29ft·lbf)

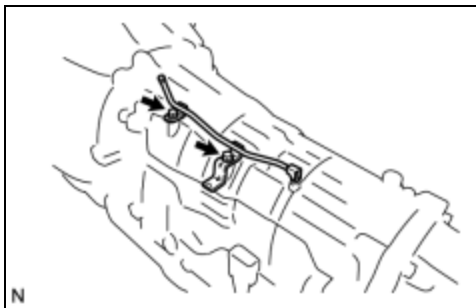


(c) Coat 5 new O-ring with ATF, and install it to the 5 automatic transmission case plug.

(d) Install the 5 automatic transmission case plugs to the automatic transmission case sub-assembly.

Torque: 7.4 N·m (75 kgf·cm, 65in·lbf)

80. INSTALL AUTOMATIC TRANSMISSION BREATHER TUBE



(a) Install the automatic transmission breather tube to the automatic transmission case sub-assembly with the 2 bolts.

Torque: 5.4 N·m (55 kgf·cm, 48in·lbf)

81. INSTALL TRANSMISSION REVOLUTION SENSOR

(a) Coat 2 new O-rings with ATF, and install them to the 2 transmission revolution sensors.

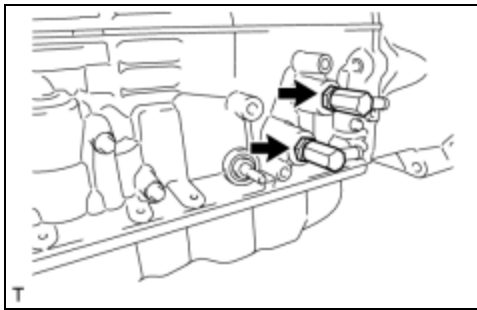


- (b) Install the 2 transmission revolution sensors to the automatic transmission case sub-assembly with the 2 bolts.

Torque: 5.4 N·m (55 kgf·cm, 48in·lbf)

82. INSTALL OIL COOLER TUBE UNION

- (a) Coat 2 new O-rings with ATF, and install the 2 oil cooler tube unions.

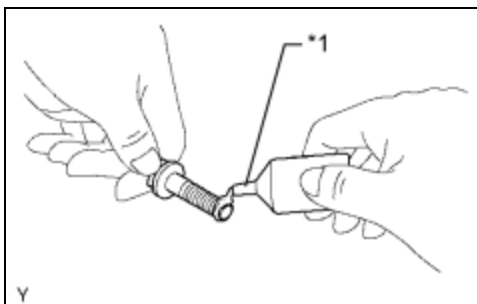


- (b) Install the 2 oil cooler tube unions to the automatic transmission case sub-assembly.

Torque: 39 N·m (393 kgf·cm, 28ft·lbf)

83. INSTALL PARK/NEUTRAL POSITION SWITCH ASSEMBLY

- (a) Clean the bolt and the bolt hole.



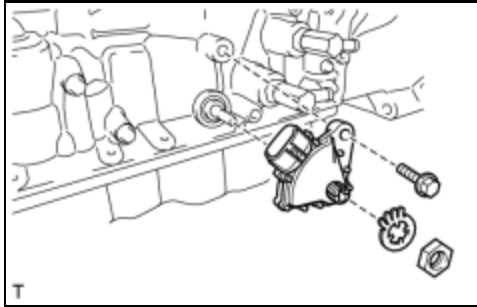
- (b) Apply adhesive to 2 or 3 threads on the end of the bolt.

Text in Illustration

*1	Adhesive
----	----------

Adhesive:

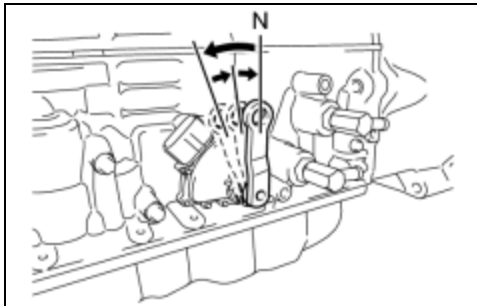
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent



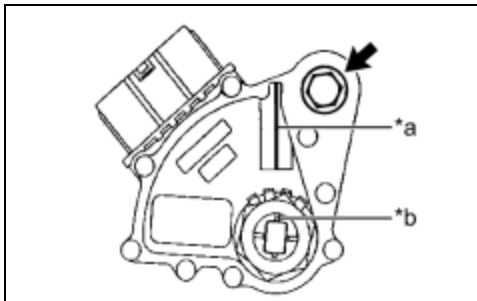
- (c) Temporarily install the park/neutral position switch assembly to the automatic transmission case sub-assembly with the bolt.

- (d) Install a new lock washer and the nut.

Torque: 6.9 N·m (70 kgf·cm, 61 in·lbf)



- (e) Turn the transmission control shaft lever RH counterclockwise until it stops, and turn it clockwise 2 notches to set it to the N position.

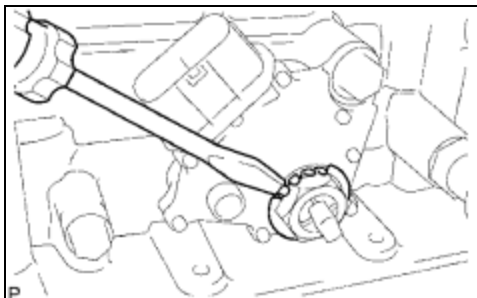


- (f) Align the neutral basic line with the groove as shown in the illustration, and tighten the bolt.

Text in Illustration

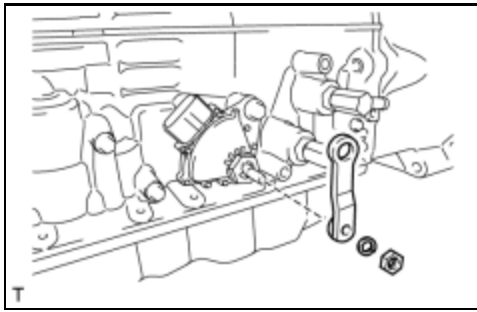
*a	Neutral Basic Line
*b	Groove

Torque: 13 N·m (130 kgf·cm, 9ft·lbf)



- (g) Using a screwdriver, bend the tabs of the lock washer.

84. INSTALL TRANSMISSION CONTROL SHAFT LEVER RH



- (a) Install the transmission control shaft lever RH to the park/ neutral position switch assembly with the spring washer and nut.

Torque: 16 N·m (160 kgf·cm, 12ft·lbf)

85. INSTALL REFILL PLUG

- (a) Coat a new O-ring with ATF, and install it to the refill plug.
(b) Install the refill plug.

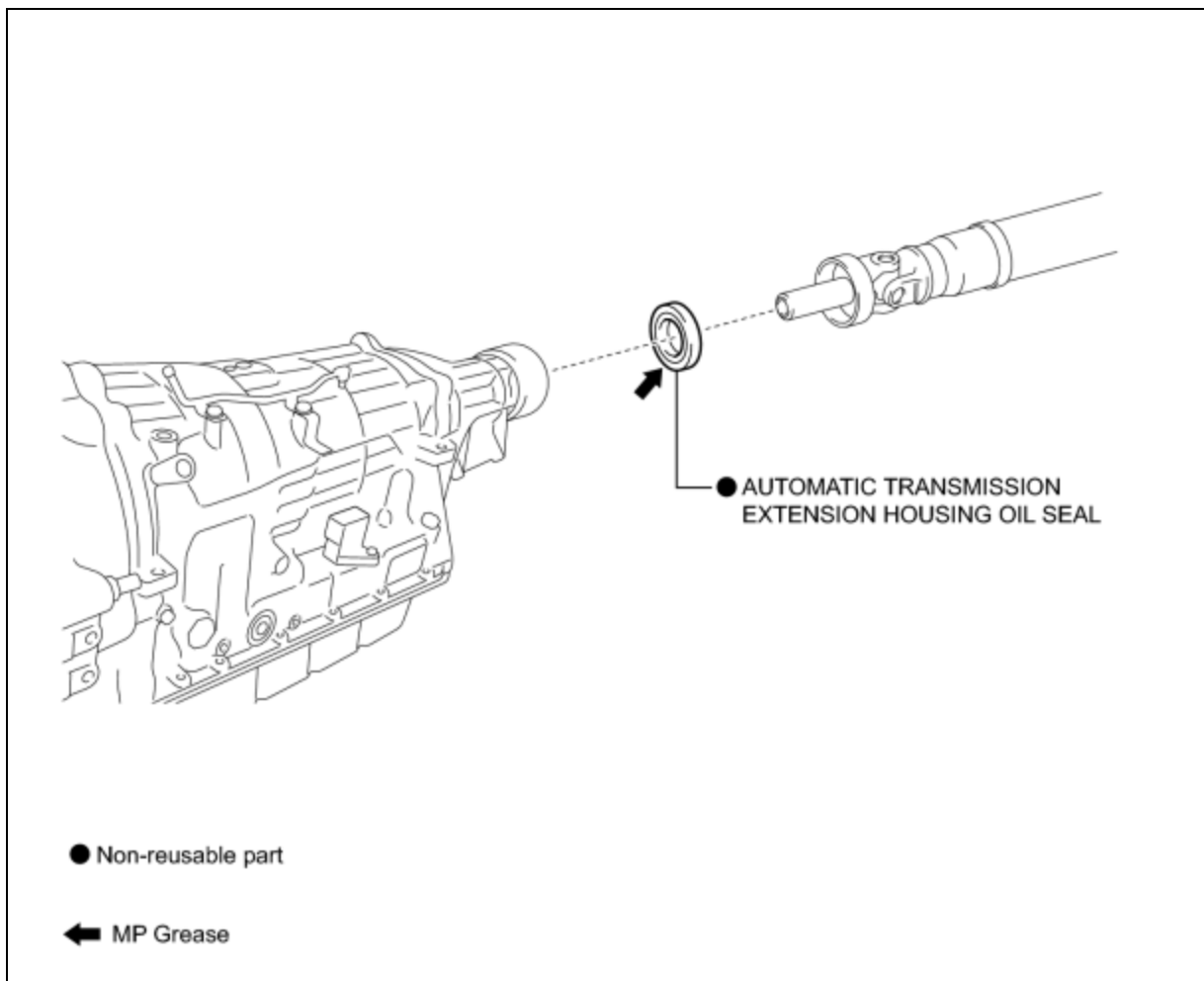
Torque: 39 N·m (400 kgf·cm, 29ft·lbf)



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NRX01LX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: EXTENSION HOUSING REAR OIL SEAL: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



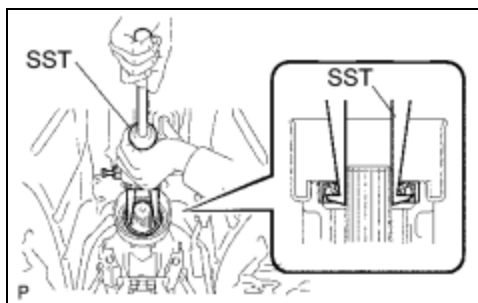
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NRY01VX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: EXTENSION HOUSING REAR OIL SEAL: REPLACEMENT (2013 FR-S)		

REPLACEMENT

1. REMOVE PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

INFO

2. REMOVE AUTOMATIC TRANSMISSION EXTENSION HOUSING OIL SEAL

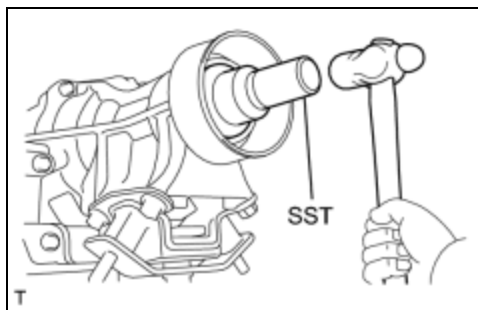


- (a) Using SST, remove the automatic transmission extension housing oil seal.

SST: 09308-00010

3. INSTALL AUTOMATIC TRANSMISSION EXTENSION HOUSING OIL SEAL

- (a) Coat the lip of a new automatic transmission extension housing oil seal with MP grease.



- (b) Using SST and a hammer, tap in the automatic transmission extension housing oil seal.

SST: 09325-40010

Standard depth:

5.4 to 5.8 mm (0.213 to 0.228 in.)

NOTICE:

- Keep the lip free of foreign matter.
- Do not tap the oil seal at an angle.

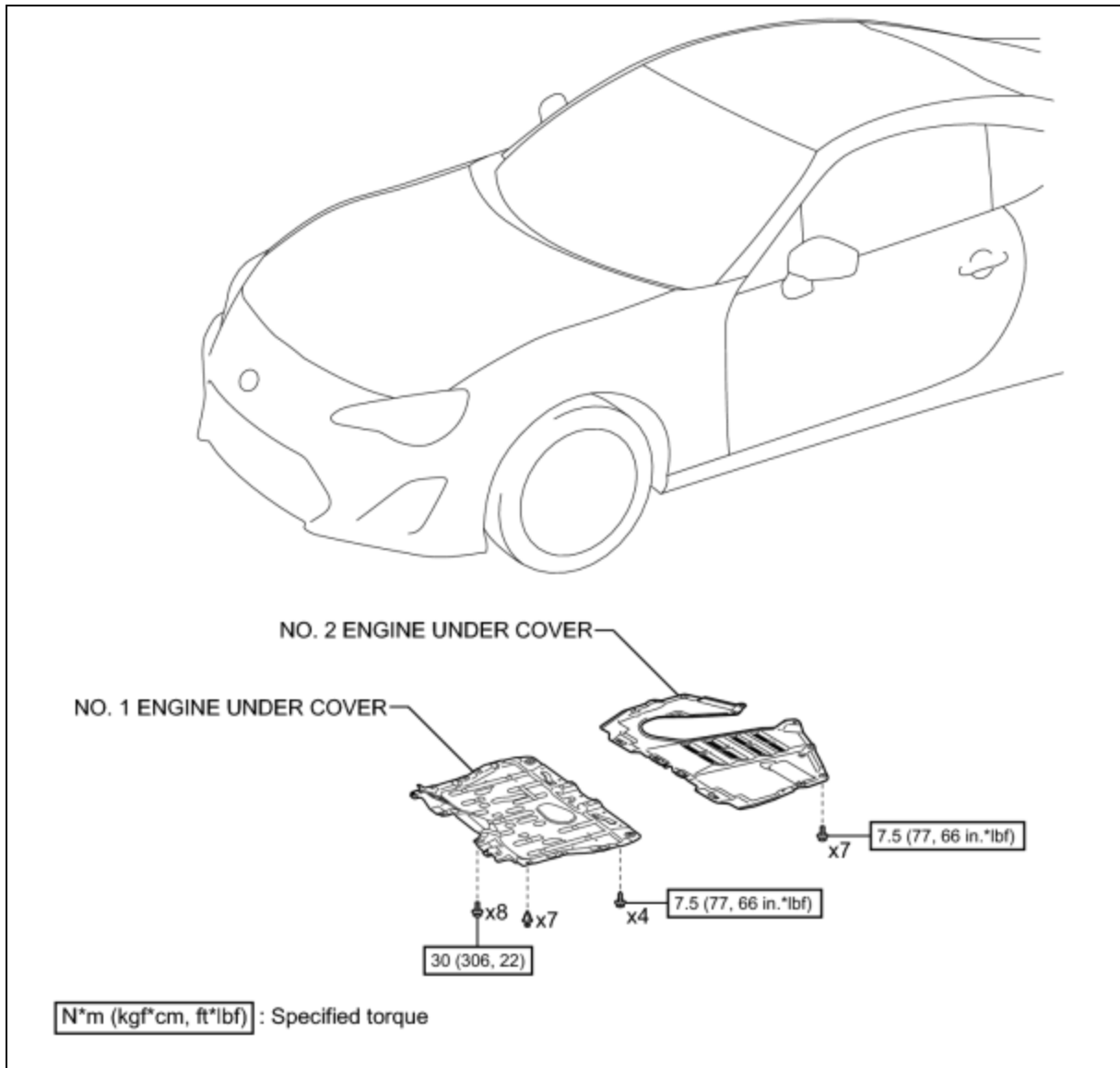
4. INSTALL PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

INFO

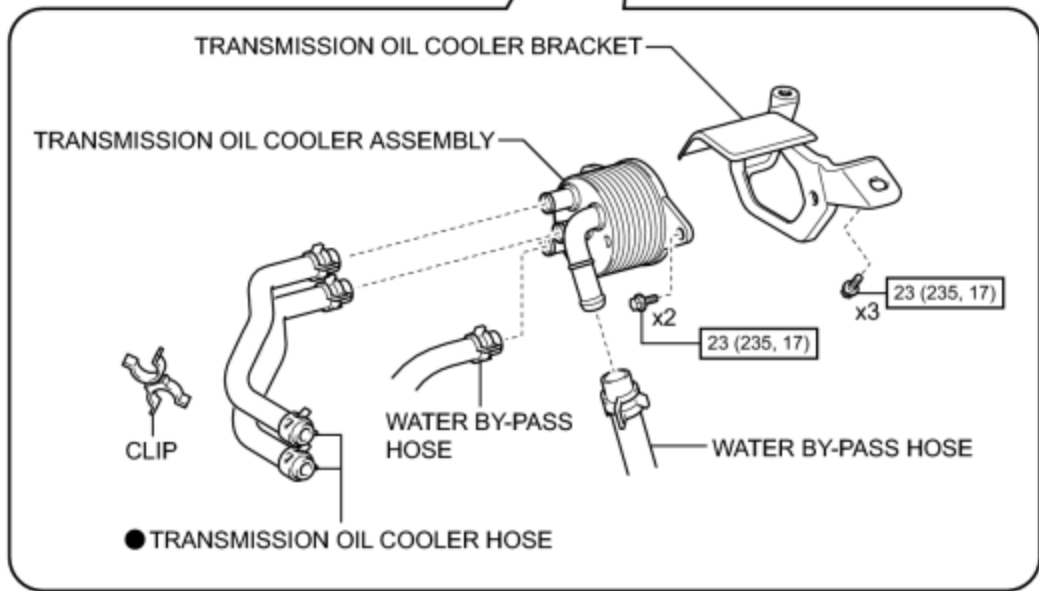
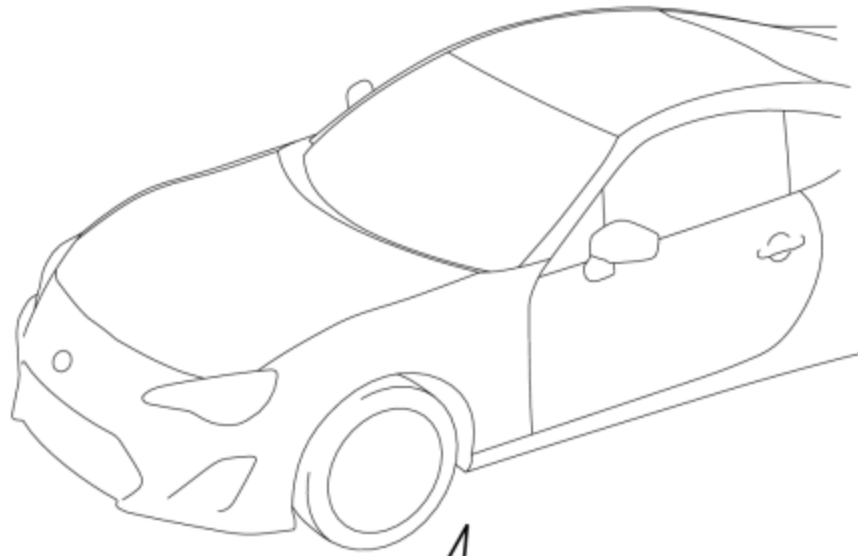
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NOE01SX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: OIL COOLER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



N*m (kgf*cm, ft*lbf) : Specified torque

● Non-reusable part



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NOC026X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: OIL COOLER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL TRANSMISSION OIL COOLER ASSEMBLY

(a) Install the transmission oil cooler to the transmission oil cooler bracket with the 2 bolts.

Torque: 23 N·m (235 kgf·cm, 17ft·lbf)

(b) Connect the 2 new oil cooler hoses to the transmission oil cooler with the 2 hose clamps.

(c) Install the transmission oil cooler with the 3 bolts.

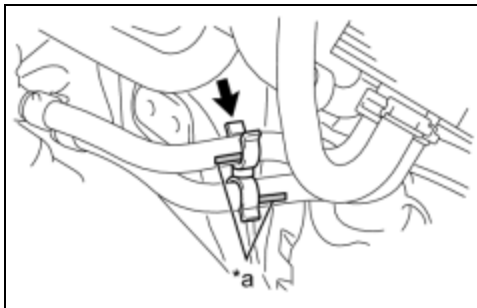
Torque: 23 N·m (235 kgf·cm, 17ft·lbf)

2. CONNECT WATER BY-PASS HOSE

(a) Connect the 2 water by-pass hoses to the transmission oil cooler with the 2 hose clamps.

3. CONNECT TRANSMISSION OIL COOLER HOSE

(a) Connect the 2 oil cooler hoses with the 2 hose clamps.



(b) Install the clip as shown in the illustration.

Text in Illustration

*a	Paint Mark
----	------------

4. ADD ENGINE COOLANT INFO

5. ADD AUTOMATIC TRANSMISSION FLUID

INFO

6. INSPECT FOR ENGINE COOLANT LEAK INFO

7. INSPECT FOR AUTOMATIC TRANSMISSION FLUID LEAK

8. INSTALL NO. 2 ENGINE UNDER COVER INFO

9. INSTALL NO. 1 ENGINE UNDER COVER INFO

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VVP010X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: PARK / NEUTRAL POSITION SWITCH: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT PARK/NEUTRAL POSITION SWITCH ASSEMBLY

- (a) Apply the parking brake and turn the ignition switch to ON.
- (b) Depress the brake pedal and check that the engine starts when the shift lever is in N or P, but does not start when the shift lever is in other positions.
- (c) Check that the back-up light illuminates and the reverse warning buzzer sounds only when the shift lever is in R.

If a malfunction failure is found, check the park/neutral position switch assembly for continuity.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NOF026X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: OIL COOLER: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE NO. 1 ENGINE UNDER COVER INFO
2. REMOVE NO. 2 ENGINE UNDER COVER INFO
3. DRAIN ENGINE COOLANT INFO
4. DISCONNECT TRANSMISSION OIL COOLER HOSE

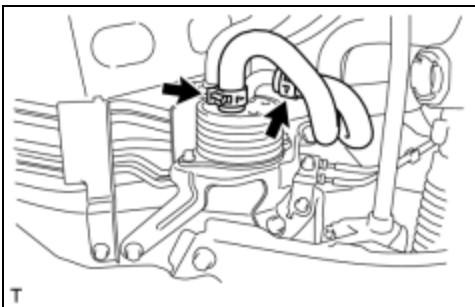


- (a) Loosen the 2 hose clamps and disconnect the 2 oil cooler hoses from the transmission oil cooler.

NOTICE:

Use a container to catch any coolant which flows out of the oil cooler hoses.

5. DISCONNECT WATER BY-PASS HOSE



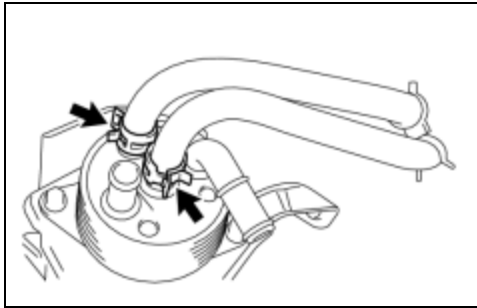
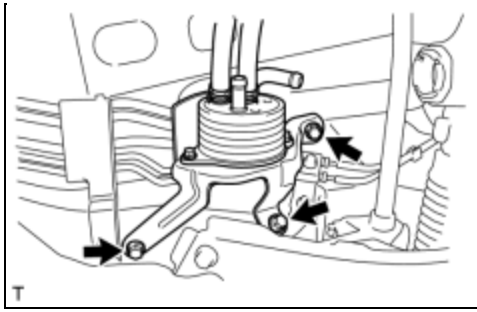
- (a) Loosen the 2 hose clamps and disconnect the 2 water by-pass hoses.

NOTICE:

Use a container to catch any coolant which flows out of the water by-pass hoses.

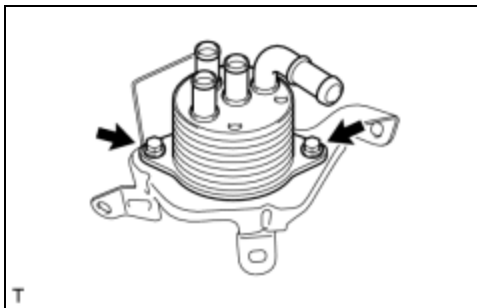
6. REMOVE TRANSMISSION OIL COOLER ASSEMBLY

- (a) Remove the 3 bolts and the transmission oil cooler.



(b) Loosen the 2 hose clamps and remove the 2 oil cooler hoses from the transmission oil cooler.

(c) Remove the clip from the oil cooler hoses.



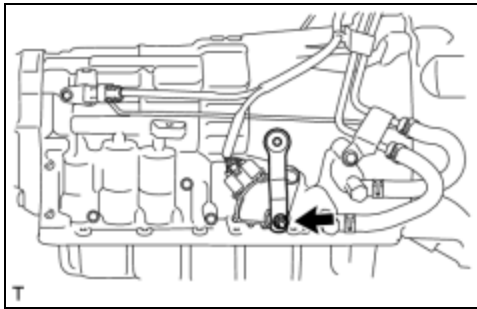
(d) Remove the 2 bolts and the transmission oil cooler from the transmission oil cooler bracket.

Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NOB010X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: PARK / NEUTRAL POSITION SWITCH: ADJUSTMENT (2013 FR-S)		

ADJUSTMENT

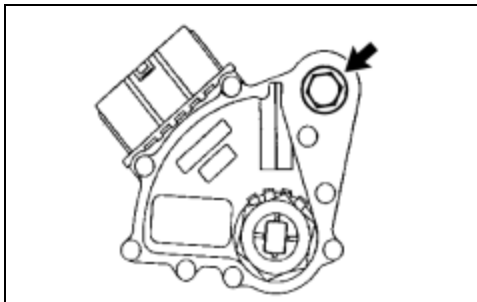
1. DISCONNECT TRANSMISSION CONTROL SHAFT LEVER RH

- (a) While pushing the shift lock release button, move the shift lever to N.



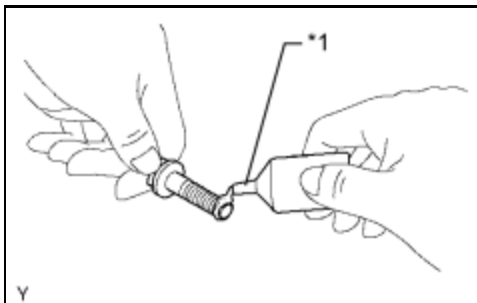
- (b) Remove the nut and spring washer, and disconnect the transmission control shaft lever RH.

2. ADJUST PARK/NEUTRAL POSITION SWITCH ASSEMBLY



- (a) Remove the bolt of the park/neutral position switch assembly.

- (b) Clean the bolt and the bolt hole.



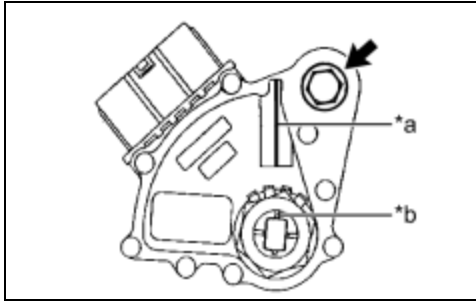
- (c) Apply adhesive to 2 or 3 threads on the end of the bolt.

Text in Illustration

*1	Adhesive
----	----------

Adhesive:

Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent



(d) Align the neutral basic line with the groove as shown in the illustration.

Text in Illustration

*a	Neutral Basic Line
*b	Groove

(e) Hold the park/neutral position switch assembly in position and install the bolt.

Torque: 13 N·m (130 kgf·cm, 9ft·lbf)

3. CONNECT TRANSMISSION CONTROL SHAFT LEVER RH

(a) Connect the transmission control shaft lever RH with the spring washer and nut.

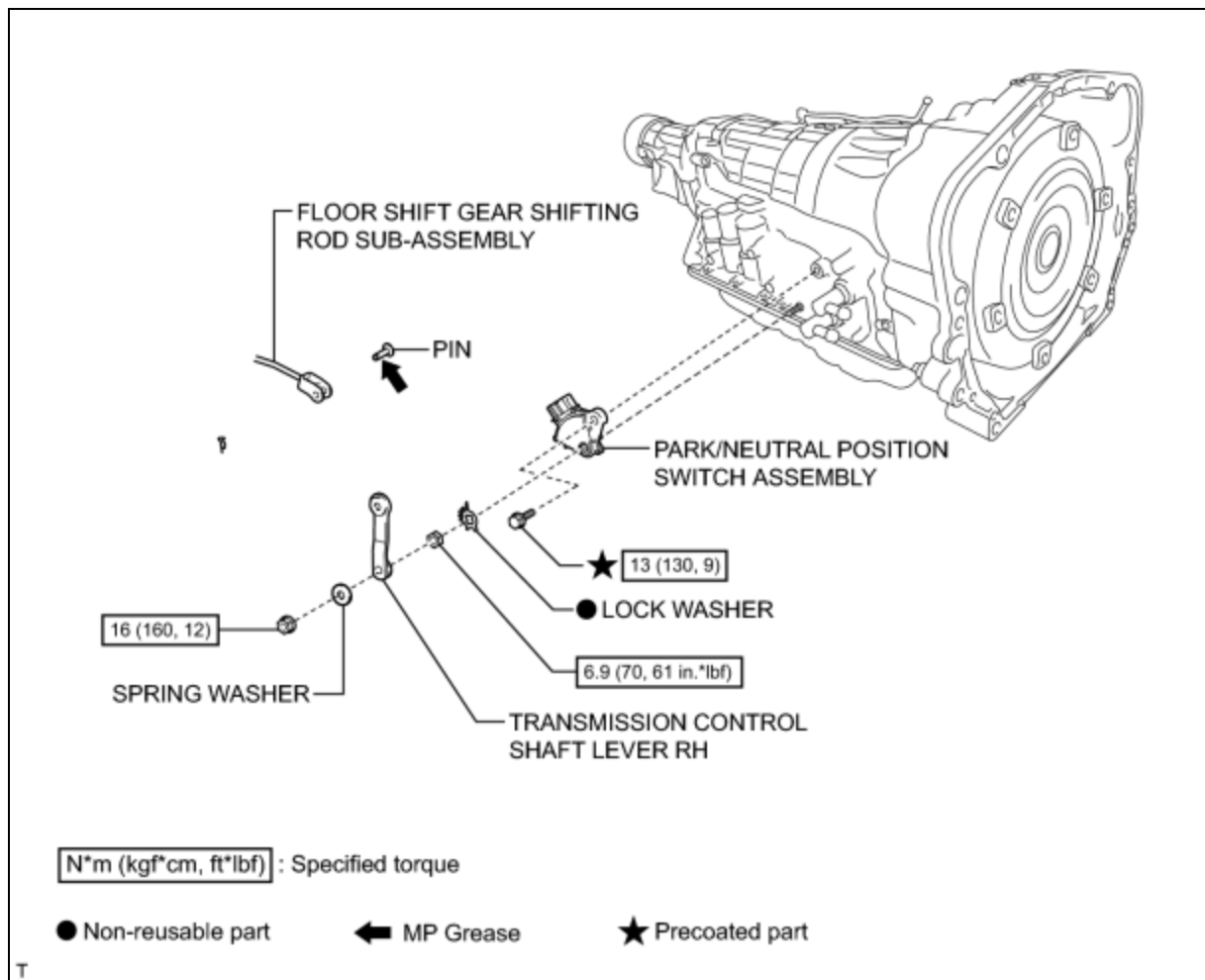
Torque: 16 N·m (160 kgf·cm, 12ft·lbf)

4. INSPECT PARK/NEUTRAL POSITION SWITCH ASSEMBLY [INFO](#)

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NOE01RX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: PARK / NEUTRAL POSITION SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NOD010X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: PARK / NEUTRAL POSITION SWITCH: INSPECTION (2013 FR-S)		

INSPECTION

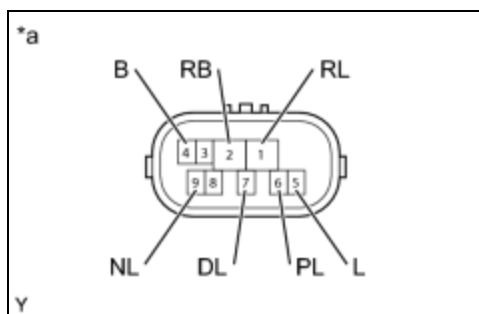
1. INSPECT PARK/NEUTRAL POSITION SWITCH ASSEMBLY

- (a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Park/Neutral Position Switch Assembly)
----	--

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
2 (RB) - 6 (PL) 4 (B) - 5 (L)	Shift lever in P	Below 1 Ω
	Shift lever not in P	10 k Ω or higher
2 (RB) - 1 (RL)	Shift lever in R	Below 1 Ω
	Shift lever not in R	10 k Ω or higher
2 (RB) - 9 (NL) 4 (B) - 5 (L)	Shift lever in N	Below 1 Ω
	Shift lever not in N	10 k Ω or higher
2 (RB) - 7 (DL)	Shift lever in D, M, "+" or "-"	Below 1 Ω
	Shift lever not in D, M, "+" or "-"	10 k Ω or higher

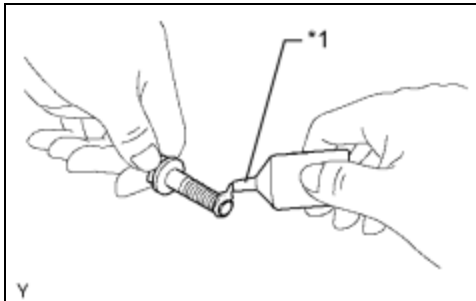
If the result is not as specified, replace the park/neutral position switch assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NOC025X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: PARK / NEUTRAL POSITION SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL PARK/NEUTRAL POSITION SWITCH ASSEMBLY

- (a) Clean the bolt and the bolt hole.



- (b) Apply adhesive to 2 or 3 threads on the end of the bolt.

Text in Illustration

*1	Adhesive
----	----------

Adhesive:

Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

- (c) Temporarily install the park/neutral position switch assembly with the bolt.

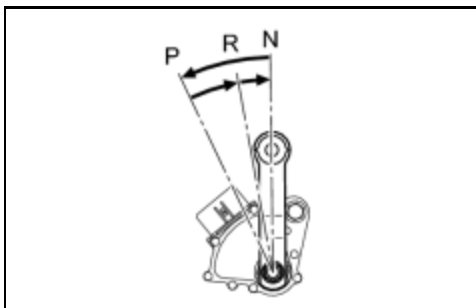
HINT:

Tighten the bolt to the specified torque when adjusting the park/neutral position switch assembly.

- (d) Install a new lock washer and the nut to the park/neutral position switch assembly.

Torque: 6.9 N·m (70 kgf·cm, 61 in·lbf)

- (e) Temporarily install the transmission control shaft lever RH.

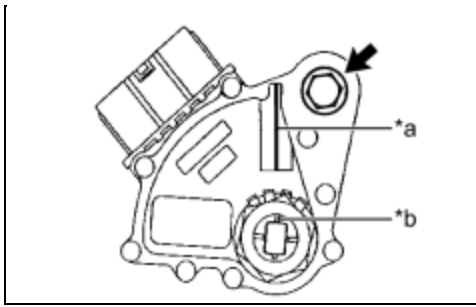


- (f) Turn the transmission control shaft lever RH counterclockwise until it stops, and turn it clockwise 2 notches to set it to the N position.

- (g) Remove the transmission control shaft lever RH.

- (h) Align the neutral basic line with the groove as shown in the illustration, and tighten the bolt.

Text in Illustration



*a	Neutral Basic Line
*b	Groove

Torque: 13 N·m (130 kgf·cm, 9ft·lbf)

- (i) Using a screwdriver, bend the tabs of the lock washer.
- (j) Connect the park/neutral position switch connector.

2. INSTALL TRANSMISSION CONTROL SHAFT LEVER RH

- (a) Install the transmission control shaft lever RH with the spring washer and nut.

Torque: 16 N·m (160 kgf·cm, 12ft·lbf)

3. CONNECT FLOOR SHIFT GEAR SHIFTING ROD SUB-ASSEMBLY

- (a) Apply MP grease to the pin.
- (b) Install the floor shift gear shifting rod sub-assembly to the transmission control shaft lever RH with the spacer, pin and clip.

HINT:

Install the pin from the right side of the vehicle.

4. INSTALL FRONT EXHAUST PIPE ASSEMBLY

INFO

5. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

INFO

6. INSPECT SHIFT LEVER POSITION

INFO

7. INSPECT PARK/NEUTRAL POSITION SWITCH ASSEMBLY

INFO

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VVP010X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: PARK / NEUTRAL POSITION SWITCH: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT PARK/NEUTRAL POSITION SWITCH ASSEMBLY

- (a) Apply the parking brake and turn the ignition switch to ON.
- (b) Depress the brake pedal and check that the engine starts when the shift lever is in N or P, but does not start when the shift lever is in other positions.
- (c) Check that the back-up light illuminates and the reverse warning buzzer sounds only when the shift lever is in R.

If a malfunction failure is found, check the park/neutral position switch assembly for continuity.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NOF025X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: PARK / NEUTRAL POSITION SWITCH: REMOVAL (2013 FR-S)		

REMOVAL

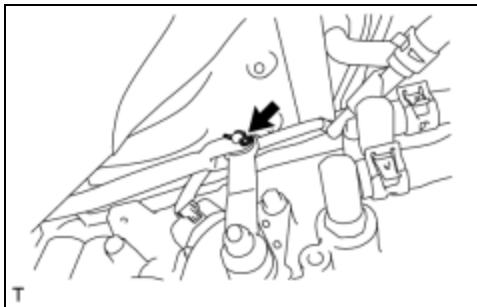
1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

INFO

2. REMOVE FRONT EXHAUST PIPE ASSEMBLY

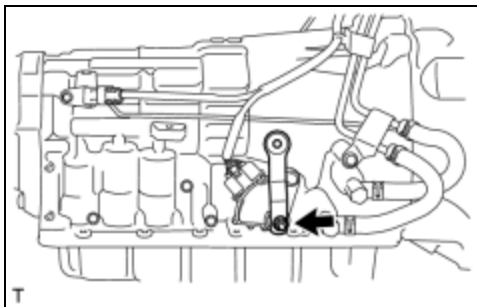
INFO

3. DISCONNECT FLOOR SHIFT GEAR SHIFTING ROD SUB-ASSEMBLY



- (a) Remove the clip and pin the floor shift gear shifting rod sub-assembly from the transmission control shaft lever RH.

4. REMOVE TRANSMISSION CONTROL SHAFT LEVER RH

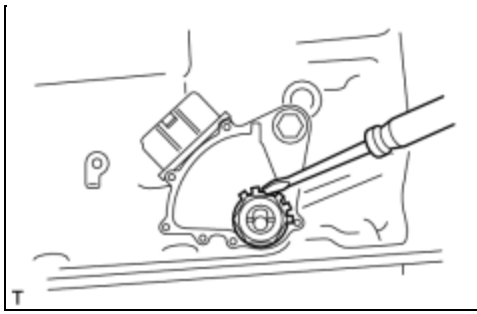


- (a) Remove the nut, spring washer and the transmission control shaft lever RH.

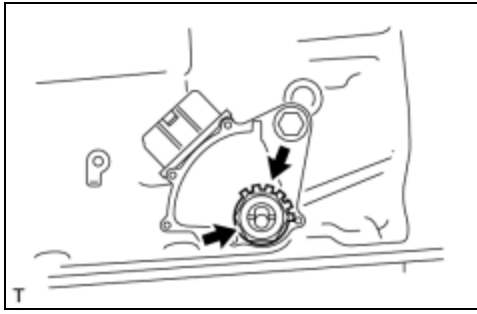
5. REMOVE PARK/NEUTRAL POSITION SWITCH ASSEMBLY

- (a) Disconnect the park/neutral position switch connector.

- (b) Using a screwdriver, bend the tabs of the lock washer.



(c) Remove the nut and the lock washer from the park/neutral position switch assembly.



(d) Remove the bolt and the park/neutral position switch assembly.

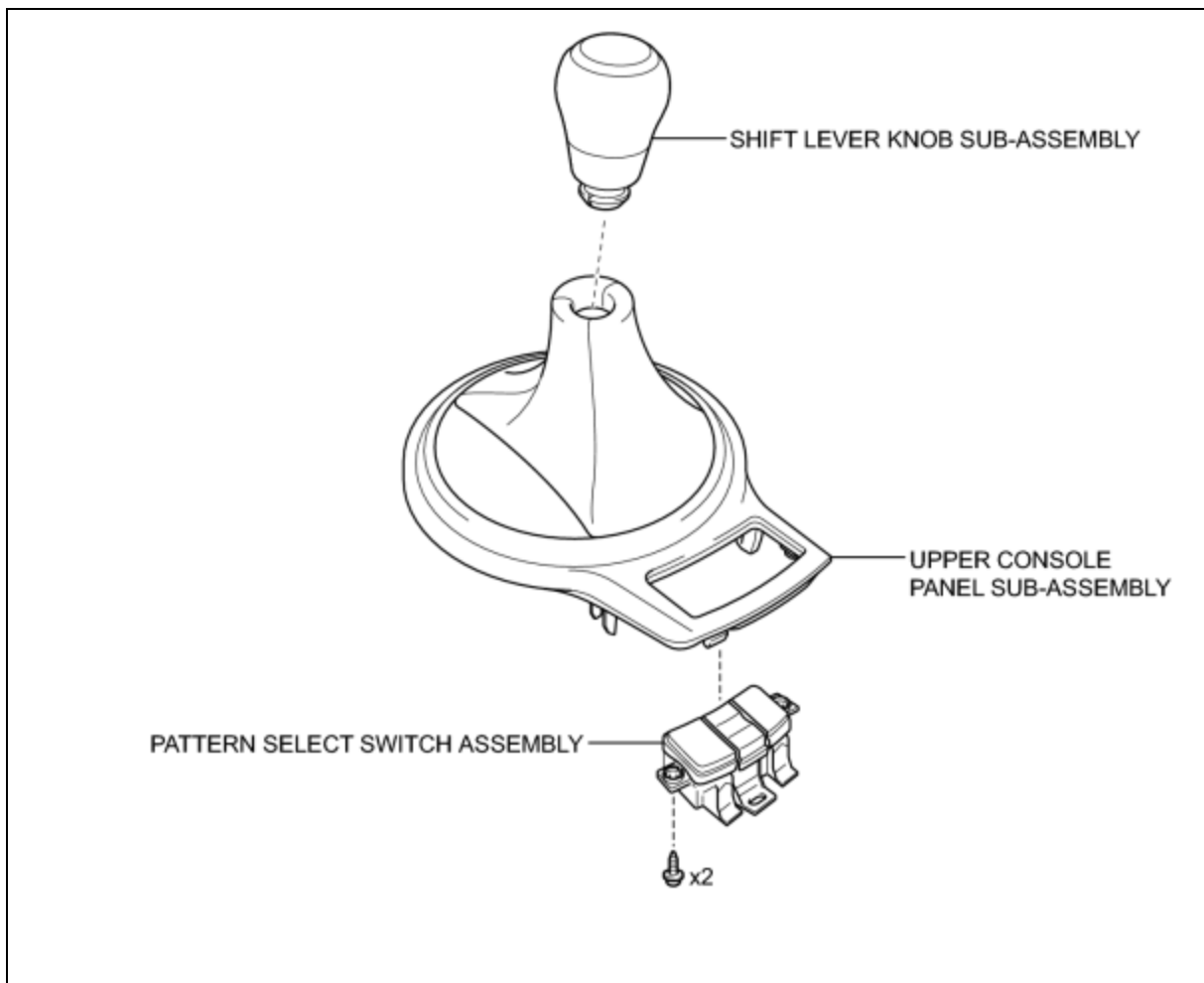
HINT:

Make sure that the manual valve lever shaft has not been rotated prior to installing the park/neutral position switch assembly as the detent spring may become detached from the manual valve lever shaft.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001T8Q01VX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: PATTERN SELECT SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NS8026X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: PATTERN SELECT SWITCH: INSPECTION (2013 FR-S)		

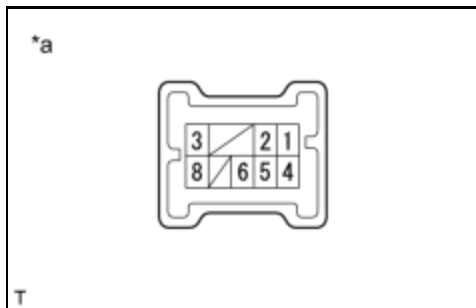
INSPECTION

1. INSPECT PATTERN SELECT SWITCH ASSEMBLY

- (a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Pattern Select Switch Assembly)
----	---



Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
6 - 8	Pattern select (SNOW) switch on	Below 1 Ω
	Pattern select (SNOW) switch off	10 k Ω or higher
4 - 8	Pattern select (SPORT) switch on	Below 1 Ω
	Pattern select (SPORT) switch off	10 k Ω or higher

If the result is not as specified, replace the pattern select switch assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001T8P02DX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: PATTERN SELECT SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL PATTERN SELECT SWITCH ASSEMBLY

- (a) Install the pattern select switch assembly with the 2 screws.

2. INSTALL UPPER CONSOLE PANEL SUB-ASSEMBLY [INFO](#)

3. INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY [INFO](#)



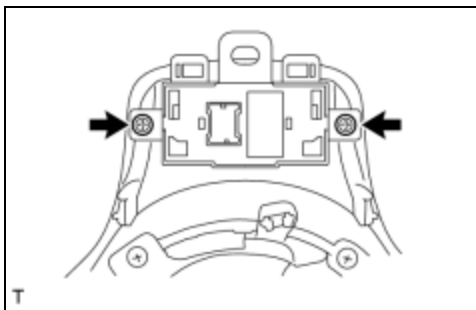
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001T8R02EX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: PATTERN SELECT SWITCH: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY [INFO](#)

2. REMOVE UPPER CONSOLE PANEL SUB-ASSEMBLY [INFO](#)

3. REMOVE PATTERN SELECT SWITCH ASSEMBLY



(a) Remove the 2 screws and the pattern select switch assembly.

Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000009002LX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SHIFT LEVER: ADJUSTMENT (2013 FR-S)		

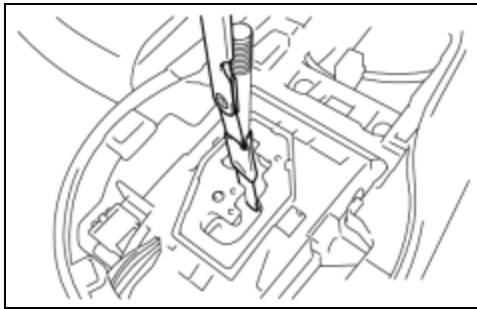
ADJUSTMENT

1. REMOVE FRONT EXHAUST PIPE ASSEMBLY

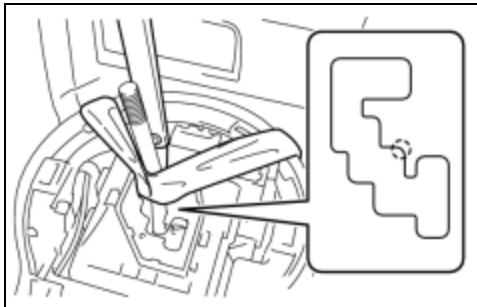
INFO

2. ADJUST SHIFT LEVER POSITION

- (a) While pushing the shift lock release button, move the shift lever to N.



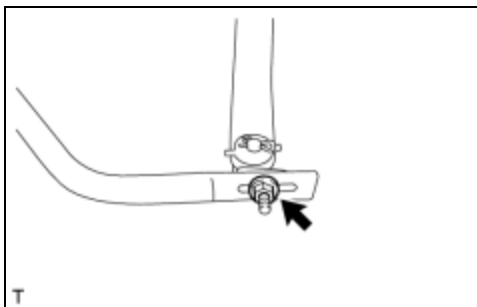
- (b) Using tape, hold a 0.3 mm feeler gauge on the floor shift control select lever.



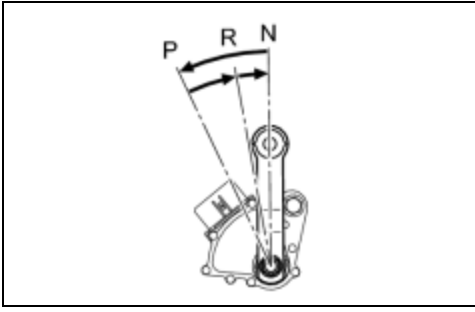
- (c) Using tape, attach the floor shift control select lever to the console box assembly.

NOTICE:

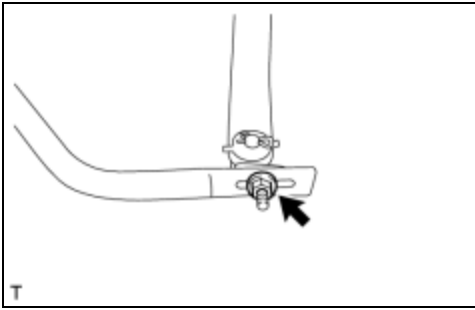
Make sure that the feeler gauge is not on the area shown in the illustration.



- (d) Remove the nut and disconnect the floor shift gear shifting rod sub-assembly.



- (e) Turn the transmission control shaft lever RH of the park/neutral position switch assembly counterclockwise until it stops, and turn it clockwise 2 notches to set it to the N position.



- (f) Temporarily install the floor shift gear shifting rod sub-assembly with the nut.

- (g) Tighten the nut while lightly pushing the lever rearward.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

NOTICE:

Do not push the lever too hard.

3. INSTALL FRONT EXHAUST PIPE ASSEMBLY

INFO

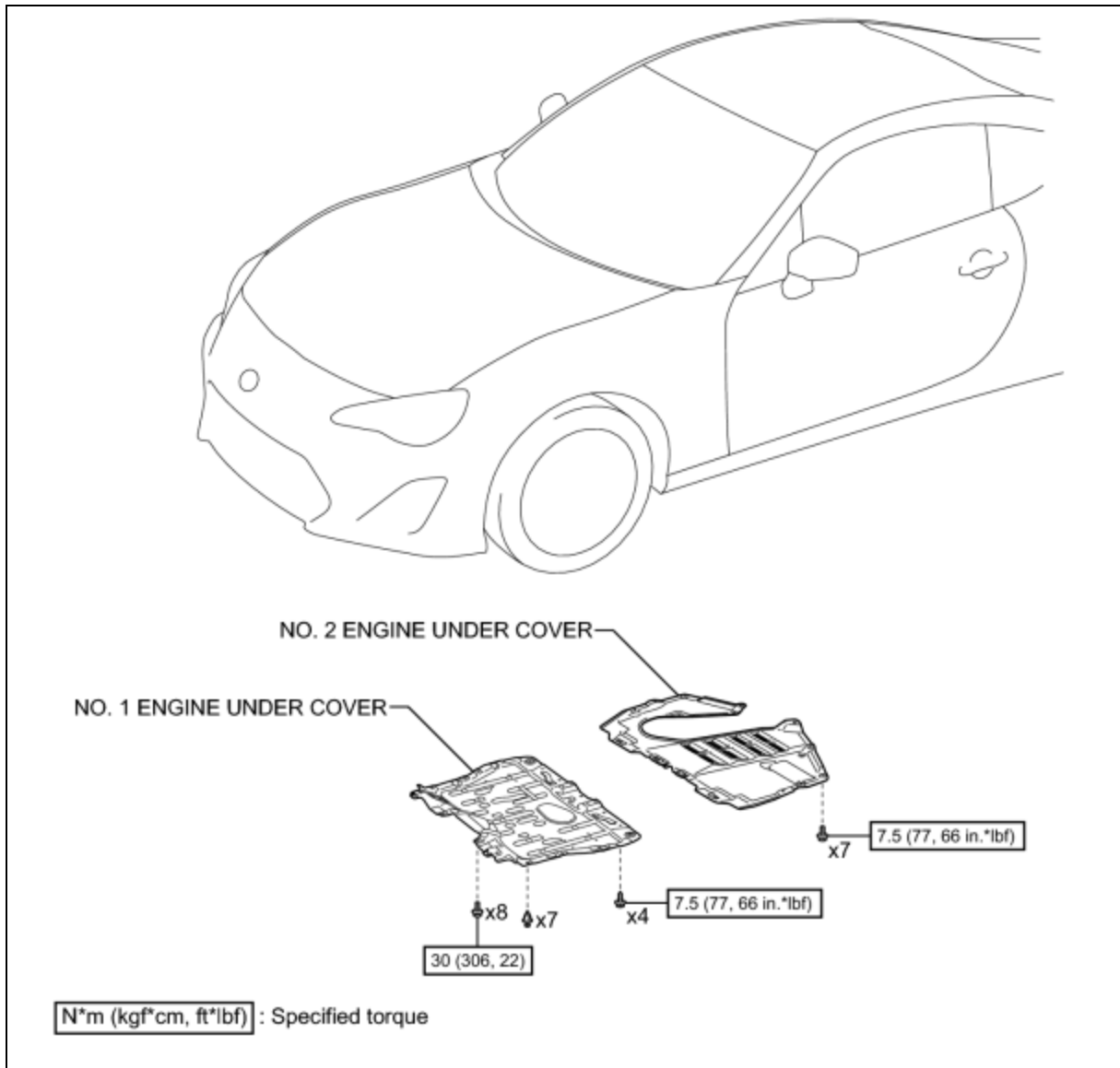
4. INSPECT SHIFT LEVER POSITION **INFO**

5. INSPECT FOR EXHAUST GAS LEAK

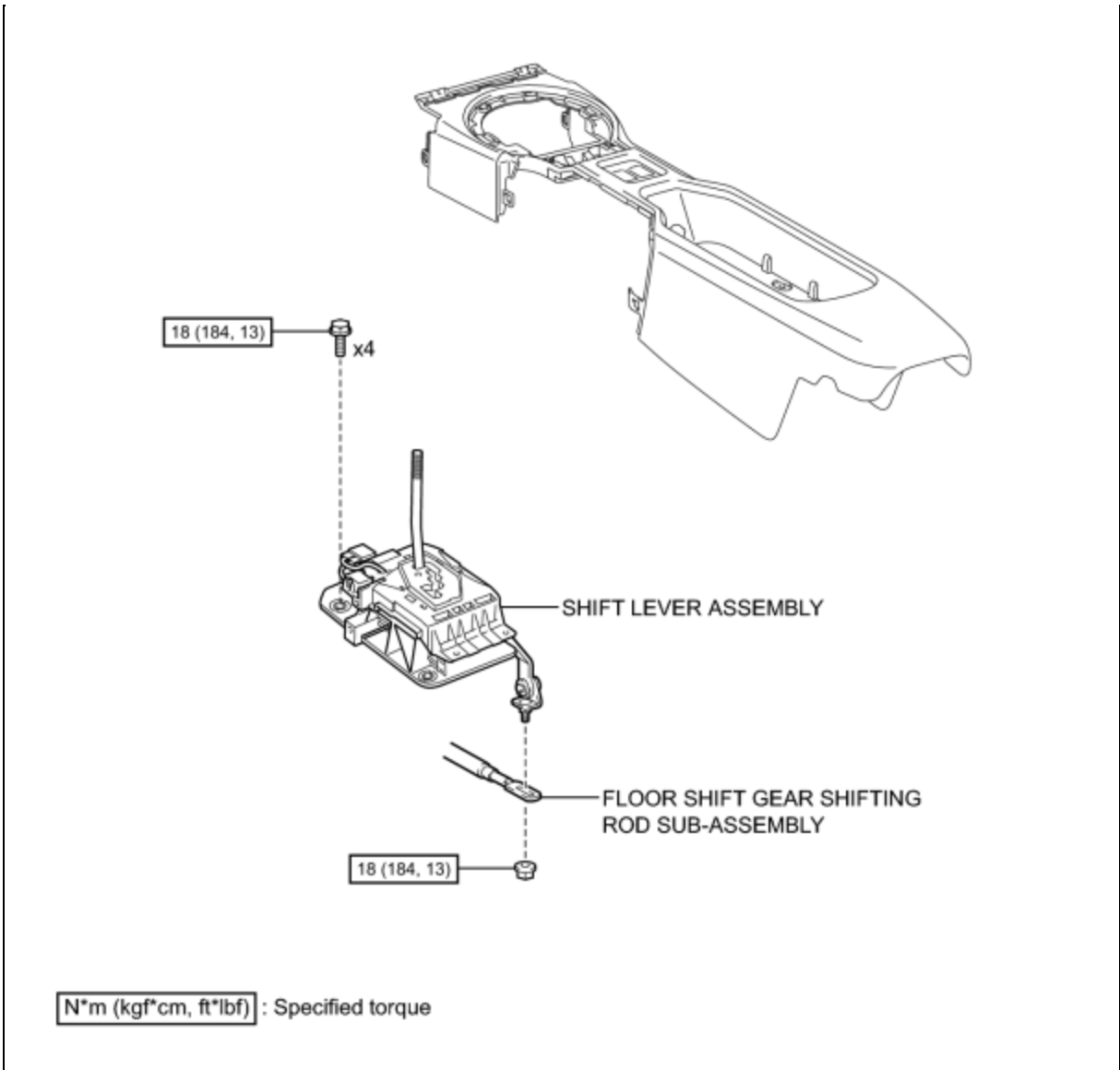
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NS3018X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SHIFT LEVER: COMPONENTS (2013 FR-S)		

COMPONENTS

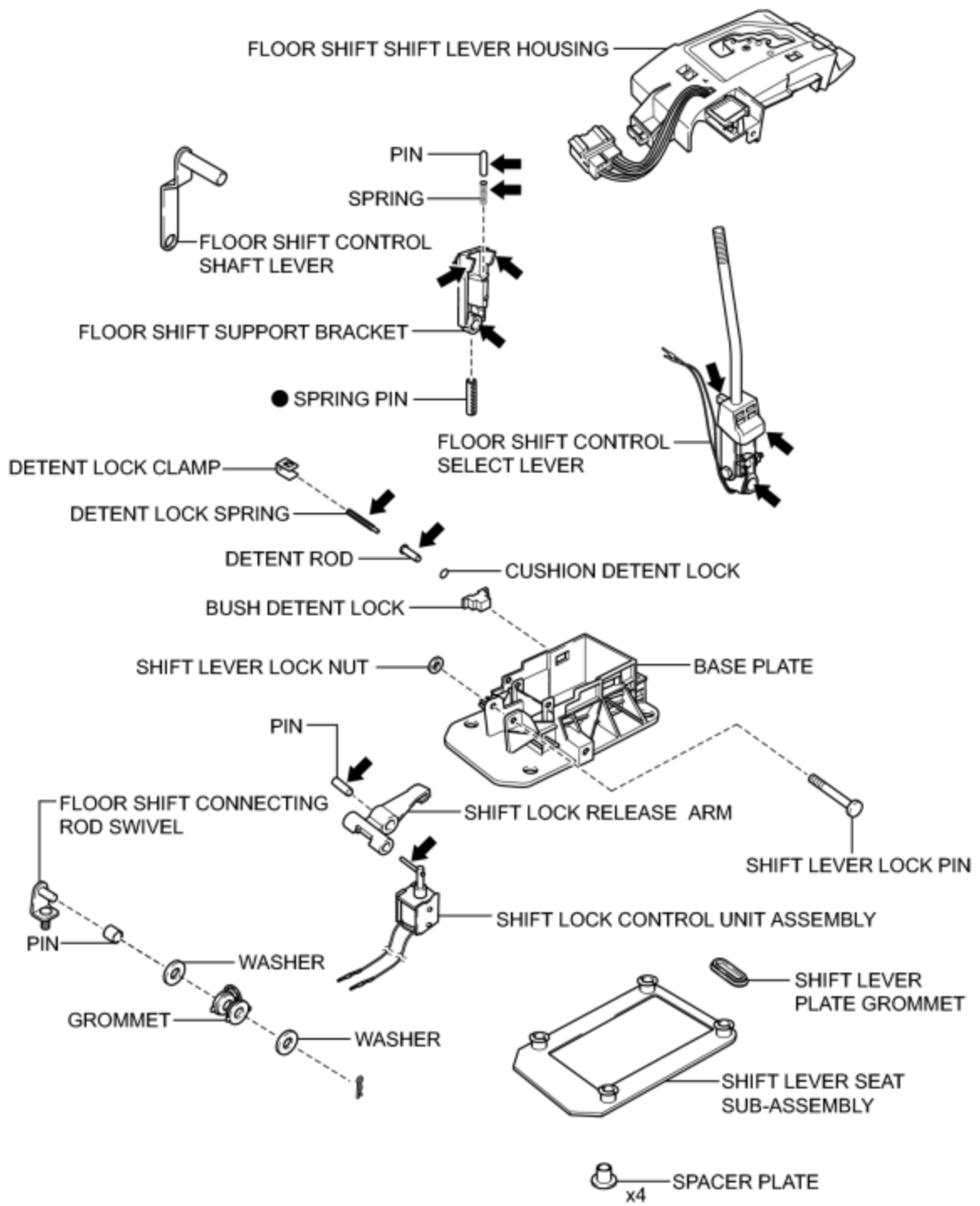
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION



● Non-reusable part

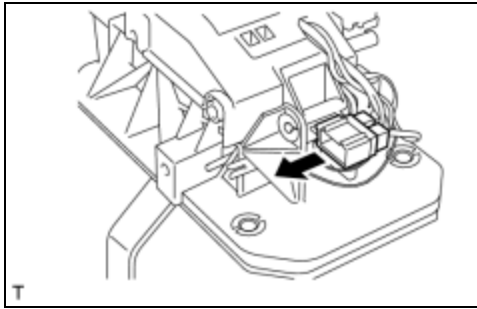
← MP Grease

T

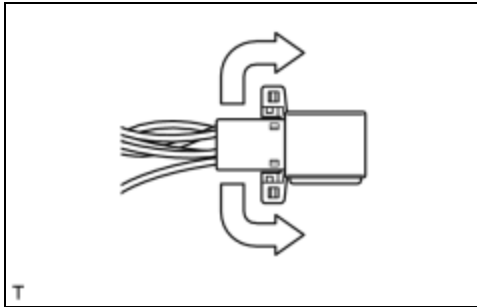
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000191W01CX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SHIFT LEVER: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. REMOVE FLOOR SHIFT SHIFT LEVER HOUSING

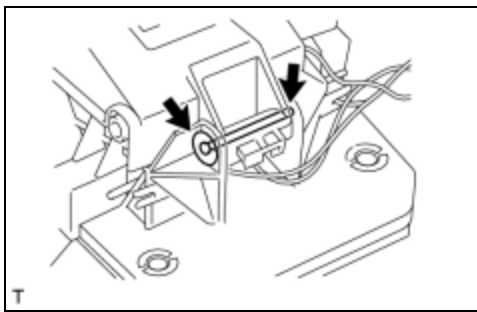
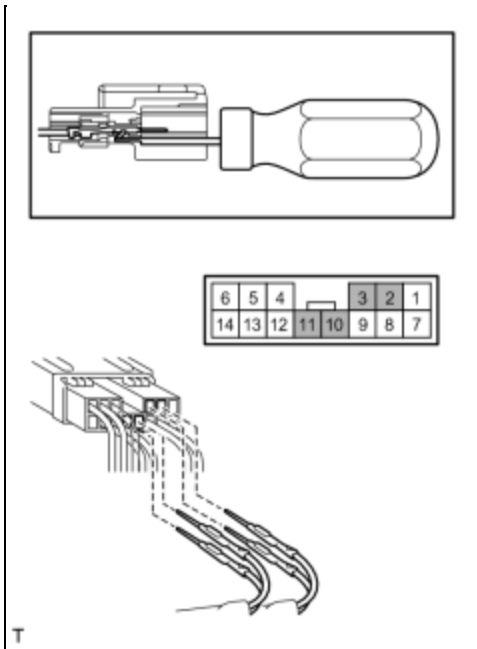


- (a) Using a screw driver, disengage the claw and disconnect the connector.

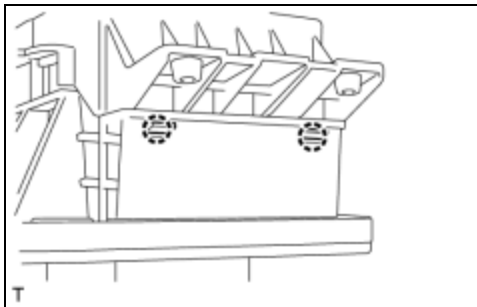


- (b) Using a thin-bladed screwdriver, lift up the terminal retainer of the transmission control switch connector to release the lock.

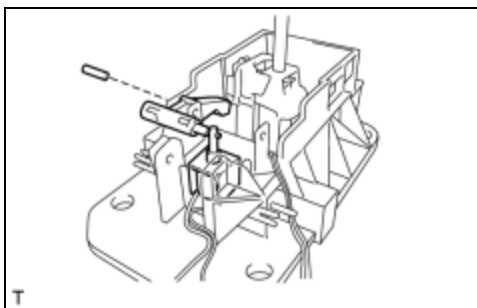
- (c) Using a thin-bladed screwdriver, pull out terminals 2, 3, 10 and 11 of the transmission control switch connector.



(d) Remove the shift lever lock nut and shift lever lock pin.

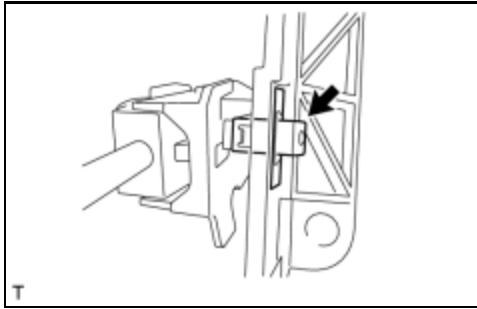


(e) Disengage the 2 claws and remove the floor shift shift lever housing from the base plate.



2. REMOVE SHIFT LOCK CONTROL UNIT ASSEMBLY

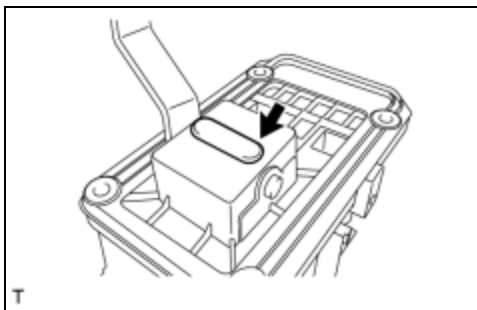
- (a) Remove the pin then remove the shift lock release arm and shift lock control unit assembly.
- (b) Remove the shift lock release arm from the shift lock control unit assembly.



3. REMOVE DETENT ROD

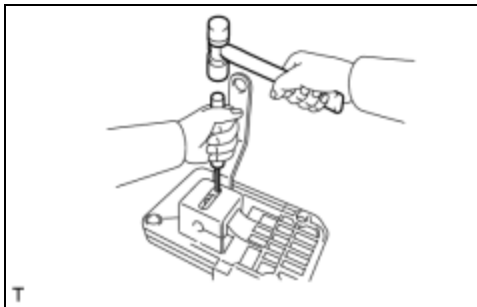
- (a) Remove the detent lock clamp.
- (b) Remove the detent lock spring and detent lock rod.
- (c) Remove the cushion detent lock from the detent lock rod.
- (d) Remove the bush detent lock.

4. REMOVE SHIFT LEVER PLATE GROMMET

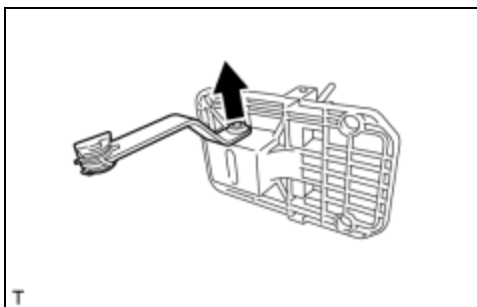


- (a) Remove the shift lever plate grommet from the base plate.

5. REMOVE FLOOR SHIFT CONTROL SHAFT LEVER

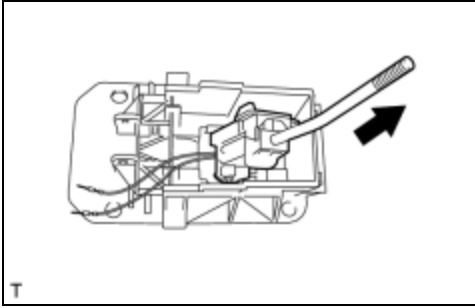


- (a) Using a pin punch (3 mm (0.118 in.)) and a hammer, drive out the spring pin.



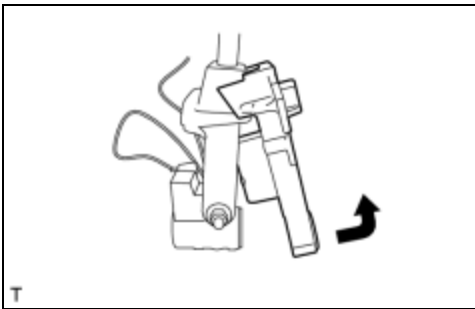
- (b) Remove the floor shift control shaft lever from the base plate.

6. REMOVE FLOOR SHIFT CONTROL SELECT LEVER

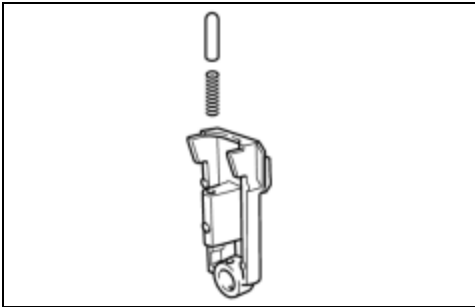


- (a) Remove the floor shift support bracket and the floor shift control shaft lever from the base plate.

7. REMOVE FLOOR SHIFT SUPPORT BRACKET

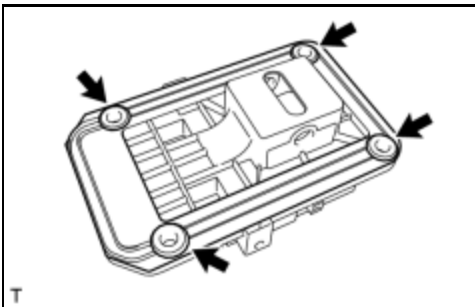


- (a) Remove the floor shift support bracket from the floor shift control shaft lever.



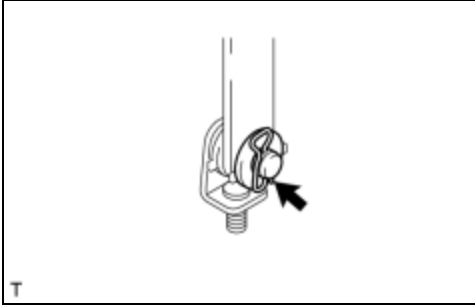
- (b) Remove the pin and the spring from the floor shift support bracket.

8. REMOVE SHIFT LEVER SEAT SUB-ASSEMBLY



- (a) Remove the 4 spacer plates and shift lever seat sub-assembly from the base plate.

9. REMOVE FLOOR SHIFT CONNECTING ROD SWIVEL



- (a) Remove the clip, 2 washers, grommet, pin and floor shift connecting rod swivel from the select lever.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NRZ01KX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SHIFT LEVER: INSPECTION (2013 FR-S)		

INSPECTION

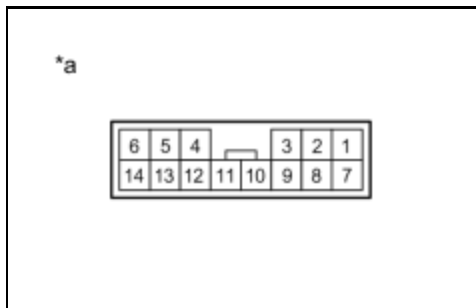
1. INSPECT TRANSMISSION CONTROL SWITCH (SHIFT LEVER ASSEMBLY)

(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Transmission Control Switch (Shift Lever Assembly))
----	---

Standard Resistance:



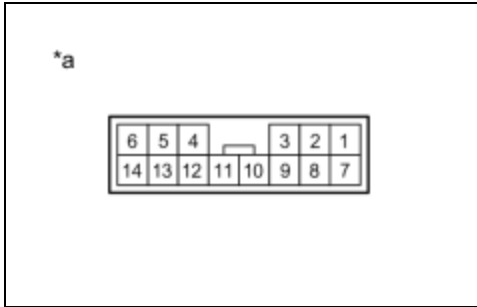
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 3	Shift lever not in P	Below 1 Ω
2 - 3	Shift lever in P	
8 - 9	Shift lever in M Shift lever held in "+" (Up shift)	
10 - 11	Shift lever in M	
12 - 13	Shift lever in M Shift lever held in "-" (Down shift)	
1 - 3	Shift lever in P	
2 - 3	Shift lever not in P	
8 - 9	Shift lever in M Shift lever not in "+"	
10 - 11	Shift lever not in M	
12 - 13	Shift lever in M Shift lever not in "-"	

If the result is not as specified, replace the transmission control switch.

2. INSPECT SHIFT LOCK CONTROL UNIT ASSEMBLY (SHIFT LEVER ASSEMBLY)

(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration



*a	Component without harness connected (Shift Lock Control Unit Assembly)
----	---

Standard Resistance:

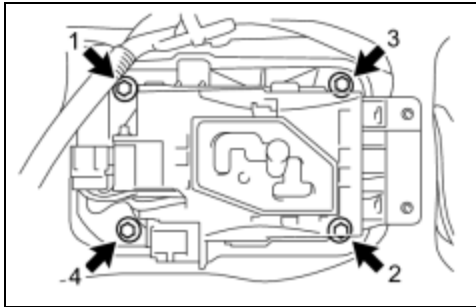
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 - 5	20°C (68°F)	27.6 to 30.5 Ω

If the result is not as specified, replace the shift lock control unit assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NS1033X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SHIFT LEVER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL SHIFT LEVER ASSEMBLY



- (a) Install and tighten the 4 bolts in the sequence shown in the illustration.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

- (b) Engage the wire harness clamp.

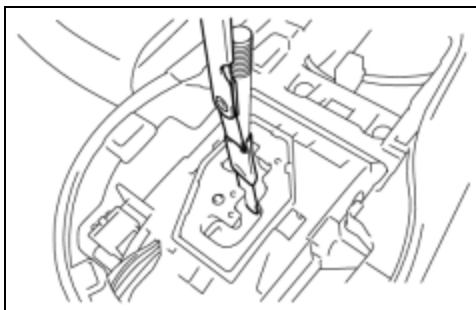
- (c) Connect the 2 connectors.

2. INSTALL CONSOLE BOX ASSEMBLY

INFO

3. CONNECT FLOOR SHIFT GEAR SHIFTING ROD SUB-ASSEMBLY

- (a) While pushing the shift lock release button, move the shift lever to N.

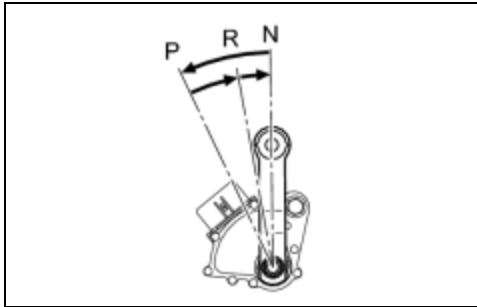
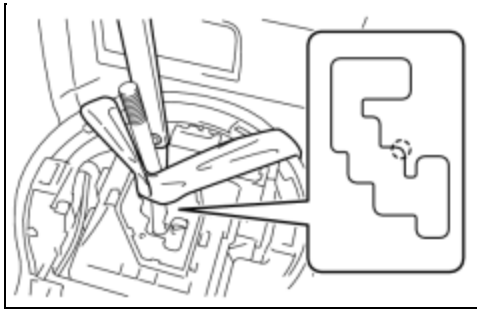


- (b) Using tape, hold a 0.3 mm feeler gauge on the floor shift control select lever.

- (c) Using tape, attach the floor shift control select lever to the console box assembly.

NOTICE:

Make sure that the feeler gauge is not on the area shown in the illustration.



- (d) Turn the transmission control shaft lever RH of the park/neutral position switch assembly counterclockwise until it stops, and turn it clockwise 2 notches to set it to the N position.

(e) Temporarily install the floor shift gear shifting rod sub-assembly with the nut.

(f) Tighten the nut while lightly pushing the lever rearward.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

NOTICE:

Do not push the lever too hard.

4. INSPECT SHIFT LEVER POSITION INFO

5. INSTALL NO. 2 ENGINE UNDER COVER INFO

6. INSTALL NO. 1 ENGINE UNDER COVER INFO

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000OA902RX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SHIFT LEVER: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT SHIFT LEVER POSITION

- (a) When moving the shift lever from P to R with the ignition switch to ON and the brake pedal depressed, make sure that it moves smoothly and correctly into position.
- (b) Check that the shift lever does not stop when moving the shift lever from R to P, and check that the shift lever does not stick when moving the shift lever from D to M.
- (c) Start the engine and make sure that the vehicle moves forward after moving the shift lever from N to D and moves rearward after moving the shift lever to R.

If the operation cannot be performed as specified, inspect the park/neutral position switch assembly and check the shift lock control unit assembly installation condition.

2. INSPECT SHIFT LOCK OPERATION

- (a) Move the shift lever to P.
- (b) Turn the ignition switch off.
- (c) Check that the shift lever cannot be moved from P.
- (d) Turn the ignition switch to ON, depress the brake pedal and check that the shift lever can be moved to other positions.

If the operation cannot be performed as specified, inspect the shift lock control unit assembly.

3. INSPECT SHIFT LOCK RELEASE BUTTON OPERATION

- (a) When operating the shift lever with the shift lock release button pressed, check that the lever can be moved to any position.

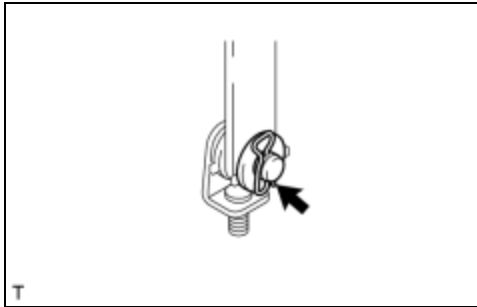
If the operation cannot be performed as specified, check the shift lock control unit assembly.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000191X01CX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SHIFT LEVER: REASSEMBLY (2013 FR-S)		

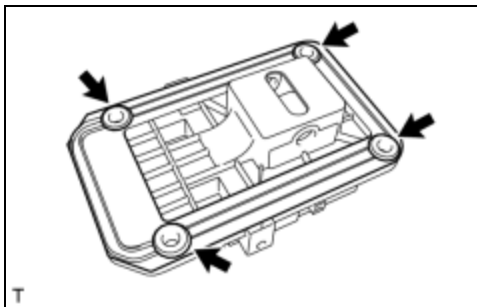
REASSEMBLY

1. INSTALL FLOOR SHIFT CONNECTING ROD SWIVEL



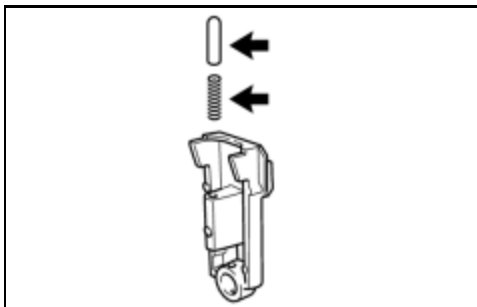
- (a) Install the 2 washers, grommet, pin and floor shift connecting rod swivel to the select lever with the clip.

2. INSTALL SHIFT LEVER SEAT SUB-ASSEMBLY



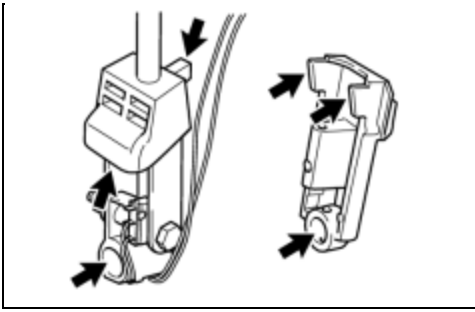
- (a) Install the shift lever seat sub-assembly and the 4 spacer plates to the base plate.

3. INSTALL FLOOR SHIFT SUPPORT BRACKET

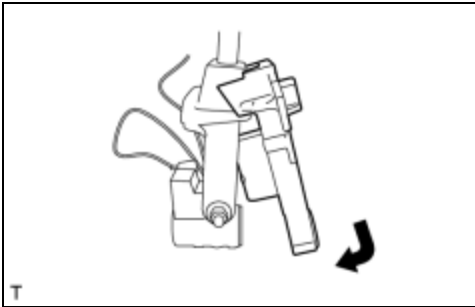


- (a) Apply MP grease to the spring and pin.

- (b) Install the spring and pin to the floor shift support bracket.

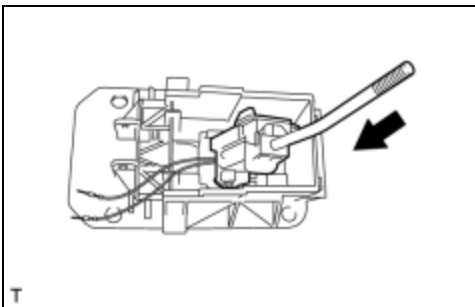


(c) Apply MP grease to the floor shift control shaft lever and floor shift support bracket.



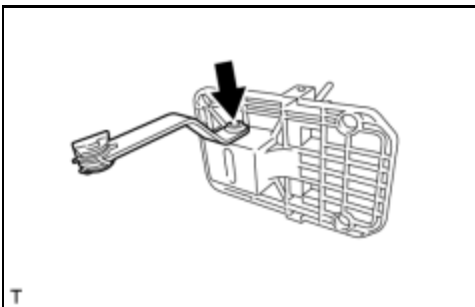
(d) Install the floor shift support bracket to the floor shift control shaft lever.

4. INSTALL FLOOR SHIFT CONTROL SELECT LEVER

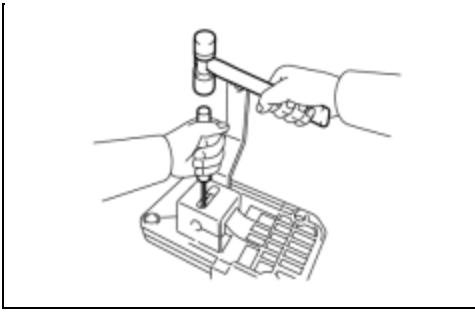


(a) Install the floor shift support bracket and floor shift control shaft lever to the base plate.

5. INSTALL FLOOR SHIFT CONTROL SHAFT LEVER

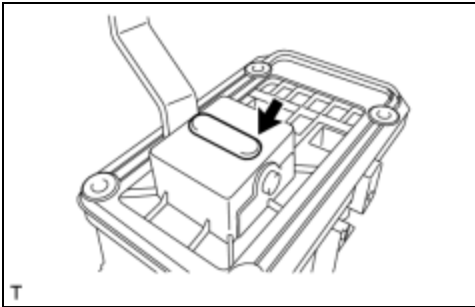


(a) Install the floor shift control shaft lever to the base plate.

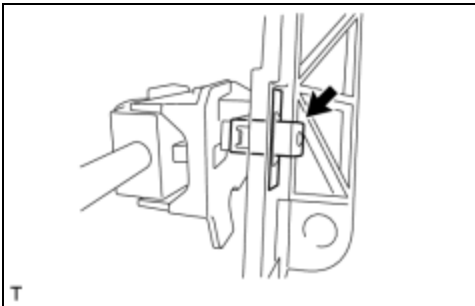


- (b) Using a pin punch (3 mm (0.118 in.)) and a hammer, install a new spring pin.

6. INSTALL SHIFT LEVER PLATE GROMMET

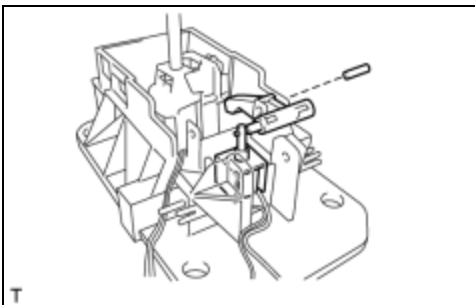


- (a) Install the shift lever plate grommet to the base plate.



7. INSTALL DETENT ROD

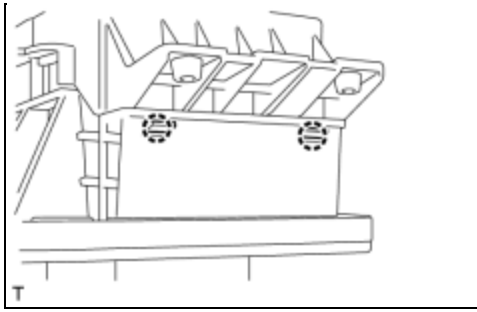
- (a) Install the bush detent lock.
- (b) Install the cushion detent lock to the detent lock rod.
- (c) Apply MP grease to the detent lock spring and detent lock rod.
- (d) Install the detent lock rod and detent lock spring.
- (e) Install the detent lock clamp.



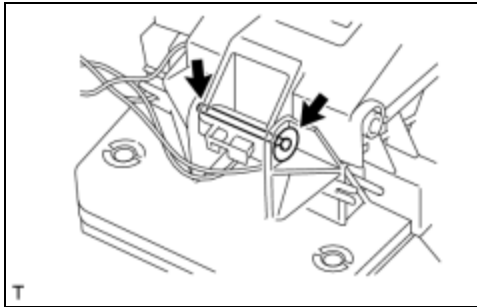
8. INSTALL SHIFT LOCK CONTROL UNIT ASSEMBLY

- (a) Apply MP grease to the pin.
- (b) Install the shift lock release arm to the shift lock control unit assembly.
- (c) Install the shift lock control unit assembly to the base plate.

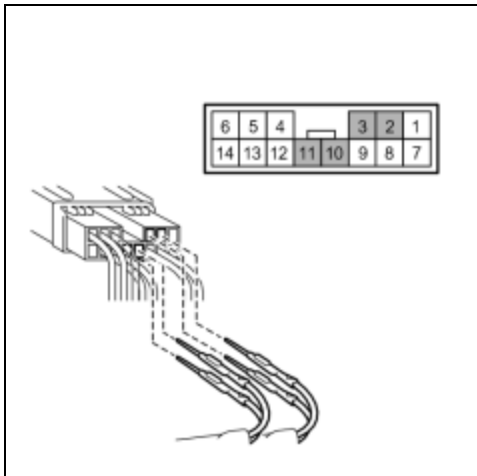
9. INSTALL FLOOR SHIFT SHIFT LEVER HOUSING



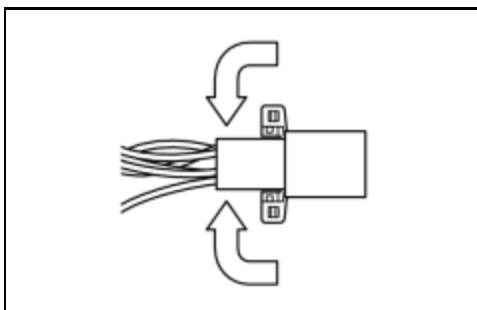
(a) Engage the 2 claws and install the floor shift lever housing to the base plate.



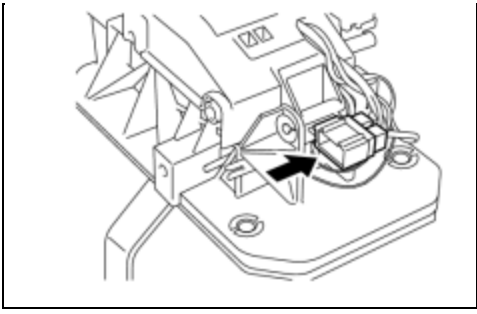
(b) Install the shift lever lock nut and shift lever lock pin.



(c) Install the terminals 2, 3, 10 and 11 of the transmission control switch connector.



(d) Lock the harness connector terminals.



(e) Engage the claw and install the connector.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NS4033X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SHIFT LEVER: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE CONSOLE BOX ASSEMBLY

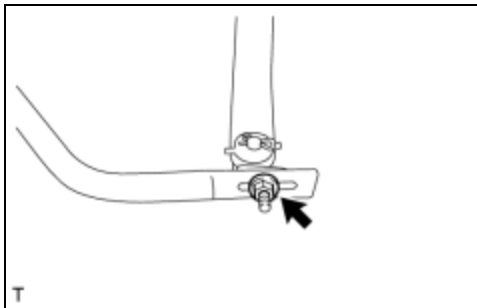
INFO

2. REMOVE NO. 1 ENGINE UNDER COVER INFO

3. REMOVE NO. 2 ENGINE UNDER COVER INFO

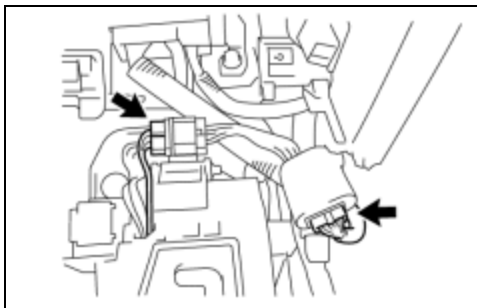
4. DISCONNECT FLOOR SHIFT GEAR SHIFTING ROD SUB-ASSEMBLY

- (a) While pushing the shift lock release button, move the shift lever to N.



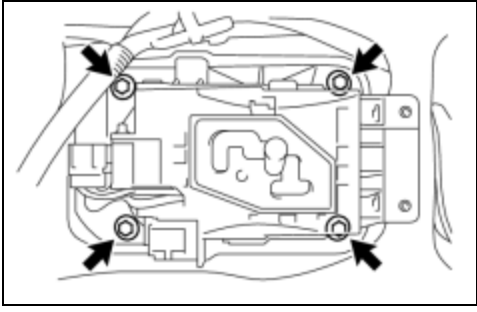
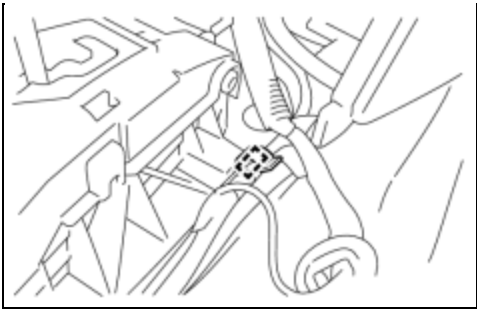
- (b) Remove the nut and disconnect the floor shift gear shifting rod sub-assembly.

5. REMOVE SHIFT LEVER ASSEMBLY



- (a) Disconnect the 2 connectors.

- (b) Disengage the wire harness clamp.

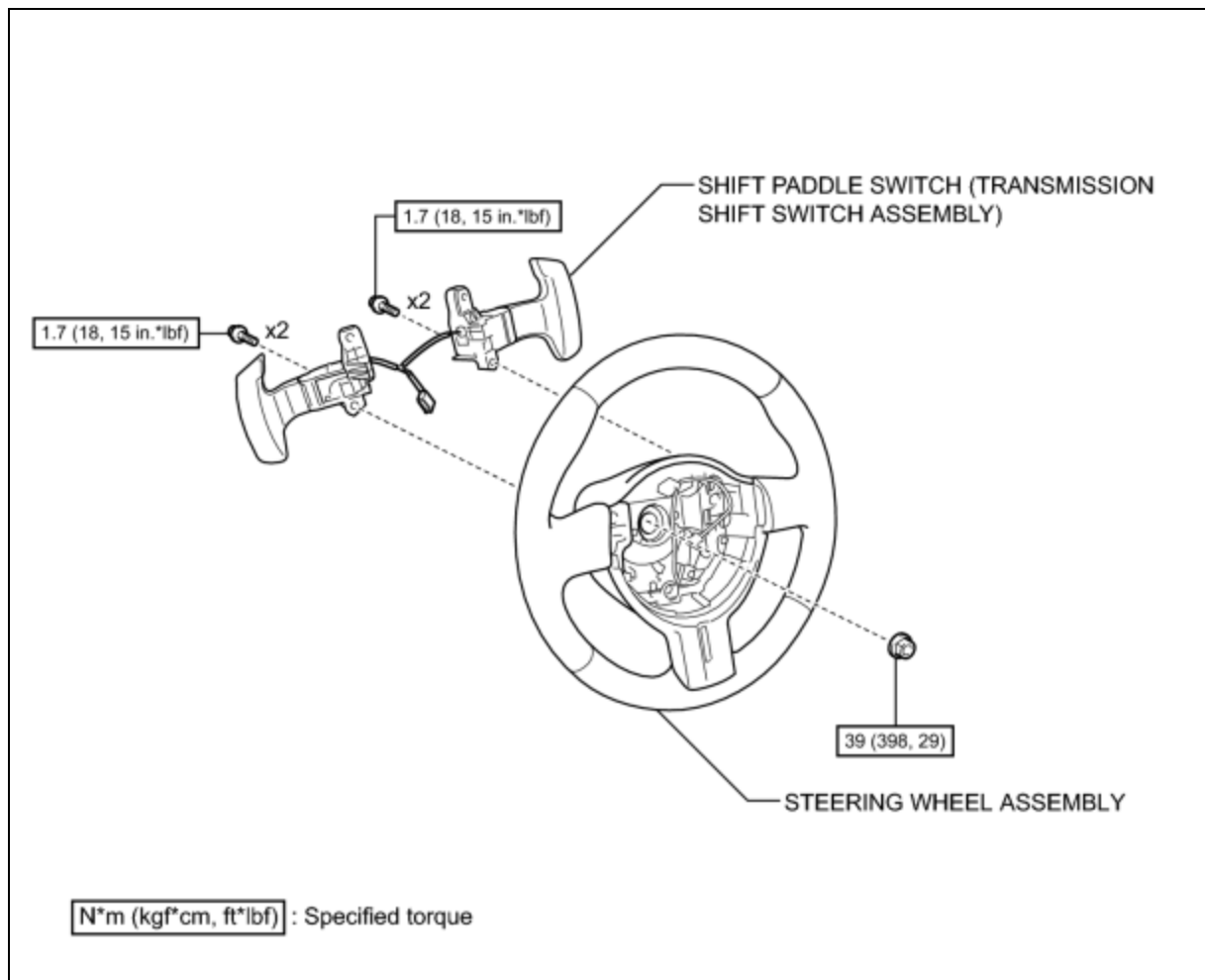


(c) Remove the 4 bolts and the shift lever assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001MAJ02VX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SHIFT PADDLE SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001MA803DX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SHIFT PADDLE SWITCH: INSPECTION (2013 FR-S)		

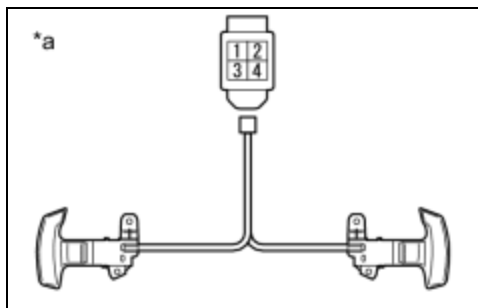
INSPECTION

1. INSPECT SHIFT PADDLE SWITCH (TRANSMISSION SHIFT SWITCH ASSEMBLY)

- (a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Shift Paddle Switch (transmission shift switch assembly))
----	---



Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 - 3	Pull continuously "+" (Up shift)	Below 1 Ω
	Release "+"	10 Ω or higher
1 - 4	Pull continuously "-" (Down shift)	Below 1 Ω
	Release "-"	10 Ω or higher

If the resistance value are not as specified, replace the shift paddle switch (transmission shift switch assembly).

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001MA7045X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SHIFT PADDLE SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL SHIFT PADDLE SWITCH (TRANSMISSION SHIFT SWITCH ASSEMBLY)

(a) Install the shift paddle switch (transmission shift switch assembly) with 4 screws.

Torque: 1.7 N·m (18 kgf·cm, 15in·lbf)

(b) Engage the clamp.

2. INSTALL STEERING WHEEL ASSEMBLY [INFO](#)

3. INSTALL STEERING PAD

[INFO](#)



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001MA9043X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SHIFT PADDLE SWITCH: REMOVAL (2013 FR-S)		

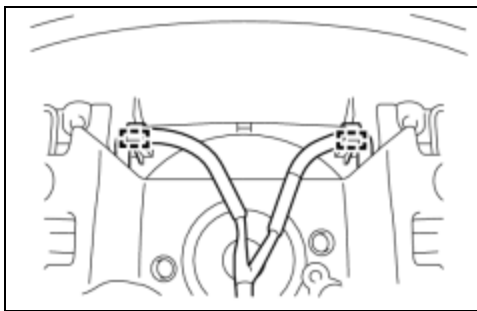
REMOVAL

1. REMOVE STEERING PAD

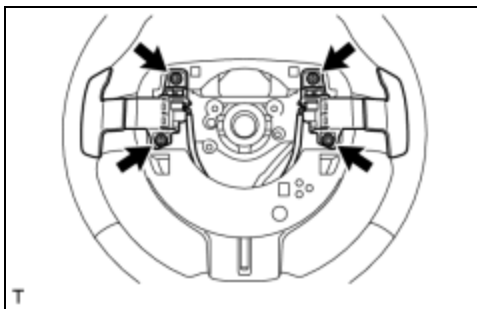
INFO

2. REMOVE STEERING WHEEL ASSEMBLY INFO

3. REMOVE SHIFT PADDLE SWITCH (TRANSMISSION SHIFT SWITCH ASSEMBLY)



(a) Detach the clamp.

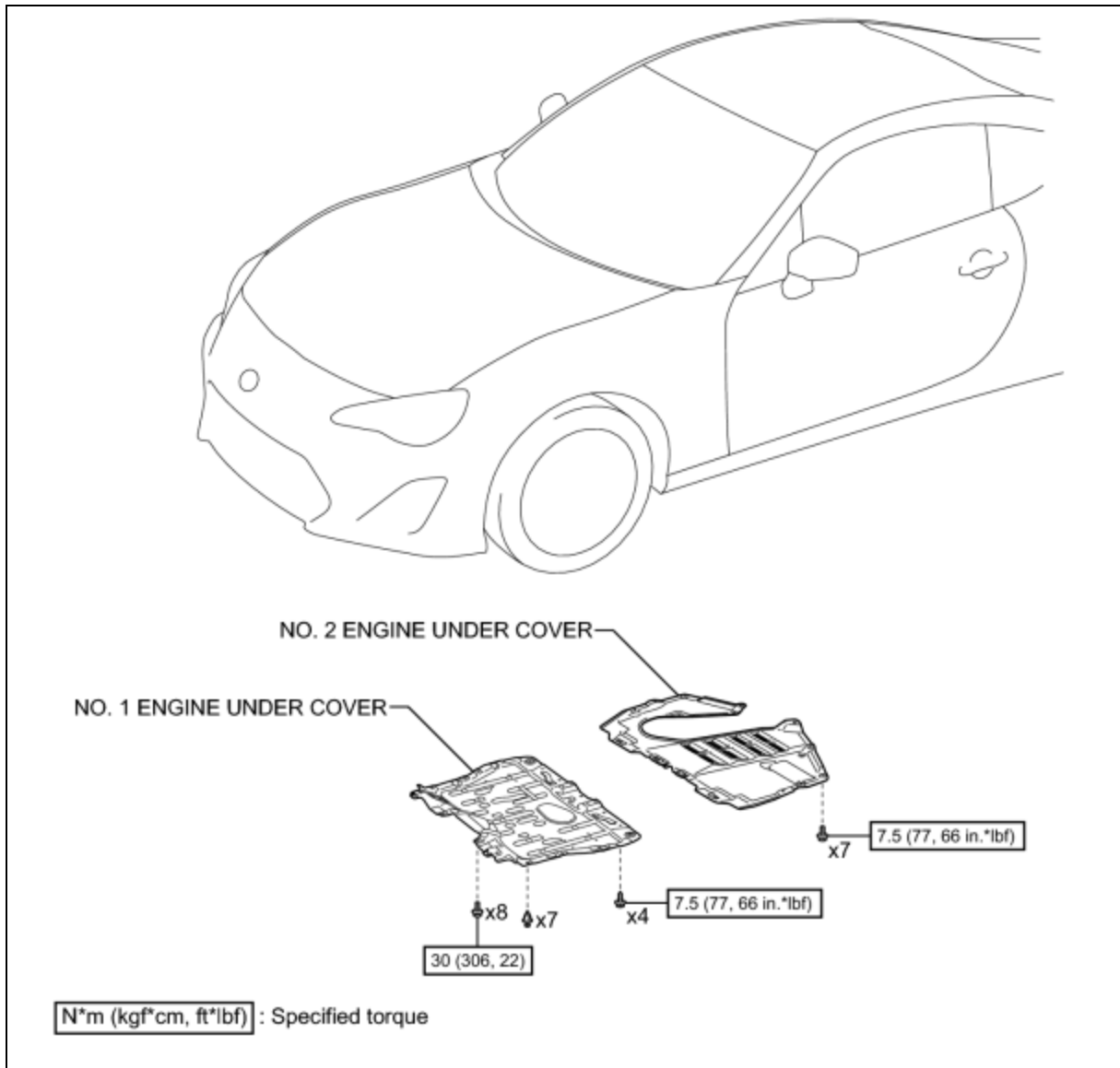


(b) Remove the 4 screws and remove the shift paddle switch (transmission shift switch assembly).

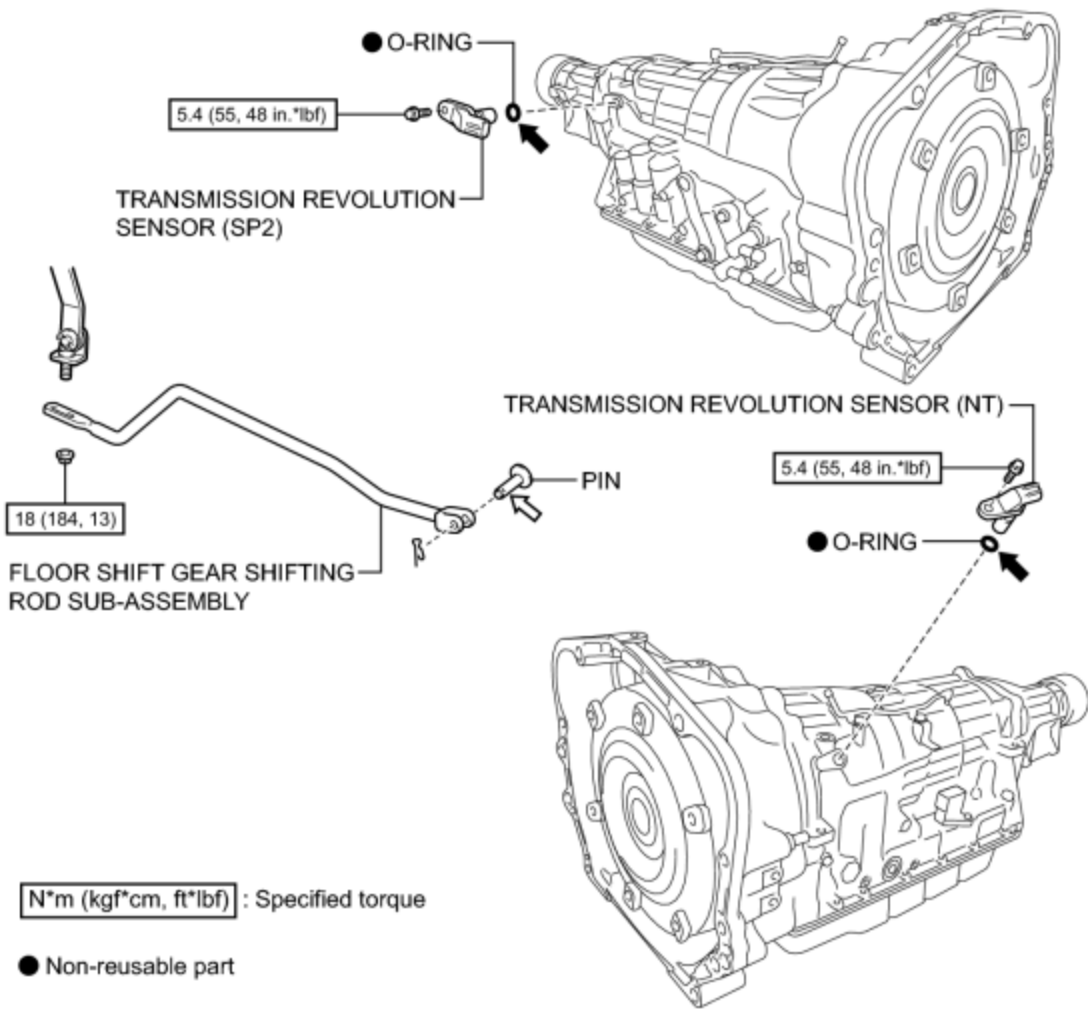
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NR6022X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SPEED SENSOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



N*m (kgf*cm, ft*lbf) : Specified torque

● Non-reusable part

← Toyota Genuine ATF WS

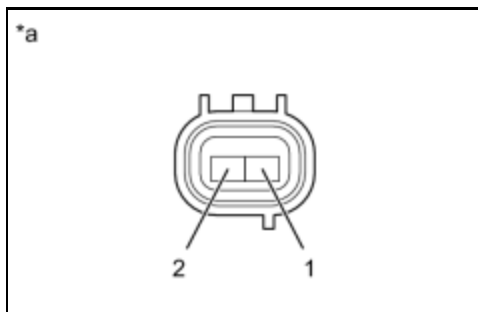
↶ MP Grease

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NR503MX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SPEED SENSOR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT TRANSMISSION REVOLUTION SENSOR (NT)

(a) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Transmission Revolution Sensor (NT))
----	--

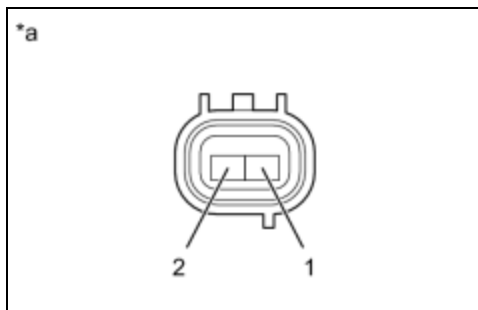
Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	560 to 680 Ω

If the result is not as specified, replace the transmission revolution sensor (NT).

2. INSPECT TRANSMISSION REVOLUTION SENSOR (SP2)

(a) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Transmission Revolution Sensor (SP2))
----	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	560 to 680 Ω

If the result is not as specified, replace the transmission revolution sensor (SP2).

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NR4024X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SPEED SENSOR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL TRANSMISSION REVOLUTION SENSOR (SP2)

- (a) Coat a new O-ring with ATF and install it to the transmission revolution sensor (SP2).
- (b) Install the transmission revolution sensor (SP2) with the bolt.
Torque: 5.4 N·m (55 kgf·cm, 48in·lbf)
- (c) Connect the transmission revolution sensor connector.

2. INSTALL FLOOR SHIFT GEAR SHIFTING ROD SUB-ASSEMBLY INFO

3. INSTALL FRONT EXHAUST PIPE ASSEMBLY

INFO

4. INSTALL TRANSMISSION REVOLUTION SENSOR (NT)

- (a) Coat a new O-ring with ATF and install it to the transmission revolution sensor (NT).
- (b) Install the transmission revolution sensor (NT) with the bolt.
Torque: 5.4 N·m (55 kgf·cm, 48in·lbf)
- (c) Connect the transmission revolution sensor connector.

5. INSTALL NO. 2 ENGINE UNDER COVER INFO

6. INSTALL NO. 1 ENGINE UNDER COVER INFO

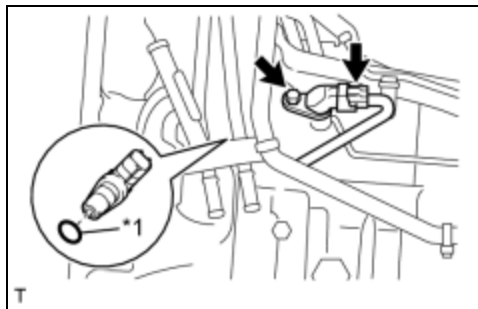
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NR7024X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: SPEED SENSOR: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE NO. 1 ENGINE UNDER COVER [INFO](#)

2. REMOVE NO. 2 ENGINE UNDER COVER [INFO](#)

3. REMOVE TRANSMISSION REVOLUTION SENSOR (NT)



(a) Disconnect the transmission revolution sensor connector.

Text in Illustration

*1	O-ring
----	--------

(b) Remove the bolt and the transmission revolution sensor (NT).

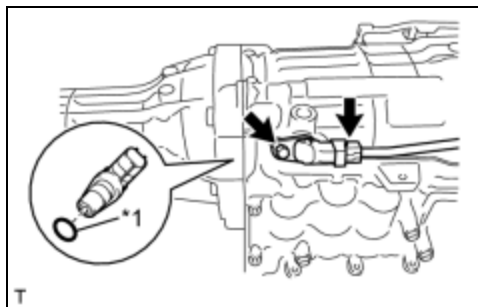
(c) Remove the O-ring from the transmission revolution sensor (NT).

4. REMOVE FRONT EXHAUST PIPE ASSEMBLY

[INFO](#)

5. REMOVE FLOOR SHIFT GEAR SHIFTING ROD SUB-ASSEMBLY [INFO](#)

6. REMOVE TRANSMISSION REVOLUTION SENSOR (SP2)



(a) Disconnect the transmission revolution sensor connector.

Text in Illustration

*1	O-ring
----	--------

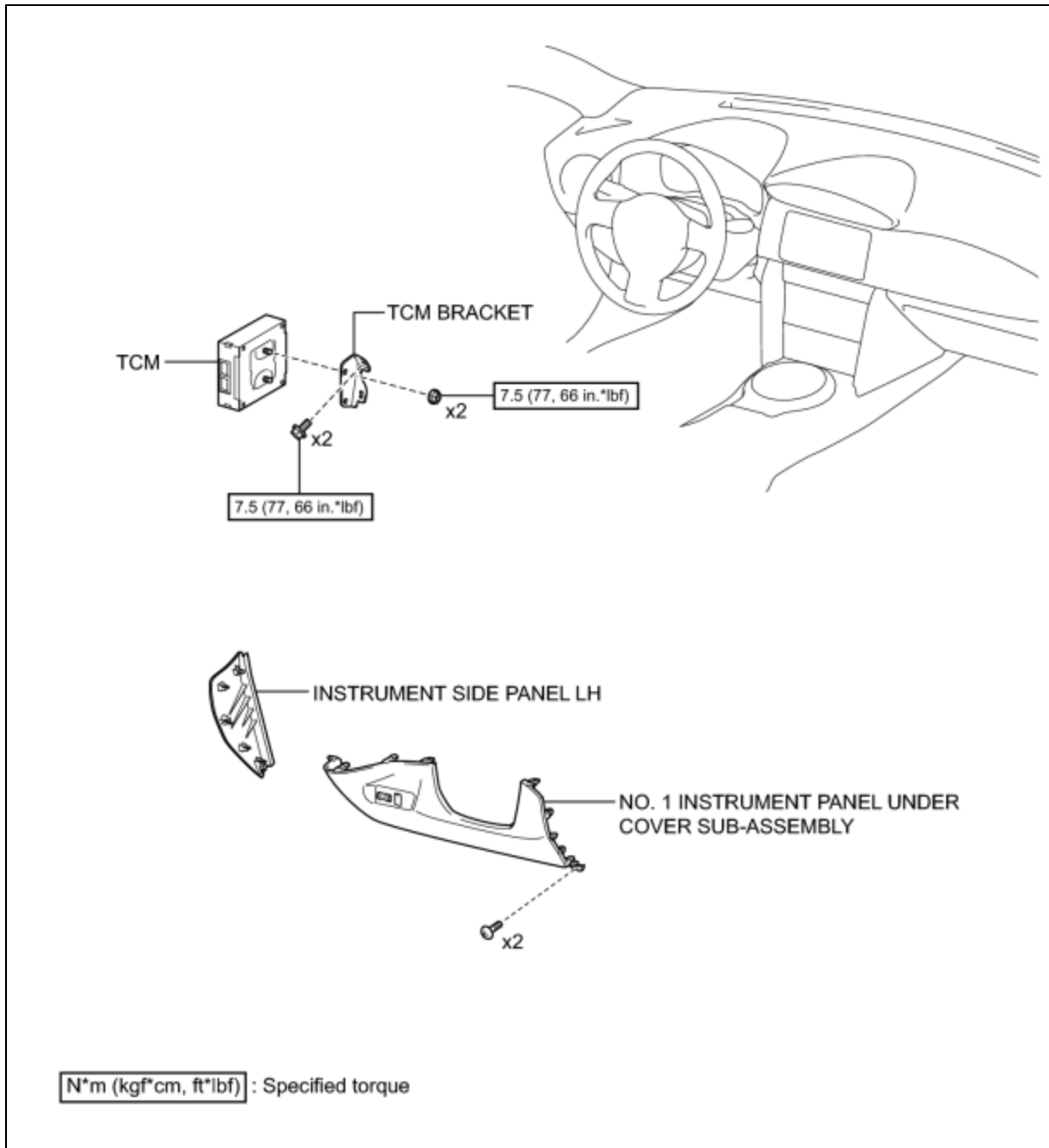
(b) Remove the bolt and the transmission revolution sensor (SP2).

(c) Remove the O-ring from the transmission revolution sensor (SP2).

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002ZA300BX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: TCM: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002ZA2009X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: TCM: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL TCM

(a) Install the TCM bracket to the TCM with the 2 nuts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

(b) Install the 2 bolts and the TCM.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

(c) Connect the 2 connectors.

2. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)

3. INSTALL INSTRUMENT SIDE PANEL LH [INFO](#)

4. RESET CHECK RESET MEMORY

[INFO](#)

HINT:

When the automatic transmission assembly, transmission valve body assembly, and TCM are replaced, the TCM learning value must be cleared.

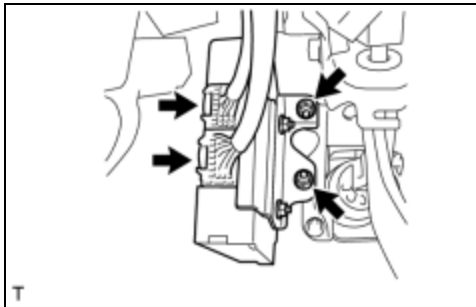
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002ZA4009X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: TCM: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE INSTRUMENT SIDE PANEL LH [INFO](#)

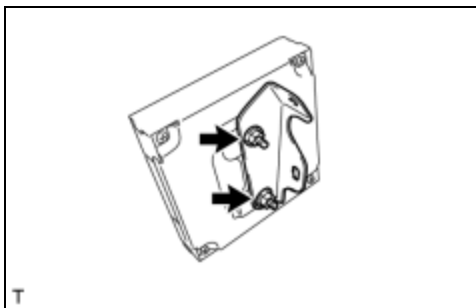
2. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)

3. REMOVE TCM



(a) Disconnect the 2 connectors.

(b) Remove the 2 bolts and the TCM.



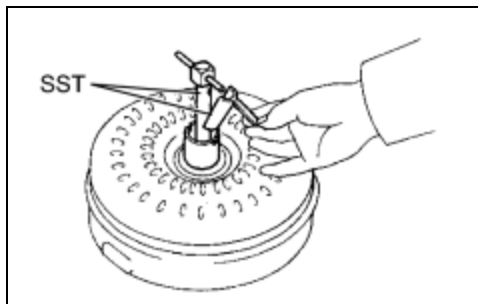
(c) Remove the 2 nuts and the TCM bracket.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NS9020X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: TORQUE CONVERTER AND DRIVE PLATE: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT TORQUE CONVERTER ASSEMBLY

- (a) Inspect the one-way clutch.



- (1) Install SST into the inner race of the one-way clutch.

SST: 09350-32014

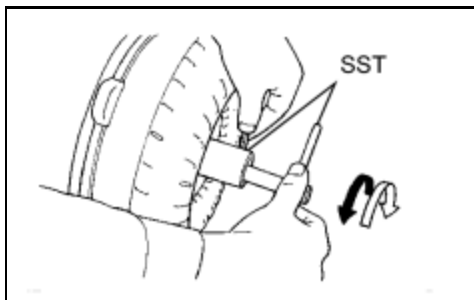
09351-32010

- (2) Set SST so that it fits in the notch of the torque converter hub and the outer race of the one-way clutch.



SST: 09350-32014

09351-32020

- (3) With the torque converter assembly standing on its side, check that the clutch locks when SST is turned counterclockwise and rotates freely and smoothly when SST is turned clockwise.



Text in Illustration

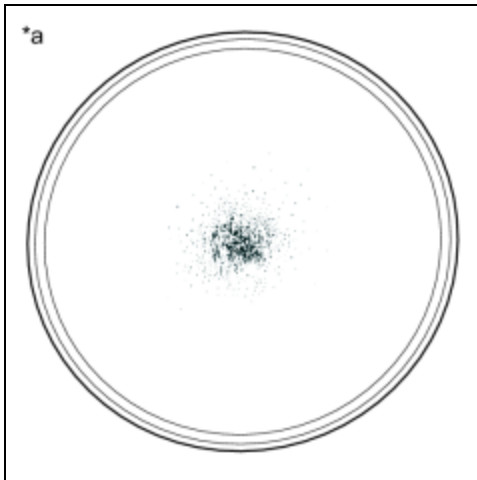
	Lock
	Free

If the results are not as specified, clean the torque converter assembly and recheck the one-way clutch.

If the results still are not as specified even after cleaning the torque converter assembly, replace the torque converter assembly.

- (b) Determine the condition of the torque converter assembly.

Text in Illustration



*a	Sample showing maximum allowable amount of powder in ATF
----	--

- (1) Check that the following conditions are met:

- During the stall test or when the shift lever is in N, metallic sounds are not emitted from the torque converter assembly.
- The one-way clutch turns in one direction and locks in the other direction.
- The amount of powder in the ATF is not more than the sample shown in the illustration.

If the results are not as specified, replace the torque converter assembly.

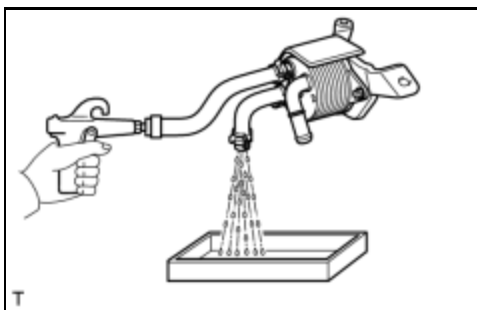
HINT:

The sample illustration shows approximately 0.025 liters (0.026 US qts, 0.022 Imp. qts) of ATF taken from a removed torque converter assembly.

- (c) Replace the ATF in the torque converter assembly.

- (1) If the ATF is discolored and/or has a foul odor, stir the ATF in the torque converter assembly thoroughly and drain the ATF with the torque converter assembly facing upward.

- (d) Clean and check the transmission oil cooler.



- (1) If the torque converter assembly is inspected or the ATF is replaced, clean the transmission oil cooler.

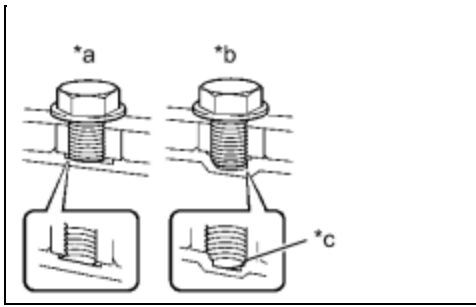
HINT:

- Apply compressed air at 196 kPa (2.0 kgf/cm², 28 psi) into the inlet hose.
- If a large amount of powder is found in the ATF, add new ATF using a bucket pump and clean the transmission oil cooler and oil pipe line again.

- (2) If the ATF is cloudy, inspect the transmission oil cooler.

- (e) Prevent deformation of the torque converter assembly and damage to the oil pump gear.

Text in Illustration

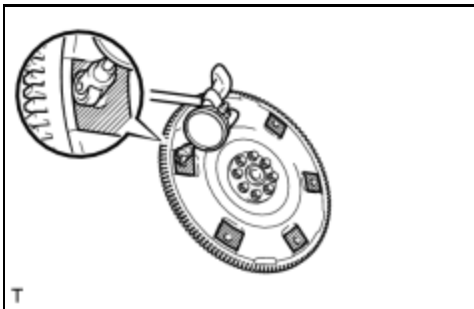


*a	Correct
*b	Incorrect
*c	Bottom is damaged


- (1) When any marks due to interference are found on the end of a bolt for the torque converter assembly and on the bottom of the bolt hole, replace the bolt and torque converter assembly.
- (2) Make sure all of the bolts are the same length.
- (3) Make sure no spring washers are missing.

2. INSPECT DRIVE PLATE

- (a) Check the drive plate for damage.
- (b) Set up a dial indicator and measure the runout of the 6 portions around the torque converter contact surfaces.



Text in Illustration

	Measuring Point
---	-----------------

Maximum runout:
0.30 mm (0.0118 in.)

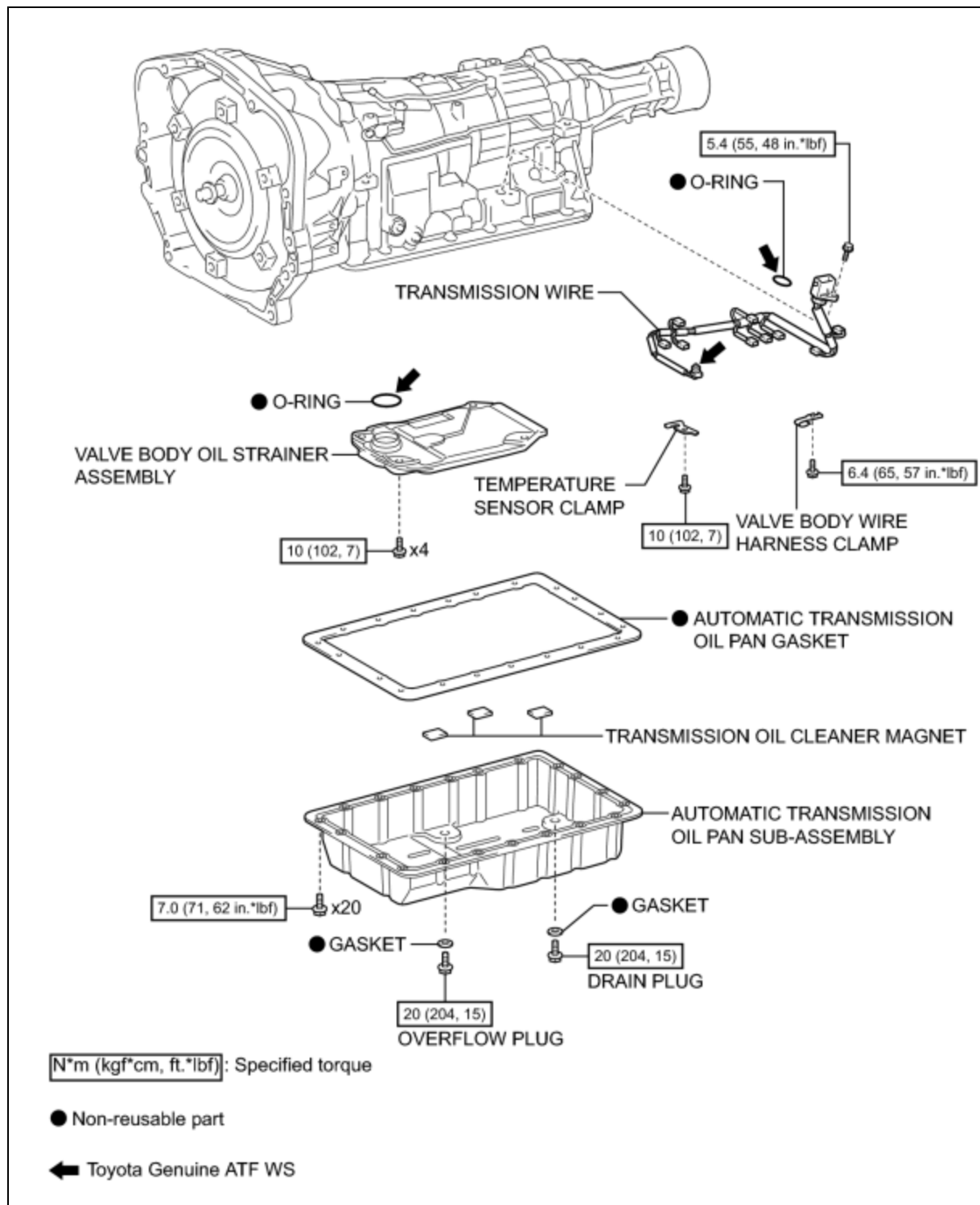
If the runout is more than the maximum, or the drive plate is damaged, replace the drive plate

INFO

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NRG014X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: TRANSMISSION WIRE: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION





Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NRF014X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: TRANSMISSION WIRE: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)

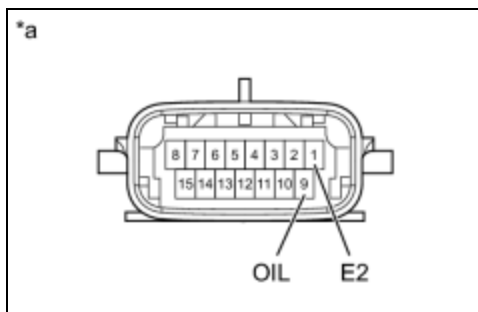
- (a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (ATF Temperature Sensor (Transmission Wire))
----	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (E2) - 9 (OIL)	Always	79 Ω to 156 k Ω
1 (E2) - Body ground	Always	10 k Ω or higher
9 (OIL) - Body ground	Always	10 k Ω or higher



HINT:

If the resistance is out of the specified range at any of the ATF temperatures shown in the table below, the driveability of the vehicle may decrease.

Standard Resistance:

ATF TEMPERATURE	SPECIFIED CONDITION
10°C (50°F)	5 to 8 k Ω
25°C (77°F)	2.5 to 4.5 k Ω
110°C (230°F)	0.22 to 0.28 k Ω

If the result is not as specified, replace the ATF temperature sensor (transmission wire).

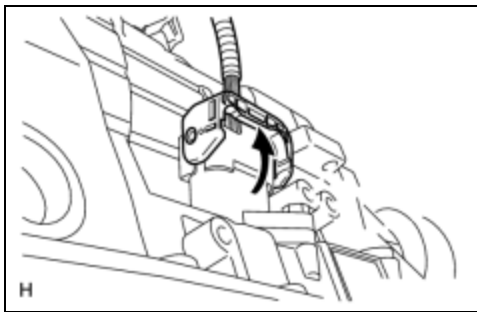
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NRE01GX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: TRANSMISSION WIRE: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL TRANSMISSION WIRE

- (a) Coat a new O-ring with ATF and install it to the transmission wire.
- (b) Install the transmission wire with the bolt.

Torque: 5.4 N·m (55 kgf·cm, 48in·lbf)



- (c) Connect the transmission wire connector.

HINT:

Push up the lever until the claw of the transmission wire connector makes a connection sound.

2. CONNECT TRANSMISSION WIRE

- (a) Connect the 9 solenoid valve connectors.
- (b) Coat the ATF temperature sensor O-ring with ATF.
- (c) Install the ATF temperature sensor and the temperature sensor clamp with the bolt.

Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

- (d) Engage the wire harness clamp.
- (e) Install the valve body wire harness clamp with the bolt.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

3. INSTALL VALVE BODY OIL STRAINER ASSEMBLY

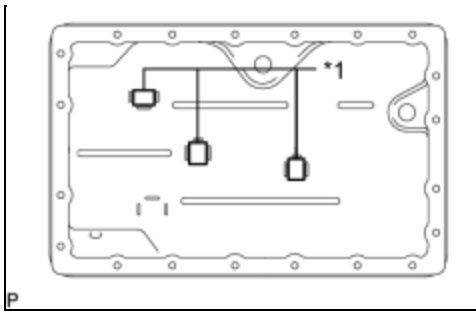
- (a) Coat a new O-ring with ATF and install it to the valve body oil strainer assembly.
- (b) Install the valve body oil strainer assembly with the 4 bolts.

Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

4. INSTALL TRANSMISSION OIL CLEANER MAGNET

- (a) Install the 3 transmission oil cleaner magnets to the automatic transmission oil pan sub-assembly as shown in the illustration.

Text in Illustration



*1	Transmission Oil Cleaner Magnet
----	---------------------------------

5. INSTALL AUTOMATIC TRANSMISSION OIL PAN SUB-ASSEMBLY

- (a) Install a new automatic transmission oil pan gasket and the automatic transmission oil pan sub-assembly with the 20 bolts.

Torque: 7.0 N·m (71 kgf·cm, 62in·lbf)

NOTICE:

Remove the gasket and be careful not to spill oil on the contacting surfaces of the transmission case and oil pan.

6. INSTALL AUTOMATIC TRANSMISSION ASSEMBLY

INFO

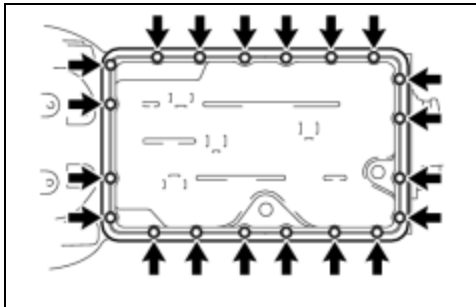
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NRH01GX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: TRANSMISSION WIRE: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE AUTOMATIC TRANSMISSION ASSEMBLY

INFO

2. REMOVE AUTOMATIC TRANSMISSION OIL PAN SUB-ASSEMBLY

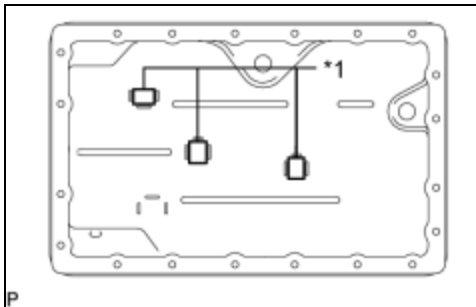


- (a) Remove the 20 bolts, automatic transmission oil pan sub-assembly and the automatic transmission oil pan gasket.

NOTICE:

Some fluid will remain in the automatic transmission oil pan sub-assembly. Remove all the bolts and carefully remove the automatic transmission oil pan sub-assembly.

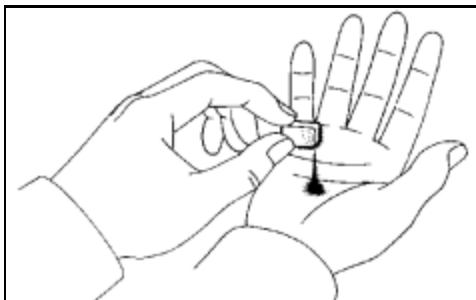
3. REMOVE TRANSMISSION OIL CLEANER MAGNET



- (a) Remove the 3 transmission oil cleaner magnets from the automatic transmission oil pan sub-assembly.

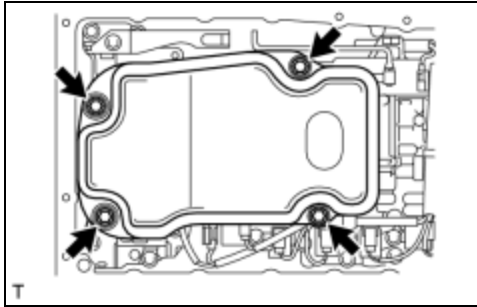
Text in Illustration

*1	Transmission Oil Cleaner Magnet
----	---------------------------------



- (b) Examine the particles in the automatic transmission oil pan sub-assembly.
- (1) Collect any steel chips with the removed transmission oil cleaner magnets. Carefully inspect the foreign matter and particles in the automatic transmission oil pan sub-assembly and on the transmission oil cleaner magnets to anticipate the type of wear you will find in the automatic transmission assembly.
- Steel (magnetic): bearing, gear and clutch plate wear
 Brass (non-magnetic): bush wear

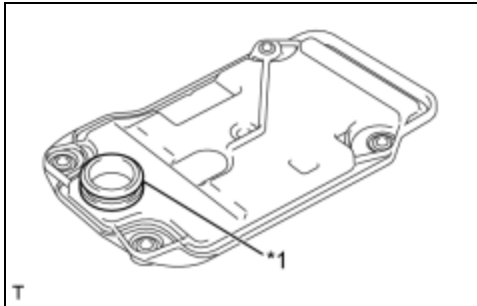
4. REMOVE VALVE BODY OIL STRAINER ASSEMBLY



- (a) Remove the 4 bolts and the valve body oil strainer assembly.

NOTICE:

Be careful as some fluid will come out of the valve body oil strainer assembly.

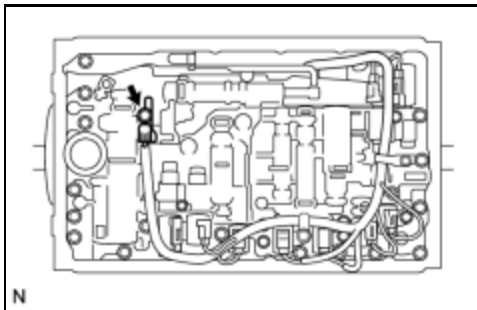


- (b) Remove the O-ring from the valve body oil strainer assembly.

Text in Illustration

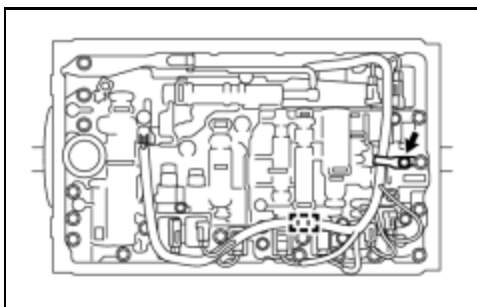
*1	O-ring
----	--------

5. DISCONNECT TRANSMISSION WIRE



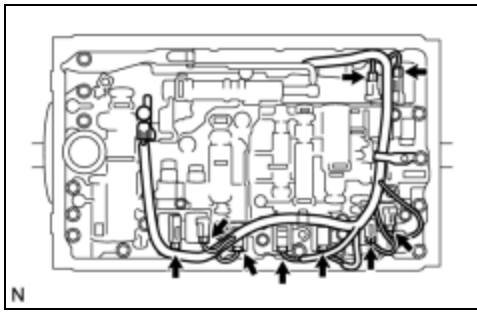
- (a) Remove the bolt and the temperature sensor clamp.

- (b) Separate the ATF temperature sensor.



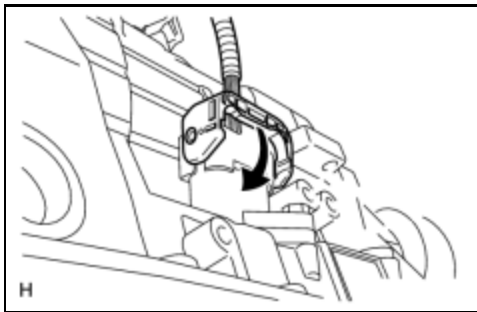
- (c) Remove the bolt and the valve body wire harness clamp.

- (d) Disengage the wire harness clamp.



(e) Disconnect the 9 solenoid valve connectors.

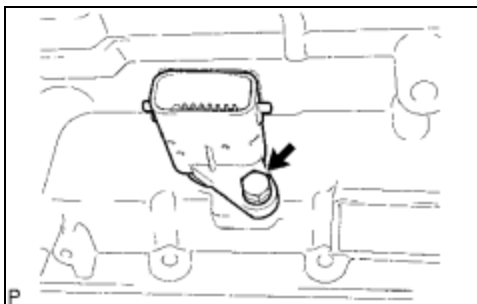
6. REMOVE TRANSMISSION WIRE



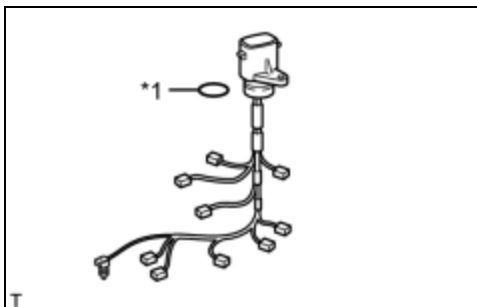
(a) Disconnect the transmission wire connector.

HINT:

Disengage the claw, press down the lever, and disconnect the transmission wire connector.



(b) Remove the bolt and pull out the transmission wire.



(c) Remove the O-ring from the transmission wire.

Text in Illustration

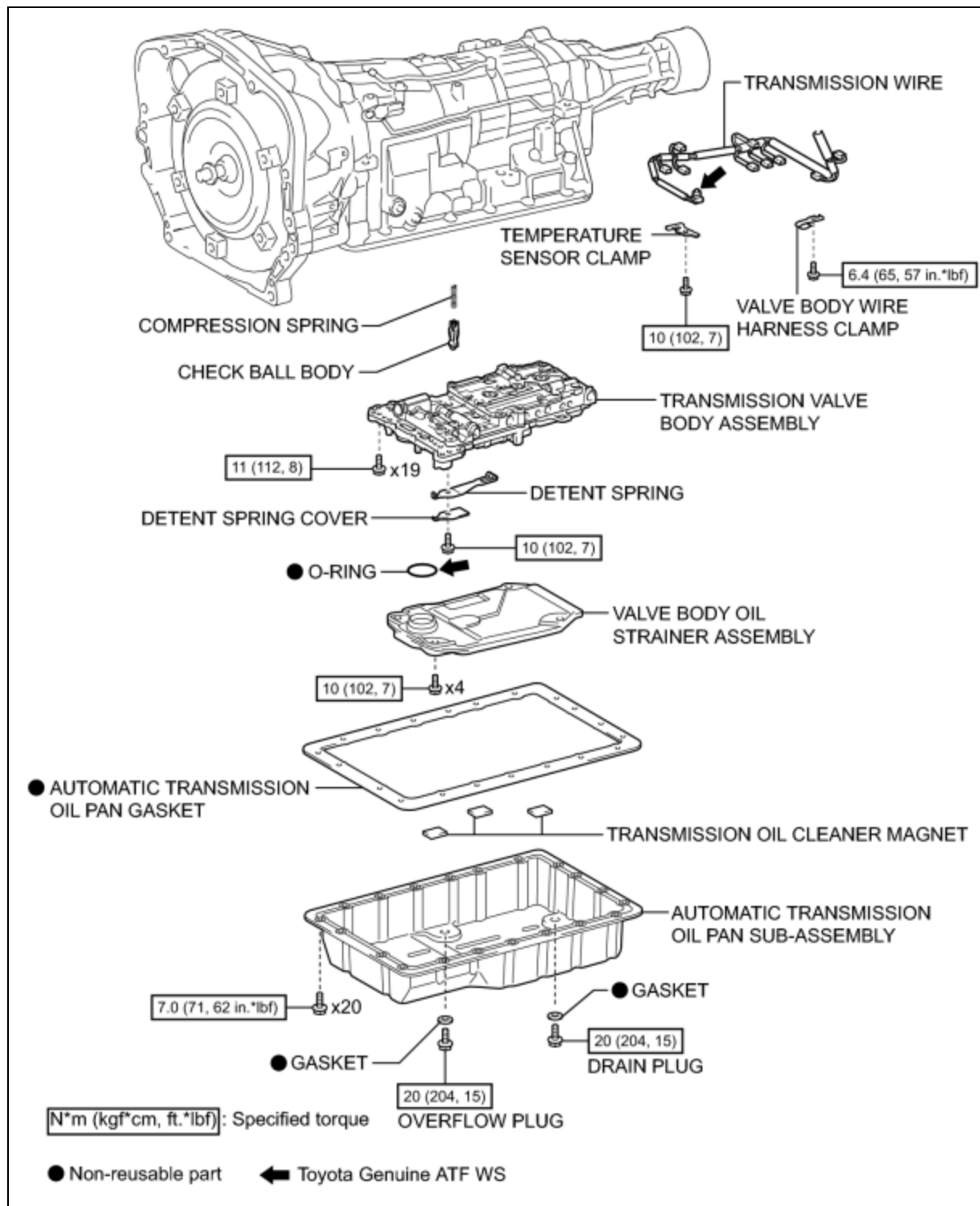
*1	O-ring
----	--------



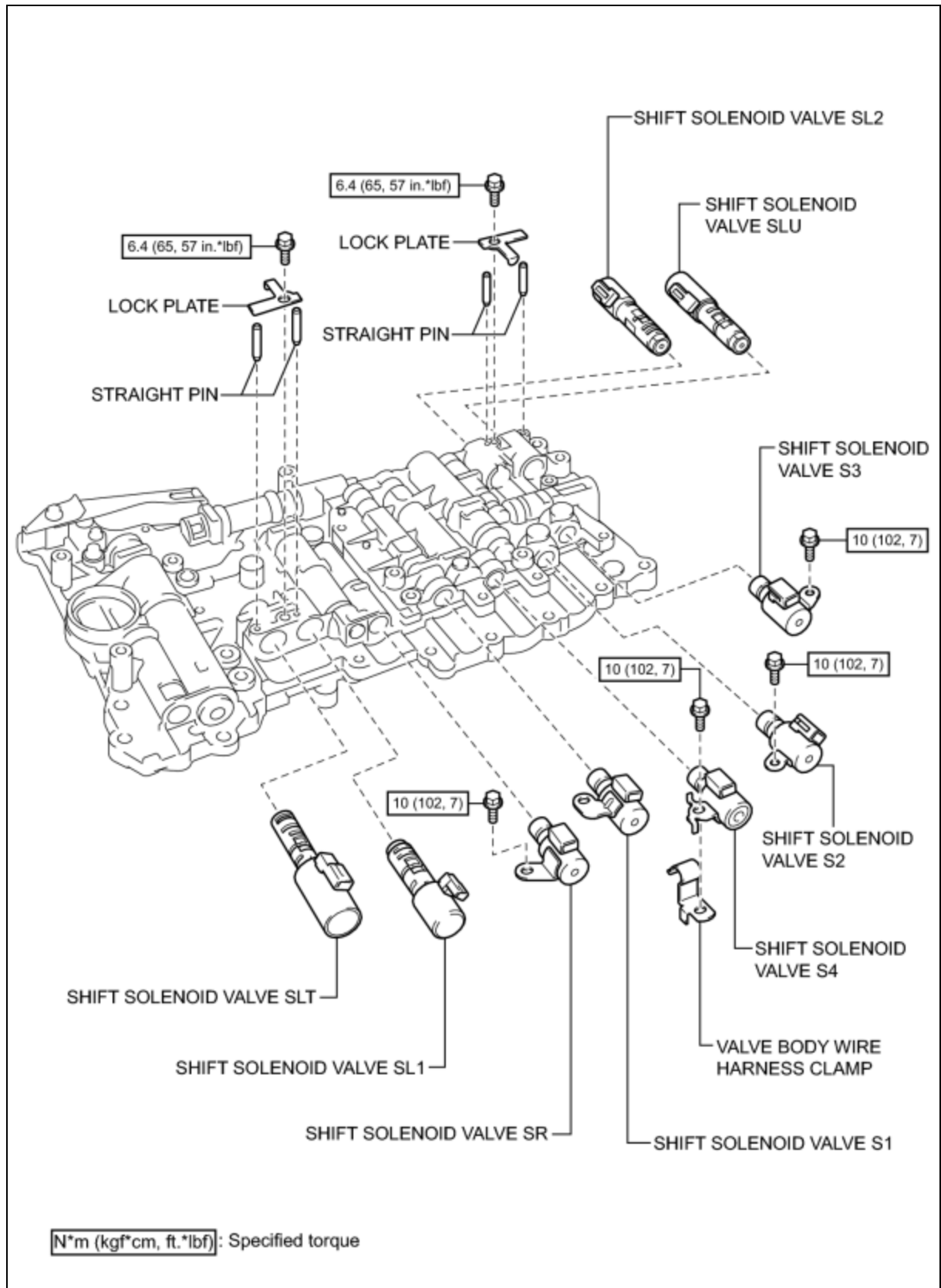
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NRN028X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: VALVE BODY ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



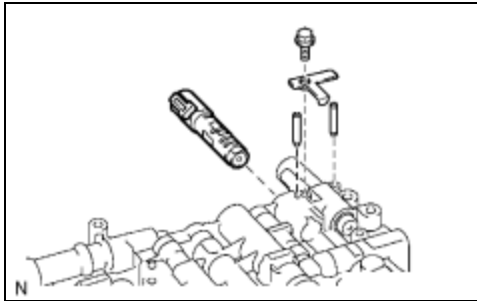
ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000O9L05YX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: VALVE BODY ASSEMBLY: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

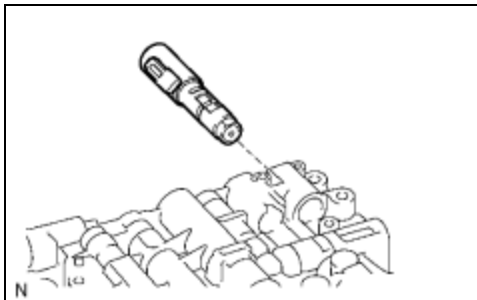
1. REMOVE SHIFT SOLENOID VALVE SL2



(a) Remove the bolt, lock plate and 2 straight pins.

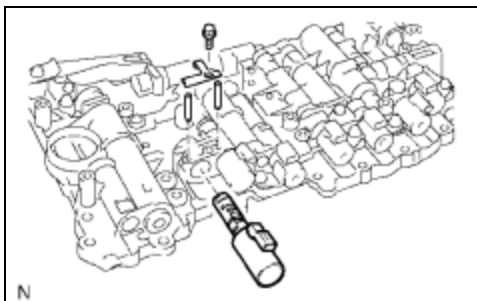
(b) Remove the shift solenoid valve SL2.

2. REMOVE SHIFT SOLENOID VALVE SLU



(a) Remove the shift solenoid valve SLU.

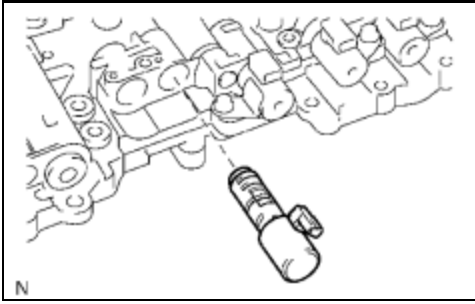
3. REMOVE SHIFT SOLENOID VALVE SLT



(a) Remove the bolt, lock plate and 2 straight pins.

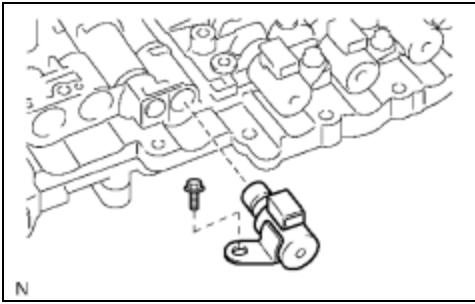
(b) Remove the shift solenoid valve SLT.

4. REMOVE SHIFT SOLENOID VALVE SL1



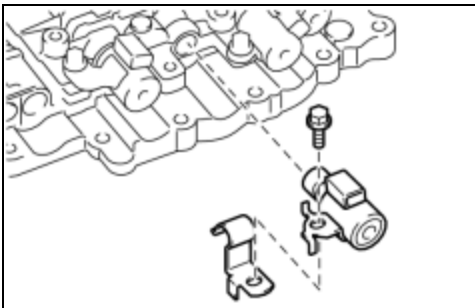
(a) Remove the shift solenoid valve SL1.

5. REMOVE SHIFT SOLENOID VALVE SR



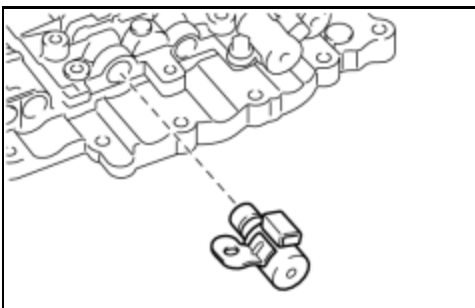
(a) Remove the bolt and the shift solenoid valve SR.

6. REMOVE SHIFT SOLENOID VALVE S4



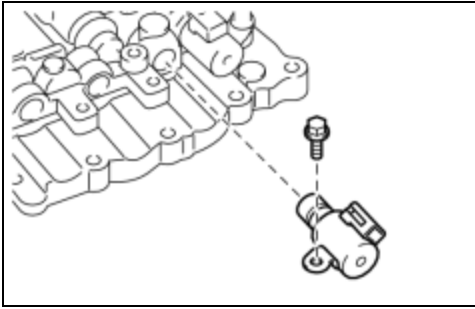
(a) Remove the bolt, valve body wire harness clamp and the shift solenoid valve S4.

7. REMOVE SHIFT SOLENOID VALVE S1



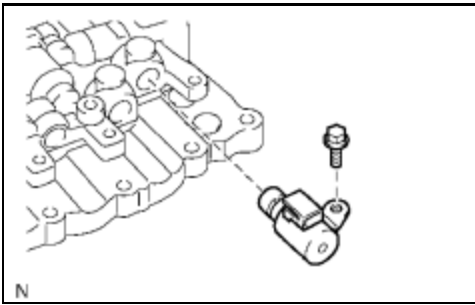
(a) Remove the shift solenoid valve S1.

8. REMOVE SHIFT SOLENOID VALVE S2



(a) Remove the bolt and the shift solenoid valve S2.

9. REMOVE SHIFT SOLENOID VALVE S3

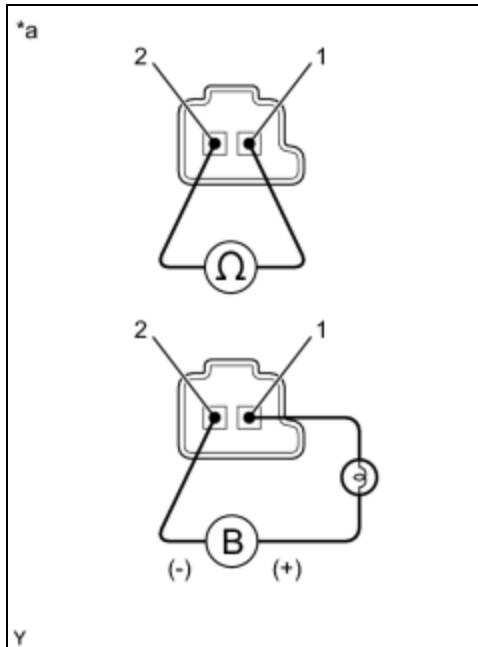


(a) Remove the bolt and the shift solenoid valve S3.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000ODH04LX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: VALVE BODY ASSEMBLY: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT SHIFT SOLENOID VALVE SL1 AND SL2



(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Shift Solenoid Valve SL1 and SL2)
----	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(b) Connect the positive (+) lead with a 21 W bulb to terminal 1 and the negative (-) lead to terminal 2 of the shift solenoid valve connector, then check the movement of the valve.

OK:

The solenoid makes an operating sound.

If the result is not as specified, replace the shift solenoid valve.

2. INSPECT SHIFT SOLENOID VALVE S1

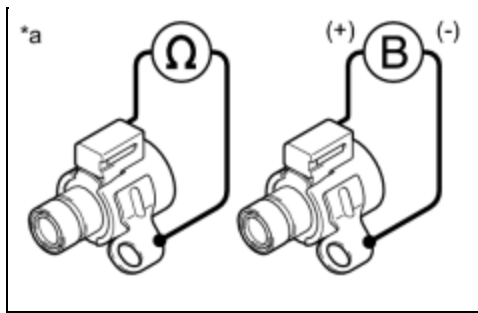
(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Shift Solenoid Valve S1)
----	--

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION



--	--

Shift solenoid valve S1 connector terminal - Shift solenoid valve S1 body	20°C (68°F)	11 to 15 Ω

(b) Connect the positive (+) lead to the terminal of the shift solenoid valve S1 connector, and the negative (-) lead to the shift solenoid valve S1 body.

OK:

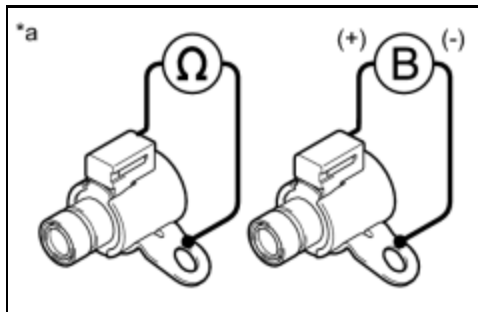
The solenoid makes an operating sound.

If the result is not as specified, replace the shift solenoid valve S1.

3. INSPECT SHIFT SOLENOID VALVE S2

(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration



*a	Component without harness connected (Shift Solenoid Valve S2)
----	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Shift solenoid valve S2 connector terminal - Shift solenoid valve S2 body	20°C (68°F)	11 to 15 Ω

(b) Connect the positive (+) lead to the terminal of the shift solenoid valve S2 connector, and the negative (-) lead to the shift solenoid valve S2 body.

OK:

The solenoid makes an operating sound.

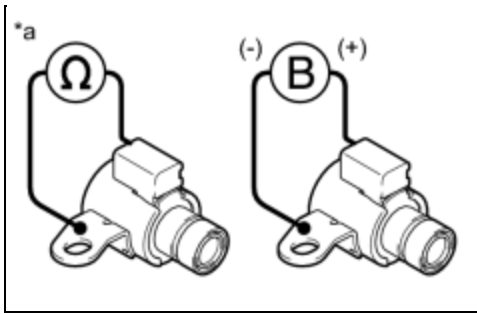
If the result is not as specified, replace the shift solenoid valve S2.

4. INSPECT SHIFT SOLENOID VALVE S3

(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

	Component without harness connected
--	-------------------------------------



*a	(Shift Solenoid Valve S3)
----	---------------------------

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Shift solenoid valve S3 connector terminal - Shift solenoid valve S3 body	20°C (68°F)	11 to 15 Ω

(b) Connect the positive (+) lead to the terminal of the shift solenoid valve S3 connector, and the negative (-) lead to the shift solenoid valve S3 body.

OK:

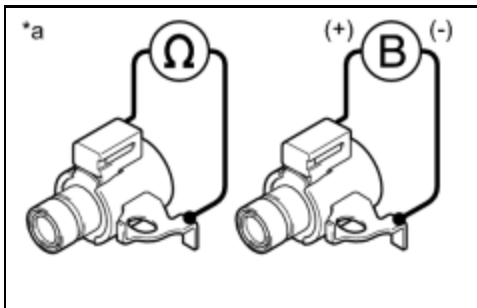
The solenoid makes an operating sound.

If the result is not as specified, replace the shift solenoid valve S3.

5. INSPECT SHIFT SOLENOID VALVE S4

(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration



*a	Component without harness connected (Shift Solenoid Valve S4)
----	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Shift solenoid valve S4 connector terminal - Shift solenoid valve S4 body	20°C (68°F)	11 to 15 Ω

(b) Connect the positive (+) lead to the terminal of the shift solenoid valve S4 connector, and the negative (-) lead to the shift solenoid valve S4 body.

OK:

The solenoid makes an operating sound.

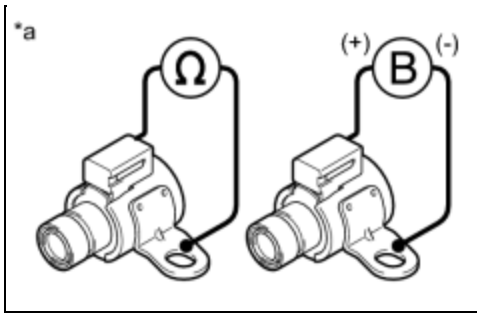
If the result is not as specified, replace the shift solenoid valve S4.

6. INSPECT SHIFT SOLENOID VALVE SR

(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

	Component without harness connected
--	-------------------------------------



*a	(Shift Solenoid Valve SR)
----	---------------------------

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Shift solenoid valve SR connector terminal - Shift solenoid valve SR body	20°C (68°F)	11 to 15 Ω

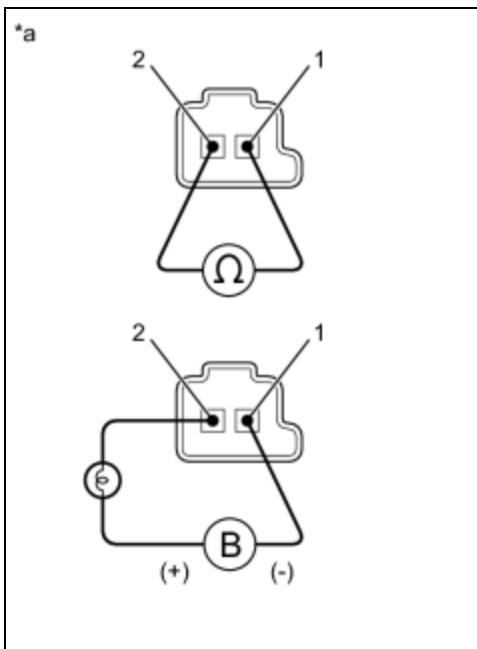
(b) Connect the positive (+) lead to the terminal of the shift solenoid valve SR connector, and the negative (-) lead to the shift solenoid valve SR body.

OK:

The solenoid makes an operating sound.

If the result is not as specified, replace the shift solenoid valve SR.

7. INSPECT SHIFT SOLENOID VALVE SLT



(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Shift Solenoid Valve SLT)
----	--

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

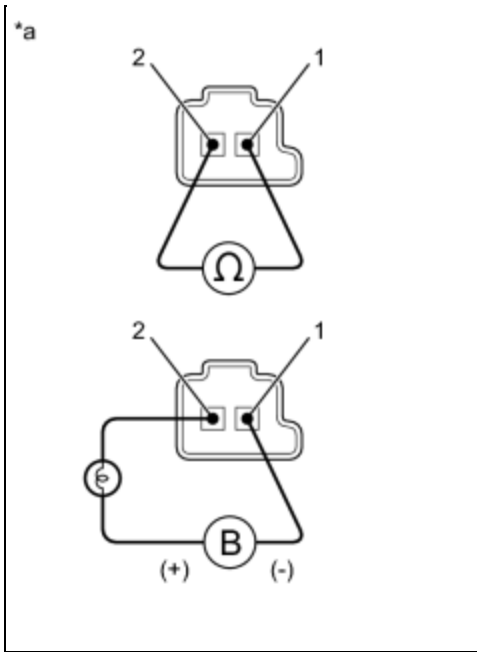
(b) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the shift solenoid valve SLT connector, then check the movement of the valve.

OK:

The solenoid makes an operating sound.

If the result is not as specified, replace the shift solenoid valve SLT.

8. INSPECT SHIFT SOLENOID VALVE SLU



(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Shift Solenoid Valve SLU)
----	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(b) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the shift solenoid valve SLU connector, then check the movement of the valve.

OK:

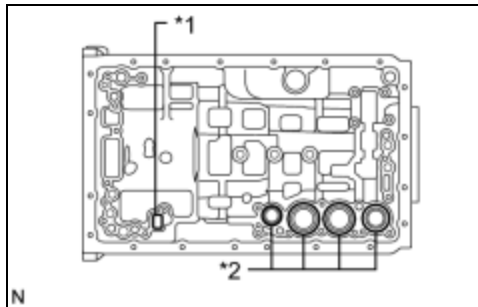
The solenoid makes an operating sound.

If the result is not as specified, replace the shift solenoid valve SLU.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NRM020X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: VALVE BODY ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL TRANSMISSION VALVE BODY ASSEMBLY



(a) Install the check ball body and the compression spring.

Text in Illustration

*1	Check Ball Body and Compression Spring
*2	Accumulator Piston

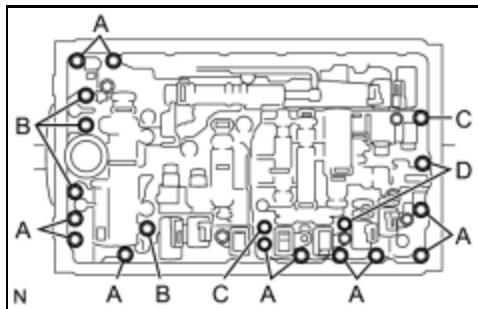
(b) Check the accumulator pistons, check ball body and the compression spring shown in the illustration.

(c) Connect the manual valve connecting rod sub-assembly to the manual valve lever sub-assembly.

(d) Install the transmission valve body assembly with the 19 bolts.

Torque: 11 N·m (112 kgf·cm, 8ft·lbf)

Bolt Length



BOLT	BOLT LENGTH
A	25 mm (0.984 in.)
B	36 mm (1.42 in.)
C	45 mm (1.77 in.)
D	50 mm (1.97 in.)

(e) Install the detent spring and the detent spring cover with the bolt.

Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

2. CONNECT TRANSMISSION WIRE [INFO](#)

3. INSTALL VALVE BODY OIL STRAINER ASSEMBLY [INFO](#)

4. INSTALL TRANSMISSION OIL CLEANER MAGNET [INFO](#)

5. INSTALL AUTOMATIC TRANSMISSION OIL PAN SUB-ASSEMBLY

6. INSTALL FRONT EXHAUST PIPE ASSEMBLY

INFO

7. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

INFO

8. ADD AUTOMATIC TRANSMISSION FLUID LEVEL

INFO

9. INSPECT AUTOMATIC TRANSMISSION FLUID LEVEL

10. RESET CHECK RESET MEMORY

INFO

11. INSPECT EXHAUST GAS LEAK

INFO

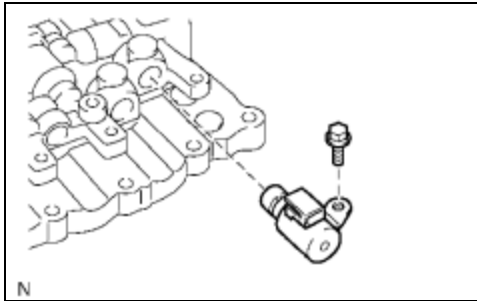


TOYOTA

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000009M05YX
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: VALVE BODY ASSEMBLY: REASSEMBLY (2013 FR-S)		

REASSEMBLY

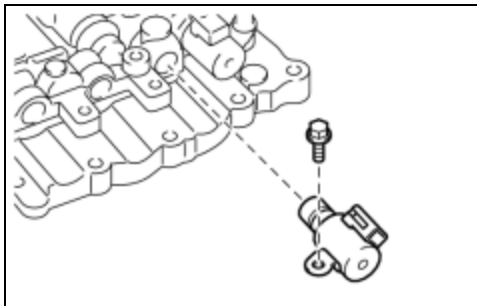
1. INSTALL SHIFT SOLENOID VALVE S3



(a) Install the shift solenoid valve S3 with the bolt.

Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

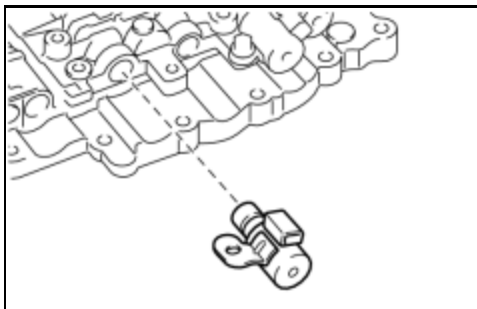
2. INSTALL SHIFT SOLENOID VALVE S2



(a) Install the shift solenoid valve S2 with the bolt.

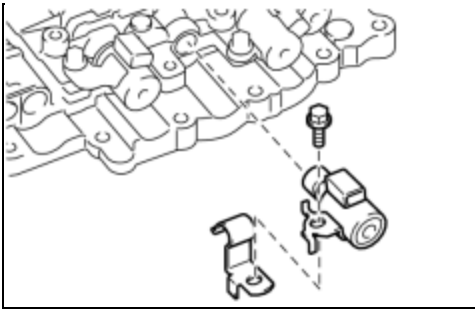
Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

3. INSTALL SHIFT SOLENOID VALVE S1



(a) Install the shift solenoid valve S1.

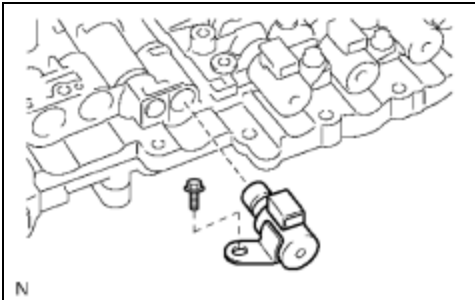
4. INSTALL SHIFT SOLENOID VALVE S4



- (a) Install the valve body wire harness clamp, shift solenoid valve S4 with the bolt.

Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

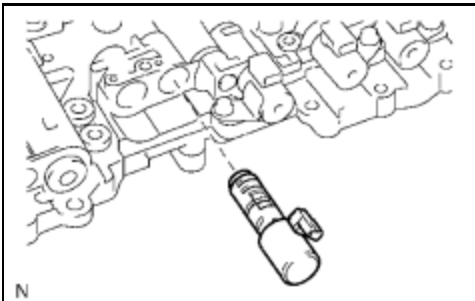
5. INSTALL SHIFT SOLENOID VALVE SR



- (a) Install the shift solenoid valve SR with the bolt.

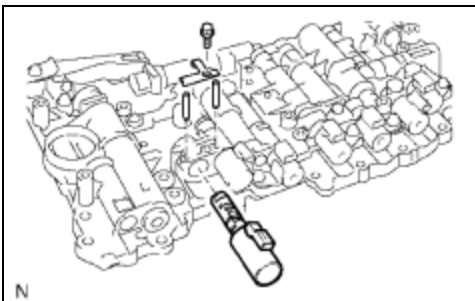
Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

6. INSTALL SHIFT SOLENOID VALVE SL1



- (a) Install the shift solenoid valve SL1.

7. INSTALL SHIFT SOLENOID VALVE SLT

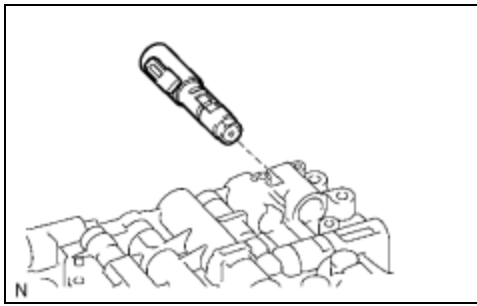


- (a) Install the shift solenoid valve SLT.

- (b) Install the 2 straight pins and lock plate with the bolt.

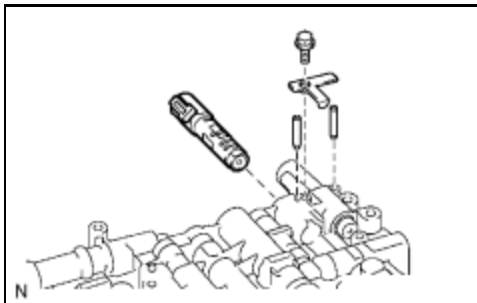
Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

8. INSTALL SHIFT SOLENOID VALVE SLU



(a) Install the shift solenoid valve SLU.

9. INSTALL SHIFT SOLENOID VALVE SL2



(a) Install the shift solenoid valve SL2.

(b) Install the 2 straight pins and lock plate with the bolt.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000NRO020X
Title: TX6A AUTOMATIC TRANSMISSION / TRANSAXLE: VALVE BODY ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

2. REMOVE FRONT EXHAUST PIPE ASSEMBLY

INFO

3. DRAIN AUTOMATIC TRANSMISSION FLUID

- (a) Remove the drain plug and gasket, and drain the ATF.
- (b) Install the drain plug and a new gasket.

Torque: 20 N·m (204 kgf·cm, 15ft·lbf)

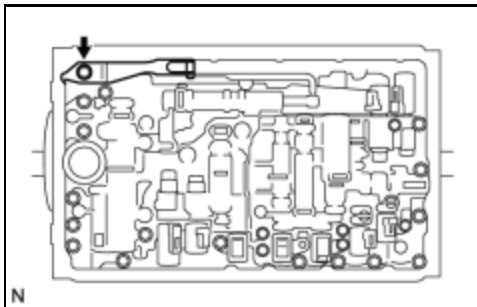
4. REMOVE AUTOMATIC TRANSMISSION OIL PAN SUB-ASSEMBLY INFO

5. REMOVE TRANSMISSION OIL CLEANER MAGNET INFO

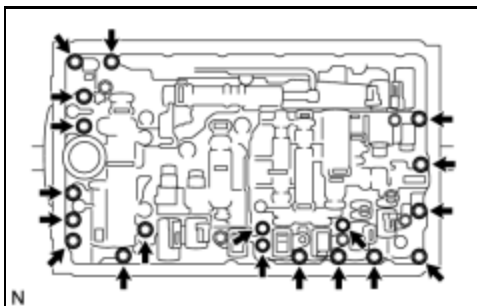
6. REMOVE VALVE BODY OIL STRAINER ASSEMBLY INFO

7. DISCONNECT TRANSMISSION WIRE INFO

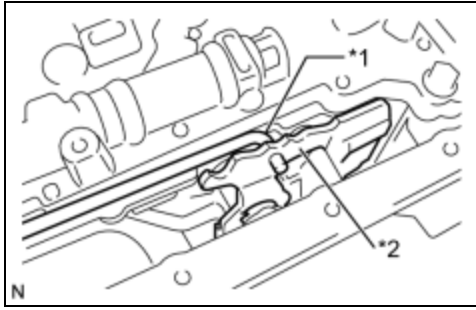
8. REMOVE TRANSMISSION VALVE BODY ASSEMBLY



- (a) Remove the bolt, detent spring cover and the detent spring.



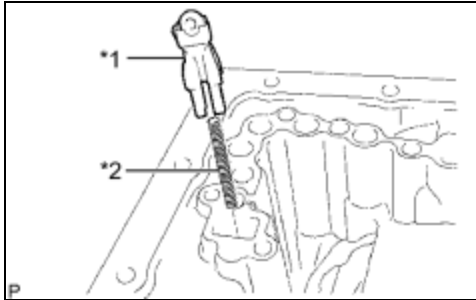
- (b) Remove the 19 bolts and the transmission valve body assembly.



(c) Disconnect the manual valve connecting rod sub-assembly from the manual valve lever sub-assembly.

Text in Illustration

*1	Manual Valve Connecting Rod Sub-assembly
*2	Manual Valve Lever Sub-assembly



(d) Remove the check ball body and the compression spring.

Text in Illustration

*1	Check Ball Body
*2	Compression Spring

NOTICE:

Do not drop the check ball body and compression spring.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000419K00HX
Title: FA20 COOLING: COOLANT: REPLACEMENT (2013 FR-S)		

REPLACEMENT

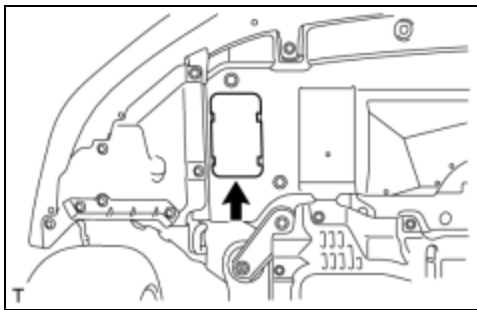
1. DRAIN ENGINE COOLANT

NOTICE:

Do not remove the radiator cap, cylinder block drain cock plugs and radiator drain cock plug while the engine and radiator are still hot. Pressurized, hot engine coolant and steam may be released and cause serious burns.

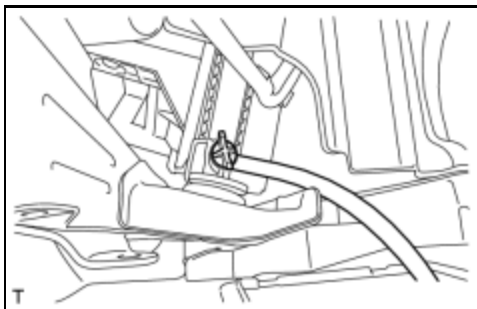
HINT:

Collect the coolant in a container and dispose of it according to the local regulations.

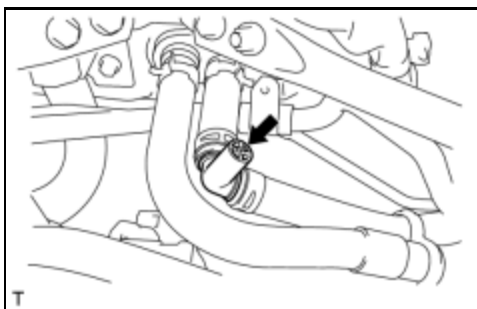


- (a) Remove the service hole cover from the front bumper under cover.

- (b) Connect a hose with an inside diameter of 8 mm (0.315 in.) to the drain plug.



- (c) Loosen the radiator drain cock plug.



- (d) Open the air bleed plug on the heater hose side.

- (e) Remove the radiator cap and drain the coolant.

2. ADD ENGINE COOLANT

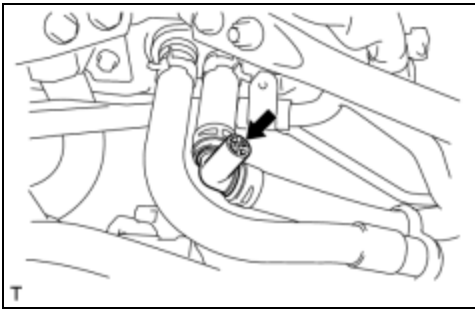
HINT:

Before replenishing the coolant, turn the A/C switch off.

- (a) Tighten the radiator drain cock plug.
(b) Pour in coolant of the specified density until it reaches the base of the entrance to the water inlet.

HINT:

- The coolant contains anti-freeze and anti-rust agents for use with engines with aluminum cylinder blocks. Using other than the specified coolant may cause rust, so be sure to use Toyota SLLC 50 Blue.
- Crimp the inlet and outlet radiator hoses several times by hand, and add water if the water level in the entrance water inlet drops.
- The coolant quantity includes the quantity in the reserve tank.



- (c) Open the air bleed plug on the heater hose side.

- (d) If the water level in the entrance to the water inlet drops, pour coolant in until it reaches the base of the entrance to the water inlet.
(e) Close the air bleed plug when the coolant begins to come out of the air bleed valve on the heater hose side.
(f) Pour in coolant of the specified concentration until it reaches the "FULL" level of the radiator reserve tank.
(g) Close the radiator cap. [*1]
(h) Start the engine, race it 5 to 6 times at under 3000 rpm or less, and then stop the engine. [*2]

HINT:

Finish this operation within 40 seconds.

- (i) 1 minute after stopping the engine, remove the radiator cap and pour coolant in if the water level in the entrance to the water inlet has dropped. [*3]
(j) Repeat operations [*1], [*2], and [*3] until the water level in the entrance to the water inlet does not drop.

HINT:

Perform before the engine warms up, as the air that comes out of the inlet radiator hose will travel to the radiator side when the engine warms up and the thermostat opens.

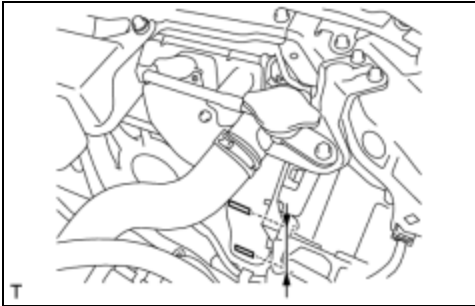
- (k) Close the radiator cap and the radiator reserve tank cap.

- (l) Start the engine, set the heater on full warm, and then run it with the blower speed set to "LO".
- (m) Run the engine at 2000 rpm or less until the radiator fan starts and stops. [*4]

HINT:

To prevent overheating, pay attention to the water temperature.

- (n) Stop the engine and wait until the coolant temperature drops to 30 °C (86 °F) or less. [*5]
- (o) Remove the radiator cap and, if the volume of coolant has dropped, pour coolant in until it reaches the base of the entrance to the water inlet and until it reaches the "FULL" level in the radiator reserve tank. [*6]
- (p) Close the radiator cap. [*7]
- (q) Set the heater to full warm, and, with the blower speed set to "LO", race the engine at 3000 rpm or less. [*8]
- (r) At this point, if the engine coolant can be heard flowing in the heater core, repeat operations [*4], [*5], [*6], [*7], and [*8].



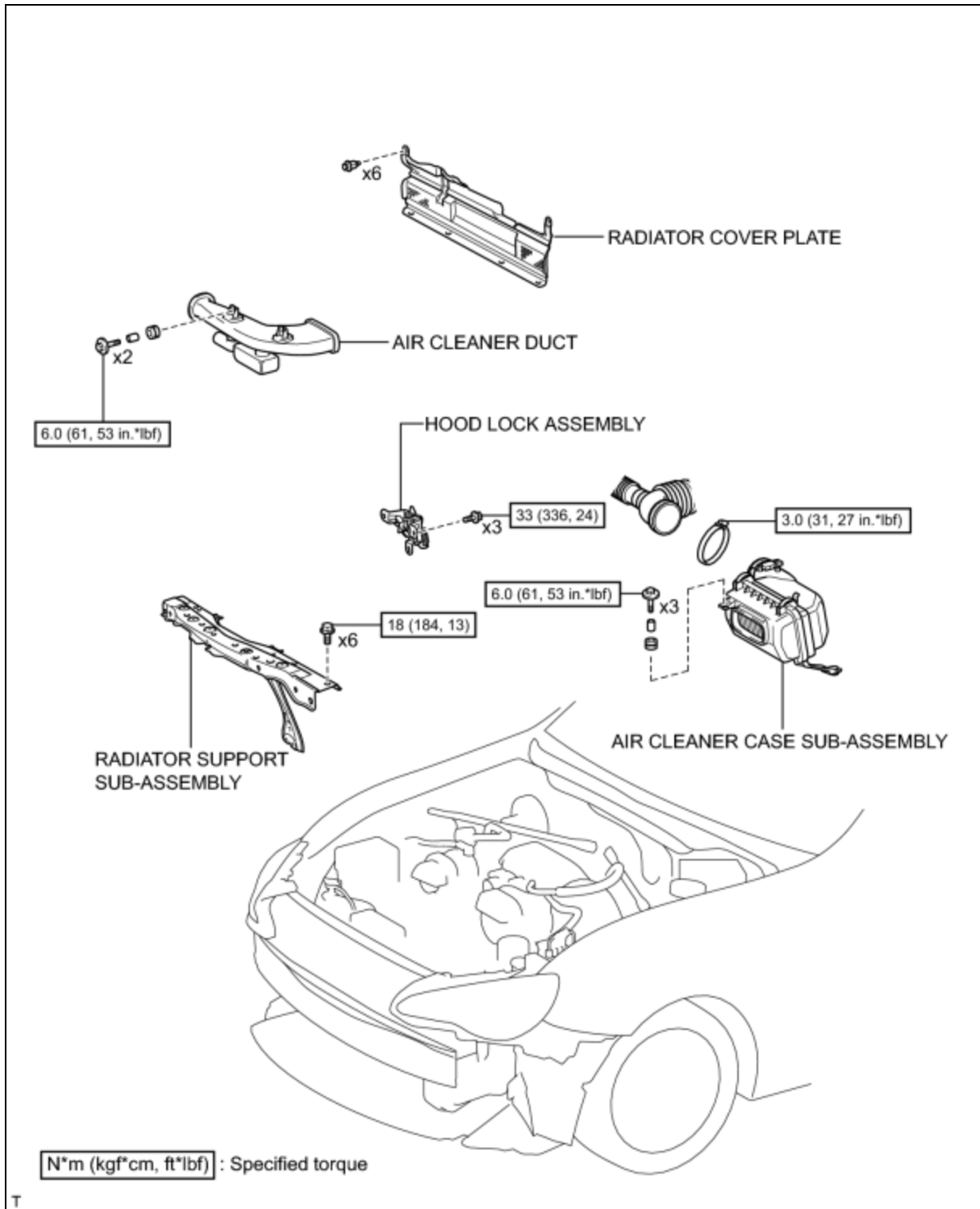
- (s) When the water level no longer drops, adjust the water level so that the water level in the radiator reserve tank reaches the "FULL" line.

3. INSPECT FOR COOLANT LEAK INFO

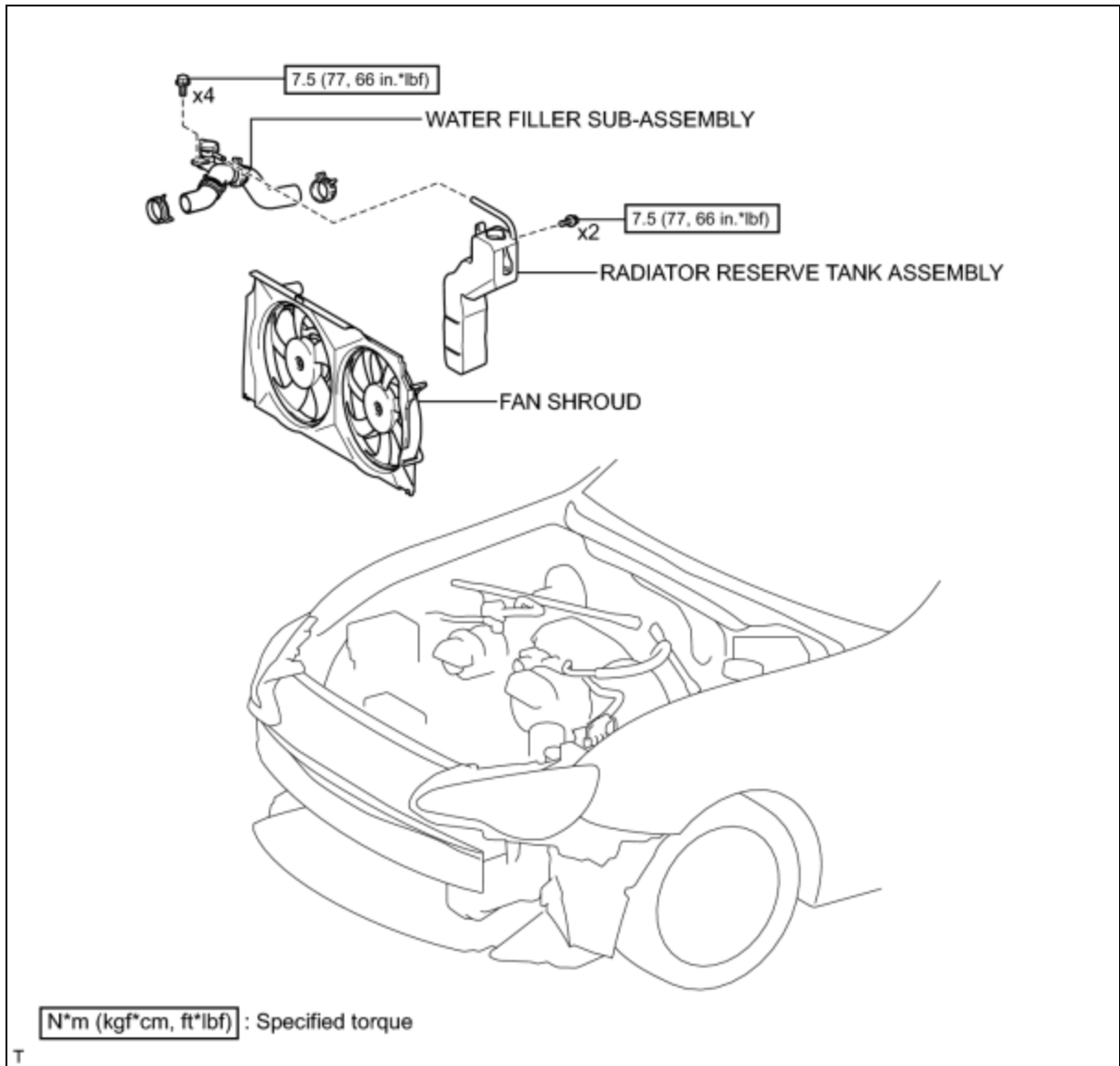
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002BMP01CX
Title: FA20 COOLING: COOLING FAN MOTOR: COMPONENTS (2013 FR-S)		

COMPONENTS

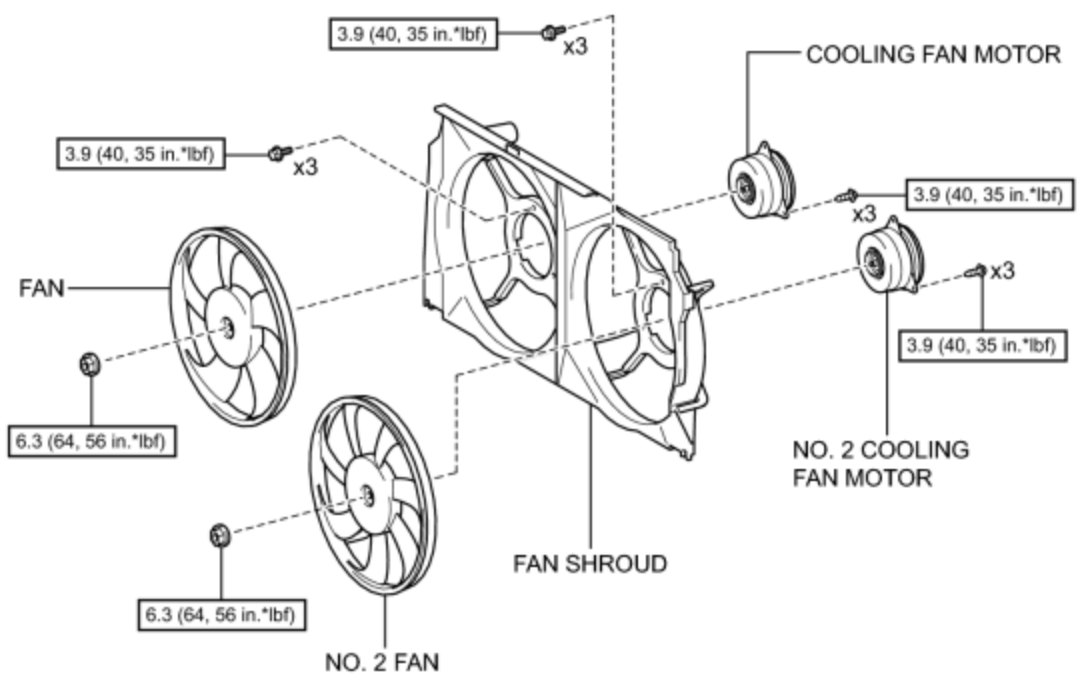
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION



N*m (kgf*cm, ft*lbf) : Specified torque

T

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002BMO01NX
Title: FA20 COOLING: COOLING FAN MOTOR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL NO. 2 COOLING FAN MOTOR

- (a) Install the No. 2 cooling fan motor with the 3 screws.

Torque: 3.9 N·m (40 kgf·cm, 35in·lbf)

2. INSTALL COOLING FAN MOTOR

- (a) Install the cooling fan motor with the 3 screws.

Torque: 3.9 N·m (40 kgf·cm, 35in·lbf)

- (b) Connect the wire harness to the 2 cooling fan motors.

3. INSTALL NO. 2 FAN

- (a) Install the No. 2 fan with the nut.

Torque: 6.3 N·m (64 kgf·cm, 56in·lbf)

4. INSTALL FAN

- (a) Install the fan with the nut.

Torque: 6.3 N·m (64 kgf·cm, 56in·lbf)

5. INSTALL FAN SHROUD

HINT:

Insert a cardboard or a blanket between the radiator assembly and the fan shroud to protect the radiator assembly.

- (a) Engage the fitting sections in the bottom of the fan shroud with the fitting sections of the radiator assembly.

NOTICE:

Do not damage the outlet radiator hose, inlet radiator hose, No.1 radiator hose, water filler sub-assembly, or air conditioner tube and accessory assembly.

- (b) Attach the 2 claws and install the fan shroud to the radiator assembly.
(c) Connect the 2 cooling fan motor connectors and 2 clamps to the radiator assembly.

6. INSTALL RADIATOR SUPPORT SUB-ASSEMBLY INFO

7. INSTALL RADIATOR COVER PLATE INFO

8. REMOVE AIR CLEANER DUCT INFO

9. CONNECT HOOD LOCK ASSEMBLY INFO

10. INSTALL WATER FILLER SUB-ASSEMBLY

- (a) Install the water filler sub-assembly with the 4 bolts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

11. INSTALL RADIATOR RESERVE TANK ASSEMBLY [INFO](#)

12. INSTALL FRONT BUMPER COVER

[INFO](#)

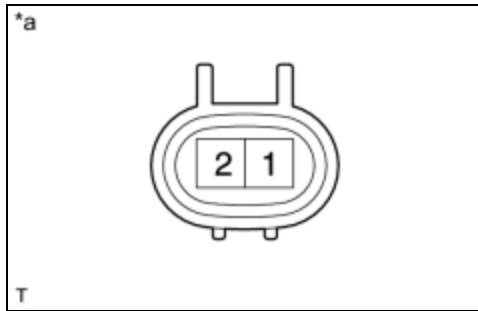
13. INSTALL AIR CLEANER CASE SUB-ASSEMBLY [INFO](#)



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000202U02NX
Title: FA20 COOLING: COOLING FAN MOTOR: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT COOLING FAN MOTOR



- (a) Check that the motor operates smoothly when the battery is connected to the cooling fan motor connector.

Text in Illustration

*a	Component without harness connected (Cooling fan motor)
----	--

If the motor does not operate smoothly, replace the cooling fan motor.

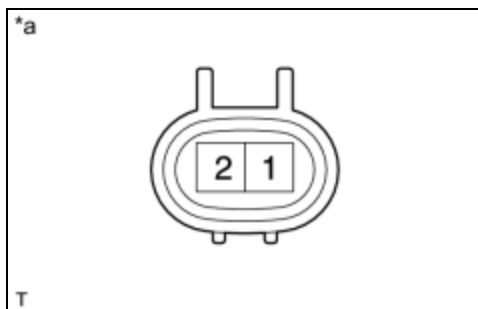
- (b) Measure the current while the motor is operating.

Standard Current:

ITEM	CONDITION	SPECIFIED CONDITION
Cooling fan motor	20°C (68°F)	7.4 to 11.4 A at 12 V

If the result is not as specified, replace the cooling fan motor.

2. INSPECT NO. 2 COOLING FAN MOTOR



- (a) Check that the motor operates smoothly when the battery is connected to the No. 2 cooling fan motor connector.

Text in Illustration

*a	Component without harness connected (No. 2 cooling fan motor)
----	--

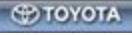
If the motor does not operate smoothly, replace the No. 2 cooling fan motor.

- (b) Measure the current while the motor is operating.

Standard Current:

ITEM	CONDITION	SPECIFIED CONDITION
No. 2 cooling fan motor	20°C (68°F)	7.4 to 11.4 A at 12 V

If the result is not as specified, replace the No. 2 cooling fan motor.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002BMQ01NX
Title: FA20 COOLING: COOLING FAN MOTOR: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE AIR CLEANER CASE SUB-ASSEMBLY INFO

2. REMOVE FRONT BUMPER COVER

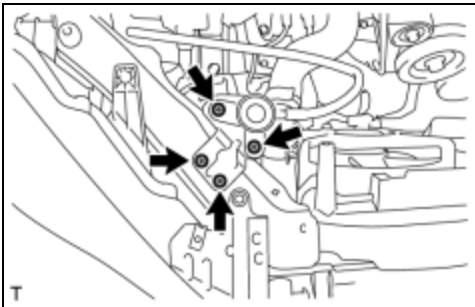
INFO

3. REMOVE AIR CLEANER DUCT INFO

4. REMOVE RADIATOR COVER PLATE INFO

5. REMOVE RADIATOR RESERVE TANK ASSEMBLY INFO

6. REMOVE WATER FILLER SUB-ASSEMBLY

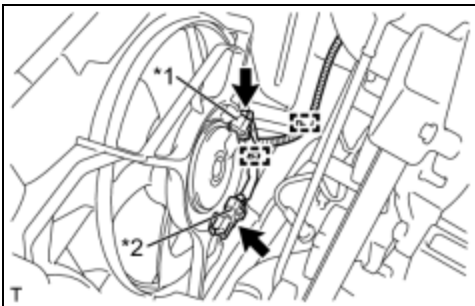


(a) Remove the 4 bolts and separate the water filler sub-assembly.

7. DISCONNECT HOOD LOCK ASSEMBLY INFO

8. REMOVE RADIATOR SUPPORT SUB-ASSEMBLY INFO

9. REMOVE FAN SHROUD



(a) Disconnect the 2 wire harness clamps and the 2 cooling fan motor connectors.

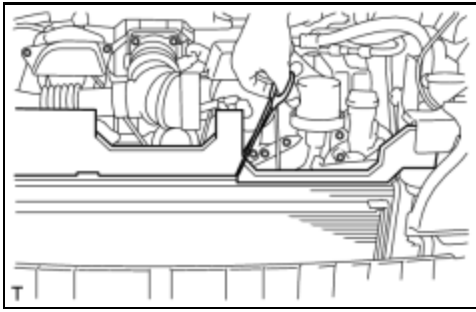
Text in Illustration

*1	Cooling fan motor connector
*2	No. 2 cooling fan motor connector

NOTICE:

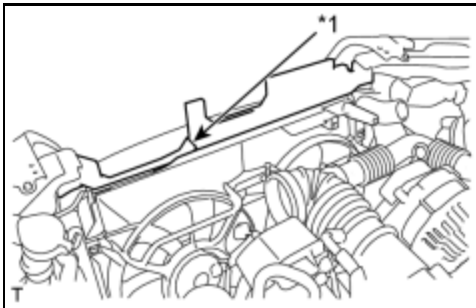
Be careful not to damage the connectors.

(b) Mark the sponge on the upper surface of the fan shroud, and use scissors, etc. to cut the sponge.



HINT:

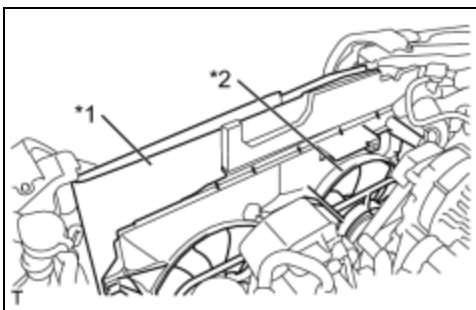
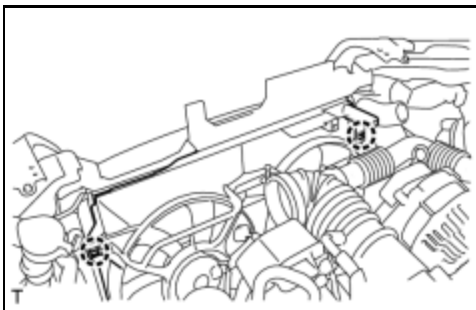
Cut the radiator packing at the position between the corner of the radiator packing and the edge of the fan shroud.



Text in Illustration

*1	Cutting Line
----	--------------

(c) Detach the 2 claws and separate the fan shroud from the radiator assembly.

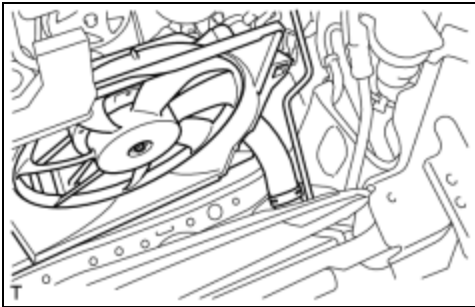


Text in Illustration

*1	Cardboard or Blanket
----	----------------------

HINT:

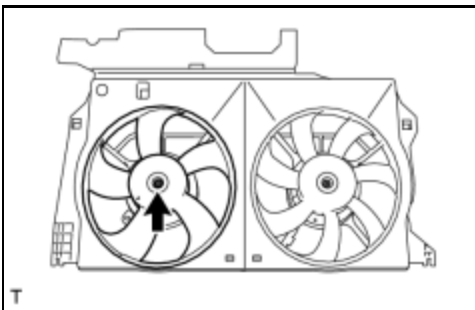
Insert a cardboard or a blanket between the radiator assembly and the fan shroud to protect the radiator assembly.



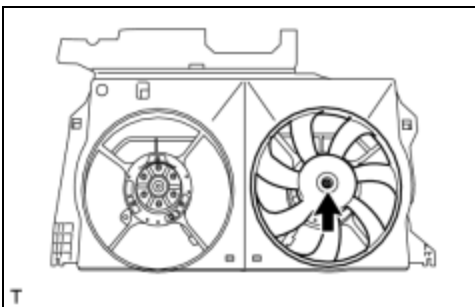
(d) Remove the fan shroud from the radiator assembly.

NOTICE:

Do not apply any excessive force to the outlet radiator hose, inlet radiator hose, No.1 radiator hose, pipe or water filler sub-assembly when removing the fan shroud.

10. REMOVE FAN

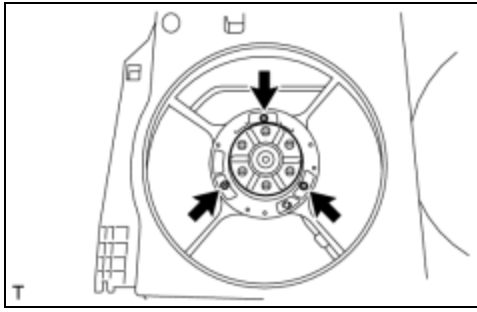
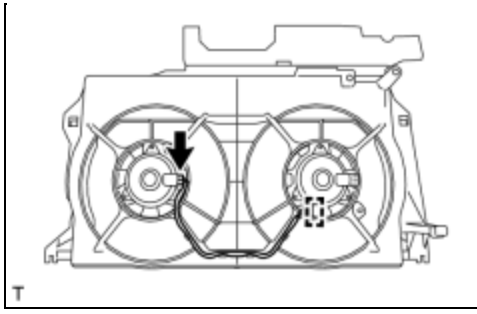
(a) Remove the nut and fan.

11. REMOVE NO. 2 FAN

(a) Remove the nut and No. 2 fan.

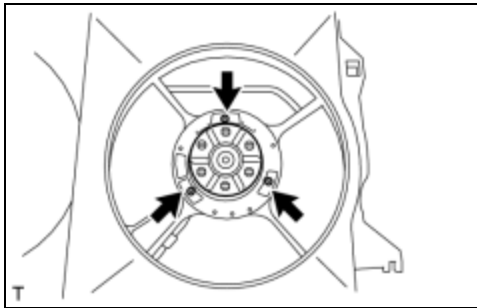
12. REMOVE COOLING FAN MOTOR

(a) Disengage the connector clamp, and disconnect the connector from cooling fan motor.



(b) Remove the 3 screws and cooling fan motor.

13. REMOVE NO. 2 COOLING FAN MOTOR



(a) Remove the 3 screws and the No. 2 cooling fan motor.

Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002YZE03HX
Title: FA20 COOLING: COOLING FAN SYSTEM: Cooling Fan Circuit (2013 FR-S)		

[Cooling Fan Circuit](#)

DESCRIPTION

The ECM turns on or off the fan relays using signals calculated from the engine coolant temperature, air conditioning (ON/OFF), air conditioner refrigerant pressure, engine speed and vehicle speed signals.

The ECM switches the circuit of the cooling fan motors between series and parallel by turning on or off the fan relays in order to control the speed of the cooling fan motors in two steps.

WIRING DIAGRAM

Refer to System Diagram [#FO](#) .

INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE ELECTRIC COOLING FAN)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Active Test / Control the Electric Cooling Fan.
- (e) Check the operation of the cooling fans while operating them using the Techstream.

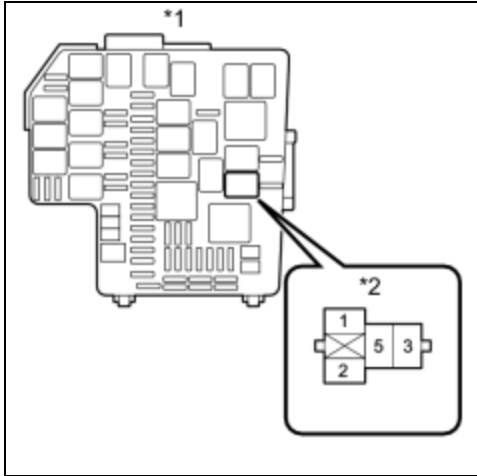
OK:

TESTER OPERATION	SPECIFIED CONDITION
ON	Cooling fans operate
OFF	Cooling fans stop

NG  **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

OK
▼

2. INSPECT ENGINE ROOM RELAY BLOCK (FAN NO. 1 RELAY VOLTAGE)



(a) Remove the FAN No. 1 relay from the engine room relay block.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
5 (FAN NO. 1 relay terminal) - Body ground	Always	11 to 14 V

Text in Illustration

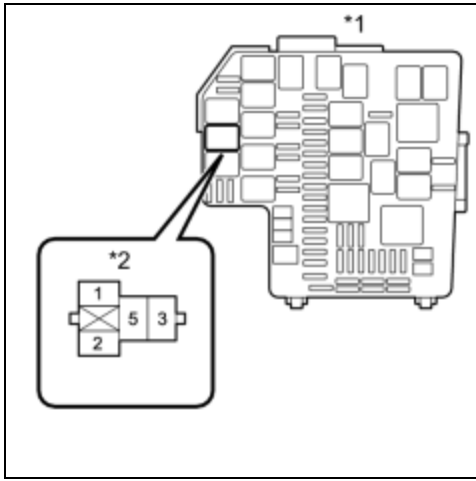
*1	Engine Room Relay Block
*2	FAN No. 1 Relay Terminals

(c) Reinstall the FAN No. 1 relay.

NG ► REPAIR OR REPLACE HARNESS OR
CONNECTOR (BATTERY - FAN NO. 1 RELAY)

OK
▼

3. INSPECT ENGINE ROOM RELAY BLOCK (FAN NO. 3 RELAY VOLTAGE)



(a) Remove the FAN No. 3 relay from the engine room relay block.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
5 (FAN NO. 3 relay terminal) - Body ground	Always	11 to 14 V

Text in Illustration

*1	Engine Room Relay Block
*2	FAN No. 3 Relay Terminals

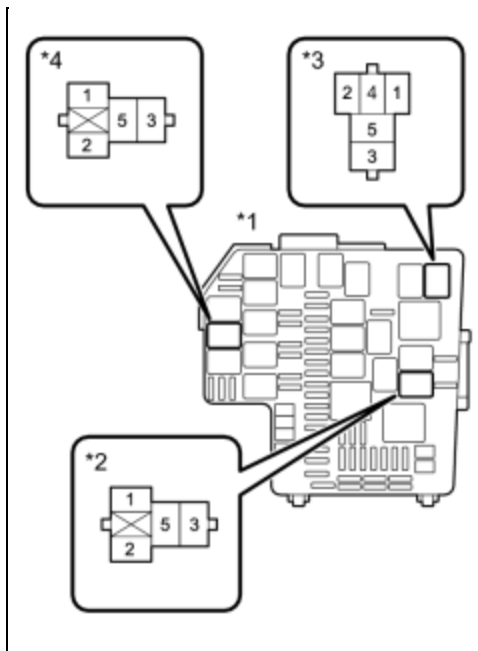
(c) Reinstall the FAN No. 3 relay.

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR (BATTERY - FAN NO. 3 RELAY)

OK



4.	CHECK HARNESS AND CONNECTOR (FAN NO. 1, NO. 2 OR NO. 3 RELAY)
-----------	--



(a) Remove the FAN No. 1, FAN No. 2 and FAN No. 3 relays from the engine room relay block.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
2 (FAN NO. 1 relay terminal) - Body ground	Ignition switch ON	11 to 14 V
1 (FAN NO. 2 relay terminal) - Body ground	Ignition switch ON	11 to 14 V
2 (FAN NO. 3 relay terminal) - Body ground	Ignition switch ON	11 to 14 V

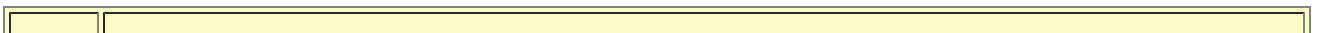
Text in Illustration

*1	Engine Room Relay Block
*2	FAN No. 1 Relay Terminals
*3	FAN No. 2 Relay Terminals
*4	FAN No. 3 Relay Terminals

(d) Reinstall the FAN No. 1, FAN No. 2 and FAN No. 3 relay.

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (FAN NO. 1, NO. 2 OR NO. 3 RELAY)**

OK
▼



5. INSPECT FAN NO. 1 RELAY


(a) Inspect the FAN No. 1 relay  .

NG  **REPLACE FAN NO. 1 RELAY**

OK



6. INSPECT FAN NO. 2 RELAY


(a) Inspect the FAN No. 2 relay  .

NG  **REPLACE FAN NO. 2 RELAY**

OK



7. INSPECT FAN NO. 3 RELAY

(a) Inspect the FAN No. 3 relay  .

NG  **REPLACE FAN NO. 3 RELAY**

OK



8. CHECK HARNESS AND CONNECTOR (FAN NO. 2 RELAY - BODY GROUND)

(a) Remove the FAN No. 2 relay from the engine room relay block.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
5 (FAN NO. 2 relay terminal) - Body ground	Always	Below 1 Ω


(c) Reinstall the FAN No. 2 relay.

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR (FAN NO. 2 RELAY - BODY GROUND)

OK



9.	INSPECT COOLING FAN MOTOR
-----------	----------------------------------

(a) Inspect the cooling fan motor  .

NG ► REPLACE COOLING FAN MOTOR

OK



10.	CHECK HARNESS AND CONNECTOR (COOLING FAN MOTOR - BODY GROUND)
------------	--

(a) Disconnect the A45 cooling fan motor connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A45-1 - Body ground	Always	Below 1 Ω

(c) Reconnect the A45 cooling fan motor connector.

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR (COOLING FAN MOTOR - BODY GROUND)

OK



	CHECK HARNESS AND CONNECTOR (COOLING FAN MOTOR - ENGINE ROOM)
--	--

11.	RELAY BLOCK)
------------	---------------------

- (a) Disconnect the A45 cooling fan motor connector.
- (b) Remove the FAN No. 1 and FAN No. 2 relays from the engine room relay block.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A45-2 - 3 (FAN NO. 1 relay terminal)	Always	Below 1 Ω
A45-2 - 4 (FAN NO. 2 relay terminal)	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A45-2 or 3 (FAN NO. 1 relay terminal) or 4 (FAN NO. 2 relay terminal) - Body ground	Always	10 kΩ or higher

- (d) Reconnect the A45 cooling fan motor connector.
- (e) Reinstall the FAN No. 1 and FAN No. 2 relays.

NG ► **REPAIR OR REPLACE HARNESS OR CONNECTOR (COOLING FAN MOTOR - ENGINE ROOM RELAY BLOCK)**

OK
▼

12.	INSPECT NO. 2 COOLING FAN MOTOR
------------	--

- (a) Inspect the No. 2 cooling fan motor INFO.

NG ► **REPLACE NO. 2 COOLING FAN MOTOR**

OK
▼

13.	CHECK HARNESS AND CONNECTOR (NO. 2 COOLING FAN MOTOR - ENGINE ROOM RELAY BLOCK)
------------	--

- (a) Disconnect the A46 No. 2 cooling fan motor connector.
- (b) Remove the FAN No. 2 and FAN No. 3 relays from the engine room relay block.
- (c) Measure the resistance according to the value(s) in the table below.


Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A46-1 - 3 (FAN NO. 2 relay terminal)	Always	Below 1 Ω
A46-2 - 3 (FAN NO. 3 relay terminal)	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A46-1 or 3 (FAN NO. 2 relay terminal) - Body ground	Always	10 k Ω or higher
A46-2 or 3 (FAN NO. 3 relay terminal) - Body ground	Always	10 k Ω or higher

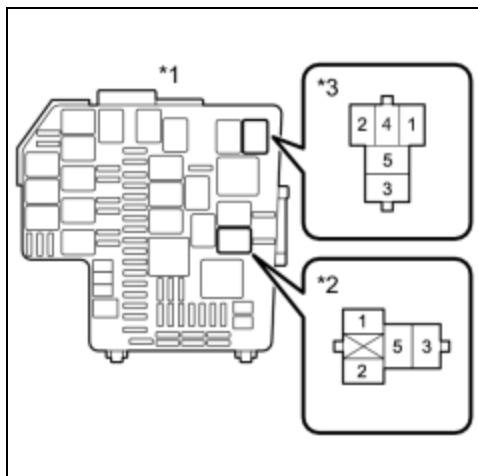
- (d) Reconnect the A46 No. 2 cooling fan motor connector.
- (e) Reinstall the FAN No. 2 and FAN No. 3 relays.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR (NO. 2 COOLING FAN MOTOR - ENGINE ROOM RELAY BLOCK)**

OK



14.	INSPECT ENGINE ROOM RELAY BLOCK (FAN NO. 1 RELAY - FAN NO. 2 RELAY)
------------	--



- (a) Remove the FAN No. 1 and FAN No. 2 relays from the engine room relay block.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (FAN NO. 1 relay terminal) - 2 (FAN NO. 2 relay terminal)	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (FAN NO. 1 relay terminal) or 2 (FAN NO. 2 relay terminal) - Body ground	Always	10 k Ω or higher

Text in Illustration

*1	Engine Room Relay Block
*2	FAN NO. 1 Relay Terminals
*3	FAN NO. 2 Relay Terminals

(c) Reinstall the FAN No. 1 and FAN No. 2 relays.

NG  **REPLACE ENGINE ROOM RELAY BLOCK**

OK



15.	CHECK HARNESS AND CONNECTOR (ECM - ENGINE ROOM RELAY BLOCK)
------------	--

(a) Disconnect the A35 ECM connector.

(b) Remove the FAN No. 2 and FAN No. 3 relays from the engine room relay block.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-11 (FAN1) - 1 (FAN NO. 1 relay terminal)	Always	Below 1 Ω
A35-11 (FAN1) - 2 (FAN NO. 2 relay terminal)	Always	Below 1 Ω
A35-12 (FAN2) - 1 (FAN NO. 3 relay terminal)	Always	Below 1 Ω

Standard Resistance (Check for Short):

--	--	--

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-11 (FAN1) or 1 (FAN NO. 1 relay terminal) or 2 (FAN NO. 2 relay terminal) - Body ground	Always	10 kΩ or higher
A35-12 (FAN2) or 1 (FAN NO. 3 relay terminal) - Body ground	Always	10 kΩ or higher

(d) Reconnect the A35 ECM connector.

(e) Reinstall the FAN No. 2 and FAN No. 3 relays.

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (ECM - ENGINE ROOM RELAY BLOCK)**

OK ▶ **REPLACE ECM**



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XW0075X
Title: FA20 COOLING: COOLING FAN SYSTEM: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT COOLING FAN OPERATION AT LOW TEMPERATURES (Below 83 °C (181 °F))

(a) Turn the ignition switch to ON.

(b) Check that the cooling fans stop.

If it does not, check the cooling fan relays and engine coolant temperature sensor, and check whether there is a disconnection or an open circuit between them.

(c) Disconnect the engine coolant temperature sensor connector.

(d) Check that the cooling fans operate.

If it does not, check the fuses, cooling fan relays, ECM and cooling fans, and check for a short circuit between the cooling fan relays and the engine coolant temperature sensor.

(e) Reconnect the engine coolant temperature sensor connector.

2. INSPECT COOLING FAN OPERATION AT HIGH TEMPERATURES (Above 96 °C (205 °F))

(a) Start the engine, and raise the engine coolant temperature to above 96 °C (205 °F).

HINT:

The engine coolant temperature is detected by the engine coolant temperature sensor on the water outlet.

(b) Check that the cooling fans operate.

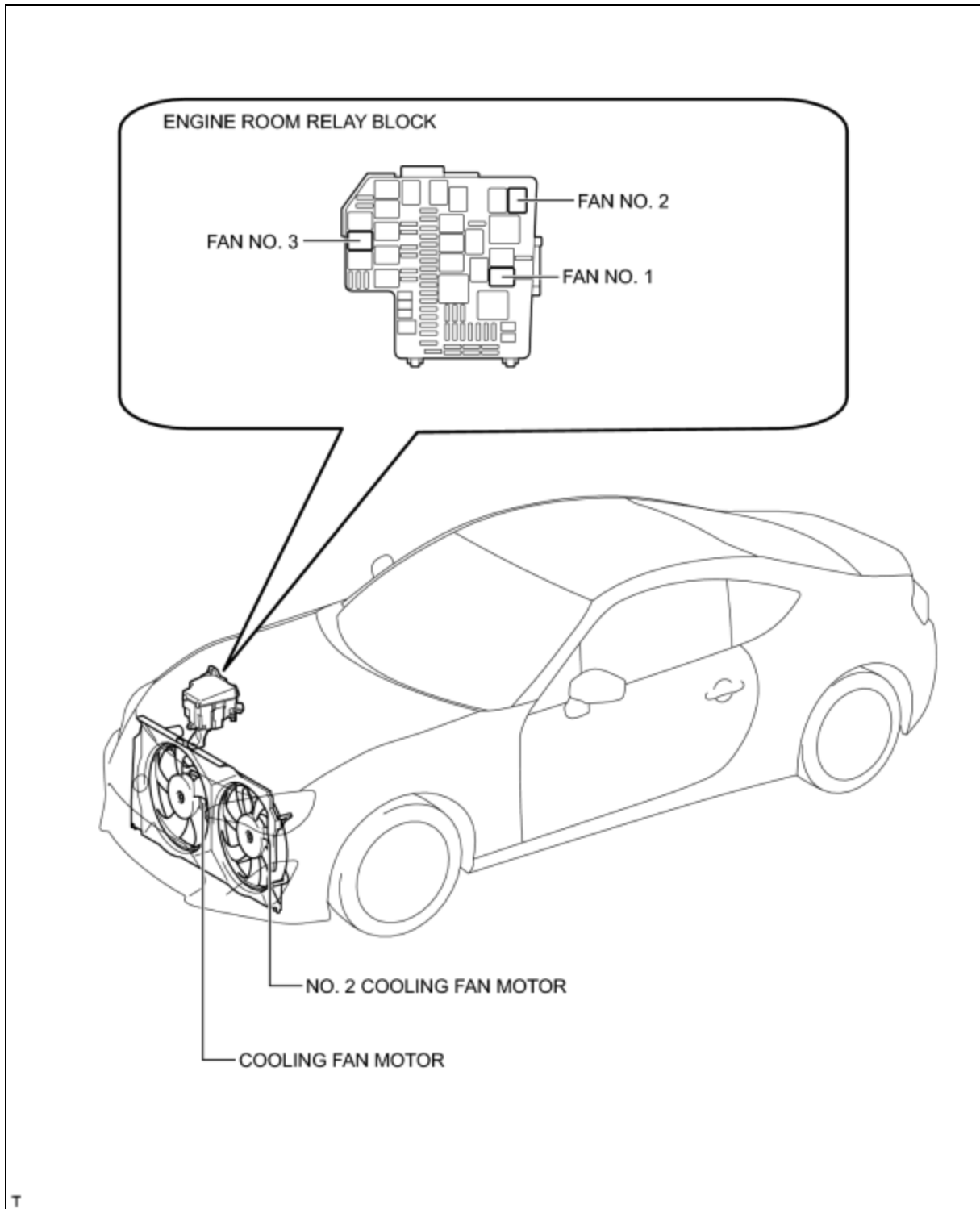
If it does not, replace the engine coolant temperature sensor.



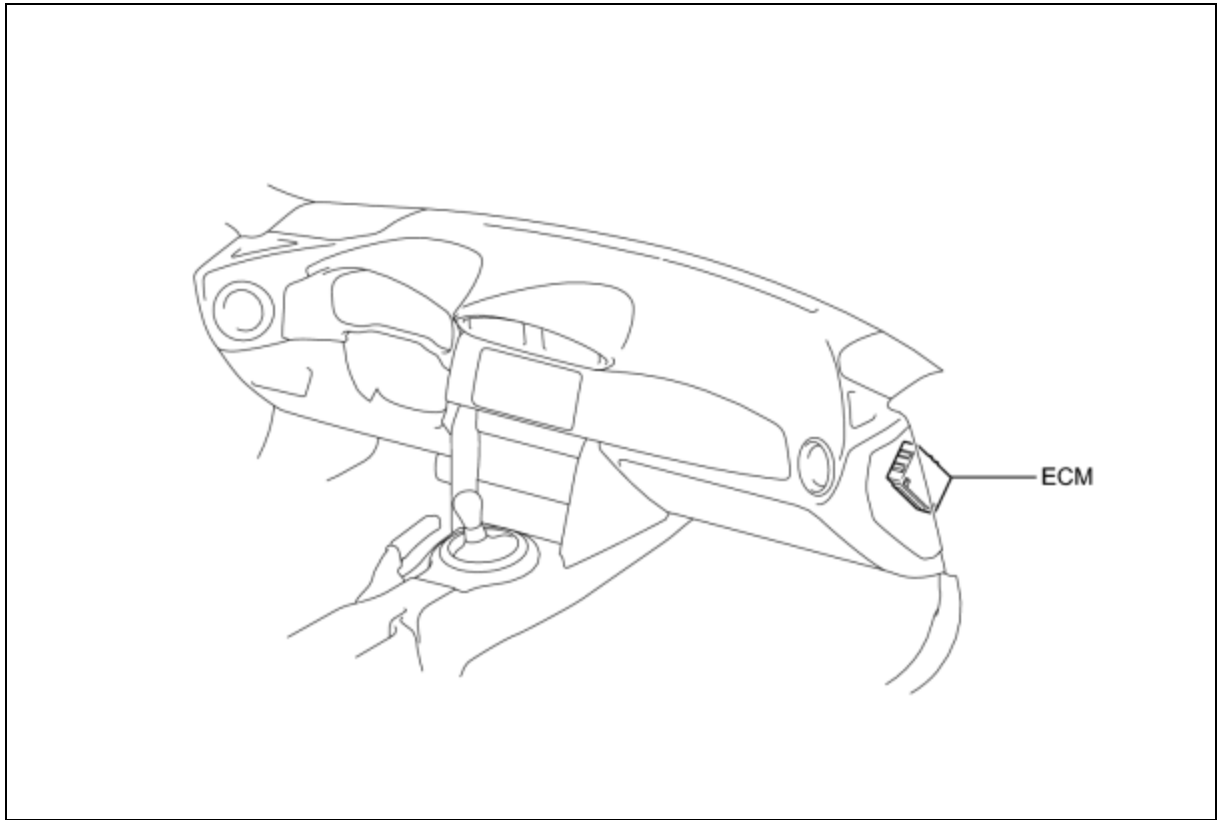
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000419I00DX
Title: FA20 COOLING: COOLING FAN SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003E0003BX
Title: FA20 COOLING: COOLING FAN SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

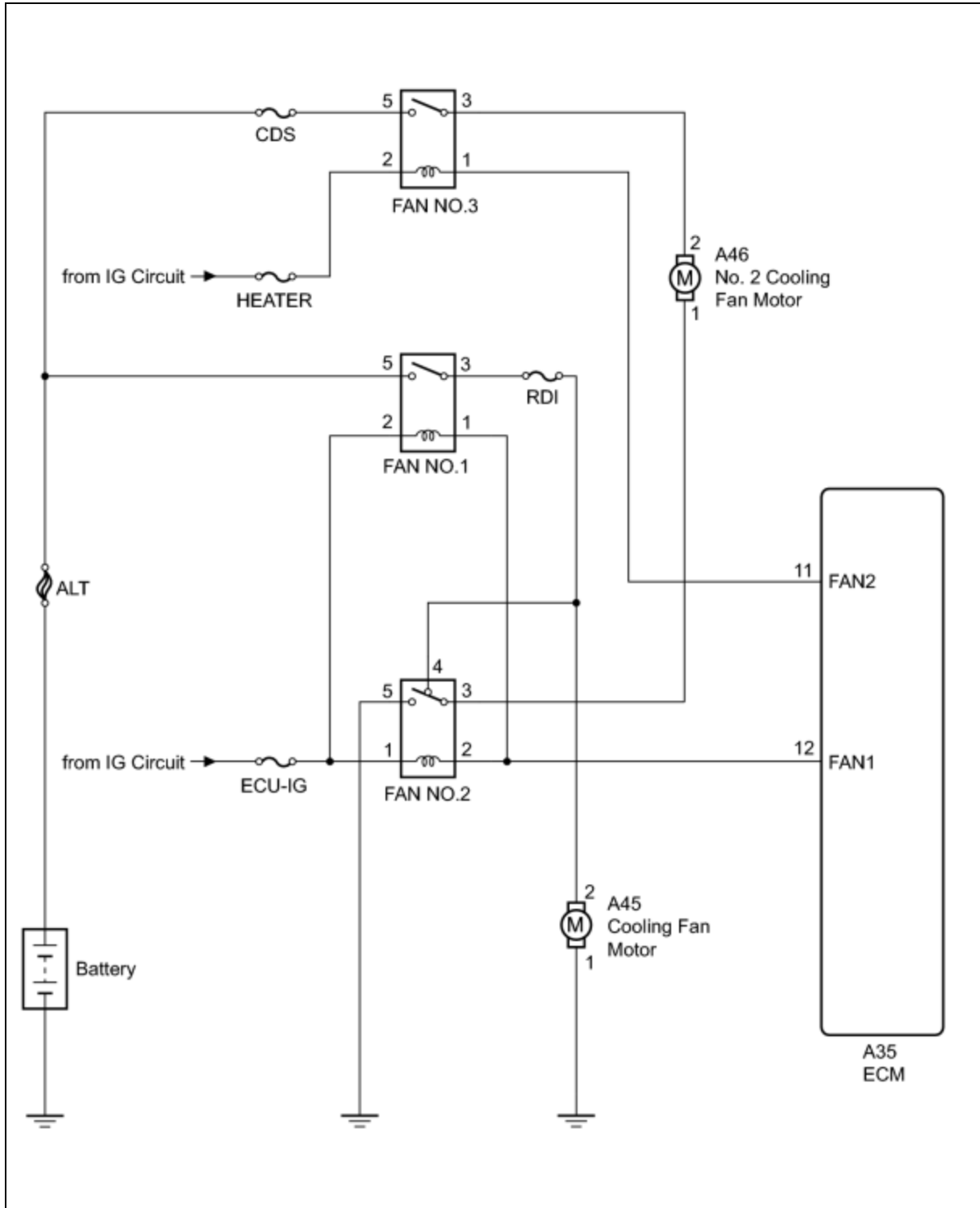
Cooling Fan System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Cooling fan does not operate	Engine coolant temperature sensor	INFO
	Cooling fan motor	INFO
	No. 2 cooling fan motor	INFO
	FAN NO. 1 relay	INFO
	FAN NO. 3 relay	INFO
	Cooling fan circuit	INFO
	ECM	INFO
Cooling fan does not stop	Engine coolant temperature sensor	INFO
	Cooling fan circuit (for short circuit)	INFO
	FAN NO. 1 relay	INFO
	FAN NO. 3 relay	INFO
	ECM	INFO
Cooling fan speed does not change	FAN NO. 2 relay	INFO
	Cooling fan circuit	INFO
	ECM	INFO



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003D8M00UX
Title: FA20 COOLING: COOLING FAN SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000V1Q0BLX
Title: FA20 COOLING: COOLING SYSTEM: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

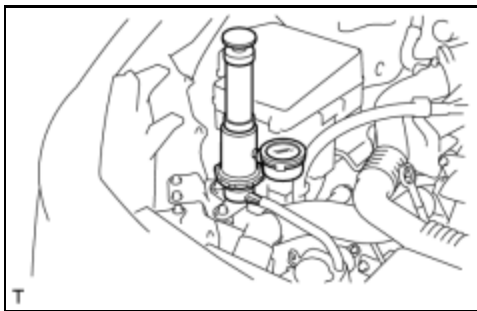
1. INSPECT FOR COOLANT LEAK

CAUTION:

Do not remove the radiator cap while the engine and radiator are still hot. Pressurized hot engine coolant and steam may be released and cause serious burns.

NOTICE:

Before performing each inspection, turn the A/C switch off.



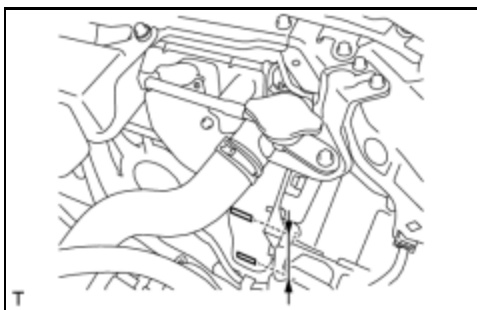
- (a) Fill the radiator with coolant and attach a radiator cap tester.

- (b) Warm up the engine.

- (c) Using a radiator cap tester, increase the pressure inside the radiator to 137 kPa (1.4 kgf/cm², 20 psi), and check that the pressure does not drop.

If the pressure drops, check the hoses, radiator and water pump for leaks. If no external leaks are found, check the heater core, cylinder block and cylinder head.

2. INSPECT ENGINE COOLANT LEVEL



- (a) Check that the engine coolant level is between the low and full lines when the engine is cold.

If the engine coolant level is low, check for leaks and add TOYOTA Genuine 50/50 Pre-mixed Super Long Life Coolant BLUE or similar high quality ethylene glycol based non-silicate, non-amine, non-nitrite and non-borate coolant with long-life hybrid organic acid technology to the full line.

NOTICE:

Do not substitute plain water for engine coolant.

3. INSPECT ENGINE COOLANT QUALITY

- (a) Remove the radiator cap.

CAUTION:

Do not remove the radiator cap while the engine and radiator are still hot. Pressurized, hot engine coolant and steam may be released and cause serious burns.

(b) Check if there are any excessive deposits of rust or scales around the radiator cap and radiator filler hole. Also, the coolant should be free of oil.

If excessively dirty, clean the coolant passage and replace the coolant.

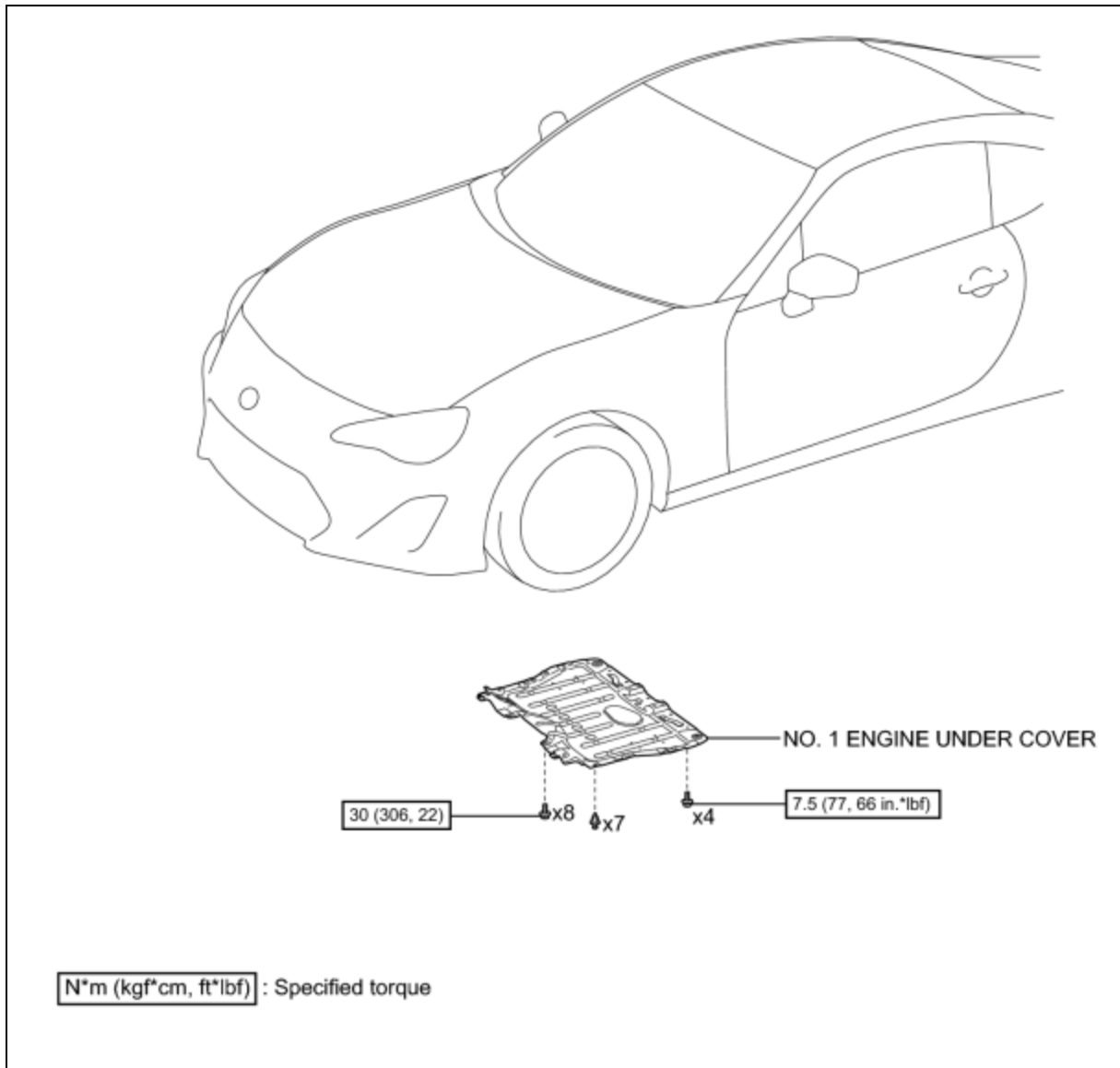
(c) Install the radiator cap.



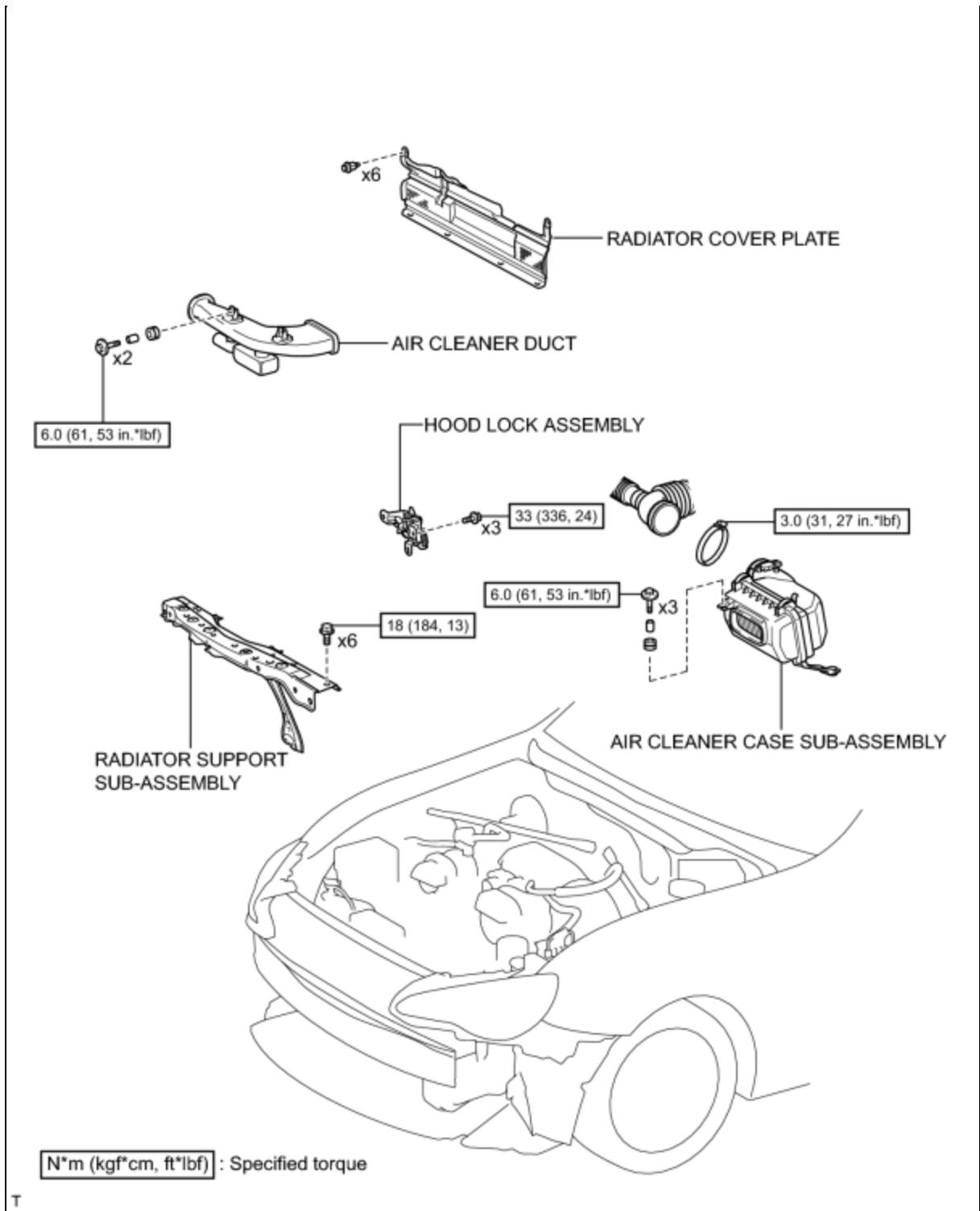
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001BJV01LX
Title: FA20 COOLING: RADIATOR: COMPONENTS (2013 FR-S)		

COMPONENTS

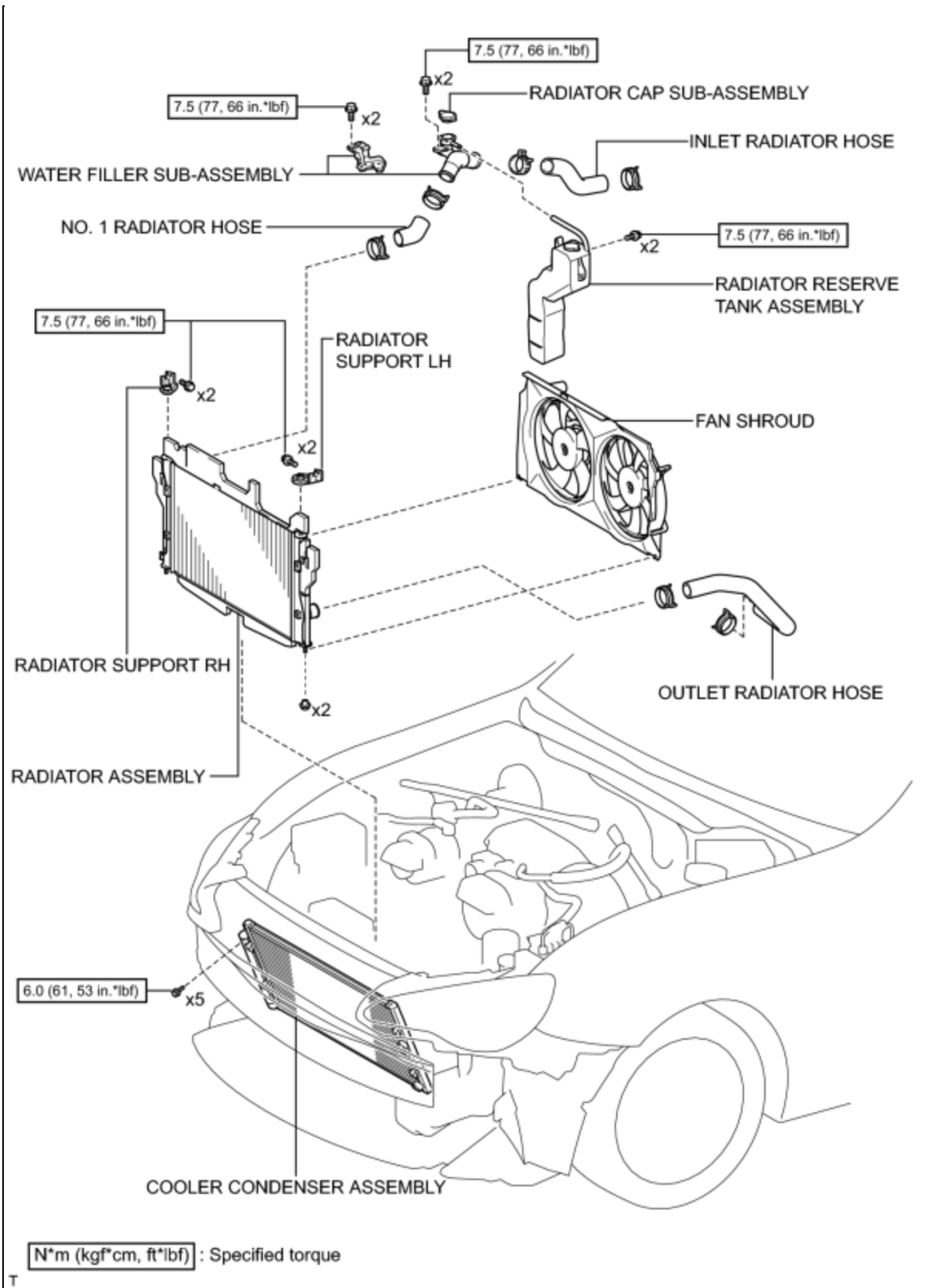
ILLUSTRATION



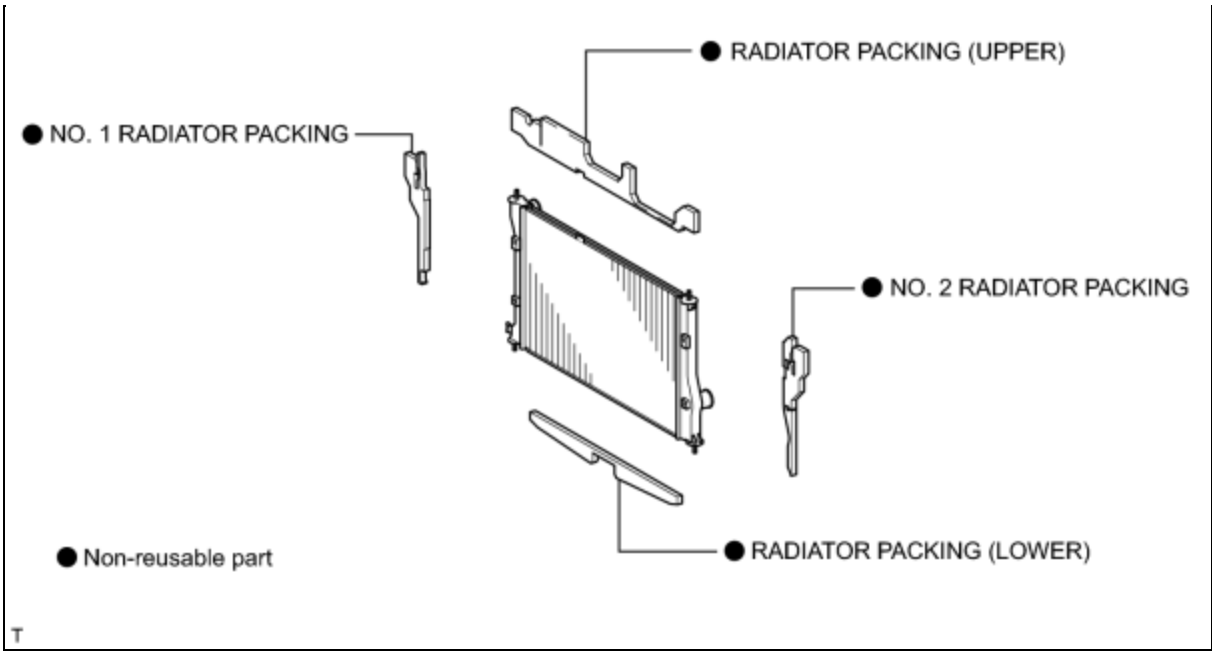
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MV1038X
Title: FA20 COOLING: RADIATOR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. REMOVE RADIATOR PACKING (LOWER)

- (a) Install the new radiator packing.

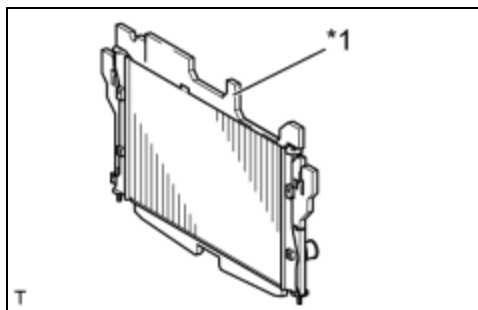
2. REMOVE NO. 2 RADIATOR PACKING

- (a) Install the new No. 2 radiator packing.

3. REMOVE NO. 1 RADIATOR PACKING

- (a) Install the new No. 1 radiator packing.

4. REMOVE RADIATOR PACKING (UPPER)



- (a) Install the new radiator packing.

Text in Illustration

*1	Radiator Packing
----	------------------

HINT:

Cut the radiator packing at the same position in the removal.

5. INSTALL OUTLET RADIATOR HOSE

- (a) Since the radiator hose must be attached in the correct position, apply match marks before removing it.
- (b) Install the outlet radiator hose to the radiator assembly and secure it with the clamp.

6. INSTALL NO. 1 RADIATOR HOSE

- (a) Since the radiator hose must be attached in the correct position, apply match marks before removing it.
- (b) Install the No. 1 radiator hose to the water filler sub-assembly and secure it with the clamp.

7. INSTALL INLET RADIATOR HOSE

- (a) Since the radiator hose must be attached in the correct position, apply match marks before removing it.
- (b) Install the inlet radiator hose to the radiator assembly and secure it with the clamp.

8. INSTALL RADIATOR ASSEMBLY

- (a) Install the 2 radiator support cushions to the radiator assembly.
- (b) While lifting the outlet radiator hose, install the radiator assembly.

NOTICE:

Push a blanket or a cardboard against the cooler condenser assembly to protect it.

(c) Attach the claw and install the thermistor assembly.

(d) Install the radiator support RH with the 2 bolts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

(e) Install the radiator support LH with the 2 bolts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

9. REMOVE FAN SHROUD INFO

10. INSTALL COOLER CONDENSER ASSEMBLY

(a) Install the cooler condenser assembly to the radiator assembly with the 5 bolts.

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

11. INSTALL RADIATOR SUPPORT SUB-ASSEMBLY

(a) Install the 6 bolts and radiator support sub-assembly.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

12. INSTALL HOOD LOCK ASSEMBLY INFO

13. INSTALL WATER FILLER SUB-ASSEMBLY

(a) Install the water filler sub-assembly and water filler bracket with the 4 bolts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

(b) Connect the inlet radiator hose and No. 1 radiator hose to the radiator assembly with the 2 clamps.

(c) Connect the radiator cap hose to the water filler sub-assembly.

14. INSTALL RADIATOR COVER PLATE

(a) Install the radiator cover plate with the 6 clips.

15. INSTALL AIR CLEANER DUCT

(a) Install the air cleaner duct with the 2 bolts.

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

16. INSTALL RADIATOR RESERVE TANK ASSEMBLY

(a) Install the radiator reserve tank assembly with the 2 bolts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

17. CONNECT OUTLET RADIATOR HOSE INFO

18. ADD ENGINE COOLANT INFO

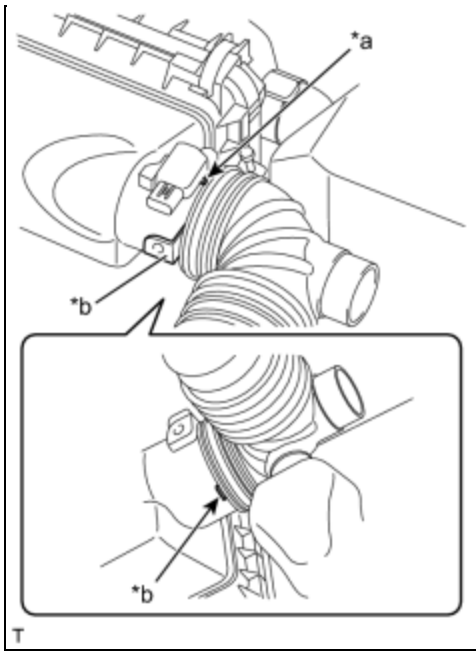
19. INSPECT FOR COOLANT LEAK INFO

20. INSTALL NO. 1 ENGINE UNDER COVER INFO

21. INSTALL FRONT BUMPER COVER

INFO

22. INSTALL AIR CLEANER CASE SUB-ASSEMBLY



(a) Connect the hose.

Torque: 3.0 N·m (31 kgf·cm, 27in·lbf)

HINT:

When connecting the hose, align the protrusion of the air cleaner case sub-assembly with the cutout of the hose, and push in the hose until it contacts the stopper of the air cleaner case sub-assembly.

Text in Illustration

*a	match marks
*b	Stopper

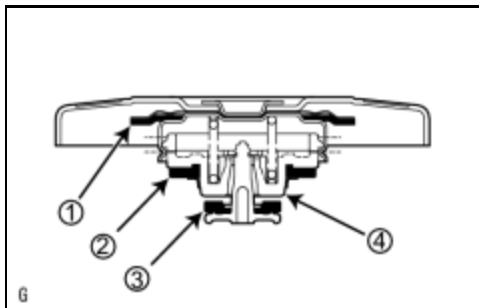


Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XYW08QX
Title: FA20 COOLING: RADIATOR: ON-VEHICLE INSPECTION (2013 FR-S)		

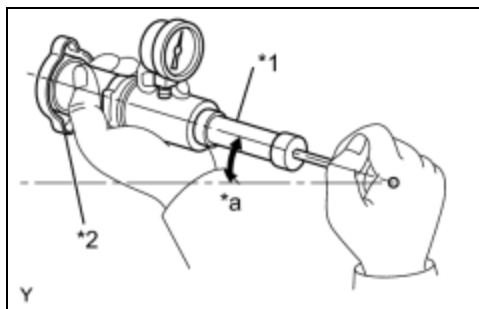
ON-VEHICLE INSPECTION

1. CHECK RADIATOR CAP SUB-ASSEMBLY

(a) Measure the valve opening pressure.



- (1) If there are water stains or foreign matter on rubber packings 1, 2 or 3, clean the part(s) with water and finger scouring.
- (2) Check that rubber packings 1, 2 or 3 are not deformed, cracked or swollen.
- (3) Check that rubber packings 3 and 4 are not stuck together.
- (4) Apply engine coolant to rubber packings 2 and 3 before using the radiator cap tester.



(5) When using the cap tester, tilt it 30° or more.

Text in Illustration

*1	Radiator Cap Tester
*2	Radiator cap sub-assembly
*a	30° or more

(6) Pump the cap tester several times, and check the maximum pressure*1.

Pumping speed:
1 pump per second

HINT:

*1: Even if the cap cannot maintain the maximum pressure, it is not a defect.

Judgment Criterion:

ITEM	SPECIFIED CONDITION
Standard valve (for brand-new cap)	93 to 123 kPa (0.95 to 1.25 kgf/cm ² , 14 to 18 psi)

Minimum standard valve
(for used cap)

83 kPa (0.85 kgf/cm² , 12 psi)

If the maximum pressure is less than the minimum standard valve, replace the radiator cap sub-assembly.

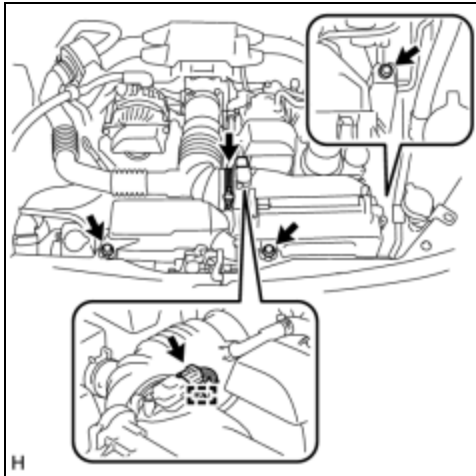


TOYOTA

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MV3036X
Title: FA20 COOLING: RADIATOR: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE AIR CLEANER CASE SUB-ASSEMBLY



(a) Disengage the clamp, and disconnect the mass air flow meter connector.

(b) Remove the 3 bolts.

(c) Loosen the hose clamp, and disconnect the hose.

(d) Remove the air cleaner case sub-assembly.

2. REMOVE FRONT BUMPER COVER

INFO

3. REMOVE NO. 1 ENGINE UNDER COVER

INFO

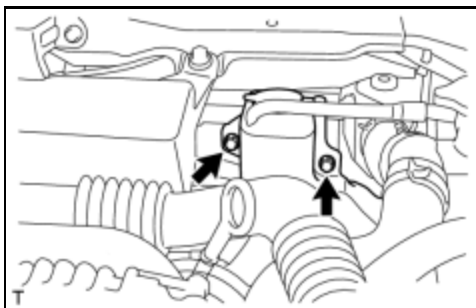
4. DRAIN ENGINE COOLANT

INFO

5. DISCONNECT OUTLET RADIATOR HOSE

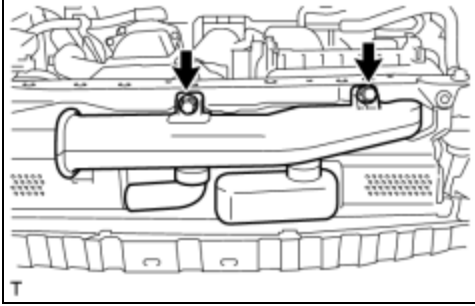
INFO

6. REMOVE RADIATOR RESERVE TANK ASSEMBLY



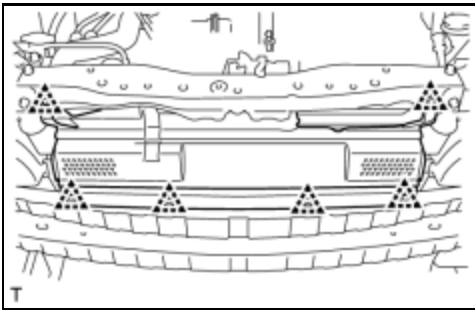
(a) Remove the 2 bolts and radiator reserve tank assembly.

7. REMOVE AIR CLEANER DUCT



(a) Remove the 2 bolts and air cleaner duct.

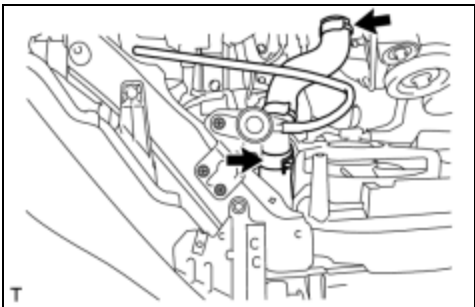
8. REMOVE RADIATOR COVER PLATE



(a) Remove the 6 clips and radiator cover plate.

9. REMOVE WATER FILLER SUB-ASSEMBLY

(a) Disconnect the radiator cap hose.



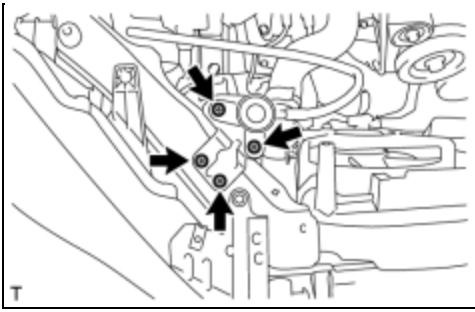
(b) Detach the 2 water hose clamps.

(c) Disconnect the inlet radiator hose and No. 1 radiator hose.

HINT:

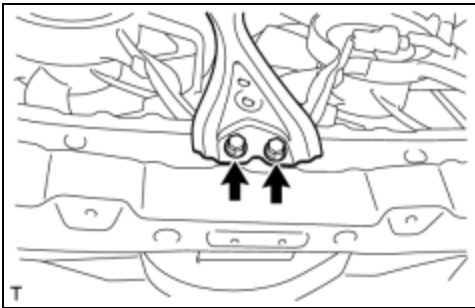
Since the radiator hose must be attached in the correct position, apply match marks before removing it.

(d) Remove the 4 bolts and the water filler sub-assembly with water filler bracket.

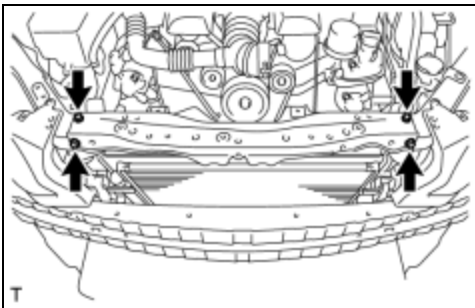


10. REMOVE HOOD LOCK ASSEMBLY INFO

11. REMOVE RADIATOR SUPPORT SUB-ASSEMBLY

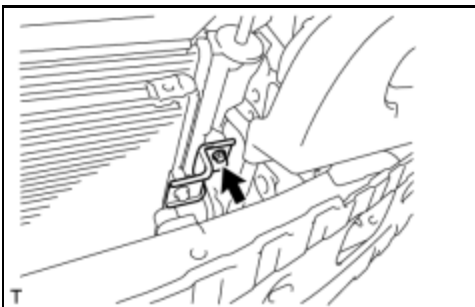


(a) Remove the 2 bolts.

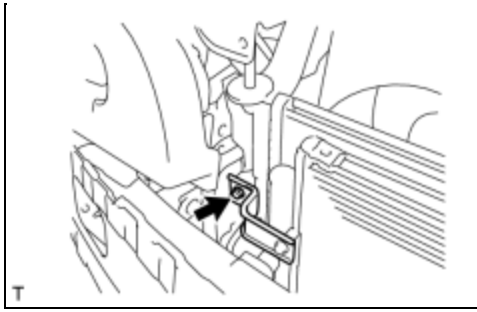


(b) Remove the 4 bolts and radiator support sub-assembly.

12. SEPARATE COOLER CONDENSER ASSEMBLY



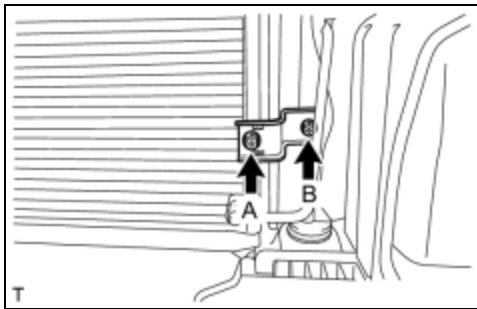
(a) Remove the bolt.



(b) Remove the bolt.



(c) Remove the bolt.

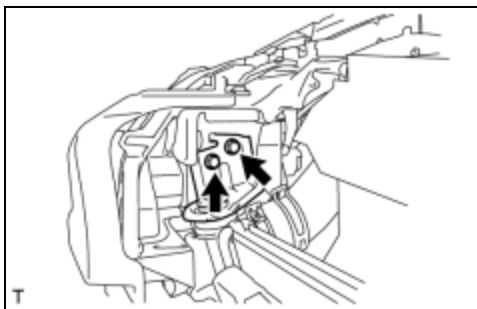


(d) Remove the bolt A.

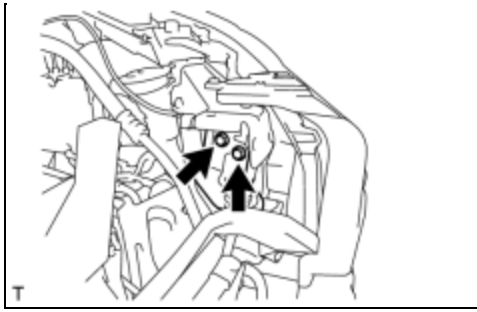
(e) Remove the bolt B and separate the cooler condenser assembly from the radiator assembly.

13. REMOVE FAN SHROUD INFO

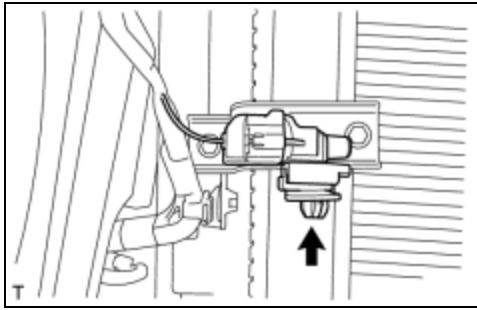
14. REMOVE RADIATOR ASSEMBLY



(a) Remove the 2 bolts and radiator support RH.



(b) Remove the 2 bolts and radiator support LH.



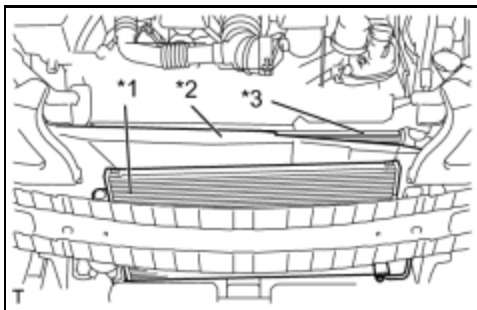
(c) Detach the claw and disconnect the thermistor assembly.

(d) While lifting the outlet radiator hose, remove the radiator assembly.

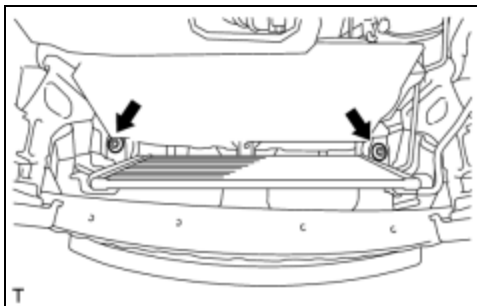
NOTICE:

Insert cardboard or a blanket between the radiator assembly and the cooler condenser assembly to protect the cooler condenser assembly.

Text in Illustration



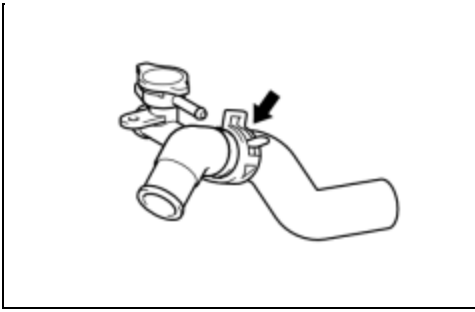
*1	Cooler condenser assembly
*2	Cardboard or Blanket
*3	Radiator assembly



(e) Remove the 2 radiator support cushions.

15. REMOVE INLET RADIATOR HOSE

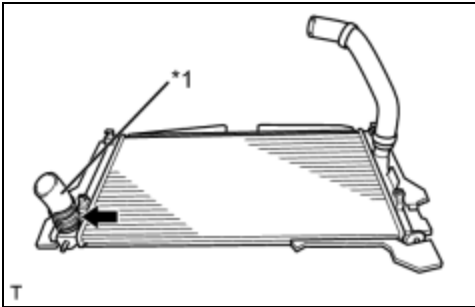
(a) Remove the clamp and the inlet radiator hose from the water filler sub-assembly.



HINT:

Since the radiator hose must be attached in the correct position, apply match marks before removing it.

16. REMOVE NO. 1 RADIATOR HOSE



(a) Remove the clamp and No. 1 radiator hose from the radiator assembly.

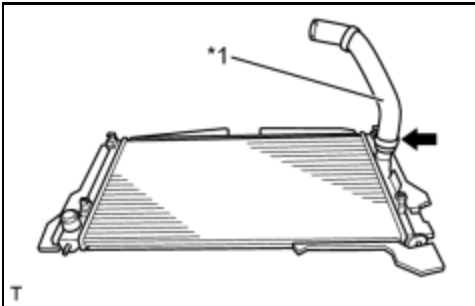
Text in Illustration

*1	No. 1 radiator hose
----	---------------------

HINT:

Since the radiator hose must be attached in the correct position, apply match marks before removing it.

17. REMOVE OUTLET RADIATOR HOSE



(a) Remove the clamp and outlet radiator hose from the radiator assembly.

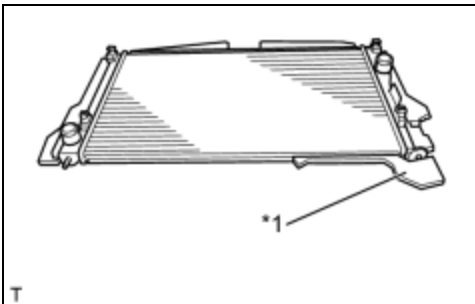
Text in Illustration

*1	Outlet radiator hose
----	----------------------

HINT:

Since the radiator hose must be attached in the correct position, apply match marks before removing it.

18. REMOVE RADIATOR PACKING (UPPER)

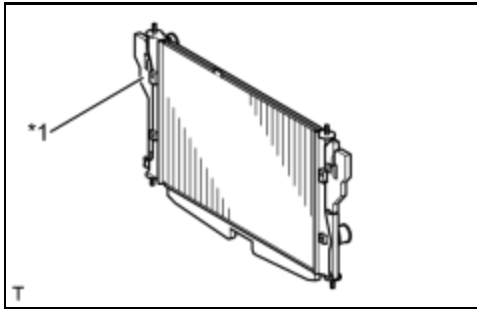


(a) Remove the radiator packing.

Text in Illustration

*1	Radiator Packing
----	------------------

19. REMOVE NO. 1 RADIATOR PACKING

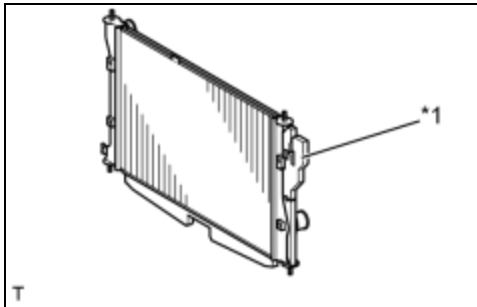


(a) Remove the No. 1 radiator packing.

Text in Illustration

*1	No. 1 Radiator Packing
----	------------------------

20. REMOVE NO. 2 RADIATOR PACKING

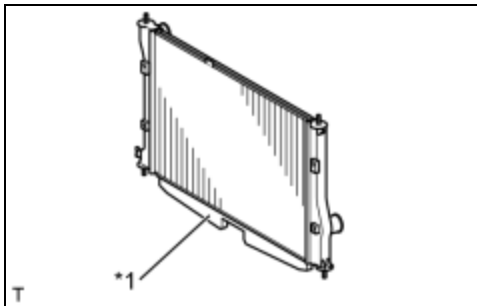


(a) Remove the No. 2 radiator packing.

Text in Illustration

*1	No. 2 Radiator Packing
----	------------------------

21. REMOVE RADIATOR PACKING (LOWER)



(a) Remove the radiator packing.

Text in Illustration

*1	Radiator Packing
----	------------------

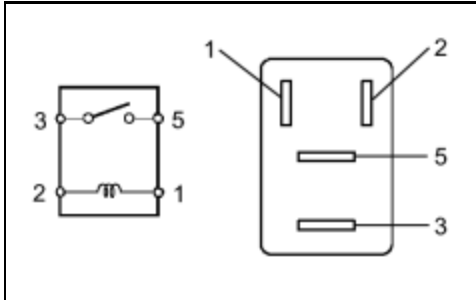
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XX00ABX
Title: FA20 COOLING: RELAY: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. FAN NO. 1 RELAY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



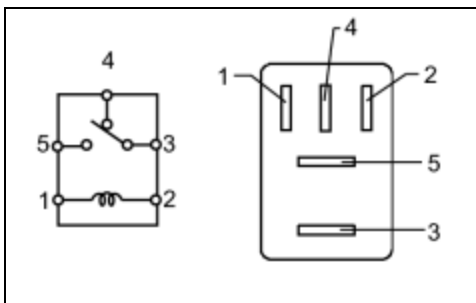
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 5	Battery voltage is not applied between terminals 1 and 2	10 kΩ or higher
3 - 5	Battery voltage is applied between terminals 1 and 2	Below 1 Ω

If the result is not as specified, replace the relay.

2. FAN NO. 2 RELAY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

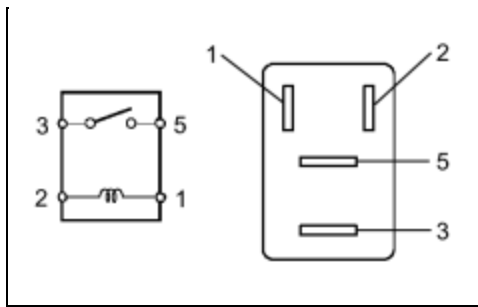


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 4	Battery voltage is not applied between terminals 1 and 2	Below 1 Ω
3 - 5	Battery voltage is not applied between terminals 1 and 2	10 kΩ or higher
3 - 4	Battery voltage is applied between terminals 1 and 2	10 kΩ or higher
3 - 5	Battery voltage is applied between terminals 1 and 2	Below 1 Ω

If the result is not as specified, replace the relay.

3. FAN NO. 3 RELAY

(a) Measure the resistance according to the value(s) in the table below.



Standard Resistance:

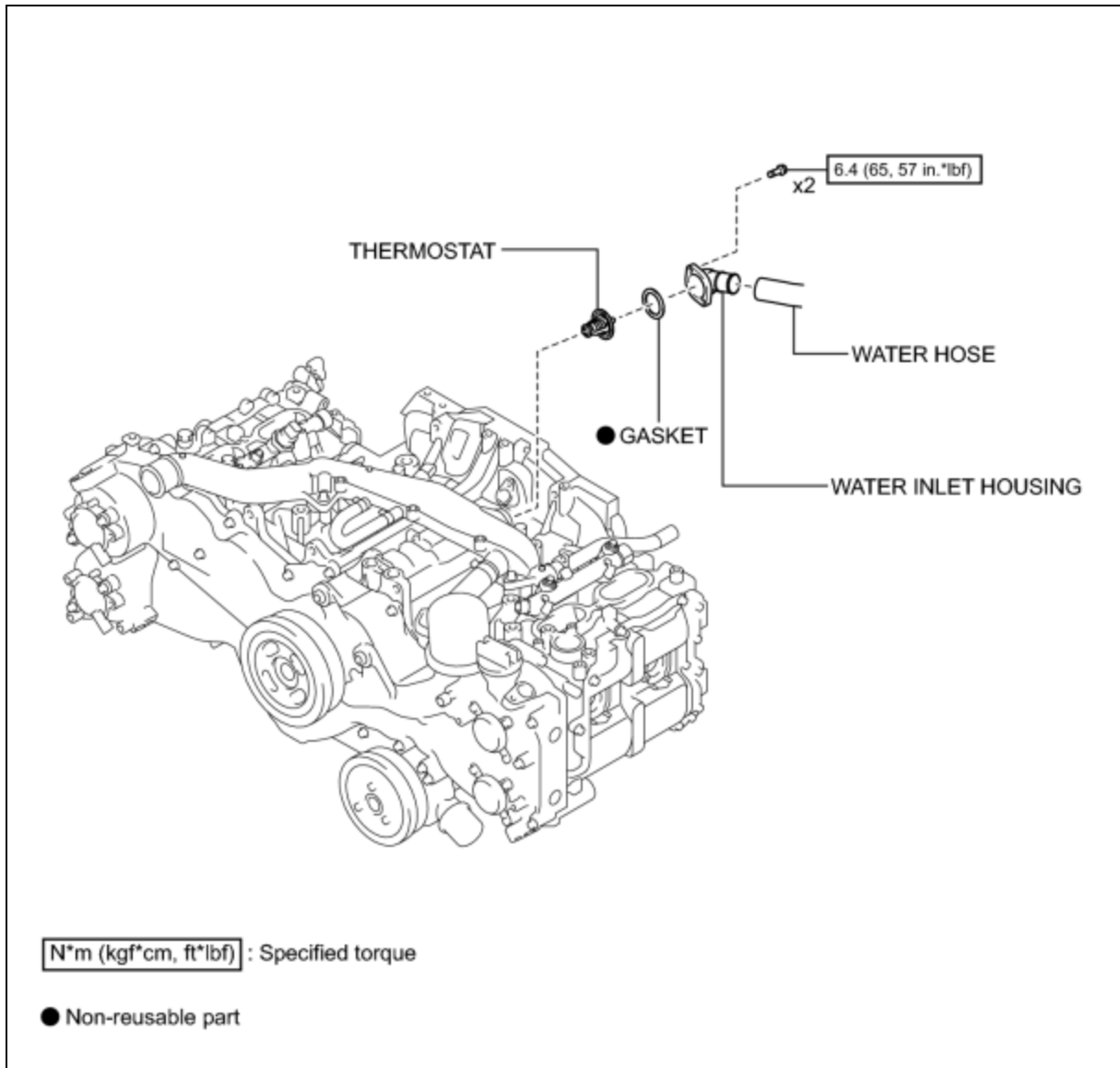
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 5	Battery voltage is not applied between terminals 1 and 2	10 k Ω or higher
3 - 5	Battery voltage is applied between terminals 1 and 2	Below 1 Ω

If the result is not as specified, replace the relay.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000RTE03TX
Title: FA20 COOLING: THERMOSTAT (for Automatic Transmission): COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000335X02CX
Title: FA20 COOLING: THERMOSTAT (for Automatic Transmission): INSPECTION (2013 FR-S)		

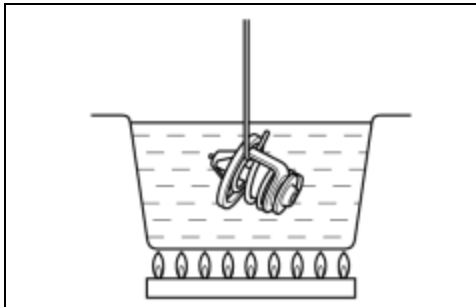
INSPECTION

1. INSPECT THERMOSTAT

- (a) Immerse the thermostat in water and then gradually heat the water.

HINT:

Hold the thermostat with a wire or the like, so that the thermostat does not come into contact with the bottom of the container.



- (b) Check the valve opening temperature of the thermostat.

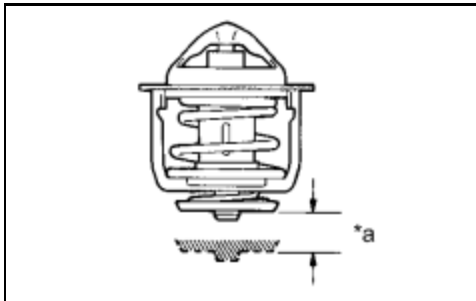
Valve opening temperature:
48 to 52°C (118 to 126°F)

HINT:

If the valve opening temperature is not as specified, replace the thermostat.

- (c) Check the valve lift.

Text in Illustration



*a	Valve Lift
----	------------

Valve lift:
6.0 mm (0.236 in.) or more at 63°C (145°F)

HINT:

If the valve lift is not as specified, replace the thermostat.

- (d) Check that the valve is fully closed when the water inlet with thermostat is at low temperatures (below 45°C (113°F)).

HINT:

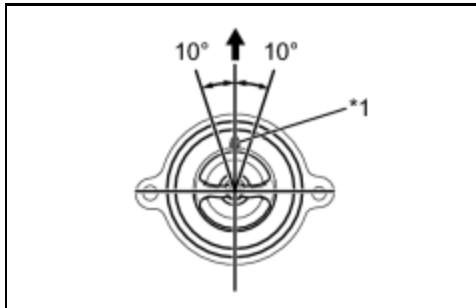
If it is not fully closed, replace the thermostat.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000RTC04VX
Title: FA20 COOLING: THERMOSTAT (for Automatic Transmission): INSTALLATION (2013 FR-S)		


INSTALLATION

1. INSTALL THERMOSTAT

- (a) Install a new gasket to the thermostat.
- (b) Install the thermostat to the water inlet housing as shown in the illustration.



Text in Illustration

*1	Jiggle Valve
	Upper Side

HINT:

The jiggle valve must be set within 10° on either side of the position shown in the illustration.

2. CONNECT WATER INLET HOUSING

- (a) Install the water inlet housing with the 2 bolts.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

3. CONNECT WATER HOSE

- (a) Connect the water hose to the water inlet housing with the hose clamp.

4. ADD COOLANT INFO

5. INSPECT FOR COOLANT LEAK INFO

6. INSTALL INTAKE MANIFOLD

INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000RTF04VX
Title: FA20 COOLING: THERMOSTAT (for Automatic Transmission): REMOVAL (2013 FR-S)		

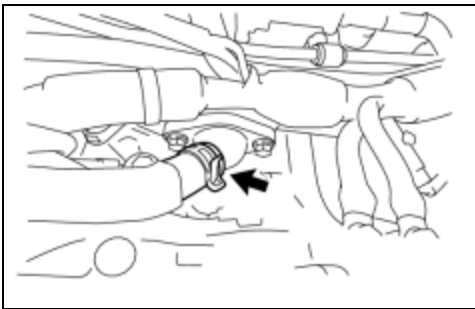
REMOVAL

1. DRAIN COOLANT INFO

2. REMOVE INTAKE MANIFOLD

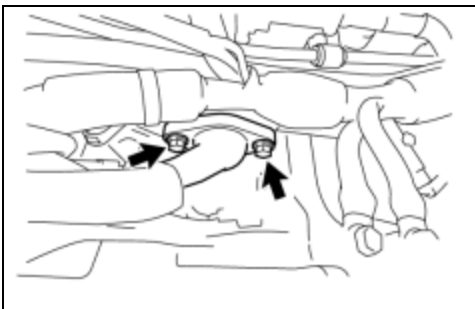
INFO

3. DISCONNECT WATER HOSE



- (a) Loosen the hose clamp and disconnect the water hose from the water inlet housing.

4. DISCONNECT WATER INLET HOUSING



- (a) Remove the 2 bolts and water inlet housing.

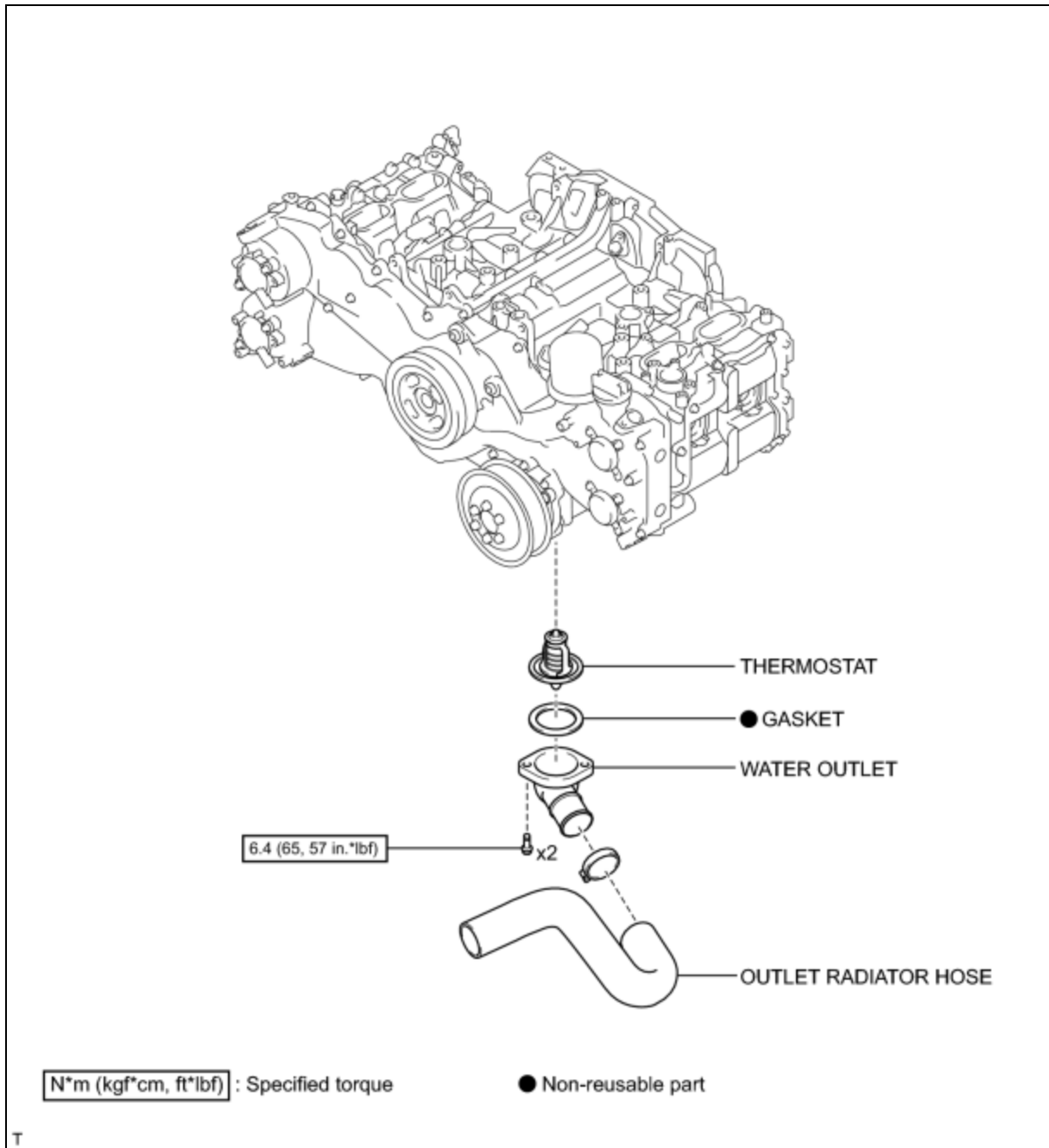
5. REMOVE THERMOSTAT

- (a) Remove the thermostat.
(b) Remove the gasket from the thermostat.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001BK2017X
Title: FA20 COOLING: THERMOSTAT (for Engine Coolant): COMPONENTS (2013 FR-S)		

COMPONENTS

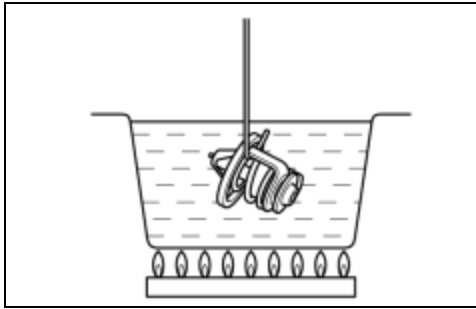
ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000041GQ00BX
Title: FA20 COOLING: THERMOSTAT (for Engine Coolant): INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT THERMOSTAT



- (a) Immerse the thermostat in water and then gradually heat the water.

HINT:

Hold the thermostat with a wire or the like, so that the thermostat does not come into contact with the bottom of the container.

- (b) Check the valve opening temperature of the thermostat.

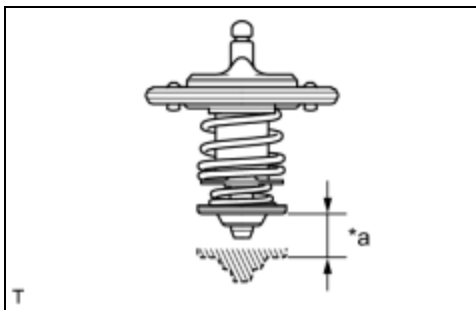
Standard valve opening temperature:
86 to 90 °C (187 to 194 °F)

HINT:

If the valve opening temperature is not as specified, replace the thermostat.

- (c) Check the valve opening temperature.

- (d) Check the valve lift.



Text in Illustration

*a	Valve lift
----	------------

Valve lift:
8.0 mm (0.315 in.) or more at 95 °C (203 °F)

HINT:

If the valve lift value is not as specified, replace the thermostat.

- (e) When the temperature of the thermostat drops below 83 °C (181 °F), check that the valve is fully closed.

HINT:

If the valve is not fully closed, replace the thermostat.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MWC028X
Title: FA20 COOLING: THERMOSTAT (for Engine Coolant): INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL THERMOSTAT

- (a) Install a new thermostat gasket to the thermostat.
- (b) Install the thermostat to the water outlet.

2. INSTALL WATER OUTLET

- (a) Install the water outlet with the 2 bolts.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

3. CONNECT OUTLET RADIATOR HOSE

- (a) Since the radiator hose must be attached in the correct position, apply match marks before removing it.
- (b) Connect the outlet radiator hose to the water outlet with the hose clamp.

4. ADD ENGINE COOLANT INFO

5. INSPECT FOR COOLANT LEAK INFO

6. INSTALL EXHAUST MANIFOLD

INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MWE028X
Title: FA20 COOLING: THERMOSTAT (for Engine Coolant): REMOVAL (2013 FR-S)		

REMOVAL

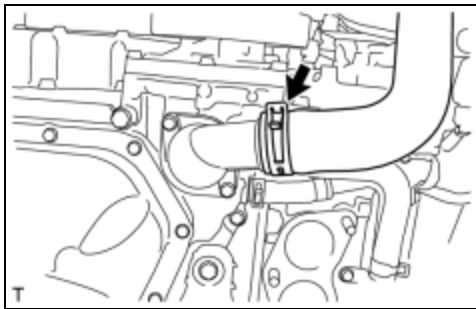
1. REMOVE EXHAUST MANIFOLD

INFO

2. DRAIN ENGINE COOLANT

INFO

3. SEPARATE OUTLET RADIATOR HOSE

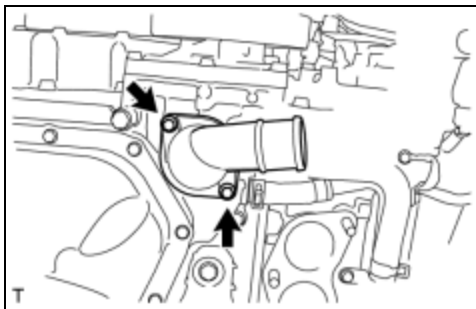


- (a) Loosen the hose clamp and disconnect the outlet radiator hose from the water outlet.

HINT:

Since the radiator hose must be attached in the correct position, apply match marks before removing it.

4. REMOVE WATER OUTLET



- (a) Remove the 2 bolts and water outlet.

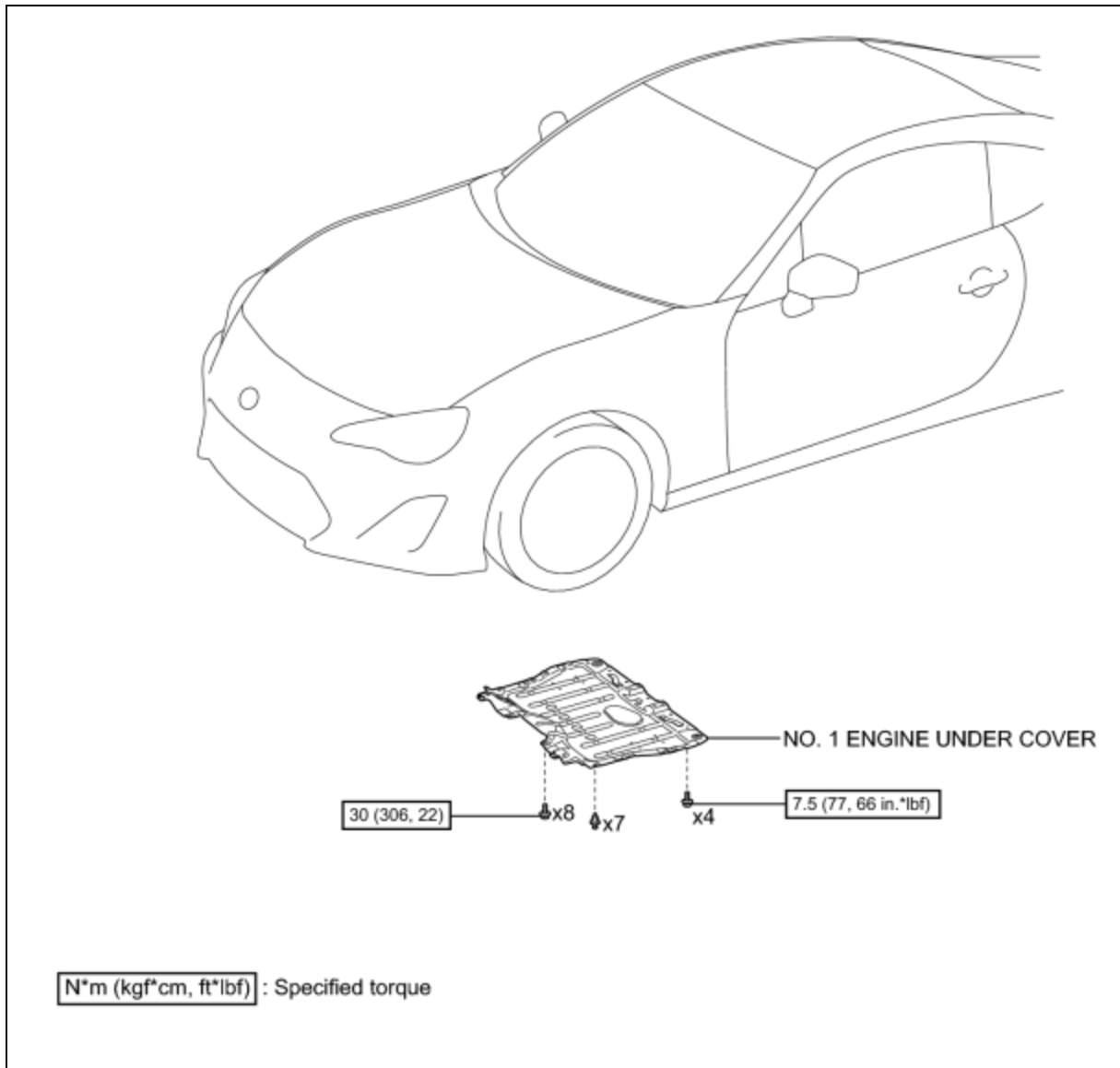
5. REMOVE THERMOSTAT

- (a) Remove the thermostat.
(b) Remove the thermostat gasket from the thermostat.

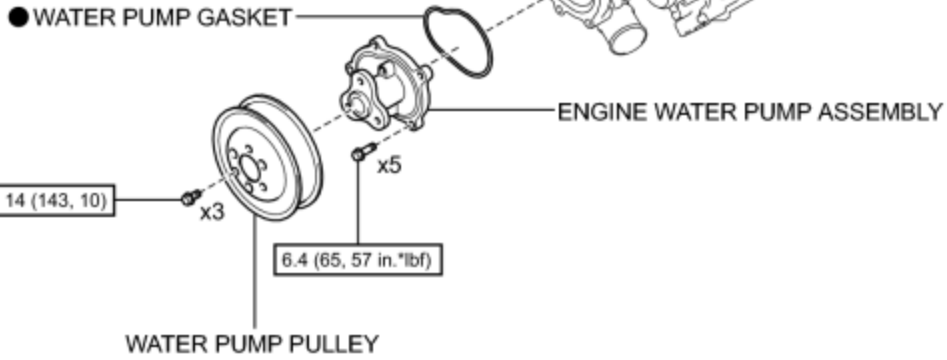
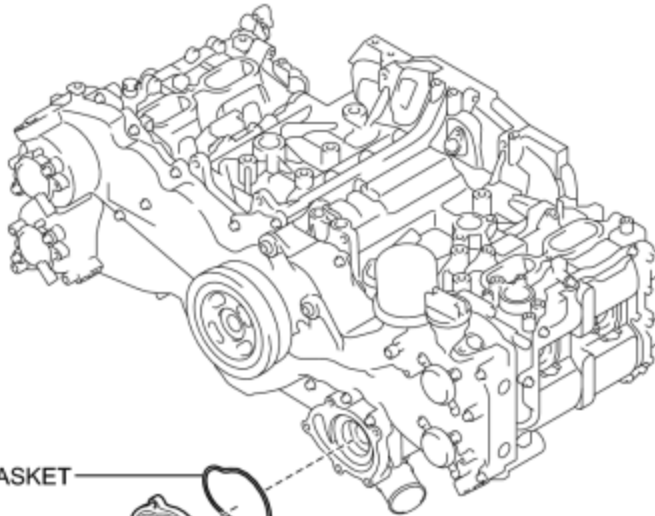
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001BJY017X
Title: FA20 COOLING: WATER PUMP: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



N·m (kgf·cm, ft·lbf) : Specified torque

● Non-reusable part

T

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MW802FX
Title: FA20 COOLING: WATER PUMP: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL ENGINE WATER PUMP ASSEMBLY

- (a) Install a new water pump gasket and the engine water pump assembly with the 5 bolts.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

2. INSTALL WATER PUMP PULLEY

- (a) Temporarily install the water pump pulley with the 3 bolts.
(b) Using SST, hold the water pump pulley and tighten the 3 bolts.

SST: 09960-10010

09962-01000

09963-00700

Torque: 14 N·m (143 kgf·cm, 10ft·lbf)

3. REMOVE EXHAUST MANIFOLD

INFO

4. INSTALL FAN AND GENERATOR V BELT

INFO

5. ADD ENGINE COOLANT

INFO

6. INSPECT FOR COOLANT LEAK

INFO

7. INSTALL NO. 1 ENGINE UNDER COVER



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000041DB00HX
Title: FA20 COOLING: WATER PUMP: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

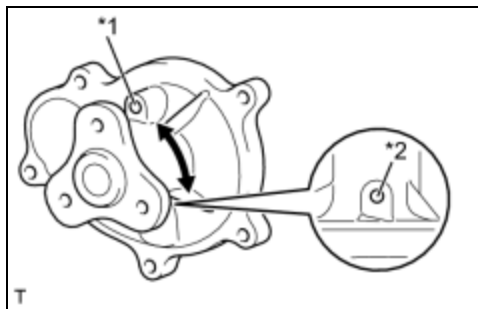
1. REMOVE WATER PUMP PULLEY

INFO

2. INSPECT ENGINE WATER PUMP ASSEMBLY

- (a) Turn the pulley and check that the water pump bearing moves smoothly and quietly. If necessary, replace the engine water pump assembly.

If necessary, replace the engine water pump assembly.



- (b) Visually check the air hole and water hole for coolant leaks.

Text in Illustration

*1	Air Hole
*2	Water Hole

If necessary, replace the engine water pump assembly.

3. INSTALL WATER PUMP PULLEY

INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MWA02CX
Title: FA20 COOLING: WATER PUMP: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE NO. 1 ENGINE UNDER COVER INFO

2. DRAIN ENGINE COOLANT INFO

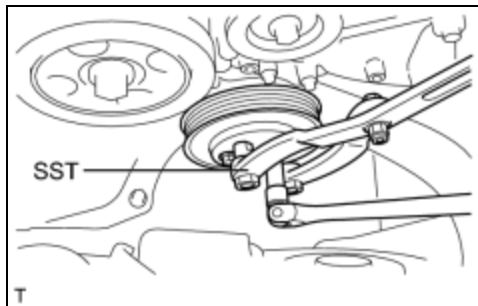
3. REMOVE FAN AND GENERATOR V BELT

INFO

4. REMOVE EXHAUST MANIFOLD

INFO

5. REMOVE WATER PUMP PULLEY

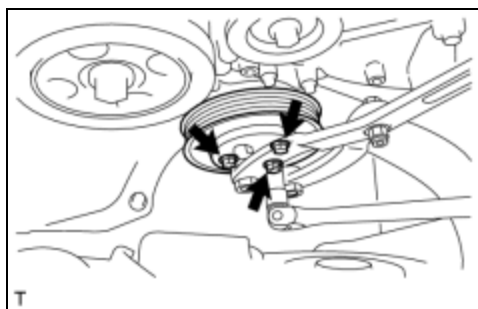


(a) Using SST, hold the water pump pulley.

SST: 09960-10010

09962-01000

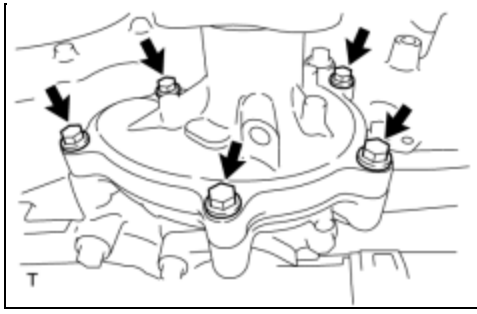
09963-00700



(b) Remove the 3 bolts and water pump pulley.

6. REMOVE ENGINE WATER PUMP ASSEMBLY

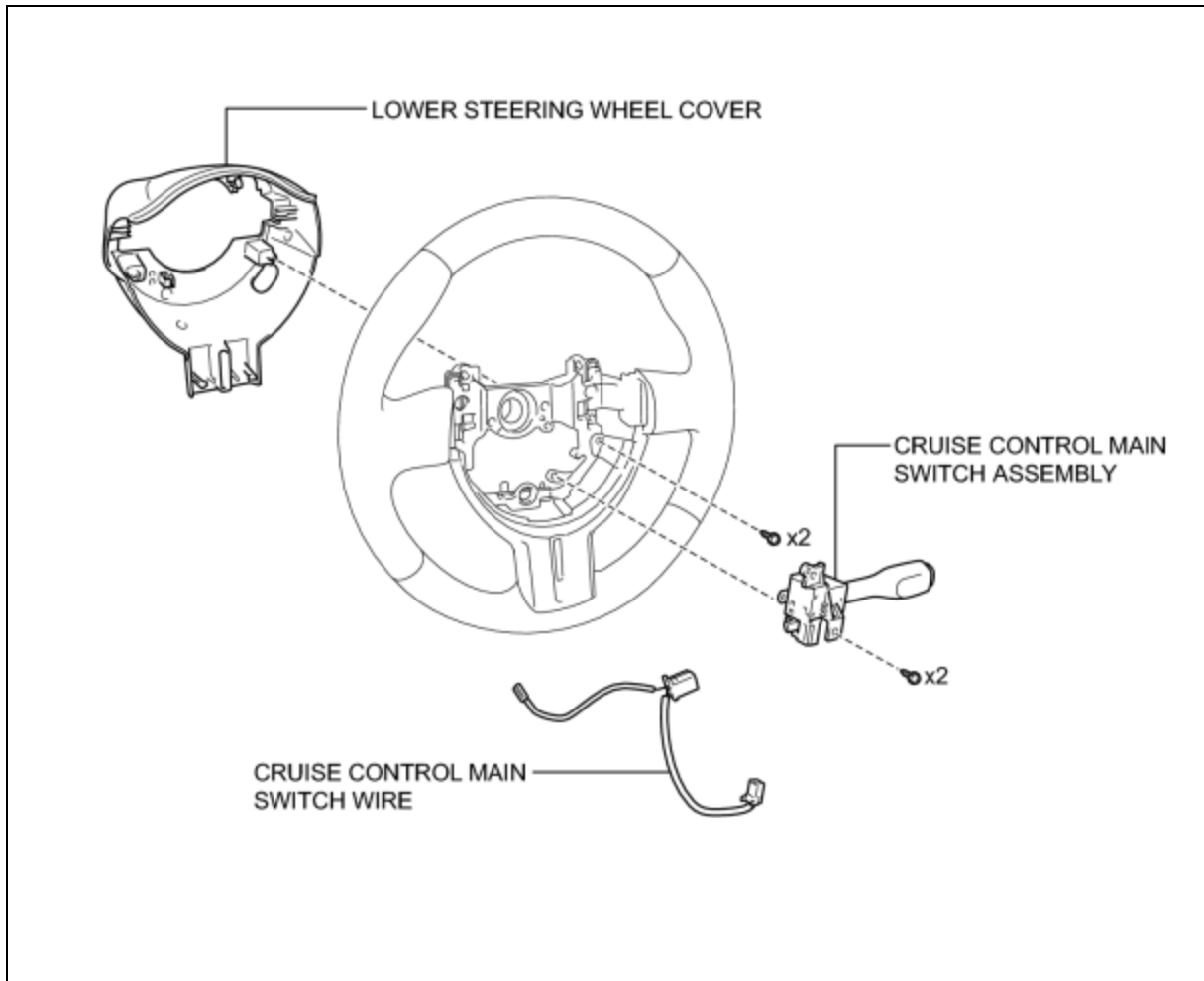
(a) Remove the 5 bolts, engine water pump assembly and water pump gasket.



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VQ204UX
Title: CRUISE CONTROL: CRUISE CONTROL MAIN SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION

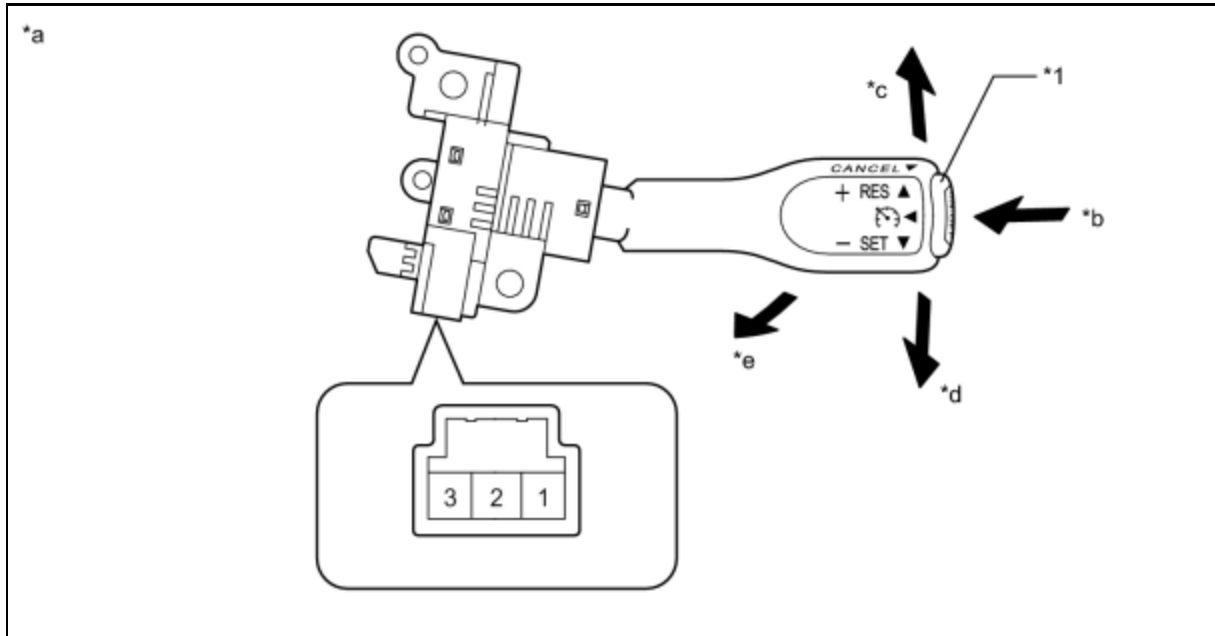


Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004TQH00FX
Title: CRUISE CONTROL: CRUISE CONTROL MAIN SWITCH: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT CRUISE CONTROL MAIN SWITCH ASSEMBLY

(a) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*1	Cruise Control Main Switch Assembly (ON-OFF button)	-	-
*a	Component without harness connected (Cruise Control Main Switch Assembly)	*b	ON-OFF
*c	+/RES	*d	-/SET
*e	CANCEL	-	-

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 - 3	Cruise control Main switch Assembly (ON-OFF button) released	1 M Ω or higher
	Cruise control Main switch Assembly (ON-OFF button) pushed	Below 2.5 Ω
	+/RES switch ON	235 to 245 Ω
	-/SET switch ON	617 to 643 Ω
	CANCEL switch ON	1509 to 1571 Ω



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VQ1071X
Title: CRUISE CONTROL: CRUISE CONTROL MAIN SWITCH: INSTALLATION (2013 FR-S)		

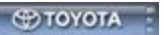
INSTALLATION

1. INSTALL CRUISE CONTROL MAIN SWITCH ASSEMBLY

- (a) Connect the cruise control main switch wire connector to the cruise control main switch assembly.
- (b) Set the cruise control main switch assembly to the lower steering wheel cover.
- (c) Engage the 2 claws and install the lower steering wheel cover.
- (d) Install the 4 screws.
- (e) Engage the clamp.

2. INSTALL STEERING WHEEL ASSEMBLY

INFO



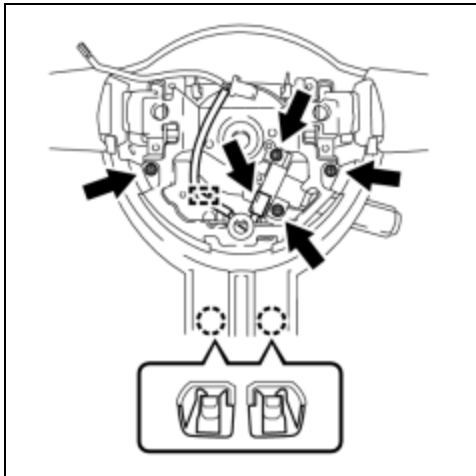
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VQ3071X
Title: CRUISE CONTROL: CRUISE CONTROL MAIN SWITCH: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE STEERING WHEEL ASSEMBLY

INFO

2. REMOVE CRUISE CONTROL MAIN SWITCH ASSEMBLY



(a) Remove the 4 screws.

(b) Engage the 2 claws and remove the lower steering wheel cover and cruise control main switch assembly.

(c) Disengage the clamp and disconnect the cruise control main switch wire connector.

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000005AY5000X
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: CANCEL CODE (2013 FR-S)		

CANCEL CODE

1. DESCRIPTION

The ECM stores cancellation of cruise control due to driver operation and system abnormality as a "CANCEL CODE". In troubleshooting, the "CANCEL CODE" can be used to specify the cause of the malfunction.

HINT:

- The "CANCEL CODE" for canceled cruise control resulting from a driver operation is also stored. Therefore, fault troubleshooting needs to determine whether the "CANCEL CODE" is due to a driver operation or a system abnormality.
- Storage of a "CANCEL CODE" due to the driver canceling cruise control is normal, and not a system abnormality.
- The "CANCEL CODE" is cleared by turning off the ignition switch. So, does not turn the ignition switch off until the "CANCEL CODE" has been checked.


2. READ CANCEL CODE

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Perform a cruise control road test, and recreate the driving conditions in which cruise control was previously canceled.
- After cruise control is canceled, check the DATA LIST INFO.
- Check the stored "CANCEL CODE".


*: "(MEMORY)" displays the storage history of the "CANCEL CODE", and is not deleted by turning the ignition switch off. When clearing, perform to clear the DTC INFO.

Cruise Cancel : Main Switch


TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : Main Switch	Cruise control was canceled through a cruise control main switch operation or cruise control main switch signal abnormality. / ON or OFF	<ul style="list-style-type: none"> • Operation of cruise control main switch • Cruise control main switch assembly malfunction • Cruise control main switch circuit malfunction
Troubleshooting:		

1. Confirm whether there has been a cruise control main switch operation.
2. If it was stored resulting from other than a driver operation, refer to "Cruise Control Switch Circuit", and perform a check  .

Cruise Cancel : Stop/Brake Switch


TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : Stop/Brake Switch	Cruise control was canceled through a brake pedal operation or stop light switch signal abnormality. / ON or OFF	<ul style="list-style-type: none"> • Brake pedal operation • Stop light switch assembly malfunction • Stop light switch circuit malfunction
	Troubleshooting: <ol style="list-style-type: none"> 1. Confirm whether there has been a brake pedal operation. 2. If it was stored resulting from other than a driver operation, refer to "Stop Light Switch Circuit", and perform a check  . 	

Cruise Cancel : Clutch Switch


TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : Clutch Switch	Cruise control was canceled through a clutch pedal operation or clutch switch signal abnormality. / ON or OFF	<ul style="list-style-type: none"> • Clutch pedal operation • Clutch switch assembly malfunction • Clutch switch circuit malfunction
	Troubleshooting: <ol style="list-style-type: none"> 1. Confirm whether there has been a clutch pedal operation. 2. If it was stored resulting from other than a driver operation, refer to "Clutch Switch Circuit", and perform a check  . 	

Cruise Cancel : Neutral Switch


TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
	Cruise control was canceled through a shift lever	<ul style="list-style-type: none"> • Shift lever operation • Park/neutral position switch

Cruise Cancel : Neutral Switch	operation or park/neutral start switch signal abnormality. / ON or OFF	<ul style="list-style-type: none"> assembly malfunction • Park/neutral position switch circuit malfunction
	Troubleshooting: <ol style="list-style-type: none"> 1. Confirm whether there has been a shift lever operation. 2. If it was stored resulting from other than a driver operation, refer to "Transmission Control Switch Circuit", and perform a check  . 	

Cruise Cancel : Cancel Switch

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : Cancel Switch	Cruise control was canceled through a CANCEL switch operation or CANCEL switch signal abnormality. / ON or OFF	<ul style="list-style-type: none"> • CANCEL switch operation • Cruise control main switch assembly malfunction • Cruise control main switch circuit malfunction
	Troubleshooting: <ol style="list-style-type: none"> 1. Confirm whether there has been a CANCEL switch operation. 2. If it was stored resulting from other than a driver operation, refer to "Cruise Control Switch Circuit", and perform a check  . 	

Cruise Cancel : IG Switch

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : IG Switch	Cruise control was canceled through an ignition switch operation or ECM power supply circuit abnormality. / ON or OFF	<ul style="list-style-type: none"> • Ignition switch operation • ECM power supply circuit malfunction
	Troubleshooting: <ol style="list-style-type: none"> 1. Confirm whether there has been an ignition switch operation. 2. If it was stored resulting from other than a driver operation, refer to "ECM Power Source Circuit", and perform a check  . 	

Cruise Cancel : Vehicle Speed 1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
		<ul style="list-style-type: none"> • Speed sensor malfunction

Cruise Cancel : Vehicle Speed 1	Cruise control was canceled through a vehicle speed signal abnormality. / ON or OFF	<ul style="list-style-type: none"> • Skid control ECU (Brake actuator assembly) malfunction • ECM malfunction
	Troubleshooting: 1. Check the VSC system DTC INFO .	

Cruise Cancel : Engine Revolution

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : Engine Revolution	One of the following conditions is met: <ul style="list-style-type: none"> • Cruise control was canceled through detection of engine speed that is more than specified. • Cruise control was canceled through moving the shift lever to 1st or R position. / ON or OFF	<ul style="list-style-type: none"> • Shift lever operation • Crankshaft position sensor malfunction • ECM malfunction
	Troubleshooting: 1. Confirm whether there has been a shift lever operation. 2. If it was stored resulting from other than a driver operation, refer to DTC P0335, and perform a check INFO .	

Cruise Cancel : Out of Range

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : Out of Range	One of the following conditions is met: <ul style="list-style-type: none"> • Cruise control was canceled through vehicle speed dropping below minimum cruise control speed. • Cruise control was canceled through setting the cruise control outside permitted vehicle speed. • Cruise control was canceled through a RESUME operation with no recorded vehicle speed. / ON or OFF	<ul style="list-style-type: none"> • SET switch operation • RESUME switch operation • Speed sensor malfunction • Skid control ECU (Brake actuator assembly) malfunction
	Troubleshooting: 1. Confirm whether there has been a SET or RESUME operation. 2. Perform a cruise control road test with a vehicle speed at 40km/h or more. 3. If the "CANCEL CODE" is stored again, check the VSC system DTC INFO .	

Cruise Cancel : Accel Angle

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA

Cruise Cancel : Accel Angle	Cruise control was canceled through an accelerator pedal operation resulting in more than 10 minutes of set vehicle speed. / ON or OFF	Accelerator pedal operation
	Troubleshooting: 1. Confirm whether there has been an accelerator pedal operation.	


Cruise Cancel : Keeping Vehicle Speed

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : Keeping Vehicle Speed	Cruise control was canceled through an inability to maintain vehicle speed. / ON or OFF	<ul style="list-style-type: none"> • Parking brake not released • Insufficient tire pressure • Road condition (inclination, road surface)
	Troubleshooting: 1. Confirm the road conditions (inclination, road surface) when the "CANCEL CODE" was stored. 2. Check the vehicle status (parking brake, tire pressure).	


Cruise Cancel : VSC/TRC Operation

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : VSC/TRC Operation	Cruise control was canceled through a VSC/TR(A)C operation. / ON or OFF	VSC/TR(A)C operation
	Troubleshooting: -	


Cruise Cancel : ABS/VSC Abnormal

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : ABS/VSC Abnormal	Cruise control was canceled through an ABS/VSC system abnormality / ON or OFF	ABS/VSC system malfunction
	Troubleshooting: 1. Check the VSC system DTC  .	


Cruise Cancel : Meter Abnormal

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : Meter Abnormal	Cruise control was canceled through a combination meter assembly abnormality. / ON or OFF	Combination meter assembly malfunction
	Troubleshooting: 1. Check the combination meter assembly  .	


Cruise Cancel : Brake Switch Abnormal

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : Brake Switch Abnormal	Cruise control was canceled through a stop light switch assembly abnormality. / ON or OFF	Stop light switch assembly malfunction
	Troubleshooting: 1. Refer to "Stop Light Switch Circuit", and perform a check  .	


Cruise Cancel : Neutral Switch Abnormal

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : Neutral Switch Abnormal	Cruise control was canceled through a park/neutral position switch abnormality. / ON or OFF	Park/neutral position switch assembly malfunction
	Troubleshooting: 1. Refer to "Transmission Control Switch Circuit", and perform a check  .	


Cruise Cancel : Vehicle Speed 2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : Vehicle Speed 2	Cruise control was canceled through a vehicle speed change abnormality. / ON or OFF	<ul style="list-style-type: none">• Speed sensor malfunction• Skid control ECU (Brake actuator assembly) malfunction
	Troubleshooting: 1. Check the VSC system DTC  .	


Cruise Cancel : Engine Abnormal

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : Engine Abnormal	Cruise control was canceled through an engine system abnormality. / ON or OFF	Engine control system malfunction
	Troubleshooting: 1. Check the engine control system DTC  .	


Cruise Cancel : Switch Related to Cruise Control

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : Switch Related to Cruise Control	Cruise control was canceled through a cruise control main switch fixation (2 minutes or more continuous input). / ON or OFF	Cruise control main switch assembly malfunction
	Troubleshooting: 1. Refer to "Cruise Control Switch Circuit", and perform a check  .	


Cruise Cancel : Brake Switch Abnormal(Memory) *

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : Brake Switch Abnormal(Memory)	"Cruise Cancel : Brake Switch Abnormal" is detected. / ON or OFF	Stop light switch assembly malfunction
	Troubleshooting: 1. Refer to "Stop Light Switch Circuit", and perform a check  .	


Cruise Cancel : Neutral Switch Abnormal(Memory) *

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : Neutral Switch Abnormal(Memory)	"Cruise Cancel : Neutral Switch Abnormal" is detected. / ON or OFF	Park/neutral position switch assembly malfunction
	Troubleshooting: 1. Refer to "Transmission Control Switch Circuit", and perform a check  .	

Cruise Cancel : Vehicle Speed 2(Memory) *

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : Vehicle Speed 2(Memory)	"Cruise Cancel : Vehicle Speed 2" is detected. / ON or OFF	<ul style="list-style-type: none"> Speed sensor malfunction Skid control ECU (Brake actuator assembly) malfunction
	Troubleshooting: 1. Check the VSC system DTC  .	

Cruise Cancel : Engine Abnormal(Memory) *

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : Engine Abnormal(Memory)	"Cruise Cancel : Engine Abnormal" is detected. / ON or OFF	Engine control system malfunction
	Troubleshooting: 1. Check the engine control system DTC  .	

Cruise Cancel : Switch Related to CCS(Memory) *

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : Switch Related to CCS(Memory)	"Cruise Cancel : Switch Related to Cruise Control" is detected. / ON or OFF	Cruise control main switch assembly malfunction
	Troubleshooting: 1. Refer to "Cruise Control Switch Circuit", and perform a check	

Cruise Cancel : ECT Abnormal

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	TROUBLE AREA
Cruise Cancel : ECT Abnormal	Cruise control was canceled through an automatic transmission system abnormality. / ON or OFF	Automatic transmission system malfunction
	Troubleshooting: 1. Check the automatic transmission system DTC INFO .	



Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000ZAN031X
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: Clutch Switch Circuit (2013 FR-S)		

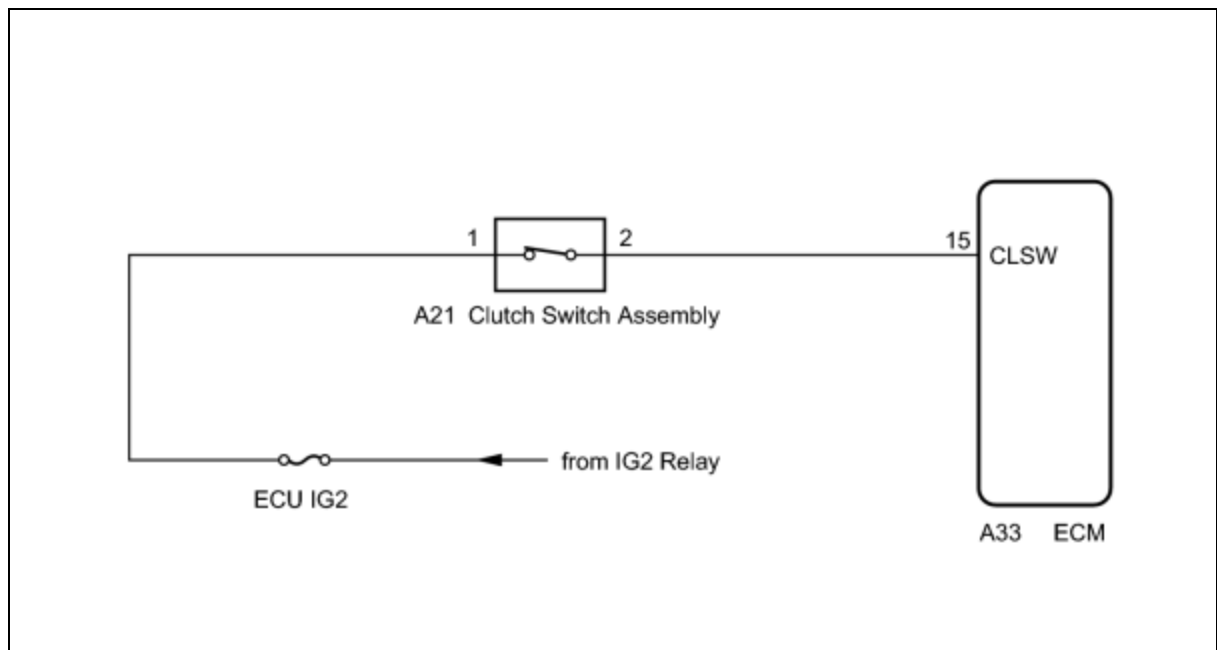
Clutch Switch Circuit

DESCRIPTION

Clutch switch circuit inspection is necessary for M/T vehicles.

When the clutch pedal is released, the ECM receives positive (+) battery voltage through the ECU IG2 fuse. While depressing the clutch pedal, the clutch switch sends a signal to terminal CLSW of the ECM. The ECM cancels cruise control drive when terminal CLSW receives the signal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Clutch switch assembly conditions can be checked using the Techstream.

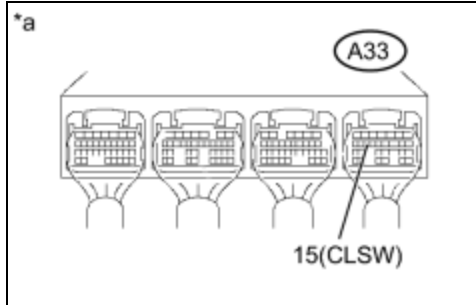
1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON.
3. Turn the Techstream on.
4. Enter the following menus: Powertrain / Engine / Data List / All Data / Clutch Switch INFO.

Engine

CLUTCH PEDAL OPERATION	CLUTCH SWITCH
Depressed	ON

PROCEDURE

1. CHECK ECM (TERMINAL VOLTAGE)



(a) Turn the ignition switch to ON.

(b) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-15 (CLSW) - Body ground	Clutch pedal depressed	Below 1 V
	Clutch pedal released	11 to 14 V

Text in Illustration

*a	Component with harness connected (ECM)
----	--

NG ► INSPECT CLUTCH SWITCH ASSEMBLY

OK ► PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE

2. INSPECT CLUTCH SWITCH ASSEMBLY

(a) Inspect the clutch switch assembly **INFO** .

NG ► REPLACE CLUTCH SWITCH ASSEMBLY

OK



3. CHECK HARNESS AND CONNECTOR (ECM - CLUTCH SWITCH ASSEMBLY)


- (a) Disconnect the clutch switch assembly connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-15 (CLSW) - A21-2	Always	Below 1 Ω

Standard resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-15 (CLSW) or A21-2 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR (ECM - CLUTCH SWITCH ASSEMBLY)**

OK  **INSPECT ECM POWER SOURCE CIRCUIT**



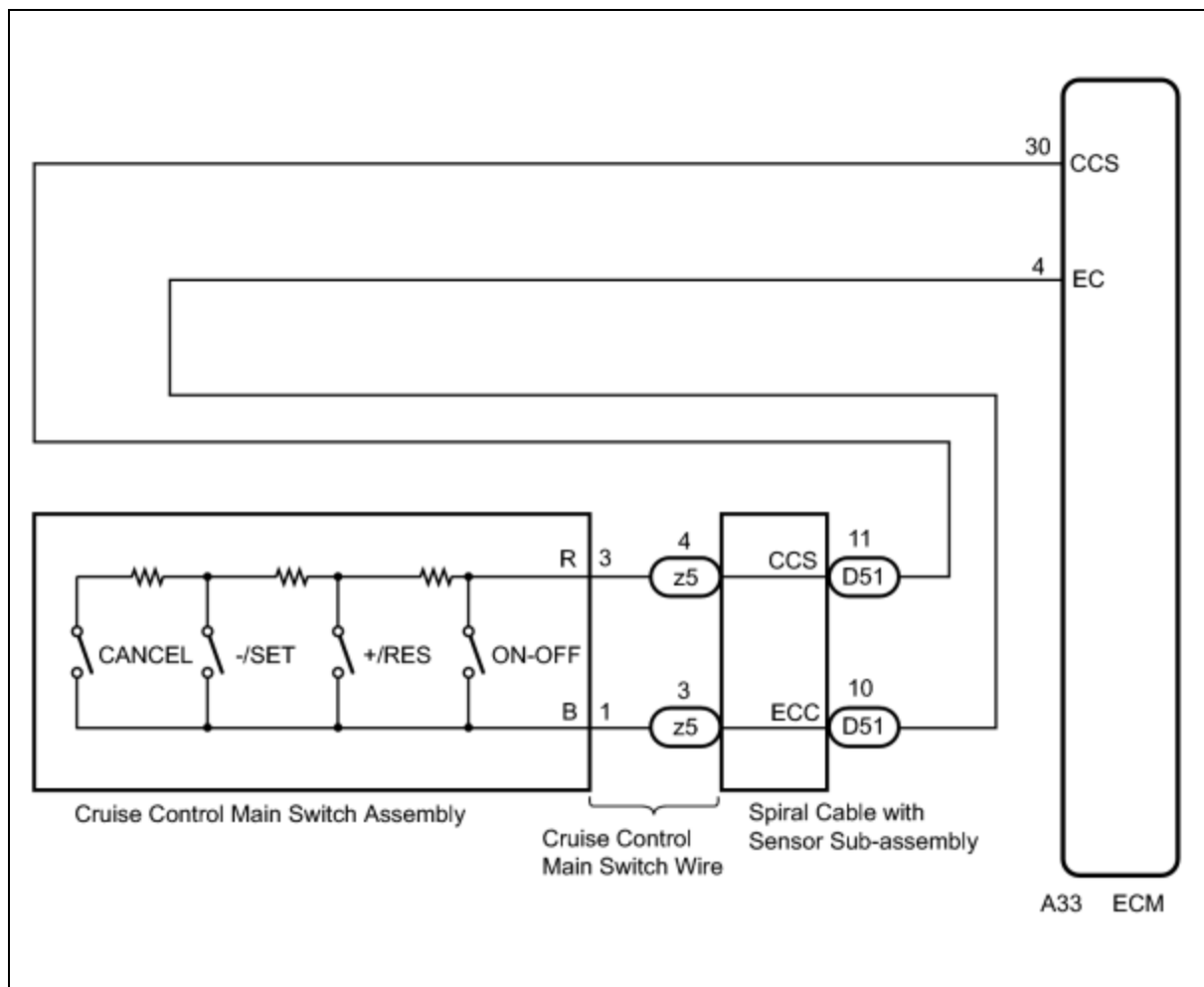
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PLUOBDX
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: Cruise Control Switch Circuit (2013 FR-S)		

Cruise Control Switch Circuit

DESCRIPTION

The cruise control main switch is used to turn the cruise control system on and off, as well as operate 7 functions: SET, - (COAST), TAP-DOWN, RES (RESUME), + (ACCEL), TAP-UP and CANCEL. The SET, TAP-DOWN and - (COAST) functions, and the RES (RESUME), TAP-UP and + (ACCEL) functions are operated with the same switch. The cruise control main switch is an automatic return type switch which turns on only while operating it in the direction of each arrow and turns off after releasing it. The internal contact points of the cruise control main switch turn on with switch operation. Then the ECM reads the voltage value that has been changed by the switch operation to control SET, - (COAST), RES (RESUME), + (ACCEL), and CANCEL.

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

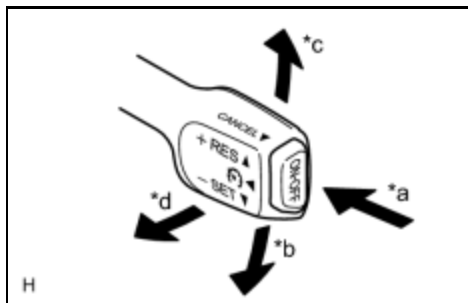
1.	READ VALUE ON TECHSTREAM
-----------	---------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Select the following menu items: Powertrain / Cruise Control / Data List.
- (e) Check the Data List to confirm proper functioning of the cruise control main switch.

Text in Illustration

*a	ON-OFF
*b	-/SET
*c	+ /RES
*d	CANCEL

Cruise Control



TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Main SW M-CPU	Cruise control main switch signal (Main CPU) / ON or OFF	ON: cruise control main switch (ON-OFF button) pushed OFF: cruise control main switch (ON-OFF button) released	-
Cancel Switch	CANCEL switch signal / ON or OFF	ON: CANCEL switch on OFF: CANCEL switch off	-
SET/COAST Switch	-/SET switch signal / ON or OFF	ON: -/SET switch on OFF: -/SET switch off	-
RES/ACC Switch	+ /RES switch signal / ON or OFF	ON: + /RES switch on OFF: + /RES switch off	-

OK:

When the cruise control main switch is operated, the display changes as shown above.

NG ▶ **INSPECT CRUISE CONTROL MAIN SWITCH ASSEMBLY**

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

2. INSPECT CRUISE CONTROL MAIN SWITCH ASSEMBLY

(a) Inspect the cruise control main switch assembly **INFO** .

NG ▶ **REPLACE CRUISE CONTROL MAIN SWITCH ASSEMBLY**

OK
▼

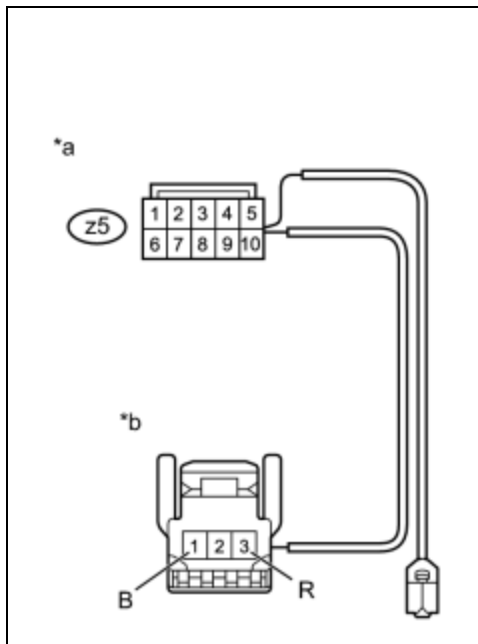
3. CHECK CRUISE CONTROL MAIN SWITCH WIRE

(a) Disconnect the cruise control main switch assembly connector.

(b) Disconnect the spiral cable with sensor sub-assembly connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):



TESTER CONNECTION	SPECIFIED CONDITION
Cruise control main switch side connector terminal 3 (R) - z5-4	Below 1 Ω
Cruise control main switch side connector terminal 1 (B) - z5-3	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Spiral Cable with Sensor Sub-assembly)
*b	Front view of wire harness connector (to Cruise Control Main Switch Assembly)

NG ▶ REPAIR OR REPLACE CRUISE CONTROL
MAIN SWITCH WIRE

OK
▼

4. INSPECT SPIRAL CABLE WITH SENSOR SUB-ASSEMBLY

(a) Inspect the spiral cable with sensor sub-assembly **INFO** .

NG ▶ REPLACE SPIRAL CABLE WITH SENSOR SUB-ASSEMBLY

OK
▼

5. CHECK HARNESS AND CONNECTOR (SPIRAL CABLE WITH SENSOR SUB-ASSEMBLY - ECM AND BODY GROUND)

- (a) Disconnect the ECM connector.
- (b) Disconnect the spiral cable with sensor sub-assembly connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-30 (CCS) - D51-11 (CCS)	Always	Below 1 Ω
A33-4 (EC) - D51-10 (ECC)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-30 (CCS) or D51-11 (CCS) - Body ground	Always	10 k Ω or higher
A33-4 (EC) or D51-10 (ECC) - Body ground	Always	10 k Ω or higher

NG ▶ REPAIR OR REPLACE HARNESS OR
CONNECTOR (SPIRAL CABLE WITH SENSOR

SUB-ASSEMBLY - ECM)

OK  REPLACE ECM



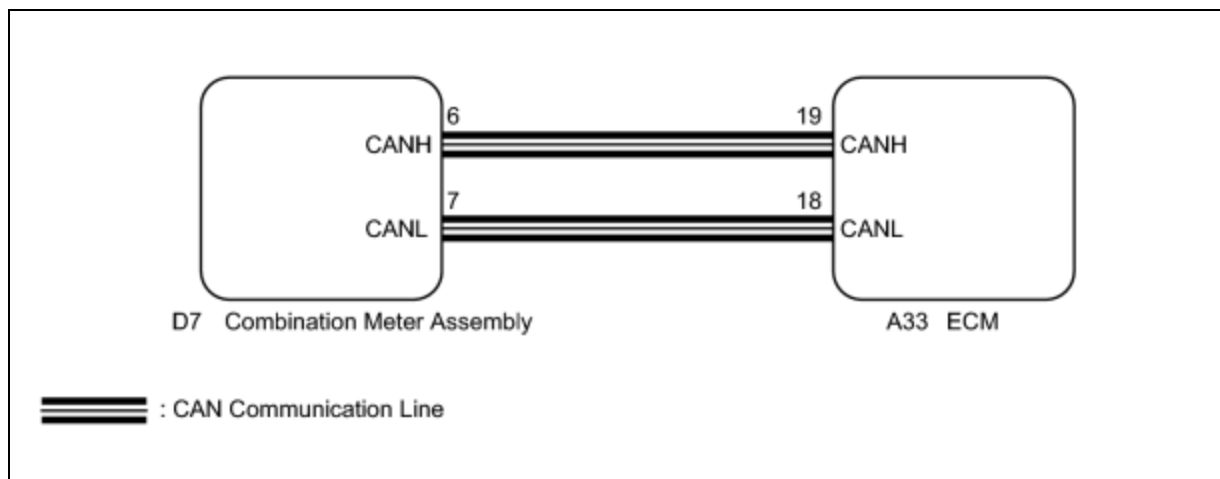
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PLV0B2X
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: Cruise Main Indicator Light Circuit (2013 FR-S)		

Cruise Main Indicator Light Circuit

DESCRIPTION

- The ECM turns on the cruise control indicator light by sending indicator output demand signals to the combination meter assembly using CAN communication.
- The cruise control indicator light illuminates in green when the cruise control system has been turned on using the ON-OFF switch. If a malfunction is detected, the cruise control indicator light changes to amber.
- The cruise control indicator light circuit uses CAN communication. If the cruise control indicator light is not functioning correctly, check for CAN communication DTCs before troubleshooting this circuit.

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1. PERFORM ACTIVE TEST USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Select the following menu items: Body Electrical / Combination Meter / Active Test.
- Check the cruise control indicator light by performing the Active Test.

Combination Meter

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Indicat. Lamp Cruise	Cruise control indicator light	Cruise control indicator light (illuminated in green) ON / OFF	-
Cruise Warning	Cruise control indicator light	Cruise control indicator light (illuminated in amber) ON / OFF	-

OK:

The cruise control indicator light goes on or off.

NG ► **REPLACE COMBINATION METER ASSEMBLY**

OK ► **PROCEED TO NEXT SUSPECTED AREA
SHOWN IN PROBLEM SYMPTOMS TABLE**




Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003TL901UX
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: Cruise SET Indicator Light Circuit (2013 FR-S)		

Cruise SET Indicator Light Circuit

DESCRIPTION

- The ECM turns on the SET indicator light by sending indicator output demand signals to the combination meter assembly using CAN communication.
- The cruise control SET indicator light illuminates when the cruise control system is controlling vehicle speed.
- The cruise control indicator light circuit uses CAN communication. If the cruise control indicator light is not functioning correctly, check for CAN communication DTCs before troubleshooting this circuit.

WIRING DIAGRAM

Refer to Cruise Main Indicator Light Circuit .

INSPECTION PROCEDURE

PROCEDURE

1.	PERFORM ACTIVE TEST USING TECHSTREAM
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Combination Meter / Active Test.
- (e) Check the cruise control SET indicator light by performing the Active Test.

Combination Meter

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Indicat. SET	Cruise control SET indicator light	Cruise control SET indicator light ON / OFF	-

OK:

The cruise control SET indicator light goes on or goes off.

NG  **REPLACE COMBINATION METER ASSEMBLY**

OK  **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PM3071X
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

[DATA LIST / ACTIVE TEST](#)

1. READ DATA LIST











HINT:













Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.




- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Select the following menu items: Powertrain / Cruise Control / Data List.
- Read the Data List according to the display on the Techstream.

[Powertrain / Cruise Control / Data List]

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
CCS Vehicle Spd	Vehicle speed / Min.: 0 km/h (0 mph), Max.: 255 km/h (158 mph)	Actual vehicle speed	-
CCS Mem Vehicle Spd	Stored vehicle speed / Min.: 0 km/h (0 mph), Max.: 255 km/h (158 mph)	Actual stored vehicle speed	-
Cruise Request Torque	Required engine torque / Min.: -32768 Nm, Max.: 32767 Nm	Actual required engine torque	-
Cruise Control	Cruise control system active condition / ON or OFF	ON: Cruise control activated OFF: Cruise control deactivated	-
CCS Indicator M-CPU	Cruise control indicator light illumination signal (Main CPU) / ON or OFF	ON: Cruise control indicator light illuminated in green OFF: Cruise control indicator light not on	-
Cancel Switch	CANCEL switch signal / ON or OFF	ON: CANCEL switch on OFF: CANCEL switch off	-
SET/COAST Switch	-/SET switch signal / ON or OFF	ON: -/SET switch on OFF: -/SET switch off	-
RES/ACC Switch	+/RES switch signal / ON or OFF	ON: +/RES switch on OFF: +/RES switch off	-
CCS Ready M-CPU	Cruise control system standby condition (Sub CPU) / ON or OFF	Each time cruise control main switch (ON-OFF button) is pushed, ON/OFF changes	-
		ON: cruise control main switch	

Main SW M-CPU	cruise control main switch signal (Main CPU) / ON or OFF	(ON-OFF button) pushed OFF: cruise control main switch (ON-OFF button) released	-
Stop Light Switch 1	Stop light switch signal1 / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
Stop Light Switch 2	Stop light switch signal2 / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
Cruise Cancel : Main Switch	"CANCEL CODE" by cruise control main switch operation / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : Stop/Brake Switch	"CANCEL CODE" by brake pedal operation / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : Clutch Switch	"CANCEL CODE" by clutch pedal operation (for Manual Transmission) / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : Neutral Switch	"CANCEL CODE" by shift lever operation (for Automatic Transmission) / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : Cancel Switch	"CANCEL CODE" by CANCEL switch operation / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : IG Switch	"CANCEL CODE" by ignition switch operation / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : Vehicle Speed 1	"CANCEL CODE" by abnormal vehicle speed signal / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : Engine Revolution	"CANCEL CODE" by raising engine speed / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : Out of Range	"CANCEL CODE" by setting the cruise control outside permitted vehicle speed / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : Accel Angle	"CANCEL CODE" by accelerator pedal operation / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 

Cruise Cancel : Keeping Vehicle Speed	"CANCEL CODE" by inability to maintain vehicle speed / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : VSC/TRC Operation	"CANCEL CODE" by VSC/TR(A)C operation / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : ABS/VSC Abnormal	"CANCEL CODE" by ABS/VSC abnormality / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : Meter Abnormal	"CANCEL CODE" by combination meter assembly abnormality / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : Brake Switch Abnormal	"CANCEL CODE" by stop light switch assembly abnormality / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : Neutral Switch Abnormal	"CANCEL CODE" by park/neutral position switch abnormality / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : Vehicle Speed 2	"CANCEL CODE" by abnormal vehicle speed change / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : Engine Abnormal	"CANCEL CODE" by engine control system abnormality / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : Switch Related to Cruise Control	"CANCEL CODE" by cruise control main switch abnormality / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : Brake Switch Abnormal(Memory)	"Cruise Cancel : Brake Switch Abnormal" is detected / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : Neutral Switch Abnormal(Memory)	"Cruise Cancel : Neutral Switch Abnormal" is detected / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : Vehicle Speed 2(Memory)	"Cruise Cancel : Vehicle Speed 2" is detected / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 

Cruise Cancel : Engine Abnormal(Memory)	"Cruise Cancel : Engine Abnormal" is detected / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : Switch Related to CCS(Memory)	"Cruise Cancel : Switch Related to CCS" is detected / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Cruise Cancel : ECT Abnormal	"CANCEL CODE" by automatic transmission system / ON or OFF	ON: "CANCEL CODE" detected OFF: "CANCEL CODE" not detected	Refer to "CANCEL CODE" 
Brake Cancel Switch	Stop light switch signal / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

2. PERFORM ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Select the following menu items: Body Electrical / Combination Meter / Active Test.
- (e) Perform "Active Test" according to the display on Techstream.

HINT:

The ignition switch must be turned on to proceed with the Active Test using the Techstream.

[Body Electrical / Combination Meter / Active Test]

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Indicat. Lamp Cruise	Cruise control indicator light	Cruise control indicator light (illuminated in green) ON / OFF	-
Indicat. SET	Cruise control SET indicator light	Cruise control SET indicator light ON / OFF	-
Cruise Warning	Cruise control indicator light	Cruise control indicator light (illuminated in amber) ON / OFF	-



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PM00ABX
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: DIAGNOSIS SYSTEM (2013 FR-S)		

DIAGNOSIS SYSTEM

1. DESCRIPTION

The ECM controls the cruise control system of the vehicle. The data and DTCs relating to the cruise control system can be read from the DLC3 of the vehicle. Use the Techstream to check and solve the problem.

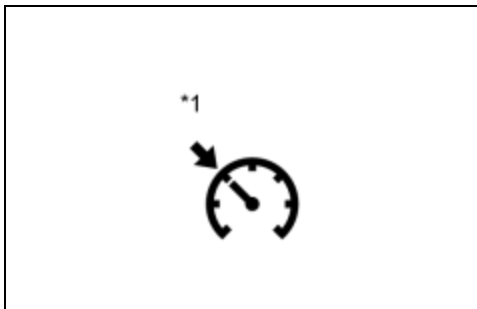
HINT:

If a speed sensor, stop light switch or any other related part malfunctions, the ECM cancels cruise control operation automatically.

2. CHECK INDICATOR

(a) Turn the ignition switch to ON.

(b) Check that the cruise control indicator light illuminates in green when the cruise control system is turned on using the cruise control main switch (ON-OFF button), and that the indicator light turns off when the cruise control system is turned off using the cruise control main switch (ON-OFF button). If the results are not as specified, perform the Cruise Main Indicator Light Circuit inspection procedure [INFO](#).



Text in Illustration

*1	Cruise Control Indicator Light (Green)
----	--

HINT:

While driving with the cruise control system controlling vehicle speed, the ECM will automatically cancel cruise control system control of vehicle speed when a malfunction occurs in one of the following: speed sensors, stop light switch assembly, or other related parts. When control of vehicle speed by the cruise control system is automatically canceled, the cruise control indicator changes to amber. At the same time, a DTC is stored.

Last Modified: 3-27-2012	6.4 S	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004VW9004X
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: DIAGNOSTIC TROUBLE CODE CHART (2013 FR-S)		


[DIAGNOSTIC TROUBLE CODE CHART](#)

DTC CODE	DETECTION ITEM	SEE PAGE
P0500	Vehicle Speed Sensor Malfunction	INFO
U0073	Control Module Communication Bus "A" Off	INFO
U0101	Lost Communication with TCM	INFO
U0122	Lost Communication with Vehicle Dynamics Control Module	INFO
U0155	Lost Communication with Instrument Panel Cluster (IPC) Control Module	INFO
U0402	Invalid Data Received from TCM	INFO
U0416	Invalid Data Received from Vehicle Dynamics Control Module	INFO
U0423	Invalid Data Received from Instrument Panel Cluster Control Module	INFO

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PM107UX
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: DTC CHECK / CLEAR (2013 FR-S)		

DTC CHECK / CLEAR

1. DTC CHECK

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Select the following menu items: Powertrain / Cruise Control / Trouble Codes.
- (e) Check the details of the DTC(s)  .

2. DTC CLEAR

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Select the following menu items: Powertrain / Cruise Control / Trouble Codes.
- (e) Clear the DTCs.

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PLO0BNX
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedure to troubleshoot the cruise control system.
- *: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	INSPECT BATTERY VOLTAGE
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(a) Measure the battery voltage with the ignition switch off.

Standard Voltage:

11 to 14 V

If the voltage is below 11 V, replace or recharge the battery before proceeding to the next step.

NEXT



3.	CHECK COMMUNICATION FUNCTION OF CONTROLLER AREA NETWORK (CAN)*
-----------	---

(a) Use the Techstream to check if the CAN communication system is functioning normally.

Result:

RESULT	PROCEED TO
CAN DTC is not output	A
CAN DTC is output	B

B **GO TO CAN COMMUNICATION SYSTEM**

A



4.	CHECK FOR DTC*
-----------	-----------------------

Refer to DTC Check / Clear  .

- (a) Check for DTCs and note any codes that are output.
- (b) Clear the DTCs.
- (c) Recheck for DTCs. Try to reproduce the DTCs by duplicating the conditions indicated by the DTCs.

Result:


RESULT	PROCEED TO
DTC does not reoccur	A
DTC reoccurs	B

B  **GO TO DTC CHART**

A



5.	ROAD TEST
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- (a) Perform the road test  .
- (b) Check that cruise control is not canceled by other than canceling operations by the driver.

Result:

RESULT	PROCEED TO
Cruise control is cancelled	A
Cruise control is not cancelled	B

B  **GO TO STEP 8**

A



6.	CHECK "CANCEL CODE"*
-----------	-----------------------------

HINT:

The driver's history of canceling cruise control is also stored.

(a) Check "CANCEL CODE"  .


Result:

RESULT	PROCEED TO
"CANCEL CODE" is not detected	A
"CANCEL CODE" is detected	B

B  **ADJUST, REPAIR OR REPLACE ACCORDING TO "CANCEL CODE"**

A


7. PROBLEM SYMPTOMS TABLE

Refer to Problem Symptoms Table  .

Result:

RESULT	PROCEED TO
Fault is not listed in Problem Symptoms Table	A
Fault is listed in Problem Symptoms Table	B

B  **ADJUST, REPAIR OR REPLACE IN ACCORDANCE WITH PROBLEM SYMPTOMS TABLE**

A


8. OVERALL ANALYSIS AND TROUBLESHOOTING*

(a) Terminals of ECU  .

(b) Data List / Active Test  .

NEXT



9.	ADJUST, REPAIR OR REPLACE
----	---------------------------

NEXT



10.	CONFIRMATION TEST
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NEXT  **END**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000ZRD071X
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: P0500: Vehicle Speed Sensor Malfunction (2013 FR-S)		

DTC	P0500	Vehicle Speed Sensor Malfunction
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DESCRIPTION

Refer to P0500 [INFO](#) .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0500	DTC P0500 is detected in SFI system.	<ul style="list-style-type: none"> • Speed sensor • Skid control ECU (Brake Actuator Assembly) • ECM

WIRING DIAGRAM

Refer to P0500 [INFO](#) .

INSPECTION PROCEDURE

PROCEDURE

1.	CHECK DTC OUTPUT
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- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Trouble Codes.
- Read the DTCs.

Result:

RESULT	PROCEED TO
DTC is not output	A
DTC P0500 is output	B

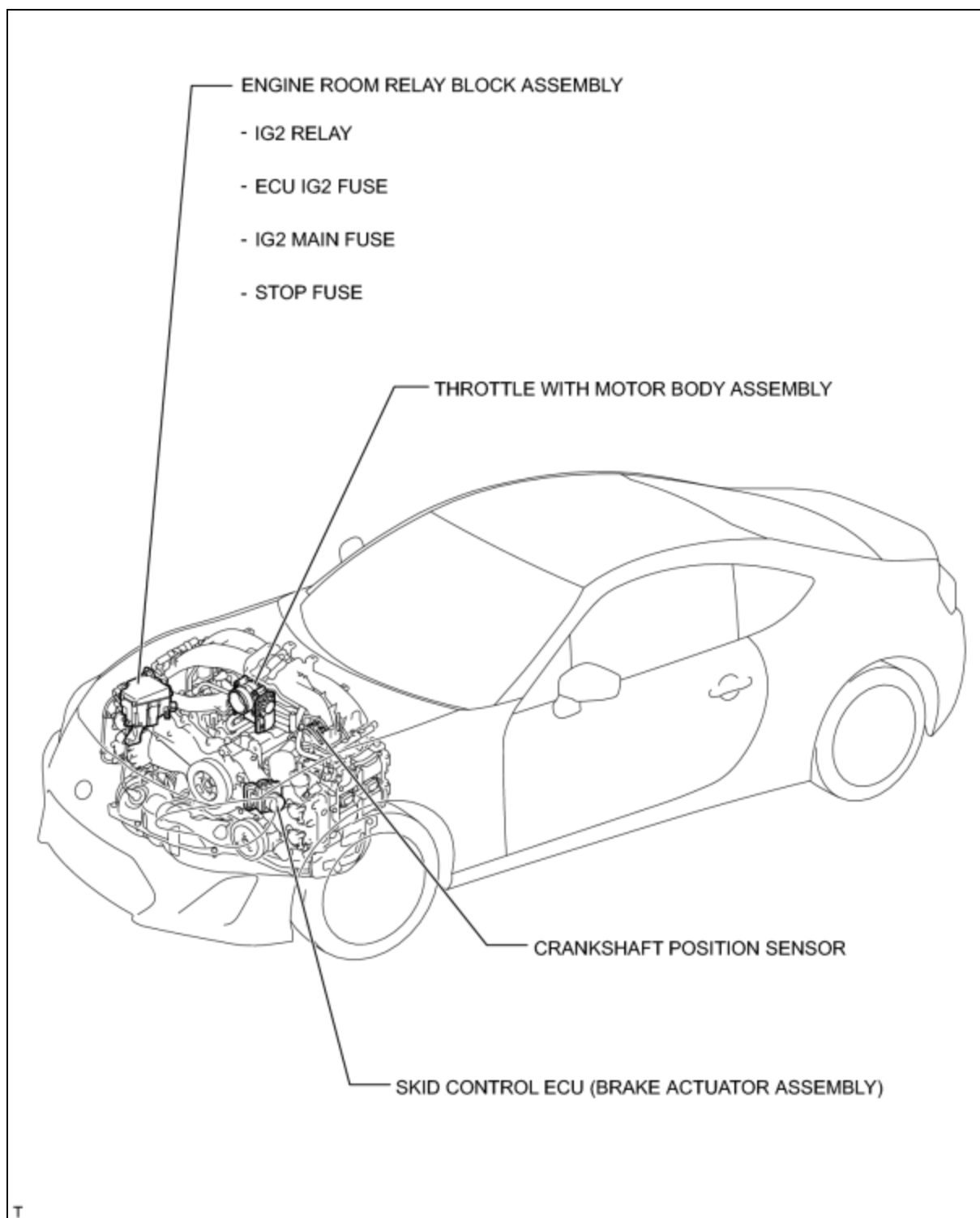
B ► **GO TO TROUBLESHOOTING FOR DTC P0500**

A ► **CHECK FOR INTERMITTENT PROBLEMS**

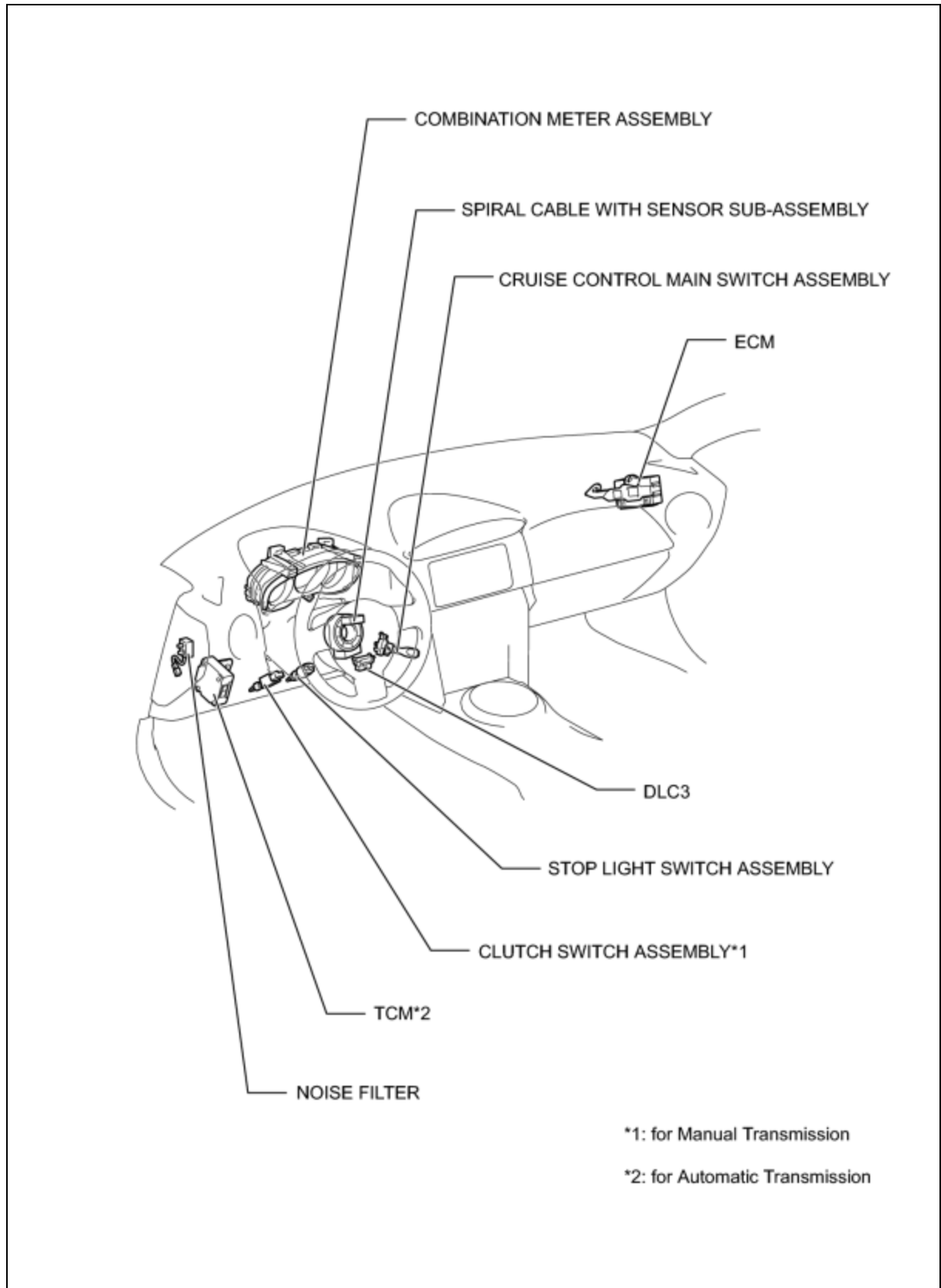
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000SSZ06FX
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PLN08BX
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

1. HANDLING PRECAUTION FOR CRUISE CONTROL SYSTEM

- (a) Turn the cruise control system off using the cruise control main switch (ON-OFF button) when not using the cruise control system.
- (b) Be careful as the vehicle speed increases when driving downhill with the cruise control system controlling vehicle speed.
- (c) The + (ACCEL)/RES (RESUME) operation changes according to the cruise control system status. When the cruise control system is controlling vehicle speed, the + (ACCEL) function operates. When the cruise control system is not controlling vehicle speed, the RES (RESUME) function operates.
- (d) While the cruise control system is controlling vehicle speed, if the cruise control indicator light changes to amber, turn the cruise control system off using the cruise control main switch (ON-OFF button) to reset the cruise control system. After the cruise control system is reset, if the cruise control system does not turn on, or if the cruise control system stops functioning immediately after being turned on, there may be a malfunction.
- (e) Do not use the cruise control system where the road conditions are as follows:
 - Heavy traffic
 - Steep downhill roads
 - Roads with sharp turns
 - Icy or snowy roads
 - Slippery roads
- (f) Do not use the cruise control system while towing.

Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PLSOBAX
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Cruise Control System

SYMPTOM	SUSPECTED AREA	SEE PAGE
The cruise control system cannot be turned on using the cruise control main switch (ON-OFF button).	Cruise control main switch circuit	INFO
	Cruise main indicator light circuit	INFO
	ECM	INFO
Vehicle speed cannot be set (the cruise control indicator light illuminates in green when the cruise control system is turned on using the cruise control main switch (ON-OFF button), but the cruise control indicator light goes out when the cruise control main switch is pushed to -/SET).	Cruise control main switch circuit	INFO
	ECM	INFO
Vehicle speed cannot be set (the cruise control indicator light illuminates in green when the cruise control system is turned on using the cruise control main switch (ON-OFF button), and it remains illuminated when the cruise control main switch is pushed to -/SET).	Stop light switch circuit	INFO
	Vehicle speed sensor circuit	INFO
	Cruise control main switch circuit	INFO
	Automatic transmission system*2	INFO
	VSC system	INFO
	Combination meter	INFO

	assembly	
	ECM	INFO
Vehicle speed control by the cruise control system is automatically canceled after it has started.	Stop light switch circuit	INFO
	Automatic transmission system*2	INFO
	Cruise control main switch circuit	INFO
	VSC system	INFO
	Combination meter assembly	INFO
	ECM	INFO
	Pulling back on the cruise control main switch does not cancel vehicle speed control by the cruise control system. (The cruise control indicator light remains illuminated in green.)	Cruise control main switch circuit
VSC system		INFO
Combination meter assembly		INFO
ECM		INFO
Pulling back on the cruise control main switch does not cancel vehicle speed control by the cruise control system. (The cruise control indicator light goes out.)	ECM	INFO
Vehicle speed control by the cruise control system is not canceled when vehicle speed drops below the low speed limit. (The cruise control indicator light remains illuminated in green.)	VSC system	INFO
	ECM	INFO
Vehicle speed control by the cruise control system is not canceled when vehicle speed drops below the low speed limit. (The cruise control indicator light goes out.)	ECM	INFO
Depressing the brake pedal does not cancel vehicle speed control by the cruise control system. (The cruise control indicator light remains illuminated in green.)	Stop light switch circuit	INFO
	Combination meter assembly	INFO
	ECM	INFO
Depressing the brake pedal does not cancel vehicle speed control by the cruise control system. (The cruise control indicator light goes out.)	ECM	INFO
	Stop light switch circuit	INFO

Moving the shift lever does not cancel vehicle speed control by the cruise control system. (The cruise control indicator light remains illuminated in green.)	Automatic transmission system*2	INFO
	Combination meter assembly	INFO
	ECM	INFO
Moving the shift lever does not cancel vehicle speed control by the cruise control system. (The cruise control indicator light goes out.)	ECM	INFO
Vehicle speed control by the cruise control system is not canceled when paddle shift switch is operated. (The cruise control indicator light remains illuminated in green.)*1	Automatic transmission system*2	INFO
	Combination meter assembly	INFO
	ECM	INFO
Vehicle speed control by the cruise control system is not canceled when paddle shift switch is operated. (The cruise control indicator light goes out.)*1	ECM	INFO
Hunting (Speed is not constant.)	Vehicle speed sensor circuit	INFO
	SFI system	INFO
The cruise control SET indicator light does not illuminate. (Vehicle speed can be set)	Cruise SET indicator light circuit	INFO
	ECM	INFO

*1: w/ Shift Paddle Switch

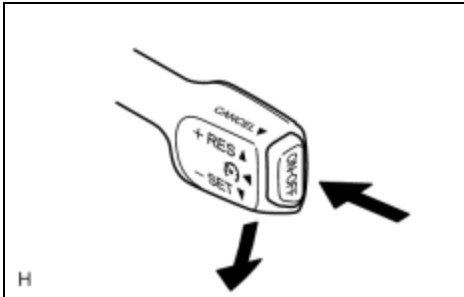
*2: for Automatic Transmission

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000ST009EX
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: ROAD TEST (2013 FR-S)		

ROAD TEST

1. PROBLEM SYMPTOM CONFIRMATION

(a) Inspect the SET function.



- (1) Turn the cruise control system on using the cruise control main switch (ON-OFF button).
- (2) Check that the cruise control indicator light illuminates in green on the combination meter assembly.
- (3) Drive at a speed between 40 km/h (25 mph) and 145 km/h (90 mph).
- (4) Push the cruise control main switch to -/SET.



- (5) Check that the cruise control SET indicator light illuminates at this time.

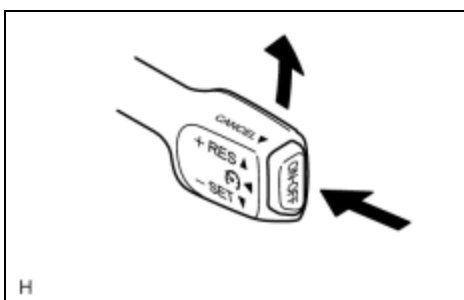
Text in Illustration

*1	Cruise Control Indicator Light (Green)
*2	Cruise Control SET Indicator

- (6) After releasing the switch, check that the vehicle maintains the set speed.

(b) Inspect the + (ACCEL) function.

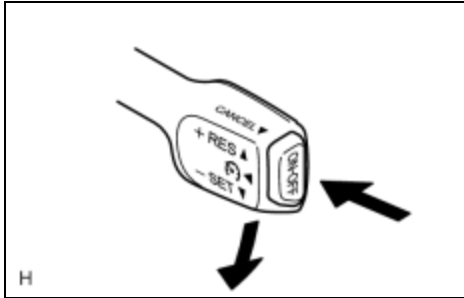
- (1) Turn the cruise control system on using the cruise control main switch (ON-OFF button).
- (2) Drive at a speed between 40 km/h (25 mph) and 145 km/h (90 mph).
- (3) Push the cruise control main switch to -/SET.
- (4) Check that vehicle speed increases while the cruise control main switch is pushed to +/RES, and that the vehicle maintains the newly set speed when the switch is released.



- (5) Push the cruise control main switch to +/RES and then release it immediately. Check that vehicle speed increases by approximately 1.6 km/h (1.0 mph) (tap-up control).

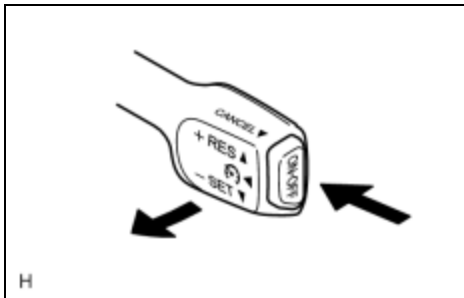
(c) Inspect the - (COAST) function.

- (1) Turn the cruise control system on using the cruise control main switch (ON-OFF button).
- (2) Drive at a speed between 40 km/h (25 mph) and 145 km/h (90 mph).
- (3) Push the cruise control main switch to -/SET.
- (4) Check that vehicle speed decreases while the cruise control main switch is pushed to -/SET, and the vehicle maintains the newly set speed when the switch is released.
- (5) Push the cruise control main switch to -/SET, and then release it immediately. Check that vehicle speed decreases by approximately 1.6 km/h (1.0 mph) (tap-down control).



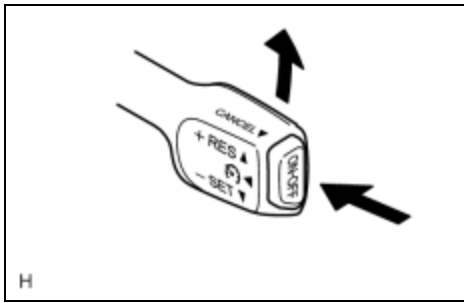
(d) Inspect the CANCEL function.

- (1) Turn the cruise control system on using the cruise control main switch (ON-OFF button).
- (2) Drive at a speed between 40 km/h (25 mph) and 145 km/h (90 mph).
- (3) Push the cruise control main switch to -/SET.
- (4) When any of the following are performed, check that cruise control system control of vehicle speed is canceled and that the normal driving mode (no control of vehicle speed by the cruise control system) resumes.



- Depressing the brake pedal
- Moving the shift lever to 1st or R position (for Manual Transmission)
- Moving the shift lever from D or M to any other position (for Automatic Transmission)
- Selecting the 3rd, 2nd or 1st range with the shift lever in M (for Automatic Transmission)
- Selecting the 3rd, 2nd or 1st range using the shift paddle switch with the shift lever in M (w/ shift paddle switch) (for Automatic Transmission)
- Pulling the cruise control main switch to CANCEL
- Turning the cruise control system off using the cruise control main switch (ON-OFF button)

(e) Inspect the RES (RESUME) function.



- (1) Turn the cruise control system on using the cruise control main switch (ON-OFF button).
- (2) Drive at a speed between 40 km/h (25 mph) and 145 km/h (90 mph).
- (3) Push the cruise control main switch to -/SET.
- (4) Cancel cruise control system control of vehicle speed by performing any of the above operations (other than turning the cruise control system off using the cruise control main switch (ON-OFF button)).
- (5) After pushing the cruise control main switch to +/RES at a speed of more than 40 km/h (25 mph), check that the vehicle resumes the speed set prior to cancellation.



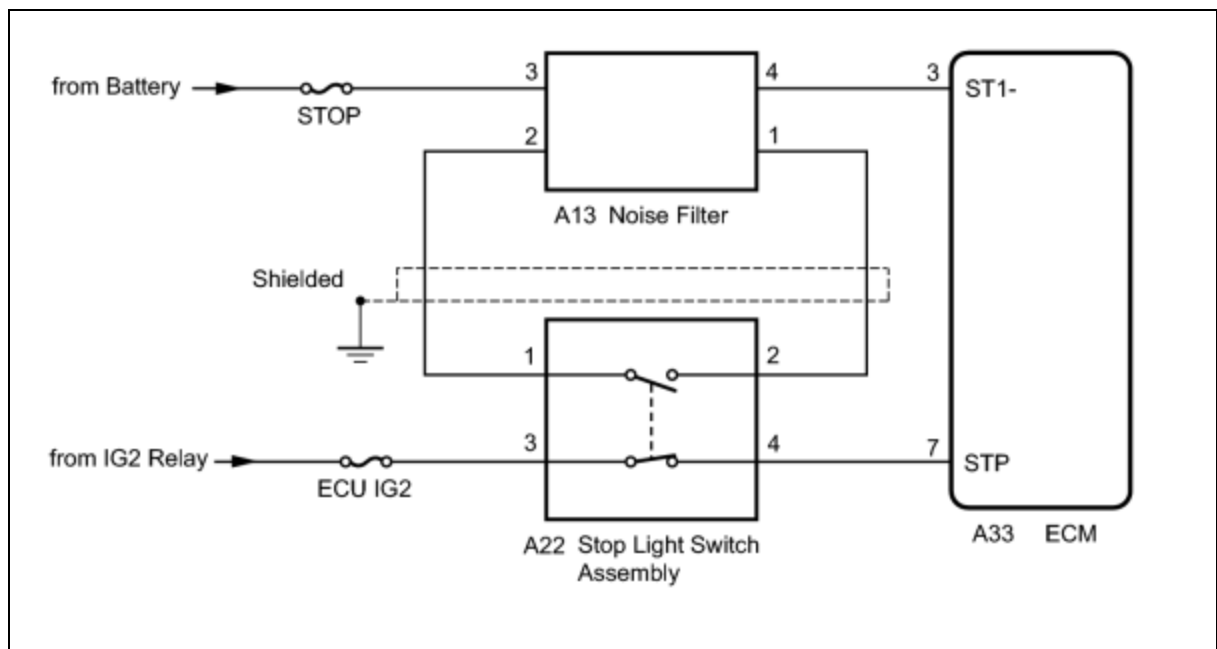
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000057K1000X
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: Stop Light Switch Circuit (2013 FR-S)		

Stop Light Switch Circuit

DESCRIPTION

When the brake pedal is released, terminal STP of the ECM receives positive (+) battery voltage through the ECU IG2 fuse. While depressing the brake pedal, the stop light switch sends a signal to terminals STP and ST1- of the ECM. The ECM cancels cruise control drive when terminal STP receives the signal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Stop light switch assembly conditions can be checked using the Techstream.

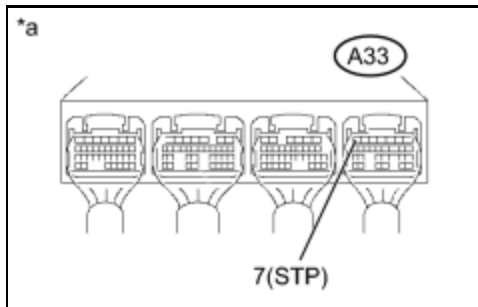
1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON.
3. Turn the Techstream on.
4. Enter the following menus: Powertrain / Cruise Control / Data List / Stop Light Switch 1 and Stop Light Switch 2.

Cruise Control

BRAKE PEDAL OPERATION	STOP LIGHT SWITCH 1	STOP LIGHT SWITCH 2
Depressed	ON	ON
Released	OFF	OFF

PROCEDURE

1.	CHECK ECM (TERMINAL VOLTAGE)
-----------	-------------------------------------



(a) Turn the ignition switch to ON.

(b) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-7 (STP) - Body ground	Brake pedal released	11 to 14 V
	Brake pedal depressed	Below 1 V

Text in Illustration

*a	Component with harness connected (ECM)
----	--

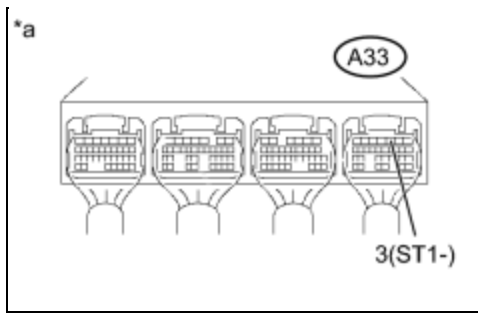
NG ► **CHECK TERMINAL VOLTAGE (POWER SOURCE OF STOP LIGHT SWITCH ASSEMBLY)**

OK



2.	CHECK ECM (TERMINAL VOLTAGE)
-----------	-------------------------------------

(a) Turn the ignition switch to ON.



(b) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-3 (ST1-) - Body ground	Brake pedal depressed	11 to 14 V
	Brake pedal released	Below 1 V

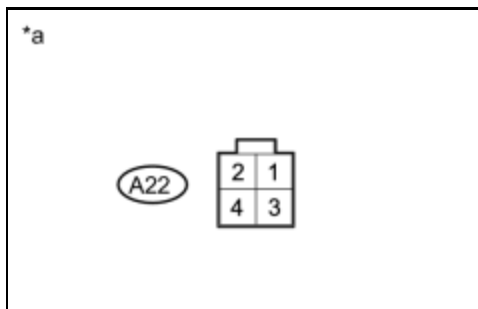
Text in Illustration

*a	Component with harness connected (ECM)
----	--

NG ► CHECK TERMINAL VOLTAGE (POWER SOURCE OF STOP LIGHT SWITCH ASSEMBLY)

OK ► PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE

3.	CHECK TERMINAL VOLTAGE (POWER SOURCE OF STOP LIGHT SWITCH ASSEMBLY)
----	--



(a) Disconnect the stop light switch assembly connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION

A22-3 - Body ground

Ignition switch ON

11 to 14 V

Text in Illustration

*a

Front view of wire harness connector
(to Stop Light Switch Assembly)

NG  **INSPECT ECM POWER SOURCE CIRCUIT**

OK



4. CHECK HARNESS AND CONNECTOR (ECM - STOP LIGHT SWITCH ASSEMBLY)

- (a) Disconnect the ECM connector.
- (b) Disconnect the stop light switch assembly connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-7 (STP) - A22-4	Always	Below 1 Ω

Standard resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-7 (STP) or A22-4 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

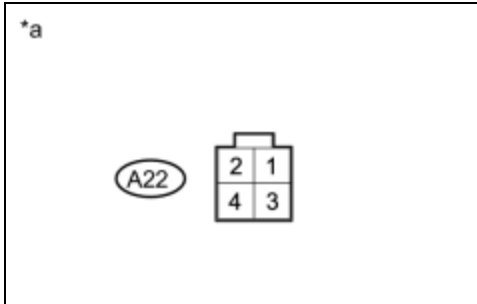


5. INSPECT STOP LIGHT SWITCH ASSEMBLY

- (a) Inspect the stop light switch assembly  .

NG  **REPLACE STOP LIGHT SWITCH ASSEMBLY**

6. CHECK TERMINAL VOLTAGE (POWER SOURCE OF STOP LIGHT SWITCH ASSEMBLY)



(a) Disconnect the stop light switch assembly connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A22-1 - Body ground	Always	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Stop Light Switch Assembly)
----	---

NG ► CHECK HARNESS AND CONNECTOR (NOISE FILTER - STOP LIGHT SWITCH ASSEMBLY)

OK



7. CHECK HARNESS AND CONNECTOR (ECM - STOP LIGHT SWITCH ASSEMBLY)

(a) Disconnect the ECM connector.

(b) Disconnect the stop light switch assembly connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-3 (ST1-) - A22-2	Always	Below 1 Ω

Standard resistance (Check for short):


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-3 (ST1-) or A22-2 - Body ground	Always	10 k Ω or higher

NG  **CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - NOISE FILTER)**

OK



8.	INSPECT STOP LIGHT SWITCH ASSEMBLY
-----------	---

(a) Inspect the stop light switch assembly  .

NG  **REPLACE STOP LIGHT SWITCH ASSEMBLY**

OK  **REPLACE ECM**

9.	CHECK HARNESS AND CONNECTOR (NOISE FILTER - STOP LIGHT SWITCH ASSEMBLY)
-----------	--

(a) Disconnect the stop light switch assembly connector.

(b) Disconnect the noise filter connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A22-1 - A13-2	Always	Below 1 Ω

Standard resistance (Check for short):


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A22-1 or A13-2 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK



10.	INSPECT NOISE FILTER
------------	-----------------------------

(a) Inspect the noise filter  .

NG  **REPLACE NOISE FILTER**

OK  **REPAIR OR REPLACE HARNESS AND CONNECTOR (NOISE FILTER - BATTERY)**

11.	CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - NOISE FILTER)
------------	--

- (a) Disconnect the stop light switch assembly connector.
- (b) Disconnect the noise filter connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A22-2 - A13-1	Always	Below 1 Ω

Standard resistance (Check for short):


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A22-2 or A13-1 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK



12.	INSPECT NOISE FILTER
------------	-----------------------------

(a) Inspect the noise filter  .

OK


13.	CHECK HARNESS AND CONNECTOR (ECM - NOISE FILTER)
------------	---

- (a) Disconnect the ECM connector.
- (b) Disconnect the noise filter connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-3 (ST1-) - A13-4	Always	Below 1 Ω

Standard resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-3 (ST1-) or A13-4 - Body ground	Always	10 k Ω or higher

NG  REPAIR OR REPLACE HARNESS AND CONNECTOR

OK  REPLACE ECM

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PLZOAFX
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

SYSTEM DESCRIPTION

1. CRUISE CONTROL SYSTEM

This system is controlled by the ECM, and control is performed using the throttle with motor body assembly. The ECM controls the following functions: ON-OFF, - (COAST)/SET, + (ACCEL)/RES (RESUME), CANCEL, vehicle speed operation and shift down control.

- The ECM compares the vehicle speed from the speed sensor with the stored vehicle speed set using the cruise control main switch. The ECM instructs the throttle valve motor of the throttle with motor body assembly to close the valve when the vehicle speed is greater than the stored speed, and instructs it to open the valve when the vehicle speed is less than the stored speed.
- The ECM receives signals such as ON-OFF, - (COAST)/SET, + (ACCEL)/RES (RESUME), and CANCEL from the cruise control main switch and executes the command.
- The ECM illuminates the combination meter assembly cruise control indicator light in green when the cruise control system is turned on using the cruise control main switch (ON-OFF button).
- The ECM illuminates the combination meter assembly cruise control indicator light in amber when a malfunction occurs during cruise control driving.



The ECM illuminates the combination meter assembly cruise control SET indicator light when vehicle speed control begins after the cruise control main switch is pushed to -/SET while driving.

Text in Illustration

*1	Cruise Control Indicator Light (Illuminated in Green or in Amber)
*2	Cruise Control SET Indicator

2. LIMIT CONTROL

(a) Low speed limit

The lowest possible set speed is approximately 40 km/h (25 mph). The cruise control system cannot be set when the vehicle speed is below the low speed limit. Control of vehicle speed will be automatically canceled but the stored vehicle speed will be retained when the vehicle speed drops below the low speed limit while the cruise control is controlling vehicle speed.

(b) High speed limit

The highest possible set speed is approximately 145 km/h (90 mph). The cruise control system cannot be set when the vehicle speed is over the high speed limit. Also, + (ACCEL)/RES (RESUME) cannot be used to increase the speed beyond the high speed limit.

3. OPERATION OF CRUISE CONTROL

The cruise control main switch is used to turn the cruise control system on and off, as well as operate 7 functions: SET, - (COAST), TAP-DOWN, RES (RESUME), + (ACCEL), TAP-UP, and CANCEL. The SET, TAP-DOWN, and - (COAST) functions, and the RES (RESUME), TAP-UP, and + (ACCEL) functions are operated with the same switch. The cruise control main switch is an automatic return type switch which turns on only while operating it in the direction of each arrow, and turns off after it is released.

(a) SET CONTROL

The vehicle speed is stored and speed control begins when the cruise control main switch is pushed to -/SET while driving with the cruise control system on (while the cruise control indicator light is illuminated in green), and the vehicle speed is within the set speed range (between the low and high speed limits).

(b) - (COAST) CONTROL

When the cruise control system is controlling vehicle speed and the cruise control main switch is pushed to -/SET and held in that position, the cruise control system sends a "required engine torque = 0 Nm" demand signal to the ECM. Following this, the vehicle speed is stored and maintained when the cruise control main switch is released.

(c) TAP-DOWN CONTROL

When the cruise control system is controlling vehicle speed and the cruise control main switch is tapped to the -/SET side (for approximately 0.6 seconds), the stored vehicle speed decreases by approximately 1.6 km/h (1.0 mph) for each time the switch is tapped. When the cruise control main switch is tapped to -/SET and the difference between the current and stored vehicle speed is more than 5 km/h (approximately 3 mph), the current vehicle speed is stored and speed control is performed.

(d) ACCELERATION CONTROL

When the cruise control system is controlling vehicle speed and the cruise control main switch is pushed to +/RES and held in that position, the cruise control system sends a signal to the ECM to operate the throttle valve motor of the throttle with motor body assembly to open the throttle valve. Following this, the vehicle speed is stored and maintained when the cruise control main switch is released.

(e) TAP-UP CONTROL

When the cruise control system is controlling vehicle speed and the cruise control main switch is tapped to the +/RES side (for approximately 0.6 seconds), the stored vehicle speed increases by approximately 1.6 km/h (1.0 mph) for each time the switch is tapped. When the cruise control main switch is tapped to +/RES and the difference between the current and stored vehicle speed is more than 5 km/h (approximately 3 mph), the stored vehicle speed will not be changed.

(f) RESUME CONTROL

If cruise control system control of vehicle speed was canceled due to any of the manual cancel conditions (other than turning the cruise control system off using the ON-OFF switch), and if the vehicle speed is between the low and high speed limits, the stored vehicle speed from the time of cancelation will be resumed and maintained when the cruise control main switch is pushed to +/RES.

(g) SHIFT DOWN CONTROL (for Automatic Transmission)

When the vehicle is cruising uphill, the transmission may shift down according to ECT control. After the ECM judges that uphill cruising has ended based on the throttle valve angle, the transmission will shift up. If the transmission shifts down during acceleration or resume control, it will shift up after acceleration or resume control is completed.

(h) MANUAL CANCEL CONTROL

Performing any of the following cancels the cruise control system control of vehicle speed (the stored vehicle speed in the ECM is maintained).

- Depressing the brake pedal.
- Moving the shift lever to 1st or R position. (for Manual Transmission)
- Moving the shift lever from D or M to any other position. (for Automatic Transmission)
- Selecting the 3rd, 2nd or 1st range with the shift lever in M. (for Automatic Transmission)
- Selecting the 3rd, 2nd or 1st range using the shift paddle switch with the shift lever in M (w/ shift paddle switch). (for Automatic Transmission)
- Pulling the cruise control main switch to CANCEL
- Turning the cruise control system off using the cruise control main switch (ON-OFF button) (the stored vehicle speed in the ECM is not maintained)

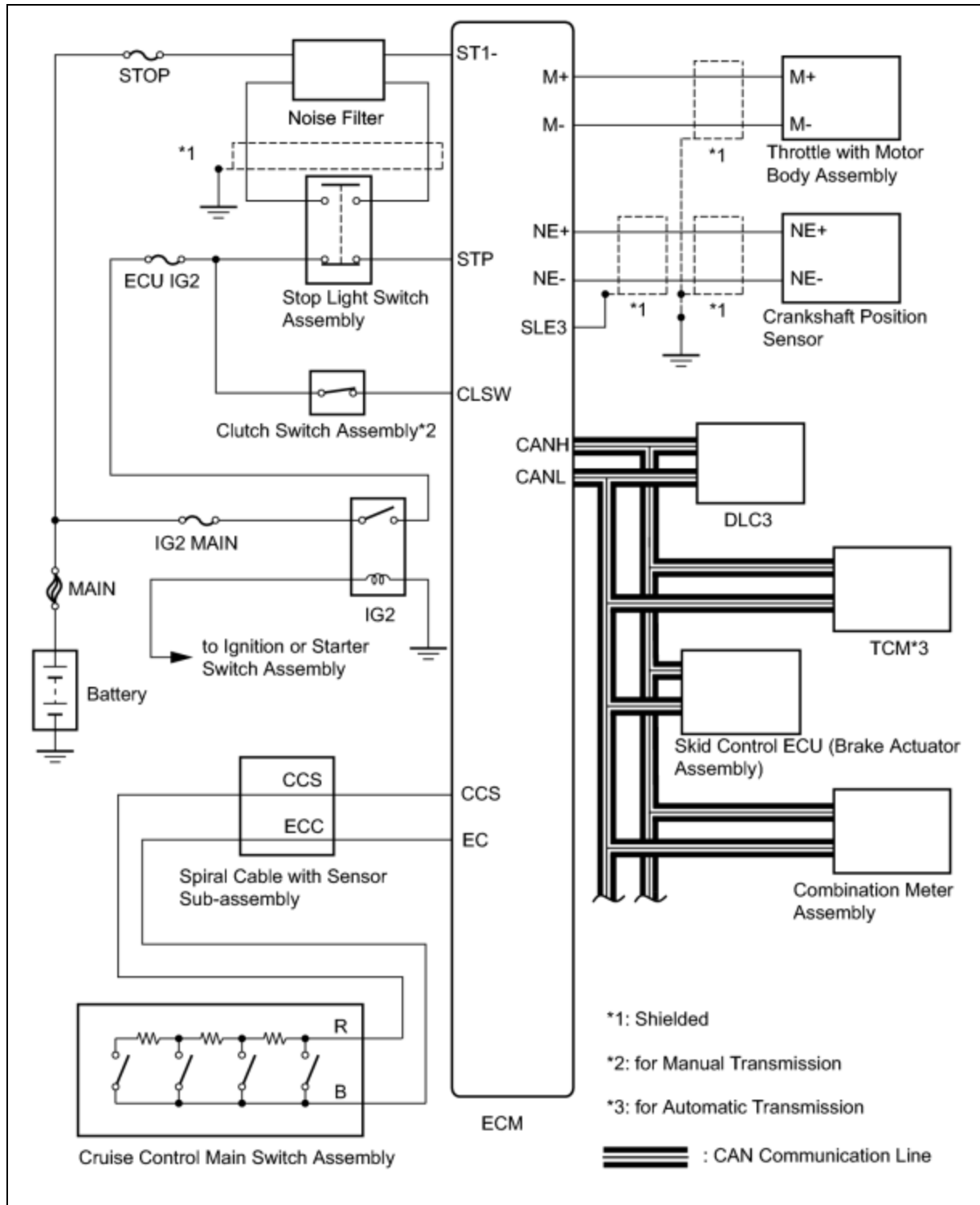
4. AUTO CANCEL

The ECM cancels the cruise control under the specified conditions. The cause for cancellation can be confirmed by referring to the "CANCEL CODE"  .



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PM2091X
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM



Communication Table

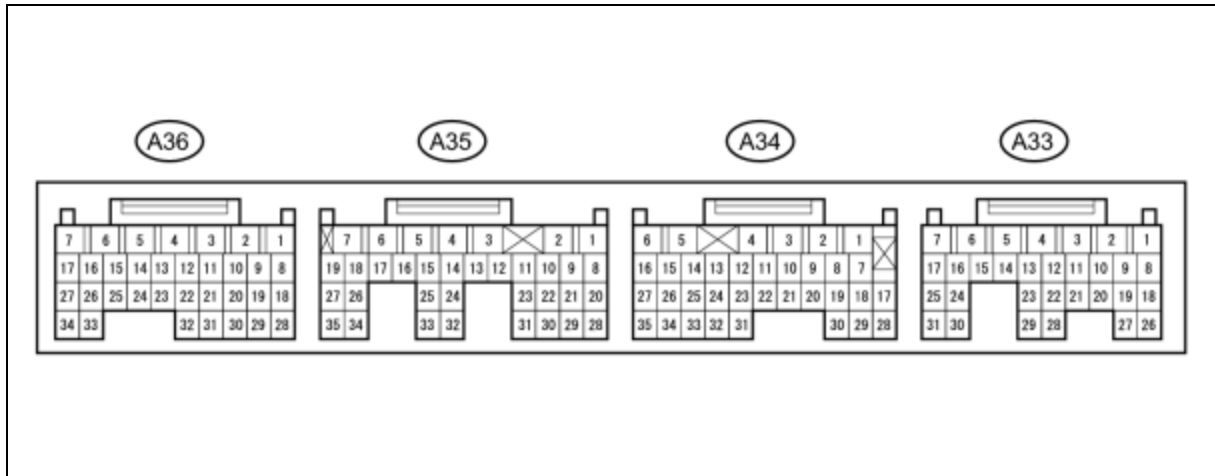
SENDER	RECEIVER	SIGNAL	LINE
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TCM	ECM	Shift lever position and gear range signal	CAN
Skid control ECU (Brake Actuator Assembly)	ECM	<ul style="list-style-type: none"> • Vehicle speed signal • ABS, TR(A)C and/or VSC operation signal 	CAN
ECM	Combination Meter Assembly (Cruise Control Indicator Light) (Cruise Control SET Indicator)	Cruise control indicator and cruise control SET indicator operation signal	CAN

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001W1U05TX
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: TERMINALS OF ECM (2013 FR-S)		

TERMINALS OF ECM

1. CHECK ECM



TERMINAL NO. (SYMBOLS)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A33-3 (ST1-) - A33-4 (EC)	BR-B - B-L	Brake signal	Ignition switch ON, Brake pedal depressed	Below 1 V
			Ignition switch ON, Brake pedal released	11 to 14 V
A33-7 (STP) - A33- 4 (EC)	R - B-L	Stop light signal	Ignition switch ON, Brake pedal depressed	11 to 14 V
			Ignition switch ON, Brake pedal released	Below 1 V
A33-15 (CLSW)* - A33-4 (EC)	R-Y - B-L	Clutch switch circuit	Ignition switch ON, Clutch pedal depressed	Below 1 V
			Ignition switch ON, Clutch pedal released	11 to 14 V
A33-30 (CCS) - A33-4 (EC)	W-L - B- L	Cruise control main switch circuit	Cruise control main switch (ON- OFF button) released	1 M Ω or higher
			Cruise control main switch (ON- OFF button) pushed	Below 2.5 Ω
			+ /RES switch ON	235 to 245 Ω
			- /SET switch ON	617 to 643 Ω
			CANCEL switch ON	1509 to 1571 Ω

*: for Manual Transmission



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002X2201MX
Title: CRUISE CONTROL: CRUISE CONTROL SYSTEM: U0073,U0101,U0122,U0155,U0402,U0416,U0423: Control Module Communication Bus "A" Off (2013 FR-S)		

DTC	U0073	Control Module Communication Bus "A" Off
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DTC	U0101	Lost Communication with TCM
------------	--------------	------------------------------------

DTC	U0122	Lost Communication with Vehicle Dynamics Control Module
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DTC	U0155	Lost Communication with Instrument Panel Cluster (IPC) Control Module
------------	--------------	--

DTC	U0402	Invalid Data Received from TCM
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DTC	U0416	Invalid Data Received from Vehicle Dynamics Control Module
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DTC	U0423	Invalid Data Received from Instrument Panel Cluster Control Module
------------	--------------	---

DESCRIPTION

The ECM communicates several signals with each sensor and ECU by CAN communication circuit.

There are any malfunctions in the communication circuit, one or more DTCs in the CAN communication system are output.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
U0073	Bus off state for 0.436 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> • Wire harness (CANL and CANH circuits) • ECM
U0101	No communication between ECM and TCM for 0.5 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> • Wire harness (CANL and CANH circuits) • TCM • ECM
	No communication between ECM and skid control ECU for	<ul style="list-style-type: none"> • Wire harness (CANL and CANH circuits)

U0122	0.5 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> • Skid control ECU (Brake actuator assembly) • ECM
U0155	No communication between ECM and combination meter assembly for 0.5 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> • Wire harness (CANL and CANH circuits) • Combination meter assembly • ECM
U0402	Invalid data received from TCM for 2 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> • Wire harness (CANL and CANH circuits) • TCM • ECM
U0416	Invalid data received from skid control ECU (brake actuator assembly) for 2 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> • Wire harness (CANL and CANH circuits) • Skid control ECU (Brake actuator assembly) • ECM
U0423	Invalid data received from combination meter assembly for 2 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> • Wire harness (CANL and CANH circuits) • Combination meter assembly • ECM

INSPECTION PROCEDURE

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT
-----------	------------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Cruise Control / Trouble Codes.
- (e) Read the DTCs.

Result:

RESULT	PROCEED TO
DTC U0073, U0101, U0122, U0155, U0402, U0416 or U0423 is output	A
DTC U0073, U0101, U0122, U0155, U0402, U0416 or U0423 and other DTCs are output	B

B ▶ GO TO DTC CHART

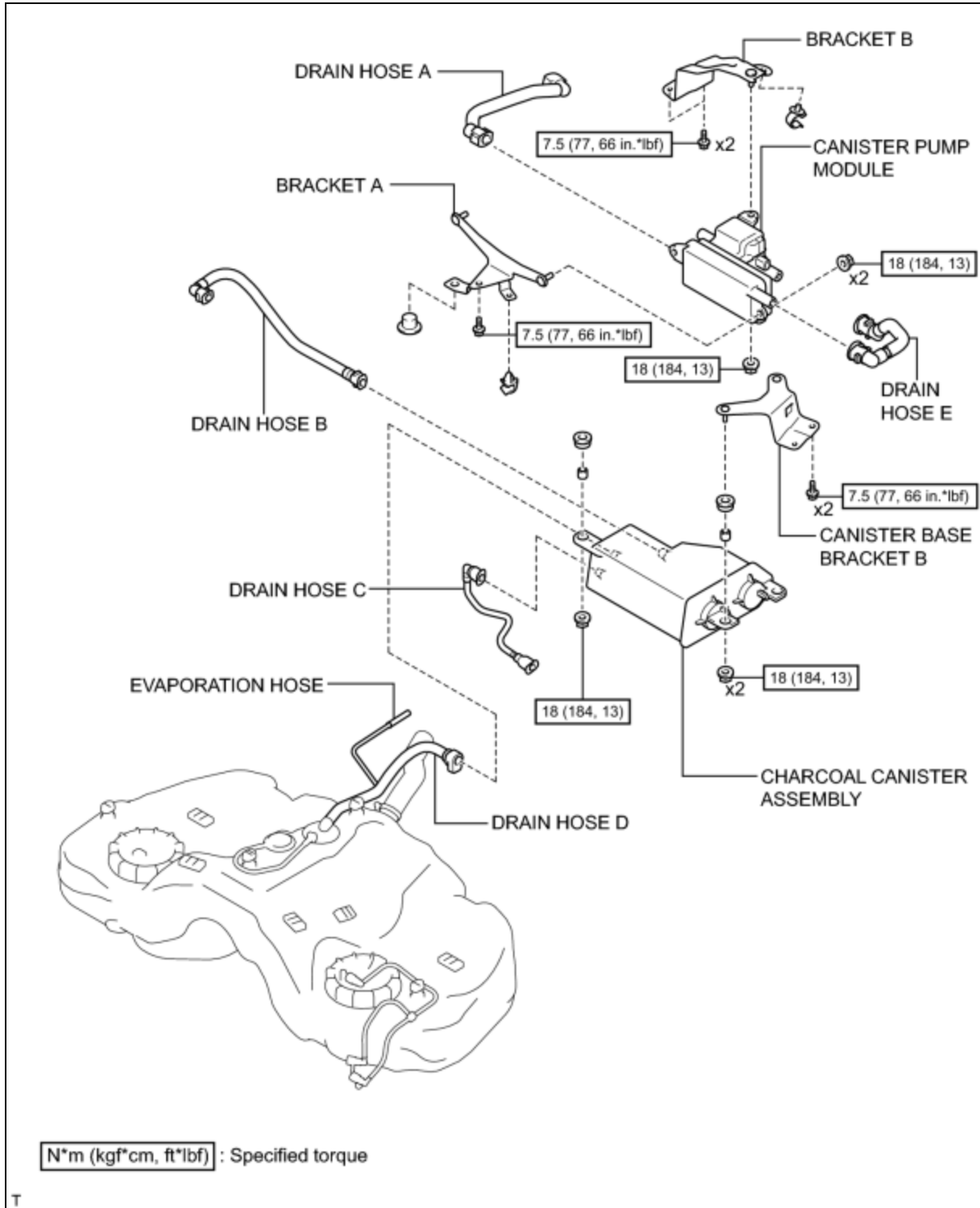
A ▶ GO TO CAN COMMUNICATION SYSTEM



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IOP009X
Title: FA20 EMISSION CONTROL: CANISTER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000310000CX
Title: FA20 EMISSION CONTROL: CANISTER: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT CHARCOAL CANISTER ASSEMBLY

NOTICE:

When applying vacuum, the needle may waver but, as long as the needle returns to its initial position immediately, it is not a malfunction.

(a) Visually check the charcoal canister assembly for cracks or damage.

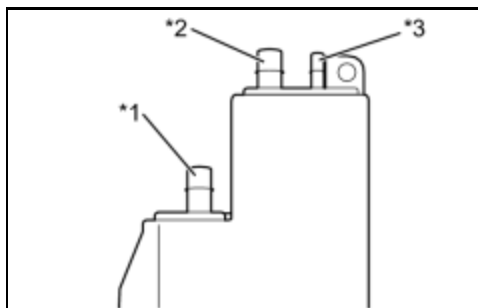
If cracks or damage is found, replace the charcoal canister assembly.

(b) Check the air flow.

(1) Using a vacuum pump, check the air flow according to the procedures below.

Text in Illustration

*1	Port A
*2	Port B
*3	Port C



OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
Ports B and C closed, and vacuum applied to port A (2 kPa (15 mmHg, 0.590 in.Hg))	No air leaks
Port C closed, and vacuum applied to port A (2 kPa (15 mmHg, 0.590 in.Hg))	Air flows from port B
Port C closed and air blown into port A (5 kPa (0.1 kgf/cm ² , 0.725 psi))	Air flows from port B
Air blown into port A (5 kPa (0.1 kgf/cm ² , 0.725 psi))	Air flows from ports B and C

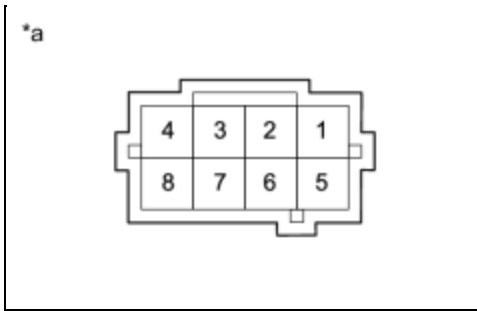
If the result is not as specified, replace the charcoal canister assembly.

2. INSPECT CANISTER PUMP MODULE

(a) Measure the resistance according to the value in the table below.

Standard Resistance:

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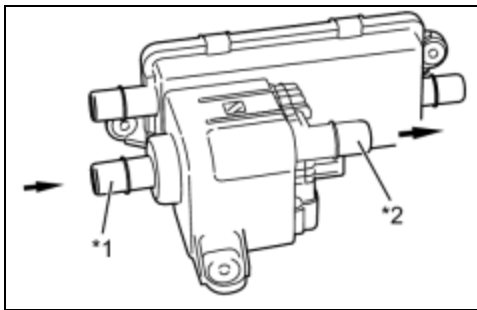


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 5	20°C (68°F)	25 to 30 Ω
1 - 5	60°C (140°F)	27 to 35 Ω

Text in Illustration

*a	Component without harness connected (Canister Pump Module)
----	---

(b) Check the operation of the check valve.

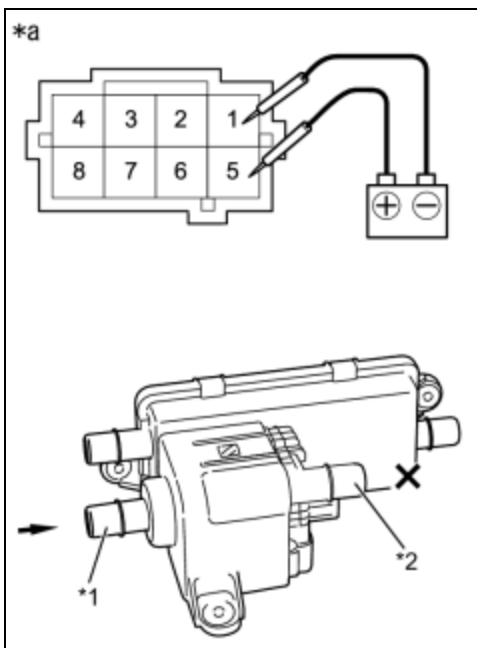


(1) Install a clean hose to the purge valve.

(2) Check that air flows from port A to port B.

Text in Illustration

*1	Port A
*2	Port B

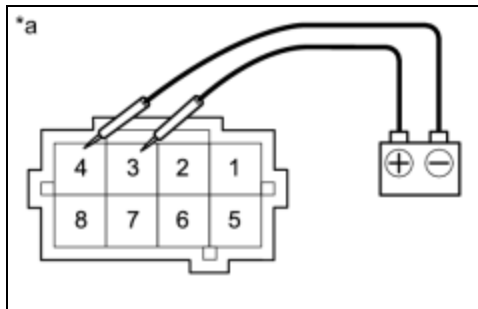


(3) Connect the positive (+) lead of the battery to terminal 1 and the negative (-) lead to terminal 5.

(4) Check that air does not flow from port A to port B.

Text in Illustration

*1	Port A
*2	Port B
*a	Component without harness connected (Canister Pump Module)



(5) Connect the positive (+) lead of the battery to terminal 3 and the negative (-) lead to terminal 4.

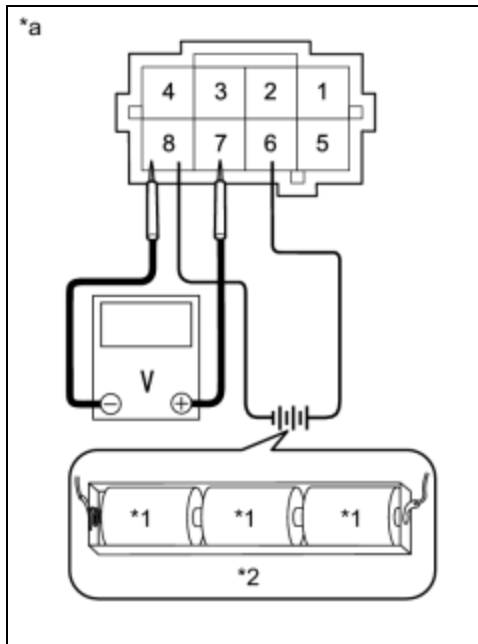
Text in Illustration

*a	Component without harness connected (Canister Pump Module)
----	---

(6) Check that the vacuum pump operates.

NOTICE:

Do not operate vacuum pump for 5 minutes or more.



(7) Connect the positive (+) lead of the battery to terminal 6 and the negative (-) lead to terminal 8.

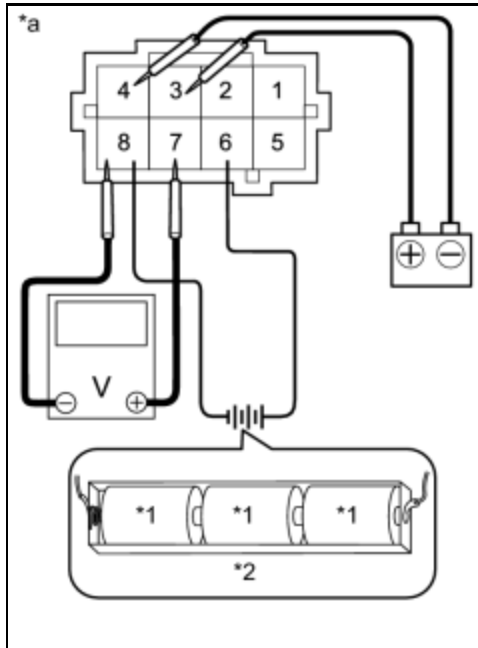
Text in Illustration

*1	1.5 V
*2	4.8 to 5.2 V
*a	Component without harness connected (Canister Pump Module)

(8) Measure the voltage according to the value in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION



- (9) Connect the positive (+) lead of the battery to terminal 6 and the negative (-) lead to terminal 8.

Text in Illustration

*1	1.5 V
*2	4.8 to 5.2 V
*a	Component without harness connected (Canister Pump Module)

- (10) Connect the positive (+) lead of the battery to terminal 3 and the negative (-) lead to terminal 4. Check that the voltage drops slightly from 3.5 volts.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003ION00CX
Title: FA20 EMISSION CONTROL: CANISTER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL CHARCOAL CANISTER ASSEMBLY

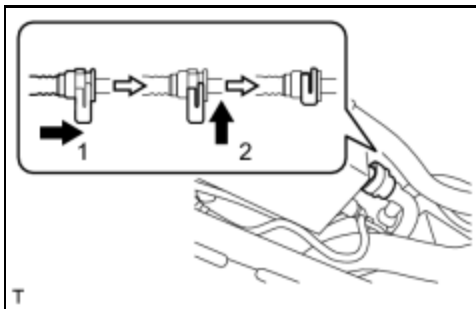
- (a) Install the canister base bracket to the charcoal canister assembly with 2 nuts.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

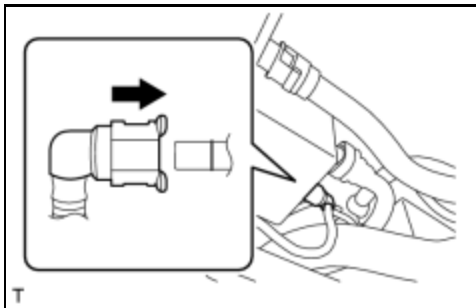
- (b) Install the charcoal canister assembly with canister base bracket with the 2 bolts and the nut.

Bolt - Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

Nut - Torque: 18 N·m (184 kgf·cm, 13ft·lbf)



- (c) Connect the drain hose D as indicated by the arrows, in the order shown in the illustration.



- (d) Connect the drain hose C as shown in the illustration.

2. INSTALL CANISTER PUMP MODULE

- (a) Install the drain hose E.
- (b) Connect the drain hose A and the drain hose B.
- (c) Engage the clamp.
- (d) Install the nuts and bracket B.
- Torque: 18 N·m (184 kgf·cm, 13ft·lbf)**
- (e) Install the 2 nuts and bracket A.
- Torque: 18 N·m (184 kgf·cm, 13ft·lbf)**
- (f) Engage the clip.
- (g) Install the check valve with 3 bolts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

- (h) Connect the evaporation hose to the fuel pipe assembly.
- (i) Engage the clip.
- (j) Connect the drain hose A to the fuel filler pipe.
- (k) Connect the drain hose B to the charcoal canister assembly.

3. INSTALL REAR SUSPENSION MEMBER SUB-ASSEMBLY

INFO

4. INSTALL REAR DIFFERENTIAL CARRIER ASSEMBLY

INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000310Q00CX
Title: FA20 EMISSION CONTROL: CANISTER: REMOVAL (2013 FR-S)		

REMOVAL

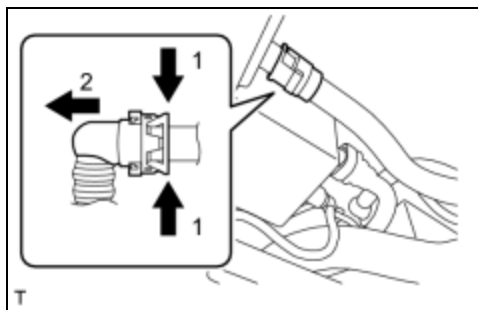
1. REMOVE REAR DIFFERENTIAL CARRIER ASSEMBLY

INFO

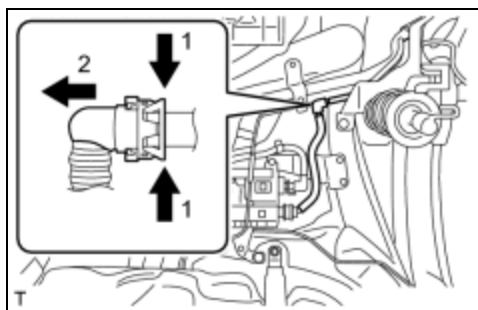
2. REMOVE REAR SUSPENSION MEMBER SUB-ASSEMBLY

INFO

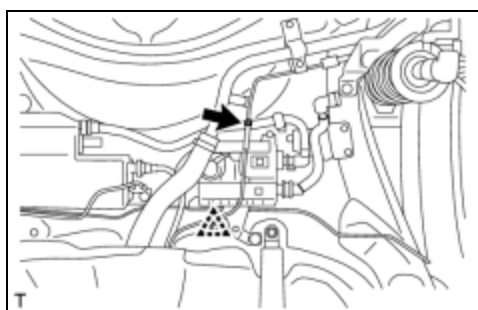
3. REMOVE CANISTER PUMP MODULE



- (a) Disconnect the drain hose B as indicated by the arrows, in the order shown in the illustration.

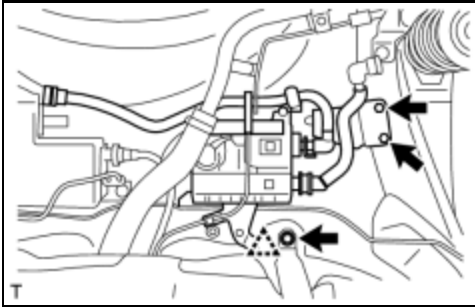


- (b) Disconnect the drain hose A as indicated by the arrows, in the order shown in the illustration.



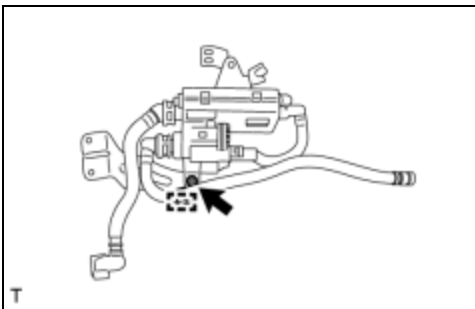
- (c) Disconnect the evaporation hose from the fuel filler pipe assembly.

(d) Disengage the clip.



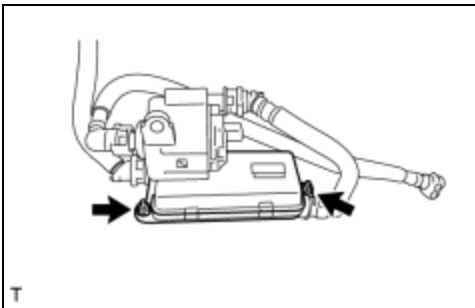
(e) Remove the 3 bolts and check valve.

(f) Disengage the clip.

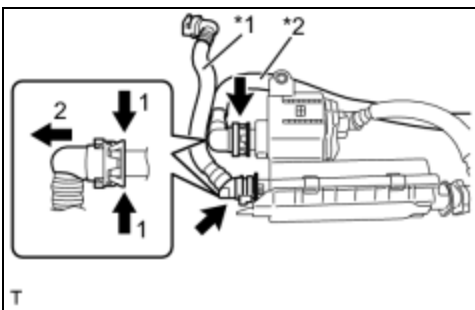


(g) Disengage the clamp.

(h) Remove the nut and bracket B.



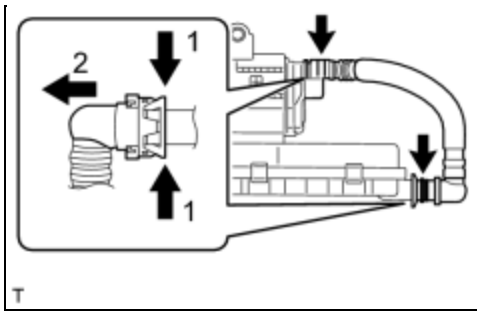
(i) Remove the 2 nuts and bracket A.



(j) Disconnect the drain hose A and drain hose B as indicated by the arrows, in the order shown in the illustration.

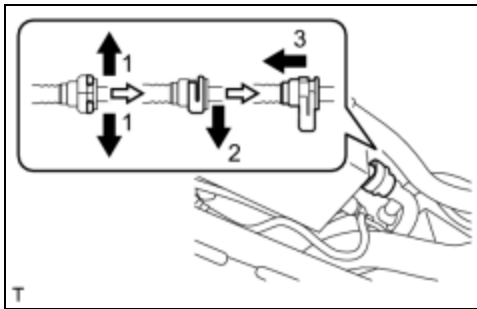
Text in Illustration

*1	Drain hose A
*2	Drain hose B

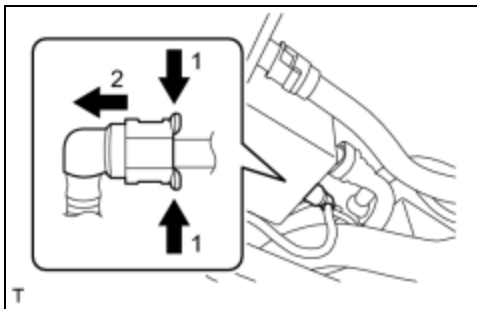


(k) Disconnect the 2 quick connector as indicated by the arrows, in the order shown in the illustration, and remove the drain hose E.

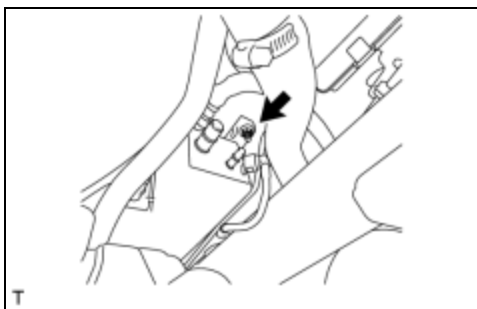
4. REMOVE CHARCOAL CANISTER ASSEMBLY



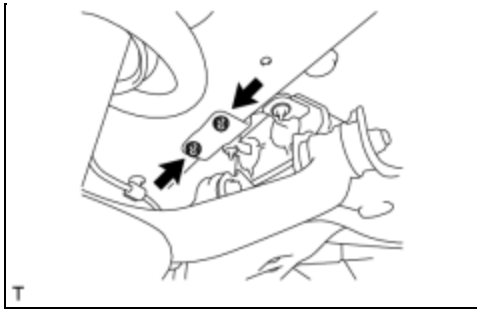
(a) Disconnect the drain hose D as indicated by the arrows, in the order shown in the illustration.



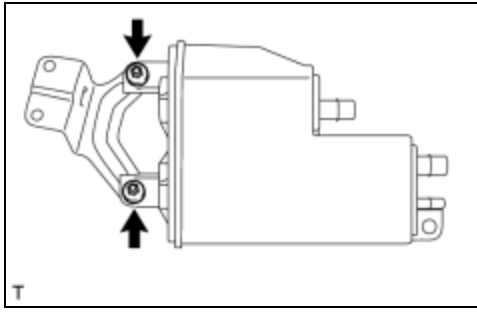
(b) Disconnect the drain hose C as indicated by the arrows, in the order shown in the illustration.



(c) Remove the nut.



(d) Remove the 2 bolts and charcoal canister assembly along with the canister base bracket B.

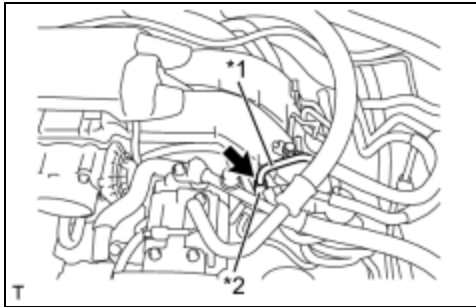


(e) Remove the 2 nuts and canister base bracket.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000310J009X
Title: FA20 EMISSION CONTROL: EMISSION CONTROL SYSTEM: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. CHECK PURGE VALVE



- (a) Disconnect the No. 2 fuel vapor feed hose (on the canister side) of the fuel pipe.

Text in Illustration

*1	Fuel pipe
*2	No.2 fuel vapor feed hose

- (b) Connect the Techstream to the DLC3.
(c) Start the engine.
(d) Turn the Techstream on.
(e) Enter the following menus: Engine / Active Test / Activate the VSV for Evap Control.
(f) When the purge valve is operated using the tester, check whether the port of the purge valve applies suction to your finger.

OK:

TESTER OPERATION	SPECIFIED CONDITION
Check valve: OFF	Purge valve has no suction
Check valve: ON	Purge valve has suction

If the result is not as specified, check the valve [INFO](#), wire harness and ECM.

- (g) Connect the No. 2 fuel vapor feed hose (on the canister side) of the purge valve.

2. INSPECT FUEL CUT-OFF RPM

- (a) Start and warm up the engine.
(b) Use a sound scope to check for injector operation noise.
(c) Increase the engine speed to at least 3000 rpm.
(d) Check that when the accelerator pedal is released, the injector operation noise stops momentarily and then resumes.

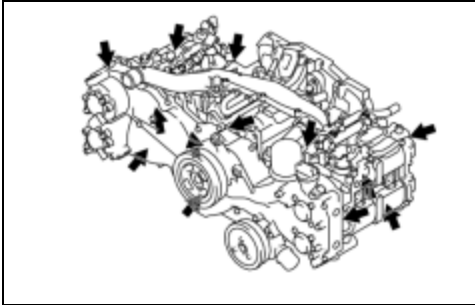
Standard:

ITEM	SPECIFIED CONDITION
Fuel cut off rpm	2500 rpm or more

If the result is not as specified, check the injector **INFO** , wire harness and ECM.

3. VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS EMISSION HOSE

(a) Check that there are no cracks, leaks or damage.



NOTICE:

- Detachment or other problems with the engine oil dipstick, filler cap, ventilation hose and other components may cause the engine to run improperly.
- Air suction caused by disconnections, looseness or cracks in the parts of the air induction system between the throttle with motor body assembly and cylinder head will cause engine failure or engine malfunctions.

If the result is not as specified, replace parts as necessary.

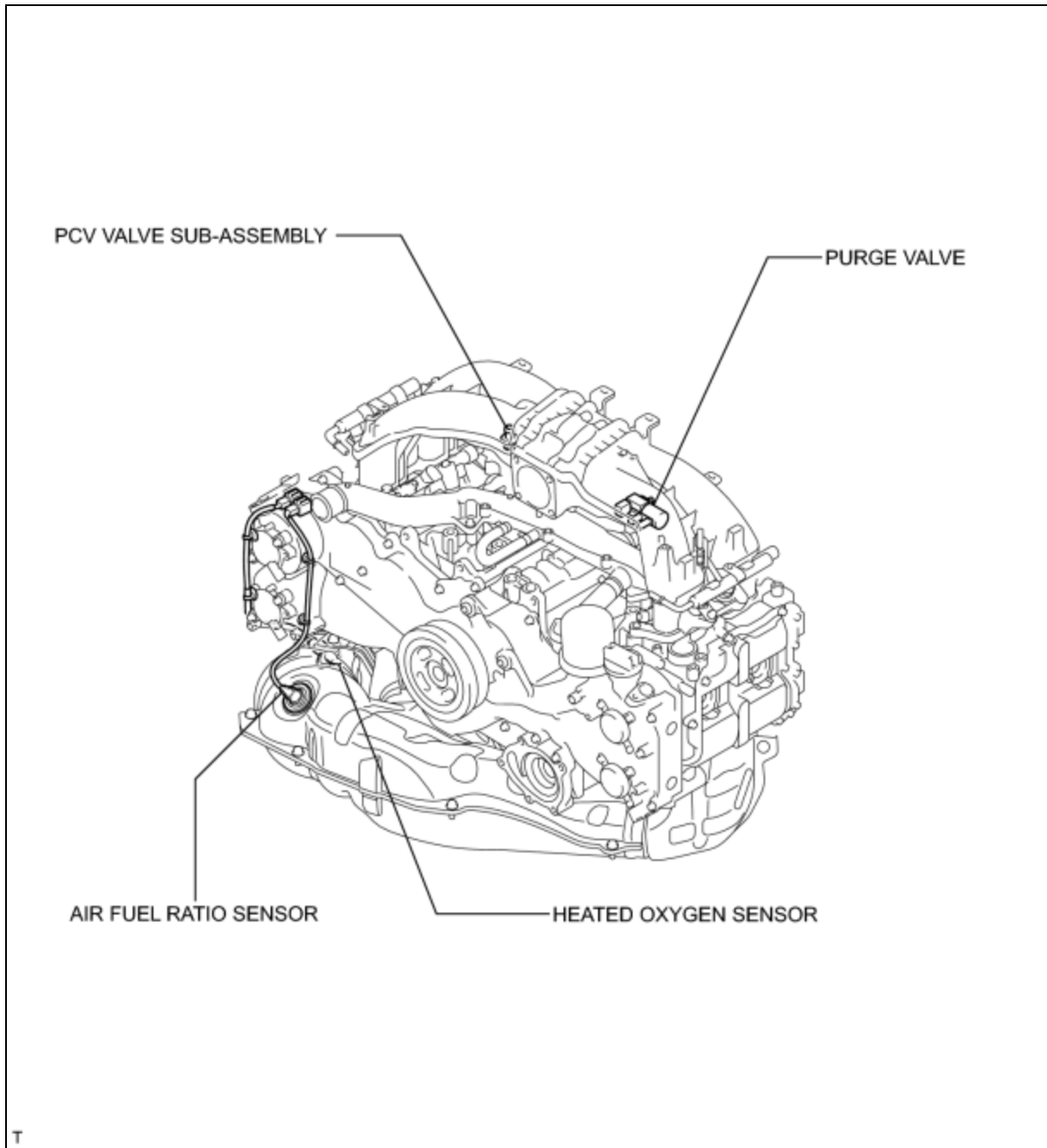
4. CHECK HOSES AND CONNECTORS

(a) Visually check for loose connections, sharp bends or damage.

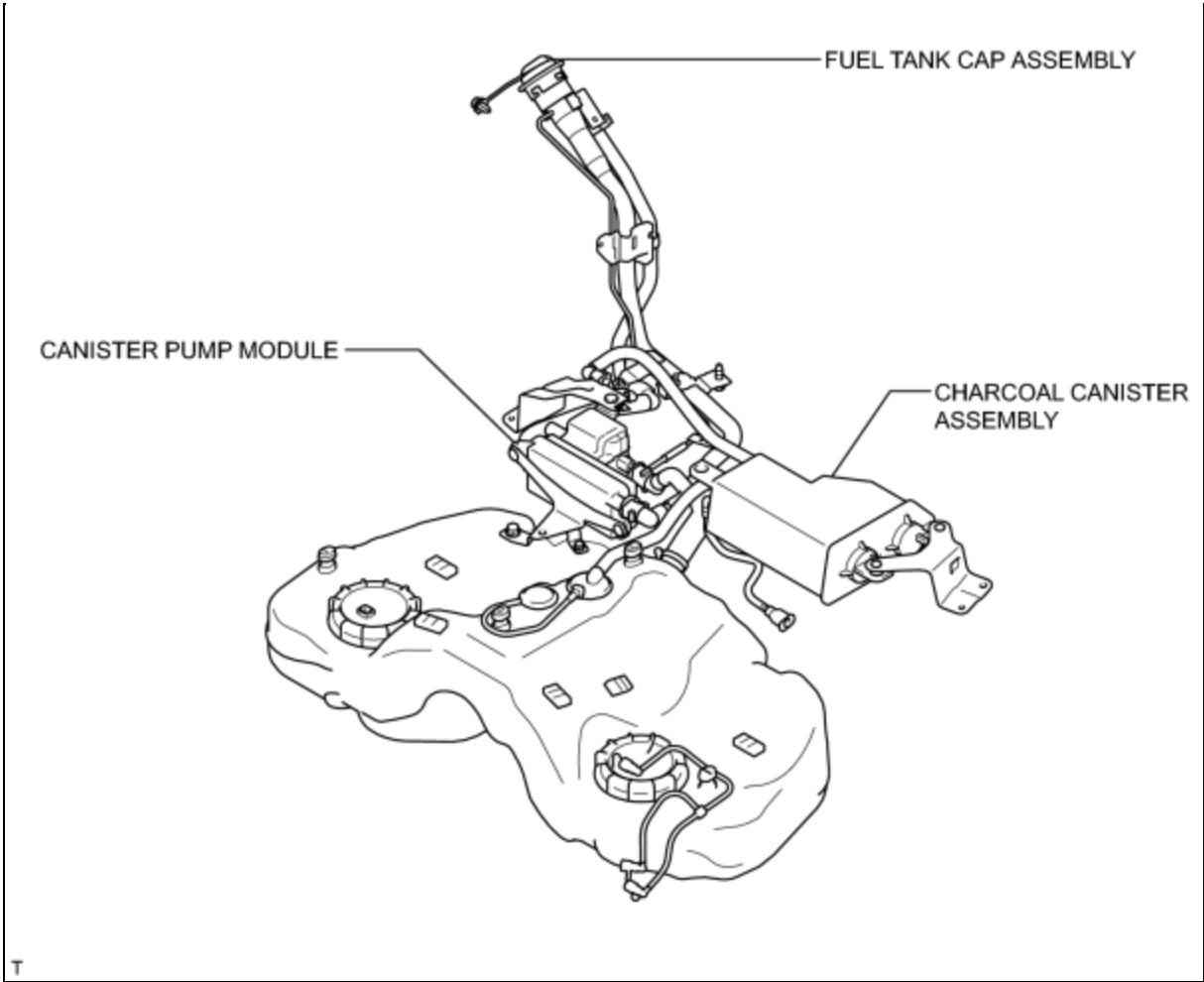
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000310H009X
Title: FA20 EMISSION CONTROL: EMISSION CONTROL SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION

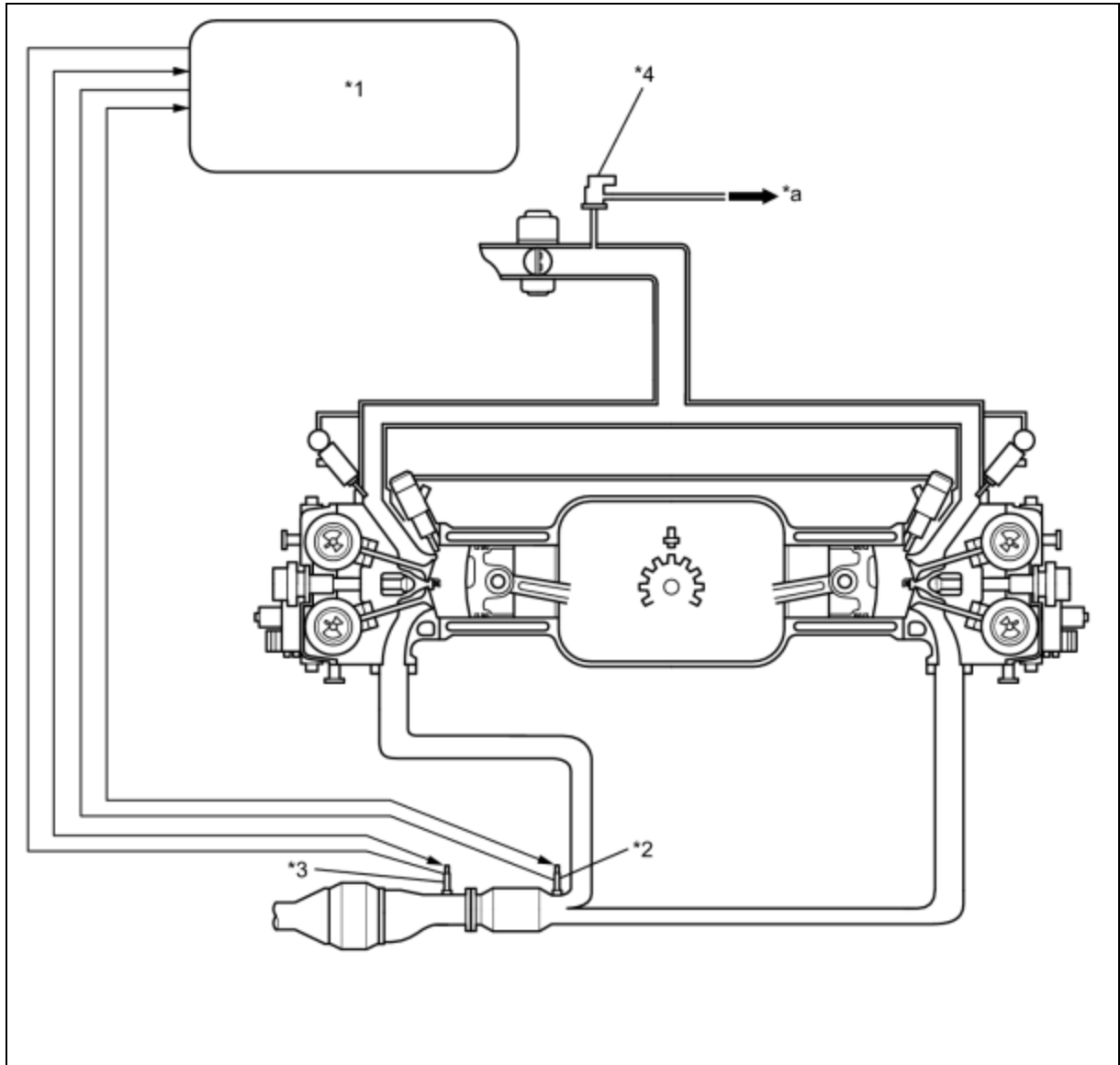


ILLUSTRATION



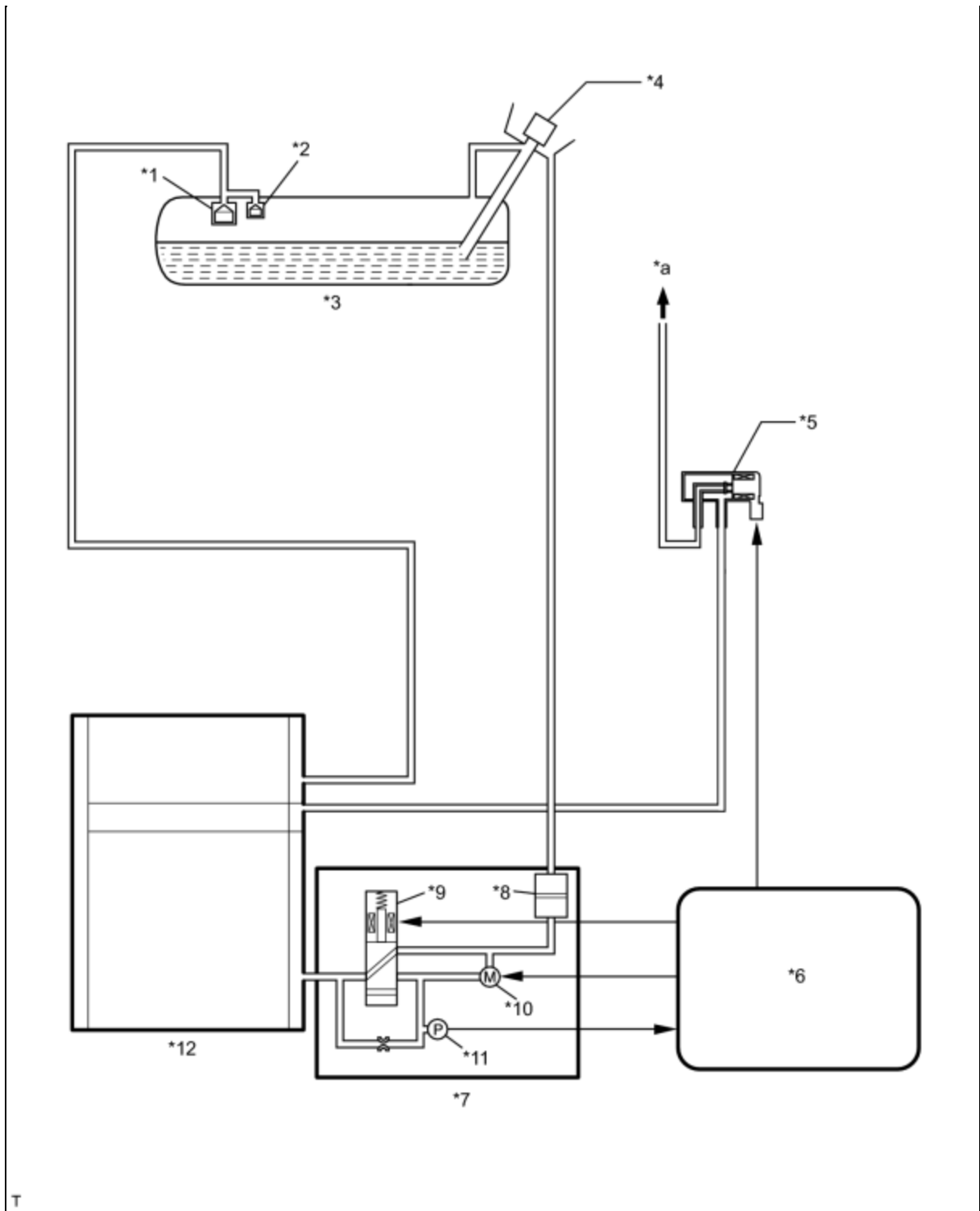
Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003101009X
Title: FA20 EMISSION CONTROL: EMISSION CONTROL SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM



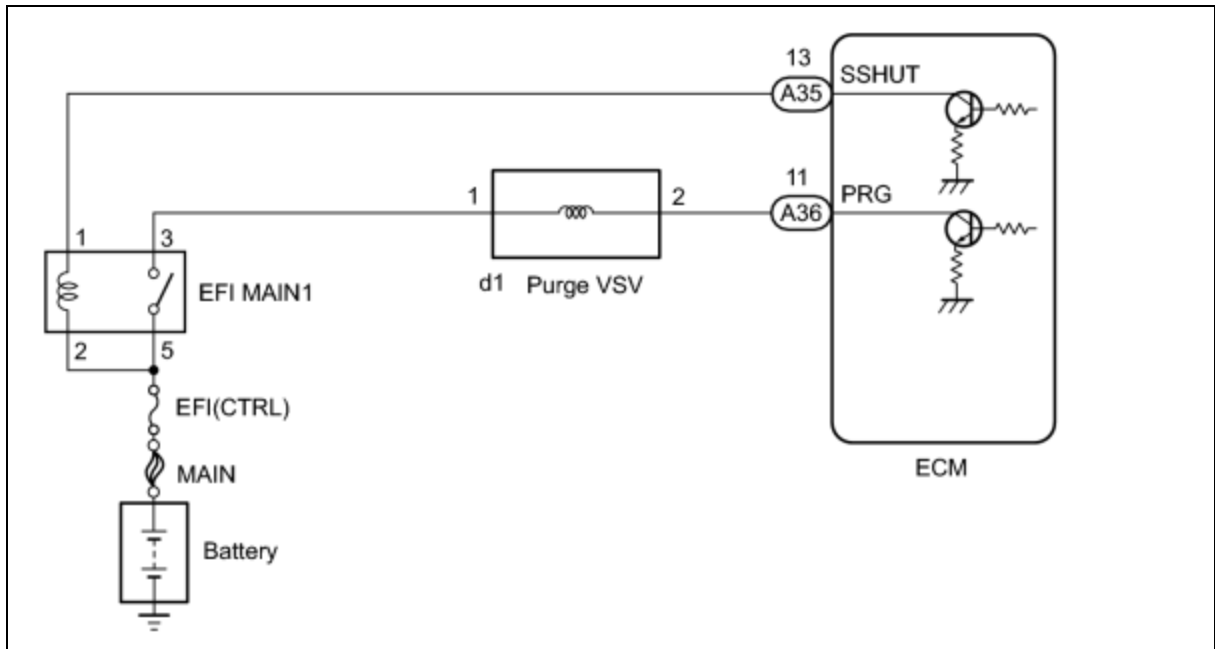
Text in illustration

*1	ECM	*2	Air Fuel Ratio Sensor
*3	Heated Oxygen Sensor	*4	Purge Valve
*a	to Charcoal Canister Assembly	-	-



Text in illustration

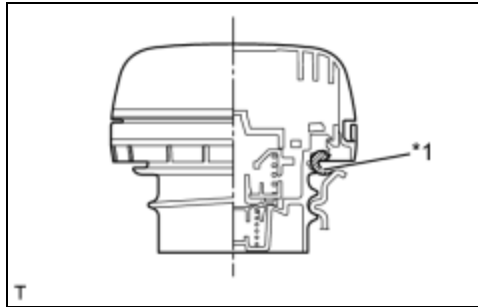
*1	Roll Over Valve	*2	Cut-off Valve
*3	Fuel Tank Assembly	*4	Fuel Tank Cap Assembly
*5	Purge Valve	*6	ECM
*7	Canister Pump Module	*8	Air Filter
*9	Vent Valve	*10	Pump Motor
*11	Canister Pressure Sensor	*12	Charcoal Canister Assembly
*a	to Intake Manifold	-	-



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000313E009X
Title: FA20 EMISSION CONTROL: FUEL TANK CAP: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT FUEL TANK CAP ASSEMBLY



(a) Visually check if the cap and/or gasket are deformed or damaged.

Text in Illustration

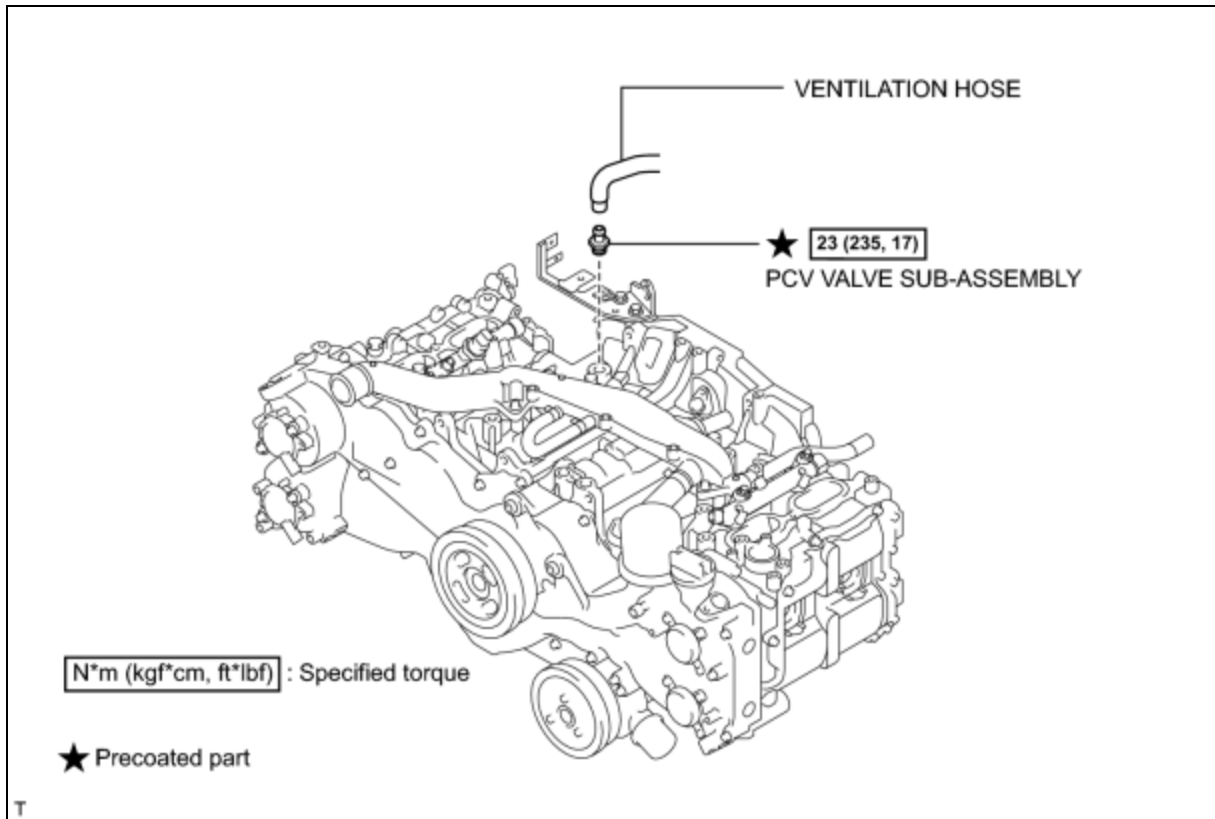
*1	Gasket
----	--------

If necessary, replace the fuel tank cap assembly or gasket.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000313100CX
Title: FA20 EMISSION CONTROL: PCV VALVE: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION

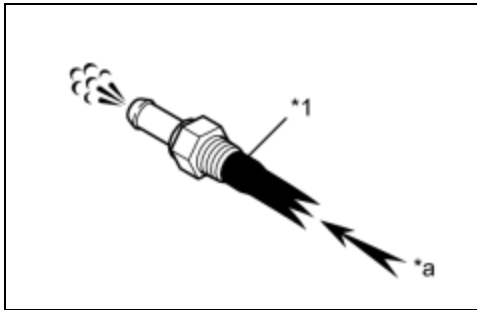


Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003I3H00HX
Title: FA20 EMISSION CONTROL: PCV VALVE: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT PCV VALVE SUB-ASSEMBLY

- (a) Install a clean hose to the PCV valve sub-assembly.
- (b) Check the PCV valve sub-assembly operation.



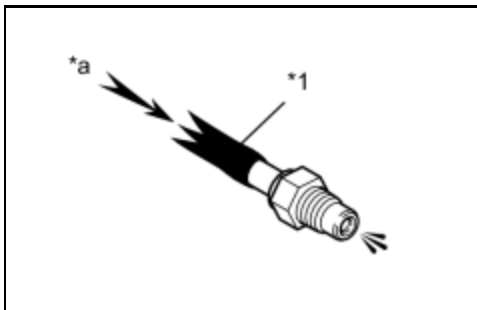
- (1) Blow air into the cylinder head side and check that air passes through easily.

Text in Illustration

*1	Clean Hose
*a	Air

CAUTION:

Do not suck air through the valve. Petroleum substances inside the valve are hazardous to your health.



- (2) Blow air into the intake manifold side and check that air passes through with difficulty.

Text in Illustration

*1	Clean Hose
*a	Air

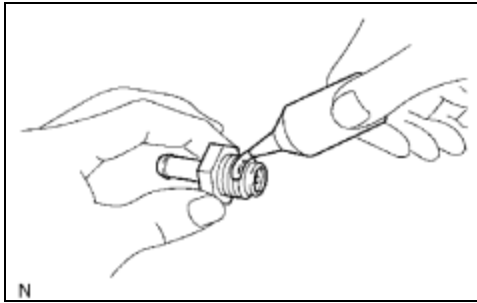
If the result is not as specified, replace the PCV valve sub-assembly.

- (c) Remove the clean hose from the PCV valve sub-assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000313G00CX
Title: FA20 EMISSION CONTROL: PCV VALVE: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL PCV VALVE SUB-ASSEMBLY



(a) Apply adhesive to 2 or 3 threads of the PCV valve sub-assembly.

Adhesive:

Three Bond 1141G or equivalent

(b) Using a 19 mm deep socket wrench, install the PCV valve sub-assembly.

Torque: 23 N·m (235 kgf·cm, 17ft·lbf)

(c) Connect the ventilation hose.

2. INSTALL INTAKE MANIFOLD

INFO



TOYOTA

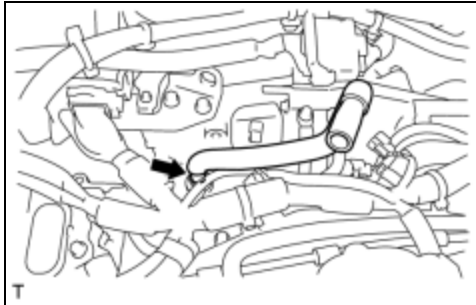
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000313J00CX
Title: FA20 EMISSION CONTROL: PCV VALVE: REMOVAL (2013 FR-S)		

REMOVAL

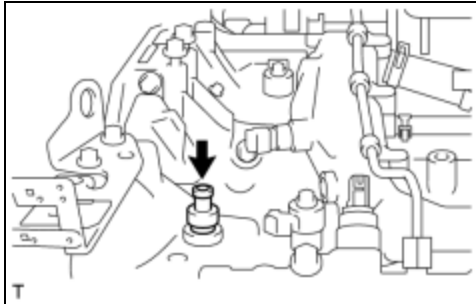
1. REMOVE INTAKE MANIFOLD

INFO

2. REMOVE PCV VALVE SUB-ASSEMBLY



- (a) Disconnect the ventilation hose from the PCV valve sub-assembly.

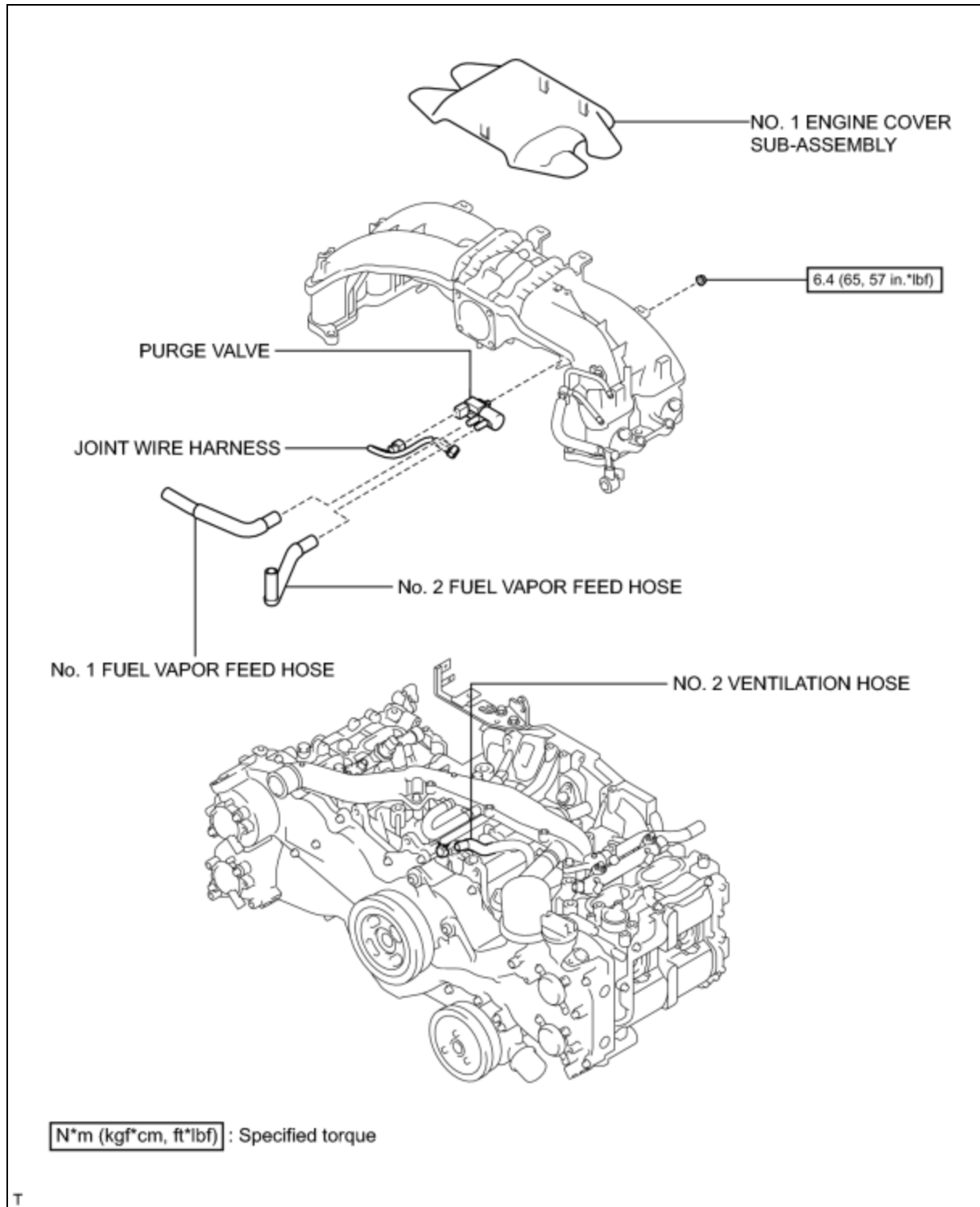


- (b) Using a 19 mm deep socket wrench, remove the PCV valve sub-assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IOX00CX
Title: FA20 EMISSION CONTROL: PURGE VALVE: COMPONENTS (2013 FR-S)		

COMPONENTS

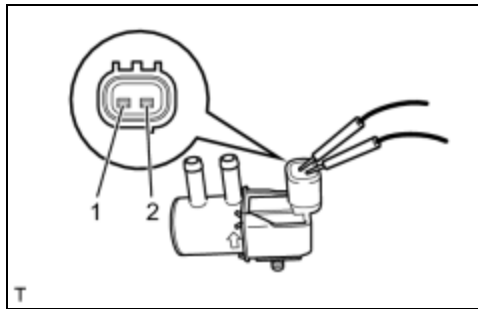
ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IOW00CX
Title: FA20 EMISSION CONTROL: PURGE VALVE: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT PURGE VALVE

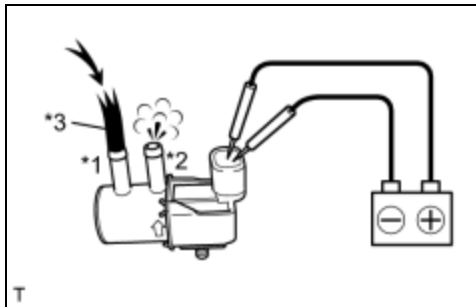


(a) Measure the resistance according to the value in the table below.

Standard Resistance:


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	21 to 27 Ω

(b) Check the operation of the purge valve.



- (1) Install a clean hose to the purge valve.
- (2) Check that air does not flow from port E to port F.
- (3) Check that air flows from port E to port F.

Text in Illustration

*1	Port E
*2	Port F
*3	Clean Hose
	Air

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
Battery does not connect	Air does not flow from port E to port F

Battery positive (+) → Terminal 1 Battery negative (-) → Terminal 2	Air flows from port E to port F
--	---------------------------------

If the result is not as specified, replace the purge valve.

(4) Remove the clean hose from the purge valve.



TOYOTA

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IOV00CX
Title: FA20 EMISSION CONTROL: PURGE VALVE: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL PURGE VALVE

- (a) Connect the joint wire harness to the purge valve.
- (b) Connect the No. 1 fuel vapor feed hose and No. 2 fuel vapor feed hose, and install the purge valve with the joint wire harness.
- (c) Connect the manifold absolute pressure sensor connector.
- (d) Connect the purge valve connector.
- (e) Install the nut and purge valve.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

2. INSTALL NO. 1 ENGINE COVER SUB-ASSEMBLY INFO

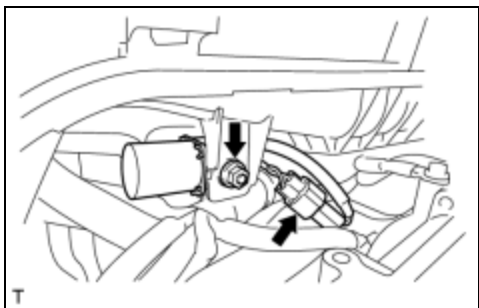


Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IOY00CX
Title: FA20 EMISSION CONTROL: PURGE VALVE: REMOVAL (2013 FR-S)		

REMOVAL

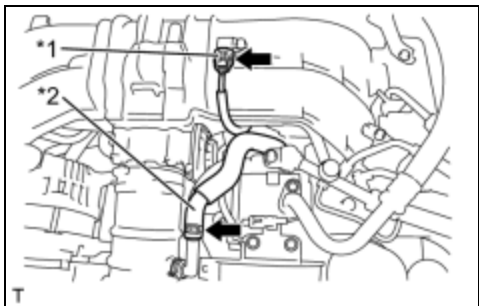
1. REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY INFO

2. REMOVE PURGE VALVE



(a) Remove the nut which holds the purge valve onto the intake manifold.

(b) Disconnect the purge valve connector.



(c) Disconnect the manifold absolute pressure sensor connector.

(d) Disconnect the No. 2 ventilation hose.

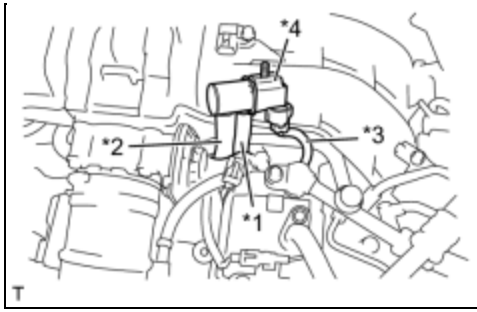
Text in Illustration

*1	air pressure sensor assembly connector
*2	No. 2 ventilation hose

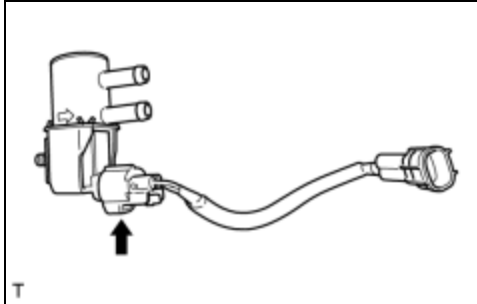
(e) Disconnect the No. 1 fuel vapor feed hose and No. 2 fuel vapor feed hose, and remove the purge valve with the joint wire harness.

Text in Illustration

*1	No. 1 fuel vapor feed hose
----	----------------------------



*2	No. 2 fuel vapor feed hose
*3	Joint wire harness
*4	purge valve

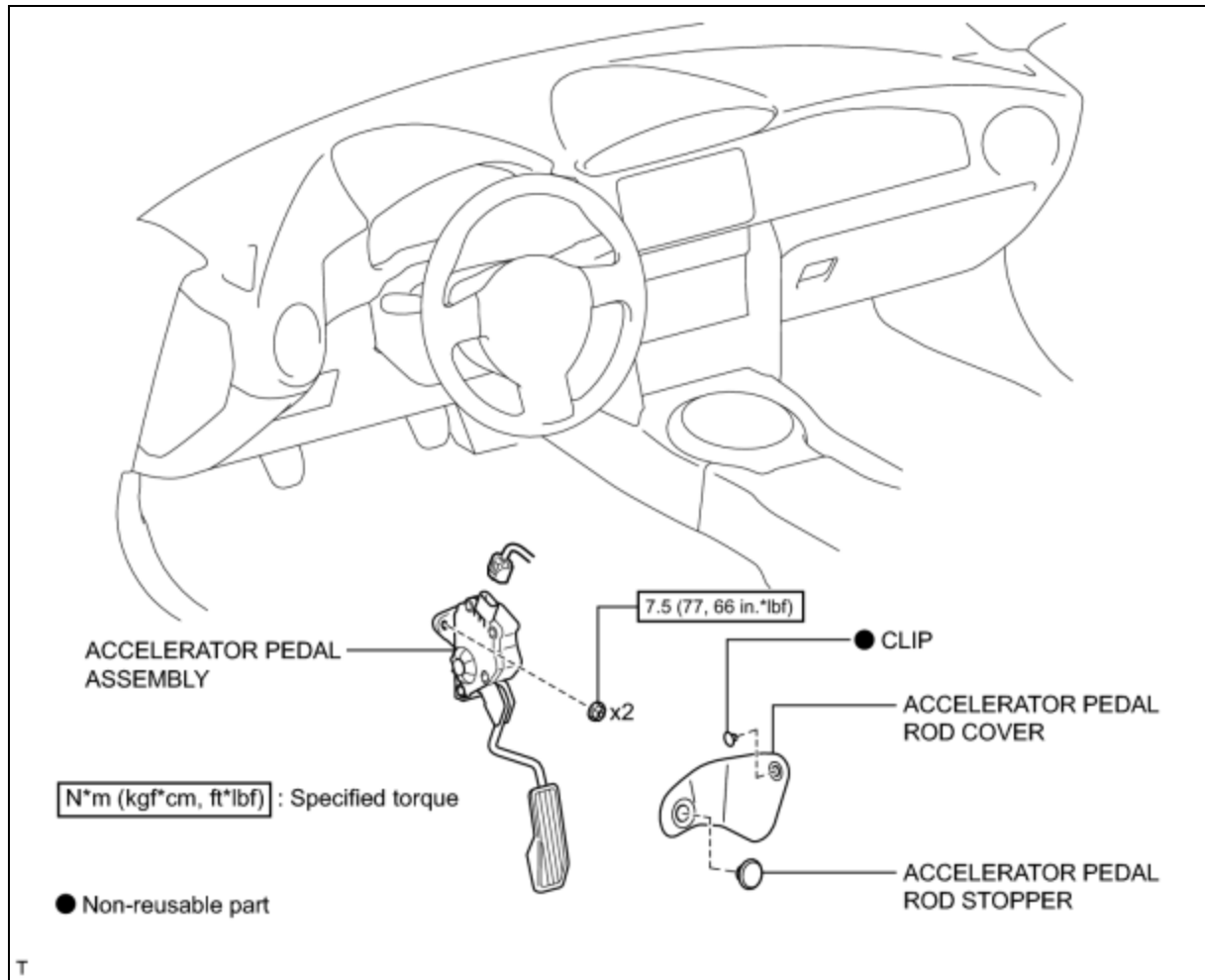


(f) Remove the joint wire harness from the purge valve assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002QU600LX
Title: FA20 ENGINE CONTROL: ACCELERATOR PEDAL: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002QU500LX
Title: FA20 ENGINE CONTROL: ACCELERATOR PEDAL: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL ACCELERATOR PEDAL ASSEMBLY

NOTICE:

- Avoid excessive force to the accelerator pedal assembly.
- Do not disassemble the accelerator pedal assembly.

(a) Install the accelerator pedal assembly with the 2 nuts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

(b) Connect the accelerator pedal assembly connector.

2. INSTALL ACCELERATOR PEDAL ROD COVER

(a) Engage the new clip, and install the accelerator pedal rod cover.

3. INSTALL ACCELERATOR PEDAL ROD STOPPER

(a) Install the accelerator pedal rod stopper.

4. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL INFO



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IHM006X
Title: FA20 ENGINE CONTROL: ACCELERATOR PEDAL: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT ACCELERATOR PEDAL ASSEMBLY

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Data List / Accel Sensor Out No. 1 and Accel Sensor Out No. 2.
- (e) Read the value displayed on the Techstream.

Standard Voltage:

ACCELERATOR PEDAL OPERATION	ACCEL SENSOR OUT NO. 1	ACCEL SENSOR OUT NO. 2
Released	0.5 to 0.8 V	0.5 to 0.8 V
Depressed	2.4 to 3.5 V	2.4 to 3.5 V

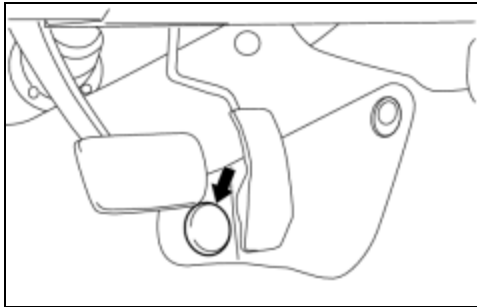


Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002QU700LX
Title: FA20 ENGINE CONTROL: ACCELERATOR PEDAL: REMOVAL (2013 FR-S)		

REMOVAL

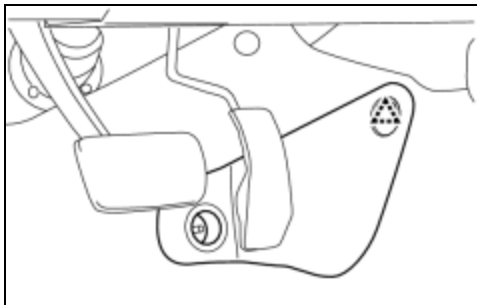
1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

2. REMOVE ACCELERATOR PEDAL ROD STOPPER

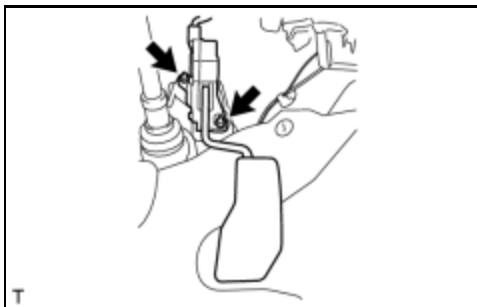


(a) Remove the accelerator pedal rod stopper.

3. REMOVE ACCELERATOR PEDAL ROD COVER



(a) Disengage the clip, and remove the accelerator pedal rod cover.



4. REMOVE ACCELERATOR PEDAL ASSEMBLY

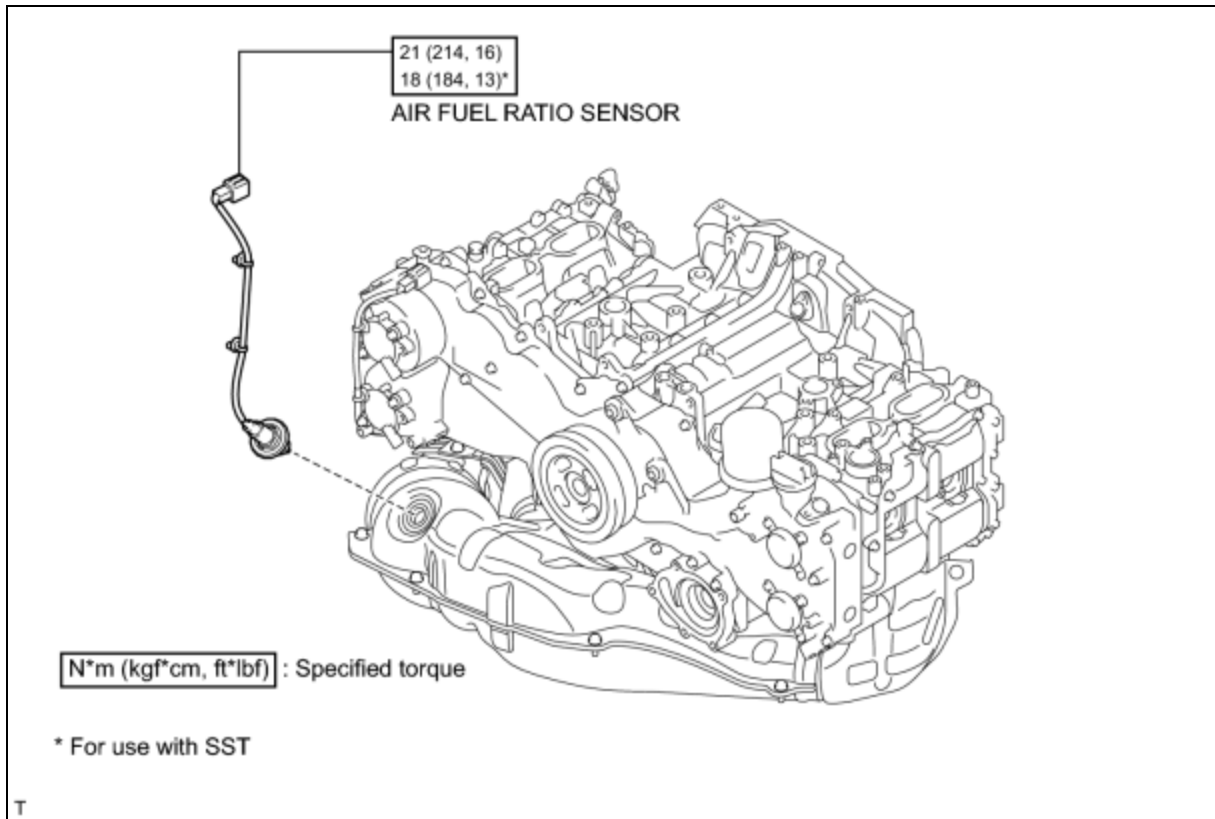
- (a) Disconnect the accelerator pedal assembly connector.
- (b) Remove the 2 nuts and the accelerator pedal assembly.



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001BOE00FX
Title: FA20 ENGINE CONTROL: AIR FUEL RATIO SENSOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



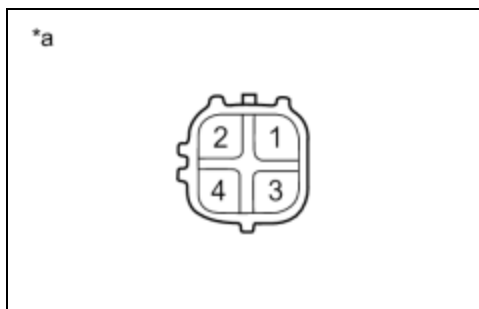
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MUG00UX
Title: FA20 ENGINE CONTROL: AIR FUEL RATIO SENSOR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT AIR FUEL RATIO SENSOR

(a) Measure the resistance according to the value(s) the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	1.98 to 2.64 Ω
1 - 4	Always	10 kΩ or higher

Text in Illustration

*a	Component without harness connected (Air Fuel Ratio Sensor)
----	--

If the result is not as specified, replace the air fuel ratio sensor.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MUFO0WX
Title: FA20 ENGINE CONTROL: AIR FUEL RATIO SENSOR: INSTALLATION (2013 FR-S)		

INSTALLATION

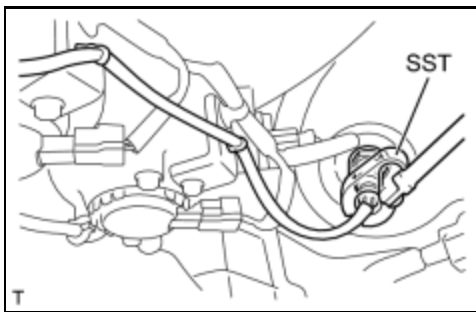
1. INSTALL AIR FUEL RATIO SENSOR

- (a) Using SST, install the air fuel ratio sensor onto the exhaust manifold.

SST: 09224-00010

Without SST - Torque: 21 N·m (214 kgf·cm, 16ft·lbf)

With SST - Torque: 18 N·m (184 kgf·cm, 13ft·lbf)



NOTICE:

If a component has been dropped or subjected to a strong impact, replace it.

HINT:

- This torque value is effective when SST is parallel to the torque wrench.
- The "with SST" torque value is effective when using SST with a fulcrum length of 30 mm (1.18 in.).
- The "with SST" torque value is effective when using a torque wrench with a fulcrum length of 180 mm (7.087 in.).
- If using a torque wrench with a different length, or connecting the torque wrench and SST at an angle, refer to the alternate torque values **INFO**.

- (b) Engage the 2 clamps.

- (c) Connect the air fuel ratio sensor connector.

2. CONNECT BATTERY NEGATIVE TERMINAL **INFO**

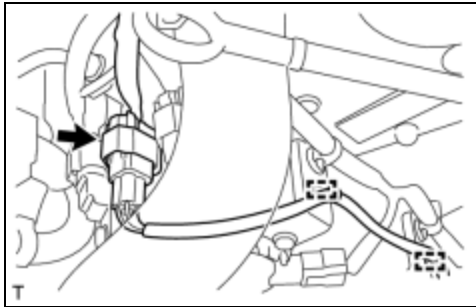
3. INSPECT FOR EXHAUST GAS LEAK **INFO**

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MUI00YX
Title: FA20 ENGINE CONTROL: AIR FUEL RATIO SENSOR: REMOVAL (2013 FR-S)		

REMOVAL

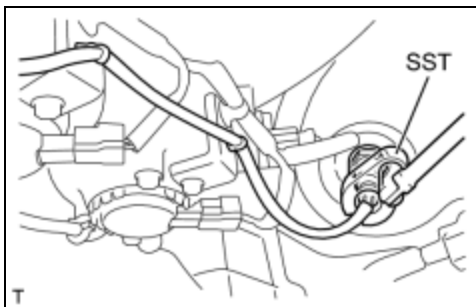
1. DISCONNECT BATTERY NEGATIVE TERMINAL INFO

2. REMOVE AIR FUEL RATIO SENSOR



(a) Disconnect the air fuel ratio sensor connector.

(b) Disengage the 2 clamps.



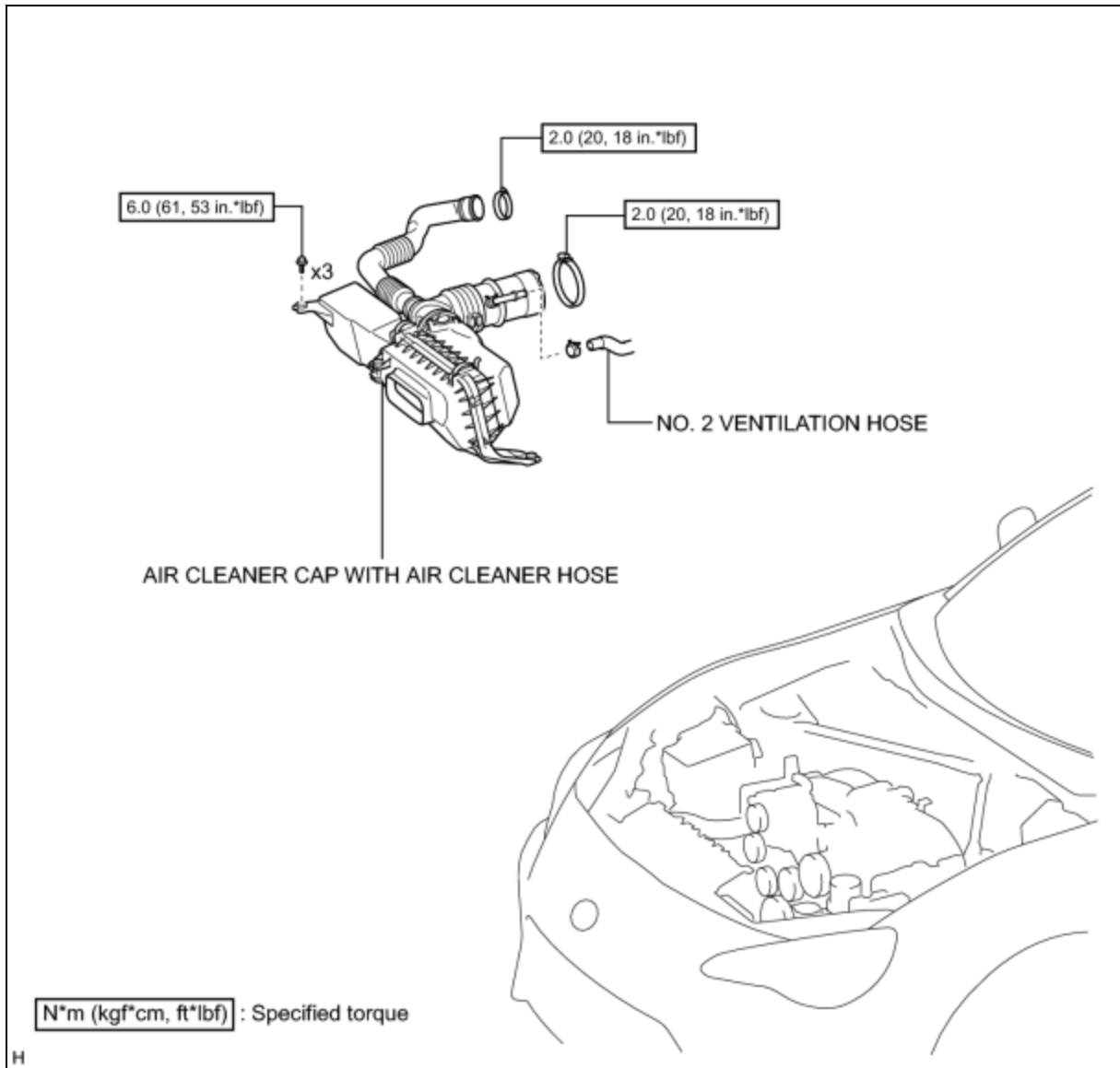
(c) Using SST, remove the air fuel ratio sensor from the exhaust manifold.

SST: 09224-00010

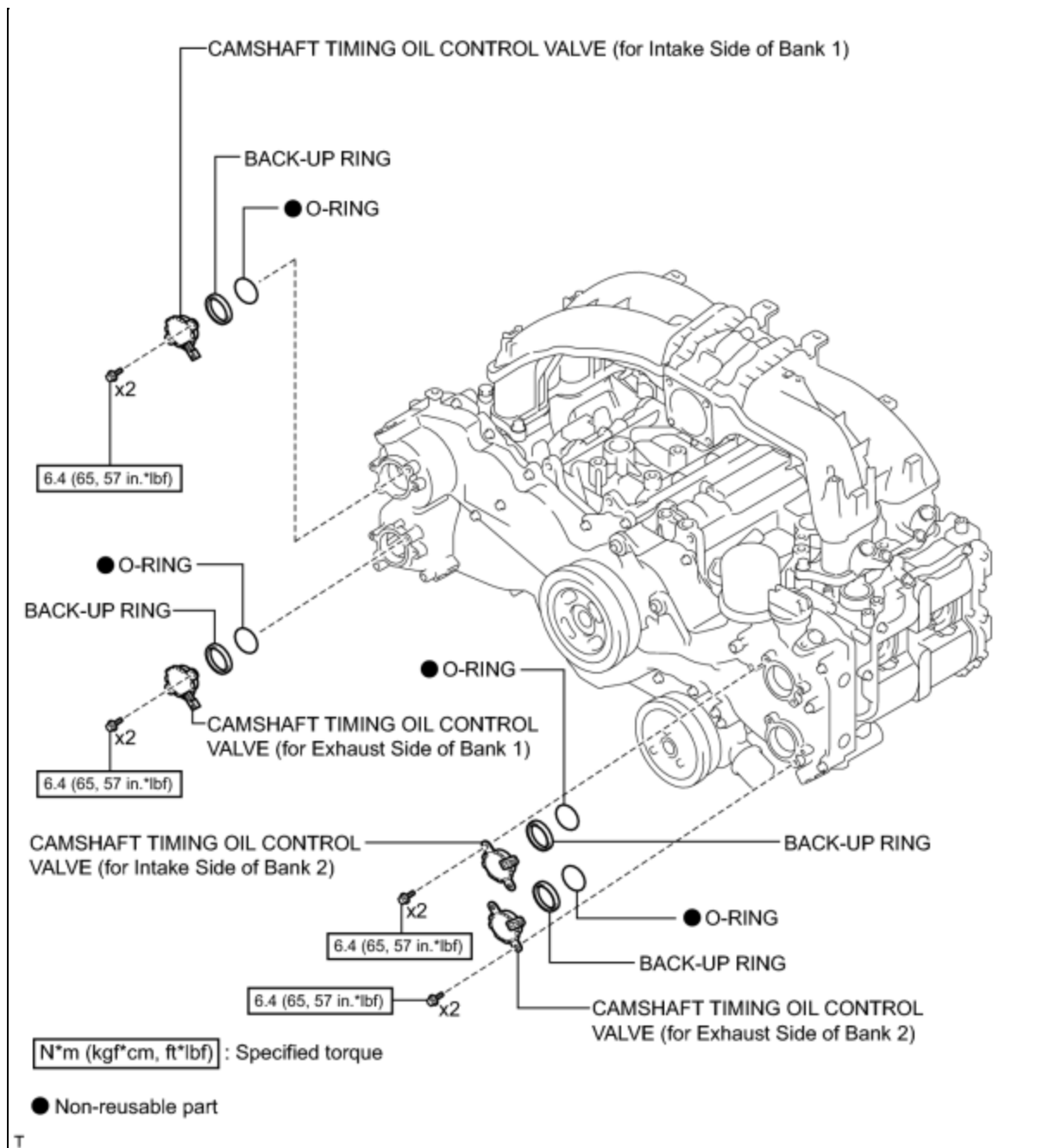
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001BO600QX
Title: FA20 ENGINE CONTROL: CAMSHAFT OIL CONTROL VALVE: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



T

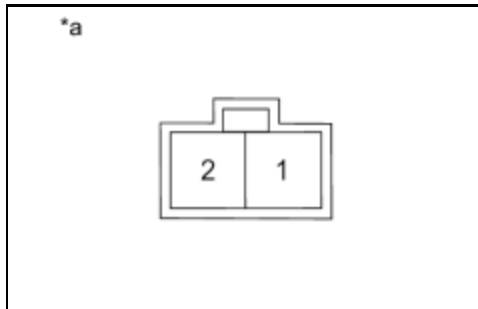
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IHH008X
Title: FA20 ENGINE CONTROL: CAMSHAFT OIL CONTROL VALVE: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT CAMSHAFT TIMING OIL CONTROL VALVE

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	6.85 to 7.65 Ω

Text in Illustration

*a	Component without harness connected (Camshaft Timing Oil Control Valve)
----	--

If the result is not as specified, replace the camshaft timing oil control valve.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001BO500PX
Title: FA20 ENGINE CONTROL: CAMSHAFT OIL CONTROL VALVE: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE (for Exhaust Side of Bank 2)

- (a) Install the back-up ring to the camshaft timing oil control valve.
- (b) Apply a light coat of engine oil to a new O-ring and install it to the camshaft timing oil control valve.
- (c) Install the camshaft timing oil control valve with the 2 bolts.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

NOTICE:

- If a component has been dropped or subjected to a strong impact, replace it.
- Make sure that the O-ring is not damaged or does not jump out of position during installation.

- (d) Connect the camshaft timing oil control valve connector.

2. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE (for Intake Side of Bank 2)

- (a) Install the back-up ring to the camshaft timing oil control valve.
- (b) Apply a light coat of engine oil to a new O-ring and install it to the camshaft timing oil control valve.
- (c) Install the camshaft timing oil control valve with the 2 bolts.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

NOTICE:

- If a component has been dropped or subjected to a strong impact, replace it.
- Make sure that the O-ring is not damaged or does not jump out of position during installation.

- (d) Connect the camshaft timing oil control valve connector.

3. INSTALL AIR CLEANER CAP WITH AIR CLEANER HOSE

4. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE (for Exhaust Side of Bank 1)

- (a) Install the back-up ring to the camshaft timing oil control valve.
- (b) Apply a light coat of engine oil to a new O-ring and install it to the camshaft timing oil control valve.
- (c) Install the camshaft timing oil control valve with the 2 bolts.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

NOTICE:

- If a component has been dropped or subjected to a strong impact, replace it.
- Make sure that the O-ring is not damaged or does not jump out of position during installation.

- (d) Connect the camshaft timing oil control valve connector.

5. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE (for Intake Side of Bank 1)

- (a) Install the back-up ring to the camshaft timing oil control valve.

(b) Apply a light coat of engine oil to a new O-ring and install it to the camshaft timing oil control valve.

(c) Install the camshaft timing oil control valve with the 2 bolts.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

NOTICE:

- If a component has been dropped or subjected to a strong impact, replace it.
- Make sure that the O-ring is not damaged or does not jump out of position during installation.

(d) Connect the camshaft timing oil control valve connector.

6. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL INFO



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IH100AX
Title: FA20 ENGINE CONTROL: CAMSHAFT OIL CONTROL VALVE: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT CAMSHAFT TIMING OIL CONTROL VALVE

- (a) Connect the Techstream to the DLC3.
- (b) Start the engine.
- (c) Turn the Techstream on.
- (d) Turn the A/C switch on.
- (e) Inspect the camshaft timing oil control valve (for intake side).
 - (1) Enter the following menus: Powertrain / Engine / Active Test / Control the VVT Linear (Bank 1).
 - (2) Check the engine speed while operating the camshaft timing oil control valve assembly (for intake side) using the Techstream.

OK:

TESTER OPERATION	SPECIFIED CONDITION
0 deg (CA)	Normal engine speed
36 deg (CA)	Engine idles roughly or stalls

If the operation is not as specified, check the camshaft timing oil control valve, wire harness and ECM.

- (3) Enter the following menus: Powertrain / Engine / Active Test / Control the VVT Linear (Bank 2).
- (4) Check the engine speed while operating the camshaft timing oil control valve assembly (for intake side) using the Techstream.

OK:

TESTER OPERATION	SPECIFIED CONDITION
0 deg (CA)	Normal engine speed
36 deg (CA)	Engine idles roughly or stalls

If the operation is not as specified, check the camshaft timing oil control valve, wire harness and ECM.

- (f) Inspect the camshaft timing oil control valve (for exhaust side).
 - (1) Enter the following menus: Powertrain / Engine / Active Test / Control the VVT Exhaust Linear (Bank 1).
 - (2) Check the engine speed while operating the camshaft timing oil control valve assembly (for exhaust side) using the Techstream.

OK:

TESTER OPERATION	SPECIFIED CONDITION
0 deg (CA)	Normal engine speed

51 deg (CA)	Engine idles roughly or stalls
-------------	--------------------------------

If the operation is not as specified, check the camshaft timing oil control valve, wire harness and ECM.

- (3) Enter the following menus: Powertrain / Engine / Active Test / Control the VVT Exhaust Linear (Bank 2).
- (4) Check the engine speed while operating the camshaft timing oil control valve assembly (for exhaust side) using the Techstream.

OK:

TESTER OPERATION	SPECIFIED CONDITION
0 deg (CA)	Normal engine speed
51 deg (CA)	Engine idles roughly or stalls

If the operation is not as specified, check the camshaft timing oil control valve, wire harness and ECM.

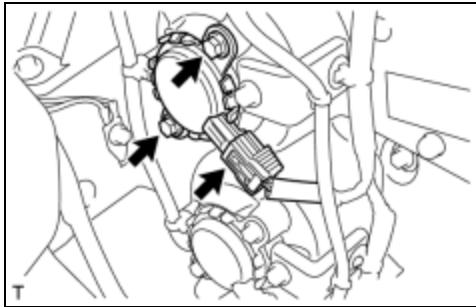


Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001BO700QX
Title: FA20 ENGINE CONTROL: CAMSHAFT OIL CONTROL VALVE: REMOVAL (2013 FR-S)		

REMOVAL

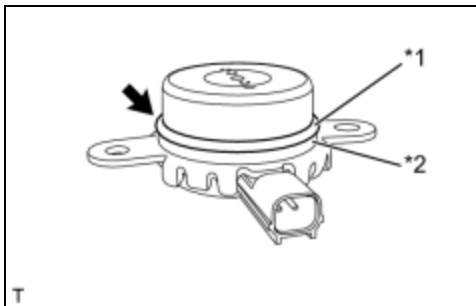
1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

2. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE (for Intake Side of Bank 1)



(a) Disconnect the camshaft timing oil control valve connector.

(b) Remove the 2 bolts and the camshaft timing oil control valve.



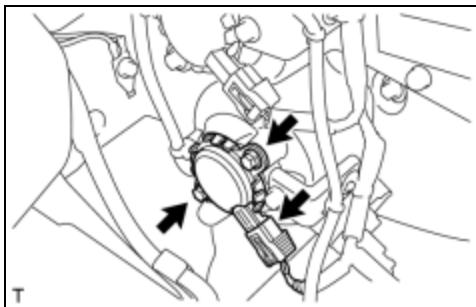
(c) Remove the O-ring from the camshaft timing oil control valve.

Text in Illustration

*1	O-ring
*2	Back-up Ring

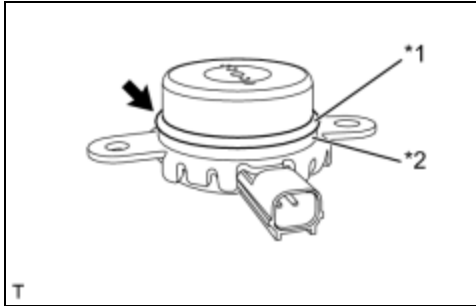
(d) Remove the back-up ring from the camshaft timing oil control valve.

3. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE (for Exhaust Side of Bank 1)



(a) Disconnect the camshaft timing oil control valve connector.

(b) Remove the 2 bolts and the camshaft timing oil control valve.



(c) Remove the O-ring from the camshaft timing oil control valve.

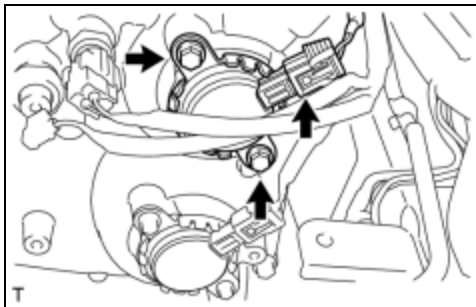
Text in Illustration

*1	O-ring
*2	Back-up Ring

(d) Remove the back-up ring from the camshaft timing oil control valve.

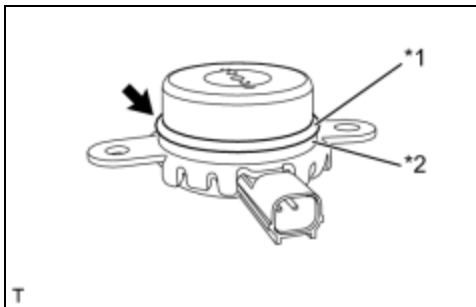
4. REMOVE AIR CLEANER CAP WITH AIR CLEANER HOSE INFO

5. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE (for Intake Side of Bank 2)



(a) Disconnect the camshaft timing oil control valve connector.

(b) Remove the 2 bolts and the camshaft timing oil control valve.



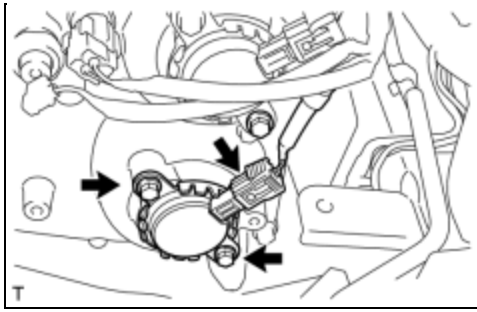
(c) Remove the O-ring from the camshaft timing oil control valve.

Text in Illustration

*1	O-ring
*2	Back-up Ring

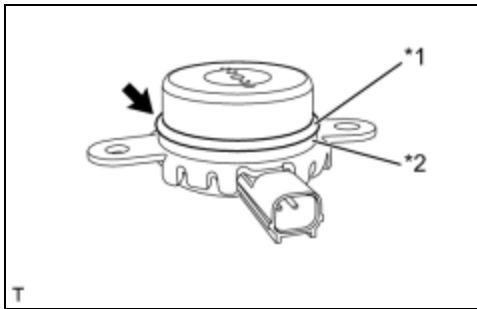
(d) Remove the back-up ring from the camshaft timing oil control valve.

6. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE (for Exhaust Side of Bank 2)



(a) Disconnect the camshaft timing oil control valve connector.

(b) Remove the 2 bolts and the camshaft timing oil control valve.



(c) Remove the O-ring from the camshaft timing oil control valve.

Text in Illustration

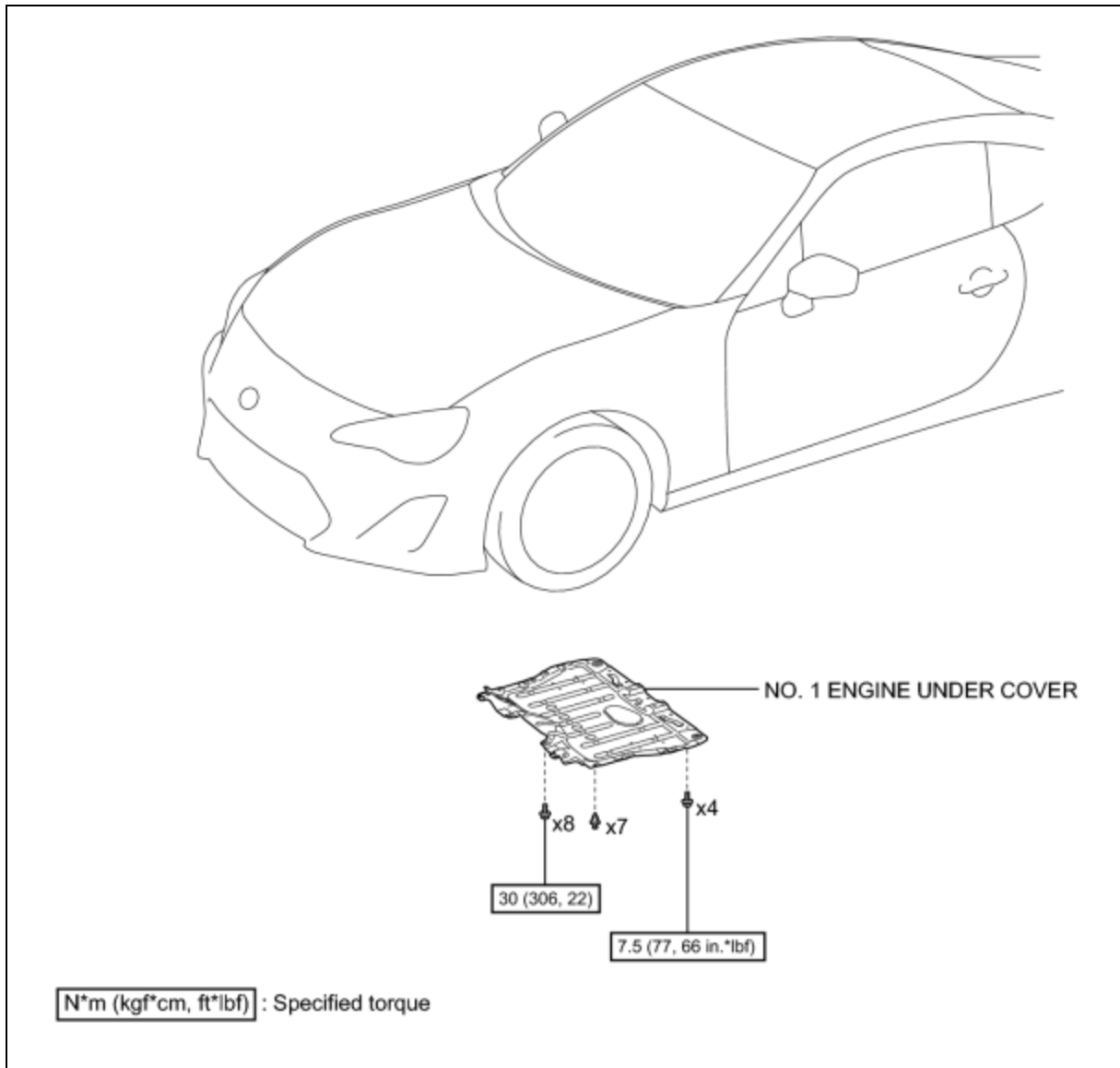
*1	O-ring
*2	Back-up Ring

(d) Remove the back-up ring from the camshaft timing oil control valve.

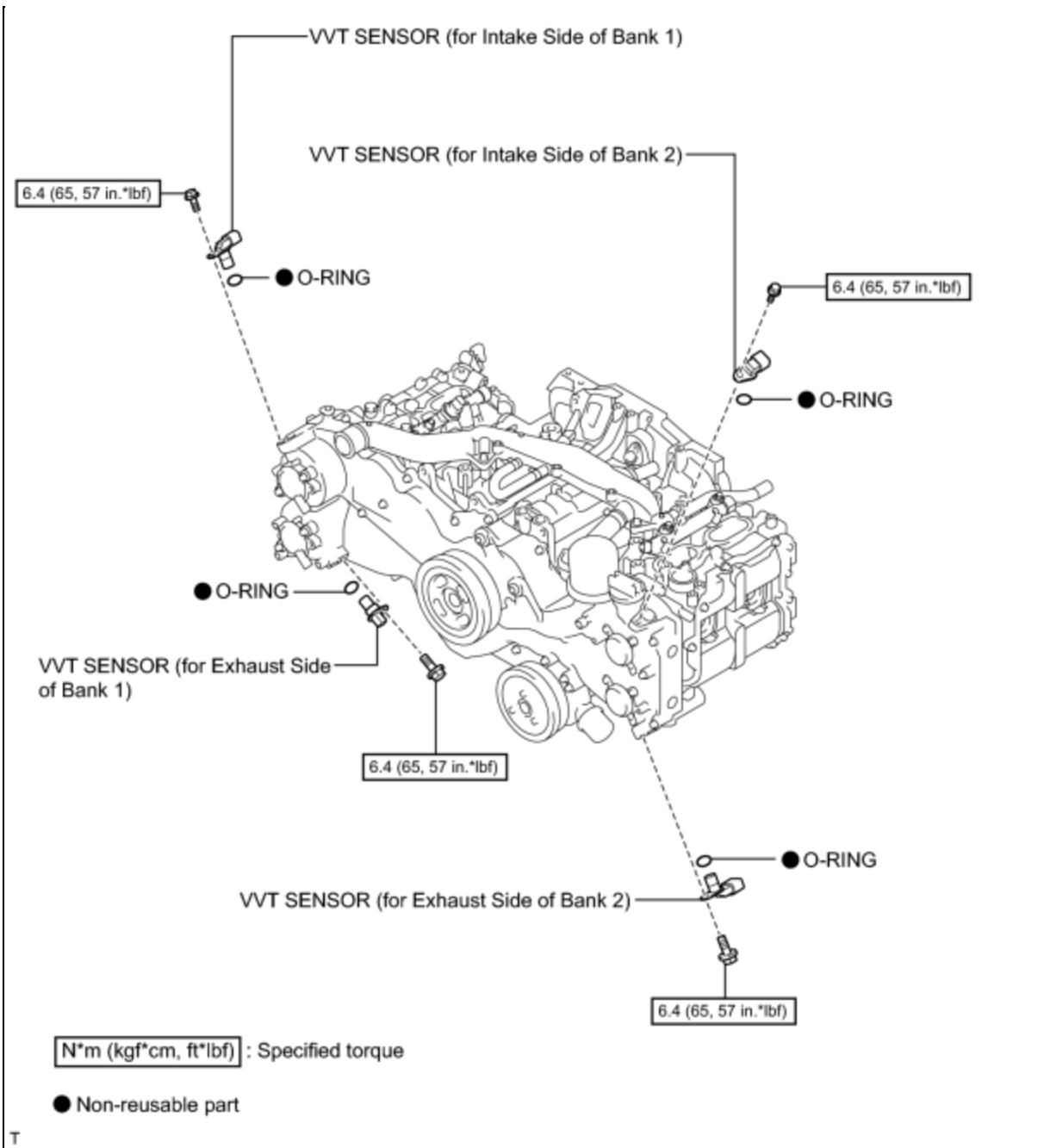
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002Q9U00HX
Title: FA20 ENGINE CONTROL: CAMSHAFT POSITION SENSOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002Q9T00JX
Title: FA20 ENGINE CONTROL: CAMSHAFT POSITION SENSOR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL VVT SENSOR (for Exhaust Side of Bank 2)

- (a) Apply a light coat of engine oil to the new O-ring of the VVT sensor.
- (b) Install the VVT sensor with the bolt.
Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)
- (c) Connect the VVT sensor connector.

2. INSTALL NO. 1 ENGINE UNDER COVER INFO

3. INSTALL VVT SENSOR (for Intake Side of Bank 2)

- (a) Apply a light coat of engine oil to the new O-ring of the VVT sensor.
- (b) Install the VVT sensor with the bolt.
Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)
- (c) Connect the VVT sensor connector

4. INSTALL VVT SENSOR (for Exhaust Side of Bank 1)

- (a) Apply a light coat of engine oil to the new O-ring of the VVT sensor.
- (b) Install the VVT sensor with the bolt.
Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)
- (c) Connect the VVT sensor connector.

5. INSTALL VVT SENSOR (for Intake Side of Bank 1)

- (a) Apply a light coat of engine oil to the new O-ring of the VVT sensor.
- (b) Install the VVT sensor with the bolt.
Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)
- (c) Connect the VVT sensor connector.

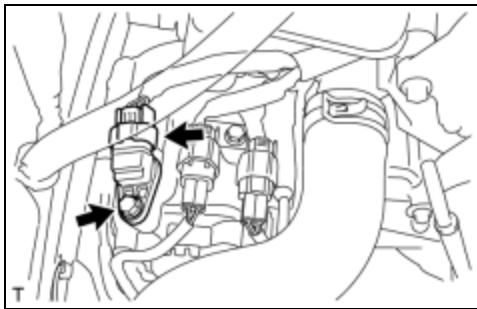
6. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002Q9V00JX
Title: FA20 ENGINE CONTROL: CAMSHAFT POSITION SENSOR: REMOVAL (2013 FR-S)		

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

2. REMOVE VVT SENSOR (for Intake Side of Bank 1)

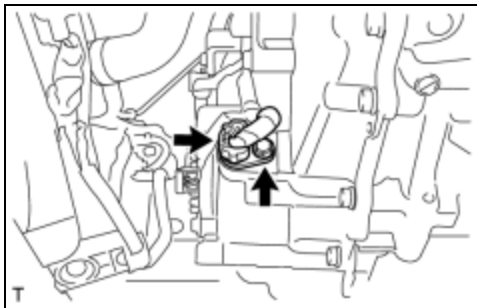


(a) Disconnect the VVT sensor connector.

(b) Remove the bolt and VVT sensor.

(c) Remove the O-ring from the VVT sensor.

3. REMOVE VVT SENSOR (for Exhaust Side of Bank 1)



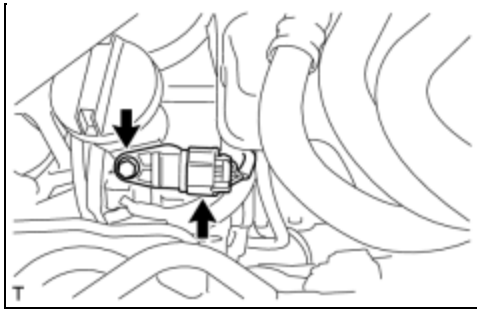
(a) Disconnect the VVT sensor connector.

(b) Remove the bolt and VVT sensor.

(c) Remove the O-ring from the VVT sensor.

4. REMOVE VVT SENSOR (for Intake Side of Bank 2)

(a) Disconnect the VVT sensor connector.

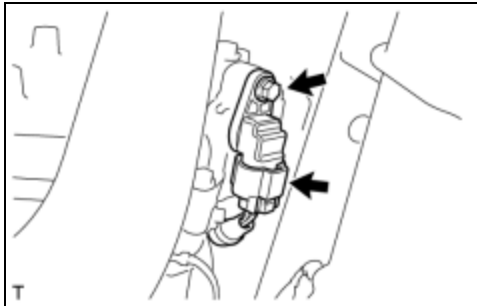


(b) Remove the bolt and VVT sensor.

(c) Remove the O-ring from the VVT sensor.

5. REMOVE NO. 1 ENGINE UNDER COVER INFO

6. REMOVE VVT SENSOR (for Exhaust Side of Bank 2)



(a) Disconnect the VVT sensor connector.

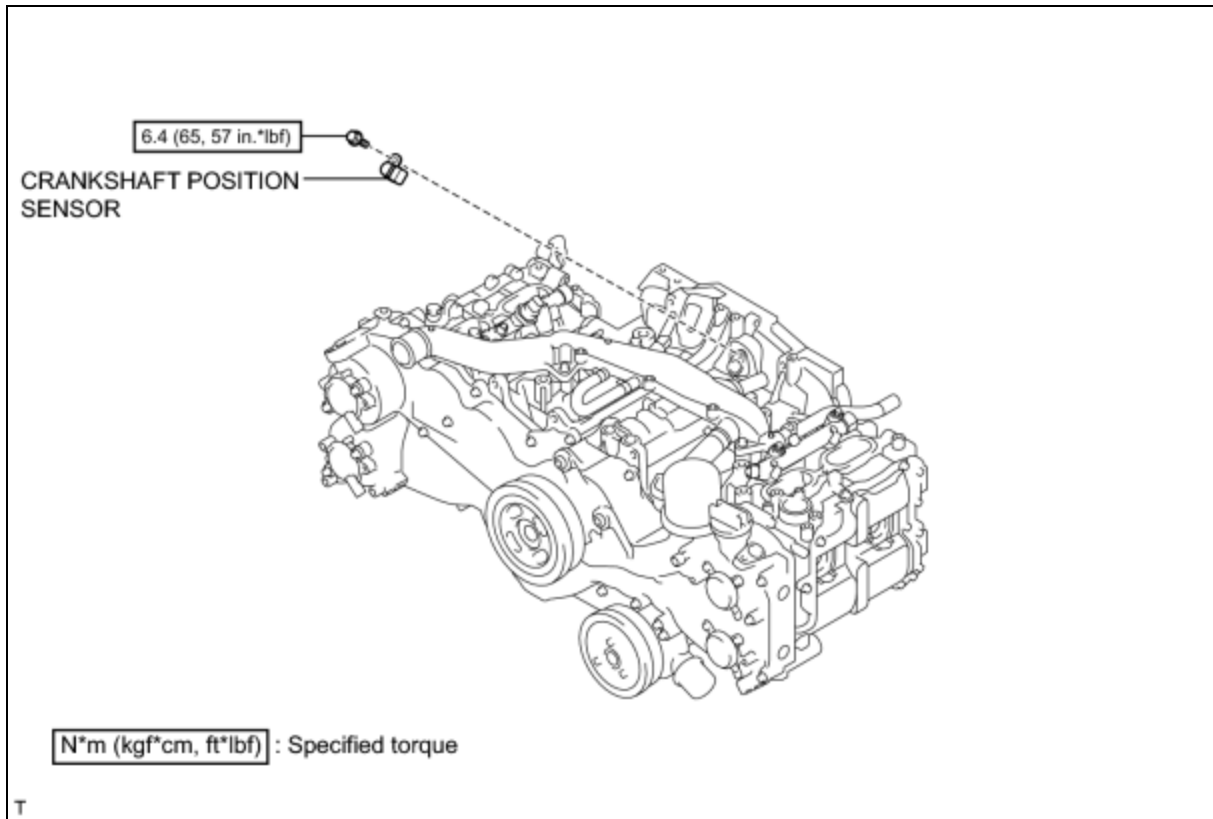
(b) Remove the bolt and VVT sensor.

(c) Remove the O-ring from the VVT sensor.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002Q9Y00JX
Title: FA20 ENGINE CONTROL: CRANKSHAFT POSITION SENSOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



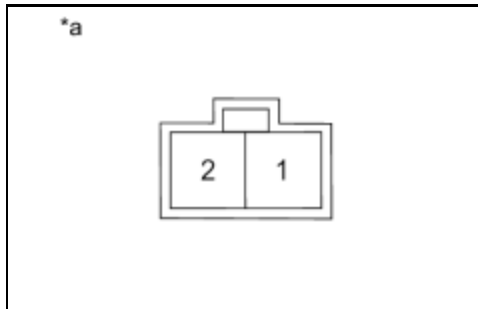
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002QA000KX
Title: FA20 ENGINE CONTROL: CRANKSHAFT POSITION SENSOR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT CRANKSHAFT POSITION SENSOR

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	Always	1836 to 2244 Ω

Text in Illustration

*a	Component without harness connected: (Crankshaft Position Sensor)
----	--

If the resistance is not as specified, replace the crankshaft position sensor.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002Q9X00JX
Title: FA20 ENGINE CONTROL: CRANKSHAFT POSITION SENSOR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL CRANKSHAFT POSITION SENSOR

(a) Install the crankshaft position sensor with the bolt.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

(b) Connect the crankshaft position sensor connector.

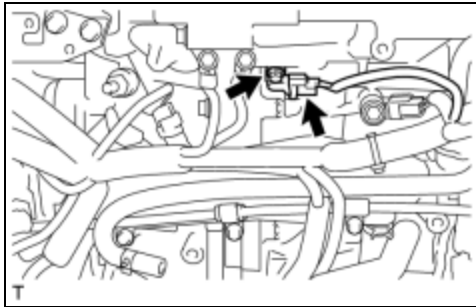
2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002Q9Z00JX
Title: FA20 ENGINE CONTROL: CRANKSHAFT POSITION SENSOR: REMOVAL (2013 FR-S)		

REMOVAL

- 1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL** INFO
- 2. REMOVE CRANKSHAFT POSITION SENSOR**



(a) Disconnect the crankshaft position sensor connector.

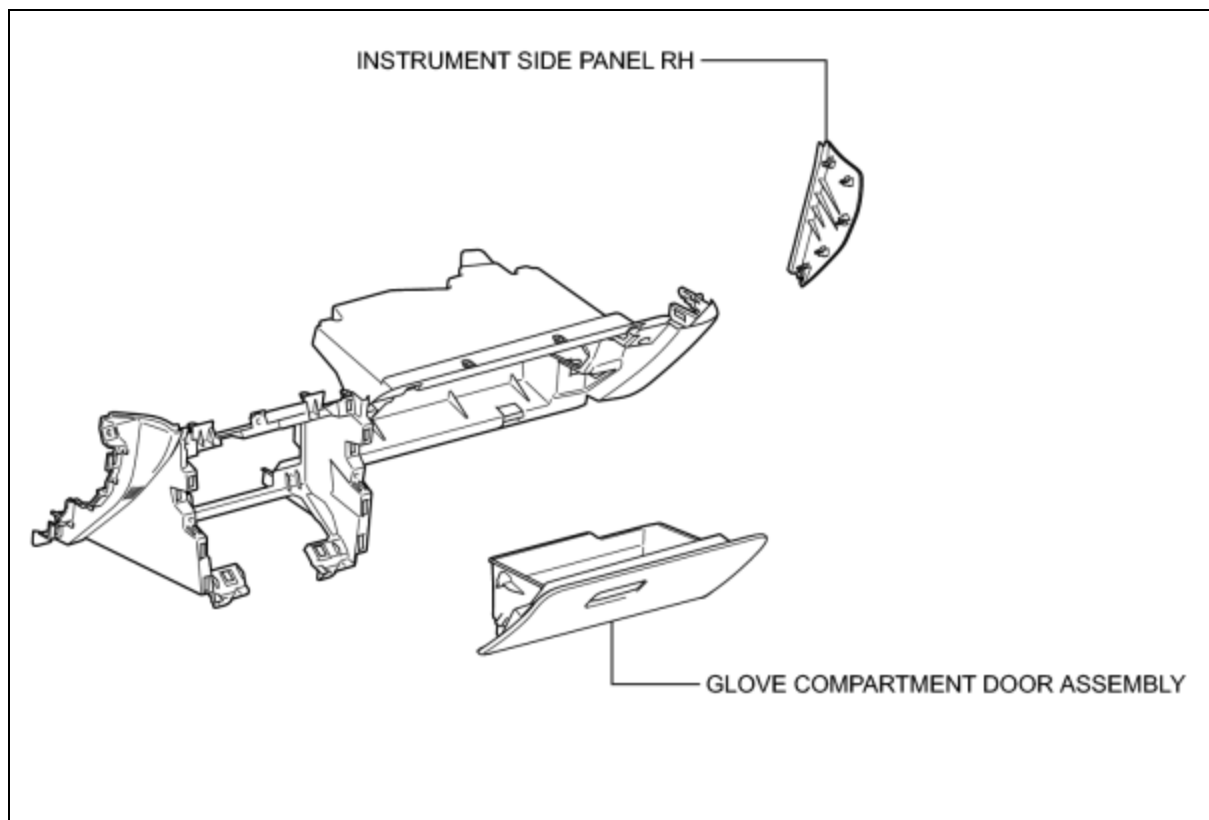
(b) Remove the bolt and crankshaft position sensor.



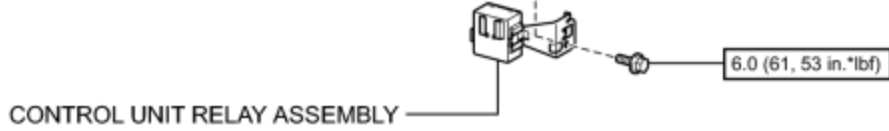
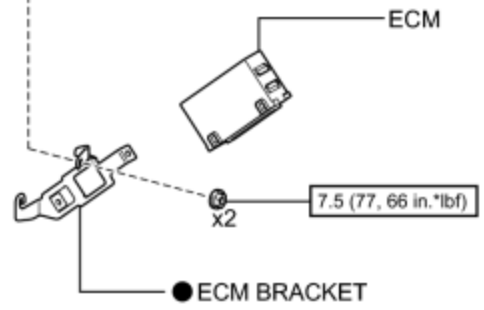
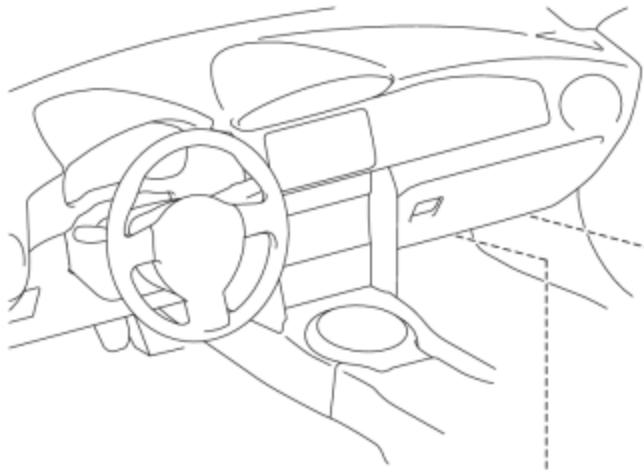
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000047VL005X
Title: FA20 ENGINE CONTROL: ECM: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



N*m (kgf*cm, ft*lbf) : Specified torque ● Non-reusable part

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Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000047NH009X
Title: FA20 ENGINE CONTROL: ECM: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL ECM BRACKET

(a) Engage the 2 claws, and install the new ECM bracket to the ECM.

NOTICE:

- After attaching the ECM bracket to the ECM, do not remove the ECM bracket.
- If the ECM bracket is attached to the ECM the wrong way around, replace ECM bracket with new items.

2. INSTALL ECM

NOTICE:

When replacing the ECM, do not use ECM with different specifications.

(a) Install the ECM with the 2 nuts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

(b) Connect the 4 connectors to the ECM.

NOTICE:

Be sure to securely connect the connectors.

3. INSTALL CONTROL UNIT RELAY ASSEMBLY INFO

4. INSTALL GLOVE COMPARTMENT DOOR ASSEMBLY INFO

5. INSTALL INSTRUMENT SIDE PANEL RH INFO

6. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL INFO

7. PERFORM INITIALIZATION INFO



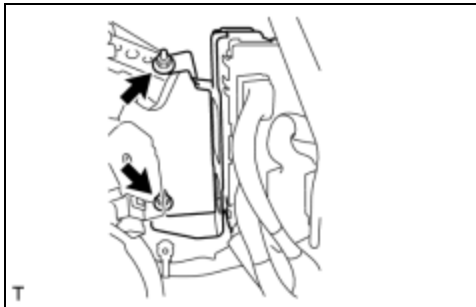
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000047NJ009X
Title: FA20 ENGINE CONTROL: ECM: REMOVAL (2013 FR-S)		

REMOVAL

NOTICE:

If the ECM or ECM bracket have replaced, use the new ECM and new ECM bracket.

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO
2. REMOVE INSTRUMENT SIDE PANEL RH INFO
3. REMOVE GLOVE COMPARTMENT DOOR ASSEMBLY INFO
4. REMOVE CONTROL UNIT RELAY ASSEMBLY INFO
5. REMOVE ECM
 - (a) Disconnect the 4 connectors from the ECM.

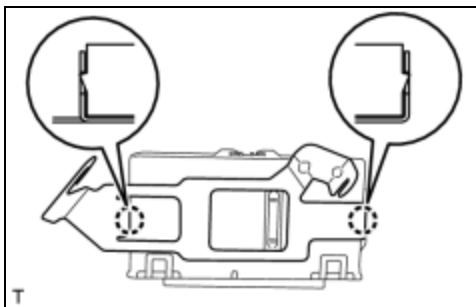


- (b) Remove the 2 nuts and the ECM.

NOTICE:

If a component has been dropped or subjected to a strong impact, replace it.

6. REMOVE ECM BRACKET

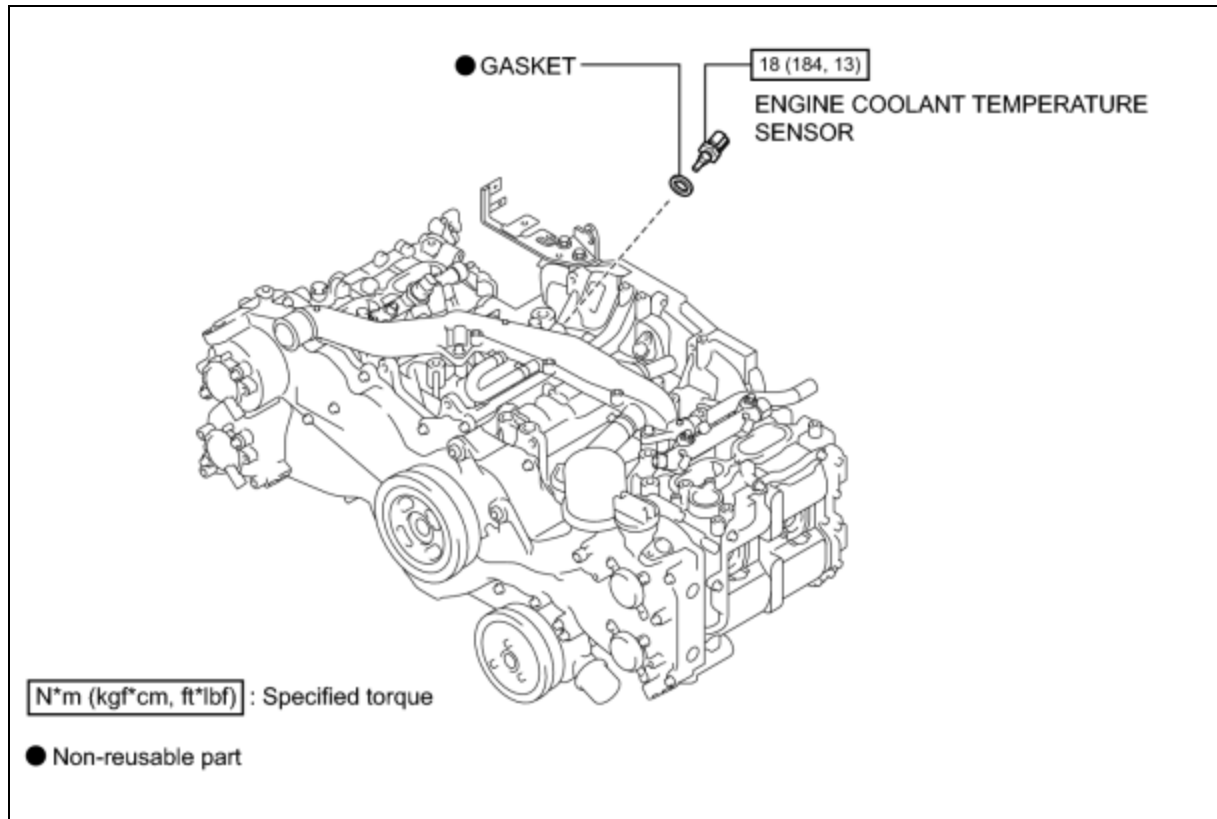


- (a) Disengage the 2 claws, and remove ECM bracket.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003111008X
Title: FA20 ENGINE CONTROL: ENGINE COOLANT TEMPERATURE SENSOR: COMPONENTS (2013 FR-S)		

COMPONENTS

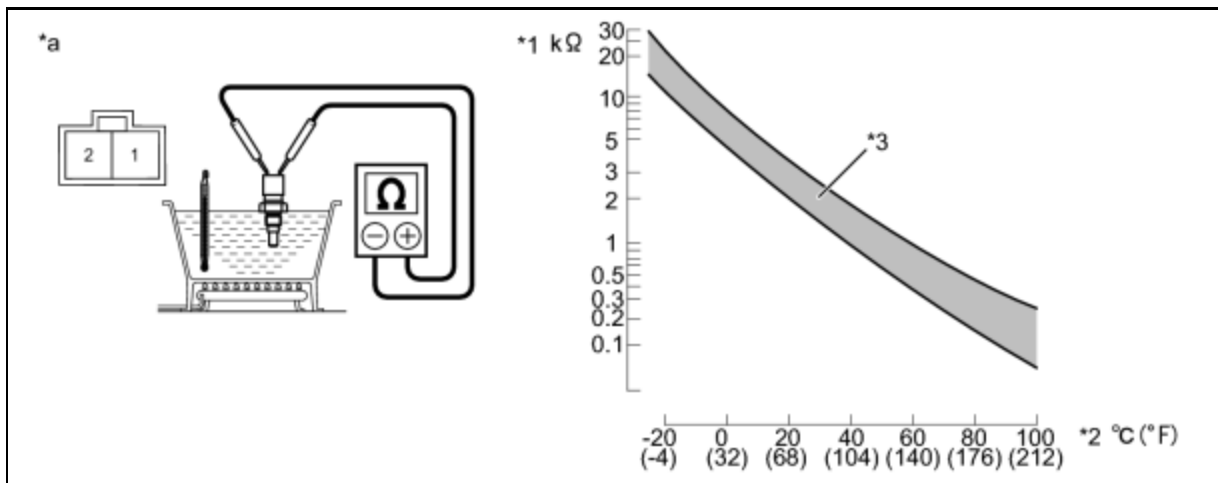
ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MTMOONX
Title: FA20 ENGINE CONTROL: ENGINE COOLANT TEMPERATURE SENSOR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT ENGINE COOLANT TEMPERATURE SENSOR



Text in Illustration

*1	Resistance	*2	Temperature
*3	Acceptable	-	-
*a	Component without harness connected (Engine Coolant Temperature Sensor)	-	-

- (a) Partially soak the sensor in the water and warm up the water.
 (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	Approximately. 20°C (68°F)	2.35 to 2.65 kΩ
	Approximately. 80°C (176°F)	0.305 to 0.331 kΩ

NOTICE:

When checking the engine coolant temperature sensor in water, keep the terminals dry. After the check, wipe the engine coolant temperature sensor dry.

If the result is not as specified, replace the engine coolant temperature sensor.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003110008X
Title: FA20 ENGINE CONTROL: ENGINE COOLANT TEMPERATURE SENSOR: INSTALLATION (2013 FR-S)		


INSTALLATION

1. INSTALL ENGINE COOLANT TEMPERATURE SENSOR

- (a) Install a new gasket to the engine coolant temperature sensor.
- (b) Using a 19 mm union nut wrench, install the engine coolant temperature sensor to the cylinder head sub-assembly.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

NOTICE:

- If a component has been dropped or subjected a strong impact, replace it.
- Use the torque value compensation formula to calculate the torque value for use when a torque wrench is combined with a tool such as a ball joint lock nut wrench  .

- (c) Connect the engine coolant temperature sensor connector.

2. INSTALL INTAKE MANIFOLD



3. FILL ENGINE COOLANT

4. INSPECT COOLANT LEAK

5. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL (for High Pressure)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003112008X
Title: FA20 ENGINE CONTROL: ENGINE COOLANT TEMPERATURE SENSOR: REMOVAL (2013 FR-S)		

REMOVAL

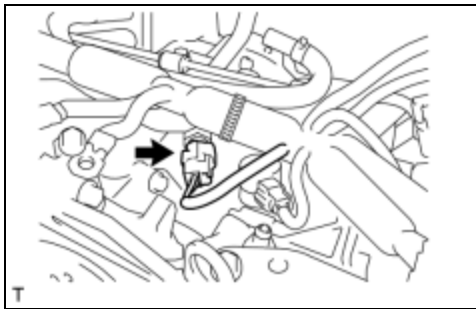
1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

2. DRAIN ENGINE COOLANT INFO

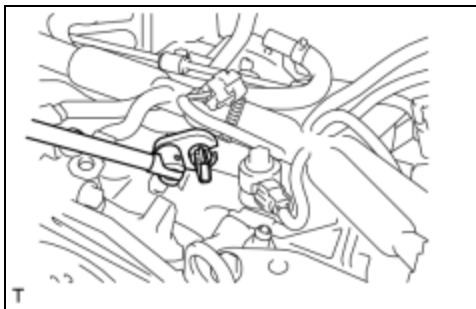
3. REMOVE INTAKE MANIFOLD

INFO

4. REMOVE ENGINE COOLANT TEMPERATURE SENSOR



(a) Disconnect the engine coolant temperature sensor connector.

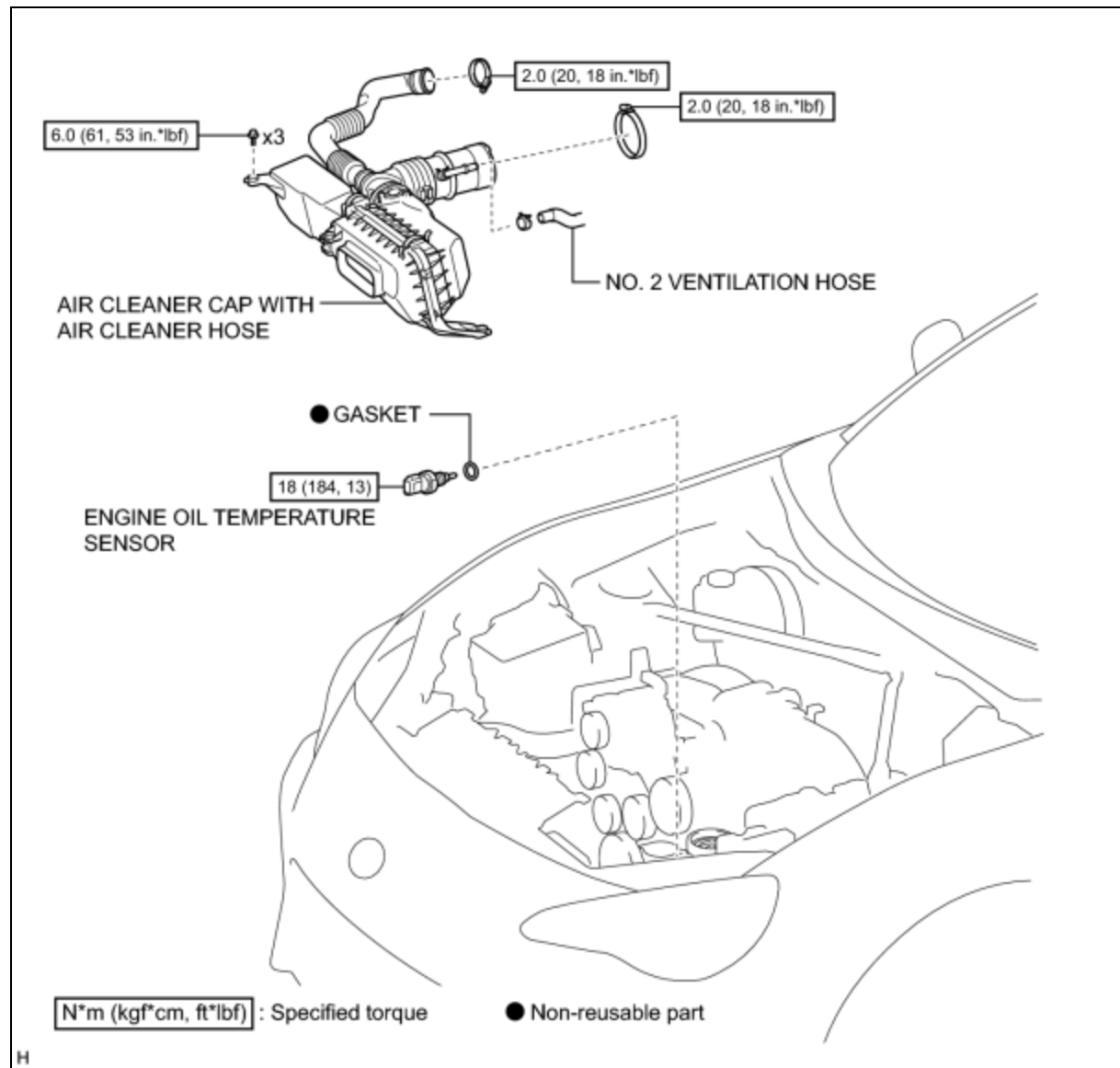


(b) Using a 19 mm union nut wrench, remove the engine coolant temperature sensor.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003111009X
Title: FA20 ENGINE CONTROL: ENGINE OIL TEMPERATURE SENSOR: COMPONENTS (2013 FR-S)		

COMPONENTS

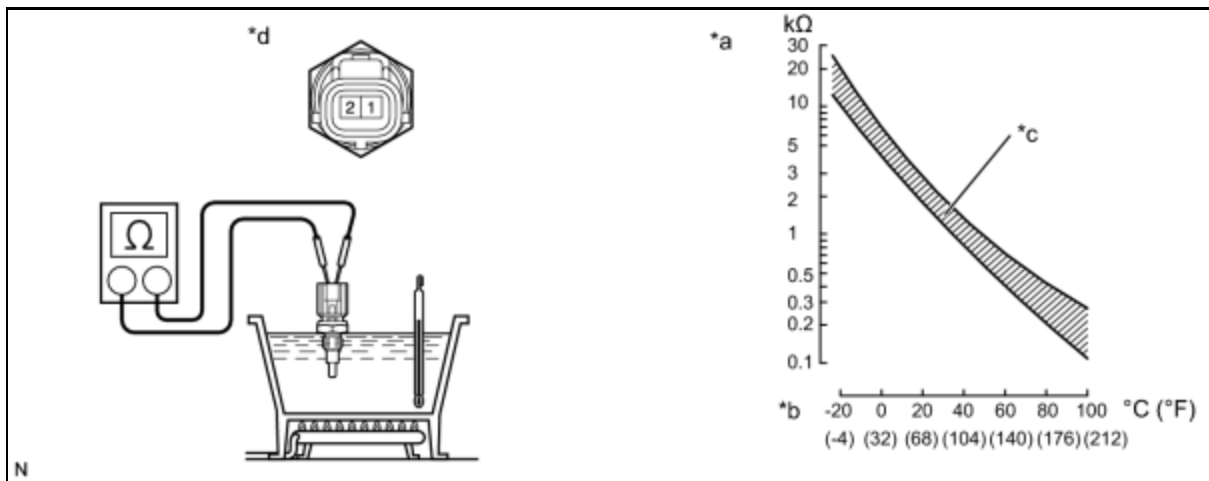
ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MTM00PX
Title: FA20 ENGINE CONTROL: ENGINE OIL TEMPERATURE SENSOR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT ENGINE OIL TEMPERATURE SENSOR



Text in Illustration

*a	Resistance	*b	Temperature
*c	Acceptable	*d	Component without harness connected (Engine oil Temperature Sensor)

- (a) Partially soak the sensor in the water and warm up the water.
 (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	Approximately 20°C (68°F)	2.25 to 2.65 kΩ
	Approximately 80°C (176°F)	0.305 to 0.331 kΩ

NOTICE:

When checking the engine oil temperature sensor in water, keep the terminals dry. After the check, wipe the engine oil temperature sensor dry.

If the result is not as specified, replace the engine oil temperature sensor.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003110009X
Title: FA20 ENGINE CONTROL: ENGINE OIL TEMPERATURE SENSOR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL ENGINE OIL TEMPERATURE SENSOR

- (a) Install a new gasket to the engine oil temperature sensor.
- (b) Using a 19 mm deep socket wrench, install the engine oil temperature sensor to the cylinder head sub-assembly.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

- (c) Connect the engine oil temperature sensor connector.

2. INSTALL AIR CLEANER CAP WITH AIR CLEANER HOSE INFO

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003112009X
Title: FA20 ENGINE CONTROL: ENGINE OIL TEMPERATURE SENSOR: REMOVAL (2013 FR-S)		

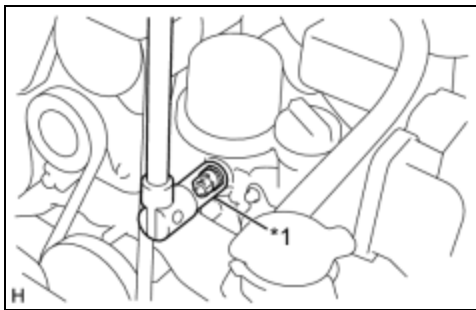
REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

2. REMOVE AIR CLEANER CAP WITH AIR CLEANER HOSE INFO

3. REMOVE ENGINE OIL TEMPERATURE SENSOR

(a) Disconnect the engine oil temperature sensor connector.



(b) Using a 19 mm deep socket wrench, remove the engine oil temperature sensor.

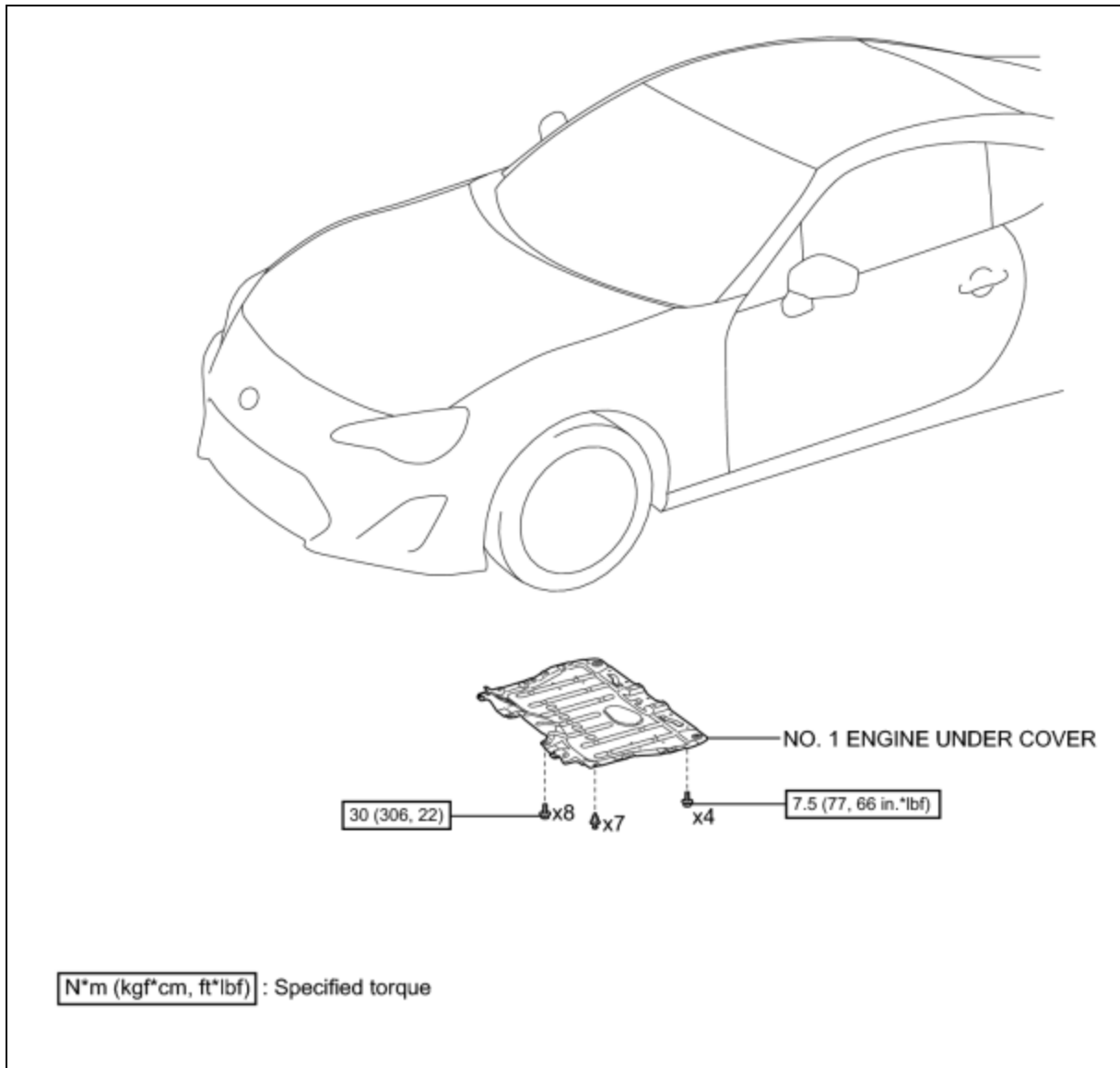
Text in Illustration

*1	19 mm Deep Socket Wrench
----	--------------------------

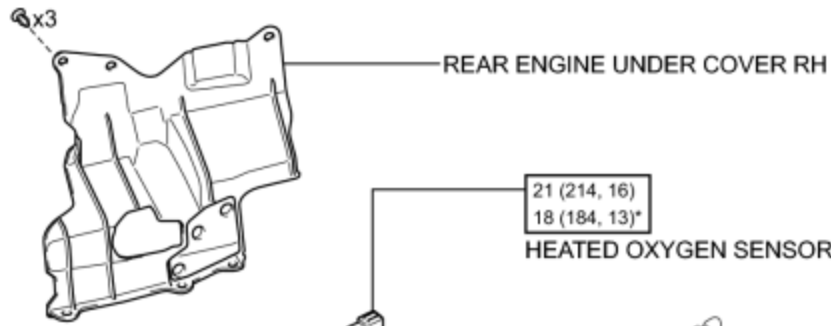
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001BOD00FX
Title: FA20 ENGINE CONTROL: HEATED OXYGEN SENSOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



N*m (kgf*cm, ft*lbf) : Specified torque

* For use with SST

T

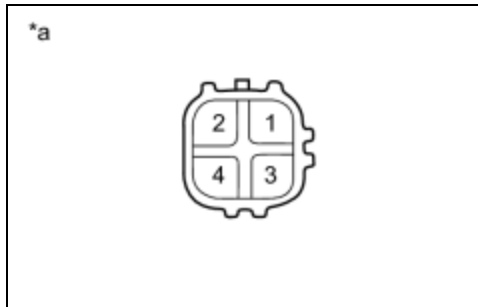
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MUK00UX
Title: FA20 ENGINE CONTROL: HEATED OXYGEN SENSOR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT HEATED OXYGEN SENSOR

(a) Measure the resistance according to the value(s) the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68 °F)	5.0 to 6.4 Ω
1 - 4	Always	10 k Ω or higher

Text in Illustration

*a	Component without harness connected (Heated Oxygen Sensor)
----	---

If the result is not as specified, replace the heated oxygen sensor.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MUJ00VX
Title: FA20 ENGINE CONTROL: HEATED OXYGEN SENSOR: INSTALLATION (2013 FR-S)		

INSTALLATION

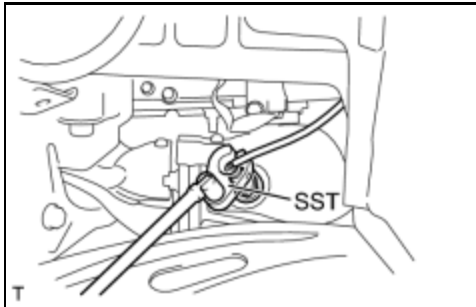
1. INSTALL HEATED OXYGEN SENSOR

- (a) Using SST, install the heated oxygen sensor onto the exhaust manifold assembly.

SST: 09224-00010

without SST - Torque: 21 N·m (214 kgf·cm, 16ft·lbf)

with SST - Torque: 18 N·m (184 kgf·cm, 13ft·lbf)



HINT:

- This torque value is effective when SST is parallel to the torque wrench.
- The "with SST" torque value is effective when using SST with a fulcrum length of 30 mm (1.18 in.).
- The "with SST" torque value is effective when using a torque wrench with a fulcrum length of 180 mm (7.087 in.).
- If using a torque wrench with a different length, or connecting the torque wrench and SST at an angle, refer to the alternate torque values [INFO](#)

- (b) Engage the 2 clamps.

- (c) Connect the oxygen sensor connector.

2. INSPECT FOR EXHAUST GAS LEAK [INFO](#)

3. INSTALL REAR ENGINE UNDER COVER RH

- (a) Instal the 3 clips, and connect the engine under cover rear RH.

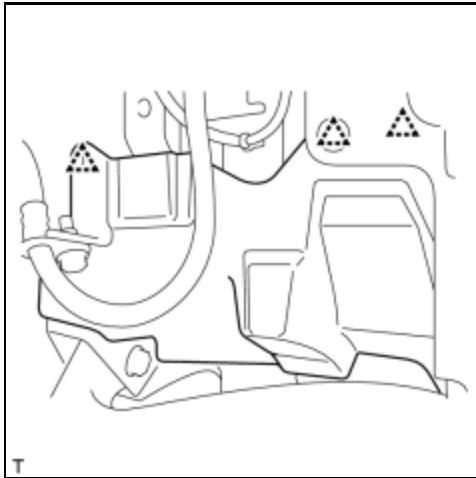
4. INSTALL NO. 1 ENGINE UNDER COVER [INFO](#)

5. INSTALL FRONT TIRE

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MUM00VX
Title: FA20 ENGINE CONTROL: HEATED OXYGEN SENSOR: REMOVAL (2013 FR-S)		

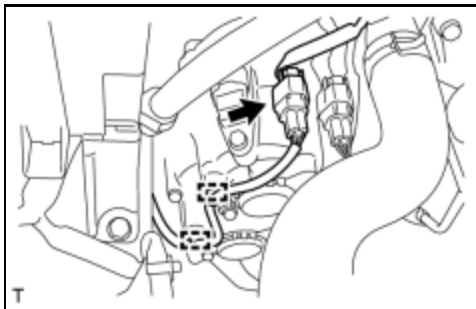
REMOVAL

1. REMOVE FRONT TIRE RH
2. REMOVE NO. 1 ENGINE UNDER COVER INFO
3. DISCONNECT REAR ENGINE UNDER COVER RH



- (a) Remove the 3 clips, and disconnect the rear engine under cover RH.

4. REMOVE HEATED OXYGEN SENSOR

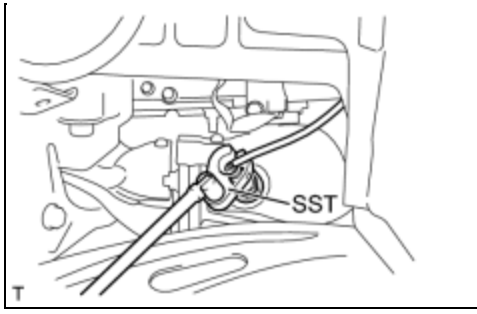


- (a) Disconnect the oxygen sensor connector.

- (b) Disengage the 2 clamps.

- (c) Using SST, remove the oxygen sensor from the exhaust manifold assembly.

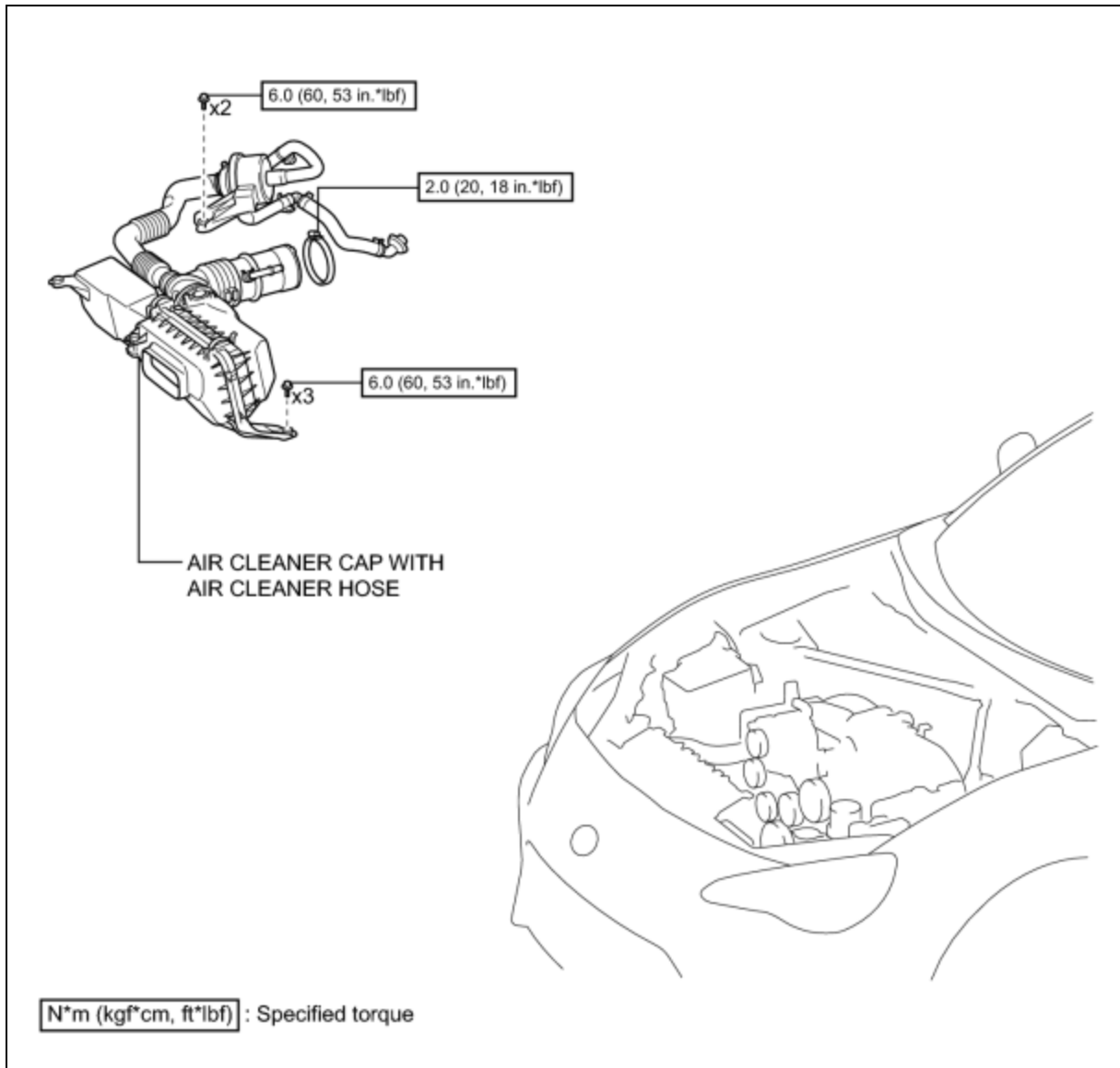
SST: 09224-00010



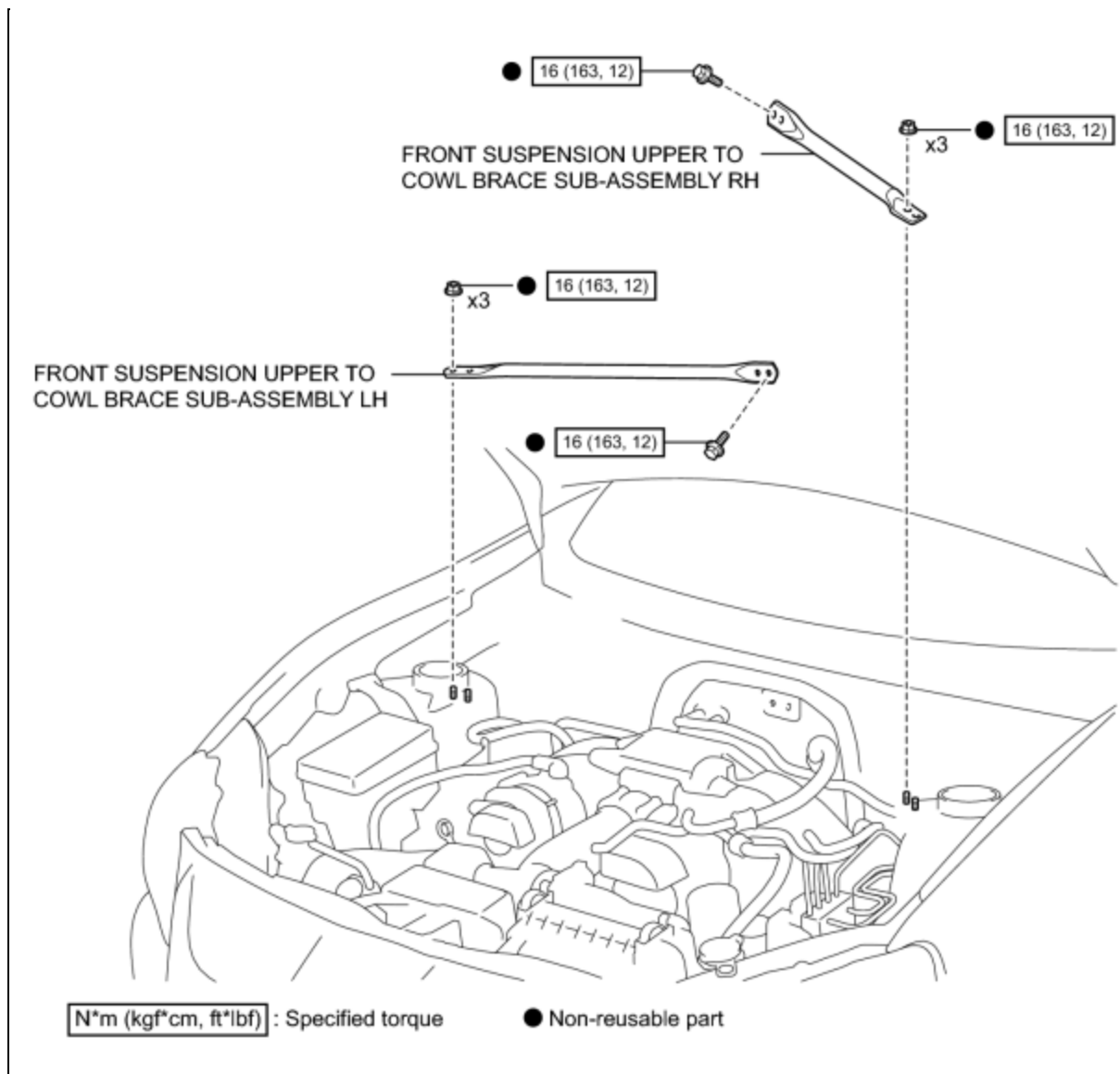
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002QV3000X
Title: FA20 ENGINE CONTROL: IGNITION COIL AND SPARK PLUG: COMPONENTS (2013 FR-S)		

COMPONENTS

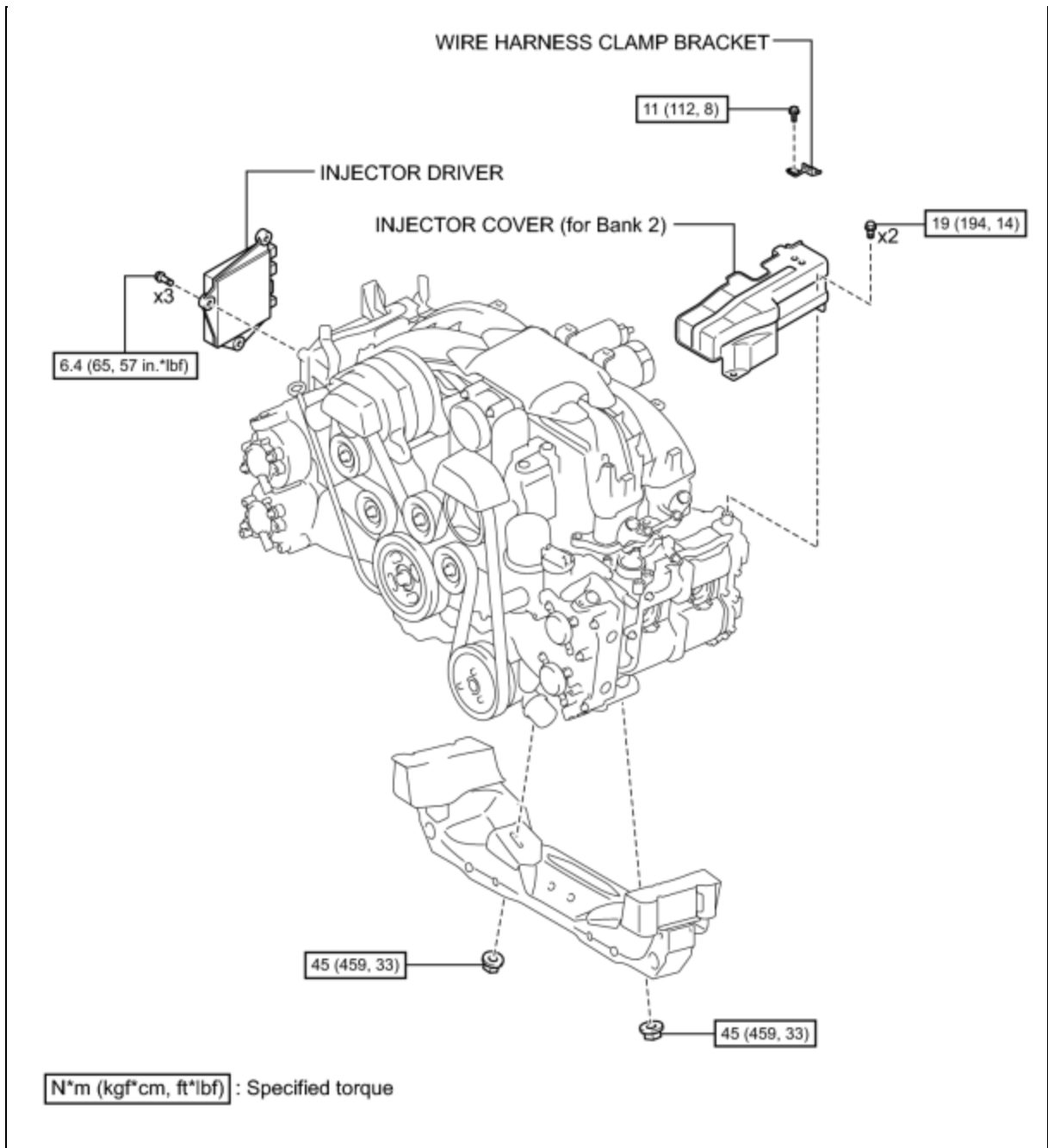
ILLUSTRATION



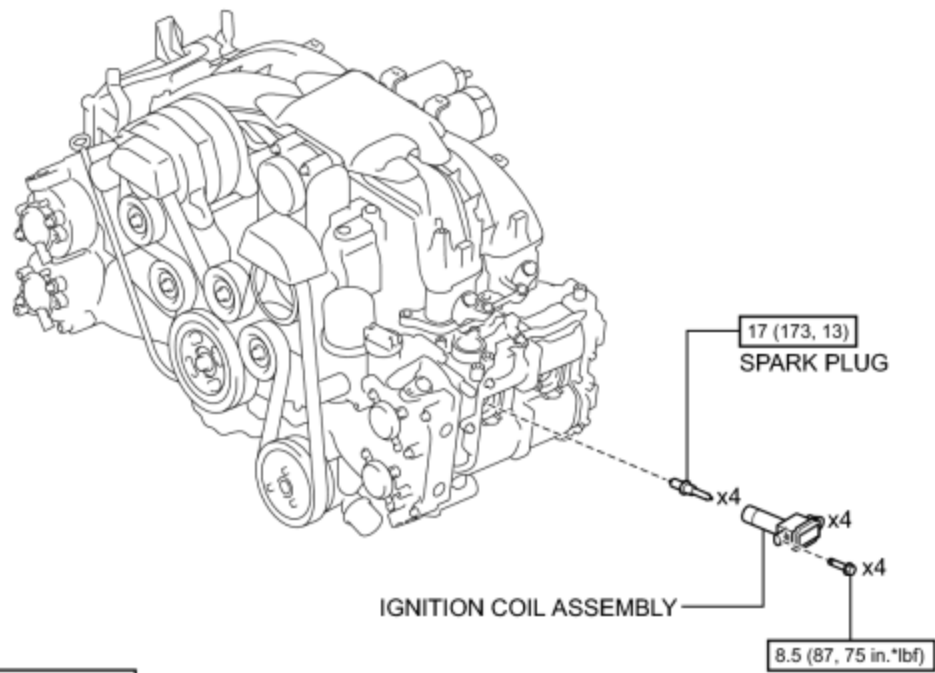
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION



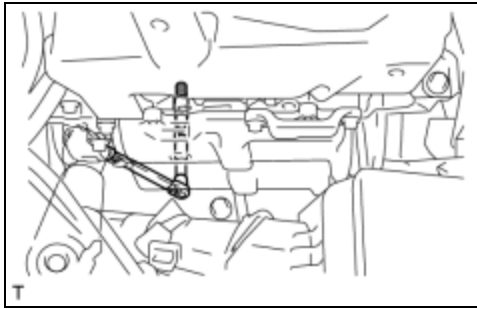
N·m (kgf·cm, ft·lbf) : Specified torque

T

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000053AP003X
Title: FA20 ENGINE CONTROL: IGNITION COIL AND SPARK PLUG: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL SPARK PLUG (for Bank 1)



- (a) Using the spark plug wrench 14 mm, tilt extension bar 35 mm and universal joint 54 mm, and install the 2 spark plugs onto the cylinder head sub-assembly.

Torque: 17 N·m (173 kgf·cm, 13ft·lbf)

NOTICE:

If a component has been dropped or subjected a strong impact, replace it.

2. INSTALL IGNITION COIL ASSEMBLY (for Bank 1)

- (a) Install the 2 ignition coils onto the cylinder head cover sub-assembly with the 2 bolts.

Torque: 8.5 N·m (87 kgf·cm, 75in·lbf)

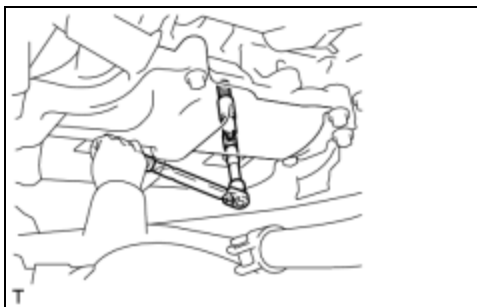
NOTICE:

If a component has been dropped or subjected a strong impact, replace it.

- (b) Connect the 2 ignition coil connectors to the ignition coil.

3. INSTALL INJECTOR DRIVER INFO

4. INSTALL SPARK PLUG (for Bank 2)



- (a) Using the spark plug wrench 14 mm, tilt extension bar 35 mm and universal joint 54 mm, and install the 2 spark plugs onto the cylinder head sub-assembly.

Torque: 17 N·m (173 kgf·cm, 13ft·lbf)

NOTICE:

If a component has been dropped or subjected a strong impact, replace it.

5. INSTALL IGNITION COIL ASSEMBLY (for Bank 2)

- (a) Install the 2 ignition coils onto the cylinder head cover sub-assembly with the 2 bolts.

Torque: 8.5 N·m (87 kgf·cm, 75in·lbf)

NOTICE:

If a component has been dropped or subjected a strong impact, replace it.

(b) Connect the 2 ignition coil connectors to the ignition coil.

6. INSTALL INJECTOR COVER (for Bank 2)

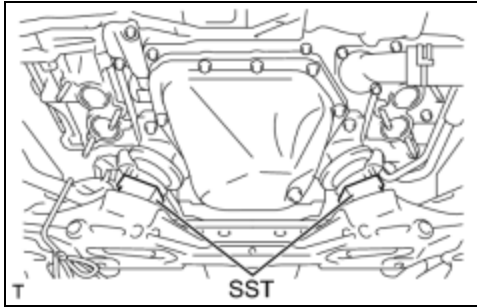
(a) Install the injector cover with the 2 bolts.

Torque: 19 N·m (194 kgf·cm, 14ft·lbf)

(b) Engage the clamp, and install the fuel hoses.

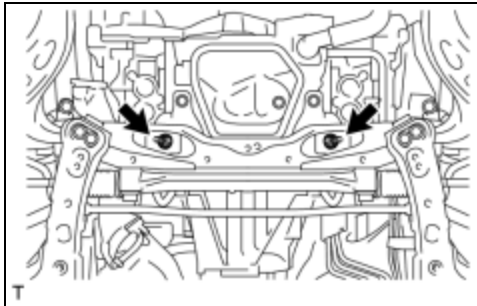
7. REMOVE SST

(a) Hoist the engine assembly up with an engine sling device and a mini crane.



(b) Remove the SST.

SST: 09250-53010



(c) Install the 2 nuts.

(d) Remove the rope that is tying the front exhaust pipe sub-assembly to the front suspension cross member sub-assembly.

8. REMOVE ENGINE HANGER INFO

9. INSTALL EXHAUST MANIFOLD

INFO

10. CONNECT ENGINE WIRE

(a) Connect the engine wire with the wire harness clamp bracket mount bolt and 3 clamps.

Torque: 11 N·m (112 kgf·cm, 8ft·lbf)

(b) Connect the engine wire with the 4 clamps.

11. INSTALL AIR CLEANER CAP WITH AIR CLEANER HOSE INFO

12. INSTALL FRONT SUSPENSION UPPER TO COWL BRACE SUB-ASSEMBLY LH INFO

13. INSTALL FRONT SUSPENSION UPPER TO COWL BRACE SUB-ASSEMBLY RH INFO

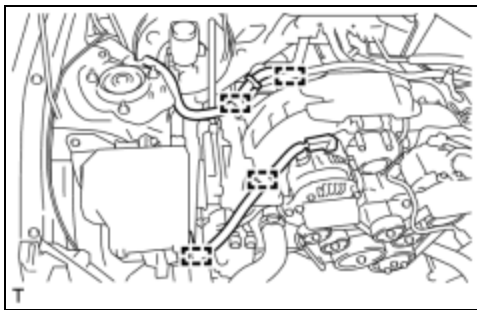
14. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL INFO



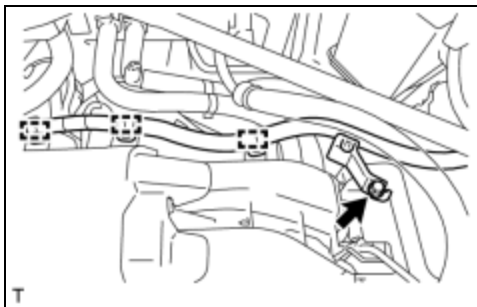
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002QV400RX
Title: FA20 ENGINE CONTROL: IGNITION COIL AND SPARK PLUG: REMOVAL (2013 FR-S)		

REMOVAL

1. SET HOOD SUB-ASSEMBLY INFO
2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO
3. REMOVE FRONT SUSPENSION UPPER TO COWL BRACE SUB-ASSEMBLY LH INFO
4. REMOVE FRONT SUSPENSION UPPER TO COWL BRACE SUB-ASSEMBLY RH INFO
5. REMOVE AIR CLEANER CAP WITH AIR CLEANER HOSE INFO
6. DISCONNECT ENGINE WIRE



(a) Disengage the 4 clamps, and disconnect the engine wire.



(b) Disengage the 3 clamps and wire harness clamp bracket mount bolt, and disconnect the engine wire.

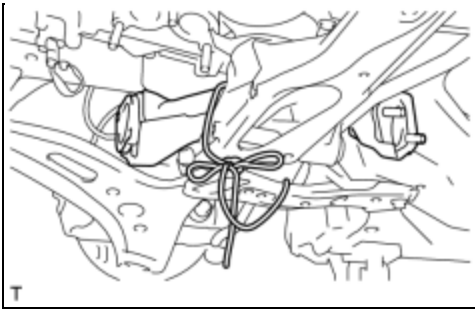
7. REMOVE EXHAUST MANIFOLD

INFO

8. INSTALL ENGINE HANGER INFO

9. SET SST

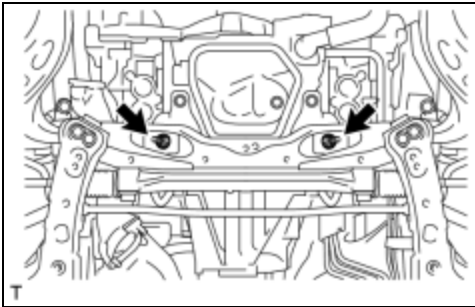
(a) Tie the front exhaust pipe sub-assembly onto the front



suspension cross member sub-assembly using rope.

HINT:

This operation is necessary in order to prevent the front exhaust pipe sub-assembly from falling off.



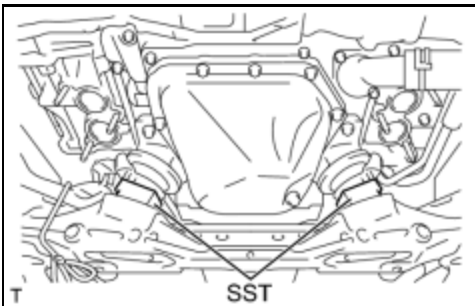
(b) Remove the 2 nuts.

(c) Install the engine hanger with the bolt.

INFO

Torque: 33 N·m (337 kgf·cm, 24ft·lbf)

(d) Hoist the engine assembly up with an engine sling device and a mini crane.



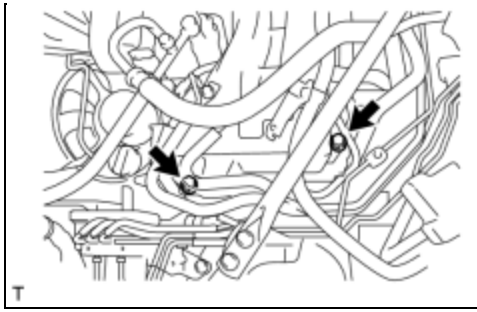
(e) Install the SST to between the engine mount and front.

SST: 09250-53010

10. REMOVE INJECTOR COVER (for Bank 2)

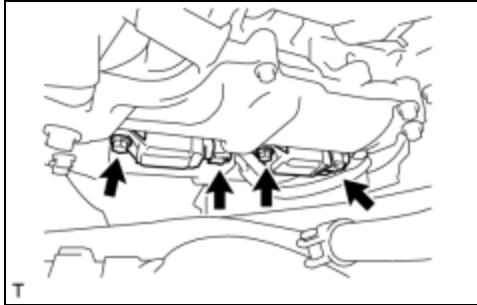


(a) Disengage the clamp, and disconnect the fuel hoses.



(b) Remove the 2 bolts and injector cover.

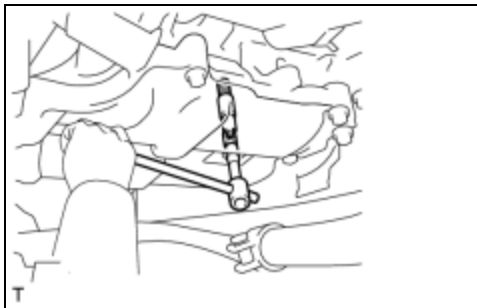
11. REMOVE IGNITION COIL ASSEMBLY (for Bank 2)



(a) Disconnect the 2 ignition coil connectors from the ignition coil assembly.

(b) Remove the 2 bolts and remove the 2 ignition coils.

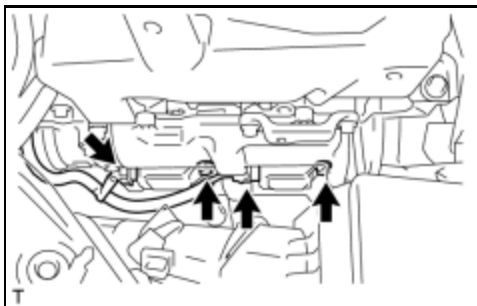
12. REMOVE SPARK PLUG (for Bank 2)



(a) Using the spark plug wrench 14 mm, tilt extension bar 35 mm and universal joint 54 mm, and remove the 2 spark plugs.

13. REMOVE INJECTOR DRIVER INFO

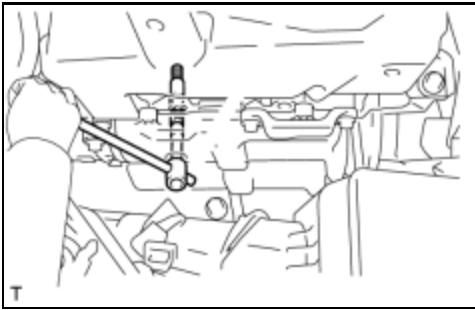
14. REMOVE IGNITION COIL ASSEMBLY (for Bank 1)



(a) Disconnect the 2 ignition coil connectors from the ignition coil assembly.

(b) Remove the 2 bolts and remove the 2 ignition coils.

15. REMOVE SPARK PLUG (for Bank 1)



(a) Using the spark plug wrench 14 mm, tilt extension bar 35 mm and universal joint 54 mm, and remove the 2 spark plugs.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IGF006X
Title: FA20 ENGINE CONTROL: IGNITION SYSTEM: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

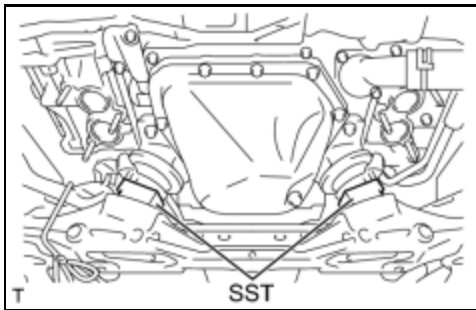
1. PERFORM SPARK TEST

- (a) Check for DTCs [INFO](#) .

NOTICE:

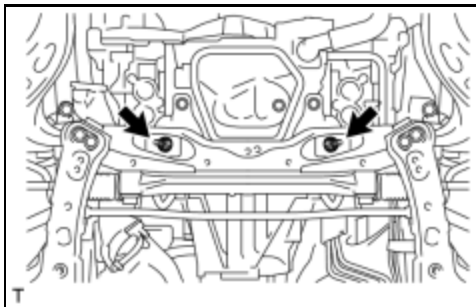
If any DTC is present, perform troubleshooting in accordance with the procedure for that DTC.

- (b) Remove the 4 ignition coils and 4 spark plugs [INFO](#) .
(c) Hoist the engine assembly up with an engine sling device and a mini crane.



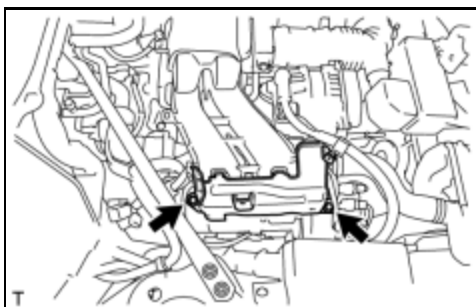
- (d) Remove the SST.

SST: 09250-53010

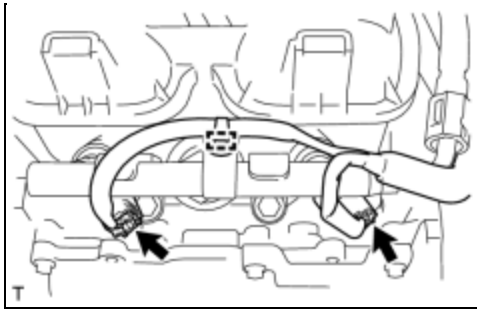


- (e) Install the 2 nuts.

Torque: 45 N·m (459 kgf·cm, 33ft·lbf)

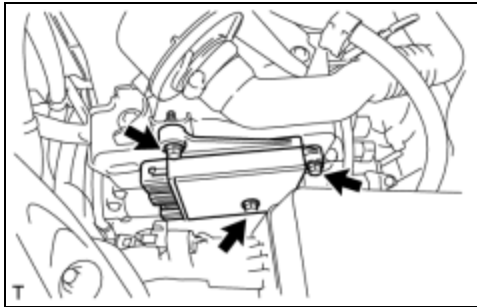


- (f) Remove the 2 bolts and injector cover (bank 1).



(g) Disconnect the 2 fuel injector connectors.

(h) Install the injector cover (bank 1).

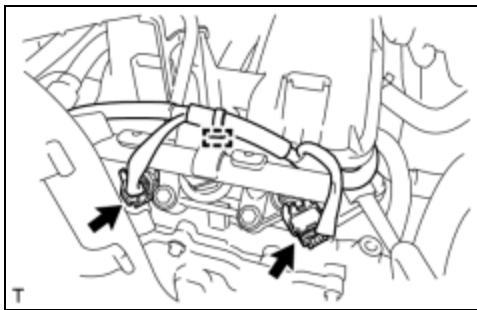


(i) Install the injector driver with the 3 bolts.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

HINT:

Do not connect the upper side 2 connectors.



(j) Disconnect the 2 fuel injector connectors.

(k) Connect the cable to the negative battery terminal.

(l) Install the air cleaner case sub-assembly with the hose.

(m) Install a spark plug to each ignition coil and connect the ignition coil connector.

(n) Ground the spark plug.

(o) Check that spark occurs while the engine is being cranked.

(p) Check whether sparks occur.

NOTICE:

- Ground the spark plugs when checking them.
- Do not crank the engine for more than 2 seconds.
- Do not use an ignition coil and spark plug that has been dropped or subjected to a strong impact.

(q) If spark does not occur, perform the following procedure.

2. INSPECT IGNITION COIL AND SPARK PLUG

(a) Perform the spark test in accordance with the following procedure.

(1) Check that the wire harness side connector of the ignition coil assembly is securely connected.

Result:

RESULT	PROCEED TO
NG	Connect securely
OK	Go to next step

(2) Perform a spark test on each ignition coil assembly.

1. If there is a cylinder where sparks do not occur, replace its ignition coil with the ignition coil of a cylinder where sparks occur normally.
2. Crank the engine and visually check that sparks occur at the cylinder with the normally operating ignition coil.

Result:

RESULT	PROCEED TO
OK	Replace ignition coil assembly
NG	Go to next step

(3) Perform a spark test on each spark plug.

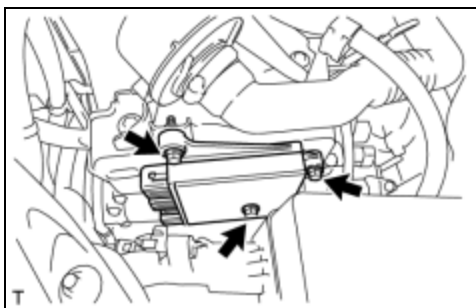
1. If there is a cylinder where sparks do not occur, replace its spark plug with the spark plug of a cylinder where sparks occur normally.
2. Crank the engine and visually check that sparks occur at the cylinder with the normally operating spark plug.

Result:

RESULT	PROCEED TO
OK	Replace spark plug
NG	Inspect the ignition system INFO

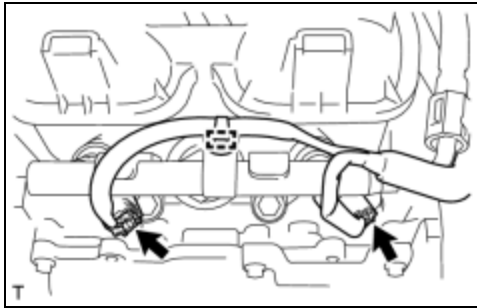
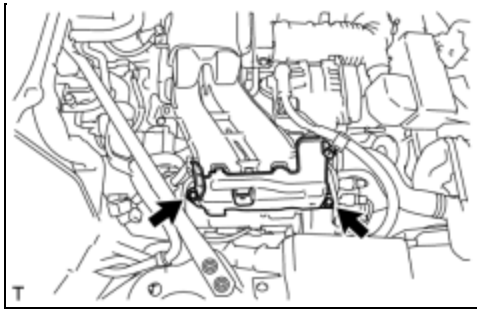
(b) Disconnect the cable from the negative battery terminal.

(c) Remove the air cleaner case sub-assembly with hose.



(d) Remove the 3 bolts and the injector driver.

(e) Remove the 2 bolts and the injector cover (bank 1).

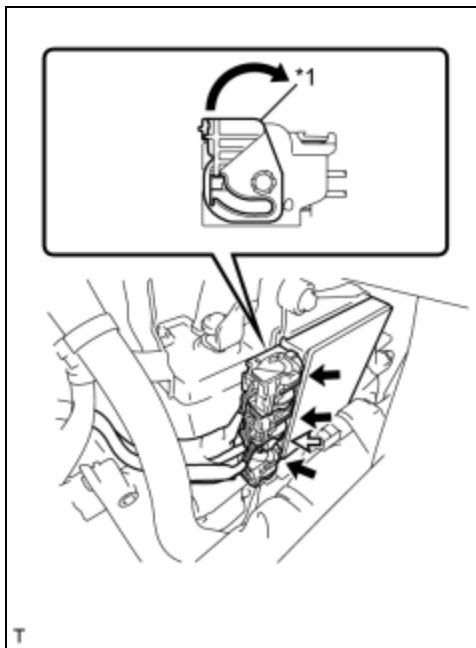


(f) Connect the 2 fuel injector connectors.


(g) Install the 2 bolts and the injector cover.

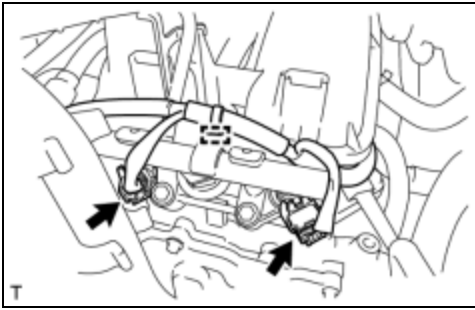
(h) Install the 3 bolts and the injector driver.

(i) Connect the 4 connectors to the injector driver. Move the lock levers in the direction indicated by the arrow to lock the 3 connectors.

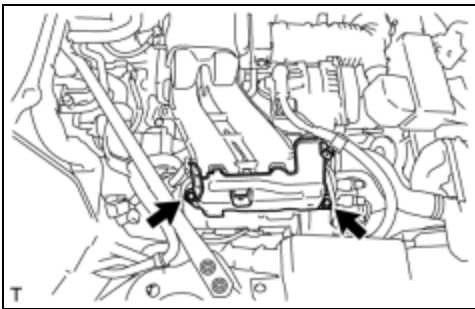


Text in Illustration

*1	Lock Lever
	Connector with Lock Lever

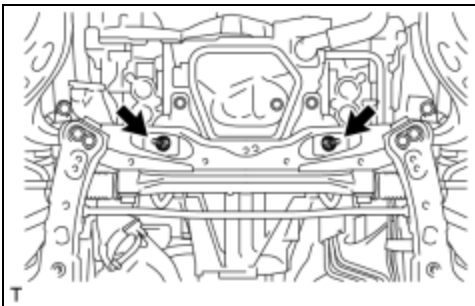


(j) Connect the 2 fuel injector connectors.



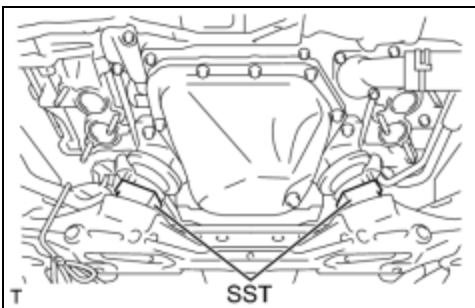
(k) Install the injector cover (bank 1) with the 2 bolts.

Torque: 19 N·m (194 kgf·cm, 14ft·lbf)



(l) Remove the 2 nuts.

(m) Hoist the engine assembly up with an engine sling device and a mini crane.



(n) Install the SST.

SST: 09250-53010

(o) Install the ignition coil assembly and spark plug [INFO](#) .

(p) Clear the DTCs [INFO](#) .

(q) Check for DTCs **INFO** .

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

3. INSPECT SPARK PLUG

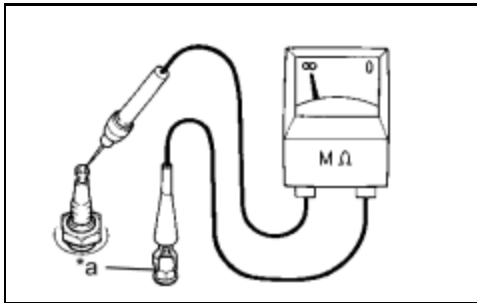
NOTICE:

- When replacing a spark plug, make sure to use the designated spark plug because an ion current type misfire detection system is used for the spark plug.
- Do not damage the platinum tip. If the spark plug has been dropped, make sure to replace it with a designated new spark plug.
- Do not use a wire brush for cleaning.
- Do not attempt to adjust the electrode gap of a used spark plug.
- Make sure to use SST to check gaps, preventing the platinum tip from being damaged.
- If damaged, replace it with a designated new spark plug.

(a) Check the electrode using a megohmmeter:

Text in Illustration

*a	Ground
----	--------



(1) Measure the resistance according to the value(s) in the table below.

Standard Insulation Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Spark plug (terminal part) - Body ground	Always	10 MΩ or higher

HINT:

- If the result is not as specified, clean the spark plug with a spark plug cleaner and measure the resistance again.
- If a megohmmeter is not available, perform the following simple inspection instead.

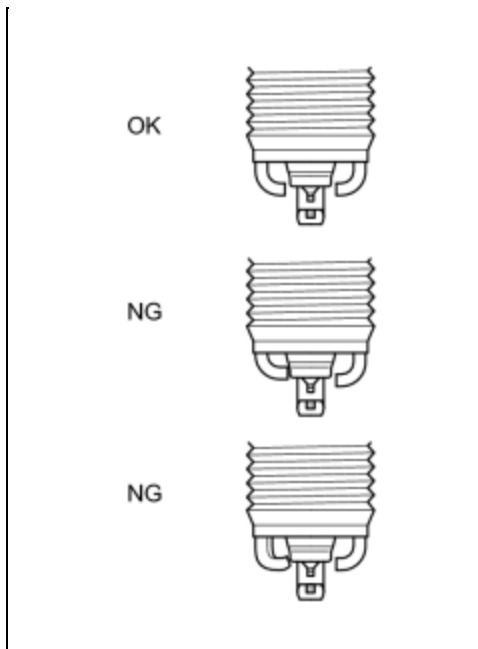
(b) Alternative inspection method:

(1) Quickly accelerate the engine to 4000 rpm 5 times.

(2) Remove the spark plug **INFO** .

(3) Visually check the spark plug.

If the electrode is dry, the spark plug is functioning



properly. If the electrode is damp, proceed to the next step.

HINT:

If a megohmmeter is not available, perform the following simple inspection instead.

- (4) Install the spark plug INFO.
- (c) Check the spark plug for any damage to its threads and insulator.

HINT:

If there is any damage, replace the spark plug.

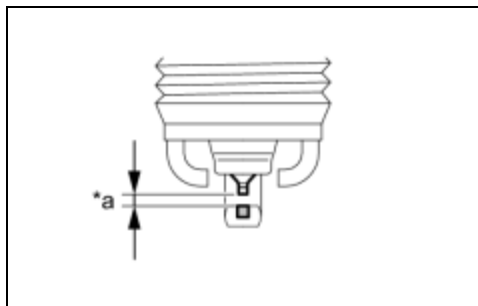
Recommended Spark Plug:

MANUFACTURER	PRODUCT
DENSO made	ZXE27HBR8

- (d) Reference:

- (1) Using SST, check the spark plug electrode gap.

Text in Illustration



*a	Spark Plug Electrode Gap
----	--------------------------

SST: 09240-00020

Maximum electrode gap for a used spark plug:

1.0 mm (0.0394 in.)

If the gap exceeds the maximum, replace the spark plug.

NOTICE:

Never attempt to adjust the gap of a used plug.

Electrode gap for a new spark plug:

0.7 to 0.8 mm (0.0276 to 0.0315 in.)

- (e) Clean the spark plugs.

If the electrode has traces of wet carbon, clean the electrode with a spark plug cleaner and then dry it.

Standard air pressure:

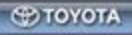
588 kPa (6.0 kgf/cm² , 85 psi)

Standard duration:

20 seconds or less

HINT:

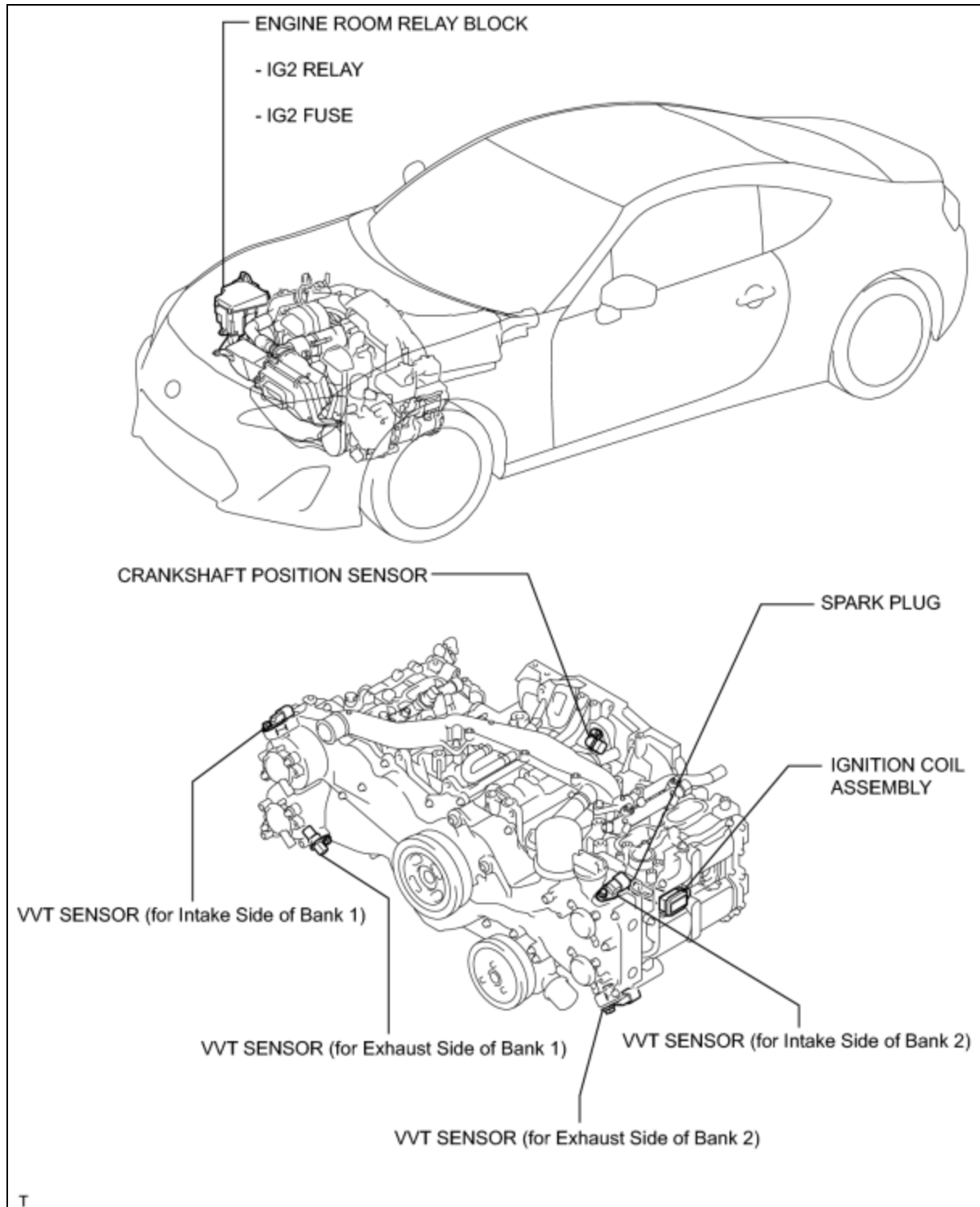
Only use a spark plug cleaner when the electrode is free of oil. If the electrode has traces of oil, use gasoline to clean off the oil before using the spark plug cleaner.



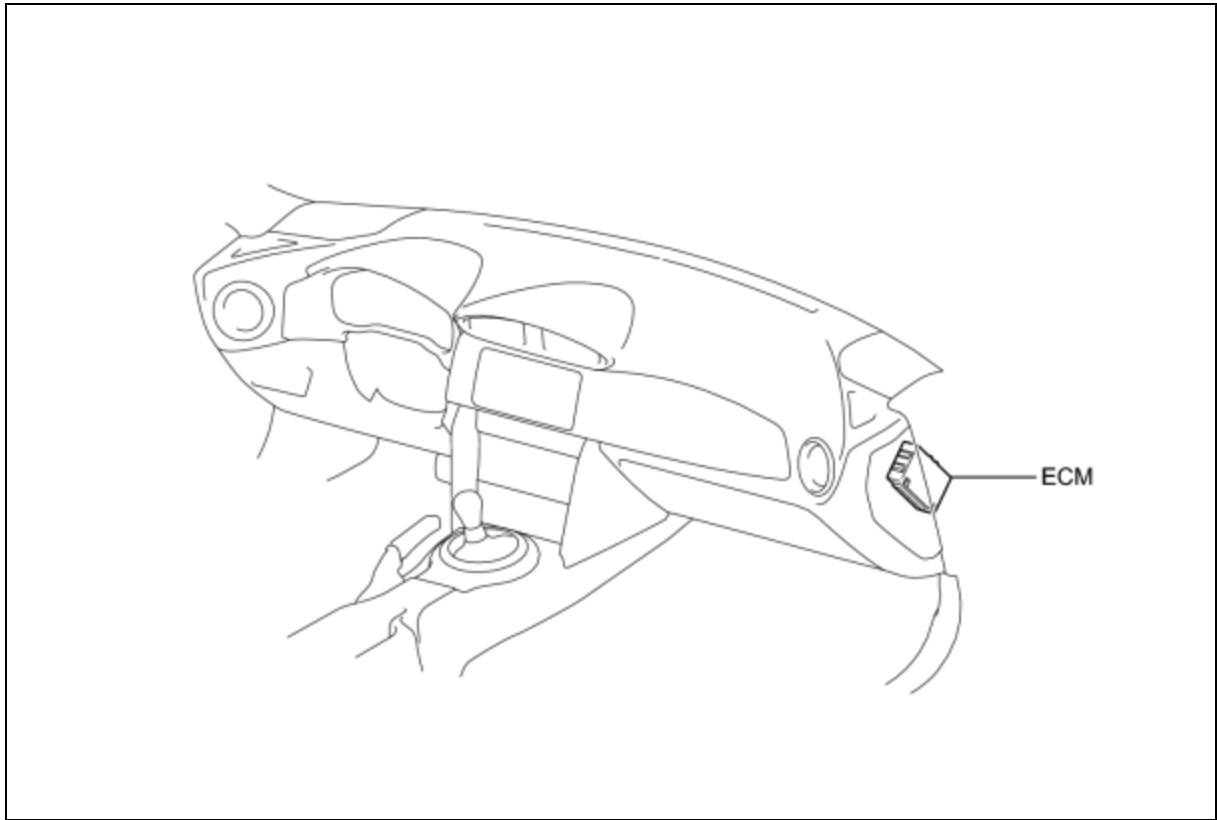
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001BOZ00FX
Title: FA20 ENGINE CONTROL: IGNITION SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION

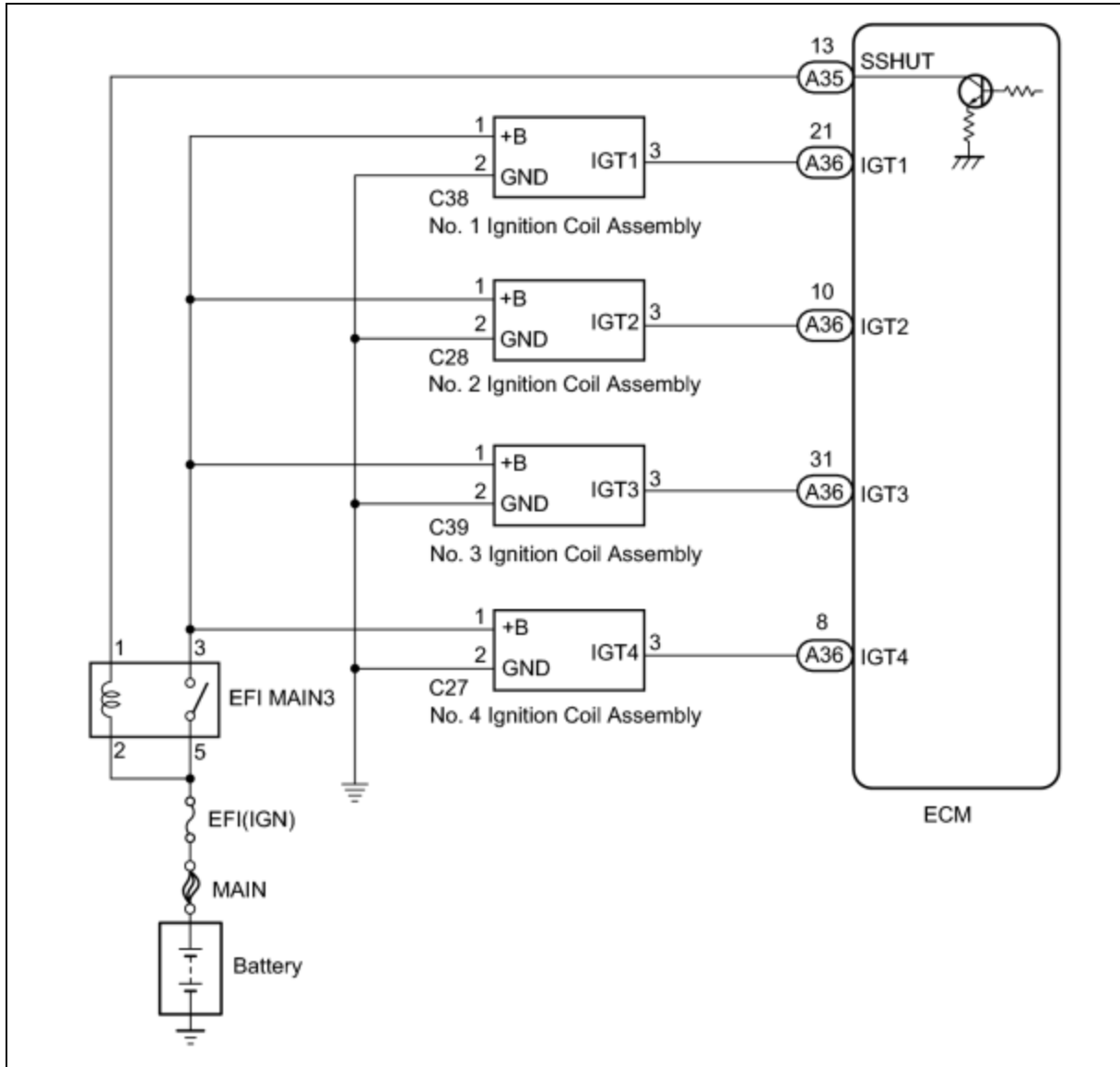


ILLUSTRATION



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IGE006X
Title: FA20 ENGINE CONTROL: IGNITION SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

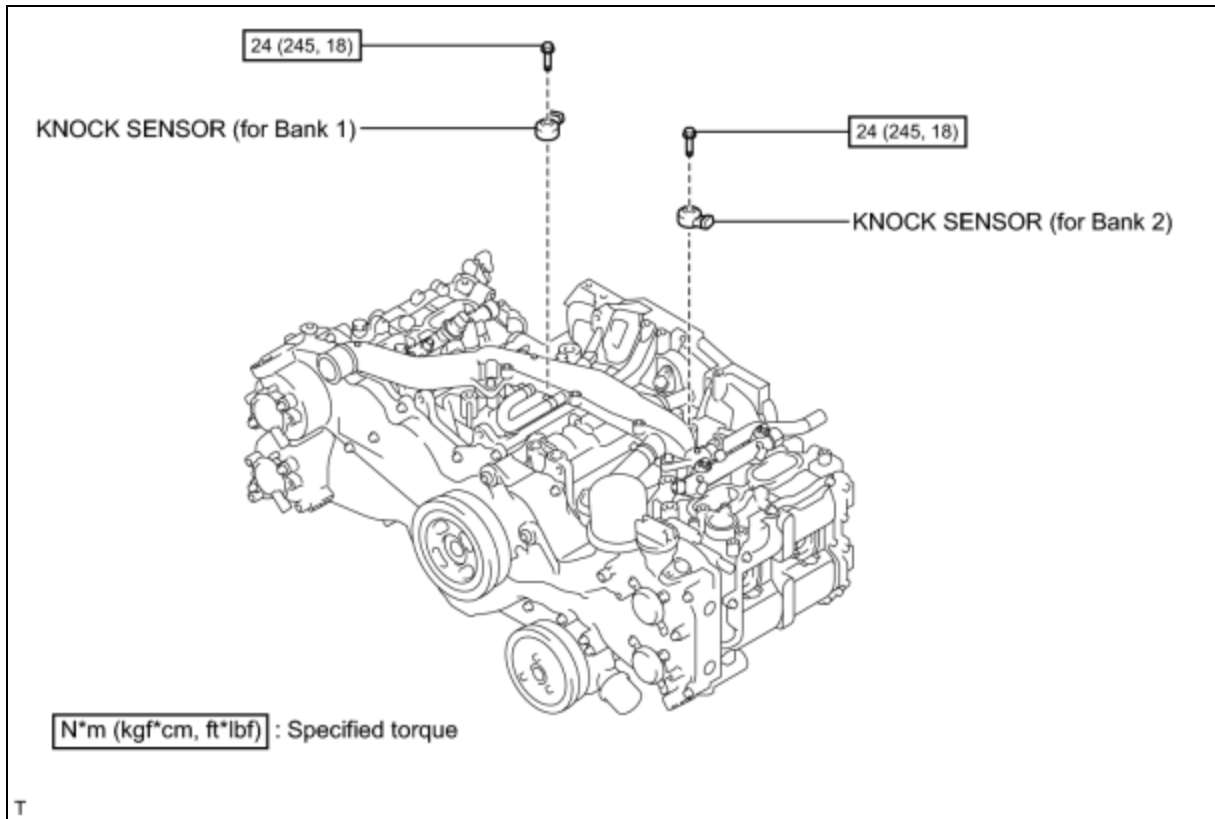
SYSTEM DIAGRAM



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001BO400JX
Title: FA20 ENGINE CONTROL: KNOCK SENSOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



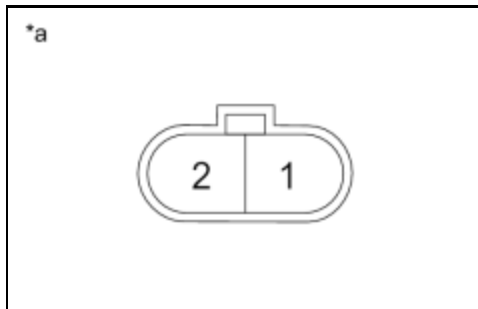
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MTF00WX
Title: FA20 ENGINE CONTROL: KNOCK SENSOR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT KNOCK SENSOR

(a) Measure the resistance according to the value(s) the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	532 to 588 kΩ

Text in Illustration

*a	Component without harness connected (Knock Sensor)
----	--

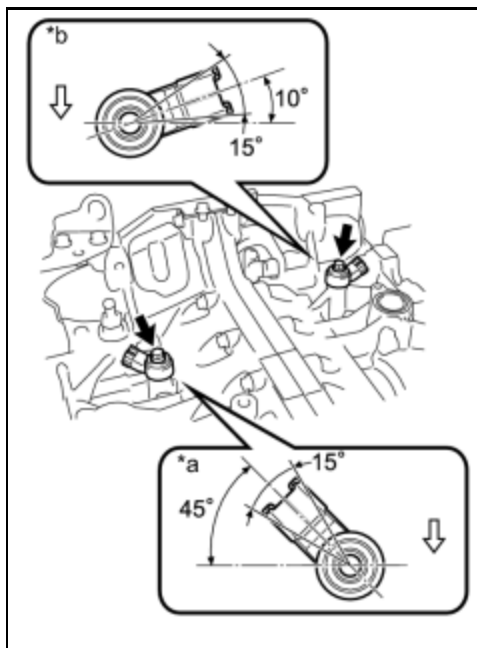
If the result is not as specified, replace the knock sensor.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MTE00WX
Title: FA20 ENGINE CONTROL: KNOCK SENSOR: INSTALLATION (2013 FR-S)		

INSTALLATION


1. INSTALL KNOCK SENSOR

(a) Install the 2 knock sensors onto the cylinder block with the 2 bolts as shown in the illustration.



Torque: 24 N·m (245 kgf·cm, 18ft·lbf)

Text in Illustration

*a	Bank 1
*b	Bank 2
	Engine Front Side

(b) Connect the 2 knock sensors connectors.

2. INSTALL INTAKE MANIFOLD

INFO

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

INFO



TOYOTA

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MTH00WX
Title: FA20 ENGINE CONTROL: KNOCK SENSOR: REMOVAL (2013 FR-S)		

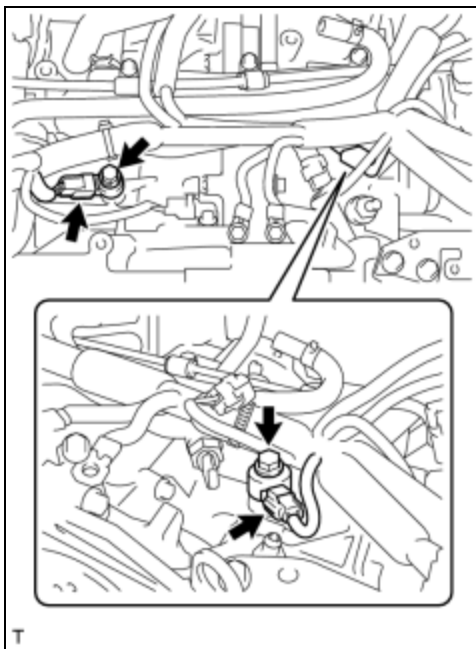
REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

2. REMOVE INTAKE MANIFOLD

INFO

3. REMOVE KNOCK SENSOR



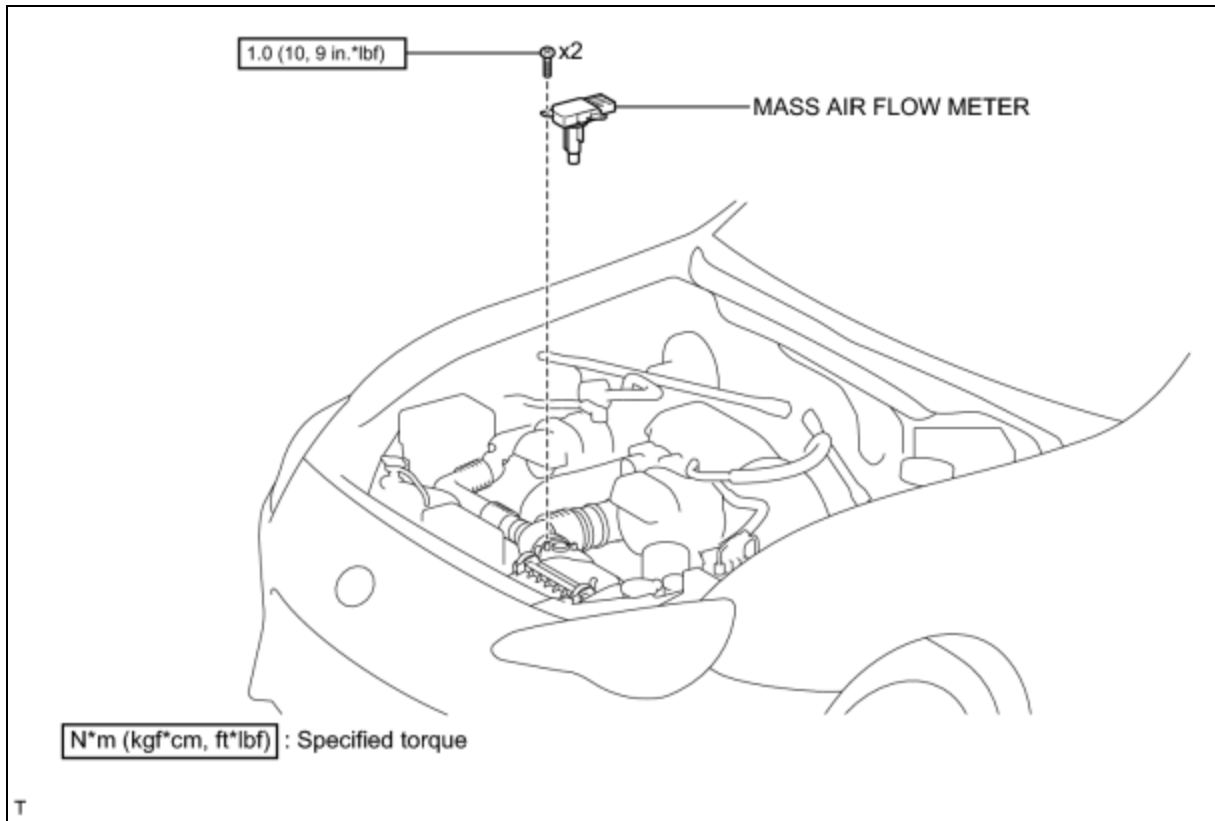
(a) Disconnect the 2 knock sensor connectors.

(b) Remove the 2 bolts and the 2 knock sensor.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IHS006X
Title: FA20 ENGINE CONTROL: MASS AIR FLOW METER: COMPONENTS (2013 FR-S)		

COMPONENTS

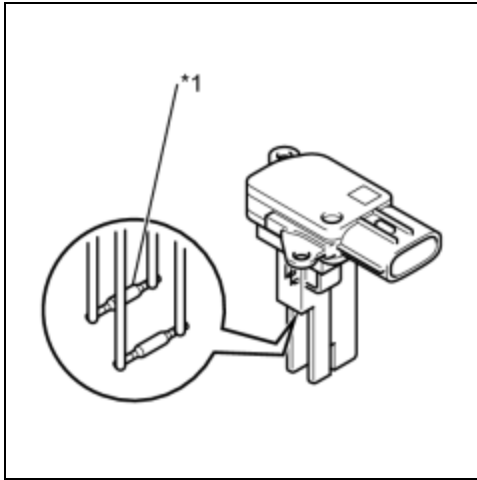
ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MTL00MX
Title: FA20 ENGINE CONTROL: MASS AIR FLOW METER: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT MASS AIR FLOW METER



- (a) Perform a visual check for any foreign matter on the platinum hot wire (heater) of the mass air flow meter shown in the illustration.

Text in Illustration

*1	Platinum Hot Wire (Heater)
----	----------------------------

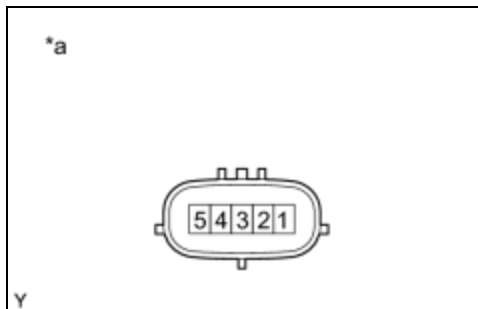
OK:

There is no foreign matter.

If the result is not as specified, replace the mass air flow meter.

- (b) Measure the resistance according to the value(s) in the table below.

Text in Illustration



*a	Component without harness connected (Mass Air Flow Meter)
----	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	-20°C (-4°F)	13.6 to 18.4 kΩ
	20°C (68°F)	2.21 to 2.69 kΩ
	60°C (140°F)	0.49 to 0.67 kΩ

If the resistance is not as specified, replace the mass air flow meter.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IHR006X
Title: FA20 ENGINE CONTROL: MASS AIR FLOW METER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL MASS AIR FLOW METER

- (a) Install the mass air flow meter with the 2 screws.

Torque: 1.0 N·m (10 kgf·cm, 9in·lbf)

- (b) Connect the mass air flow meter.

2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL [INFO](#)



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IHU006X
Title: FA20 ENGINE CONTROL: MASS AIR FLOW METER: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

NOTICE:

- Perform the mass air flow meter inspection according to the procedures below.
- Only replace the mass air flow meter when the mass air flow value in the Data List is not within the normal operating range (with the engine stopped) or there is foreign matter on the mass air flow meter platinum hot wire (heater).

1. INSPECT MASS AIR FLOW METER

(a) Read the value using the Techstream.

NOTICE:

- Perform the inspection with the vehicle indoors and on a level surface.
- Perform the inspection of the mass air flow meter while it is installed to the air cleaner case (installed to the vehicle).
- During the test, do not use the exhaust air duct to perform suction on the exhaust pipe.

(1) Connect the Techstream to the DLC3.

(2) Turn the ignition switch to ON.

(3) Turn the Techstream on.

(4) Enter the following menus: Data List / MAF.

(5) Wait for 30 seconds, and read the values on the Techstream.

Standard:

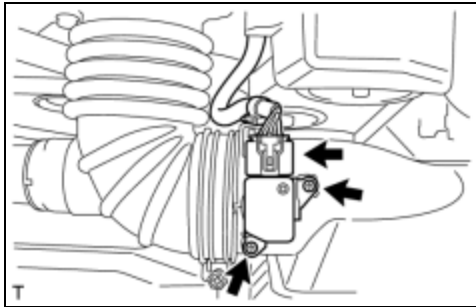
TESTER DISPLAY	CONDITION	STANDARD CONDITION
MAF	<ul style="list-style-type: none"> • Engine not running • 30 seconds after turning ignition switch to ON 	0.47 gm/sec or less

- If the result is not as specified, replace the mass air flow meter.
- If the result is within the specified range, inspect the mass air flow meter INFO.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IHT006X
Title: FA20 ENGINE CONTROL: MASS AIR FLOW METER: REMOVAL (2013 FR-S)		

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO
2. REMOVE MASS AIR FLOW METER



(a) Disconnect the mass air flow meter connector.

(b) Remove the 2 screws and the mass air flow meter.



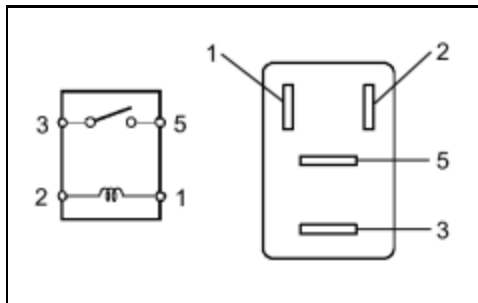
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000480H005X
Title: FA20 ENGINE CONTROL: RELAY: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT EFI MAIN 1 RELAY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



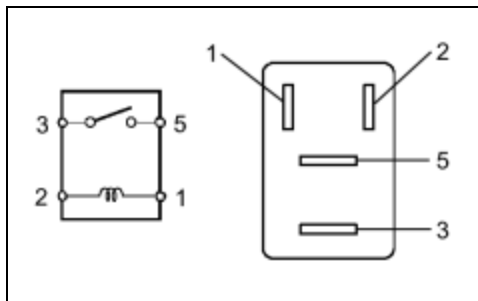
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 5	Battery voltage not applied to 1 and 2 terminals	10 k Ω or higher
	Battery voltage applied to 1 and 2 terminals	Below 1 Ω

If the result is not as specified, replace the EFI main 1 relay.

2. INSPECT EFI MAIN 2 RELAY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 5	Battery voltage not applied to 1 and 2 terminals	10 k Ω or higher
	Battery voltage applied to 1 and 2 terminals	Below 1 Ω

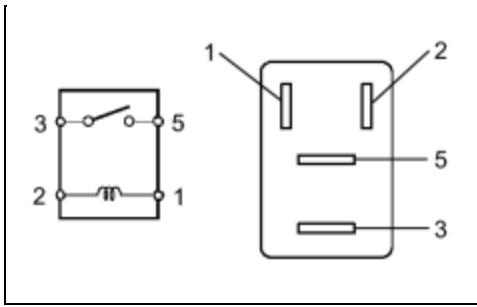
If the result is not as specified, replace the EFI main 2 relay.

3. INSPECT EFI MAIN 3 RELAY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
-------------------	-----------	---------------------



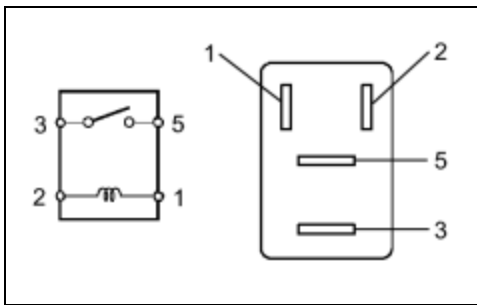
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 5	Battery voltage not applied to 1 and 2 terminals	10 kΩ or higher
	Battery voltage applied to 1 and 2 terminals	Below 1 Ω

If the result is not as specified, replace the EFI main 3 relay.

4. INSPECT IG2 RELAY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



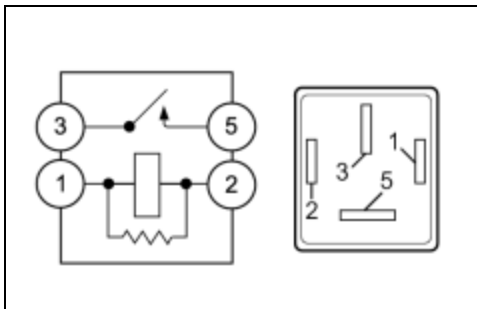
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 5	Battery voltage not applied to 1 and 2 terminals	10 kΩ or higher
	Battery voltage applied to 1 and 2 terminals	Below 1 Ω

If the result is not as specified, replace the IG2 relay.

5. INSPECT INJ RELAY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 5	Battery voltage not applied to 1 and 2 terminals	10 kΩ or higher
	Battery voltage applied to 1 and 2 terminals	Below 1 Ω

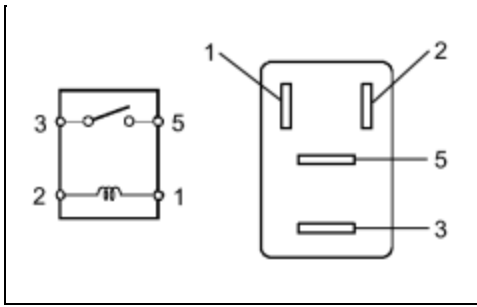
If the result is not as specified, replace the INJ relay.

6. INSPECT ETCS RELAY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 5	Battery voltage not applied to 1 and 2 terminals	10 kΩ or higher
3 - 5	Battery voltage applied to 1 and 2 terminals	Below 1 Ω



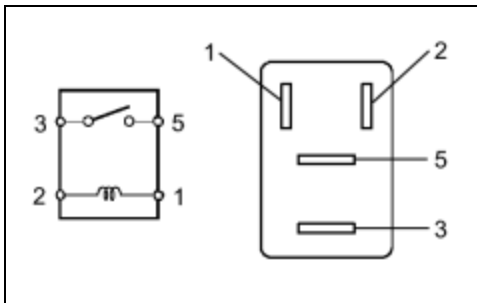
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 5	Battery voltage not applied to 1 and 2 terminals	10 k Ω or higher
	Battery voltage applied to 1 and 2 terminals	Below 1 Ω

If the result is not as specified, replace the ETCS relay.

7. INSPECT C/OPEN RELAY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 5	Battery voltage not applied to 1 and 2 terminals	10 k Ω or higher
	Battery voltage applied to 1 and 2 terminals	Below 1 Ω

If the result is not as specified, replace the C/OPEN relay.

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDMOMBX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: BASIC INSPECTION (2013 FR-S)		

BASIC INSPECTION

When a malfunction is not confirmed by the DTC check, troubleshooting should be carried out for all circuits considered to be possible causes of the problem. In many cases, by carrying out the basic engine check shown in the following procedure, the location of the problem can be found quickly and efficiently. Therefore, using this check is essential when engine troubleshooting.

1.	CHECK BATTERY VOLTAGE
-----------	------------------------------

NOTICE:

Carry out this check with the engine stopped and the ignition switch off.

Result

RESULT	PROCEED TO
11 V or higher	OK
Below 11 V	NG

NG ► CHARGE OR REPLACE BATTERY

OK



2.	CHECK WHETHER ENGINE CRANKS
-----------	------------------------------------

NG ► PROCEED TO PROBLEM SYMPTOMS TABLE

OK



3.	CHECK WHETHER ENGINE STARTS
-----------	------------------------------------

NG ► GO TO STEP 6

OK



4.	CHECK AIR CLEANER FILTER ELEMENT SUB-ASSEMBLY
-----------	--


(a) Visually check that the air cleaner filter element sub-assembly is not excessively contaminated with dirt or oil.

NG ▶ **REPLACE AIR CLEANER FILTER ELEMENT SUB-ASSEMBLY**

OK



5.	CHECK IDLING SPEED
-----------	---------------------------

(a) Check the engine idling speed  .

NG ▶ **TROUBLESHOOT IDLING SPEED AND PROCEED TO NEXT STEP**

OK



6.	CHECK FUEL PRESSURE
-----------	----------------------------

(a) Check the fuel pressure  .

NG ▶ **TROUBLESHOOT FUEL PRESSURE AND PROCEED TO NEXT STEP**

OK



7.	CHECK FOR SPARK
-----------	------------------------

(a) Perform a spark test  .

NG ▶ TROUBLESHOOT SPARK AND PROCEED TO NEXT STEP

OK ▶ PROCEED TO PROBLEM SYMPTOMS TABLE

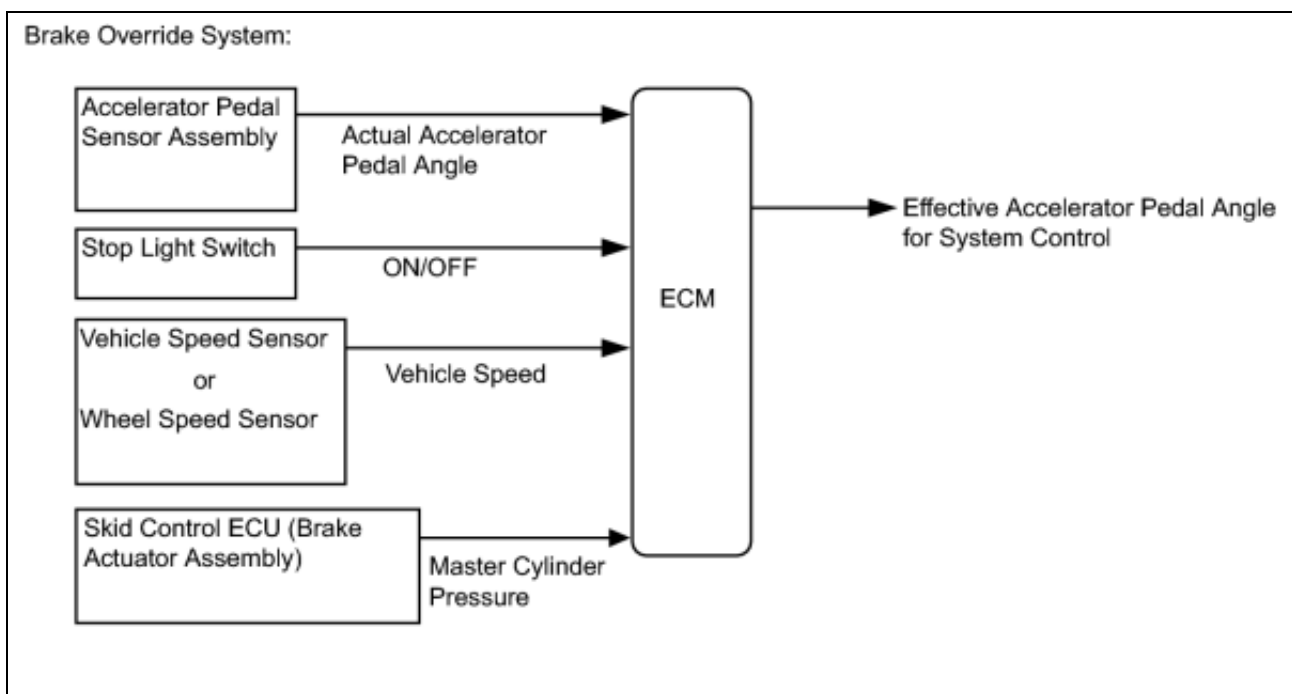


Last Modified: 4-14-2014	6.6 J	Doc ID: RM000004G8F0CEX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE CONTROL: SFI SYSTEM: Brake Override System; 2013 MY FR-S [03/2012 -]		

Brake Override System

DESCRIPTION

When the vehicle is being driven with the accelerator pedal depressed, depressing the brake pedal without releasing the accelerator pedal will activate the brake override system to restrict driving torque. The conditions for activating the brake override system as well as the items that are controlled are explained below.



Activation Conditions:

- Vehicle is running at or above the specified speed.
- The accelerator pedal is depressed, and then the brake pedal is depressed.

NOTICE:

The vehicle may not enter the brake override system control due to the relation of the accelerator pedal angle and the vehicle's speed.

Items Controlled:

- Driving torque is restricted.

HINT:

During brake override system control, the value for the accelerator pedal angle (which is used for engine control) is forcibly reduced to a specified value. For this reason, the Data List value for Accelerator Position will be replaced with a specified value regardless of the actual accelerator

pedal angle (Accel Sens. No. 1 Volt %, Accel Sens. No. 2 Volt %)

Deactivation Conditions:

- When the Stop Light Switch turns OFF or the actual accelerator pedal angle increases or decreases beyond the specified range.

INSPECTION PROCEDURE

Inspection Method

Drive at 10 km/h (6.25 mph), depress the accelerator pedal by 1/2 to 3/4 and keep it in that position. Under these conditions, if the brake pedal is depressed, then the brake override system has been activated.

CAUTION:

When carrying out the inspection, use a place where you are able to carry it out safely and also pay close attention to your surroundings.

Also, when driving make absolutely sure that all road traffic laws, such as speed limits, are observed.

HINT:

- Under normal conditions, the Accelerator Position value changes in response to the Accel Sens. No. 1 Volt % value. For more information on the numerical values, refer to the Data List INFO.
- If the Data List values of Accelerator Position and Accel Sens. No. 1 Volt % do not match, and the value of Accelerator Position changes but the value of Accel Sens. No. 1 Volt % is constant, this confirms that brake override system has activated. (Data can be captured relatively easily by using the snapshot function in the Data List. Confirm the data after performing the drive test.)

NOTICE:

The brake override system restricts driving torque if the brake pedal is depressed when driving with the accelerator pedal depressed. If a customer reports experiencing loss of torque after the accelerator and brake pedals have both been intentionally depressed, explain to the customer that this is not a malfunction, and that the customer should avoid depressing both the accelerator and brake pedals at the same time.

Example: While operating the accelerator pedal, the customer uses their left foot to operate the brake pedal.

PROCEDURE

1.	CHECK DTC OUTPUT
-----------	-------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and turn the Techstream on.
- (c) Enter the following menus: System Select / Health Check.
- (d) Check DTCs.

Result

RESULT	PROCEED TO
--------	------------

DTC is not output	A
DTCs are output	B

B  **GO TO DTC CHART**

A



2. READ VALUE USING TECHSTREAM (STOP LIGHT SWITCH AND ST1)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and turn the Techstream on.
- (c) Enter the following menus: Powertrain / Engine / Data List / Stop Light Switch and ST1.
- (d) Check the Data List indication when the brake pedal is depressed and released.

OK:



TECHSTREAM DISPLAY	CONDITION	SPECIFIED CONDITION
Stop Light Switch	Brake pedal released	OFF
	Brake pedal depressed	ON
ST1	Brake pedal released	OFF
	Brake pedal depressed	ON

NG  **INSPECT STOP LIGHT SWITCH ASSEMBLY**

OK



3. INSPECT BRAKE PEDAL

- (a) Inspect and adjust the brake pedal (for Manual Transmission)  .
- (b) Inspect and adjust the brake pedal (for Automatic Transmission)  .

HINT:

If the stop light switch turns ON too late, the start of brake override system control may be delayed; if it turns ON too soon, brake override system control may begin too early, so conduct

inspection of the brake pedal and stop light switch assembly.

RESULT	PROCEED TO
OK	A
NG (for Manual Transmission)	B
NG (for Automatic Transmission)	C

B ▶ REPAIR OR REPLACE BRAKE PEDAL

C ▶ REPAIR OR REPLACE BRAKE PEDAL

A



4. READ VALUE USING TECHSTREAM (ACCELERATOR PEDAL SENSOR)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and turn the Techstream on.
- (c) Enter the following menus: Powertrain / Engine / Data List / Accel Sens. No. 1 Volt % and Accel Sens. No. 2 Volt %.
- (d) Read the value displayed on the Techstream.

OK:

TECHSTREAM DISPLAY	CONDITION	SPECIFIED CONDITION
Accel Sens. No. 1 Volt %	Accelerator Pedal Released → Depressed → Released	Values smoothly change following accelerator pedal operation
Accel Sens. No. 2 Volt %		

HINT:

For numerical values of Accel Sens. No. 1 Volt % and Accel Sens. No. 2 Volt %, refer to the Data List

INFO

NG ▶ REPLACE ACCELERATOR PEDAL SENSOR ASSEMBLY

OK

**5. READ VALUE USING TECHSTREAM (VEHICLE SPEED)**

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and turn the Techstream on.
- (c) Start the engine.
- (d) Enter the following menus: Powertrain / Engine / Data List / Vehicle Speed.
- (e) Read the value displayed on the Techstream.

Standard:

TECHSTREAM DISPLAY	CONDITION	SPECIFIED CONDITION
Vehicle Speed	Vehicle stopped, engine running	0 km/h (0 mph)
	Vehicle running at constant speed between 16.1 to 64.4 km/h (10 to 40 mph)	No large fluctuations when driving at a constant speed

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

HINT:

Data can be captured relatively easily by using the snapshot function in the Data List. Confirm the data after performing the drive test.

NG  **GO TO METER / GAUGE SYSTEM**

OK**6. READ VALUE USING TECHSTREAM (FR, FL, RR, RL WHEEL SPEED)**

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and turn the Techstream on.
- (c) Start the engine.
- (d) Enter the following menus: Chassis / ABS/VSC/TRAC / Data List / FR Wheel Speed, FL Wheel Speed, RR Wheel Speed and RL Wheel Speed.

(e) Read the value displayed on the Techstream.

Standard:

TECHSTREAM DISPLAY	CONDITION	SPECIFIED CONDITION
FR Wheel Speed	Vehicle stopped, engine running	0 km/h (0 mph)
FL Wheel Speed		
RR Wheel Speed	Vehicle running at constant speed between 16.1 to 64.4 km/h (10 to 40 mph)	No large fluctuations when driving at a constant speed
RL Wheel Speed		
Speed		

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

HINT:

Data can be captured relatively easily by using the snapshot function in the Data List. Confirm the data after performing the drive test.

NG  **INSPECT FRONT OR REAR SPEED SENSOR**

OK  **END**





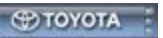
Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDQ0U4X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: CHECK FOR INTERMITTENT PROBLEMS (2013 FR-S)		

CHECK FOR INTERMITTENT PROBLEMS

HINT:

Inspect the vehicle ECM using check mode. Intermittent problems are easier to detect with the Techstream when the ECM is in check mode. In check mode, the ECM uses 1 trip detection logic, which is more sensitive to malfunctions than normal mode (default), which uses 2 trip detection logic.

1. Clear DTCs  .
2. Switch the ECM from normal mode to check mode using the Techstream  .
3. Perform a simulation test.
4. Check and wiggle the harness(es), connector(s) and terminal(s).



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDLOOBX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: CHECK MODE PROCEDURE (2013 FR-S)		

CHECK MODE PROCEDURE

HINT:

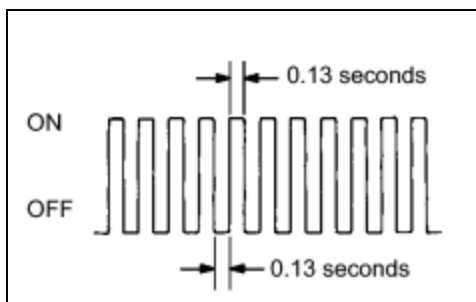
Compared to normal mode, check mode is more sensitive to malfunctions. Therefore, check mode can detect malfunctions that cannot be detected in normal mode.

NOTICE:

All the stored DTCs and freeze frame data are cleared if: 1) the ECM is changed from normal mode to check mode or vice versa; or 2) the ignition switch is turned from ON to ACC or off while in check mode. Before changing modes, always check and note any DTCs and freeze frame data.

1. CHECK MODE PROCEDURE

- (a) Check and ensure the following conditions:
 - (1) Battery voltage is 11 V or higher.
 - (2) Throttle valve is fully closed.
 - (3) Shift lever is in P, N or neutral.
 - (4) A/C switch is off.
- (b) Turn the ignition switch off.
- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch to ON.
- (e) Turn the Techstream on.
- (f) Enter the following menus: Powertrain / Engine / Utility / Check Mode.
- (g) Switch the ECM from normal mode to check mode.



- (h) Check that the MIL flashes as shown in the illustration.

- (i) Start the engine.
- (j) Check that the MIL turns off.
- (k) Simulate the conditions of the malfunction described by the customer.
- (l) Check DTCs and freeze frame data using the Techstream.

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDR0C4X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: CHECKING MONITOR STATUS (2013 FR-S)		

CHECKING MONITOR STATUS



The purpose of the monitor result (mode 06) is to allow access to the results of on-board diagnostic monitoring tests of specific components/systems that are not continuously monitored. Examples are catalysts and evaporative emissions (EVAP) systems.

The monitor result allows the OBD II scan tool to display the monitor status, test value, minimum test limit and maximum test limit. These data are displayed after the vehicle has been driven to run the monitor.

When the test value is not between the minimum and maximum test limits, the ECM (PCM) interprets this as a malfunction. If the test value is on the borderline of the test limits, the component is likely to malfunction in the near future.

Perform the following procedures to view the monitor status. Although these procedures refer to the Lexus/Toyota Techstream, the monitor status can be checked using a generic OBD II scan tool. Refer to your scan tool operator's manual for specific procedural information.

1. PERFORM MONITOR DRIVE PATTERN

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and turn the Techstream on.
- (c) Clear DTCs  .
- (d) Operate the vehicle in accordance with the applicable drive pattern described in Readiness Monitor Drive Pattern  . Do not turn the ignition switch off.

NOTICE:

The test results will be lost if the ignition switch is turned off.

2. ACCESS MONITOR RESULT

- (a) Enter the following menus: Powertrain / Engine / Monitor / Current Monitor / Result.
- (b) Confirm the monitor status for each component.

HINT:

The monitor status for each component is displayed in the Result column.

- **Pass:** The component is functioning normally.
- **Fail:** The component is malfunctioning.

- (c) Display the test results and test values for a monitor by selecting the icon in the Details column for that monitor.

3. CHECK COMPONENT STATUS

- (a) Compare the test value with the minimum test limit (Min Limit) and maximum test limit (Max Limit).
- (b) If the test value is between the minimum and maximum test limits, the component is functioning normally. If not, the component is malfunctioning. The test value is usually not near the test limits. If the test value is on the borderline of the test limits, the component is likely to malfunction in the near future.

HINT:

The monitor result might on rare occasions be Pass even if the Malfunction Indicator Lamp (MIL) is illuminated. This indicates the system malfunctioned on a previous driving cycle. This might be caused by an intermittent problem.

4. MONITOR RESULT INFORMATION

When using a generic scan tool, multiply the test value by the scaling value.

Refer to "Monitor Result" in each DTC related to the monitor .

Advance / Retarded Intake Side (for Bank 1):

MONITOR ID	TEST ID	SCALING	UNIT	DESCRIPTION
\$35	\$8B	Multiply by 0.5	°CA	VVT slow response (Advance)
\$35	\$8C	Multiply by 0.5	°CA	VVT slow response (Retarded)

Advance / Retarded Intake Side (for Bank 2):

MONITOR ID	TEST ID	SCALING	UNIT	DESCRIPTION
\$36	\$8B	Multiply by 0.5	°CA	VVT slow response (Advance)
\$36	\$8C	Multiply by 0.5	°CA	VVT slow response (Retarded)

Advance / Retarded Exhaust Side (for Bank 1):

MONITOR ID	TEST ID	SCALING	UNIT	DESCRIPTION
\$35	\$8D	Multiply by 0.5	°CA	VVT slow response (Advance)
\$35	\$8E	Multiply by 0.5	°CA	VVT slow response (Retarded)

Advance / Retarded Exhaust Side (for Bank 2):

MONITOR ID	TEST ID	SCALING	UNIT	DESCRIPTION
\$36	\$8D	Multiply by 0.5	°CA	VVT slow response (Advance)
\$36	\$8E	Multiply by 0.5	°CA	VVT slow response (Retarded)

A/F Sensor Bank 1 Sensor 1:

MONITOR ID	TEST ID	SCALING	UNIT	DESCRIPTION
\$01	\$84	Multiply by 0.004	No dimension	A/F sensor minimum value
\$01	\$85	Multiply by 0.004	No dimension	A/F sensor maximum value
\$01	\$86	Multiply by 0.004	No dimension	A/F sensor response
\$01	\$8F	Multiply by 0.004	No dimension	A/F sensor fluctuation (Width)
\$01	\$90	Multiply by 0.004	No dimension	A/F sensor fluctuation (Time)
\$01	\$91	Multiply by 0.004	No dimension	Rich to lean delay level
\$01	\$92	Multiply by 0.001	Second	Rich / lean time ratio
\$01	\$A3	Multiply by 0.004	No dimension	Lean to rich delay level

\$01	\$A4	Multiply by 0.001	Second	Lean / rich time ratio
\$01	\$AC	Multiply by 0.001	Second	Waiting time for rich side
\$01	\$AD	Multiply by 0.001	Second	Rich / lean time difference
\$01	\$AE	Multiply by 0.001	Second	Waiting time for lean side
\$01	\$AF	Multiply by 0.001	Second	Lean / rich time difference

HO2 Sensor Bank 1 Sensor 2:

MONITOR ID	TEST ID	SCALING	UNIT	DESCRIPTION
\$02	\$05	Multiply by 0.004	Second	Rich to lean sensor threshold time (calculated)
\$02	\$06	Multiply by 0.004	Second	Lean to rich sensor threshold time (calculated)
\$02	\$07	Multiply by 0.005	V	Minimum sensor voltage for test cycle (calculation)
\$02	\$08	Multiply by 0.005	V	Maximum sensor voltage for test cycle (calculation)

Catalyst:

MONITOR ID	TEST ID	SCALING	UNIT	DESCRIPTION
\$21	\$89	Multiply by 0.004	No dimension	Oxygen storage capacity of catalyst

EVAP Monitor (Cap Off):

MONITOR ID	TEST ID	SCALING	UNIT	DESCRIPTION
\$39	\$93	Multiply by 0.00025	kPa	Mode B test result

EVAP Monitor (0.040"):

MONITOR ID	TEST ID	SCALING	UNIT	DESCRIPTION
\$3B	\$94	Multiply by 0.00025	kPa	Mode C test result
\$3B	\$95	Multiply by 0.00025	kPa	Mode D test result

EVAP Monitor (0.020"):

MONITOR ID	TEST ID	SCALING	UNIT	DESCRIPTION
\$3C	\$96	Multiply by 0.00025	kPa	Mode D test result
\$3C	\$97	Multiply by 0.00025	kPa	Mode E test result
\$3C	\$C1	Multiply by 0.00025	kPa	Mode 4-1 test result
\$3C	\$C2	Multiply by 0.00025	kPa	Mode 4-2 test result
\$3C	\$C3	Multiply by 0.00025	kPa	Mode 5 test result
\$3C	\$C4	Multiply by 0.00025	kPa	Mode 7 test result
\$3C	\$C5	Multiply by 0.00025	kPa	Mode 8 test result
\$3C	\$C6	Multiply by 0.01	Second	Mode 9 test result
\$3C	\$C7	Multiply by 0.00025	kPa	Mode 13 test result

\$3C	\$C8	Multiply by 0.00025	kPa	Mode 15-1 test result
\$3C	\$C9	Multiply by 0.00025	kPa	Mode 15-2 test result
\$3C	\$CA	Multiply by 0.00025	kPa	Mode 16 test result

Purge Flow Monitor:

MONITOR ID	TEST ID	SCALING	UNIT	DESCRIPTION
\$3D	\$98	Multiply by 0.00025	kPa	0.04" mode Z test result
\$3D	\$CB	Multiply by 0.01	Second	Test 1 result
\$3D	\$CC	Multiply by 0.00025	kPa	Test 2 result

A/F Sensor Heater Bank 1 Sensor 1:

MONITOR ID	TEST ID	SCALING	UNIT	DESCRIPTION
\$41	\$9B	Multiply by 1	Time	Oxygen sensor heater test result

Oxygen Sensor Heater Bank 1 Sensor 2:

MONITOR ID	TEST ID	SCALING	UNIT	DESCRIPTION
\$42	\$A2	Multiply by 1	Ω	A/F sensor heater impedance

Misfire:

MONITOR ID	TEST ID	SCALING	UNIT	DESCRIPTION
\$A1	\$0B	Multiply by 1	Time	Total EWMA misfire count of all cylinders in last ten driving cycles
\$A1	\$0C	Multiply by 1	Time	<ul style="list-style-type: none"> When ignition switch ON, total misfire count of all cylinders in last driving cycle is displayed. While engine is running, total misfire count of all cylinders in current driving cycle is displayed.
\$A2	\$0B	Multiply by 1	Time	Total EWMA* misfire count of cylinder 1 in last ten driving cycles
\$A2	\$0C	Multiply by 1	Time	<ul style="list-style-type: none"> When ignition switch ON, total misfire count of cylinder 1 in last driving cycle is displayed. While engine is running, total misfire count of cylinder 1 in current driving cycle is displayed.
\$A3	\$0B	Multiply by 1	Time	Total EWMA* misfire count of cylinder 2 in last ten driving cycles
\$A3	\$0C	Multiply by 1	Time	<ul style="list-style-type: none"> When ignition switch ON, total misfire count of cylinder 2 in last driving cycle is displayed. While engine is running, total misfire count of cylinder 2 in current driving cycle is displayed.

\$A4	\$OB	Multiply by 1	Time	Total EWMA* misfire count of cylinder 3 in last ten driving cycles
\$A4	\$OC	Multiply by 1	Time	<ul style="list-style-type: none"> • When ignition switch ON, total misfire count of cylinder 3 in last driving cycle is displayed. • While engine is running, total misfire count of cylinder 3 in current driving cycle is displayed.
\$A5	\$OB	Multiply by 1	Time	Total EWMA* misfire count of cylinder 4 in last ten driving cycles
\$A5	\$OC	Multiply by 1	Time	<ul style="list-style-type: none"> • When ignition switch ON, total misfire count of cylinder 4 in last driving cycle is displayed. • While engine is running, total misfire count of cylinder 4 in current driving cycle is displayed.

HINT:

*: EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles (calculated)
 Calculation: $0.1 \times (\text{current counts}) + 0.9 \times (\text{previous average})$ Initial value for (previous average) = 0



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000SXS076X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

- In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.
- The actual values may differ from the values listed in the chart under "Results of real-vehicle check" due to climate, weather conditions, etc.

HINT:

Normal Condition: If no conditions are specifically stated for "idling", the shift lever should be in P, N or neutral, the A/C switch should be off and all accessory switches should be off.

- Warm up the engine.
- Turn the A/C switch off.
- Turn the ignition switch off.
- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Data List.

HINT:

- To display the list box, press the pull down menu button next to Primary. Then select a measurement group.
- When you select a measurement group, the ECU data belonging to that group is displayed.
- Measurement Group List / Description
 - All Data / All data
 - Primary / -
 - Engine Control / Engine control system related data
 - Gas General / -
 - Gas AF Control / Air fuel ratio control system related data
 - Gas AF O2 Sensor / Air fuel ratio sensor and heated oxygen sensor related data
 - Gas Throttle / Gasoline throttle system related data
 - Gas Intake Control / Intake control system related data
 - Gas Valve Control / Valve control system related data
 - Gas Misfire / "Misfire" related data
 - Gas Starting / "Difficult to start" related data
 - Gas Rough Idle / "Rough idle" related data

- Gas Evaporative / Evaporative system related data
- o Gas CAT Converter / Catalyst converter related data
- o Check Mode / Check mode related data
- o Monitor Status / Monitor status related data
- o Ignition / Ignition system related data
- o Charging Control / Charging control system related data
- o Compression / Data used during "Check the Cylinder Compression" Active Test
- o AT / Continuously variable transaxle system related data
- o Vehicle Information / Vehicle information

(h) According to the display on the Techstream, read the Data List.

HINT:

- The title used for each group of Data List items in this repair manual does not appear on the Techstream. However, the name in parentheses after the title, which is a Measurement Group, does appear on the Techstream. When the name shown in parentheses is selected on the Techstream, all the Data List items listed for that group will be displayed.
- "Result of real-vehicle check" is the assessment of one vehicle. Use it only for reference.

2. Various Vehicle Conditions 1 (All Data)

Vehicle Speed

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Vehicle Speed	Vehicle speed/ Min.: 0 km/h (0 mph), Max.: 255 km/h (158 mph)	Actual vehicle speed	Yes
	Diagnostic Note: <ul style="list-style-type: none"> • This is the current vehicle speed • The vehicle speed is detected using the wheel speed sensors. <ul style="list-style-type: none"> o Vehicle speed data is delayed when it is displayed. Therefore, even if the vehicle speed listed in the freeze frame data is 0 km/h (0 mph), this does not always mean that the malfunction occurred when the vehicle was stopped. o To accurately confirm whether the vehicle was stopped or not, use "SPD (SP2)" which is the transmission output speed. 		

Engine Speed

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Engine Speed	Engine speed/ Min.: 0 rpm, Max.: 16383 rpm	650 to 800 rpm: Idling	Yes
	Diagnostic Note: When the crankshaft position sensor is malfunctioning, "Engine Speed" is approximately 0 or varies greatly from the actual engine speed.		

Calculate Load

TESTER	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
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DISPLAY			
Calculate Load	Load calculated by ECM/ Min.: 0%, Max.: 100%	15 to 40%: Idling	Yes
	Diagnostic Note: This is the engine load calculated based on the estimated intake manifold pressure. Calculate Load = Estimated intake manifold pressure / maximum intake manifold pressure x 100 (%) (For example, when the estimated intake manifold pressure is the same as atmospheric pressure, Calculate Load is 100%.)		

Vehicle Load

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Vehicle Load	Vehicle load/ Min.: 0%, Max.: 25700%	-	Yes
	Diagnostic Note: This is the engine intake air charging efficiency. Vehicle Load = Current intake airflow (g/rev.) / maximum intake airflow Maximum intake airflow = Displacement (L) / 2 x 1.2 (g/rev.) HINT: Due to individual engine differences, intake air temperature, etc., the value may exceed 100%. Intake airflow (g/rev.) = Intake airflow (gm/sec) x 60 / Engine speed (rpm) (Intake airflow (gm/sec) is MAF)		

MAF

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
MAF	Airflow rate from Mass Air Flow (MAF) meter/ Min.: 0 gm/sec, Max.: 655.35 gm/sec	1.0 to 3.0 gm/sec: Idling 8 to 13 gm/sec: 3000 rpm (without load)	Yes
	Diagnostic Note: This is the intake air amount from the mass air flow meter.		

Atmosphere Pressure

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Atmosphere	Atmospheric pressure/ Min.: 0 kPa (0 mmHg), Max.: 255 kPa (1912 mmHg)	Equivalent to atmospheric pressure (absolute pressure): Ignition switch ON	Yes

Pressure	Diagnostic Note: <ul style="list-style-type: none"> • This value is calculated from the intake air amount. • Standard atmospheric pressure: 101 kPa (757 mmHg) • For every 100 m increase in altitude, pressure drops by 1 kPa. This varies by weather.
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MAP

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
MAP	intake manifold pressure/ Min.: 0 kPa (0 mmHg), Max.: 255 kPa (1912 mmHg)	80 to 110 kPa: Ignition switch ON 20 to 48 kPa: Idling (A/C off)	Yes
	Diagnostic Note: Intake manifold pressure is calculated by manifold absolute pressure sensor.		

Engine Oil Temperature Sensor

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Engine Oil Temperature Sensor	Engine oil temperature/ Min.: -40°C, Max.: 215°C	More than 85°C (185°F): After warming up	Yes
	Diagnostic Note: Engine oil temperature is calculated by engine oil temperature sensor.		

Coolant Temp

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Coolant Temp	Coolant temperature/ Min.: -40°C, Max.: 215°C	75 to 100°C (167 to 212°F): After warming up	Yes
	Diagnostic Note: This is the engine coolant temperature. <p>HINT:</p> <ul style="list-style-type: none"> • After warming up the engine, the engine coolant temperature is 75 to 100°C. • After a long soak, the engine coolant temperature, intake air temperature and ambient air temperature are approximately equal. • If the value is -40°C (-40°F) or higher than 215°C (419°F), the sensor circuit may be open or shorted. 		

Intake Air

TESTER	MEASUREMENT	NORMAL CONDITION	STORED AS FREEZE
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DISPLAY	ITEM/RANGE		FRAME DATA
Intake Air	Intake air temperature/ Min.: -40°C, Max.: 215°C	Equivalent to temperature at location of mass air flow meter: Ignition switch ON	Yes
	Diagnostic Note: This is the intake air temperature. HINT: <ul style="list-style-type: none"> • After a long soak, the engine coolant temperature, intake air temperature and ambient air temperature are approximately equal. • If the value is -40°C (-40°F) or higher than 215°C (419°F), the sensor circuit is open or shorted. 		

Ambient Temperature

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Ambient Temperature	Ambient temperature/ Min.: -40°C, Max.: 215°C	Equivalent to ambient air temperature: Ignition switch ON	Yes
	Diagnostic Note: This is the ambient temperature. HINT: <ul style="list-style-type: none"> • After a long soak, the engine coolant temperature, intake air temperature and ambient air temperature are approximately equal. 		

Engine Run Time

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Engine Run Time	Engine run time/ Min.: 0 s, Max.: 65535 s	Time after engine start	Yes
	Diagnostic Note: This is the time elapsed since the engine started. HINT: The time is counted only while the engine is running.		

Initial Engine Coolant Temp

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
	Initial engine coolant temperature/	-	Yes

Initial Engine Coolant Temp	Min.: -40°C, Max.: 119.3°C		
	Diagnostic Note: This is the coolant temperature stored when the ignition switch is turned to ON.		

Initial Intake Air Temp

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Initial Intake Air Temp	Initial intake air temperature/ Min.: -40°C, Max.: 119.3°C	-	Yes
	Diagnostic Note: This is the intake air temperature stored when the ignition switch is turned to ON.		

Battery Voltage

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Battery Voltage	Battery voltage/ Min.: 0 V, Max.: 65.535 V	11 to 14 V: Idling	Yes
	Diagnostic Note: If 11 V or less, characteristics of some electrical components may change.		

3. Throttle Control 1 (Gas Throttle)

Accelerator Position

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Accelerator Position	Accelerator pedal position/ Min.: 0%, Max.: 399.9%	Actual accelerator pedal position	No
	Diagnostic Note: This is the accelerator pedal position defined using the learned fully released position (sensor output) of accelerator pedal position sensor as 0% and the fully depressed position as 100%.		

Accel Sens. No.1 Volt %

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Accel Sens. No.1 Volt %	Absolute Accelerator Pedal Position (APP) No. 1/ Min.: 0%, Max.: 100%	10 to 20%: Accelerator pedal released 50 to 70%: Accelerator pedal fully depressed	Yes
	Diagnostic Note: The accelerator pedal position sensor No. 1 output is converted using 5 V = 100%. HINT: If there are no accelerator pedal position sensor DTCs stored, it is possible to conclude		

that the accelerator pedal position sensor system is normal.

Accel Sens. No.2 Volt %

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Accel Sens. No.2 Volt %	Absolute APP No. 2/ Min.: 0%, Max.: 100%	10 to 20%: Accelerator pedal released 50 to 70%: Accelerator pedal fully depressed	Yes
	Diagnostic Note: The accelerator pedal position sensor No. 2 output is converted using 5 V = 100%.		

Accel Sensor Out No.1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Accel Sensor Out No.1	APP sensor No. 1 voltage/ Min.: 0 V, Max.: 4.980 V	0.5 to 0.8 V: Accelerator pedal released 2.4 to 3.5 V: Accelerator pedal fully depressed	No
	Diagnostic Note: This is the raw voltage from the accelerator pedal position sensor No. 1.		

Accel Sensor Out No.2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Accel Sensor Out No.2	APP sensor No. 2 voltage/ Min.: 0 V, Max.: 4.980 V	0.5 to 0.8 V: Accelerator pedal released 2.4 to 3.5 V: Accelerator pedal fully depressed	No
	Diagnostic Note: This is the raw voltage from the accelerator pedal position sensor No. 2. Accelerator pedal position sensor No. 2 is used to monitor accelerator pedal position sensor No. 1. When there is a malfunction in sensor No. 1, the ECM uses sensor No. 2 to control the engine.		

Accelerator Idle Position

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Accelerator Idle Position	Whether or not accelerator pedal position sensor detecting released accelerator pedal/ ON or OFF	ON: Accelerator pedal released	No
	Diagnostic Note: This is a parameter calculated by the ECM which indicates whether the accelerator pedal		

is in the learned idle position.

Accel Fully Close Learn #1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Accel Fully Close Learn #1	Accelerator fully released learned value No. 1/ Min.: 0 deg, Max.: 124.5 deg	2.5 to 6.5 deg: Ignition switch ON	No
	Diagnostic Note: This is the value of accelerator pedal position sensor No. 1 learned when the accelerator pedal is released.		

Accel Fully Close Learn #2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Accel Fully Close Learn #2	Accelerator fully released learned value No. 2/ Min.: 0 deg, Max.: 124.5 deg	2.5 to 6.5 deg: Ignition switch ON	No
	Diagnostic Note: This is the value of accelerator pedal position sensor No. 2 learned when the accelerator pedal is released.		

Throttle Sensor Volt %

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Throttle Sensor Volt %	Absolute throttle position sensor/ Min.: 0%, Max.: 100%	<ul style="list-style-type: none"> • 10 to 22%: Throttle fully closed • 80 to 90%: Throttle fully open 	Yes
	Diagnostic Note: The throttle position sensor No. 1 output is converted using 5 V = 100%.		

Throttl Sensor #2 Volt %

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Throttl Sensor #2 Volt %	Throttle sensor position #2/ Min.: 0%, Max.: 100%	<ul style="list-style-type: none"> • 35 to 45%: Throttle fully closed • 80 to 90%: Throttle fully open 	Yes
	Diagnostic Note: The throttle position sensor No. 2 output is converted using 5 V = 100%.		

ST1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
ST1	Brake pedal signal/ ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	No
Diagnostic Note: This is the stop light switch signal.			

Throttle Idle Position

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Throttle Idle Position	Whether or not throttle position sensor detecting idle/ ON or OFF	ON: Accelerator pedal released	No
Diagnostic Note: This is a parameter calculated by the ECM. The value is ON when the throttle is at the idle position and OFF when the throttle is open.			

Throttle Require Position

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Throttle Require Position	Required throttle position/ Min.: 0 V, Max.: 4.980 V	0.5 to 1.1 V: Idling at P, N or neutral (A/C off)	No
Diagnostic Note: This is a value calculated by the ECM showing the voltage for the target throttle valve position.			

Throttle Sensor Position

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Throttle Sensor Position	Throttle sensor position/ Min.: 0%, Max.: 100%	<ul style="list-style-type: none"> • 3 to 5%: Throttle fully closed • 65 to 75%: Throttle fully open 	Yes
Diagnostic Note: This is the throttle valve opening amount used for engine control. This value has no meaning when the ignition switch is ON and the engine is stopped.			

Throttle Position No. 1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Throttle Position No. 1	Throttle position sensor No. 1 output voltage/ Min.: 0 V, Max.: 4.980 V	<ul style="list-style-type: none">• 0.5 to 1.1 V: Throttle fully closed• 3.2 to 4.8 V: Throttle fully open• 0.6 to 1.4 V: Fail-safe operating	No
	Diagnostic Note: This is the throttle position sensor No. 1 output voltage.		

Throttle Position No. 2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Throttle Position No. 2	Throttle position sensor No. 2 output voltage/ Min.: 0 V, Max.: 4.980 V	<ul style="list-style-type: none">• 1.5 to 2.2 V: Throttle fully closed• 4.0 to 4.5 V: Throttle fully open• 1.9 to 2.6 V: Fail-safe operating	No
	Diagnostic Note: This is the throttle position sensor No. 2 output voltage.		

Throttle Position Command

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Throttle Position Command	Throttle position command value/ Min.: 0 V, Max.: 4.980 V	-	No
	Diagnostic Note: Throttle Position Command is the same value as Throttle Require Position.		

Throttle Sens Open Pos #1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Throttle Sens Open Pos #1	Throttle position sensor No. 1/ Min.: 0 V, Max.: 4.980 V	0.7 to 1.1 V: Ignition switch ON	No
	Diagnostic Note: This is the throttle position sensor No. 1 output voltage when there is no current supplied to the electronic throttle actuator. The accelerator pedal is released but the throttle valve is kept open by the throttle valve opener with the ignition switch ON.		

Throttle Sens Open Pos #2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Throttle Sens Open Pos #2	Throttle position sensor No. 2/ Min.: 0 V, Max.: 4.980 V	0.7 to 1.1 V: Ignition switch ON	No
	Diagnostic Note: This is the throttle position sensor No. 2 output voltage when there is no current supplied to the electronic throttle actuator. The accelerator pedal is released but the throttle valve is kept open by the throttle valve opener with the ignition switch ON.		

Throttle Motor Power Supply Relay

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Throttle Motor Power Supply Relay	Throttle motor power supply relay/ ON or OFF	ON: Ignition switch ON	Yes

Throttle Motor DUTY

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Throttle Motor DUTY	Throttle actuator/ Min.: 0%, Max.: 100%	2 to 5%: Idling at P, N or neutral (A/C off)	Yes
	Diagnostic Note: This is the output duty ratio of the throttle actuator drive circuit.		

Throttle Motor Duty (Open)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Throttle Motor Duty (Open)	Throttle actuator duty ratio (open)/ Min.: 0%, Max.: 255%	0 to 40%: Idling at P, N or neutral (A/C off)	No
	Diagnostic Note: This is the duty ratio used to drive the throttle actuator and open the throttle valve. It is an ECM command signal.		

Throttle Motor Duty (Close)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
	Throttle actuator duty ratio (close)/ Min.: 0%, Max.: 255%	0 to 40%: Idling at P, N or neutral (A/C off)	No

Throttle Motor Duty (Close)	<p>Diagnostic Note: This is the duty ratio used to drive the throttle actuator and close the throttle valve. It is an ECM command signal.</p> <p>HINT: During idling, the throttle valve opening angle is usually controlled using a duty ratio drive signal which closes the throttle valve. However, when carbon deposits build up, it may be necessary to open the throttle valve more than the throttle valve opener does. In that case, the opening angle is controlled using a "Throttle Motor Duty (Open)" signal which opens the throttle valve.</p>
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Throttle Fully Close Learn

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Throttle Fully Close Learn	Throttle valve fully closed (learned value)/ Min.: 0 V, Max.: 4.980 V	0.35 to 0.85 V: Ignition switch ON	No
	Diagnostic Note: <ul style="list-style-type: none"> The ECM uses this learned value to determine the fully closed (and fully open) position of the throttle valve. Learning is performed immediately after the ignition switch is turned to ON. 		

+BM Voltage

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
+BM Voltage	+BM voltage/ Min.: 0 V, Max.: 79.998 V	11 to 14 V: Ignition switch ON	No
	Diagnostic Note: This is the power supply for the electronic throttle actuator.		

Actuator Power Supply

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Actuator Power Supply	Actuator power supply/ ON or OFF	ON: Ignition switch ON	No
	Diagnostic Note: If +BM power is lost, this item changes to OFF.		

Throttle Position

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
	Throttle valve opening angle/		

Throttle Position	Min.: 0 deg, Max.: 499.99 deg	-	Yes
Diagnostic Note: This value has no meaning when the ignition switch is ON and the engine is stopped.			

4. Idle Speed Control (Gas Rough Idle)

ISC Flow

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
ISC Flow	Flow rate calculated using information from each sensor/ Min.: 0 g/s, Max.: 299.99 g/s	-	Yes
	Diagnostic Note: This is the total ISC airflow amount (the amount of intake air necessary to maintain idling). HINT: ISC Flow (total ISC airflow amount) = ISC Learning Value + ISC Feedback Value + each compensation amount		

ISC Position

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
ISC Position	Requested throttle opening amount calculated using ISC control/ Min.: 0 deg, Max.: 499.99 deg	-	Yes
	Diagnostic Note: This is the throttle valve opening amount while the engine is idling (the throttle valve opening amount necessary to maintain ISC air flow).		

ISC Feedback Value

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
ISC Feedback Value	ISC feedback amount/ Min.: -150 g/s, Max.: 149.99 g/s	-	Yes
	Diagnostic Note: This is the feedback amount necessary to adjust the airflow amount to maintain the target idling speed. HINT: When the idling speed differs from the target, the feedback amount is adjusted. If the feedback amount becomes more than a certain value, this will be reflected in the ISC learned airflow value.		

ISC Learning Value

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
ISC Learning Value	ISC learned airflow value/ Min.: -150 g/s, Max.: 149.99 g/s	-	Yes
	Diagnostic Note: This is the learned value of the airflow amount necessary for engine idling. HINT: <ul style="list-style-type: none"> If ISC Feedback Value becomes more than a certain value, this will be reflected in ISC Learning Value. ISC Flow (total ISC airflow amount) = ISC Learning Value + ISC Feedback Value + each compensation amount 		

Electric Load Feedback Val

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Electric Load Feedback Val	Compensation flow rate according to electrical load/ Min.: -150 g/s, Max.: 149.99 g/s	-	Yes
	Diagnostic Note: This is the ISC compensation amount determined according to the electrical load.		

Air Conditioner FB Val

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Air Conditioner FB Val	Compensation flow rate according to air conditioner load/ Min.: -150 g/s, Max.: 149.99 g/s	-	Yes
	Diagnostic Note: This is the ISC compensation amount determined according to the air conditioner load.		

Deposit Loss Flow

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Deposit	Flow loss due to deposits/ Min.: -150 g/s, Max.: 149.99 g/s	-	Yes
	Diagnostic Note: <ul style="list-style-type: none"> This value indicates the amount of compensation for a decrease in flow passage area due to the buildup of deposits on the throttle valve. Check this value for reference when the engine stalls, is difficult to start, or idles roughly. 		

Loss Flow	<p>When the ISC learned value is initialized by disconnecting the battery negative terminal or removing the EFI(+B) fuse , performing the following procedures in order to quickly relearn the Deposit Loss Flow value. After the Deposit Loss Flow has been relearned, gradual fine adjustments will continue automatically.</p> <ul style="list-style-type: none"> ○ Start the engine cold and allow the engine to idle. ○ After the engine is warmed up (engine coolant temperature is above 80°C [176°F]), allow the engine to idle for an additional 5 minutes. ○ Turn the ignition switch off and wait for 30 seconds. ○ Start the engine again, and allow the engine to idle for 5 minutes.
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5. Fuel System (Gas General)

Fuel Press

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Fuel Press	Fuel pressure/ Min.: 0 kPa (0 kgf/cm ² , 0 psi), Max.: 655350 kPa (6683 kgf/cm ² , 95050 psi)	3000 to 5000 kPa (30.6 to 51.0 kgf/cm ² , 435 to 725 psi): Idling at P, N or neutral after warming up (A/C off)	Yes
Diagnostic Note: This item indicates the fuel pressure on the high-pressure side.			

Fuel Pump Duty

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Fuel Pump Duty	Fuel pump duty/ Min.: 0%, Max.: 399.9%	20 to 70%: Idling	Yes

Fuel Level Sensor Impedance

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Fuel Level Sensor Impedance	Fuel Level Sensor Impedance/ Min.: 0 Ohm, Max.: 511.5 Ohm	About 100 Ohm: Fuel receiver gauge is F position	No

Injector (Port)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Injector (Port)	Injection period of the No. 1 cylinder/ Min.: 0 μs, Max.: 65535 μs	1000 to 2000 μs Idling after warming up	Yes
Diagnostic Note: This is the injection period of the No. 1 cylinder (the command value from the ECM).			

Injection Volum (Cylinder 1)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Injection Volum (Cylinder 1)	Injection volume (cylinder 1)/ Min.: 0 ml, Max.: 2.047 ml	0 to 0.15 ml: Idling after warming up	Yes
	Diagnostic Note: This is the fuel injection volume for 10 injections.		

Fuel Pressure Target Value

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Fuel Pressure Target Value	Target fuel pressure/ Min.: 0 MPa, Max.: 65.535 MPa	<ul style="list-style-type: none"> • 3 to 5 MPa (31 to 51 kgf/cm², 435 to 725 psi): Idling after warming up • 7 to 9 MPa (72 to 91 kgf/cm², 1024 to 8924 psi): 2500 rpm (without load) 	Yes
	Diagnostic Note: This item indicates the target fuel pressure for the high-pressure fuel pump.		

HP FP Discharge Rate

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
HP FP Discharge Rate	Fuel volume required by the high pressure fuel pump/ Min.: 0 ml, Max.: 2.047 ml	0.04 to 0.08 ml: Idling at P, N or neutral after warming up (A/C off)	Yes
	Diagnostic Note: This item indicates the high-pressure fuel pump discharge amount.		

Injection Way

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Injection Way	Injection mode/ Port / Direct / Either	-	Yes
	Diagnostic Note: This item indicates the injection mode.		

Injection Switching Status

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA

Injection Switching Status	Prohibition of changing the D-4S injection method/ OK or NG	-	Yes
	Diagnostic Note: This item indicates whether the Control the Injection Way Active Test is prohibited.		

Injection Timing (D4)


TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Injection Timing (D4)	Injection timing/ Min.: -3277 deg(CA), Max.: 3276.7 deg(CA)	320 to 340 deg(CA): Idling at P, N or neutral after warming up (A/C off)	Yes
	Diagnostic Note: This item indicates the injection timing of the main injector.		

Injection Time (D4)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Injection Time (D4)	Injection time/ Min.: 0 μ s, Max.: 65535 μ s	0 to 2000 μ s: Idling at P, N or neutral after warming up (A/C off)	Yes
	Diagnostic Note: This item indicates the last injection time of the injector for the number 1 cylinder.		

6. EVAP System 1 (All Data)

Vacuum Pump

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Vacuum Pump	Key-off EVAP system pump status/ ON or OFF	-	Yes
	Diagnostic Note: This item changes to ON during the key-off EVAP monitor which is performed approximately 5 hours after the ignition switch is turned off  .		

7. EVAP System 2 (Gas Evaporative)

EVAP (Purge) VSV

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
	Purge valve control duty/ Min.: 0%, Max.: 100%	-	Yes
	Diagnostic Note: <ul style="list-style-type: none"> This is the command signal from the ECM. 		

EVAP (Purge) VSV	<ul style="list-style-type: none"> This is the purge valve control duty ratio. When EVAP (Purge) VSV is any value except 0%, EVAP purge* is being performed. *: Gasoline vapor from the fuel tank is being introduced into the intake system via the purge VSV. When the engine is cold or immediately after the engine is started, EVAP (Purge) VSV is 0%.
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Evap Purge Flow

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Evap Purge Flow	Purge flow/ Min.: 0%, Max.: 399.9%	-	Yes
	Diagnostic Note: This is the percentage of total engine airflow contributed by EVAP purge operation. (Evap Purge Flow = Purge flow / Engine airflow x 100 (%))		

Purge Density Learn Value

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Purge Density Learn Value	Purge density learned value/ Min.: -200%, Max.: 199.993%	-	Yes
	Diagnostic Note: Purge Density Learn Value is the proportion of the decrease in injection volume (based on the change in the air fuel ratio feedback compensation value) related to a 1% purge flow rate. When Purge Density Learn Value is a large negative value, the purge effect is large. The purge density is determined from the change in the air fuel ratio feedback compensation value when purge flow is introduced. Purge density learning is performed so that the feedback compensation value is 0 +/-2%. HINT: <ul style="list-style-type: none"> Usually, the value is approximately +/-1%. 1%: The concentration of HC in the purge gas is relatively low. 0%: The concentration of HC in the purge gas is approximately equal to the stoichiometric air fuel ratio. Large negative values indicate that the concentration of HC in the purge gas is relatively high. 		

Vapor Pressure Pump

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
	Vapor pressure/ Min.: 0 kPa (0 mmHg), Max.: 1441.77 kPa (10814.17 mmHg)	Approximately 100 kPa (750 mmHg): Ignition switch ON	No
	Diagnostic Note: This is the EVAP system pressure monitored by the canister pressure sensor.		

Vapor Pressure Pump	<p>HINT:</p> <ul style="list-style-type: none"> • Except for when the monitor is running, this value should be approximately the same as atmospheric pressure. • As Vapor Pressure Pump is almost the same as Atmosphere Pressure when the engine is stopped, these items can be used to help determine if the canister pressure sensor characteristics are abnormal, if there is noise, or if the sensor output is stuck at a certain value.
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EVAP System Vent Valve

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
EVAP System Vent Valve	Key-off EVAP system vent valve status/ ON or OFF	OFF: Vent ON: Close	Yes

EVAP Purge VSV

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
EVAP Purge VSV	VSV status for EVAP control/ ON or OFF	-	Yes
Diagnostic Note: This parameter displays ON when EVAP (Purge) VSV is 30% or more, and displays OFF when the VSV duty ratio is less than 30%.			

Purge Cut VSV Duty

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Purge Cut VSV Duty	Purge valve duty/ Min.: 0%, Max.: 399.9%	-	Yes
Results of real-vehicle check: <ul style="list-style-type: none"> • Idling (warm up the engine): 0.0% • Running without load (3000 rpm): 33.3% 			

8. Air Fuel Ratio Control 1 (All Data)

Target Air-Fuel Ratio

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Target Air-Fuel	Target air fuel ratio/ Min.: 0, Max.: 1.99	0.8 to 1.2: During idling	Yes
Diagnostic Note: This is the target air fuel ratio used by the ECM.			

Ratio	1.0 is the stoichiometric air fuel ratio. Values that are more than 1 indicate the system attempting to make the air fuel ratio leaner. Values that are less than 1 indicate the system attempting to make the air fuel ratio richer. Target Air-Fuel Ratio and AF Lambda B1S1 are related.
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9. Air Fuel Ratio Control 2 (Gas AF O2 Sensor)

AF Lambda B1S1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
AF Lambda B1S1	Output air fuel ratio associated/ Min.: 0, Max.: 1.999	<ul style="list-style-type: none"> Value less than 1 (0.000 to 0.999) = Rich 1 = Stoichiometric air fuel ratio Value more than 1 (1.001 to 1.999) = Lean 	Yes
	Diagnostic Note: This is the actual air fuel ratio calculated based on the air fuel ratio sensor output. Performing the "Control the Injection Volume" or "Control the Injection Volume for A/F Sensor" function of the Active Test enables the technician to check the voltage output of the sensor.		

AFS Voltage B1S1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
AFS Voltage B1S1	Air fuel ratio sensor output voltage/ Min.: 0 V, Max.: 7.999 V	About 2.2 V: Idling (warming up the engine)	Yes
	Diagnostic Note: <ul style="list-style-type: none"> This is the voltage output of the air fuel ratio sensor (the voltage cannot be measured at the terminals of the sensor). This value is calculated by the ECM based on the current output of the air fuel ratio sensor (refer to AFS Current B1S1 below for the actual sensor output). Performing the "Control the Injection Volume" or "Control the Injection Volume for A/F Sensor" function of the Active Test enables the technician to check the voltage output of the sensor. 		

AFS Current B1S1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
AFS Current B1S1	Air fuel ratio sensor output current / Min.: -128 mA, Max.: 127.99 mA	-0.5 to 0.5 mA: Idling	Yes
	Diagnostic Note: <ul style="list-style-type: none"> With a stoichiometric air fuel ratio (for example, during idling after the engine is 		

warmed up), the air fuel ratio sensor current output is approximately -0.5 to 0.5 mA.

- When the value is outside the range of 0.7 to 2.2 mA when the fuel-cut is being performed, there is a malfunction in the air fuel ratio sensor or sensor circuit.

A/F Sensor Impedance B1S1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
A/F Sensor Impedance B1S1	Air fuel ratio sensor impedance/ Min.: 0 Ohm, Max.: 6553.5 Ohm	About 32 Ohm: Idling after warming up	Yes

A/F Heater Duty #1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
A/F Heater Duty #1	Air fuel ratio sensor heater duty ratio/ Min.: 0%, Max.: 399.9%	0 to 100%	Yes
	Diagnostic Note: When the value is any value except 0%, current is being supplied to the heater.		

O2S B1S2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
O2S B1S2	Heated oxygen sensor output voltage / Min.: 0 V, Max.: 1.275 V	0 to 0.9 V: Vehicle driven at constant speed of 70 km/h (44mph)	Yes
	Diagnostic Note: This is the output voltage of the heated oxygen sensor. Values close to 0 V indicate an air fuel ratio leaner than the stoichiometric ratio. Values close to 1 V indicate an air fuel ratio richer than the stoichiometric ratio. During air fuel ratio feedback control, the value moves back and forth in the range of 0 to 1 V. Performing the "Control the Injection Volume" or "Control the Injection Volume for A/F Sensor" function of the Active Test enables the technician to check voltage output of the sensor.		

O2 Heater B1S2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
O2 Heater B1S2	Heated oxygen sensor heater/ Not Act or Active	-	Yes

O2 Sensor Heater Duty

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
O2 Sensor Heater Duty	Oxygen sensor heater duty ratio/ Min.: 0%, Max.: 400%	0 to 100%	Yes
Diagnostic Note: When the vehicle is any valve except 0%, current is being supplied to the heater.			

Short FT #1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Short FT #1	Short-term fuel trim / Min.: -100%, Max.: 99.2%	-15 to +15%	Yes
Diagnostic Note: This item is the "short-term fuel injection volume compensation ratio" used to maintain the air fuel ratio at the stoichiometric ratio using the air fuel ratio sensor for feedback.			

Long FT #1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Long FT #1	Long-term fuel trim / Min.: -100%, Max.: 99.2%	-15 to +15%	Yes
Diagnostic Note: The ECM will learn the Long FT values based on Short FT. The goal is to keep Short FT at 0% to keep the A/F mixture at the stoichiometric ratio. This value is used to determine whether the system related to air fuel ratio control is malfunctioning. The condition of the system is determined based on the sum of Short FT and Long FT (excluding times when the system is in transition).			
<ul style="list-style-type: none"> • +15% or more: There may be a lean air fuel ratio. • -15 to +15%: The air fuel ratio can be determined to be normal. • -15% or less: There may be a rich air fuel ratio. • The learned value is cleared when the battery cable is disconnected. • Air fuel ratio feedback leaning is divided up according to the engine operating range (engine speed * load), and separate value are stored for each operating range. "Long FT #1" indicates the learned value for the current operating range. [A/F Learn Value Idle #1], [A/F Learn Value Low #1], [A/F Learn Value Mid1 #1], [A/F Learn Value Mid2 #1] and [A/F Learn Value High #1] indicate the leaned values for the different operating ranges. The learned value that is the same as "Long FT #1" indicates the current engine operating range. 			

Fuel System Status #1

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Fuel System Status #1	Fuel system status/ ON or OFF	-	Yes

10. Ignition System (Ignition)

IGN Advance

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
IGN Advance	Ignition timing advance for No. 1 cylinder/ Min.: -64 deg., Max.: 63.5 deg.	BTDC -5 to 10 deg.: Idling at N position	Yes

Knock Feedback Value

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Knock Feedback Value	Knocking feedback value/ Min.: -1024 deg(CA), Max.: 1023.9 deg(CA)	-	Yes
	<p>Diagnostic Note: This is the ignition timing retard compensation amount determined by the presence or absence of knocking. Ignition timing = Most retarded timing value*1 + Knock Correct Learn Value*2 + Knock Feedback Value*3 Example: 21 deg(CA) = 10° + 14° - 3° *1: The most retarded timing value is a constant determined by the engine speed and engine load. *2: The knock correction learned value is calculated as shown below in order to keep Knock Feedback Value as close to -3 deg(CA) as possible. When Knock Feedback Value is less than -4 deg(CA), Knock Correct Learn Value is slowly decreased. When Knock Feedback Value is more than -2 deg(CA), Knock Correct Learn Value is slowly increased. *3: The base value is -3 deg(CA) and is adjusted based on the presence or absence of knocking. When there is no knocking, the value is increased, and when knocking is present, the value is decreased.</p> <p>HINT:</p> <p>If Knock Feedback Value does not change around the time when knocking occurs even though knocking continues (for example, stays at -3 deg(CA)), it can be determined that knocking is not being detected.</p> <p>Possible Causes:</p> <ul style="list-style-type: none"> • There is a problem with the knock sensor sensitivity. • The knock sensor is improperly installed. • There is a problem with a wire harness. 		

Knock Correct Learn Value

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Knock Correct Learn Value	Knocking correction learned value/ Min.: -1024 deg(CA), Max.: 1023.9 deg(CA)	-	Yes
	<p>Diagnostic Note: Refer to "Knock Feedback Value". When there is knocking or a lack of power, compare the following values to another vehicle of the same model.</p> <ul style="list-style-type: none"> • Engine speed • Calculate Load • IGN Advance • Knock Feedback Value • Knock Correct Learn Value <p>Knock Correct Learn Value is large: There is no knocking and the ignition timing is advanced. Knock Correct Learn Value is small: Knocking is present and the ignition timing is being retarded.</p> <p>HINT:</p> <p>When knocking continues even though Knock Correct Learn Value is less than that of the vehicle being used for comparison (in other words, the ignition timing is being retarded but the knocking is not stopping), there may be a buildup of deposits or other such problems due to deterioration over time (oil entering the cylinders, poor quality fuel, etc.).</p>		

Idle Spark Advn Ctrl #1 to #4

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Idle Spark Advn Ctrl #1 Idle Spark Advn Ctrl #2 Idle Spark Advn Ctrl #3 Idle Spark Advn Ctrl #4	Individual cylinder timing advance compensation amount (No. 1 to No. 4)/ Min.: -16 deg(CA), Max.: 15.875 deg(CA)	-	Yes
	<p>Diagnostic Note:</p> <ul style="list-style-type: none"> • This is the ignition timing advance compensation amount used to stabilize idling (each cylinder has a separate value). When the speed for a certain cylinder drops, the system advances the timing for that particular cylinder in an attempt to restore the speed and stabilize idling. • It may be possible to use this item to help determine specific cylinders which are not operating normally. 		

11. VVT Control 1 (All Data)

VVT Aim Angle #1, #2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
VVT Aim Angle #1, #2	VVT hold duty learned value for bank 1 (bank 2)/ Min.: 0%, Max.: 399.9%	-	Yes
	Diagnostic Note: This value represents the duty ratio necessary to operate the camshaft timing oil control valve in order to block the camshaft timing oil control valve path and maintain the advanced state of the VVT controller. This is only available during the Active Test.		

VVT Change Angle #1, #2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
VVT Change Angle #1, #2	VVT displacement angle for bank 1 (bank2)/ Min.: -320 DegFR, Max.: 320 DegFR	-	Yes
	Diagnostic Note: This is the VVT displacement angle during forced operation. This is only available during the Active Test. By checking the VVT Change Angle during the Active Test, it is also possible to determine whether or not the camshaft position sensor signal is being output.		

VVT OCV Duty #1, #2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
VVT OCV Duty #1, #2	VVT camshaft timing oil control valve operation duty for bank 1 (bank2)/ Min.: 0%, Max.: 399.9%	-	Yes
	Diagnostic Note: This is the requested duty value for forced operation. This is only available during the Active Test.		

VVT Ex Hold Lrn Val #1, #2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
VVT Ex Hold Lrn Val #1, #2	VVT exhaust hold duty ratio learned value for bank 1 (bank2)/ Min.: 0%, Max.: 399.9%	-	Yes
	Diagnostic Note: This value represents the duty ratio necessary to operate the camshaft timing oil control valve in order to block the camshaft timing oil control valve path and maintain the advanced state of the VVT controller. This is only available during the Active Test.		

VVT Ex Chg Angle #1, #2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
VVT Ex Chg Angle #1, #2	VVT exhaust displacement angle for bank 1 (bank2)/ Min.: 0 DegFR, Max.: 639.9 DegFR	-	Yes
Diagnostic Note: This is the displacement angle during forced operation. This is only available during the Active Test.			

VVT Ex OCV Duty #1, #2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
VVT Ex OCV Duty #1, #2	VVT exhaust camshaft timing oil control valve duty for bank 1 (bank2)/ Min.: 0%, Max.: 399.9%	-	No
Diagnostic Note: This is the requested duty value for forced operation. This is only available during the Active Test.			

Target VVT Angle #1, #2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Target VVT Angle #1, #2	Target VVT angle for bank 1 (bank2)/ Min.: -320 DegFR, Max.: 320 DegFR	-	Yes
Diagnostic Note: This is only available during the Active Test.			

Target VVT Ex Angle #1, #2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Target VVT Ex Angle #1, #2	Target VVT exhaust angle for bank 1 (bank2)/ Min.: 0 DegFR, Max.: 640 DegFR	-	Yes
Diagnostic Note: This is only available during the Active Test.			

VVT OCV Current #1, #2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
	VVT camshaft timing oil control valve	0.55 to 0.85 A: Idling	

VVT OCV Current #1, #2	output current for bank 1 (bank2)/ Min.: 0 A, Max.: 1.99 A	after warming up	Yes
Diagnostic Note: This is only available during the Active Test.			

VVT Ex OCV Current #1, #2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
VVT Ex OCV Current #1, #2	VVT exhaust camshaft timing oil control valve output current for bank 1 (bank2)/ Min.: 0 A, Max.: 1.99 A	0.55 to 0.85 A: Idling after warming up	Yes
Diagnostic Note: This is only available during the Active Test.			

12. VN Turbo (All Data)

VN Turbo Type

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
VN Turbo Type	Turbo type/ Not/Commo/Vacuum/CAN	Not	No
Diagnostic Note: This is the type of the turbo charger.			

13. Catalyst (Gas CAT Converter)

Catalyst Temp B1S1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Catalyst Temp B1S1	Catalyst temperature/ Min.: -40°C, Max.: 6513.5°C	-	Yes
Diagnostic Note: This is the temperature of the front catalyst estimated by the ECM.			

14. Various Vehicle Conditions 2 (All Data)

Starter Signal

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Starter Signal	Starter signal/ ON or OFF	ON: Starter operating OFF: Starter not operating	Yes

Starter Control

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Starter Control	Starter signal/ ON or OFF	ON: Starter operating OFF: Starter not operating	Yes

Starter Cut Relay

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Starter Cut Relay	Starter cut relay/ ON or OFF	-	Yes

ACC Relay

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
ACC Relay	ACC relay/ ON or OFF	-	Yes

Neutral Position SW Signal

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Neutral Position SW Signal	PNP switch status/ ON or OFF	ON: Shift lever in P, N or neutral	Yes

Clutch Switch

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Clutch Switch	Clutch switch status/ ON or OFF	ON: Clutch pedal depressed OFF: Clutch pedal released	Yes

Stop Light Switch

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Stop Light Switch	Stop light switch status/ ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	Yes

A/C Signal

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
A/C Signal	A/C switch status/ ON or OFF	ON: A/C on	Yes

A/C Pressure Normal SW

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
A/C Pressure Normal SW	Air conditioning pressure sensor status/ ON or OFF	ON: Air conditioning pressure sensor on	Yes

Closed Throttle Position SW

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Closed Throttle Position SW	Closed throttle position switch/ ON or OFF	<ul style="list-style-type: none"> • ON: Throttle fully closed • OFF: Throttle open 	Yes

Rear Defogger SW

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Rear Defogger SW	Rear defogger switch/ ON or OFF	ON: Rear defogger switch ON	No

Blower Fan SW

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Blower Fan SW	Blower fan switch/ ON or OFF	ON: Blower fan switch ON	No

Head Light Switch

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Head Light Switch	Head light switch/ ON or OFF	ON: light control switch tail on	No

Front Wiper Switch

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Front Wiper Switch	Front wiper switch/ ON or OFF	ON: Front wiper switch ON	No

Ignition Status

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Ignition Status	Ignition switch/ ON or OFF	ON: Ignition switch ON	Yes

Fuel Cut Condition

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Fuel Cut Condition	Fuel cut condition/ ON or OFF	ON: Fuel cut operating	Yes

15. Check Mode (Check Mode)

Check Mode

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Check Mode	Check mode/ ON or OFF	ON: Check mode on	No

16. Test Result (Monitor Status)

Monitor Information 1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE	STORED AS FREEZE FRAME DATA
NSW Test Result	N position monitor/ Compl or Incmpl	-	*1	No
OXS1 Test Result	Check mode result for heated oxygen sensor / Compl or Incmpl	-	*1	No
A/F Test Results #1	Check mode result for air fuel ratio sensor/ Compl or Incmpl	-	*1	No
Starter SW Test Result	Check mode result for starter switch/ Compl or Incmpl	-	*1	No
Complete Parts Monitor	Comprehensive component monitor/ Not Avl or Avail	-	*1	No
Fuel System Monitor	Fuel system monitor/ Not Avl or Avail	-	*1	No
Misfire Test Result	Check mode result for misfire monitor/ Not Avl or Avail	-	*1	No
EGR/VVT Monitor	EGR/VVT monitor/ Not Avl or Avail	-	*1	No
EGR/VVT Monitor	EGR/VVT monitor/ Not Avl or Avail	-	*1	No

	Compl or Incmpl			
O2S(A/FS) Heater Monitor	O2S (A/FS) heater monitor/ Not Avl or Avail	-	*1	No
O2S(A/FS) Heater Monitor	O2S (A/FS) heater monitor/ Compl or Incmpl	-	*1	No
O2S(A/FS) Monitor	O2S (A/FS) monitor/ Not Avl or Avail	-	*1	No
O2S(A/FS) Monitor	O2S (A/FS) monitor/ Compl or Incmpl	-	*1	No
A/C Monitor	A/C monitor/ Not Avl or Avail	-	*1	No
A/C Monitor	A/C monitor/ Compl or Incmpl	-	*1	No
2nd Air Monitor	2nd air monitor/ Not Avl or Avail	-	*1	No
2nd Air Monitor	2nd air monitor/ Compl or Incmpl	-	*1	No
EVAP Monitor	EVAP monitor/ Not Avl or Avail	-	*1	No
EVAP Monitor	EVAP monitor/ Compl or Incmpl	-	*1	No
Heated Catalyst Monitor	Heated catalyst monitor/ Not Avl or Avail	-	*1	No
Heated Catalyst Monitor	Heated catalyst monitor/ Compl or Incmpl	-	*1	No
Catalyst Monitor	Catalyst monitor/ Not Avl or Avail	-	*1	No
Catalyst Monitor	Catalyst monitor/ Compl or Incmpl	-	*1	No

*1:

Avail: The monitor is available on the vehicle.

Not Avl: The monitor is not available on the vehicle.

Incmpl / Compl: The item changes from Incmpl to Compl if the monitor was completed at least once at some time in the past. This item does not change when the ignition switch is turned off. However, the item changes back to Incmpl when DTCs are cleared or the battery cable is disconnected.

Monitor result (mode 06): The last judgment result is output. This is not cleared when the ignition switch is turned off, but is cleared when DTCs are cleared.

Monitor Information 2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE	STORED AS FREEZE FRAME DATA
Component Monitor ENA	Comprehensive component monitor/ Unable or Enable	-	*2	No

Component Monitor CMPL	Comprehensive component monitor/ Compl or Incmpl	-	*2	No
Fuel System Monitor ENA	Fuel system monitor/ Unable or Enable	-	*2	No
Fuel System Monitor CMPL	Fuel system monitor/ Compl or Incmpl	-	*2	No
Misfire Monitor ENA	Misfire monitor/ Unable or Enable	-	*2	No
Misfire Monitor CMPL	Misfire monitor/ Compl or Incmpl	-	*2	No
EGR/VVT Monitor ENA	EGR monitor/ Unable or Enable	-	*2	No
EGR/VVT Monitor CMPL	EGR monitor/ Compl or Incmpl	-	*2	No
Heater Monitor ENA	O2S (A/FS) heater monitor/ Unable or Enable	-	*2	No
Heater Monitor CMPL	O2S (A/FS) heater monitor/ Compl or Incmpl	-	*2	No
O2S(A/FS) Monitor ENA	O2S (A/FS) monitor/ Unable or Enable	-	*2	No
O2S(A/FS) Monitor CMPL	O2S (A/FS) monitor/ Compl or Incmpl	-	*2	No
A/C Monitor ENA	A/C monitor/ Unable or Enable	-	*2	No
A/C Monitor CMPL	A/C monitor/ Compl or Incmpl	-	*2	No
2nd Air Monitor ENA	2nd air monitor/ Unable or Enable	-	*2	No
2nd Air Monitor CMPL	2nd air monitor/ Compl or Incmpl	-	*2	No
EVAP Monitor ENA	EVAP monitor/ Unable or Enable	-	*2	No
EVAP Monitor CMPL	EVAP monitor/ Compl or Incmpl	-	*2	No
Heated Cat Monitor ENA	Heated catalyst monitor/ Unable or Enable	-	*2	No
Heated Cat Monitor CMPL	Heated catalyst monitor/ Compl or Incmpl	-	*2	No
Catalyst Monitor ENA	Catalyst monitor/ Unable or Enable	-	*2	No
Catalyst Monitor	Catalyst monitor/			

CMPL	Compl or Incmpl	-	*2	No
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*2:
 Enable: The monitor is available on the vehicle.
 Unable: The monitor is not available on the vehicle.
 Incmpl / Compl: The item changes from Incmpl to Compl if the monitor was completed during the current trip. The item changes back to Incmpl when the ignition switch is turned off.
 Monitor result (mode 06): The last judgment result is output. This is not cleared when the ignition switch is turned off, but is cleared when DTCs are cleared. Therefore, only when DTCs are cleared at the beginning of a trip do the system monitor (Monitor Information 2) and monitor result (mode 06) match.

17. Various Vehicle Conditions 3 (All Data)

TC Terminal

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
TC Terminal	TC terminal status/ ON or OFF	-	No

Codes (Include History)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
# Codes (Include History)	Number of codes/ Min.: 0, Max.: 255	0	No

MIL

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
MIL	MIL status/ ON or OFF	-	No

MIL ON Run Distance

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
MIL ON Run Distance	Distance driven with MIL on/ Min.: 0 km, Max.: 65535 km	-	No
Diagnostic Note: This is the distance driven after a DTC is stored.			

Running Time from MIL ON

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Running Time from MIL ON	Running time from MIL ON/ Min.: 0 min, Max.: 65535	-	No

	min		
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Time after DTC Cleared

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Time after DTC Cleared	Time after DTCs cleared/ Min.: 0 min, Max.: 65535 min	Time after DTCs cleared	Yes
	Diagnostic Note: This is the time elapsed after DTCs were cleared. Time elapsed after the ignition switch is turned off is not counted.		

Distance from DTC Cleared

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Distance from DTC Cleared	Distance driven after DTCs cleared/ Min.: 0 km, Max.: 65535 km	Distance driven after DTCs cleared	Yes
	Diagnostic Note: This is the distance driven after DTCs were cleared.		

Warmup Cycle Cleared DTC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Warmup Cycle Cleared DTC	Warmup cycles after DTCs cleared/ Min.: 0, Max.: 255	-	Yes
	Diagnostic Note: This is the number of warmup cycles after the DTCs were cleared. This is the number of times the engine was warmed up* after DTCs were cleared (or after the vehicle left the factory). *: An engine warmup is defined as the engine coolant temperature rising 20°C (104°F) or more and reaching a temperature of 70°C (158°F) or higher after the engine is started.		

Dist Batt Cable Disconnect

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Dist Batt Cable Disconnect	Distance driven after battery cable disconnected/ Min.: 0 km, Max.: 65535 km	Total distance vehicle driven after battery cable disconnected	Yes

IG OFF Elapsed Time

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
IG OFF Elapsed Time	Time after ignition switch off/ Min.: 0 min, Max.: 655350 min	-	Yes

OBD Requirements

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
OBD Requirements	OBD requirement	OBD II (California ARB)	No

Number of Emission DTC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Number of Emission DTC	Emissions-related DTCs	-	No
	Diagnostic Note: This is the number of emissions-related DTCs.		

TC and TE1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
TC and TE1	TC and CG (TE1) terminals of DLC3/ ON or OFF	-	Yes

18. Misfire (Gas Misfire)

Cylinder #1 Misfire Count to Cylinder #4 Misfire Count

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Cylinder #1 Misfire Count Cylinder #2 Misfire Count Cylinder #3 Misfire Count Cylinder #4 Misfire Count	Misfire count of cylinders 1 to 4/ Min.: 0, Max.: 255	0 to 16	Yes
Diagnostic Note: This is the misfire count for each individual cylinder. This counter is incremented by one for each misfire and is cleared every 200 revolutions. Check this item to help determine the malfunctioning cylinder.			

19. Various Vehicle Conditions 4 (All Data)

Engine Speed (Starter Off)

TESTER DISPLAY	MEASUREMENT	NORMAL	STORED AS FREEZE FRAME
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	ITEM/RANGE	CONDITION	DATA
Engine Speed (Starter Off)	Engine speed when starter off/ Min.: 0 rpm, Max.: 51199 rpm	-	Yes
	Diagnostic Note: This is the engine speed immediately after starting the engine.		

Starter Count

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Starter Count	Number of times starter turned on after ignition switch turned to ON/ Min.: 0, Max.: 255	-	Yes
	Diagnostic Note: This is the number of times the starter turned on during the current trip.		

Run Dist of Previous Trip

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Run Dist of Previous Trip	Distance driven during previous trip/ Min.: 0 km, Max.: 655.35 km	-	Yes
	Diagnostic Note: Before 5 seconds elapse after starting the engine, which is DTC P1604 (Startability Malfunction) detection duration, this parameter indicates the distance driven during the previous trip. After 5 seconds elapse after starting the engine, this parameter indicates the distance driven during the current trip calculated from the vehicle speed signal. HINT: Run Dist of Previous Trip in freeze frame data which were present when the startability malfunction occurred (DTC P1604 detected) indicates the distance driven during the previous trip, but in all other cases, such as for the snapshot data of Data List (real-time measurements), or for freeze frame data which were present when the DTCs other than P1604 were detected, the value indicates the distance driven during the current trip.		

Engine Starting Time

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Engine Starting Time	Time elapsed before engine starts/ Min.: 0 ms, Max.: 655350 ms	-	Yes
	Diagnostic Note: This is the time elapsed after the starter turns on until the engine speed reaches 400 rpm.		

This value is cleared 5 seconds after the engine is started and the value is displayed as 0 ms.

Previous Trip Coolant Temp

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Previous Trip Coolant Temp	Engine coolant temperature during previous trip/ Min.: -40°C, Max.: 215°C	-	Yes
	Diagnostic Note: Before 120 seconds elapse after starting the engine, this parameter indicates the engine coolant temperature at the end of the previous trip. After 120 seconds elapse after starting the engine, this parameter indicates the engine coolant temperature during the current trip.		

Previous Trip Intake Temp

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Previous Trip Intake Temp	Intake air temperature during previous trip/ Min.: -40°C, Max.: 215°C	-	Yes
	Diagnostic Note: Before 120 seconds elapse after starting the engine, this parameter indicates the intake air temperature at the end of the previous trip. After 120 seconds elapse after starting the engine, this parameter indicates the intake air temperature during the current trip.		

Engine Oil Temperature

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Engine Oil Temperature	Engine oil temperature (estimated temperature)/ Min.: -40°C, Max.: 215°C	-	Yes

Previous Trip Eng Oil Temp

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Previous Trip Eng Oil Temp	Engine oil temperature during previous trip/ Min.: -40°C, Max.: 215°C	-	Yes

Ambient Temp for A/C

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
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Ambient Temp for A/C	Ambient temperature for A/C/ Min.: -40°C, Max.: 215°C	-	Yes
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Previous Trip Ambient Temp

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Previous Trip Ambient Temp	Ambient temperature during previous trip/ Min.: -40°C, Max.: 215°C	-	Yes

Engine Start Hesitation

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Engine Start Hesitation	History of hesitation during engine start/ ON or OFF	-	Yes
	Diagnostic Note: This value changes to ON when the engine speed does not reach 500 rpm during cranking.		

Low Rev for Eng Start

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Low Rev for Eng Start	History of low engine speed after engine start/ ON or OFF	-	Yes
	Diagnostic Note: This flag changes to ON when the engine speed drops to 200 rpm or less within approximately 2 seconds of starting the engine.		

Fuel Cut Elps Time

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Fuel Cut Elps Time	Time elapsed before engine starts/ Time elapsed after fuel cut/ Min.: 0 sec, Max.: 67107 sec	-	Yes

Engine Oil Temp for Eng Start

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Engine Oil Temp for	History of engine oil temperature		

Eng Start	during engine start/ Min.: -40 deg, Max.: 215 deg	-	Yes
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A/F Learn Value Idle #1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
A/F Learn Value Idle #1	Air fuel ratio learn value of idle area/ Min.: -50%, Max.: 49.6%	-15 to +15%	Yes
	Diagnostic Note: Learning is performed when idling with the engine warmed up (engine coolant temperature is 80°C [176°F] or higher).		

A/F Learn Value Idle #1 (Dual)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
A/F Learn Value Idle #1 (Dual)	Air fuel ratio learn value of idle area/ Min.: -50%, Max.: 49.6%	-15 to +15%	Yes
	Diagnostic Note: Learning is performed when idling with the engine warmed up (engine coolant temperature is 80°C [176°F] or higher).		

A/F Learn Value Low #1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
A/F Learn Value Low #1	Air fuel ratio learn value of low load area/ Min.: -50%, Max.: 49.6%	-15 to +15%	Yes
	Diagnostic Note: Learning is performed when driving with the engine warmed up (engine coolant temperature is 80°C [176°F] or higher) and operating in the low load range (when the range of engine loads is divided into four parts).		

A/F Learn Value Mid1 #1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
A/F Learn Value Mid1 #1	Air fuel ratio learn value of middle1 load area/ Min.: -50%, Max.: 49.6%	-15 to +15%	Yes
	Diagnostic Note: Learning is performed when driving with the engine warmed up (engine coolant temperature is 80°C [176°F] or higher) and operating in the mid-size load range closer to the low load range (when the range of engine loads is divided into four parts).		

A/F Learn Value High #1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
A/F Learn Value High #1	Air fuel ratio learn value of high load area/ Min.: -50%, Max.: 49.6%	-15 to +15%	Yes
	Diagnostic Note: Learning is performed when driving with the engine warmed up (engine coolant temperature is 80°C [176°F] or higher) and operating in the high load range (when the range of engine loads is divided into four parts).		

A/F Learn Value Low #1 (Dual)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
A/F Learn Value Low #1	Air fuel ratio learn value of low load area/ Min.: -50%, Max.: 49.6%	-15 to +15%	Yes
	Diagnostic Note: Learning is performed when driving with the engine warmed up (engine coolant temperature is 80°C [176°F] or higher) and operating in the low load range (when the range of engine loads is divided into four parts).		

A/F Learn Value Mid1 #1 (Dual)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
A/F Learn Value Mid1 #1	Air fuel ratio learn value of middle1 load area/ Min.: -50%, Max.: 49.6%	-15 to +15%	Yes
	Diagnostic Note: Learning is performed when driving with the engine warmed up (engine coolant temperature is 80°C [176°F] or higher) and operating in the mid-size load range closer to the low load range (when the range of engine loads is divided into four parts).		

A/F Learn Value High #1 (Dual)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
A/F Learn Value High #1	Air fuel ratio learn value of high load area/ Min.: -50%, Max.: 49.6%	-15 to +15%	Yes
	Diagnostic Note: Learning is performed when driving with the engine warmed up (engine coolant temperature is 80°C [176°F] or higher) and operating in the high load range (when the range of engine loads is divided into four parts).		

A/C Magnetic Clutch Relay

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
A/C Magnetic Clutch Relay	A/C magnetic clutch relay/ ON or OFF	ON: A/C on	Yes

Electrical Fan Motor

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Electrical Fan Motor	Electric fan motors operation status/ ON or OFF	-	Yes

Electric Cooling Fan Relay #1

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Electric Cooling Fan Relay #1	Electric cooling fan relay No. 1/ ON or OFF	ON: Cooling fan relay No. 1 ON	Yes

Electric Cooling Fan Relay #2

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Electric Cooling Fan Relay #2	Electric cooling fan relay No. 2/ ON or OFF	ON: Cooling fan relay No. 2 ON	Yes

Brake Override System

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Brake Override System	Brake override system operation/ ON or OFF	ON: Brake override system ON	Yes

Idle Fuel Cut

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Idle Fuel Cut	Fuel cut at idle/ ON or OFF	ON: Fuel cut operating	Yes
	Diagnostic Note: Idle Fuel Cut = "ON" when the throttle valve is fully closed and the engine speed is		

high.

FC TAU

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
FC TAU	Fuel cut TAU (fuel cut during very light load)/ ON or OFF	ON: Fuel cut operating	Yes
	Diagnostic Note: This is the fuel cut performed under a very light load to prevent the engine combustion from becoming incomplete.		

Immobiliser Fuel Cut

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Immobiliser Fuel Cut	Status of immobiliser fuel cut/ ON or OFF	-	Yes

Immobiliser Fuel Cut History

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Immobiliser Fuel Cut History	Status of the immobiliser fuel cut history/ ON or OFF	-	Yes

Fuel Dilution Estimate

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Fuel Dilution Estimate	Fuel dilution estimate/ Min.: 0 ml, Max.: 1279.9 ml	-	No

20. Compression (Compression)

Engine Speed of Cyl #1 to #4

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Engine Speed of Cyl #1 Engine Speed of Cyl	Engine speed for cylinder No. 1 to No. 4/ Min.: 0 rpm, Max.: 51199 rpm	-	Yes
	Diagnostic Note: This is output only when Check the Cylinder Compression is performed using the Active Test.		

#2 Engine Speed of Cyl	This is the engine speed for each cylinder measured during the engine cranking. When there is compression loss, the engine speed for that cylinder increases.
#3 Engine Speed of Cyl	HINT: When multiple cylinders have compression loss, the engine speeds for multiple cylinders increase and it is not possible to determine which cylinders have compression loss. At this time, it is necessary to actually perform a compression measurement.
#4	

Av Engine Speed of All Cyl

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Av Engine Speed of All Cyl	Average engine speed for all cylinders/ Min.: 0 rpm, Max.: 51199 rpm	-	No
	Diagnostic Note: This is output only when Check the Cylinder Compression is performed using the Active Test.		

21. Automatic Transmission (All Data)

Refer to Automatic Transmission System [INFO](#) .

Received MIL from ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Received MIL from ECT	MIL status/ ON or OFF	-	Yes

Shift Position Sig from ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Shift Position Sig from ECT	Received Shift Position Signal from ECT/ 1st, 2nd, 3rd, 4th, 5th, 6th, 7th or 8th	Same as actual gear ratio	Yes

SPD (NT)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
SPD (NT)	Input turbine speed (speed sensor NT)/ Min.: 0 rpm, Max.:	<ul style="list-style-type: none"> Lock-up ON (After warming up engine): Input turbine speed (NT) equal to engine speed Lock-up OFF (Idling at P or N position): 	Yes

	12750 rpm	Input turbine speed (NT) nearly equal to engine speed	
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ECT Lock Up

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
ECT Lock Up	ECT lock up status/ ON or OFF	-	Yes

Shift SW Status (P Range)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Shift SW Status (P Range)	Park/neutral position switch status/ ON or OFF	ON: Shift lever in P OFF: Shift lever not in P	Yes

Shift SW Status (R Range)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Shift SW Status (R Range)	Park/neutral position switch status/ ON or OFF	ON: Shift lever in R OFF: Shift lever not in R	Yes

Shift SW Status (N Range)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Shift SW Status (N Range)	Park/neutral position switch status/ ON or OFF	ON: Shift lever in N OFF: Shift lever not in N	Yes

Sports Mode Selection SW

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Sports Mode Selection SW	Sport mode select switch status/ ON or OFF	ON: Shift lever in M, "+" or "-" OFF: Shift lever not in M, "+" or "-"	Yes

Shift SW Status (D Range)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Shift SW Status (D Range)	Park/neutral position switch status/	ON: Shift lever in D OFF: Shift lever not	Yes

	ON or OFF	in D
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Spark Timing Retard Request from ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Spark Timing Retard Request from ECT	Status of the spark timing retard request from ECT/ ON or OFF	-	Yes

Fuel Cut Request from ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Fuel Cut Request from ECT	Status of the fuel cut request from ECT/ ON or OFF	-	Yes

Torque Down Prohibit Request to ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Torque Down Prohibit Request to ECT	Status of the torque down prohibit request to ECT/ ON or OFF	-	Yes

Torque Down Request from VSC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Torque Down Request from VSC	Status of the torque down request from VSC/ ON or OFF	-	Yes

Torque Up Request from VSC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Torque Up Request from VSC	Status of the torque up request from VSC/ ON or OFF	-	Yes

Torque Down Prohibit Request to VSC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Torque Down Prohibit Request to VSC	Status of the torque down prohibit request to VSC/ ON or OFF	-	Yes

Torque Up Prohibit Request to VSC

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	STORED AS FREEZE FRAME DATA
Torque Up Prohibit Request to VSC	Status of the torque up prohibit request to VSC/ ON or OFF	-	Yes

22. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch to ON.
- (e) Turn the Techstream on.
- (f) Enter the following menus: Powertrain / Engine / Active Test.
- (g) According to the display on the Techstream, perform the Active Test.

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Injection Volume	Change injection volume	Between -12.5% and 24.8%	<ul style="list-style-type: none"> • All injectors are tested at the same time. • This test is possible when the following conditions are met: <ul style="list-style-type: none"> ◦ Engine speed is 3000 rpm or less. ◦ Engine coolant temperature is 80°C (80°F) or more. • Injection volume can be changed in fine gradations within control range. • Control the Injection Volume enables the checking and graphing of the air fuel ratio sensor and the heated oxygen sensor voltage outputs. • To conduct the test, enter the following menus: Active Test / Control the Injection Volume /

			<p>AFS Voltage B1S1 and O2S B1S2.</p> <ul style="list-style-type: none"> • During the Active Test, air fuel ratio feedback control and feedback learning are stopped.
Control the Injection Volume for A/F Sensor	Change injection volume	-12%/0%/12%	<ul style="list-style-type: none"> • All injectors are tested at the same time. • This test is possible when the following conditions are met: <ul style="list-style-type: none"> ◦ Engine speed is 3000 rpm or less. ◦ Engine coolant temperature is 80°C (80°F) or more. • Control the Injection Volume for A/F Sensor enables the checking and graphing of the air fuel ratio sensor and the heated oxygen sensor voltage outputs. • To conduct the test, enter the following menus: Active Test / Control the Injection Volume for A/F Sensor / AFS Voltage B1S1 and O2S B1S2. • During the Active Test, air fuel ratio feedback control and feedback learning are stopped.
Activate the VSV for Evap Control	Activate purge VSV control	ON/OFF	<ul style="list-style-type: none"> • Engine is stopped.
Control the A/C Magnet Clutch	A/C magnet clutch control	ON/OFF	<p>Perform this test when the following conditions are met:</p> <ul style="list-style-type: none"> • Ignition switch is ON. • Engine is stopped. • Shift lever is in P, N or neutral.
Control the Fuel Pump / Speed	Activate fuel pump	ON/OFF	<p>Perform this test when the following conditions are met:</p> <ul style="list-style-type: none"> • Ignition switch is ON. • Engine is stopped. • Shift lever is in P, N or neutral.
			Perform this test when the following

Control the Fuel Pump Duty	Fuel pump control	25%/80%	<p>conditions are met:</p> <ul style="list-style-type: none"> • Ignition switch is ON. • Engine is stopped. • Shift lever is in P, N or neutral.
Connect the TC and TE1	Turn on and off TC and TE1 connection	ON/OFF	<ul style="list-style-type: none"> • ON: TC and TE1 are connected. • OFF: TC and TE1 are disconnected. • Perform this test when the following conditions are met: <ul style="list-style-type: none"> ◦ Ignition switch is ON. ◦ Engine is stopped. ◦ Shift lever is in P, N or neutral.
Control the Electric Cooling Fan	Control electric cooling fan	ON/OFF	Perform this test when the ignition switch is ON.
Activate the ACC Cut Relay	Activate ACC cut relay	ON/OFF	<p>Perform this test when the following conditions are met:</p> <ul style="list-style-type: none"> • Ignition switch is ON. • Engine is stopped. • Shift lever is in P, N or neutral.
Control the ETCS Open/Close Slow Speed	Throttle actuator	Close/Open	<p>This test is possible when the following conditions are met:</p> <ul style="list-style-type: none"> • Ignition switch is ON. • Engine is stopped. • Accelerator pedal is fully depressed. • Shift lever is in P, N or neutral.
Control the ETCS Open/Close Fast Speed	Throttle actuator	Close/Open	<ul style="list-style-type: none"> • Same as above.
Control the Injection Timing #1	Control injection timing #1	Between -16 deg(CA) and 15.87 deg(CA)	Test possible during vehicle stopping and engine idling.
Control the Injection Timing #2	Control injection timing #2	Between -16 deg(CA) and 15.87 deg(CA)	Test possible during vehicle stopping and engine idling.
Control the Injection Timing #3	Control injection timing #3	Between -16 deg(CA) and 15.87 deg(CA)	Test possible during vehicle stopping and engine idling.

Control the Injection Timing #4	Control injection timing #4	Between -16 deg(CA) and 15.87 deg(CA)	Test possible during vehicle stopping and engine idling.
Control the Target Fuel Pressure	Control the target fuel pressure	-12.5 to 24.8%	Perform the test at below 3000 rpm.
Control the Voltage of Alternator	Control the voltage of alternator	12.8 to 14.3 V	Perform this test when the following conditions are met: <ul style="list-style-type: none"> • Engine is idling. • Shift lever is in P, N or neutral.
Control the Injection Way	Perform 3 pattern in order to operate fuel injection	Either/Port/Direct	This test is possible when the following conditions are met: <ul style="list-style-type: none"> • Engine speed is 3000 rpm or less • Engine coolant temperature is 80°C (176°F) or more. • Shift lever is in P, N or neutral. Perform the port mode within 3 minutes.
D-4S (A/F Control)	Perform 3 pattern in order to operate air fuel ratio control	<ul style="list-style-type: none"> • Either/Port/Direct • -12.5 to 24.8% 	This test is possible when the following conditions are met: <ul style="list-style-type: none"> • Engine speed is 3000 rpm or less • Engine coolant temperature is 80°C (176°F) or more. • Shift lever is in P, N or neutral. Perform the port mode within 3 minutes.
D-4S (Fuel Cut)	Perform 3 pattern in order to operate fuel cut	<ul style="list-style-type: none"> • Either/Port/Direct • Selected cylinder (cylinder #1 to #4) 	This test is possible when the following conditions are met: <ul style="list-style-type: none"> • Engine speed is 3000 rpm or less • Engine coolant temperature is 80°C (176°F) or more. • Shift lever is in P, N or neutral. Perform the port mode within 3 minutes.
D-4S (Injection Volume)	Perform 3 pattern in order to operate injection volume	<ul style="list-style-type: none"> • Either/Port/Direct • -12.5 to 24.8% 	This test is possible when the following conditions are met: <ul style="list-style-type: none"> • Engine speed is 3000 rpm or less • Engine coolant temperature is 80°C (176°F) or more. • Shift lever is in P, N or neutral.

			Perform the port mode within 3 minutes.
Control the Select Cylinder Fuel Cut	Selected cylinder (cylinder #1 to #4) injector fuel cut	#1/#2/#3/#4 ON/OFF	<p>This test is possible when the following conditions are met</p> <ul style="list-style-type: none"> • Vehicle is stopped. • Engine is idling. • Shift lever is in P, N or neutral. • Speed sensor is normal. <p>*1</p>
Control the All Cylinders Fuel Cut	All cylinder fuel cut	ON/OFF	<p>This test is possible when the following conditions are met</p> <ul style="list-style-type: none"> • Vehicle is stopped. • Engine is idling. • Shift lever is in P, N or neutral. • Speed sensor is normal. <p>*1</p>
Check the Cylinder Compression	Check the cylinder compression pressure	ON/OFF	<p>This test is possible when the following conditions are met</p> <ul style="list-style-type: none"> • Vehicle is stopped. • Engine is idling. • Shift lever is in P, N or neutral. • Speed sensor is normal. <p>*1 Fuel injection and ignition stop in all cylinders. *2</p>
Activate the Starter Cut Relay	Activate starter cut relay	ON/OFF	<p>Perform this test when the following conditions are met:</p> <ul style="list-style-type: none"> • Ignition switch is ON. • Engine is stopped. • Shift lever is in P, N or neutral.
Control the Target Engine Speed	Control the target engine speed	500 to 2000 rpm	Test possible during vehicle stopping and engine idling.
Control the VVT Linear (Bank 1)	Control VVT (for intake side of bank 1)	-27 to 36 deg (CA)	<ul style="list-style-type: none"> • Engine stalls or idles roughly when the VVT actuator is operated. • Perform this test when the following conditions are met: <ul style="list-style-type: none"> ◦ Engine is idling. ◦ Shift lever is in P, N or neutral.

			<ul style="list-style-type: none"> • DTCs related to the VVT system may be stored due to Active Test operation, but this does not indicate a malfunction.
Control the VVT Linear (Bank 2)	Control VVT (for intake side of bank 2)	-27 to 36 deg (CA)	<ul style="list-style-type: none"> • Engine stalls or idles roughly when the VVT actuator is operated. • Perform this test when the following conditions are met: <ul style="list-style-type: none"> ◦ Engine is idling. ◦ Shift lever is in P, N or neutral. • DTCs related to the VVT system may be stored due to Active Test operation, but this does not indicate a malfunction.
Control the VVT Exhaust Linear (Bank 1)	Control VVT (for exhaust side of bank 1)	0 to 51 deg (CA)	<ul style="list-style-type: none"> • Engine stalls or idles roughly when the VVT actuator is operated. • Perform this test when the following conditions are met: <ul style="list-style-type: none"> ◦ Engine is idling. ◦ Shift lever is in P, N or neutral. • DTCs related to the VVT system may be stored due to Active Test operation, but this does not indicate a malfunction.
Control the VVT Exhaust Linear (Bank 2)	Control VVT (for exhaust side of bank 2)	0 to 51 deg (CA)	<ul style="list-style-type: none"> • Engine stalls or idles roughly when the VVT actuator is operated. • Perform this test when the following conditions are met: <ul style="list-style-type: none"> ◦ Engine is idling. ◦ Shift lever is in P, N or neutral. • DTCs related to the VVT system may be stored due to Active Test operation, but this does not indicate a malfunction.

NOTICE:

***1:**

- If the display of the Data List item Catalyst OT MF F/C item is Not Avl, perform this Active Test with the vehicle stopped and the engine idling.
- If the display of the Data List item Catalyst OT MF F/C item is Avail, perform this Active Test as described below.
 - a. Stop the engine, turn the ignition switch to ON.
 - b. Enter the Control the Select Cylinder Fuel Cut.
 - c. Select the cylinder for fuel cut (cylinder #1 to #4) and turn the Active Test ON (press the RIGHT or LEFT button).
 - d. Start the engine.

HINT:

***2: When cranking the engine, each cylinder measures the engine speed. In this Active Test, the fuel and ignition of all cylinders is cut. The engine must then be cranked for approximately 10 seconds. At this time, the speed of each cylinder is measured. If the speed of one cylinder is more than the other cylinders, it can be determined that the compression pressure of that cylinder is lower than the other cylinders.**

1. Warm up the engine.
2. Turn the ignition switch off.
3. Connect the Techstream to the DLC3.
4. Turn the ignition switch to ON.
5. Turn the Techstream on.
6. Enter the following menus: Powertrain / Engine / Active Test / Check the Cylinder Compression.

HINT:

To display the entire Data List, press the pull down menu button next to Primary. Then select Compression.

7. Push the snapshot button to turn the snapshot function on.

HINT:

Using the snapshot function, data can be recorded during the Active Test.

8. While the engine is not running, press the RIGHT or LEFT button to change Check the Cylinder Compression to ON.

HINT:

After performing the above procedure, Check the Cylinder Compression will start. Fuel injection for all cylinders is prohibited and each cylinder engine speed measurement enters standby mode.

9. Crank the engine for about 10 seconds.

HINT:

Continue to crank the engine until the values change from the default value (51199 rpm).

10. Monitor the engine speed (Engine Speed of Cyl #1 to #4) displayed on the Techstream.

HINT:

At first, the Techstream displays extremely high cylinder engine speed values. After approximately 10 seconds of engine cranking, each cylinder engine speed measurement will change to the actual engine speed.

NOTICE:



- o Do not crank the engine continuously for 20 seconds or more.
- o If it is necessary to crank the engine again after Check the Cylinder Compression has been changed to ON and the engine has been cranked once, press Exit to return to the Active Test menu screen. Then change Check the Cylinder Compression to ON and crank the engine.
- o Use a fully-charged battery.

23. SYSTEM CHECK

HINT:

Performing a System Check enables the system, which consists of multiple actuators, to be operated without removing any parts. In addition, it can show whether or not any DTCs are stored, and can detect potential malfunctions in the system. The System Check can be performed with the Techstream.

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Utility.
- (e) Perform the System Check by referring to the table below.

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Evaporative System Check (Automatic Mode)	Perform 5 steps in order to operate EVAP key-off monitor automatically	35°C (95°F) or less	<ul style="list-style-type: none">• If no pending DTCs are output after performing this test, the system is functioning normally.• Refer to EVAP Inspection Procedure  .
Evaporative System Check (Manual Mode)	Perform 5 steps in order to operate EVAP key-off monitor manually	35°C (95°F) or less	<ul style="list-style-type: none">• Used to detect malfunctioning parts.• Refer to EVAP Inspection Procedure  .

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Model Year: 2013	Model: FR-S	Doc ID: RM000000PDC0GNX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: DEFINITION OF TERMS (2013 FR-S)		

DEFINITION OF TERMS

TERM	DEFINITION
Monitor Description	Description of what ECM monitors and how it detects malfunctions (monitoring purpose and details).
Related DTCs	Group of diagnostic trouble codes that are output by ECM based on same malfunction detection logic.
Typical Enabling Condition	Preconditions that allow ECM to detect malfunctions. With all preconditions satisfied, ECM stores DTC when monitored value(s) exceeds malfunction threshold(s).
Sequence of Operation	Order of monitor priority, applied if multiple sensors and components are involved in single malfunction detection process. Each sensor and component is monitored in turn, when previous detection operation is completed.
Required Sensor/Components	Sensors and components used by ECM to detect each malfunction.
Frequency of Operation	Number of times ECM checks for each malfunction during each driving cycle. "Once per driving cycle" means ECM only performs checks for that malfunction once during single driving cycle. "Continuous" means ECM performs checks for that malfunction whenever enabling conditions are met.
Duration	Minimum time for which ECM must detect continuous deviation in monitored value(s) in order to store DTC. Timing begins when Typical Enabling Conditions are met.
Malfunction Thresholds	Value beyond which ECM determines malfunctions exist and stores DTCs.
MIL Operation	Timing of MIL illumination after malfunction is detected. "Immediate" means ECM illuminates MIL as soon as malfunction is detected. "2 driving cycles" means ECM illuminates MIL if same malfunction is detected second time during next sequential driving cycle.

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDJ0VLX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: DIAGNOSIS SYSTEM (2013 FR-S)		

DIAGNOSIS SYSTEM

1. DESCRIPTION

When troubleshooting OBD II (On-Board Diagnostics) vehicles, the Techstream (complying with SAE J1987) must be connected to the DLC3 (Data Link Connector 3) of the vehicle. Various data in the vehicle's ECM (Engine Control Module) can be then read.

OBD II regulations require that the vehicle's on-board computer illuminates the MIL (Malfunction Indicator Lamp) on the instrument panel when the computer detects a malfunction in:



- a. The emission control system and components.
- b. The powertrain control components (which affect vehicle emissions).
- c. The computer itself.

In addition, the applicable DTCs prescribed by SAE J2012 are stored in the ECM memory. If the malfunction does not recur in 3 consecutive trips, the MIL turns off automatically but the DTCs remain stored in the ECM memory.

To check the DTCs, connect the Techstream to the DLC3. The Techstream displays output DTCs, freeze frame data, and a variety of engine data. The DTCs and freeze frame data can be cleared with the Techstream. In order to enhance OBD function on vehicles and develop the Off-Board diagnosis system, Controller Area Network (CAN) communication is used in this system. CAN is a network which uses a pair of data transmission lines spanning multiple computers and sensors. It allows for high speed communications between the systems and simplification of the wire harness connections.

2. NORMAL MODE AND CHECK MODE

The diagnosis system operates in normal mode during normal vehicle use. In normal mode, 2 trip detection logic is used to ensure accurate detection of malfunctions. Check mode is also available as an option for technicians. In check mode, 1 trip detection logic is used for duplicating malfunction symptoms and increasing the system's ability to detect malfunctions, including intermittent problems (Techstream only).

3. 2 TRIP DETECTION LOGIC

When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory (1st trip). If the same malfunction is detected during the next subsequent drive cycle, the MIL is illuminated (2nd trip).

4. DLC3 (Data Link Connector 3)

- (a) Check the DLC3 INFO .

5. FREEZE FRAME DATA

The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was moving or stationary, whether the engine was warmed up or not, whether the air fuel ratio was lean or rich, as well as other data stored at the time of a malfunction.

6. BATTERY VOLTAGE

Standard voltage:

11 to 14 V

If voltage is below 11 V, replace or recharge the battery.

7. MIL (Malfunction Indicator Lamp)

- (a) The MIL is illuminated when the ignition switch is first turned to ON (the engine is not running).
 (b) The MIL turns off when the engine is started. If the MIL remains illuminated, the diagnosis system has detected a malfunction or abnormality in the system.

HINT:

If the MIL is not illuminated when the ignition switch is first turned to ON, check the MIL circuit INFO .

8. ALL READINESS

HINT:

- With "All Readiness", you can check whether or not the DTC judgment has been completed by using the Techstream.
 - You should check "All Readiness" after simulating malfunction symptoms or for validation after finishing repairs.
- (a) Connect the Techstream to the DLC3.
 (b) Turn the ignition switch to ON.
 (c) Turn the Techstream on.
 (d) Clear DTCs INFO .
 (e) Turn the ignition switch off and wait for at least 30 seconds.
 (f) Turn the ignition switch to ON and turn the Techstream on.
 (g) Perform the DTC judgment driving pattern to run the DTC judgment.
 (h) Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 (i) Input the DTCs to be confirmed.
 (j) Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> • DTC judgment completed • System normal
ABNORMAL	<ul style="list-style-type: none"> • DTC judgment completed

	System abnormal
INCOMPLETE	<ul style="list-style-type: none"> • DTC judgment not completed • Perform the driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> • Unable to perform DTC judgment • Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit



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Model Year: 2013	Model: FR-S	Doc ID: RM000000PDF0FSX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: DIAGNOSTIC TROUBLE CODE CHART (2013 FR-S)		

DIAGNOSTIC TROUBLE CODE CHART

HINT:

Factors such as instrument type may cause readings to differ slightly from stated values. If any DTCs are output during a check mode DTC check, check the circuit for the DTCs listed in the table below. For details of each DTC, refer to the "See page" below.

*: The MIL flashes when a catalyst damaging misfire is detected.

DTC CODE	DETECTION ITEM	MIL	MEMORY	SEE PAGE
P000A	Camshaft Position "A" - Timing Slow Response Bank 1	Comes on	DTC stored	INFO
P000B	Camshaft Position "B" - Timing Slow Response Bank 1	Comes on	DTC stored	INFO
P000C	Camshaft Position "A" - Timing Slow Response Bank 2	Comes on	DTC stored	INFO
P000D	Camshaft Position "B" - Timing Slow Response Bank 2	Comes on	DTC stored	INFO
P0010	Camshaft Position "A" Actuator Circuit (Bank 1)	Comes on	DTC stored	INFO
P0011	Camshaft Position "A" - Timing Over-Advanced or System Performance (Bank 1)	Comes on	DTC stored	INFO
P0013	Camshaft Position "B" Actuator Circuit / Open (Bank 1)	Comes on	DTC stored	INFO
P0014	Camshaft Position "B" - Timing Over-Advanced or System Performance (Bank 1)	Comes on	DTC stored	INFO
P0016	Crankshaft Position - Camshaft Position Correlation (Bank 1 Sensor A)	Comes on	DTC stored	INFO
P0017	Crankshaft Position - Camshaft Position Correlation (Bank 1 Sensor B)	Comes on	DTC stored	INFO
P0018	Crankshaft Position - Camshaft Position Correlation (Bank 2 Sensor A)	Comes on	DTC stored	INFO
P0019	Crankshaft Position - Camshaft Position Correlation (Bank 2 Sensor B)	Comes on	DTC stored	INFO
P0020	Camshaft Position "A" Actuator Circuit (Bank 2)	Comes on	DTC stored	INFO
P0021	Camshaft Position "A" - Timing Over-Advanced or System Performance (Bank 2)	Comes on	DTC stored	INFO
P0023	Camshaft Position "B" Actuator Circuit / Open (Bank 2)	Comes on	DTC stored	INFO

P0024	Camshaft Position "B" - Timing Over-Advanced or System Performance (Bank 2)	Comes on	DTC stored	INFO
P0030	A/F Sensor Heater Control Circuit (Bank 1 Sensor 1)	Comes on	DTC stored	INFO
P0031	Oxygen (A/F) Sensor Heater Control Circuit Low (Bank 1 Sensor 1)	Comes on	DTC stored	INFO
P0032	Oxygen (A/F) Sensor Heater Control Circuit High (Bank 1 Sensor 1)	Comes on	DTC stored	INFO
P0037	Oxygen Sensor Heater Control Circuit Low (Bank 1 Sensor 2)	Comes on	DTC stored	INFO
P0038	Oxygen Sensor Heater Control Circuit High (Bank 1 Sensor 2)	Comes on	DTC stored	INFO
P0068	MAP / MAF - Throttle Position Correlation	Comes on	DTC stored	INFO
P0087	Fuel Rail / System Pressure - Too Low	Comes on	DTC stored	INFO
P0088	Fuel Rail / System Pressure - Too High	Comes on	DTC stored	INFO
P0101	Mass Air Flow Circuit Range / Performance Problem	Comes on	DTC stored	INFO
P0102	Mass or Volume Air Flow Circuit Low Input	Comes on	DTC stored	INFO
P0103	Mass or Volume Air Flow Circuit High Input	Comes on	DTC stored	INFO
P0107	Manifold Absolute Pressure / Barometric Pressure Circuit Low Input	Comes on	DTC stored	INFO
P0108	Manifold Absolute Pressure / Barometric Pressure Circuit High Input	Comes on	DTC stored	INFO
P0111	Intake Air Temperature Sensor Gradient Too High	Comes on	DTC stored	INFO
P0112	Intake Air Temperature Circuit Low Input	Comes on	DTC stored	INFO
P0113	Intake Air Temperature Circuit High Input	Comes on	DTC stored	INFO
P0116	Engine Coolant Temperature Circuit Range / Performance Problem	Comes on	DTC stored	INFO
P0117	Engine Coolant Temperature Circuit Low Input	Comes on	DTC stored	INFO
P0118	Engine Coolant Temperature Circuit High Input	Comes on	DTC stored	INFO
P0122	Throttle Position Sensor Circuit Low Input	Comes on	DTC stored	INFO
P0123	Throttle / Pedal Position Sensor / Switch "A" Circuit High Input	Comes on	DTC stored	INFO

P0125	Insufficient Coolant Temperature for Closed Loop Fuel Control	Comes on	DTC stored	INFO
P0128	Coolant Thermostat (Coolant Temperature Below Thermostat Regulating Temperature)	Comes on	DTC stored	INFO
P0131	Oxygen Sensor Circuit Low Voltage (Bank 1 Sensor 1)	Comes on	DTC stored	INFO
P0132	Oxygen Sensor Circuit High Voltage Bank1 Sensor1	Comes on	DTC stored	INFO
P0134	Oxygen Sensor Circuit No Activity Detected (Bank 1 Sensor 1)	Comes on	DTC stored	INFO
P0137	Oxygen Sensor Circuit Low Voltage (Bank 1 Sensor 2)	Comes on	DTC stored	INFO
P0138	Oxygen Sensor Circuit High Voltage (Bank 1 Sensor 2)	Comes on	DTC stored	INFO
P013A	Oxygen Sensor Slow Response - Rich to Lean Bank 1 Sensor 2	Comes on	DTC stored	INFO
P013B	O2 Sensor Slow Response - Lean to Rich (Bank 1 Sensor 2)	Comes on	DTC stored	INFO
P013E	O2 Sensor Delayed Response - Rich to Lean (Bank 1 Sensor 2)	Comes on	DTC stored	INFO
P013F	O2 Sensor Delayed Response - Lean to Rich (Bank 1 Sensor 2)	Comes on	DTC stored	INFO
P0140	Oxygen Sensor Circuit No Activity Detected (Bank 1 Sensor 2)	Comes on	DTC stored	INFO
P0141	Oxygen Sensor Heater Circuit (Bank 1 Sensor 2)	Comes on	DTC stored	INFO
P014C	A/F Sensor Slow Response - Rich to Lean Bank 1 Sensor 1	Comes on	DTC stored	INFO
P014D	A/F Sensor Slow Response - Lean to Rich Bank 1 Sensor 1	Comes on	DTC stored	INFO
P015A	A/F Sensor Delayed Response - Rich to Lean Bank 1 Sensor 1	Comes on	DTC stored	INFO
P015B	A/F Sensor Delayed Response - Lean to Rich Bank 1 Sensor 1	Comes on	DTC stored	INFO
P0171	System Too Lean (Bank 1)	Comes on	DTC stored	INFO
P0172	System Too Rich (Bank 1)	Comes on	DTC stored	INFO
P0191	Fuel Rail Pressure Sensor Circuit Range / Performance	Comes on	DTC stored	INFO
P0192	Fuel Rail Pressure Sensor Circuit Low Input	Comes on	DTC stored	INFO
P0193	Fuel Rail Pressure Sensor Circuit High Input	Comes on	DTC stored	INFO

P0196	Engine Oil Temperature Sensor (Range/Performance)	Comes on	DTC stored	INFO
P0197	Engine Oil Temperature Sensor Low	Comes on	DTC stored	INFO
P0198	Engine Oil Temperature Sensor High	Comes on	DTC stored	INFO
P0201	Injector Circuit / Open - (Cylinder 1)	Comes on	DTC stored	INFO
P0202	Injector Circuit / Open - (Cylinder 2)	Comes on	DTC stored	INFO
P0203	Injector Circuit / Open - (Cylinder 3)	Comes on	DTC stored	INFO
P0204	Injector Circuit / Open - (Cylinder 4)	Comes on	DTC stored	INFO
P0222	Throttle / Pedal Position Sensor / Switch "B" Circuit Low Input	Comes on	DTC stored	INFO
P0223	Throttle / Pedal Position Sensor / Switch "B" Circuit High Input	Comes on	DTC stored	INFO
P0230	Fuel Pump Primary Circuit	Comes on	DTC stored	INFO
P0300	Random / Multiple Cylinder Misfire Detected	Comes on/Blinks*	DTC stored	INFO
P0301	Cylinder 1 Misfire Detected	Comes on/Blinks*	DTC stored	INFO
P0302	Cylinder 2 Misfire Detected	Comes on/Blinks*	DTC stored	INFO
P0303	Cylinder 3 Misfire Detected	Comes on/Blinks*	DTC stored	INFO
P0304	Cylinder 4 Misfire Detected	Comes on/Blinks*	DTC stored	INFO
P0327	Knock Sensor 1 Circuit Low Input (Bank 1 or Single Sensor)	Comes on	DTC stored	INFO
P0328	Knock Sensor 1 Circuit High Input (Bank 1 or Single Sensor)	Comes on	DTC stored	INFO
P0332	Knock Sensor 2 Circuit Low Input (Bank 2)	Comes on	DTC stored	INFO
P0333	Knock Sensor 2 Circuit High Input (Bank 2)	Comes on	DTC stored	INFO
P0335	Crankshaft Position Sensor "A" Circuit	Comes on	DTC stored	INFO
P0336	Crankshaft Position Sensor Range / Performance	Comes on	DTC stored	INFO
P0340	Camshaft Position Sensor Circuit Malfunction	Comes on	DTC stored	INFO

P0341	Camshaft Position Sensor "A" Circuit Range / Performance (Bank 1 or Single Sensor)	Comes on	DTC stored	INFO
P0345	Camshaft Position Sensor "A" Circuit (Bank 2)	Comes on	DTC stored	INFO
P0346	Camshaft Position Sensor "A" Circuit Range / Performance (Bank 2)	Comes on	DTC stored	INFO
P0351	Ignition Coil "A" Primary / Secondary Circuit	Comes on	DTC stored	INFO
P0352	Ignition Coil "B" Primary / Secondary Circuit	Comes on	DTC stored	INFO
P0353	Ignition Coil "C" Primary / Secondary Circuit	Comes on	DTC stored	INFO
P0354	Ignition Coil "D" Primary / Secondary Circuit	Comes on	DTC stored	INFO
P0365	Camshaft Position Sensor "B" Circuit (Bank 1)	Comes on	DTC stored	INFO
P0366	Camshaft Position Sensor "B" Circuit Range / Performance (Bank 1)	Comes on	DTC stored	INFO
P0390	Camshaft Position Sensor "B" Circuit (Bank 2)	Comes on	DTC stored	INFO
P0391	Camshaft Position Sensor "B" Circuit Range / Performance (Bank 2)	Comes on	DTC stored	INFO
P0420	Catalyst System Efficiency Below Threshold (Bank 1)	Comes on	DTC stored	INFO
P0441	Evaporative Emission Control System Incorrect Purge Flow	Comes on	DTC stored	INFO
P0451	Evaporative Emission Control System Pressure Sensor Range / Performance	Comes on	DTC stored	INFO
P0452	Evaporative Emission Control System Pressure Sensor / Switch Low Input	Comes on	DTC stored	INFO
P0453	Evaporative Emission Control System Pressure Sensor / Switch High Input	Comes on	DTC stored	INFO
P0455	Evaporative Emission Control System Leak Detected (Gross Leak)	Comes on	DTC stored	INFO
P0456	Evaporative Emission Control System Leak Detected (Very Small Leak)	Comes on	DTC stored	INFO
P0458	Evaporative Emission System Purge Control Valve Circuit Low	Comes on	DTC stored	INFO
P0459	Evaporative Emission System Purge Control Valve Circuit High	Comes on	DTC stored	INFO
P0461	Fuel Level Sensor "A" Circuit Range / Performance	Comes on	DTC stored	INFO
P0462	Fuel Level Sensor "A" Circuit Low	Comes on	DTC stored	INFO

P0463	Fuel Level Sensor "A" Circuit High	Comes on	DTC stored	INFO
P0500	Vehicle Speed Sensor "A"	Comes on	DTC stored	INFO
P0506	Idle Air Control System RPM Lower than Expected	Comes on	DTC stored	INFO
P0507	Idle Air Control System RPM Higher than Expected	Comes on	DTC stored	INFO
P050A	Cold Start Idle Air Control System Performance	Comes on	DTC stored	INFO
P050B	Cold Start Ignition Timing Performance	Comes on	DTC stored	INFO
P0560	System Voltage	Comes on	DTC stored	INFO
P0604	Internal Control Module Random Access Memory (RAM) Error	Comes on	DTC stored	INFO
P0605	Internal Control Module Read Only Memory (ROM) Error	Comes on	DTC stored	INFO
P0606	ECM / PCM Processor	Comes on	DTC stored	INFO
P060A	Internal Control Module Monitoring Processor Performance	Comes on	DTC stored	INFO
P060B	Internal Control Module A/D Processing Performance	Comes on	DTC stored	INFO
P0616	Starter Relay Circuit Low	Comes on	DTC stored	INFO
P0617	Starter Relay Circuit High	Comes on	DTC stored	INFO
P062D	No. 1 Fuel Injector Driver Circuit Performance	Comes on	DTC stored	INFO
P062F	Internal Control Module EEPROM Error	Comes on	DTC stored	INFO
P0700	Transmission Control System (MIL Request)	Comes on	DTC stored	INFO
P0851	Park / Neutral Switch Input Circuit Low	Comes on	DTC stored	INFO
P0852	Park / Neutral Switch Input Circuit High	Comes on	DTC stored	INFO
P1109	Throttle Deposit Malfunction	Does not come on	DTC stored	INFO
P1160	Throttle Valve Return Spring Malfunction	Comes on	DTC stored	INFO
P1170	Port Injector Fuel Performance	Does not come on	DTC stored	INFO

P117B	Direct Injector Fuel Performance	Does not come on	DTC stored	INFO
P1235	High Pressure Fuel Pump Circuit	Comes on	DTC stored	INFO
P1261	DI Injector Circuit / Open - (Cylinder 1)	Comes on	DTC stored	INFO
P1262	DI Injector Circuit / Open - (Cylinder 2)	Comes on	DTC stored	INFO
P1263	DI Injector Circuit / Open - (Cylinder 3)	Comes on	DTC stored	INFO
P1264	DI Injector Circuit / Open - (Cylinder 4)	Comes on	DTC stored	INFO
P1449	Evaporative Emission System Lid Open Switch Stuck ON	Comes on	DTC stored	INFO
P1451	Fuel Tank Pressure Sensor Range/Performance	Comes on	DTC stored	INFO
P1603	Engine Stall History	Does not come on	DTC stored	INFO
P1604	Startability Malfunction	Does not come on	DTC stored	INFO
P2096	Post Catalyst Fuel Trim System Too Lean (Bank 1)	Comes on	DTC stored	INFO
P2097	Post Catalyst Fuel Trim System Too Rich (Bank 1)	Comes on	DTC stored	INFO
P2101	Throttle Actuator Control Motor Circuit Range/Performance	Comes on	DTC stored	INFO
P2102	Throttle Actuator Control Motor Circuit Low	Comes on	DTC stored	INFO
P2103	Throttle Actuator Control Motor Circuit High	Comes on	DTC stored	INFO
P2109	Throttle / Pedal Position Sensor "A" Minimum Stop Performance	Does not come on	DTC stored	INFO
P2119	Throttle Actuator Control Throttle Body Range / Performance	Comes on	DTC stored	INFO
P2122	Throttle / Pedal Position Sensor / Switch "D" Circuit Low Input	Comes on	DTC stored	INFO
P2123	Throttle / Pedal Position Sensor / Switch "D" Circuit High Input	Comes on	DTC stored	INFO
P2127	Throttle / Pedal Position Sensor / Switch "E" Circuit Low Input	Comes on	DTC stored	INFO
P2128	Throttle / Pedal Position Sensor / Switch "E" Circuit High Input	Comes on	DTC stored	INFO
P2135	Throttle / Pedal Position Sensor / Switch "A" / "B" Voltage Correlation	Comes on	DTC stored	INFO

P2138	Throttle / Pedal Position Sensor / Switch "D" / "E" Voltage Correlation	Comes on	DTC stored	INFO
P2195	Oxygen (A/F) Sensor Signal Stuck Lean (Bank 1 Sensor 1)	Comes on	DTC stored	INFO
P2196	Oxygen (A/F) Sensor Signal Stuck Rich (Bank 1 Sensor 1)	Comes on	DTC stored	INFO
P219A	Bank 1 Air-Fuel Ratio Imbalance	Comes on	DTC stored	INFO
P2401	Evaporative Emission System Leak Detection Pump Control Circuit Low	Comes on	DTC stored	INFO
P2402	Evaporative Emission Leak Detection Pump Stuck ON	Comes on	DTC stored	INFO
P2404	Evaporative Emission System Leak Detection Pump Sense Circuit Range / Performance	Comes on	DTC stored	INFO
P2419	Evaporative Emission System Switching Valve Control Circuit Low	Comes on	DTC stored	INFO
P2420	Evaporative Emission Pressure Switching Valve Stuck OFF	Comes on	DTC stored	INFO
P2610	ECM / PCM Internal Engine Off Timer Performance	Comes on	DTC stored	INFO
U0073	Control Module Communication Bus "A" Off	Comes on	DTC stored	INFO
U0101	Lost Communication with TCM	Comes on	DTC stored	INFO
U0122	Lost Communication with Vehicle Dynamics Control Module	Comes on	DTC stored	INFO
U0140	Lost Communication with Body Control Module	Comes on	DTC stored	INFO
U0155	Lost Communication with Instrument Panel Cluster (IPC) Control Module	Comes on	DTC stored	INFO
U0402	Invalid Data Received from TCM	Comes on	DTC stored	INFO
U0416	Invalid Data Received from Vehicle Dynamics Control Module	Comes on	DTC stored	INFO
U0423	Invalid Data Received from Instrument Panel Cluster Control Module	Comes on	DTC stored	INFO



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDKOXX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: DTC CHECK / CLEAR (2013 FR-S)		

DTC CHECK / CLEAR

NOTICE:

When the diagnosis system is changed from normal mode to check mode or vice versa, all DTCs and freeze frame data recorded in normal mode are cleared. Before changing modes, always check and make a note of DTCs and freeze frame data.

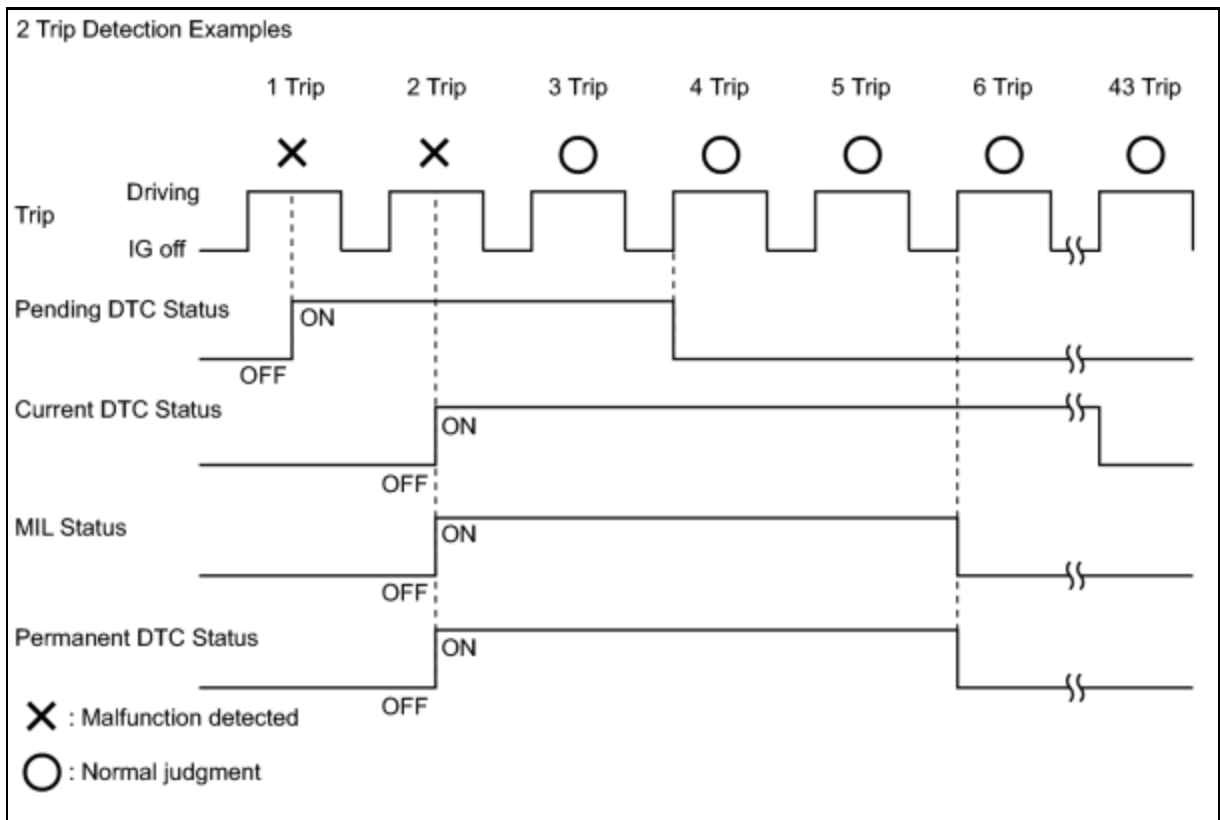
HINT:

- DTCs which are stored in the ECM can be displayed on the Techstream. The Techstream can display the current, pending and permanent DTCs.
- If a malfunction is detected during the current driving cycle, current and permanent DTCs are stored.
- Some DTCs are not stored if the ECM does not detect the same malfunction again during a second consecutive driving cycle. However, such malfunctions, detected on only one occasion, are stored as pending DTCs.
- Current and pending DTCs can be cleared by using the Techstream or by disconnecting the cable from the negative (-) battery terminal. However, permanent DTCs cannot be cleared using either of these two methods.
- After clearing current DTCs using the Techstream (or by disconnecting the cable from the negative battery terminal), permanent DTCs can be cleared when the system is determined to be normal for the relevant DTCs and then the universal trip is performed. The driving pattern to obtain a normal judgment is described under the "Confirmation Driving Pattern" for the respective DTC.

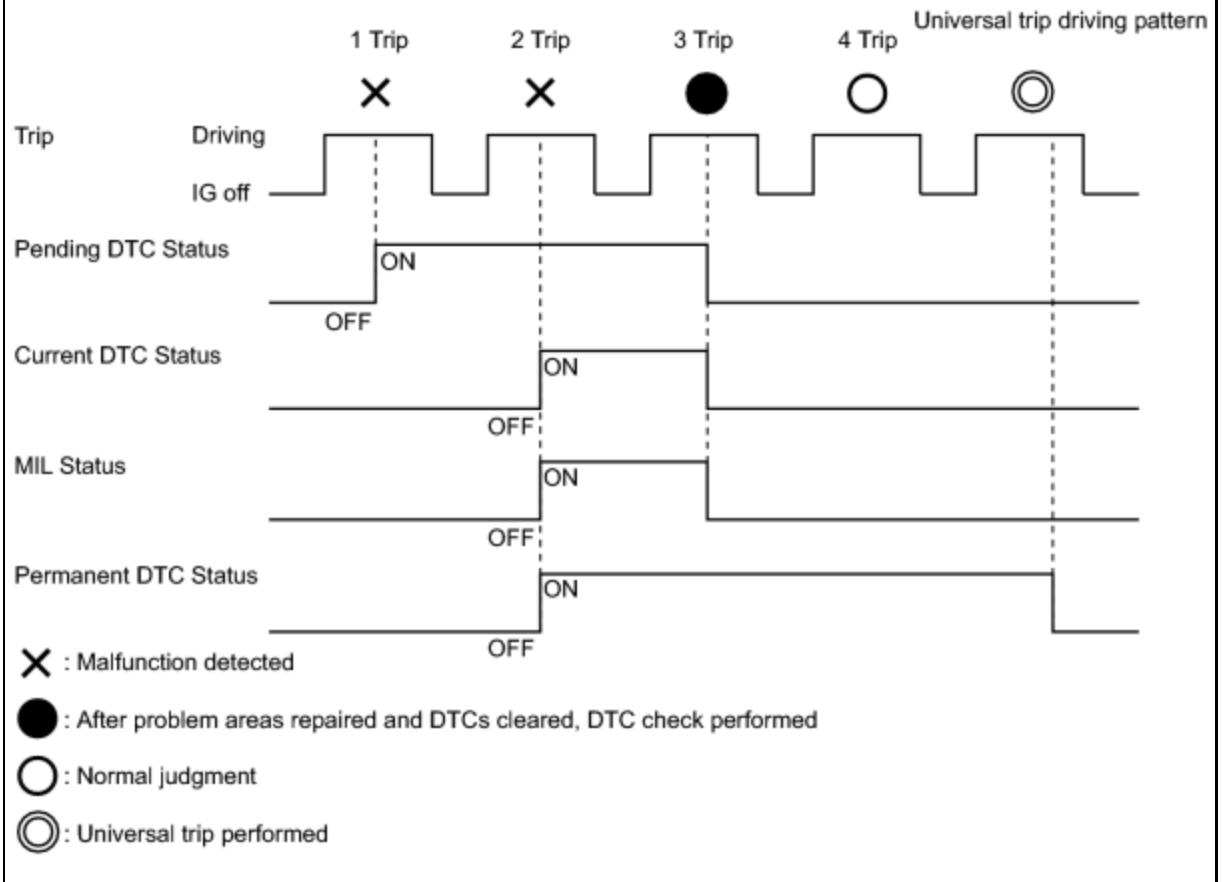
2 Trip Detection Examples

Pending DTC	Store condition	Malfunction detected
	Clear condition	System determined to be normal or DTCs cleared using Techstream or Cable disconnected from negative (-) battery terminal
Current DTC	Store condition	Malfunction detected (2nd trip)
	Clear condition	No malfunctions in 40 driving cycles or DTCs cleared using Techstream or Cable disconnected from negative (-) battery terminal
Permanent DTC	Store condition	Malfunction detected (2nd trip)
	Clear condition	Ignition switch turned to ON after normal judgment obtained in 3 consecutive driving cycles or After DTCs cleared using Techstream or cable disconnected from negative (-) battery terminal, normal judgment obtained and universal trip performed (not for misfire and fuel system DTCs)

		or After DTCs cleared using Techstream or cable disconnected from negative (-) battery terminal, malfunction not detected when universal trip driving performed (misfire and fuel system DTCs)
MIL	ON	Malfunction detected (2nd trip)
	OFF	Ignition switch turned to ON after normal judgment obtained in 3 consecutive driving cycles or DTCs cleared using Techstream or Cable disconnected from negative (-) battery terminal



2 Trip Detection Examples (Instance when DTCs were cleared midway through by using the Techstream or by disconnecting the cable from the negative battery terminal)



HINT:

- Obtaining a normal judgment and performing a universal trip driving pattern can be done in the same driving cycle or in different driving cycles.
- It is unnecessary to obtain a normal judgment if the DTCs are misfire or fuel system DTCs.

1. CHECK DTC

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Check DTCs and freeze frame data, and then write them down.
- (f) Check the details of the DTCs INFO.

2. CLEAR DTC (Pending and Current DTC)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Clear DTCs.

3. CLEAR DTC (Pending and Current DTC without using Techstream)

(a) Perform either of the following operations:

NOTICE:

After turning ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO** .

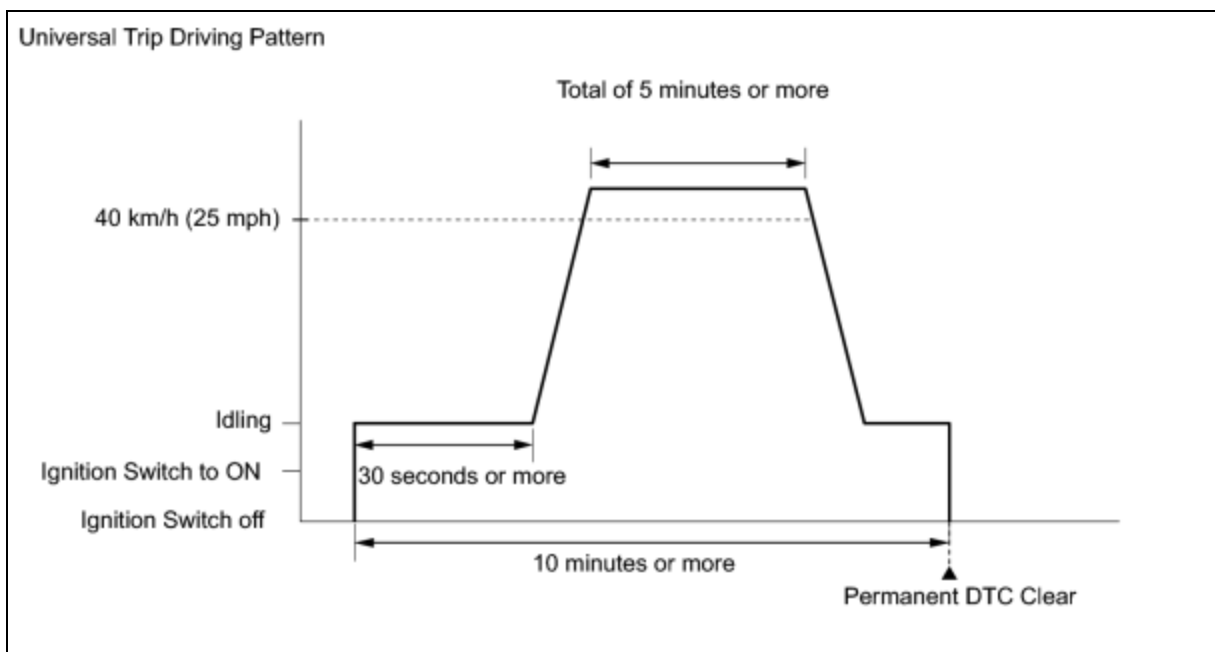
(1) Disconnect the cable from the negative (-) battery terminal for more than 1 minute.

(2) Remove the EFI (+B) fuse from the engine room relay block assembly located inside the engine compartment for more than 1 minute.

4. CLEAR PERMANENT DTC

HINT:

Even if the following procedure is not performed, permanent DTCs are cleared by obtaining a normal judgment during 3 consecutive driving cycles.



- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Trouble Codes.
- Check if permanent DTCs are stored.

HINT:

If permanent DTCs are not output, it is not necessary to continue this procedure.

- Clear DTCs.
- Perform the respective confirmation driving patterns in order to obtain a normal judgment for the output DTCs.

HINT:

- Confirmation driving patterns do not need to be performed for misfire and fuel system DTCs.
- For the confirmation driving pattern, refer to the procedures for the relevant DTC **INFO** .

(h) Perform the universal trip.

HINT:

The driving pattern to obtain a normal judgment and the universal trip driving can be performed consecutively in the same driving cycle.

1. Idle the engine for 30 seconds or more.
2. Drive the vehicle at 40 km/h (25 mph) or more for a total of 5 minutes or more.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

HINT:

It is possible to complete the drive pattern even if the vehicle decelerates to less than 40 km/h (25 mph) during the driving cycle provided that the vehicle is driven at 40 km/h (25 mph) or more for a total of 5 minutes.

3. Allow 10 minutes or more to elapse from the time the engine is started.
 - (i) Enter the following menus: Powertrain / Engine / Trouble Codes.
 - (j) Check that the permanent DTCs have been cleared.

HINT:

The permanent DTCs are cleared when the universal trip is completed.



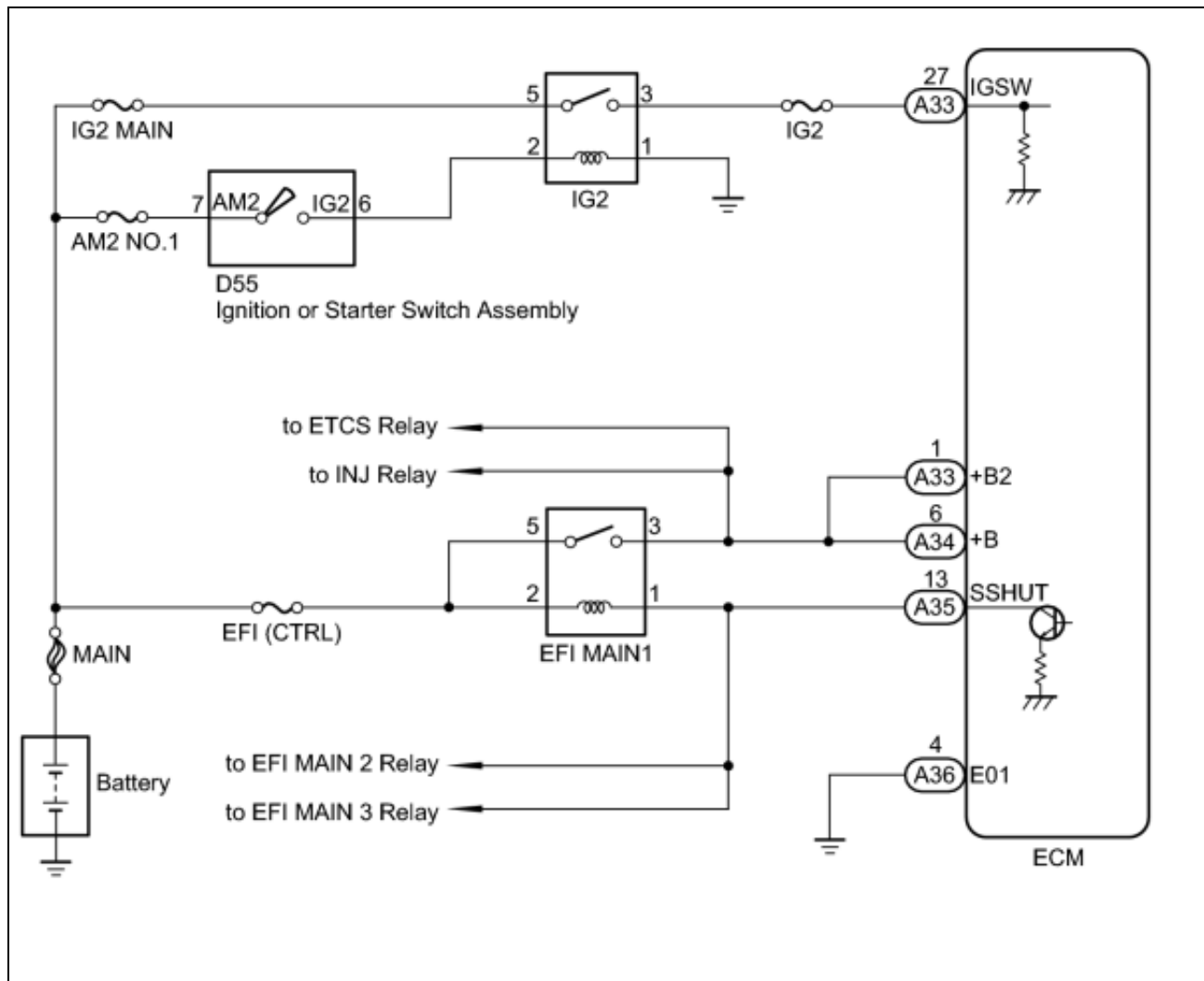
Last Modified: 4-14-2014	6.6 J	Doc ID: RM000001F7102QX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 - 05/2013]
Title: FA20 ENGINE CONTROL: SFI SYSTEM: ECM Power Source Circuit; 2013 MY FR-S [03/2012 - 05/2013]		

ECM Power Source Circuit

DESCRIPTION

When the ignition switch is turned to ON, the IGSW signal is input into the ECM. This turns the internal transistor ON, causing the current to flow to the EFI MAIN1 relay coil, which closes the relay, supplying power to the ECM +B and +B2 terminals.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

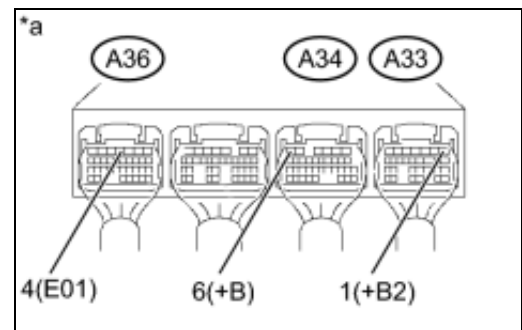
PROCEDURE

1. INSPECT ECM (POWER SOURCE VOLTAGE)

- (a) Turn the ignition switch to ON.
- (b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-6 (+B) - A36-4 (E01)	Ignition switch ON	12 to 14 V
A33-1 (+B2) - A36-4 (E01)	Ignition switch ON	12 to 14 V



Text in Illustration

*a	Component with harness connected (ECM)
----	--

NG **GO TO STEP 4**

OK



2. CHECK HARNESS AND CONNECTOR (ECM - BODY GROUND)

- (a) Disconnect the ECM connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-4 (E01) - Body ground	Always	Below 1 Ω

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

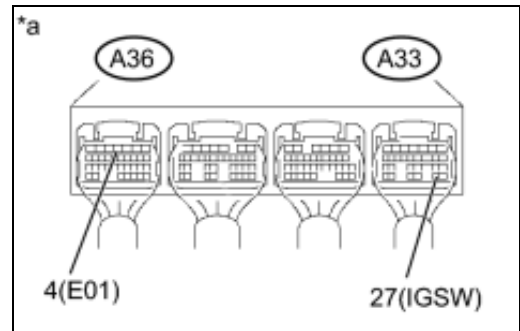
OK
▼

3. INSPECT ECM (IGSW TERMINAL VOLTAGE)

- (a) Turn the ignition switch to ON.
- (b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-27 (IGSW) - A36-4 (E01)	Ignition switch ON	10 to 13 V



Text in Illustration

*a	Component without harness connected (ECM)
----	---

NG ▶ **GO TO STEP 8**

OK ▶ **REPLACE ECM**

4. INSPECT ECM (SSHUT TERMINAL VOLTAGE)

- (a) Turn the ignition switch to ON.
- (b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

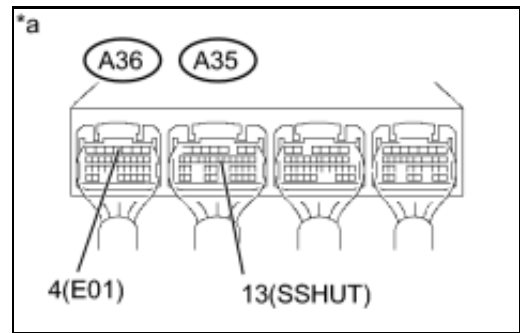

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION

A35-13 (SSHUT) - A36-4
(E01)Ignition switch
ON

approximately 0 V

Text in Illustration

*a

Component without harness connected
(ECM)**NG** ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****5. INSPECT RELAY (EFI MAIN1)**(a) Inspect the EFI MAIN1 relay  .**NG** ▶ **REPLACE RELAY (EFI MAIN1)****OK****6. CHECK HARNESS AND CONNECTOR (EFI MAIN1 RELAY - ECM)**

- (a) Remove the EFI MAIN1 relay from the engine room relay block assembly.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN1 relay terminal 1 - A35-13 (SSHUT)	Always	Below 1 Ω
EFI MAIN1 relay terminal 3 - A34-6 (+B)	Always	Below 1 Ω
EFI MAIN1 relay terminal 3 - A33-1 (+B2)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN1 relay terminal 1 or A35-13 (SSHUT) - Body ground	Always	10 k Ω or higher
EFI MAIN1 relay terminal 3, A34-6 (+B) or A33-1 (+B2) - Body ground	Always	10 k Ω or higher

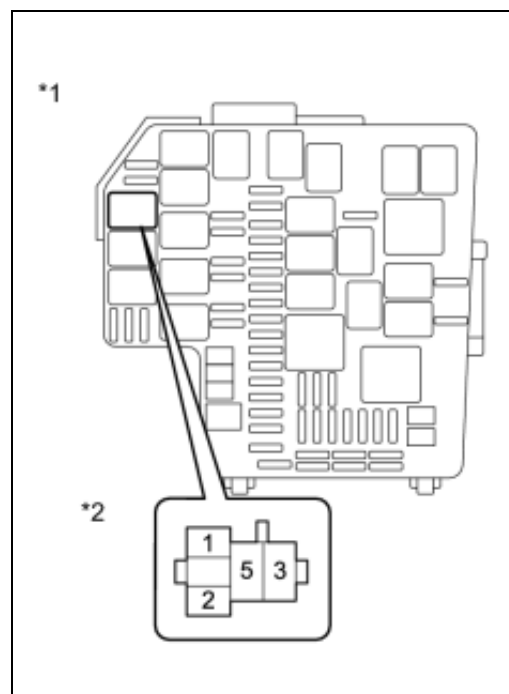
NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



7. INSPECT TERMINAL VOLTAGE (EFI MAIN1 RELAY)

(a) Remove the EFI MAIN1 relay from the engine room relay block assembly.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN1 relay terminal 2 - Body ground	Always	11 to 14 V
EFI MAIN1 relay terminal 5 - Body ground	Always	11 to 14 V

Text in Illustration

*1	Engine Room Relay Block Assembly
*2	EFI MAIN1 Relay Terminal

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



8. CHECK HARNESS AND CONNECTOR (IG2 RELAY - ECM)

- (a) Remove the IG2 relay from the engine room relay block assembly.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
IG2 relay terminal 3 - A33-27 (IGSW)	Always	Below 1 Ω
IG2 relay terminal 1 - Body ground	Always	Below 1 Ω

Standard Resistance (Check for short):


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
IG2 relay terminal 3 or A33-27 (IGSW) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



9. INSPECT RELAY (IG2)

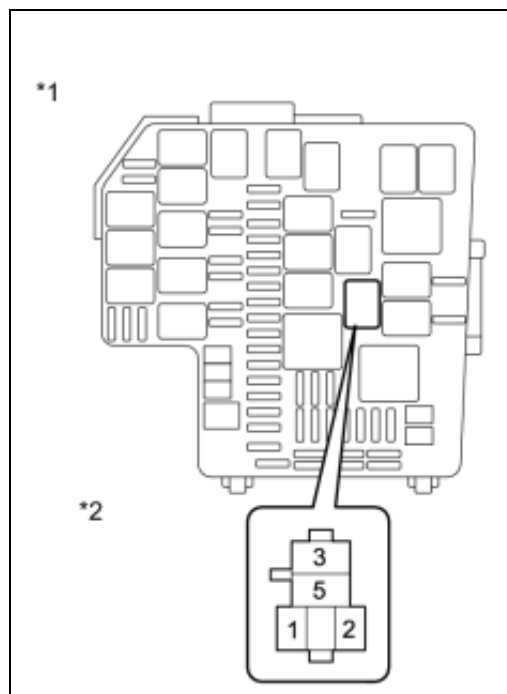
- (a) Inspect the IG2 relay  .

NG  **REPLACE RELAY (IG2)**

OK


10. INSPECT TERMINAL VOLTAGE (IG2 RELAY)

(a) Remove the IG2 relay from the engine room relay block assembly.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
IG2 relay terminal 5 - Body ground	Always	11 to 14 V

Text in Illustration

*1	Engine Room Relay Block Assembly
*2	IG2 Relay Terminal

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



11.	CHECK HARNESS AND CONNECTOR (IG2 RELAY - IGNITION OR STARTER SWITCH ASSEMBLY)
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- (a) Remove the IG2 relay from the engine room relay block assembly.
- (b) Disconnect the ignition or starter switch assembly connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
IG2 relay terminal 2 - D55-6 (IG2)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
IG2 relay terminal 2 or D55-6 (IG2) - Body ground	Always	10 k Ω or higher

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



12.	INSPECT IGNITION OR STARTER SWITCH ASSEMBLY
------------	--

- (a) Inspect the ignition or starter switch assembly .

NG **REPLACE IGNITION OR STARTER SWITCH ASSEMBLY**

OK **REPAIR OR REPLACE HARNESS OR CONNECTOR**



Last Modified: 4-14-2014	6.6 J	Doc ID: RM0000011IO036X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE CONTROL: SFI SYSTEM: EVAP System; 2013 MY FR-S [03/2012 -]		

EVAP System

RELATED DTCS

DTC NO.	MONITORING ITEM	SEE PAGE
P0441	Purge flow	INFO
P0451	Difference between canister pressure sensor (built into canister pump module) output value and manifold absolute pressure sensor output value	INFO
P0452	Canister pressure sensor (built into canister pump module) voltage low	INFO
P0453	Canister pressure sensor (built into canister pump module) voltage high	
P0455	EVAP gross leak	INFO
P0456	EVAP small leak	INFO
P0458	Purge valve voltage low	
P0459	Purge valve voltage high	
P1449	Air filter clogged (built into canister pump module)	INFO
P1451	Pipe clogged	INFO
P2404	<ul style="list-style-type: none"> Reference orifice high-flow (built into canister pump module) Reference orifice low-flow (built into canister pump module) 	
P2401	Leak detection pump stuck OFF (built into canister pump module)	INFO
P2402	Leak detection pump stuck ON (built into canister pump module)	
P2419	Vent valve stuck closed (built into canister pump module)	
P2420	Vent valve stuck open (vent) (built into canister pump module)	
P2610	Soak timer (built into ECM)	INFO

If any EVAP system DTCs are stored, the malfunctioning area can be determined using the table below.

Malfunctioning Areas	DTCs	P0441	P0451	P0452	P0453	P0455	P0456	P0458	P0459

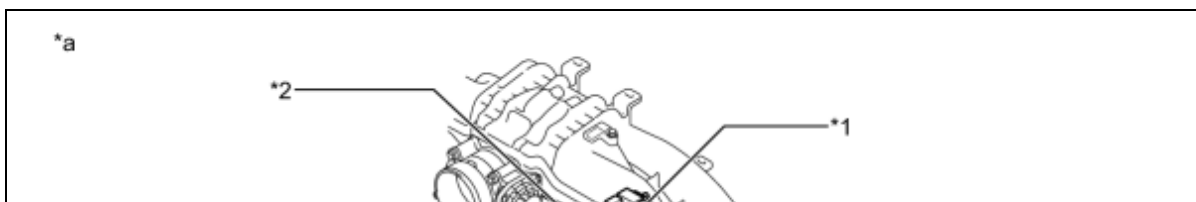
Purge valve stuck open	●				●		
Purge valve stuck closed	●						
Purge valve low output						●	
Purge valve high output							●
Canister pressure sensor signal fixed		●					
Canister pressure sensor low output			●				
Canister pressure sensor high output				●			
Gross leak	●				●		
Small leak						●	

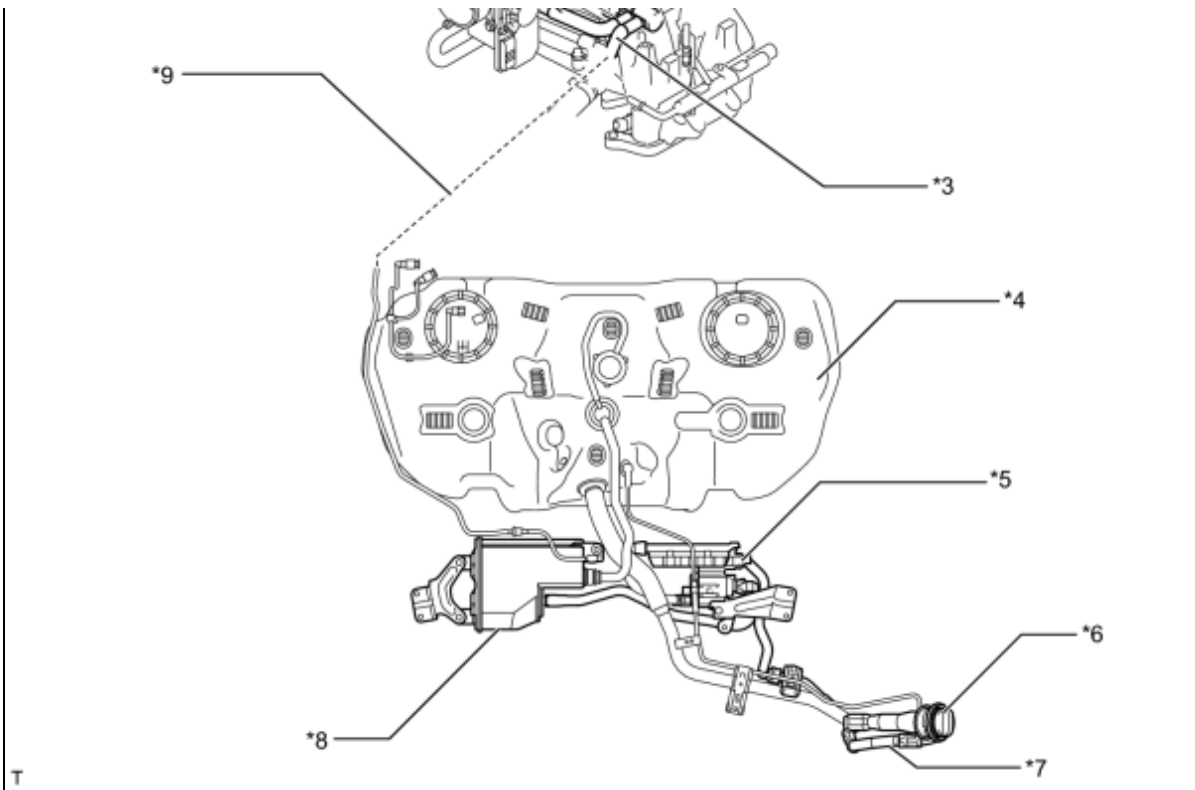
Malfunctioning Areas	DTCs						
	P1449	P1451	P2401	P2402	P2404	P2419	P2420
Reference orifice low-flow					●		
Reference orifice high-flow					●		
Leak detection pump stuck OFF			●		●		
Leak detection pump stuck ON				●	●		
Vent valve stuck closed					●	●	
Vent valve stuck open					●		●
Canister filter clogged		●					
Pipe clogged	●						

NOTICE:

If the reference pressure difference between the first and second checks is more than the specification, all the DTCs relating to the reference pressure (P0455, P0456, P1451, P2404) will all be stored.

DESCRIPTION



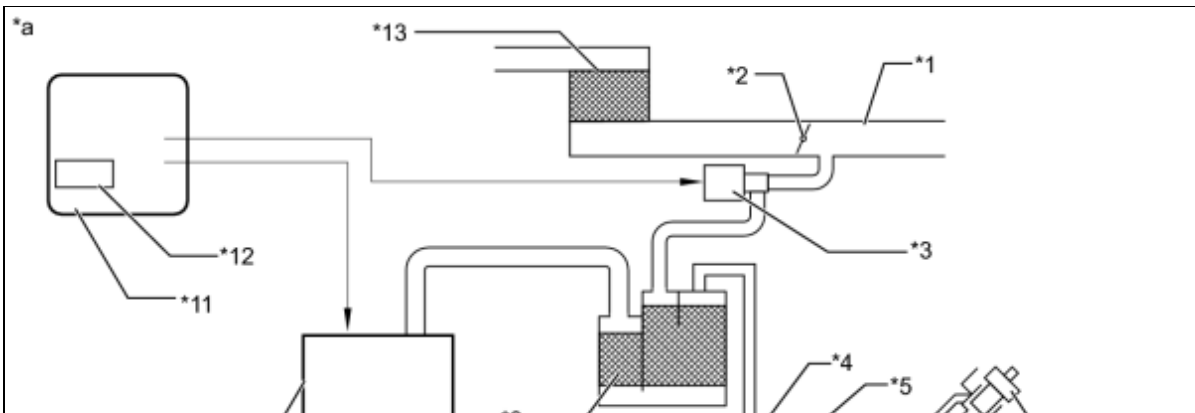


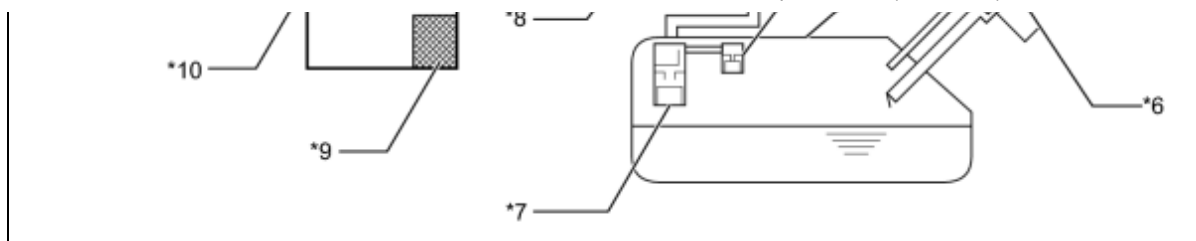
Text in Illustration

*1	Purge Valve	*2	EVAP Hose (to Intake Manifold)
*3	EVAP Hose (from Charcoal Canister Assembly)	*4	Fuel Tank
*5	Canister Pump Module - Canister Pressure Sensor - Leak Detection Pump - Vent Valve - Canister filter	*6	Fuel Tank Cap Assembly
*7	Air Inlet Port	*8	Charcoal Canister Assembly
*9	Purge Line	-	-
*a	Location of EVAP (Evaporative Emission) System	-	-

HINT:

The canister pressure sensor, the canister filter, the leak detection pump and the vent valve are built into the canister pump module.





Text in Illustration

*1	Intake Manifold	*2	Throttle Valve
*3	Purge Valve	*4	Cut-off Valve
*5	Fuel Tank	*6	Fuel Tank Cap Assembly
*7	Fuel Tank Vent Valve	*8	Charcoal Canister Assembly (Charcoal Filter)
*9	Canister Filter	*10	Canister Pump Module
*11	ECM	*12	Soak Timer
*13	Air Cleaner	-	-
*a	EVAP System Circuit	-	-

NOTICE:

In the EVAP system of this vehicle, turning ON the vent valve does not seal off the EVAP system. To check for leaks in the EVAP system, disconnect the air inlet drain hose and apply pressure from atmospheric side of the charcoal canister assembly.

While the engine is running, if a predetermined condition (closed-loop, etc.) is met, the purge valve is opened by the ECM and fuel vapors stored in the charcoal canister assembly are purged to the intake manifold. The ECM changes the duty cycle ratio of the purge valve to control purge flow volume.

The purge flow volume is also determined by the intake manifold pressure. Atmospheric pressure is allowed into the charcoal canister assembly through the vent valve to ensure that the purge flow is maintained when negative pressure (vacuum) is applied to the charcoal canister assembly.

The following two monitors run to confirm appropriate EVAP system operation.

1. Purge flow monitor

The purge flow monitor consists of the 2 monitors. The 1st monitor is conducted every time and the 2nd monitor is activated if necessary.

- The 1st monitor

While the engine is running and the purge valve (Vacuum Switching Valve) is on (open), the ECM monitors the purge flow by measuring the EVAP pressure change. If the variation in the pressure is less than threshold, the ECM begins the 2nd monitor.

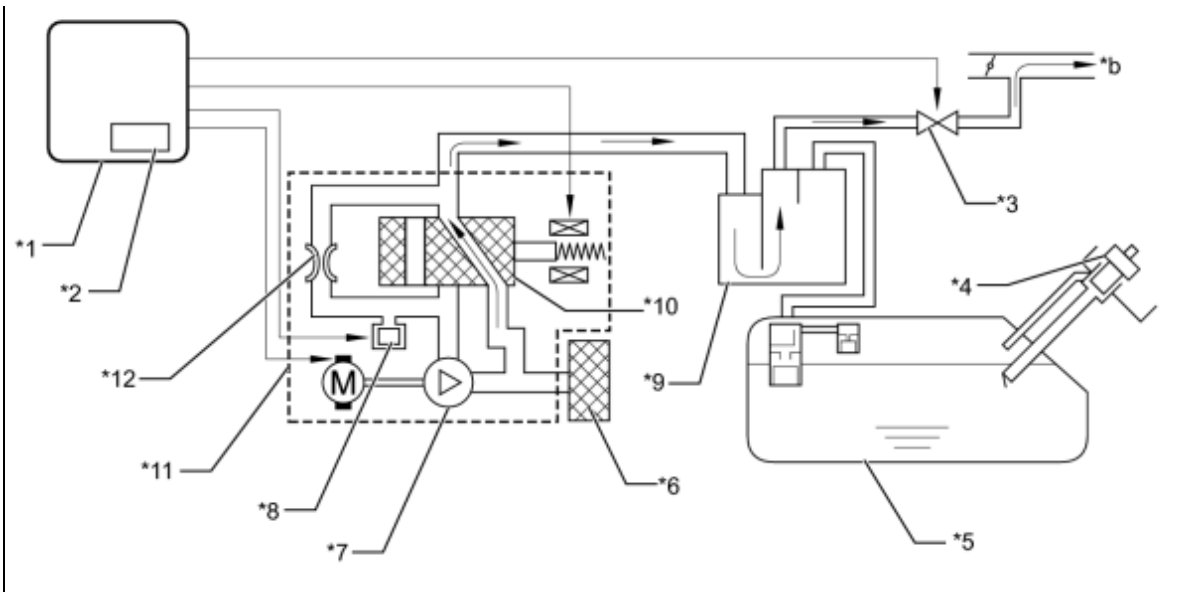
- The 2nd monitor

The vent valve is turned ON (closed) and the EVAP pressure is then measured. If the variation in the pressure is less than threshold, the ECM interprets this as the purge valve being stuck closed, and illuminates the MIL and stores DTC P0441 (2 trip detection logic).

Atmospheric pressure check:

In order to ensure reliable malfunction detection, the variation between the atmospheric pressures, before and after of the purge flow monitor, is measured by the ECM.

*a

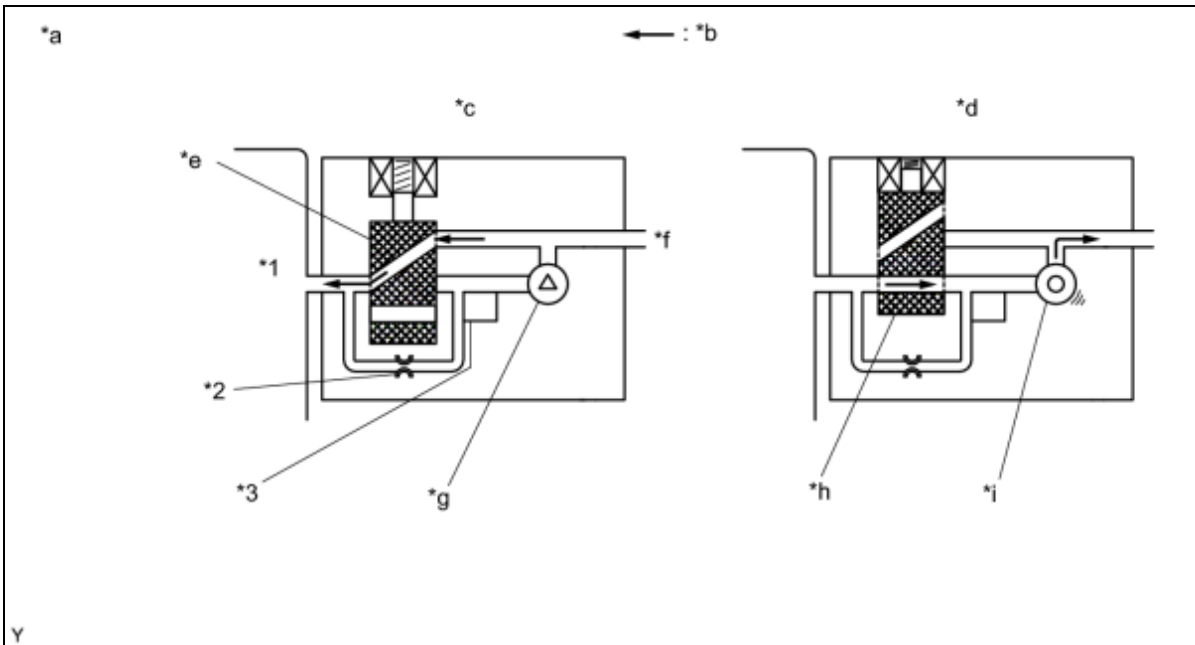


Text in Illustration

*1	ECM	*2	Soak Timer
*3	Purge Valve (on)	*4	Fuel Tank Cap Assembly
*5	Fuel Tank	*6	Canister Filter
*7	Leak Detection Pump (off)	*8	Canister Pressure Sensor
*9	Charcoal Canister Assembly	*10	Vent Valve (off)
*11	Canister Pump Module	*12	Reference Orifice (0.02 inch)
*a	EVAP Purge Flow	*b	to Intake Manifold

COMPONENT	OPERATION
Charcoal Canister Assembly	Contains activated charcoal to absorb EVAP (Evaporative Emissions) generated in fuel tank.
Cut-off valve	Located in fuel tank. Valve closes by its own weight when vehicle overturns to prevent fuel from spilling out.
Purge valve (Vacuum Switching Valve)	Opens or closes line between charcoal canister assembly and intake manifold. ECM uses purge valve to control EVAP purge flow. In order to discharge EVAP absorbed by charcoal canister assembly to intake manifold, ECM opens purge valve. EVAP discharge volume to intake manifold controlled by purge valve duty cycle (current-carrying time). (Open: on, Close: off)
Fuel tank vent valve	Located in the fuel tank. Passes evaporative emissions occurring during fueling to the charcoal canister assembly. Additionally, this mechanism also detects when the fuel tank is full.
Soak timer	Built into ECM. To ensure accurate EVAP monitor, measures 5 hours (+/-15 min) after ignition switch is turned off. This allows fuel to cool down, stabilizing EVAP pressure. When approximately 5 hours elapsed, ECM activates (refer to fig. 3).
Canister pump module	Consists of (a) to (d) below. Canister pump module cannot be disassembled.
(a) Vent valve	Vents and closes EVAP system. When ECM turns valve on, EVAP system is closed. When ECM turns valve off, EVAP system is vented. Negative pressure (vacuum) is created in EVAP system to check for EVAP leaks by closing purge valve, turning on vent valve (closing it) and operating leak detection

	pump (refer to fig. 1).
(b) Canister pressure sensor	Indicates pressure as voltages. ECM supplies regulated 5 V to pressure sensor, and uses feedback from sensor to monitor EVAP system pressure (refer to fig. 2).
(c) Leak detection pump	Creates negative pressure (vacuum) in EVAP system for leak check.
(d) Reference orifice	Has opening with 0.02 inch diameter. Vacuum is produced through orifice by closing purge valve, turning off vent valve and operating leak detection pump, to monitor reference pressure. Reference pressure indicates a small leak of EVAP.

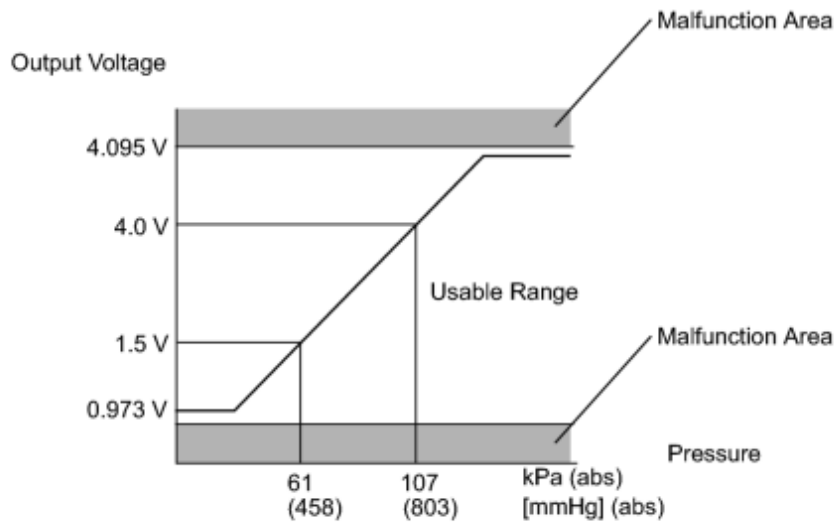


Text in Illustration

*1	Canister	*2	Reference Orifice (0.02 Inch)
*3	Canister Pressure Sensor	-	-

*a	Canister Pump Module (fig. 1)	*b	Airflow
*c	Condition: Purge Flow	*d	Condition: Leak Check
*e	Vent Valve: off (vent)	*f	to Canister Filter (Atmosphere)
*g	Leak Detection Pump: off	*h	Vent Valve: on (closed)
*i	Leak Detection Pump: on	-	-

Canister Pressure Sensor Specification (fig.2)

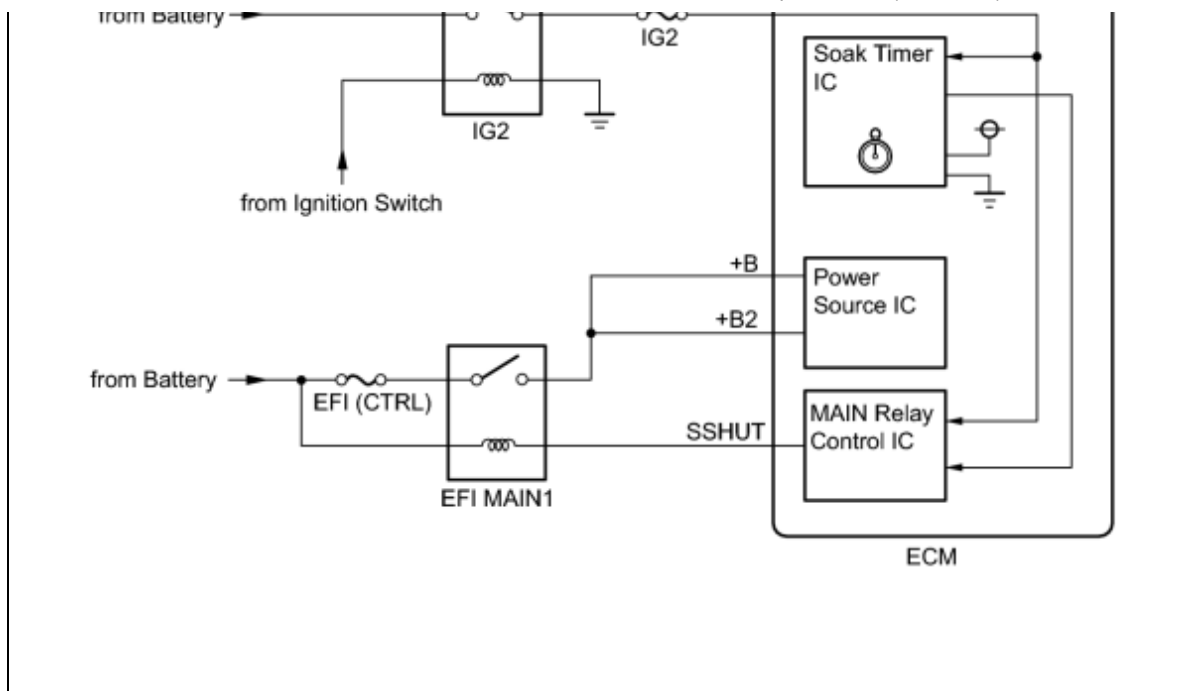


HINT:

Standard atmospheric pressure is 101.3 kPa (abs) [760 mmHg (abs)]

fig. 3





WIRING DIAGRAM

Refer to DTC P0451 INFO.

INSPECTION PROCEDURE

NOTICE:

- Inspect the fuses for circuits related to this system before performing the following inspection procedure.
- The Techstream is required to conduct the following diagnostic troubleshooting procedure.

HINT:

- Using the Techstream monitor results enables the EVAP (Evaporative Emission) system to be confirmed.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	CONFIRM DTC
-----------	--------------------

- Turn the ignition switch off and wait for 10 seconds.
- Turn the ignition switch to ON.
- Turn the ignition switch off and wait for 10 seconds.
- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON and turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Trouble Codes.
- Confirm DTCs and freeze frame data.

If any EVAP system DTCs are stored, the malfunctioning area can be determined using the table below.

Malfunctioning Areas	DTCs							
	P0441	P0451	P0452	P0453	P0455	P0456	P0458	P0459
Purge valve stuck open	●				●			
Purge valve stuck closed	●							
Purge valve low output							●	
Purge valve high output								●
Canister pressure sensor signal fixed		●						
Canister pressure sensor low output			●					
Canister pressure sensor high output				●				
Gross leak	●				●			
Small leak						●		

Malfunctioning Areas	DTCs						
	P1449	P1451	P2401	P2402	P2404	P2419	P2420
Reference orifice low-flow					●		
Reference orifice high-flow					●		
Leak detection pump stuck OFF			●		●		
Leak detection pump stuck ON							

Leak detection pump stuck off				●	●		
Vent valve stuck closed					●	●	
Vent valve stuck open					●		●
Canister filter clogged		●					
Pipe clogged	●						

NOTICE:

If the reference pressure difference between the first and second checks is more than the specification, all the DTCs relating to the reference pressure (P0455, P0456, P1451, P2404) will all be stored.

NEXT



2. PERFORM EVAP SYSTEM CHECK (AUTOMATIC MODE)

NOTICE:

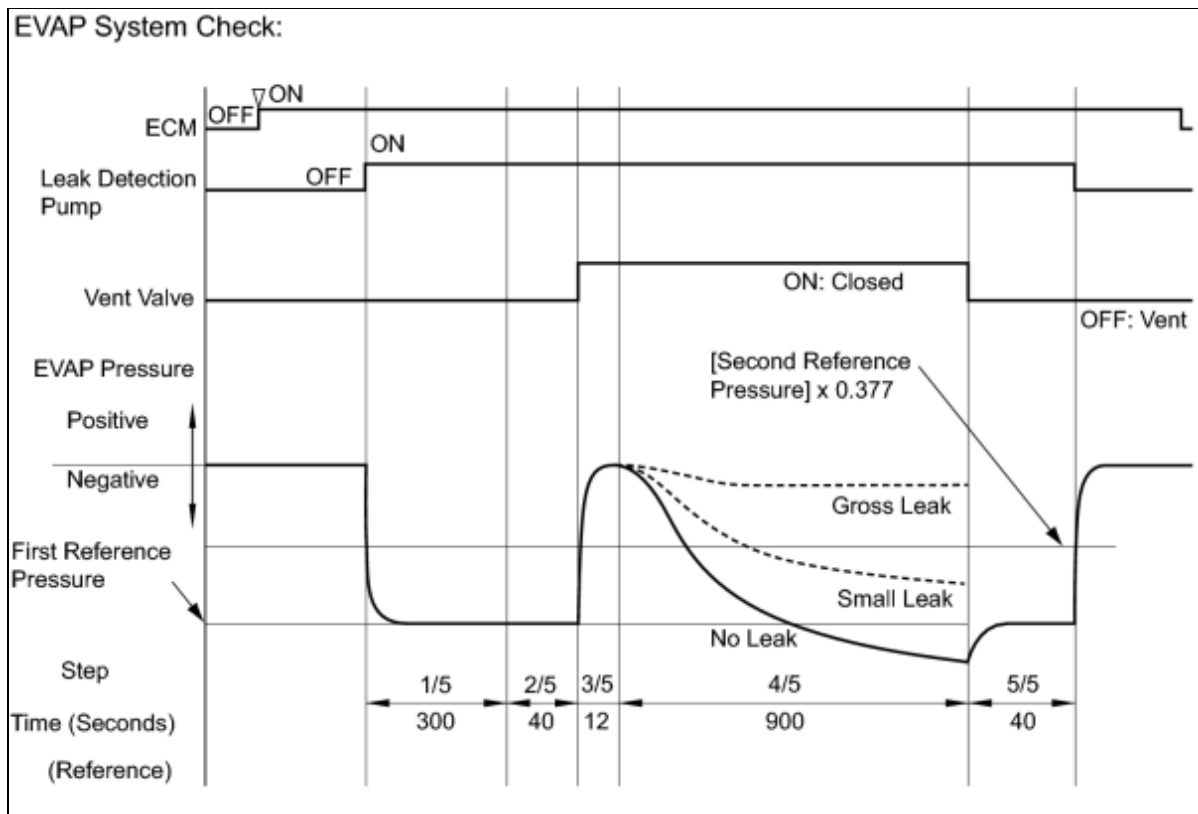
- The Evaporative System Check (Automatic Mode) consists of 5 steps performed automatically by the Techstream. It takes a maximum of approximately 24 minutes.
- Do not perform the Evaporative System Check when the fuel tank is more than 90% full because the cut-off valve may be closed, making the fuel tank leak check unavailable.
- Do not run the engine during this operation.
- When the temperature of the fuel is 35°C (95°F) or more, a large amount of vapor forms and any check results become inaccurate. When performing the Evaporative System Check, keep the fuel temperature below 35°C (95°F) and the coolant temperature below 45°C (113°F).

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs INFO.
- (e) Enter the following menus: Powertrain / Engine / Utility / Evaporative System Check / Automatic Mode.
- (f) After the EVAP SYSTEM CHECK is completed, check for pending DTCs by entering the following menus: Powertrain / Engine / Trouble Codes.

NEXT



3. PERFORM EVAP SYSTEM CHECK (MANUAL MODE)

**NOTICE:**

- In the Evaporative System Check (Manual Mode), the series of 5 Evaporative System Check steps are performed manually using the Techstream.
- Do not perform the Evaporative System Check when the fuel tank is more than 90% full because the cut-off valve may be closed, making the fuel tank leak check unavailable.
- Do not run the engine during this operation.
- When the temperature of the fuel is 35°C (95°F) or more, a large amount of vapor forms and any check results become inaccurate. When performing the Evaporative System Check, keep the fuel temperature below 35°C (95°F) and the coolant temperature below 45°C (113°F).

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

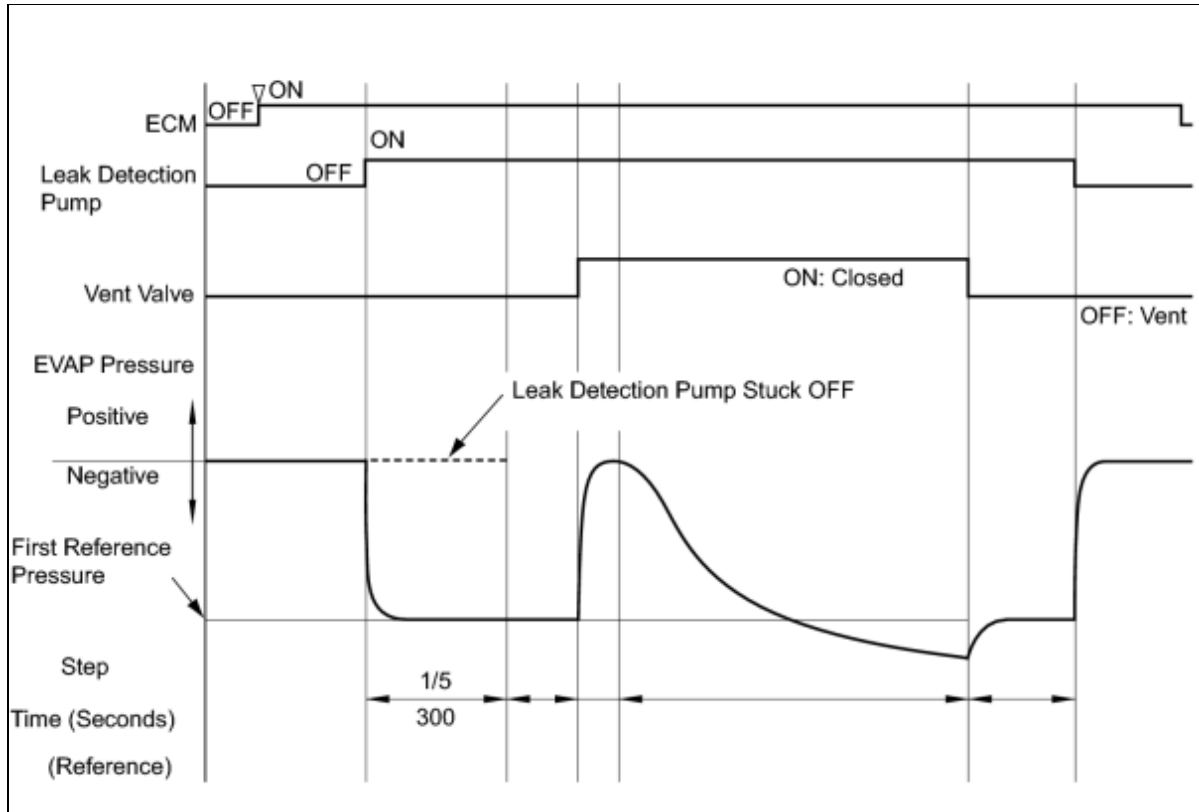
(c) Turn the Techstream on.

(d) Clear the DTCs INFO.

(e) Enter the following menus: Powertrain / Engine / Utility / Evaporative System Check / Manual Mode.



4. PERFORM EVAP SYSTEM CHECK (STEP 1/5)



(a) Check the EVAP pressure in step 1/5.

Result

DTC *	RESULT	SUSPECTED TROUBLE AREA	PROCEED TO
-	Virtually no variation in EVAP pressure	Not yet determined	A
P2404	EVAP pressure is less than -0.224 kPa(gauge) [2 mmHg(gauge)]	Leak detection pump stuck OFF	B

*: These DTCs are already present in the ECM when the vehicle arrives and are confirmed in the "Confirm DTC" procedure above.

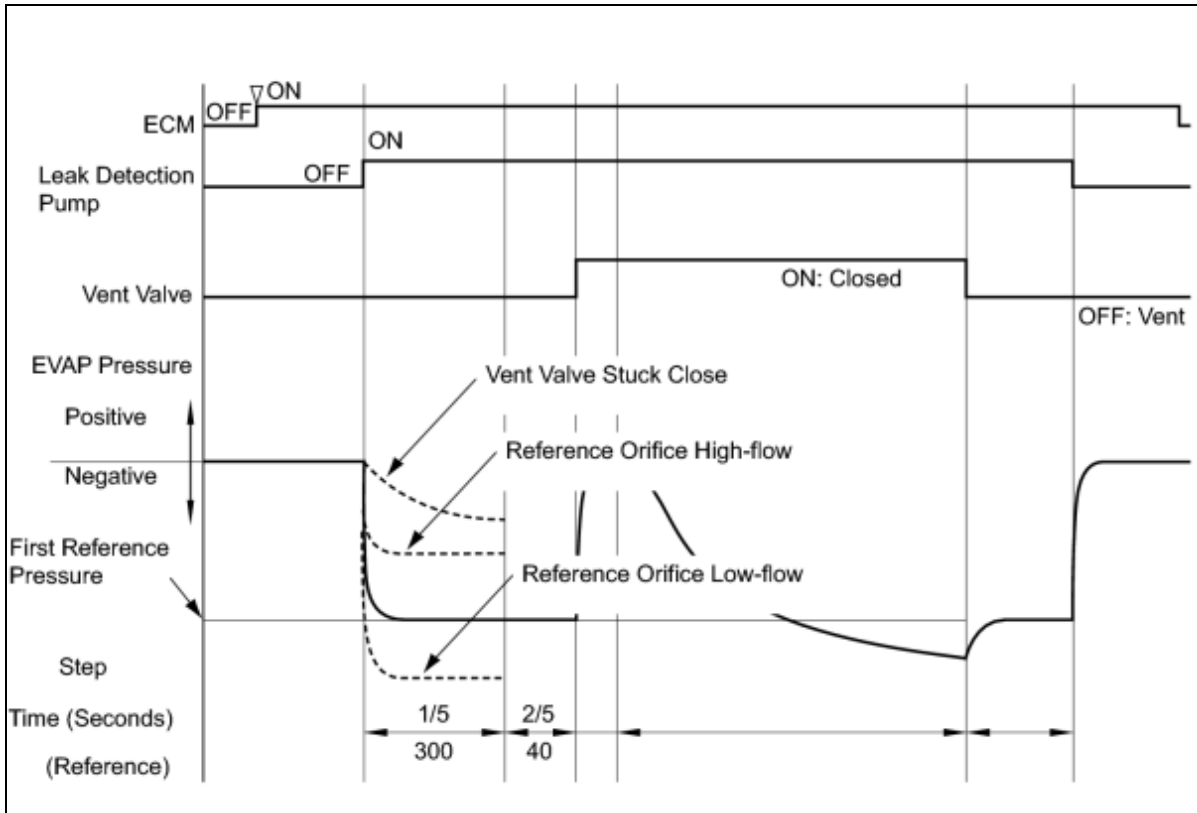
B **GO TO STEP 9**

A



5. PERFORM EVAP SYSTEM CHECK (STEP 2/5)

5. PERFORM EVAP SYSTEM CHECK (STEP 2/5)



(a) Check the EVAP pressure in steps 2/5.

Result

DTC*	RESULT	SUSPECTED TROUBLE AREA	PROCEED TO
-	Virtually no variation in EVAP pressure	Not yet determined	A
P2404	EVAP pressure fluctuates by more than +/- 0.3 kPa (gauge) [2 mmHg (gauge)]	<ul style="list-style-type: none"> • Vent valve stuck close • Reference orifice high-flow • Reference orifice low-flow 	B

*: These DTCs are already present in the ECM when the vehicle arrives and are confirmed in the "Confirm DTC" procedure above.

HINT:

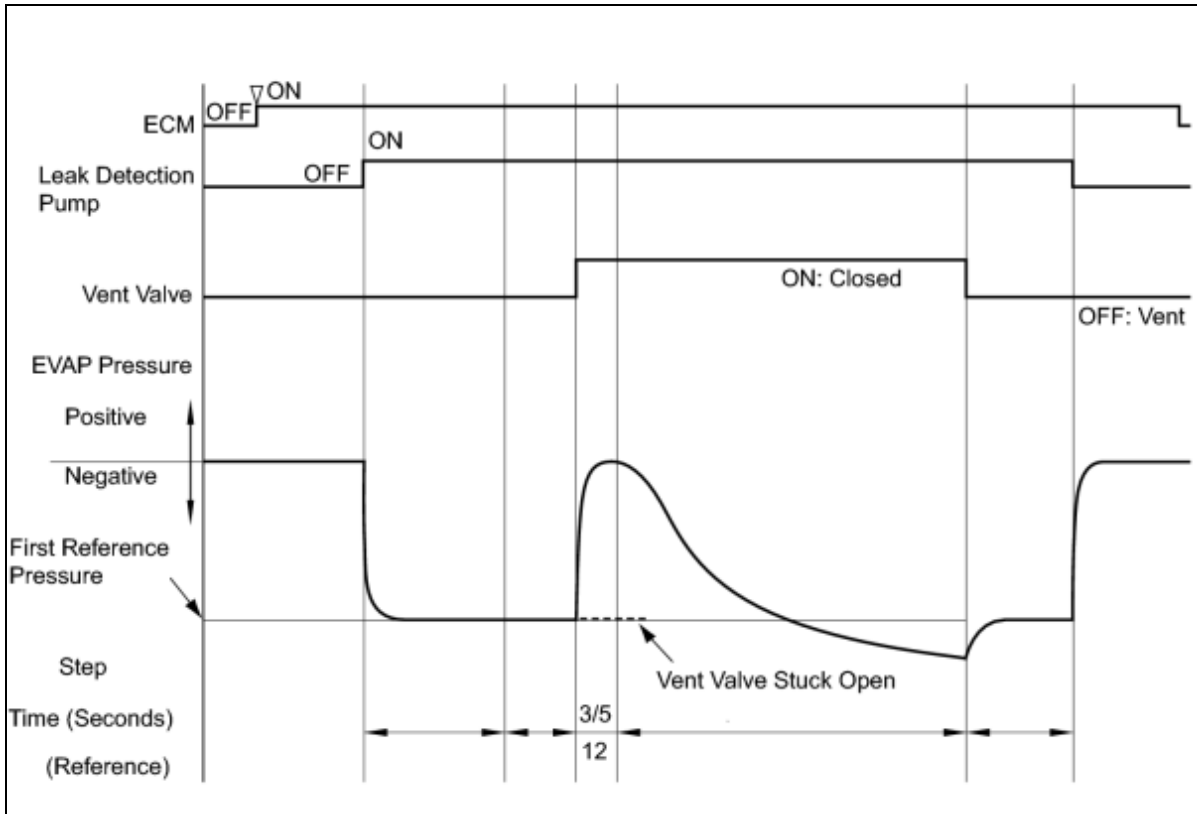
The first reference pressure is the value determined in step 2/5.

B **GO TO STEP 12**

A



6. PERFORM EVAP SYSTEM CHECK (STEP 3/5)



(a) Check the EVAP pressure in step 3/5.

Result

DTC*	RESULT	SUSPECTED TROUBLE AREA	PROCEED TO
-	EVAP pressure increases by 0.2 kPa (gauge) [2 mmHg (gauge)] or more within 12 seconds.	Not yet determined	A
P2404	<ul style="list-style-type: none"> EVAP pressure increases by less than 0.2 kPa (gauge) [2 mmHg (gauge)] within 12 seconds. Virtually no variation in EVAP pressure 	Vent valve stuck open	B

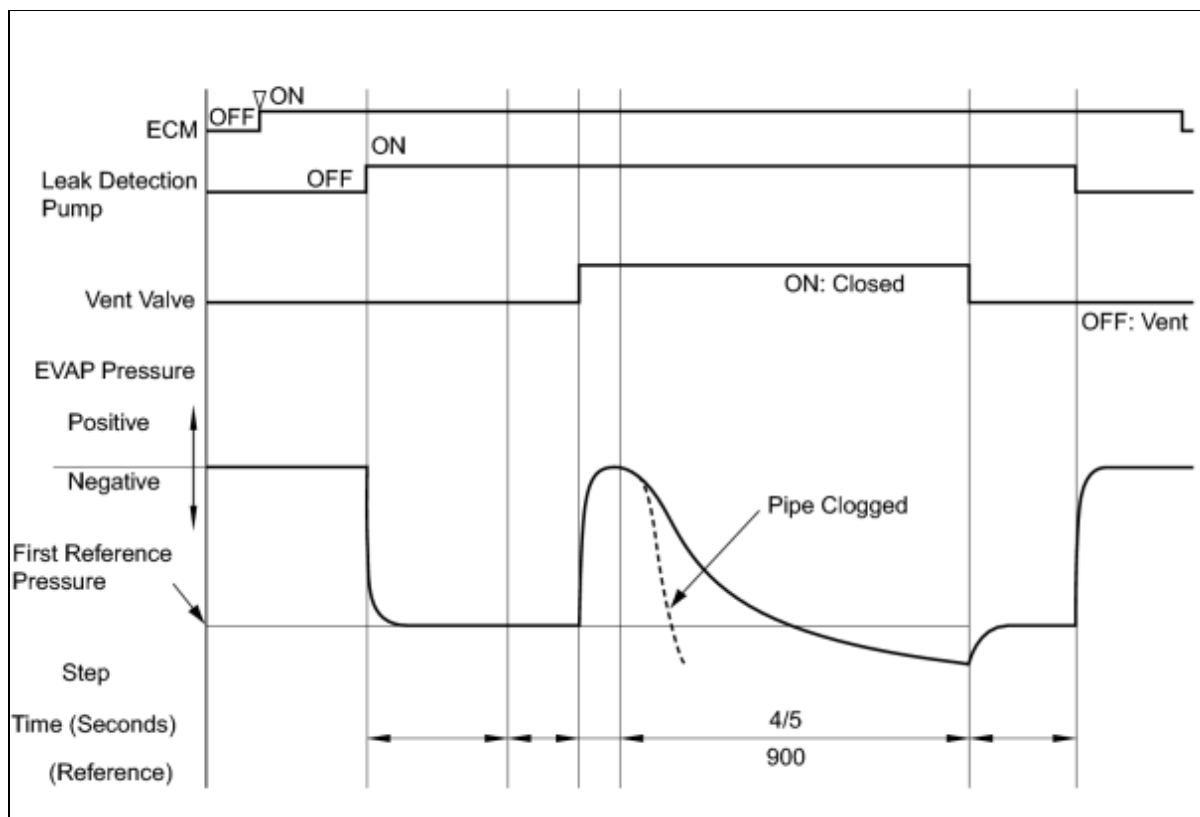
*: These DTCs are already present in the ECM when the vehicle arrives and are confirmed in the "Confirm DTC" procedure above.

B **GO TO STEP 14**

A



7. PERFORM EVAP SYSTEM CHECK (STEP 4/5)



(a) Check the EVAP pressure in step 4/5.

Result

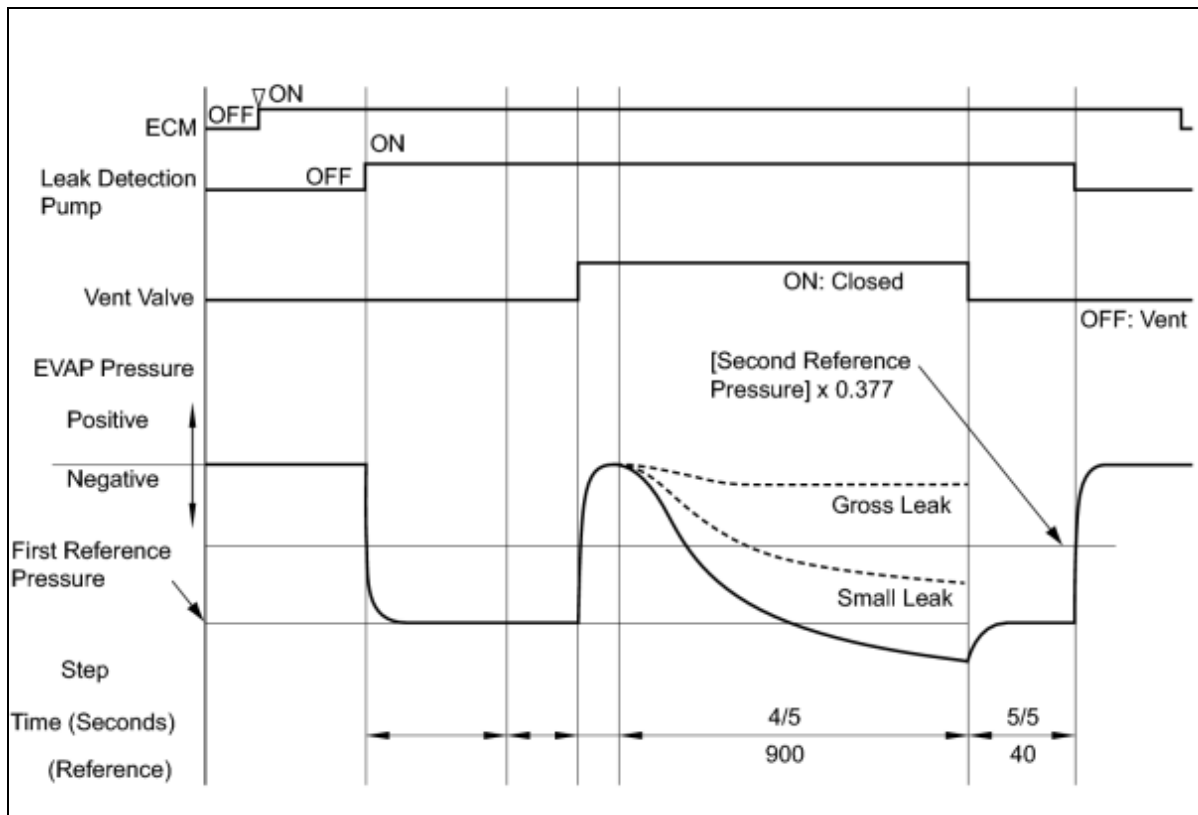
DTC*	RESULT	SUSPECTED TROUBLE AREA	PROCEED TO
-	EVAP pressure is more than -5 kPa (gauge) [-38 mmHg (gauge)] within 900 seconds	Not yet determined	A
P1451	EVAP pressure is reference pressure -0.9 kPa [- 7 mmHg] less then -5 kPa (gauge) [-38 mmHg (gauge)] within 27 seconds	Pipe clogged	B

*: These DTCs are already present in the ECM when the vehicle arrives and are confirmed in the "Confirm DTC" procedure above.

B **GO TO STEP 18**

A

8. PERFORM EVAP SYSTEM CHECK (STEP 5/5)



- (a) Check the EVAP pressure in step 5/5.
- (b) Compare the EVAP pressure in step 4/5 and the reference pressure (step 5/5).

Result

DTC*	RESULT	SUSPECTED TROUBLE AREA	PROCEED TO
-	EVAP pressure increases by 0.3 kPa (gauge) [2 mmHg (gauge)] or less within 40 seconds.	Not yet determined (no leakage from EVAP system)	A
P2404	EVAP pressure increases by more than 0.3 kPa (gauge) [2 mmHg (gauge)] within 40 seconds of proceeding from step 4/5 to 5/5	EVAP gross leak	B
P0455	EVAP pressure from step 4/5 higher than [reference pressure (step 4/5) x 0.377]	EVAP gross leak	B
P0456	EVAP pressure from step 4/5 higher than reference pressure (step D)	EVAP small leak	B

*: These DTCs are already present in the ECM when the vehicle arrives and are confirmed in the "Confirm DTC" procedure above.

A ► GO TO STEP 27

B ► GO TO STEP 20

9. PERFORM ACTIVE TEST USING TECHSTREAM (ACTIVATE THE VACUUM PUMP)

(a) Enter the following menus: Powertrain / Engine / Active Test / Activate the Vacuum Pump.

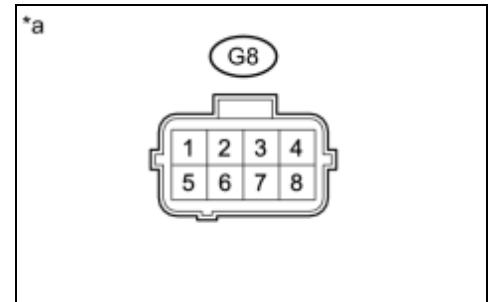
(b) Measure the voltage according to the value(s) in the table below.

Text in Illustration

*a	Front view of wire harness connector (to Canister Pump Module)
----	---

Result

TESTER CONNECTION	CONDITION	TEST RESULT	SUSPECTED TROUBLE AREA	PROCEED TO
G8-4 - Body ground	Leak detection pump on and off (Active Test ON and OFF)	Approximately 0 V when OFF and ON	Power source wire harness of leak detection pump	A
		10 to 13 V when OFF and ON	<ul style="list-style-type: none"> Wire harness or connector between leak detection pump and ECM ECM 	B
		10 to 13 V when OFF Approximately 0 V when ON	Leak detection pump	C



B ► GO TO STEP 11

C ► GO TO STEP 28

A
▼

10. INSPECT CANISTER PUMP MODULE (POWER SOURCE FOR LEAK DETECTION PUMP)

(a) Turn the ignition switch off.

(b) Disconnect the canister pump module connector.

(c) Turn the ignition switch to ON.

(d) Measure the voltage according to the value(s) in the table below.

Result

TESTER CONNECTION	CONDITION	TEST RESULT	SUSPECTED TROUBLE AREA	PROCEED TO
G8-3 - Body ground	Ignition switch ON	11 to 14 V	Canister pump module	A
		Below 1 V	Wire harness or connector between canister pump module and battery	B

A ► **GO TO STEP 28**

B ► **GO TO STEP 25**

11. CHECK HARNESS AND CONNECTOR (CANISTER PUMP MODULE - ECM)

- (a) Turn the ignition switch off.
- (b) Disconnect the canister pump module connector.
- (c) Disconnect the ECM connector.
- (d) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-8 (MPMP) - G8-4	Always	Below 1 Ω
A35-8 (MPMP) or G8-4 - Body ground	Always	10 k Ω or higher

Result

RESULT	SUSPECTED TROUBLE AREA	PROCEED TO
OK	ECM	A
NG	Wire harness or connector between ECM and canister pump module	B

A ► **GO TO STEP 30**

B ► **GO TO STEP 25**

12. INSPECT CANISTER PUMP MODULE (VENT VALVE OPERATION)

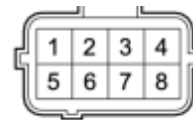
- (a) Turn the ignition switch off.

- (b) Disconnect the canister pump module connector.



Text in Illustration

*a	Component without harness connected (Canister Pump Module)
----	---



(c) Apply the battery voltage to terminals G8-5 and G8-1 of the canister pump module.

(d) Touch the canister pump module to confirm the vent valve operation.

Result

CONDITION	TESTER RESULT	SUSPECTED TROUBLE AREA	PROCEED TO
Apply battery voltage to terminals G8-5 and G8-1	Operating	<ul style="list-style-type: none"> Wire harness or connector between vent valve and ECM Leak detection pump performance deteriorates Leak detection pump circuit malfunctioning (large resistance exists in the circuit) ECM 	A
	Not operating	Vent valve	B

B ► GO TO STEP 28

A
▼

13.	CHECK HARNESS AND CONNECTOR (CANISTER PUMP MODULE - ECM)
------------	---

- (a) Turn the ignition switch off.
- (b) Disconnect the canister pump module connector.
- (c) Disconnect the ECM connector.
- (d) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-1 (VPMP) - G8-1	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-1 (VPMP) or G8-1 - Body ground	Always	10 k Ω or higher

Result

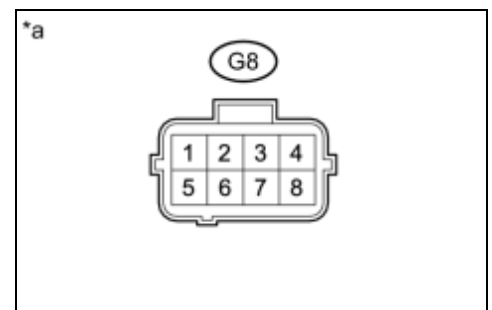
RESULT	SUSPECTED TROUBLE AREA	PROCEED TO
OK	ECM	A
NG	Wire harness or connector between ECM and canister pump module	B

A ► GO TO STEP 30

B ► GO TO STEP 25

14. INSPECT CANISTER PUMP MODULE (POWER SOURCE FOR VENT VALVE)

(a) Turn the ignition switch off.

**Text in Illustration**

*a	Front view of wire harness connector (to Canister Pump Module)
----	---

(b) Disconnect the canister pump module connector.

(c) Turn the ignition switch to ON.

(d) Measure the voltage according to the value(s) in the table below.

Result

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION	SUSPECTED TROUBLE AREA	PROCEED TO
G8-5 - Body ground	Ignition switch ON	11 to 14 V	<ul style="list-style-type: none"> Wire harness or connector between vent valve and ECM Vent valve Charcoal canister assembly (charcoal filter inside canister) clogged ECM 	A
		Below 1 V	Power source wire harness of vent valve	B

B ► GO TO STEP 25



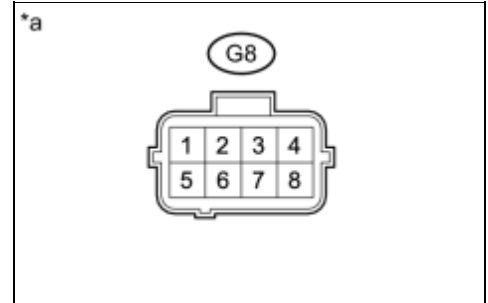
15. INSPECT CANISTER PUMP MODULE (VENT VALVE OPERATION)

(a) Turn the ignition switch off.

(b) Disconnect the canister pump module connector.

Text in Illustration

*a	Component without harness connected (Canister Pump Module)
----	---



(c) Apply the battery voltage to terminals G8-5 and G8-1 of the pump module.

(d) Touch the canister pump module to confirm the vent valve operation.

Result

CONDITION	TESTER RESULT	SUSPECTED TROUBLE AREA	PROCEED TO
Apply battery voltage to terminals G8-5 and G8-1	Operating	<ul style="list-style-type: none"> • Wire harness or connector between vent valve and ECM • Leak detection pump performance deteriorates • Leak detection pump circuit malfunctioning (large resistance exists in the circuit) • ECM 	A
	Not operating	<ul style="list-style-type: none"> • Vent valve 	B

B **GO TO STEP 28**



16. CHECK HARNESS AND CONNECTOR (CANISTER PUMP MODULE - ECM)

(a) Turn the ignition switch off.

(b) Disconnect the canister pump module connector.

(c) Disconnect the ECM connector.

(d) Measure the resistance according to the value(s) in the table below.

Result


TESTER CONNECTION	CONDITION	TEST RESULT	SUSPECTED TROUBLE AREA	PROCEED TO
A35-1 (VPMP) - G8-1	Always	Below 1 Ω	<ul style="list-style-type: none"> Charcoal canister assembly (charcoal filter inside canister) clogged ECM 	A
		10 k Ω or higher	Wire harness or connector between ECM and charcoal canister assembly pump module	B

B  **GO TO STEP 25**

A



17. INSPECT CANISTER PUMP MODULE (CHARCOAL FILTER INSIDE CANISTER)

(a) Check for filter blockage in the charcoal canister assembly  .

OK:

No blockages in the charcoal canister assembly.

OK  **GO TO STEP 30**

NG  **GO TO STEP 24**

18. INSPECT EVAP HOSE (CHARCOAL CANISTER ASSEMBLY - CANISTER PUMP MODULE)

(a) Check for blockages in the EVAP purge line between the charcoal canister assembly and canister pump module.

OK:

No blockages in the EVAP purge line between the charcoal canister assembly and canister pump module.

NG  **GO TO STEP 26**

OK



19. INSPECT EVAP HOSE (CHARCOAL CANISTER ASSEMBLY - FUEL TANK)

(a) Check for blockages in the EVAP purge line between the charcoal canister assembly and fuel tank.

OK:

No blockages in the EVAP purge line between the charcoal canister assembly and fuel tank.

OK ► GO TO STEP 24

NG ► GO TO STEP 26

20. CHECK FUEL TANK CAP ASSEMBLY

(a) Check that the fuel tank cap assembly is correctly installed and confirm that the fuel tank cap assembly meets OEM specifications.

(b) Tighten the fuel tank cap assembly firmly (only one click sound could be heard).

Result

TEST RESULT	SUSPECTED TROUBLE AREA	PROCEED TO
fuel tank cap assembly correctly installed	-	A
fuel tank cap assembly loose	<ul style="list-style-type: none"> fuel tank cap assembly improperly installed Defective fuel tank cap assembly fuel tank cap assembly does not meet OEM specifications 	B
Defective fuel tank cap assembly	-	B
No fuel tank cap assembly	-	C

B ► GO TO STEP 22

C ► GO TO STEP 23

A



21. LOCATE EVAP LEAK PART

(a) Check for leakage from EVAP system (hose, disconnection, cracks, etc.).

(b) Repair or replace the leak point.

NEXT ► GO TO STEP 29

22. CORRECTLY REINSTALL OR REPLACE FUEL TANK CAP ASSEMBLY

HINT:

- When reinstalling the fuel tank cap assembly, tighten it firmly (only one click sound could be heard).
- When replacing the fuel tank cap assembly, use a fuel tank cap assembly that meets OEM specifications, and install it firmly.

NEXT ► **GO TO STEP 29**

23. REPLACE FUEL TANK CAP ASSEMBLY

HINT:

When installing the fuel tank cap assembly, tighten it firmly (only one click sound could be heard).

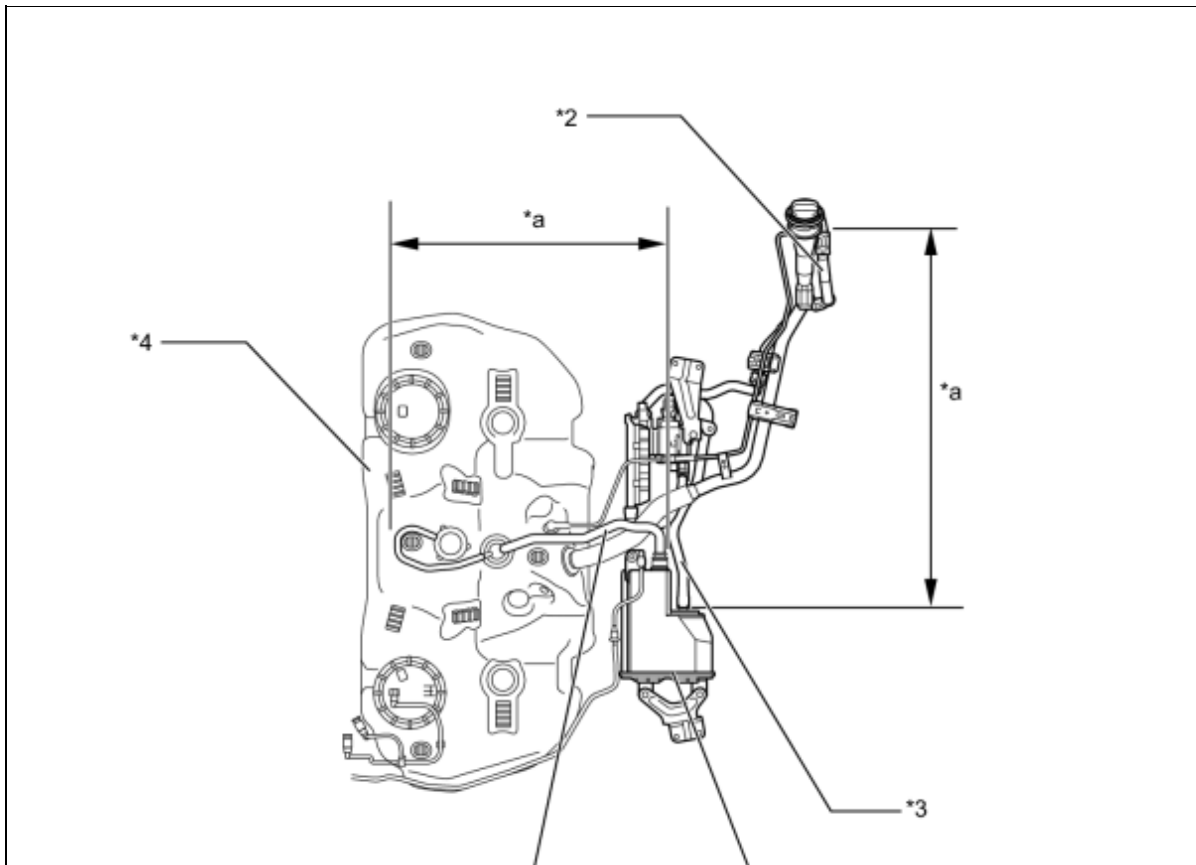
NEXT ► **GO TO STEP 29**

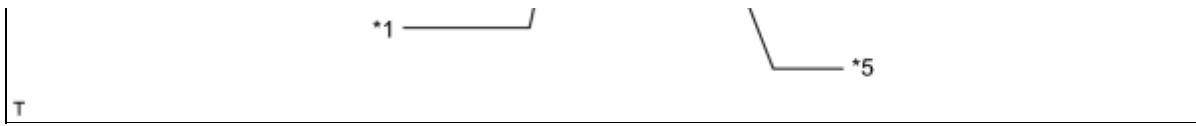
24. REPLACE CHARCOAL CANISTER ASSEMBLY

(a) Replace the charcoal canister assembly **INFO**.

NOTICE:

- When replacing the charcoal canister assembly, check the canister pump module interior and related pipes for water, fuel and other liquids. If liquids are present, check for disconnections and/or cracks in the following: 1) the pipe from the air inlet port to the canister pump module; 2) the canister filter; and 3) the fuel tank vent hose.
- Check for filter blockage in the canister filter. If the canister filter has blockages, replace the canister pump module.



**Text in Illustration**

*1	Fuel Tank Vent Hose	*2	Air Inlet Port
*3	Drain Hose	*4	Fuel Tank
*5	Charcoal Canister Assembly	-	-
*a	Inspection Area (check for disconnection and/or cracks)	-	-

NEXT ► **GO TO STEP 29****25. REPAIR OR REPLACE HARNESS OR CONNECTOR****NEXT** ► **GO TO STEP 29****26. REPAIR OR REPLACE EVAP PURGE LINE (PURGE VALVE - CANISTER)****NEXT** ► **GO TO STEP 29****27. REPAIR OR REPLACE PARTS AND COMPONENTS INDICATED BY OUTPUT DTCS**

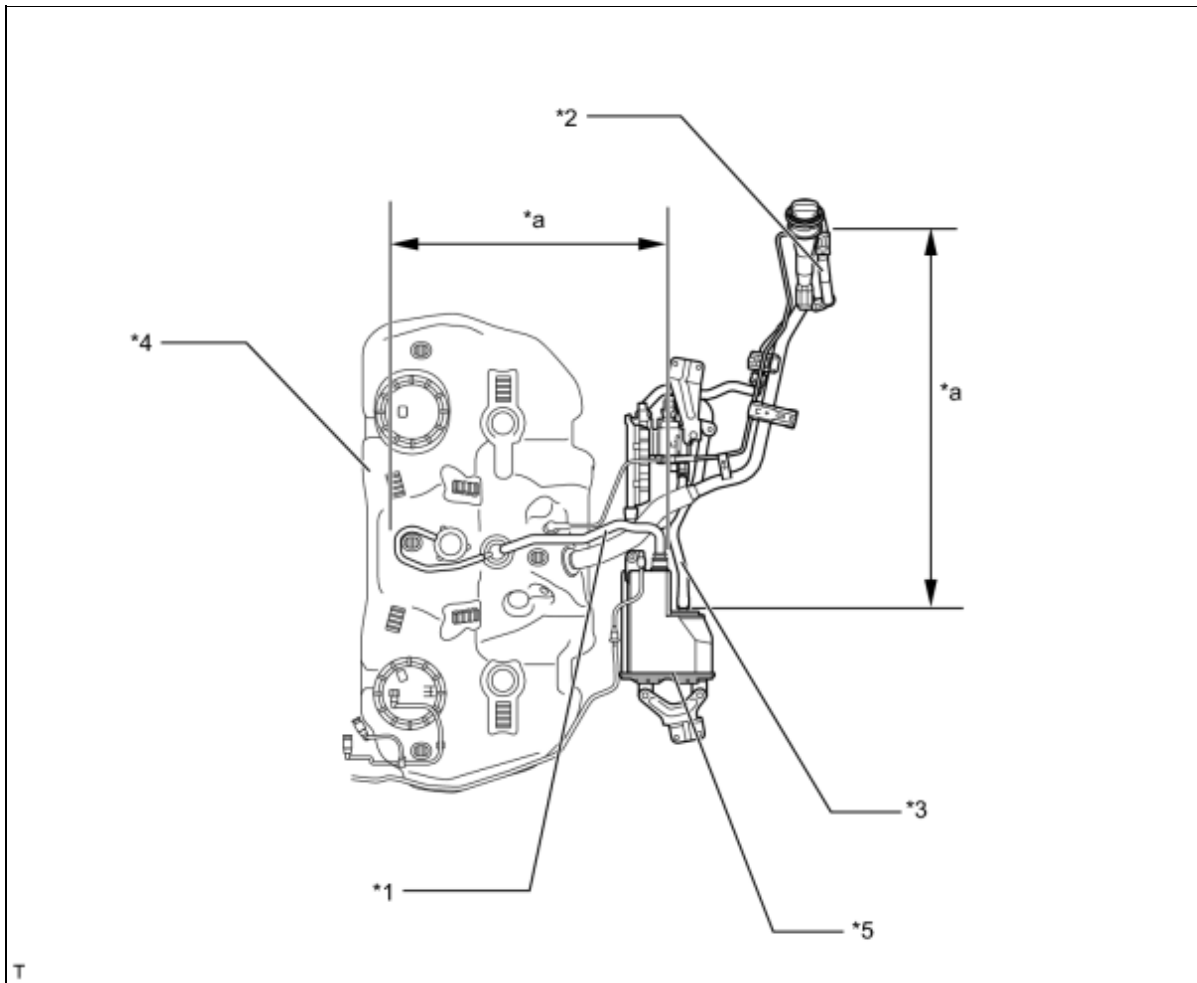
(a) Repair the malfunctioning areas indicated by the DTCs that had been confirmed when the vehicle was brought in.

NEXT ► **GO TO STEP 29****28. REPLACE CHARCOAL CANISTER ASSEMBLY**

(a) Replace the canister pump module  .

NOTICE:

- When replacing the charcoal canister assembly, check the canister pump module interior and related pipes for water, fuel and other liquids. If liquids are present, check for disconnections and/or cracks in the following: 1) the pipe from the air inlet port to the canister pump module; 2) the canister filter; and 3) the fuel tank vent hose.
- Check for filter blockage in the canister filter. If the canister filter has blockages, replace the canister filter.



Text in Illustration

*1	Fuel Tank Vent Hose	*2	Air Inlet Port
*3	Vent Hose	*4	Fuel Tank
*5	Charcoal Canister Assembly	-	-
*a	Inspection Area (check for disconnection and/or cracks)	-	-

NEXT




29. PERFORM EVAP SYSTEM CHECK (AUTOMATIC MODE)

NOTICE:

- The Evaporative System Check (Automatic Mode) consists of 5 steps performed automatically by the Techstream. It takes a maximum of approximately 24 minutes.
- Do not perform the Evaporative System Check when the fuel tank is more than 90% full because the cut-off

- Do not perform the Evaporative System Check when the fuel tank is more than 90% full because the cut-off valve may be closed, making the fuel tank leak check unavailable.
- Do not run the engine in this step.
- When the temperature of the fuel is 35°C (95°F) or more, a large amount of vapor forms and any check results become inaccurate. When performing the Evaporative System Check, keep the fuel temperature below 35°C (95°F) and the coolant temperature below 45°C (113°F).

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Enter the following menus: Powertrain / Engine / Utility / Evaporative System Check / Automatic Mode.
- (f) After the Evaporative System Check is completed, check for pending DTCs by entering the following menus: Powertrain / Engine / Trouble Codes.

Result


RESULT	PROCEED TO
EVAP system DTCs are output	A
No DTCs output (No pending DTCs output)	B

B  **END**

A



30.	REPLACE ECM
------------	--------------------

- (a) Replace the ECM  .

NEXT




31.	PERFORM EVAP SYSTEM CHECK (AUTOMATIC MODE)
------------	---

NOTICE:

- The Evaporative System Check (Automatic Mode) consists of 5 steps performed automatically by the Techstream. It takes a maximum of approximately 24 minutes.
- Do not perform the Evaporative System Check when the fuel tank is more than 90% full because the cut-off valve may be closed, making the fuel tank leak check unavailable.
- Do not run the engine in this step.
- When the temperature of the fuel is 35°C (95°F) or more, a large amount of vapor forms and any check results become inaccurate. When performing the Evaporative System Check, keep the fuel temperature below 35°C (95°F) and the coolant temperature below 45°C (113°F).

35°C (95°F) and the coolant temperature below 45°C (113°F).

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Enter the following menus: Powertrain / Engine / Utility / Evaporative System Check / Automatic Mode.
- (f) After the Evaporative System Check is completed, check for pending DTCs by entering the following menus: Powertrain / Engine / Trouble Codes.

HINT:

If no pending DTCs are found, the repair has been successfully completed.

NEXT  **END**



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDO0IEX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: FAIL-SAFE CHART (2013 FR-S)		

FAIL-SAFE CHART

If any of the following DTCs are stored, the ECM enters fail-safe mode to allow the vehicle to be driven temporarily or stops fuel injection.

DTC CODE	FAIL-SAFE OPERATION	FAIL-SAFE DEACTIVATION CONDITION
P000A P000C P0010 P0011 P0016 P0018 P0020 P0021 P0341 P0345 P0346	Fix intake VVT control at intermediate position	After recovery in normal status, turn the ignition switch to ON again
P000B P000D P0013 P0014 P0017 P0019 P0023 P0024 P0365 P0366 P0390 P0391	Fix exhaust VVT control at maximum retard angle	After recovery in normal status, turn the ignition switch to ON again
P0031 P0032 P0037 P0131 P0132 P0134 P0137 P0138 P013A P013B P013E P013F P0140 P0141	Stop air fuel ratio feedback control	After recovery in normal status, turn the ignition switch to ON again
P0087		

P0088 P0191 P0192 P0193 P1235	<ul style="list-style-type: none"> • Stop fuel pump assembly drive (high pressure side) • Fix fuel pressure at 0.4 MPa (4.07 kgf/cm² , 57.9 psi). • Cut fuel at 1500 rpm or more 	After recovery in normal status, turn the ignition switch to ON again
P0101 P0102 P0103	Make the engine load the manifold absolute pressure converted estimated value	Return to normal status
P0068 P0107 P0108	Make the manifold absolute pressure value the mass air flow meter converted estimated value	Return to normal status
P0111 P0112 P0113	Fix inlet air temperature at 20°C (68°F)	Return to normal status
P0116 P0117 P0118 P0125	<ul style="list-style-type: none"> • Fix coolant temperature at 70°C (158°F) • Stop intake and exhaust VVT 	Return to normal status
P0172	Stop purge control	Return to normal status
P0196 P0197 P0198	Fix engine oil temperature at 70°C (158°F)	Return to normal status
P062D P1261 P1262 P1263 P1264	<ul style="list-style-type: none"> • Cut fuel at 1500 rpm or more • Cut fuel to abnormal cylinders 	After recovery in normal status, turn the ignition switch to ON again
P0201 P0202 P0203 P0204	Cut fuel to abnormal cylinders	After recovery in normal status, turn the ignition switch to ON again
P062F P0122 P0123 P0222 P0223 P0604 P0605 P0606 P060A P060B P1160 P2101 P2102 P2103 P2109 P2119	Stop electronic throttle control, and fix the throttle valve opening angle (5 degrees)	After recovery in normal status, turn the ignition switch to ON again

P2135		
P0327 P0328 P0332 P0333	Maximum retard angle	Return to normal status
P0451	Stop leak detection pump control	Return to normal status
P0500	Fix ECU recognized vehicle speed at 10 km/h (6.2 mph)	Return to normal status
P0851 P0852	Turn off the gear position display within the combination meter	Return to normal status
P1451 P2404	Fix atmospheric pressure at 101.3 kPa (760 mmHg)	Return to normal status
P2122 P2123 P2127 P2128	Accelerator pedal sensor assembly has 2 sensor circuits: Main and Sub If either circuit malfunctions, substitute the normal accelerator position sensor until the prescribed angle. If both circuits malfunction, fix accelerator position at prescribed angle (12%).	After recovery in normal status, turn the ignition switch to ON again
P2138	<ul style="list-style-type: none"> • Fix accelerator pedal angle • Stop electronic throttle control, and fix the throttle valve opening angle 	After recovery in normal status, turn the ignition switch to ON again

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDS0SJX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: FREEZE FRAME DATA (2013 FR-S)		

FREEZE FRAME DATA

1. DESCRIPTION

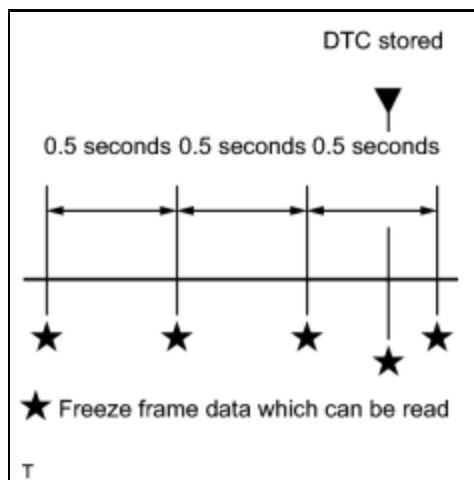
The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was moving or stationary, whether the engine was warmed up or not, whether the air fuel ratio was lean or rich, as well as other data recorded at the time of a malfunction.

Freeze frame data records the engine conditions (fuel system information, calculated load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when a malfunction is detected.

HINT:

If it is impossible to duplicate the problem even though a DTC is output, check the freeze frame data.

The ECM records engine conditions in the form of freeze frame data every 0.5 seconds. Using the Techstream, 5 separate sets of freeze frame data can be checked.



- 3 data sets from before the DTC was stored
- 1 data set from when the DTC was stored
- 1 data set from after the DTC was stored

These data sets can be used to simulate the condition of the vehicle from around the time of the occurrence of the malfunction. The data may assist in identifying the cause of the malfunction, and in judging whether it was temporary or not.

2. LIST OF FREEZE FRAME DATA

Refer to "Data List / Active Test" [INFO](#) .

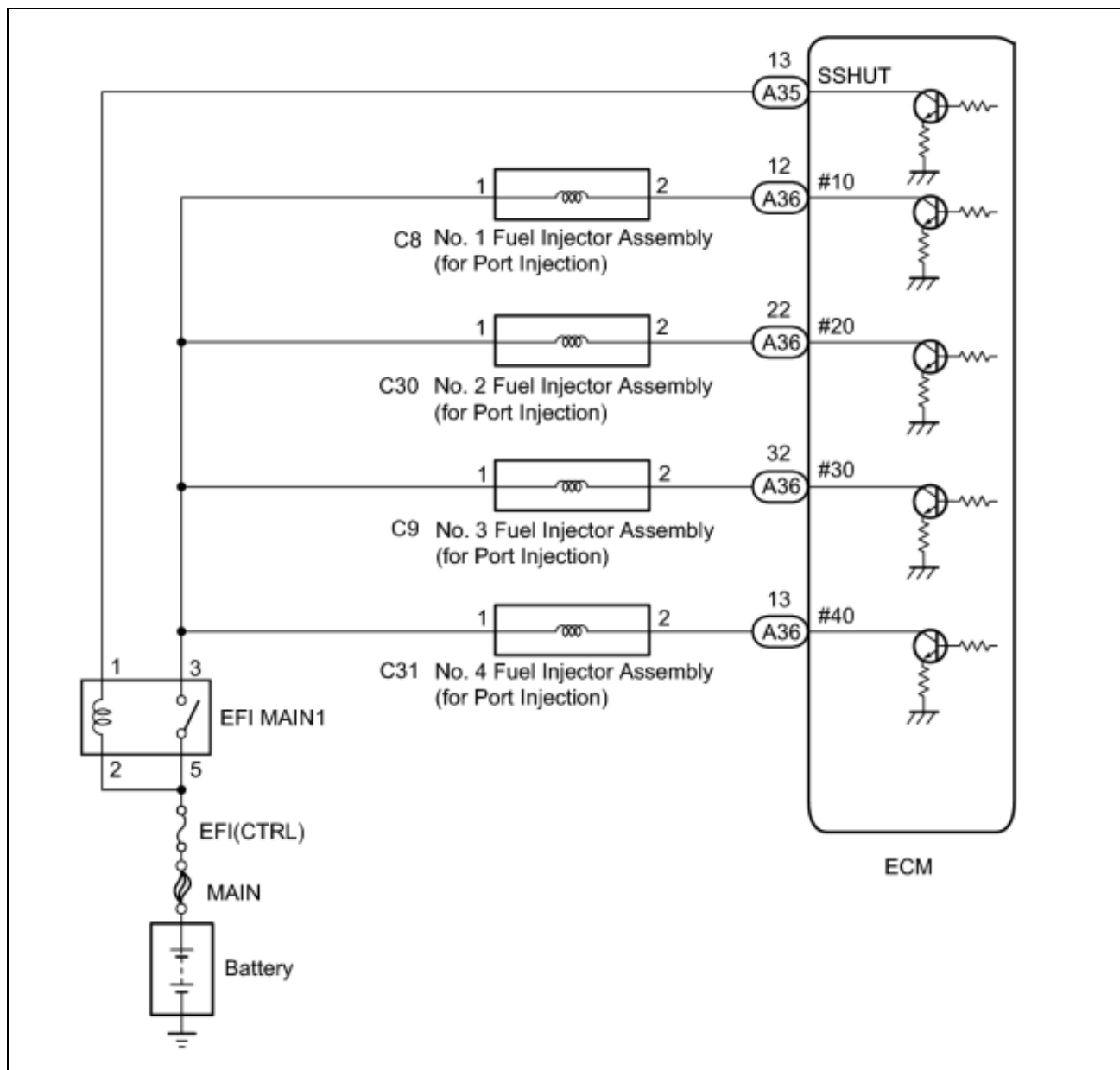
Last Modified: 4-14-2014	6.6 J	Doc ID: RM000000ZRM0EXX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 - 05/2013]
Title: FA20 ENGINE CONTROL: SFI SYSTEM: Fuel Injector Circuit; 2013 MY FR-S [03/2012 - 05/2013]		

Fuel Injector Circuit

DESCRIPTION

The fuel injectors (for port injection) are attached to the intake manifold, and inject fuel into the intake manifold based on the ECM signals.

WIRING DIAGRAM



INSPECTION PROCEDURE

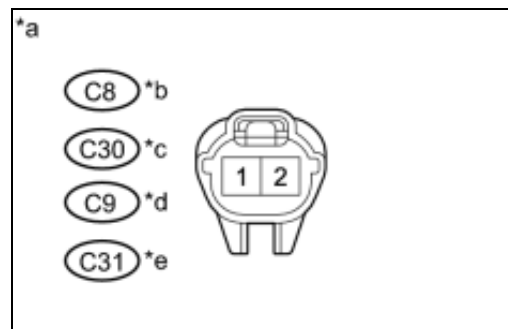
NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. INSPECT FUEL INJECTOR ASSEMBLY (POWER SOURCE)

(a) Disconnect the fuel injector assembly connectors.



(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.


Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
C8-1 - Body ground	Ignition switch ON	11 to 14 V
C30-1 - Body ground	Ignition switch ON	11 to 14 V
C9-1 - Body ground	Ignition switch ON	11 to 14 V
C31-1 - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Fuel Injector Assembly)
*b	No. 1 cylinder
*c	No. 2 cylinder
*d	No. 3 cylinder
*e	No. 4 cylinder

NG  **GO TO STEP 4**

OK**2. INSPECT FUEL INJECTOR ASSEMBLY (INJECTION AND VOLUME)**(a) Check the fuel injector injection and volume  .**NG**  **REPLACE FUEL INJECTOR ASSEMBLY****OK****3. CHECK HARNESS AND CONNECTOR (FUEL INJECTOR ASSEMBLY - ECM)**

- (a) Disconnect the fuel injector assembly connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C8-2 - A36-12 (#10)	Always	Below 1 Ω
C30-2 - A36-22 (#20)	Always	Below 1 Ω
C9-2 - A36-32 (#30)	Always	Below 1 Ω
C31-2 - A36-13 (#40)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C1-2 or A36-12 (#10) - Body ground	Always	10 k Ω or higher
C2-2 or A36-22 (#20) - Body ground	Always	10 k Ω or higher
C3-2 or A36-32 (#30) - Body ground	Always	10 k Ω or higher
C8-2 or A36-13 (#40) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **REPLACE ECM**

4. CHECK HARNESS AND CONNECTOR (FUEL INJECTOR ASSEMBLY - EFI MAIN1 RELAY)

- (a) Disconnect the fuel injector assembly connector.
- (b) Remove the EFI MAIN1 relay from the engine room relay block assembly.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C8-1 - EFI MAIN1 relay terminal 3	Always	Below 1 Ω
C30-1 - EFI MAIN1 relay terminal 3	Always	Below 1 Ω
C9-1 - EFI MAIN1 relay terminal 3	Always	Below 1 Ω
C31-1 - EFI MAIN1 relay terminal 3	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C8-1 or EFI MAIN1 relay terminal 3 - Body ground	Always	10 k Ω or higher
C30-1 or EFI MAIN1 relay terminal 3 - Body ground	Always	10 k Ω or higher
C9-1 or EFI MAIN1 relay terminal 3 - Body ground	Always	10 k Ω or higher
C31-1 or EFI MAIN1 relay terminal 3 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **CHECK ECM POWER SOURCE CIRCUIT**



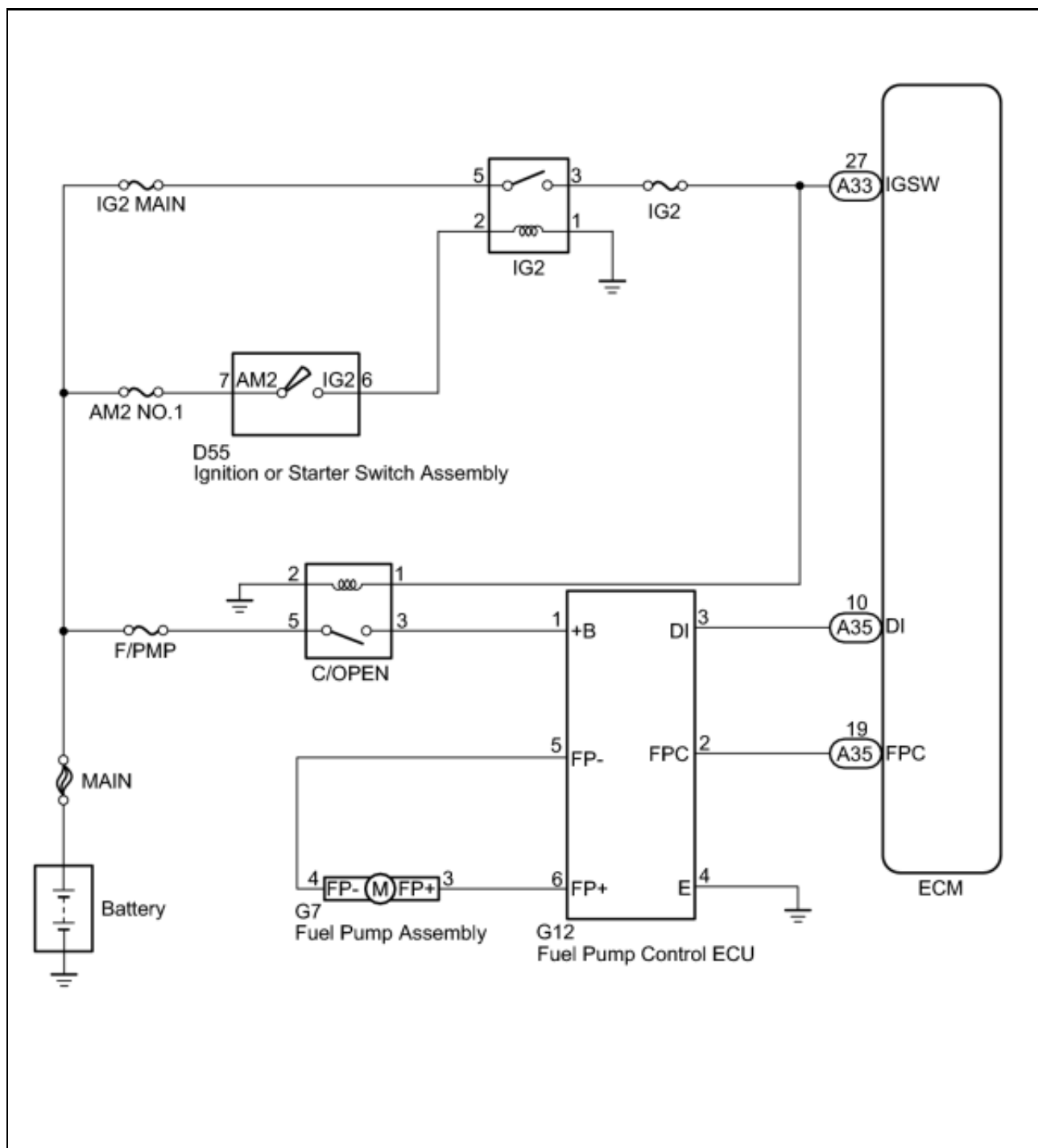
Last Modified: 4-14-2014	6.6 J	Doc ID: RM000001F70022X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE CONTROL: SFI SYSTEM: Fuel Pump Control Circuit; 2013 MY FR-S [03/2012 -]		

Fuel Pump Control Circuit

DESCRIPTION

The fuel pump circuit (low pressure side) is comprised of the ECM, fuel pump assembly (low pressure side), and fuel pump control ECU assembly (which operates the fuel pump [low pressure side]). The ECM judges the speed of the fuel pump assembly (low pressure side) based on the engine output. This speed is converted into a loading signal, which is sent to the fuel pump control ECU assembly. The fuel pump control ECU assembly adjusts the fuel pump operating speed (low pressure side), based on the signal sent from the ECM.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

- PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP/SPEED)**

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Active Test / Control the Fuel Pump/Speed.
- (e) Check whether the fuel pump operating sound occurs when performing the Active Test on the Techstream.

Result

RESULT	PROCEED TO
Fuel pump operating sound does not occur	A
Fuel pump operating sound occurs	B

B  **GO TO STEP 8**

A



2. PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Active Test /Control the Fuel Pump Duty.
- (e) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (FP+) - 4 (FP-)	FPC Duty: 25%	3.2 to 4.05 V
3 (FP+) - 4 (FP-)	FPC Duty: 80%	8.8 to 12.5 V

Text in Illustration

*a	Component without harness connected
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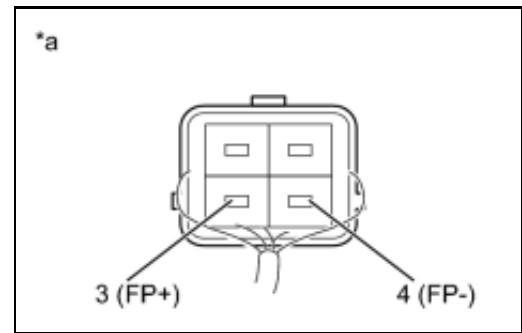
(Fuel Pump Assembly)

(f) Enter the following menus: Powertrain / Engine / Active Test / Control the Fuel Pump/Speed.

(g) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (FP+) - 4 (FP-)	ON (FPC Duty: 25%)	9.0 to 14.0 V

**HINT:**

- Be sure to measure the voltage with all the connectors connected.
- Before performing this inspection, check that the battery voltage is between 11 and 14 V (not depleted).

NG ▶ GO TO STEP 6

OK

3. CHECK HARNESS AND CONNECTOR (ECM - FUEL PUMP CONTROL ECU ASSEMBLY)

(a) Disconnect the ECM connector.

(b) Disconnect the fuel pump control ECU assembly connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-19 (FPC) - G12-2 (FPC)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
-------------------	-----------	---------------------


A35-19 (FPC) or G12-2 (FPC) - Body ground	Always	10 kΩ or higher
---	--------	-----------------

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK




4. REPLACE FUEL PUMP ASSEMBLY

(a) Replace the fuel pump assembly  .

NEXT



5. CHECK CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED

(a) Check the fuel pump operation  .


OK:

Malfunction has been repaired successfully.

NG ▶ **REPLACE ECM**

OK ▶ **END**


6. REPLACE FUEL PUMP CONTROL ECU ASSEMBLY

(a) Replace the fuel pump control ECU assembly  .

NEXT



7. CHECK CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED

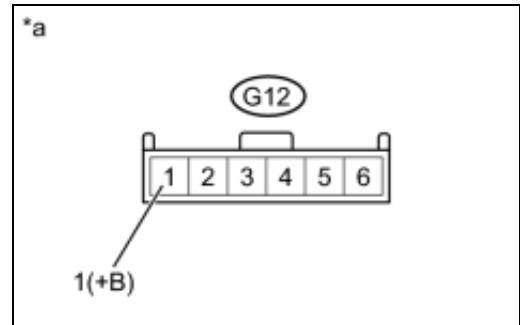
(a) Check the fuel pump operation  .

OK:

Malfunction has been repaired successfully.

NG  **REPLACE ECM****OK**  **END****8. INSPECT FUEL PUMP CONTROL ECU ASSEMBLY (POWER SOURCE VOLTAGE)**

(a) Disconnect the fuel pump control ECU assembly connector.



(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G12-1 (+B) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a

Front view of wire harness connector:
(to Fuel Pump Control ECU Assembly)

NG  **GO TO STEP 14****OK****9. CHECK HARNESS AND CONNECTOR (FUEL PUMP - FUEL PUMP CONTROL ECU ASSEMBLY)**

(a) Disconnect the fuel pump connector.

- (b) Disconnect the fuel pump control ECU assembly connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G7-4 (FP-) - G12-5 (FP-)	Always	Below 1 Ω
G7-3 (FP+) - G12-6 (FP+)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G7-4 (FP-) or G12-5 (FP-) - Body ground	Always	10 k Ω or higher
G7-3 (FP+) or G12-6 (FP+) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



10.	INSPECT FUEL PUMP ASSEMBLY
------------	-----------------------------------

- (a) Inspect fuel pump assembly  .

NG  **REPLACE FUEL PUMP ASSEMBLY**

OK



11.	CHECK HARNESS AND CONNECTOR (FUEL PUMP CONTROL ECU ASSEMBLY - ECM)
------------	---

- (a) Disconnect the ECM connector.
- (b) Disconnect the fuel pump control ECU assembly connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-19 (FPC) - G12-2 (FPC)	Always	Below 1 Ω
G12-4 (E)- Body ground	Always	Below 1 Ω

Standard Resistance (Check for short):


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-19 (FPC) or G12-2 (FPC) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK




12. REPLACE FUEL PUMP CONTROL ECU ASSEMBLY

(a) Replace the fuel pump control ECU assembly  .

NEXT



13. CHECK CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED

(a) Check the fuel pump operation  .

OK:

Malfunction has been repaired successfully.

NG  **REPLACE ECM**

OK  **END**

14. CHECK HARNESS AND CONNECTOR (C/OPEN RELAY - FUEL PUMP CONTROL ECU ASSEMBLY)

(a) Remove the C/OPEN relay from the engine room relay block assembly.

- (b) Disconnect the fuel pump control ECU assembly connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C/OPEN relay terminal 3 - G12-1 (+B)	Always	Below 1 Ω
C/OPEN relay terminal 1 - Body ground	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C/OPEN relay terminal 3 or G12-1 (+B) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



15. INSPECT TERMINAL VOLTAGE (C/OPEN RELAY)

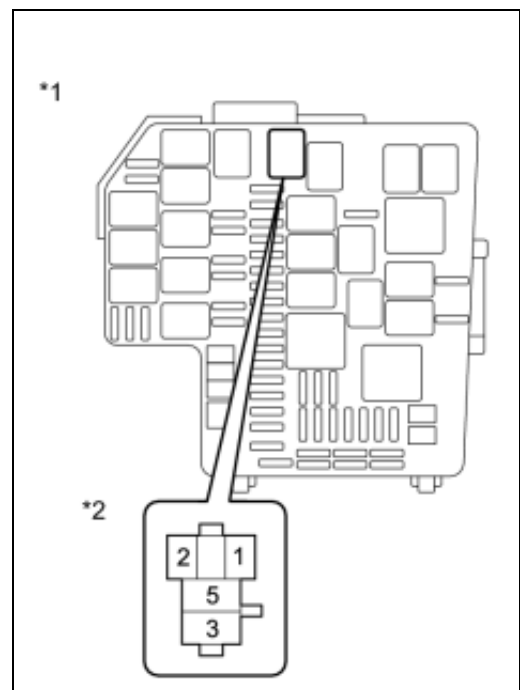
- (a) Remove the C/OPEN relay from the engine room relay block assembly.
- (b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C/OPEN relay terminal 5 - Body ground	IG ON	11 to 14 V

Text in Illustration

*1	Engine Room Relay Block Assembly
*2	C/OPEN Relay Terminal



OK

16.	CHECK HARNESS AND CONNECTOR (C/OPEN RELAY - ECM - IG2 RELAY)
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- (a) Disconnect the ECM connector.
- (b) Remove the C/OPEN relay and IG2 relay from the engine room relay block assembly.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C/OPEN relay terminal 2 - A33-27 (IGSW)	Always	Below 1 Ω
C/OPEN relay terminal 2 - IG2 relay terminal 3	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C/OPEN relay terminal 2, A33-27 (IGSW) or IG2 relay terminal 3 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **REPLACE ECM**



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PD90TLX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

*: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
----	-----------------------------

NEXT



2.	CUSTOMER PROBLEM ANALYSIS
----	---------------------------

NEXT



3.	CONNECT TECHSTREAM TO DLC3*
----	-----------------------------

HINT:


If the display indicates a communication fault in the Techstream, inspect the DLC3.

When any CAN communication system DTCs are output, perform troubleshooting on the CAN communication system first.

NEXT



4.	CHECK DTC AND FREEZE FRAME DATA*
----	----------------------------------

(a) Check for DTCs  and freeze frame data .

HINT:

Record or print DTCs and freeze frame data if necessary.

NEXT



5.	CLEAR DTC AND FREEZE FRAME DATA *
-----------	--

(a) Clear DTCs and freeze frame data [INFO](#) .

NEXT



6.	CONDUCT VISUAL INSPECTION
-----------	----------------------------------

NEXT



7.	SELECT CHECK MODE DIAGNOSIS *
-----------	--------------------------------------

(a) Switch the ECM from normal mode to check mode.

HINT:

Refer to Check Mode Procedure [INFO](#) .

NEXT



8.	CONFIRM PROBLEM SYMPTOMS
-----------	---------------------------------

(a) Confirm problem symptoms.

HINT:

If the engine does not start, first perform the "Check DTC" procedure and "Conduct Basic Inspection" procedure below.

Result

RESULT	PROCEED TO
Malfunction does not occur	A
Malfunction occurs	B

B  GO TO STEP 10

A



9.	SIMULATE SYMPTOMS
-----------	--------------------------

HINT:

Refer to Symptom Simulation  .

NEXT



10.	CHECK DTC*
------------	-------------------

(a) Check for DTCs.

HINT:

Refer to DTC Check / Clear  .

Result

RESULT	PROCEED TO
Trouble code output	A
No trouble code output	B

B  GO TO STEP 12

A



11.	REFER TO DTC CHART
------------	---------------------------

(a) Refer to Diagnostic Trouble Code Chart  .

NEXT



12.	CONDUCT BASIC INSPECTION
------------	---------------------------------

(a) Conduct basic inspection INFO.

Result

RESULT	PROCEED TO
Malfunctioning parts not confirmed	A
Malfunctioning parts confirmed	B

B **GO TO STEP 17**

A



13.	REFER TO PROBLEM SYMPTOMS TABLE
------------	--

(a) Refer to Problem Symptoms Table INFO.

Result

RESULT	PROCEED TO
Malfunctioning circuit confirmed	A
Malfunctioning parts confirmed	B

B **GO TO STEP 17**

A



14.	CHECK ECM POWER SOURCE CIRCUIT
------------	---------------------------------------

(a) Check the ECM power source circuit.

HINT:

Refer to ECM Power Source Circuit INFO.

NEXT



15.	CONDUCT CIRCUIT INSPECTION
------------	-----------------------------------

Result

RESULT	PROCEED TO
Malfunction not confirmed	A
Malfunction confirmed	B

B **GO TO STEP 18**

A



16.	CHECK FOR INTERMITTENT PROBLEMS
------------	--

(a) Check for intermittent problems.

HINT:

Refer to Check for Intermittent Problems  .

NEXT



17.	CONDUCT PARTS INSPECTION
------------	---------------------------------

NEXT



18.	IDENTIFY PROBLEM
------------	-------------------------

NEXT



19. ADJUST AND/OR REPAIR

NEXT



20. CONDUCT CONFIRMATION TEST

NEXT  **END**



 **TOYOTA** 

Last Modified: 4-14-2014	6.6 J	Doc ID: RM000000WZ10ULX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE CONTROL: SFI SYSTEM: MIL Circuit; 2013 MY FR-S [03/2012 -]		

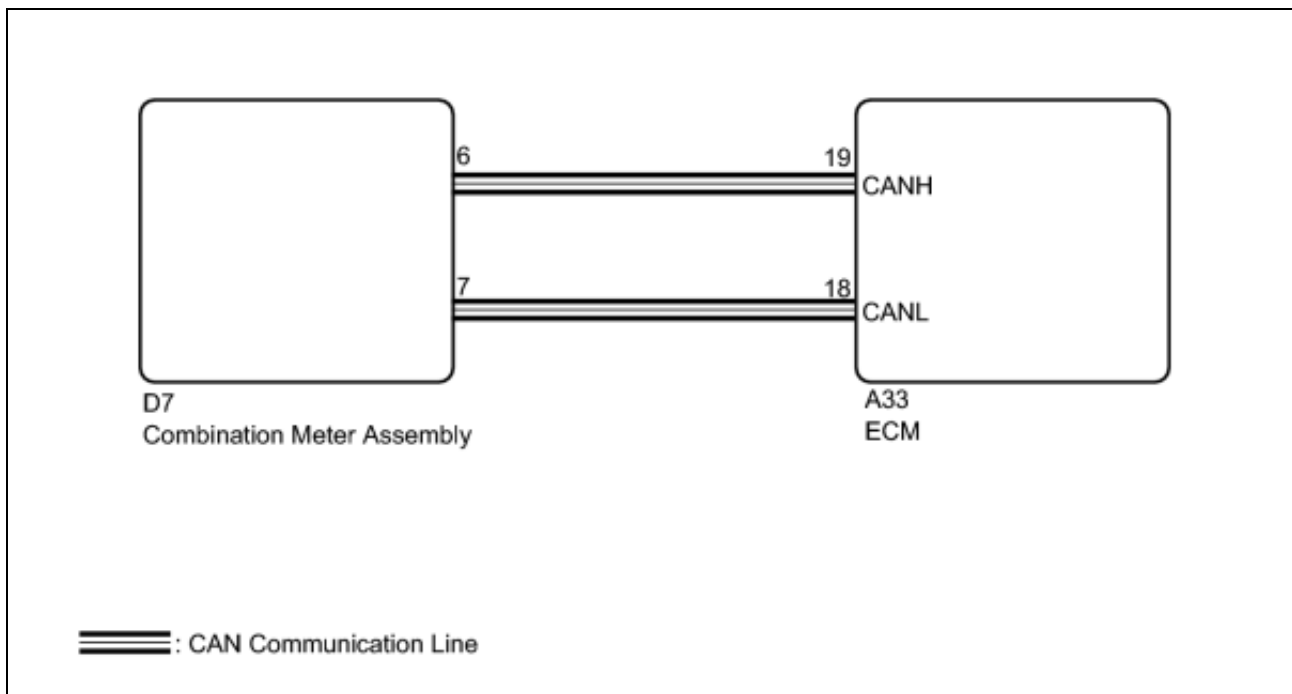
MIL Circuit

DESCRIPTION

The MIL (Malfunction Indicator Lamp) is used to indicate vehicle malfunctions detected by the ECM. When the ignition switch is turned to ON, power is supplied to the MIL circuit, which illuminates the MIL.

The MIL operation can be checked visually: When the ignition switch is turned to ON, the MIL should be illuminated and should turn off after engine is started. If the MIL remains illuminated or is not illuminated, conduct the following troubleshooting procedure using the Techstream.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

- CHECK THAT MIL IS ILLUMINATED**

(a) Perform troubleshooting in accordance with the table below.

Result

RESULT	PROCEED TO
MIL remains ON	A
MIL does not illuminate	B
MIL illuminates for several seconds, but turns off after engine is started	C

B ► GO TO STEP 3

C ► CHECK FOR INTERMITTENT PROBLEMS

A
▼

2. CHECK WHETHER MIL TURNS OFF

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Check if any DTCs have been detected. Note down any DTCs.

Result

RESULT	PROCEED TO
No DTC detected	A
Any DTCs detected	B

HINT:

Check for detected DTCs output from other ECUs which relate to the MIL.

B ► REPAIR CIRCUITS INDICATED BY OUTPUT DTCS

A ► GO TO METER / GAUGE SYSTEM

3. CHECK THAT ENGINE STARTS

(a) Turn the ignition switch to ON.

(b) Start the engine.

Result

RESULT	PROCEED TO
Engine starts	A
Engine does not start*	B

HINT:

*: The Techstream cannot communicate with the ECM.

B ► GO TO VC OUTPUT CIRCUIT

A ► REPLACE COMBINATION METER



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDU00MX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P000A,P000C,P0011,P0021: Camshaft Position "A" - Timing Slow Response Bank 1 (2013 FR-S)		

DTC	P000A	Camshaft Position "A" - Timing Slow Response Bank 1
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DTC	P000C	Camshaft Position "A" - Timing Slow Response Bank 2
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DTC	P0011	Camshaft Position "A" - Timing Over-Advanced or System Performance (Bank 1)
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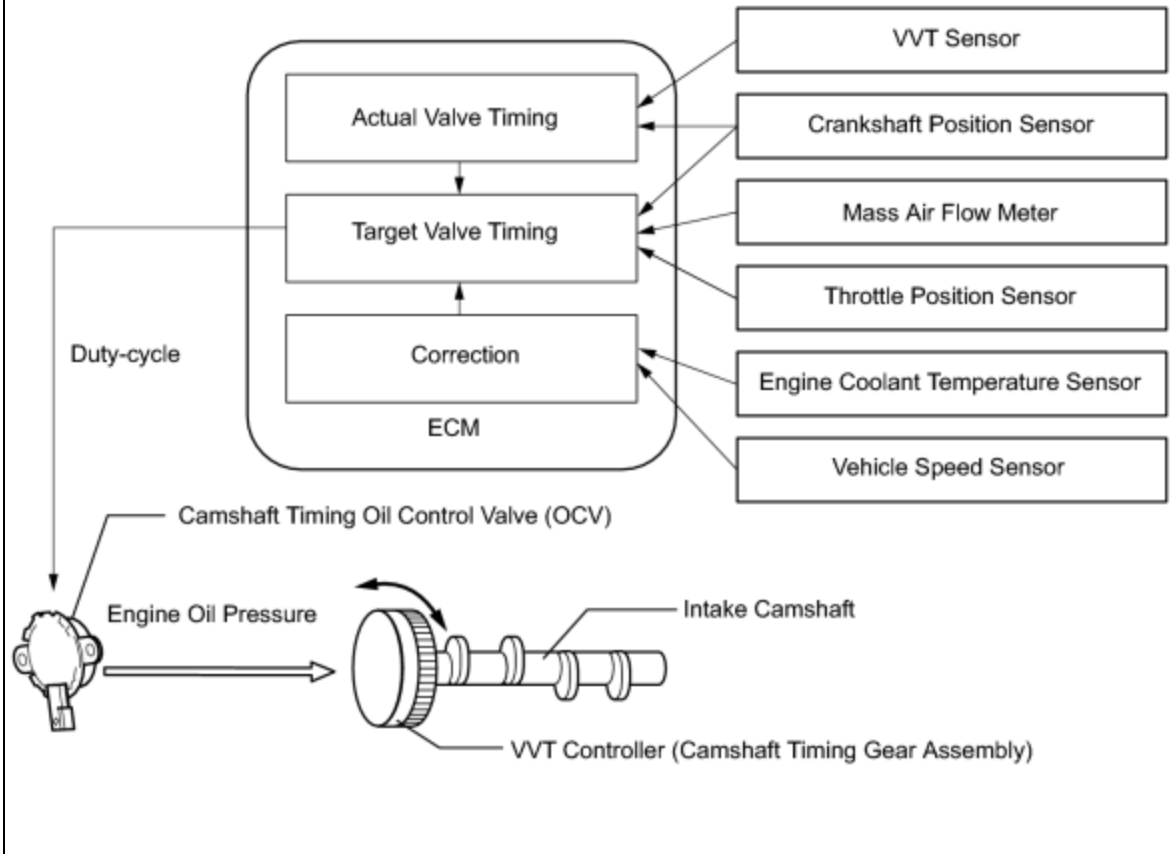
DTC	P0021	Camshaft Position "A" - Timing Over-Advanced or System Performance (Bank 2)
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DESCRIPTION

The Variable Valve Timing (VVT) system adjusts the intake valve timing to improve driveability. The engine oil pressure turns the VVT controller to adjust the valve timing.

The camshaft timing oil control valve is a solenoid valve and switches the engine oil line. The valve moves when the ECM applies 12 V to the solenoid. The ECM changes the energizing time to the solenoid (duty-cycle) in accordance with the camshaft position, crankshaft position, throttle position, etc.

VVT System:



DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P000A	Integrated deviations in target intake valve timing and actual intake valve timing per specified time exceed thresholds for 15 seconds (bank 1). (2 trip detection logic)	<ul style="list-style-type: none"> • Valve timing • Camshaft timing oil control valve (for intake side of bank 1) • Oil control valve filter • Camshaft timing gear assembly (for intake side of bank 1) • ECM
P0011	Deviation in target intake valve timing and actual intake valve timing exceeds thresholds (bank 1). (2 trip detection logic)	
P000C	Integrated deviations in target intake valve timing and actual intake valve timing per specified time exceed thresholds for 15 seconds (bank 2). (2 trip detection logic)	<ul style="list-style-type: none"> • Valve timing • Camshaft timing oil control valve (for intake side of bank 2) • Oil control valve filter • Camshaft timing
	Deviation in target intake valve timing and actual intake valve	

P0021	timing exceeds thresholds (bank 2). (2 trip detection logic)	gear assembly (for intake side of bank 2) • ECM
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MONITOR DESCRIPTION

The ECM optimizes the intake valve timing using the Variable Valve Timing (VVT) system to control the intake camshaft. The VVT system includes the ECM, the camshaft timing oil control valve and the VVT controller (camshaft timing gear assembly). The ECM sends a target duty-cycle control signal to the camshaft timing oil control valve. This control signal regulates the oil pressure supplied to the VVT controller. The VVT controller can advance or retard the intake camshaft.

If the difference between the target and actual intake valve timings is large, and changes in the actual intake valve timing are small, the ECM interprets this as the VVT controller stuck malfunction and stores a DTC.

These DTCs indicate that the VVT controller cannot operate properly due to camshaft timing oil control valve malfunctions or the presence of foreign objects in the camshaft timing oil control valve.

MONITOR STRATEGY

Related DTCs	P000A: VVT intake method with mid-position start functional check (Bank 1) P000C: VVT intake method with mid-position start functional check (Bank 2) P0011: VVT intake method with mid-position start functional check (Bank 1) P0021: VVT intake method with mid-position start functional check (Bank 2)
Required Sensors/Components (Main)	Camshaft timing oil control valve Camshaft timing gear assembly
Required Sensors/Components (Related)	Crankshaft position sensor VVT sensor Engine coolant temperature sensor
Frequency of Operation	Continuous
Duration	15 seconds: P000A, P000C 7 seconds: P0011, P0021 (Target error) 1 second: P0011, P0021 (Mid lock position)
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs not stored	P0340, P0345 (Camshaft position sensor - intake with variable valve timing (VVT))
Battery voltage	10.9 V or more

Engine speed	500 rpm or higher
Engine oil temperature	0°C (32°F) or higher

P000A, P000C

VVT feedback control	Active
Change of VVT target angle during 64 msec	Less than 3.84°C
VVT target position	0°C or more

P0011, P0021 (Target error)

VVT feedback control	Active
----------------------	--------

P0011, P0021 (Mid lock position)

VVT command	Mid lock position
Elapsed time after engine start	0.5 seconds or more

TYPICAL MALFUNCTION THRESHOLDS

P000A, P000C

Sigma (VVT target position - VVT actual position)	More than 4000°C or less than -4000°C
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P0011, P0021 (Target error)

VVT target position - VVT actual position	More than 7°C or less than -7°C
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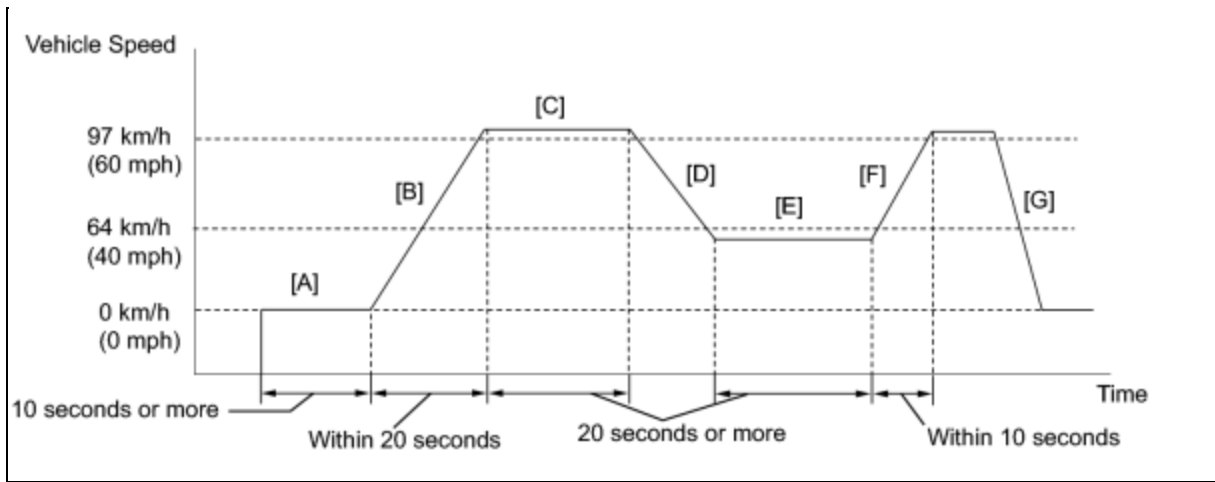
P0011, P0021 (Mid lock position)

VVT target position - VVT actual position	More than 10°C or less than -10°C
---	-----------------------------------

MONITOR RESULT

Refer to detailed information in Checking Monitor Status  .

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. Perform the following the confirmation driving pattern.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

- a. Idle the engine for 10 seconds or more [A].
- b. Accelerate the vehicle to 97 km/h (60 mph) or more within 20 seconds [B].
- c. Drive the vehicle at 97 km/h (60 mph) or more for 20 seconds or more [C].
- d. Release the accelerator pedal to Decelerate until the vehicle speed decreases to less than 64 km/h (40 mph) [D].

HINT:

Release the accelerator pedal fully to perform the fuel-cut.

- e. Drive the vehicle at 60 km/h (40 mph) or less for 20 seconds or more [E].
 - f. Accelerate the vehicle to 97 km/h (60 mph) or more within 10 seconds [F].
 - g. Release the accelerator pedal and stop the vehicle [G].
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
 9. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
- o If a pending DTC is not output, perform the following procedure.

10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
11. Input the DTC: P000A, P000C, P0011 or P0021.
12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal

ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs **INFO** .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM

Refer to DTC P0010 **INFO** .

INSPECTION PROCEDURE

HINT:

- If DTC P000A or P0011 is displayed, check the intake camshaft circuit for the right bank VVT system (bank 1).
- If DTC P000C or P0021 is displayed, check the intake camshaft circuit for the left bank VVT system (bank 2).
- Bank 1 refers to the bank that includes the No. 1 cylinder*.

*: The No. 1 cylinder is the cylinder which is farthest from transmission.

- Bank 2 refers to the bank that does not include the No. 1 cylinder.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P000A, P000C, P0011 OR P0021)
-----------	--

(a) Connect the Techstream to the DLC3.

- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Read DTCs.

Result

RESULT	PROCEED TO
DTC P000A, P000C, P0011 or P0021 is output	A
DTC P000A, P000C, P0011 or P0021 and other DTCs are output	B

HINT:

If any DTCs other than DTC P000A, P000C, P0011 or P0021 are output, troubleshoot those DTCs first.

B  [GO TO DTC CHART](#)

A



2.	PERFORM ACTIVE TEST USING TECHSTREAM (OPERATE CAMSHAFT TIMING OIL CONTROL VALVE)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Start the engine.
- (c) Turn the Techstream on.
- (d) Turn the A/C switch on.
- (e) Enter the following menus: Powertrain / Engine / Active Test / Control the VVT Linear (Bank 1), Control the VVT Linear (Bank 2).
- (f) Check the engine speed while operating the camshaft timing oil control valve (for intake camshaft) using the Techstream.

OK:

TECHSTREAM OPERATION	SPECIFIED CONDITION
0 deg (CA)	Normal engine speed
36 deg (CA)	Engine idles roughly or stalls

HINT:

Refer to "Data List / Active Test" [VVT OCV Duty #1, VVT OCV Duty #2 and VVT Change Angle #1, VVT Change Angle #2]  .

OK
▼

3.	CHECK WHETHER DTC OUTPUT RECURS (DTC P000A, P000C, P0011 OR P0021)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs INFO.
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine and warm it up.
- (i) Drive the vehicle in accordance with the driving pattern described in the Confirmation Driving Pattern.
- (j) Enter the following menus: Powertrain / Engine / Trouble Codes / Pending.
- (k) Read pending DTCs.

Result

RESULT	PROCEED TO
DTC is not output	A
DTC P000A, P000C, P0011 or P0021 is output	B

HINT:

DTC P000A, P000C, P0011 or P0021 may be stored when foreign objects in the engine oil are caught in some parts of the system. The DTC will remain stored even if the system returns to normal after a short time. These foreign objects may then be captured by the oil filter.

B ► CHECK VALVE TIMING (CHECK FOR LOOSE TIMING CHAIN AND JUMPED TEETH)

A ► CHECK FOR INTERMITTENT PROBLEMS

4.	CHECK VALVE TIMING (CHECK FOR LOOSE TIMING CHAIN AND JUMPED TEETH)
-----------	---


(a) Check the valve timing  .

NG  **ADJUST VALVE TIMING**

OK



5.	INSPECT CAMSHAFT TIMING OIL CONTROL VALVE (FOR INTAKE CAMSHAFT)
-----------	--

(a) Inspect the camshaft timing oil control valve (for intake camshaft)  .

NG  **REPLACE CAMSHAFT TIMING OIL CONTROL VALVE (FOR INTAKE CAMSHAFT)**

OK



6.	INSPECT CAMSHAFT TIMING GEAR ASSEMBLY
-----------	--

(a) Inspect the camshaft timing gear assembly  .

HINT:

DTC P000A, P000C, P0011 or P0021 may be stored when foreign objects in the engine oil are caught in some parts of the system. The DTC will remain stored even if the system returns to normal after a short time. These foreign objects may then be captured by the oil filter.

NG  **REPLACE CAMSHAFT TIMING GEAR ASSEMBLY (FOR INTAKE CAMSHAFT)**

OK



7.	CHECK WHETHER DTC OUTPUT RECURS (DTC P000A, P000C, P0011 OR P0021)
-----------	---

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

- (d) Clear the DTCs INFO .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine and warm it up.
- (i) Drive the vehicle in accordance with the driving pattern described in the Confirmation Driving Pattern.
- (j) Enter the following menus: Powertrain / Engine / Trouble Codes / Pending.
- (k) Read pending DTCs.

Result

RESULT	PROCEED TO
DTC is not output	A
DTC P000A, P000C, P0011 or P0021 is output	B

HINT:

DTC P000A, P000C, P0011 or P0021 may be stored when foreign objects in the engine oil are caught in some parts of the system. The DTC will remain stored even if the system returns to normal after a short time. These foreign objects may then be captured by the oil filter.

B ► REPLACE ECM

A ► END



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XH80G0X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P000B,P000D,P0014,P0024: Camshaft Position "B" - Timing Slow Response Bank 1 (2013 FR-S)		

DTC	P000B	Camshaft Position "B" - Timing Slow Response Bank 1
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DTC	P000D	Camshaft Position "B" - Timing Slow Response Bank 2
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DTC	P0014	Camshaft Position "B" - Timing Over-Advanced or System Performance (Bank 1)
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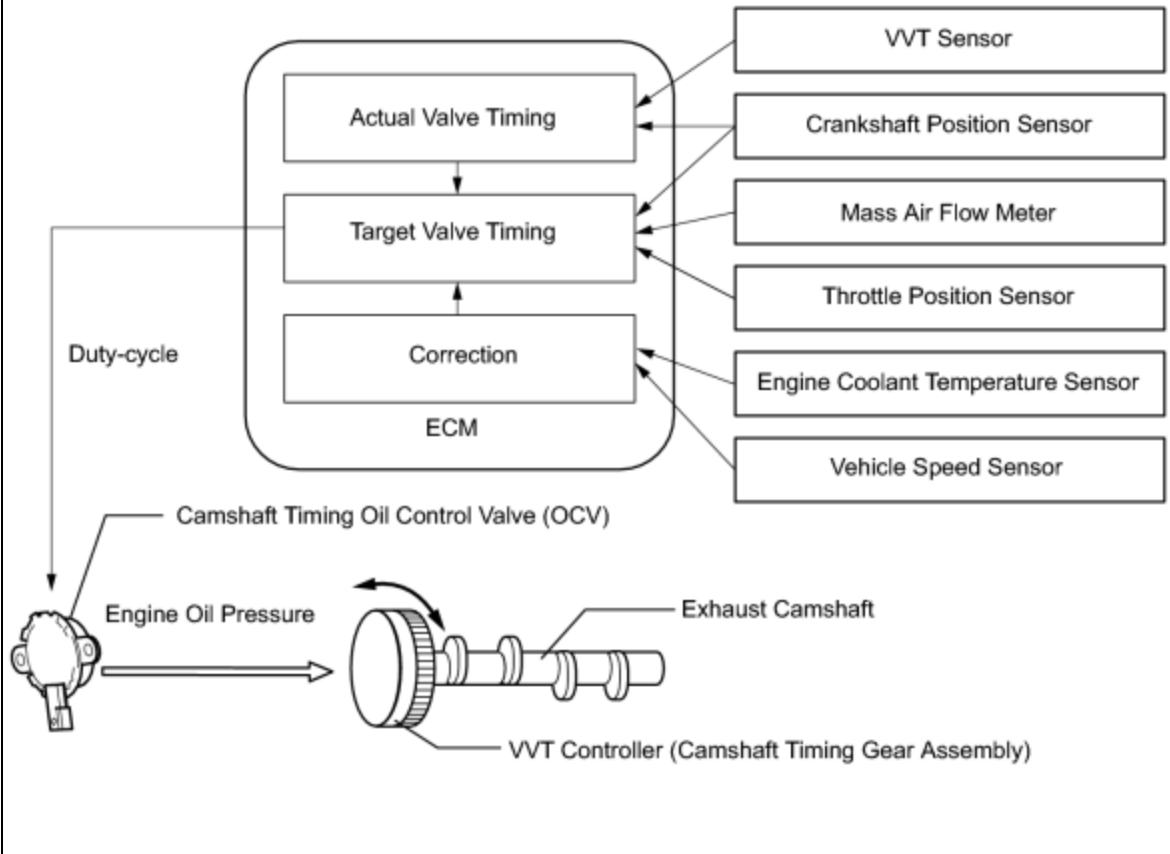
DTC	P0024	Camshaft Position "B" - Timing Over-Advanced or System Performance (Bank 2)
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DESCRIPTION

The Variable Valve Timing (VVT) system adjusts the exhaust valve timing to improve driveability. The engine oil pressure turns the VVT controller to adjust the valve timing.

The camshaft timing oil control valve is a solenoid valve and switches the engine oil line. The valve moves when the ECM applies 12 V to the solenoid. The ECM changes the energizing time to the solenoid (duty-cycle) in accordance with the camshaft position, crankshaft position, throttle position, etc.

VVT System:



DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P000B	Integrated deviations in target exhaust valve timing and actual exhaust valve timing per specified time exceed threshold for 25 seconds (bank 1). (2 trip detection logic)	<ul style="list-style-type: none"> • Valve timing • Camshaft timing oil control valve (for exhaust side of bank 1) • Camshaft oil control valve filter (bank 1) • Camshaft timing gear assembly (for exhaust side of bank 1) • ECM
P0014	Deviation in target exhaust valve timing and actual exhaust valve timing exceeds threshold for 8 seconds (bank 1). (2 trip detection logic)	
P000D	Integrated deviations in target exhaust valve timing and actual exhaust valve timing per specified time exceed threshold for 25 seconds (bank 2). (2 trip detection logic)	<ul style="list-style-type: none"> • Valve timing • Camshaft timing oil control valve (for exhaust side of bank 2) • Camshaft oil control valve filter (bank 2) • Camshaft timing
	Deviation in target exhaust valve timing and actual exhaust	

P0024	valve timing exceeds threshold for 8 seconds (bank 2). (2 trip detection logic)	gear assembly (for exhaust side of bank 2) • ECM
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MONITOR DESCRIPTION

The ECM optimizes the exhaust valve timing using the Variable Valve Timing (VVT) system to control the exhaust camshaft. The VVT system includes the ECM, the camshaft timing oil control valve and the VVT controller (camshaft timing exhaust gear assembly). The ECM sends a target duty-cycle control signal to the camshaft timing oil control valve. This control signal regulates the oil pressure supplied to the VVT controller. The VVT controller can advance or retard the exhaust camshaft.

If the difference between the target and actual exhaust valve timing is large, and changes in the actual exhaust valve timing are small, the ECM interprets this as a VVT controller stuck malfunction and stores a DTC.

MONITOR STRATEGY

Related DTCs	P000B: VVT exhaust method without mid-position start (Bank 1) P000D: VVT exhaust method without mid-position start (Bank 2) P0014: VVT exhaust method without mid-position start (Bank 1) P0024: VVT exhaust method without mid-position start (Bank 2)
Required Sensors/Components (Main)	Camshaft timing oil control valve Camshaft timing exhaust gear assembly
Required Sensors/Components (Related)	Crankshaft position sensor VVT sensor Engine coolant temperature sensor
Frequency of Operation	Continuous
Duration	25 seconds: P000B, P000D 8 seconds: P0014, P0024
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs not stored	P0365, P0390 (Camshaft position sensor - exhaust with variable valve timing (VVT))
Battery voltage	10.9 V or more
Engine speed	500 rpm or higher
Engine oil temperature	0°C (32°F) or higher
VVT feedback control	Active

P000B, P000D

Change of VVT target angle during 64 msec	Less than 3.84°CA
VVT target position	0°CA or more

TYPICAL MALFUNCTION THRESHOLDS

P000B, P000D

Sigma (VVT target position - VVT actual position)	More than 4000°CA or less than -4000°CA
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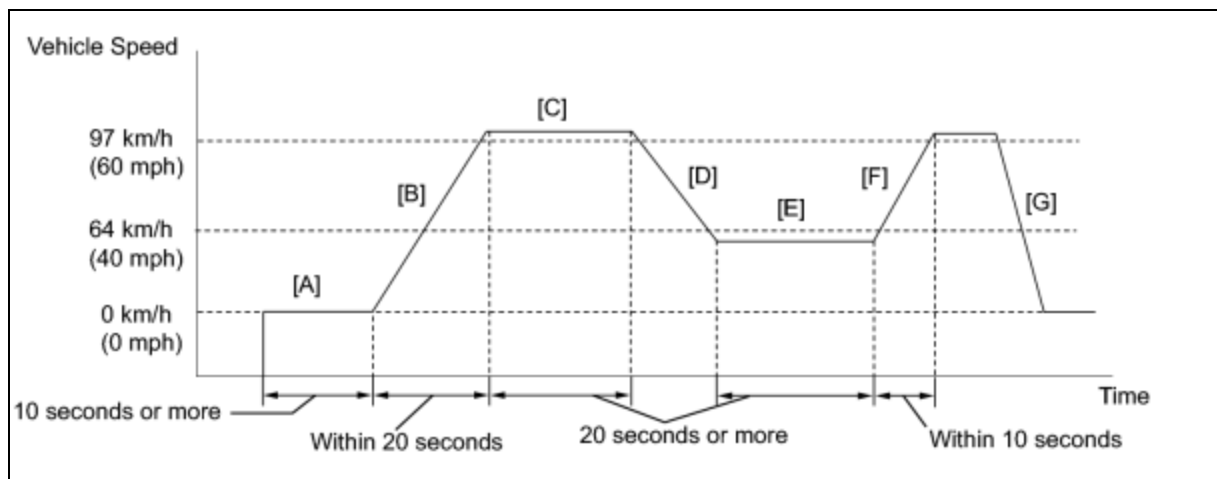
P0014, P0024

VVT target position - VVT actual position	More than 15°CA or less than -15°CA
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MONITOR RESULT

Refer to detailed information in Checking Monitor Status [INFO](#).

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) [INFO](#).
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. Perform the following the confirmation driving pattern.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

- a. Idle the engine for 10 seconds or more [A].
- b. Accelerate the vehicle to 97 km/h (60 mph) or more within 20 seconds [B].
- c. Drive the vehicle at 97 km/h (60 mph) or more for 20 seconds or more [C].
- d. Release the accelerator pedal to Decelerate until the vehicle speed decreases to less

than 64 km/h (40 mph) [D].

HINT:

Release the accelerator pedal fully to perform the fuel-cut.


- e. Drive the vehicle at 60 km/h (40 mph) or less for 20 seconds or more [E].
 - f. Accelerate the vehicle to 97 km/h (60 mph) or more within 10 seconds [F].
 - g. Release the accelerator pedal and stop the vehicle [G].
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
 9. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 11. Input the DTC: P000B, P000D, P0014 or P0024.
 12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none">o DTC judgment completedo System normal
ABNORMAL	<ul style="list-style-type: none">o DTC judgment completedo System abnormal
INCOMPLETE	<ul style="list-style-type: none">o DTC judgment not completedo Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none">o Unable to perform DTC judgmento Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
 - o If the judgment result shows ABNORMAL, the system has a malfunction.
13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM

Refer to DTC P0013  .

INSPECTION PROCEDURE

HINT:

- If DTC P000B or P0014 is displayed, check the exhaust camshaft circuit for the right bank VVT system (bank 1).
- If DTC P000D or P0024 is displayed, check the exhaust camshaft circuit for the left bank VVT system (bank 2).
- DTC P0014 or P0024 may be stored when foreign objects in the engine oil are caught in some parts of the system. The DTC will remain stored even if the system returns to normal after a short time. Those foreign objects may then be captured by the oil filter.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P000B, P000D, P0014 OR P0024)
-----------	--

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Trouble Codes.
- Read DTCs.

Result

RESULT	PROCEED TO
DTC P000B, P000D, P0014 or P0024 is output	A
DTC P000B, P000D, P0014 or P0024 and other DTCs are output	B

HINT:

If any DTCs other than P000B, P000D, P0014 or P0024 are output, troubleshoot those DTCs first.

B  **GO TO DTC CHART**

A



2.	PERFORM ACTIVE TEST USING TECHSTREAM (OPERATE CAMSHAFT TIMING OIL CONTROL VALVE)
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- (a) Connect the Techstream to the DLC3.
- (b) Start the engine.
- (c) Turn the Techstream on.
- (d) Turn the A/C switch on.
- (e) Enter the following menus: Powertrain / Engine / Active Test / Control the VVT Exhaust Linear (Bank 1), Control the VVT Exhaust Linear (Bank 2).
- (f) Check the engine speed while operating the camshaft timing oil control valve (for exhaust camshaft) using the Techstream.

OK:

TECHSTREAM OPERATION	SPECIFIED CONDITION
0 deg (CA)	Normal engine speed
51 deg (CA)	Engine idles roughly or stalls

HINT:


Refer to "Data List / Active Test" [VVT Ex OCV Duty #1, VVT Ex OCV Duty #2 and VVT Ex Chg Angle #1, VVT Ex Chg Angle #2]  .

NG  **CHECK VALVE TIMING (CHECK FOR LOOSE TIMING CHAIN AND JUMPED TEETH)**

OK



3.	CHECK WHETHER DTC OUTPUT RECURS (DTC P000B, P000D, P0014 OR P0024)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine and warm it up.
- (i) Drive the vehicle in accordance with the driving pattern described in the Confirmation Driving Pattern.
- (j) Enter the following menus: Powertrain / Engine / Trouble Codes / Pending.

(k) Read pending DTCs.

Result

RESULT	PROCEED TO
DTC P000B, P000D, P0014 or P0024 is output	A
DTC is not output	B

HINT:

DTC P000B, P000D, P0014 or P0024 may be stored when foreign objects in the engine oil are caught in some parts of the system. The DTC will remain stored even if the system returns to normal after a short time. These foreign objects may then be captured by the oil filter.

B ▶ CHECK FOR INTERMITTENT PROBLEMS

A



4.	CHECK VALVE TIMING (CHECK FOR LOOSE TIMING CHAIN AND JUMPED TEETH)
-----------	---

(a) Check the valve timing  .

NG ▶ ADJUST VALVE TIMING

OK



5.	INSPECT CAMSHAFT TIMING OIL CONTROL VALVE (FOR EXHAUST CAMSHAFT)
-----------	---


(a) Inspect the camshaft timing oil control valve (for exhaust camshaft)  .

NG ▶ REPLACE CAMSHAFT TIMING OIL CONTROL VALVE (FOR EXHAUST CAMSHAFT)

OK



6.	INSPECT CAMSHAFT TIMING EXHAUST GEAR ASSEMBLY
-----------	--

(a) Inspect the camshaft timing exhaust gear assembly  .

HINT:


DTC P000B, P000D, P0014 or P0024 may be stored when foreign objects in the engine oil are caught in some parts of the system. The DTC will remain stored even if the system returns to normal after a short time. These foreign objects may then be captured by the oil filter.

NG  **REPLACE CAMSHAFT TIMING EXHAUST GEAR ASSEMBLY**

OK



7.	CHECK WHETHER DTC OUTPUT RECURS (DTC P000B, P000D, P0014 OR P0024)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine and warm it up.
- (i) Drive the vehicle in accordance with the driving pattern described in the Confirmation Driving Pattern.
- (j) Enter the following menus: Powertrain / Engine / Trouble Codes / Pending.
- (k) Read pending DTCs.

Result

RESULT	PROCEED TO
DTC is not output	A
DTC P000B, P000D, P0014 or P0024 is output	B

HINT:

DTC P000B, P000D, P0014 or P0024 may be stored when foreign objects in the engine oil are caught in some parts of the system. The DTC will remain stored even if the system returns to normal after a short time. These foreign objects may then be captured by the oil filter.

B  **REPLACE ECM**

A ▶ END



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDWOMSX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0010,P0020: Camshaft Position "A" Actuator Circuit (Bank 1) (2013 FR-S)		

DTC	P0010	Camshaft Position "A" Actuator Circuit (Bank 1)
------------	--------------	--

DTC	P0020	Camshaft Position "A" Actuator Circuit (Bank 2)
------------	--------------	--

DESCRIPTION

Refer to P000A INFO.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0010	Oil control valve current is less than 0.306 A for intake camshaft circuit for 2 seconds or more (bank 1). (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in camshaft timing oil control valve circuit (for intake side of bank 1) • Camshaft timing oil control valve (for intake side of bank 1) • ECM
P0020	Oil control valve current is less than 0.306 A for intake camshaft circuit for 2 seconds or more (bank 2). (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in camshaft timing oil control valve circuit (for intake side of bank 2) • Camshaft timing oil control valve (for intake side of bank 2) • ECM

MONITOR DESCRIPTION

This DTC is designed to detect open or short in the camshaft timing oil control valve (for intake camshaft) circuit. If the camshaft timing oil control valve's duty-cycle is excessively high or low while the engine is running, the ECM will illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P0010: Oil control valve for intake-VVT circuit continuity (Bank 1) P0020: Oil control valve for intake-VVT circuit continuity (Bank 2)
Required Sensors/Components (Main)	camshaft timing oil control valve
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous

Duration	2 second
MIL Operation	Immediate
Sequence of Operation	None

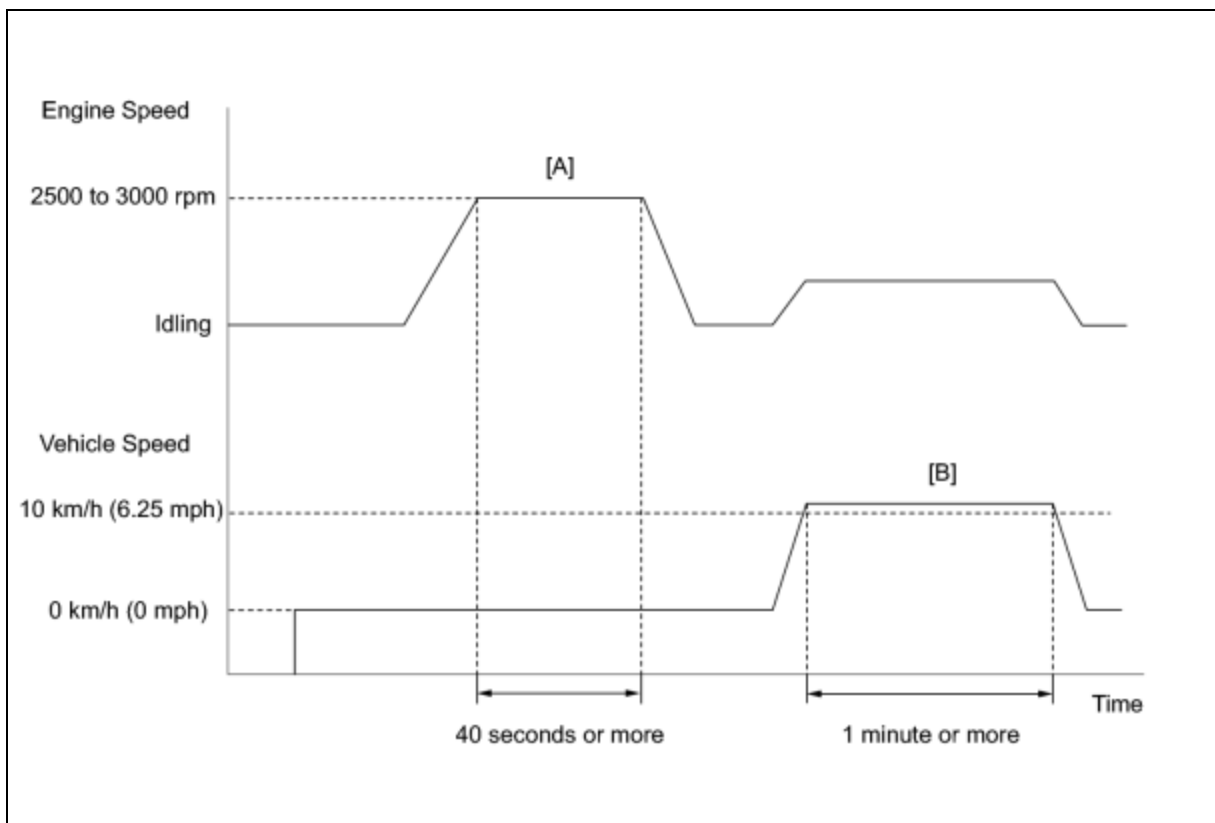
TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not present	None
Battery voltage	10.9 V or more
Camshaft timing oil control valve control duty	99.61% or more

TYPICAL MALFUNCTION THRESHOLDS

Camshaft timing oil control valve control actual current	Less than 0.306 A
--	-------------------

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.


9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P0010 or P0020.
 13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none">o DTC judgment completedo System normal
ABNORMAL	<ul style="list-style-type: none">o DTC judgment completedo System abnormal
INCOMPLETE	<ul style="list-style-type: none">o DTC judgment not completedo Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none">o Unable to perform DTC judgmento Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

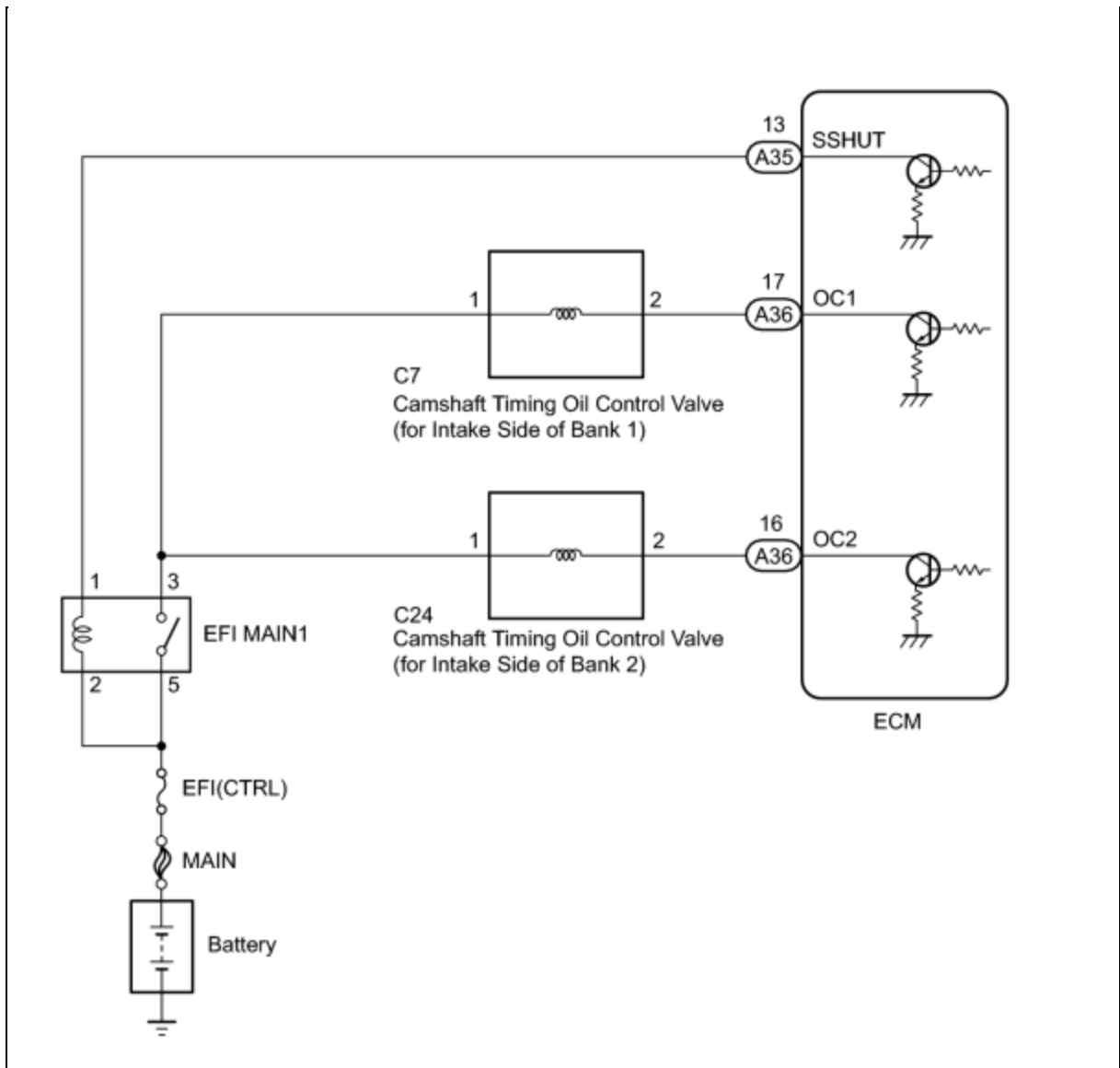
HINT:

- o If the judgment result shows NORMAL, the system is normal.
 - o If the judgment result shows ABNORMAL, the system has a malfunction.
14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTC P0010 is displayed, check the intake camshaft circuit for the right bank VVT system (bank 1).
- If DTC P0020 is displayed, check the intake camshaft circuit for the left bank VVT system (bank 2).
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	READ DTC OUTPUT
-----------	------------------------

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.

- (c) Turn the Techstream on.
- (d) Clear the DTC after recording the freeze frame data and DTC.
- (e) Turn the ignition switch off.
- (f) Start the engine and allow the engine to idle.
- (g) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (h) Read DTCs.

Result

RESULT	PROCEED TO
DTC P0010 or P0020 is output	A
DTC is not output	B

B ▶ CHECK FOR INTERMITTENT PROBLEMS

A



2.	INSPECT CAMSHAFT TIMING OIL CONTROL VALVE (FOR INTAKE CAMSHAFT)
-----------	--

- (a) Inspect the camshaft timing oil control valve (for intake camshaft)  .

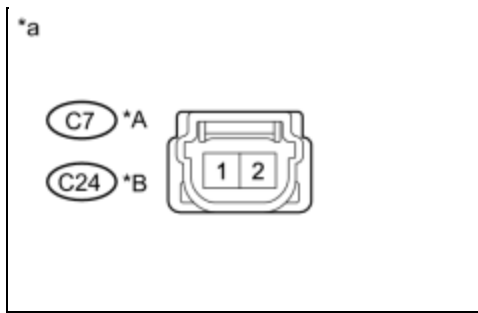
NG ▶ REPLACE CAMSHAFT TIMING OIL CONTROL VALVE (FOR INTAKE CAMSHAFT)

OK



3.	CHECK TERMINAL VOLTAGE (POWER SOURCE OF CAMSHAFT TIMING OIL CONTROL VALVE)
-----------	---

- (a) Disconnect the camshaft timing oil control valve (for intake camshaft connector).



(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C7-1 - Body ground	Ignition switch ON	11 to 14 V
C24-1 - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	Bank 1
*B	Bank 2
*a	Front view of wire harness connector (to Camshaft Timing Oil Control Valve)

NG **INSPECT RELAY (EFI MAIN1)**

OK



4.	CHECK HARNESS AND CONNECTOR (CAMSHAFT TIMING OIL CONTROL VALVE - ECM)
-----------	--

(a) Disconnect the camshaft timing oil control valve (for intake camshaft connector).

(b) Disconnect the ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-17 (OC1) - C7-2	Always	Below 1 Ω
A36-16 (OC2) - C24-2	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-17 (OC1) or C7-2 - Body ground	Always	10 kΩ or higher
A36-16 (OC2) or C24-2 - Body ground	Always	10 kΩ or higher

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ► REPLACE ECM

5.	INSPECT RELAY (EFI MAIN1)
-----------	----------------------------------

(a) Inspect EFI MAIN1 relay INFO.

NG ► REPLACE RELAY (EFI MAIN1)

OK
▼

6.	CHECK WIRE HARNESS AND CONNECTOR (CAMSHAFT TIMING OIL CONTROL VALVE - EFI MAIN1 RELAY)
-----------	---

(a) Disconnect the ECM connector.

(b) Remove the EFI MAIN1 relay from the engine room relay block assembly.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN1 relay terminal 3 - C7-1	Always	Below 1 Ω
EFI MAIN1 relay terminal 3 - C24-1	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN1 relay terminal 3 or C7-1 - Body ground	Always	10 kΩ or higher
EFI MAIN1 relay terminal 3 or C24-1 - Body ground	Always	10 kΩ or higher

NG ▶ REPAIR OR REPLACE HARNESS OR
CONNECTOR

OK ▶ CHECK ECM POWER SOURCE CIRCUIT



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XH70FAX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0013,P0023: Camshaft Position "B" Actuator Circuit / Open (Bank 1) (2013 FR-S)		

DTC	P0013	Camshaft Position "B" Actuator Circuit / Open (Bank 1)
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DTC	P0023	Camshaft Position "B" Actuator Circuit / Open (Bank 2)
------------	--------------	---

DESCRIPTION

Refer to P000B INFO.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0013	Oil control valve current is less than 0.306 A for exhaust camshaft circuit for 2 seconds or more (bank 1). (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in camshaft timing oil control valve circuit (for exhaust side of bank 1) • Camshaft timing oil control valve (for exhaust side of bank 1) • ECM
P0023	Oil control valve current is less than 0.306 A for exhaust camshaft circuit for 2 seconds or more (bank 2). (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in camshaft timing oil control valve circuit (for exhaust side of bank 2) • Camshaft timing oil control valve (for exhaust side of bank 2) • ECM

MONITOR DESCRIPTION

This DTC is designed to detect open or short in the camshaft timing oil control valve (for exhaust camshaft) circuit. If the camshaft timing oil control valve's duty-cycle is excessively high or low while the engine is running, the ECM will illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P0013: Oil control valve for exhaust-VVT circuit continuity (Bank 1) P0023: Oil control valve for exhaust-VVT circuit continuity (Bank 2)
Required Sensors/Components (Main)	Exhaust camshaft timing oil control valve
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous

Duration	2 seconds
MIL Operation	Immediately
Sequence of Operation	None

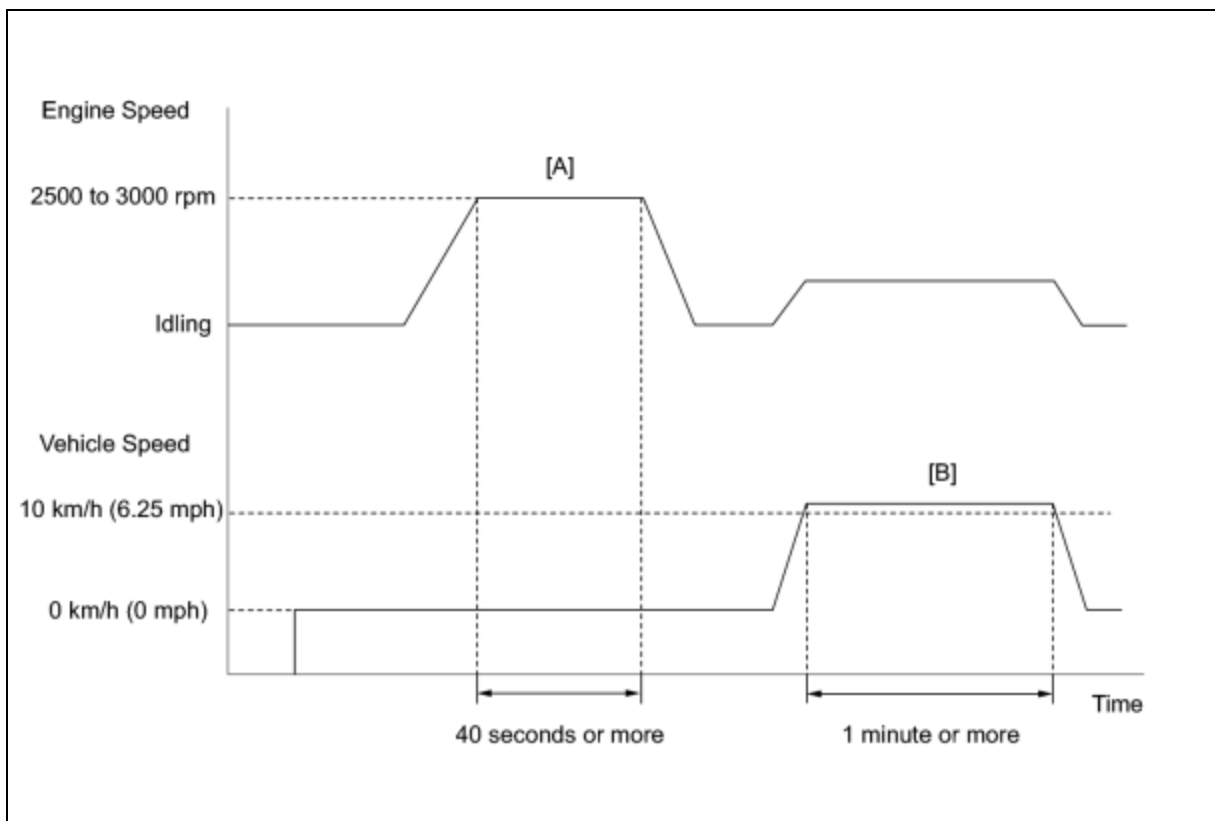
TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not present	None
Battery voltage	10.9 V or more
Camshaft timing oil control valve control duty	99.61% or more

TYPICAL MALFUNCTION THRESHOLDS

Camshaft timing oil control valve control actual current	Less than 0.306 A
--	-------------------

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.


9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P0013 or P0023.
 13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none">o DTC judgment completedo System normal
ABNORMAL	<ul style="list-style-type: none">o DTC judgment completedo System abnormal
INCOMPLETE	<ul style="list-style-type: none">o DTC judgment not completedo Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none">o Unable to perform DTC judgmento Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

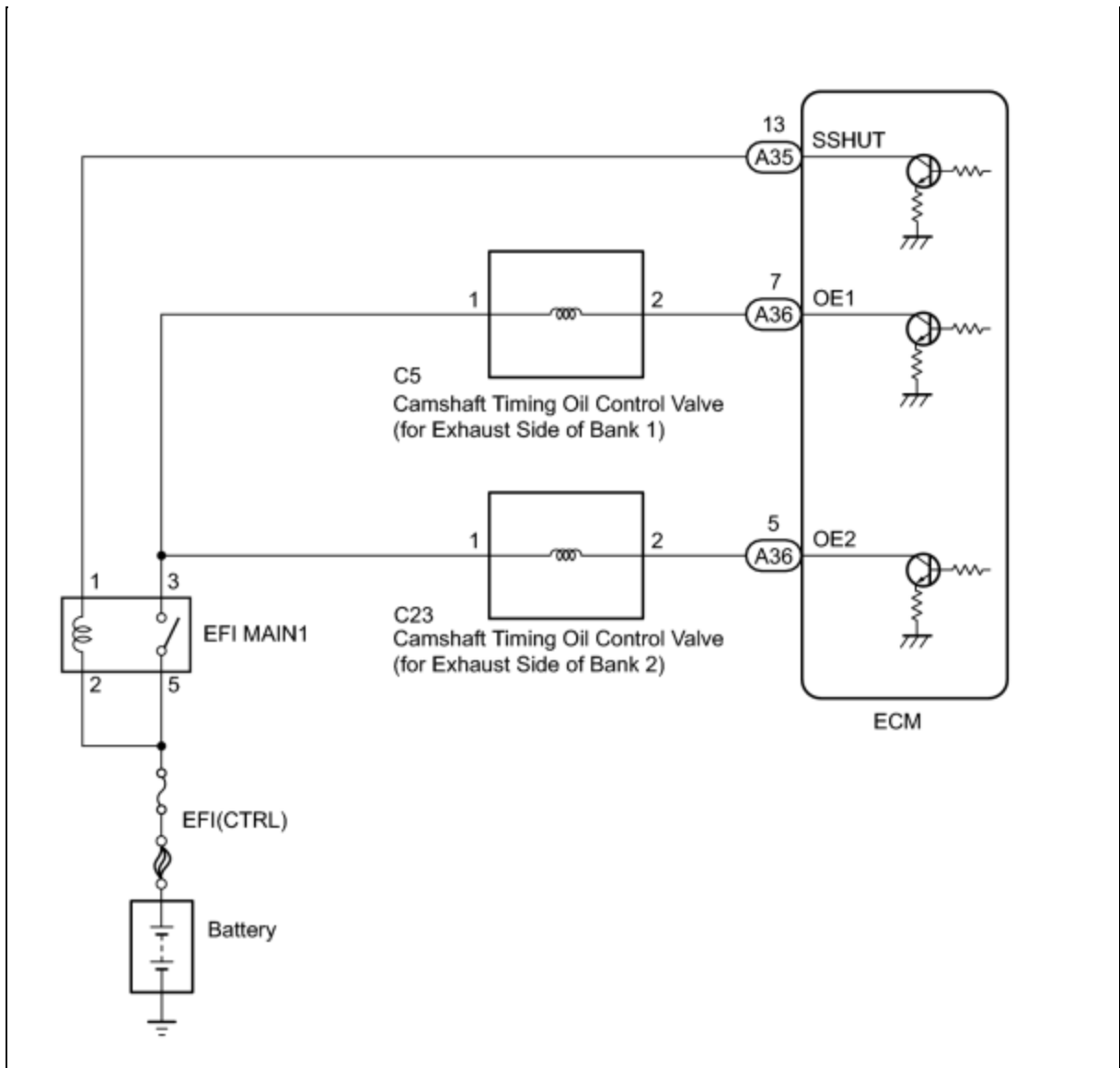
HINT:

- o If the judgment result shows NORMAL, the system is normal.
 - o If the judgment result shows ABNORMAL, the system has a malfunction.
14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTC P0013 is displayed, check the exhaust camshaft circuit for the right bank VVT system (bank 1).
- If DTC P0023 is displayed, check the exhaust camshaft circuit for the left bank VVT system (bank 2).
- Bank 1 refers to the bank that includes the No. 1 cylinder*.

*: The No. 1 cylinder is the cylinder which is farthest from transmission.

- Bank 2 refers to the bank that does not include the No. 1 cylinder.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	READ DTC OUTPUT
----	-----------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTC after recording the freeze frame data and DTC.
- (e) Turn the ignition switch off.
- (f) Start the engine and allow the engine to idle.
- (g) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (h) Read DTCs.

Result

RESULT	PROCEED TO
DTC P0013 or P0023 is output	A
DTC is not output	B

B ► CHECK FOR INTERMITTENT PROBLEMS

A



2.	INSPECT CAMSHAFT TIMING OIL CONTROL VALVE (FOR EXHAUST CAMSHAFT)
-----------	---

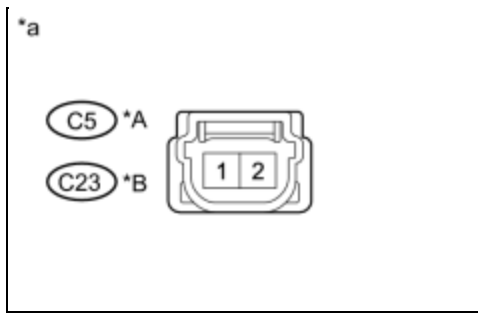
- (a) Inspect the camshaft timing oil control valve (for exhaust camshaft) INFO.

NG ► REPLACE CAMSHAFT TIMING OIL CONTROL VALVE (FOR EXHAUST CAMSHAFT)

OK



3.	CHECK TERMINAL VOLTAGE (POWER SOURCE OF CAMSHAFT TIMING OIL CONTROL VALVE)
-----------	---



(a) Disconnect the camshaft timing oil control valve (for exhaust camshaft connector).

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C5-1 - Body ground	Ignition switch ON	11 to 14 V
C23-1 - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	Bank 1
*B	Bank 2
*a	Front view of wire harness connector (to Camshaft Timing Oil Control Valve)

NG ▶ **INSPECT RELAY (EFI MAIN1)**

OK



4.	CHECK HARNESS AND CONNECTOR (CAMSHAFT TIMING OIL CONTROL VALVE - ECM)
-----------	--

(a) Disconnect the camshaft timing oil control valve (for exhaust camshaft) connector.

(b) Disconnect the ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-7 (OE1) - C5-2	Always	Below 1 Ω
A36-5 (OE2) - C23-2	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-7 (OE1) or C5-2 - Body ground	Always	10 kΩ or higher
A36-5 (OE2) or C23-2 - Body ground	Always	10 kΩ or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **REPLACE ECM**

5.	INSPECT RELAY (EFI MAIN1)
-----------	----------------------------------

(a) Inspect EFI MAIN1 relay  .

NG  **REPLACE RELAY (EFI MAIN1)**

OK


6.	CHECK HARNESS AND CONNECTOR (CAMSHAFT TIMING OIL CONTROL VALVE - EFI MAIN1 RELAY)
-----------	--

(a) Disconnect the ECM connector.

(b) Remove the EFI MAIN1 relay from the engine room relay block assembly.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN1 relay terminal 3 - C5-1	Always	Below 1 Ω
EFI MAIN1 relay terminal 3 - C23-1	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN1 relay terminal 3 or C5-1 - Body ground	Always	10 kΩ or higher
EFI MAIN1 relay terminal 3 or C23-1 - Body ground	Always	10 kΩ or higher

NG ▶ REPAIR OR REPLACE HARNESS OR
CONNECTOR

OK ▶ CHECK ECM POWER SOURCE CIRCUIT



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WC20GWX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P014C,P014D,P015A,P015B: A/F Sensor Slow Response - Rich to Lean Bank 1 Sensor 1 (2013 FR-S)		

DTC	P014C	A/F Sensor Slow Response - Rich to Lean Bank 1 Sensor 1
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DTC	P014D	A/F Sensor Slow Response - Lean to Rich Bank 1 Sensor 1
------------	--------------	--

DTC	P015A	A/F Sensor Delayed Response - Rich to Lean Bank 1 Sensor 1
------------	--------------	---

DTC	P015B	A/F Sensor Delayed Response - Lean to Rich Bank 1 Sensor 1
------------	--------------	---

DESCRIPTION

Refer to DTC P2195  .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P014C	The "Rich to Lean response rate deterioration level*" value is standard or less for 70 seconds. (2 trip detection logic)	<ul style="list-style-type: none"> • Air fuel ratio sensor • Air fuel ratio sensor heater • ECM
P014D	The "Lean to Rich response rate deterioration level*" value is standard or more for 70 seconds. (2 trip detection logic)	
P015A	The "Rich to Lean delay level*" value is standard or more. (2 trip detection logic)	
P015B	The "Lean to Rich delay level*" value is standard or more. (2 trip detection logic)	

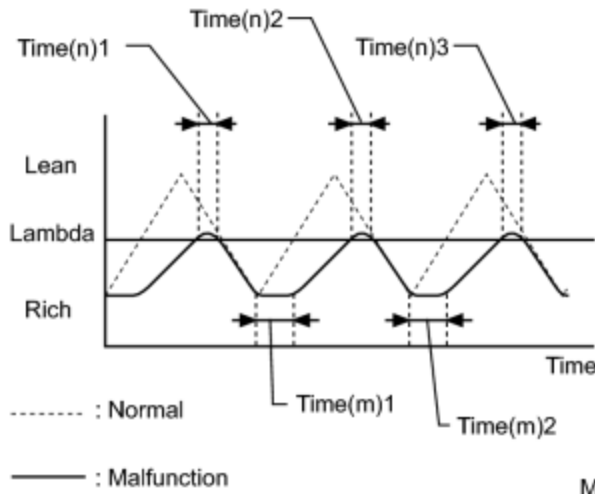
*: Calculated by ECM based on the air fuel ratio sensor output.

MONITOR DESCRIPTION

P014C, P014D (Asymmetric slow response)

The ECM monitors the time that the air fuel ratio sensor output waveform is at its maximum and minimum as time(m) and Time(n) respectively.

P014C:



n: Local Maximum

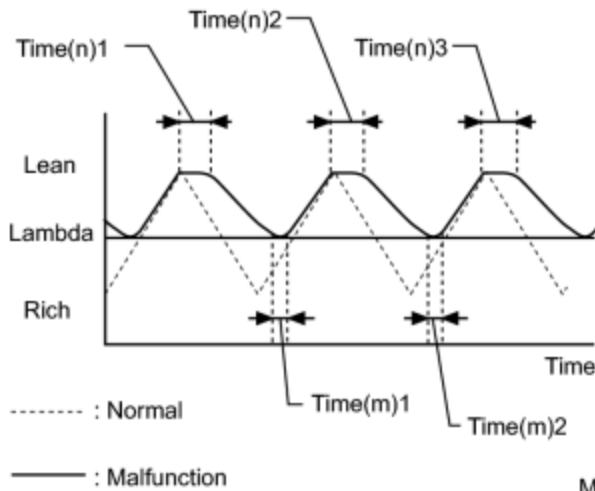
m: Local Minimum

$$\text{Average of Time}(n) = (\text{Time}(n)1 + \text{Time}(n)2 + \dots) / \text{Number of Peaks}$$

$$\text{Average of Time}(m) = (\text{Time}(m)1 + \text{Time}(m)2 + \dots) / \text{Number of Peaks}$$

$$\text{Malfunction: Average of Time}(m) - \text{Average of Time}(n) = 0.08 \text{ seconds or more}$$

P014D:



n: Local Maximum

m: Local Minimum

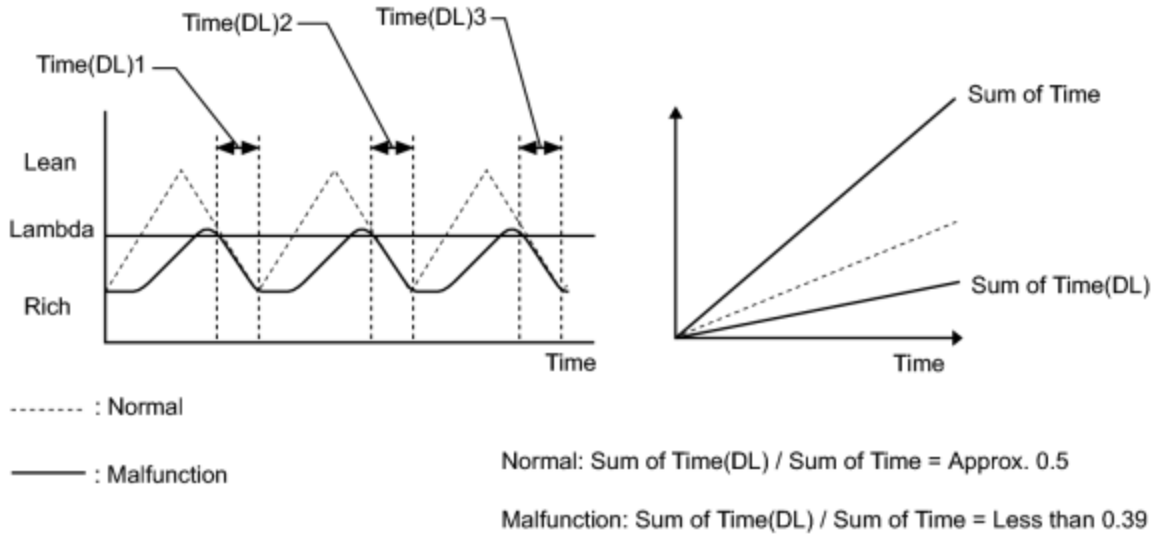
$$\text{Average of Time}(n) = (\text{Time}(n)1 + \text{Time}(n)2 + \dots) / \text{Number of Peaks}$$

$$\text{Average of Time}(m) = (\text{Time}(m)1 + \text{Time}(m)2 + \dots) / \text{Number of Peaks}$$

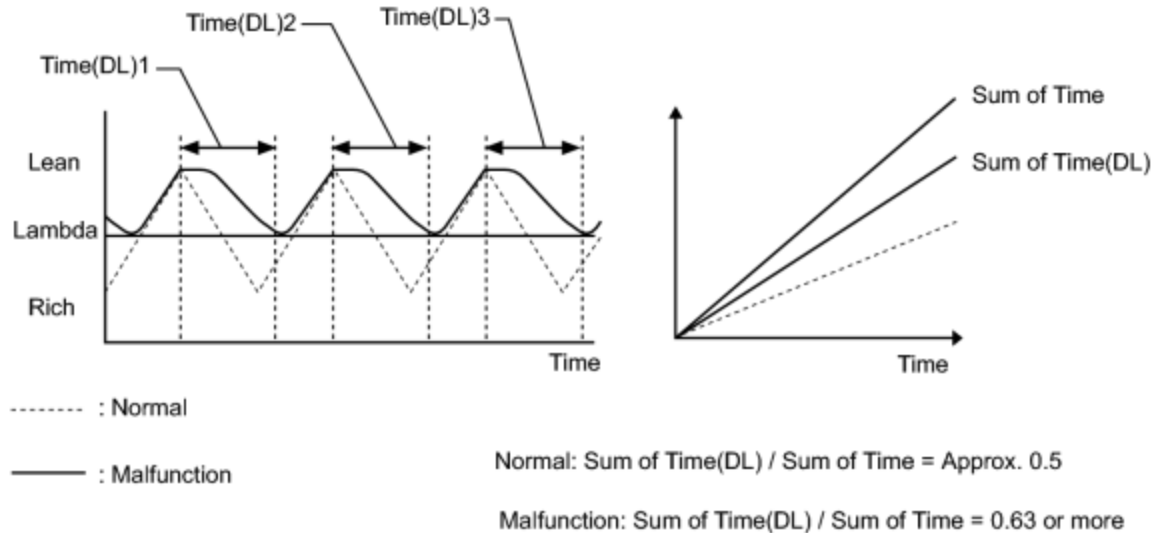
$$\text{Malfunction: Average of Time}(n) - \text{Average of Time}(m) = 0.1 \text{ seconds or more}$$

If the difference between the average time(m) and the average time(n) is the specified value or more, and the air fuel ratio sensor output waveform time of decreasing lambda is less than the air fuel ratio sensor output cumulative time, then P014C is stored, and if this is more, P014D is stored.

P014C:

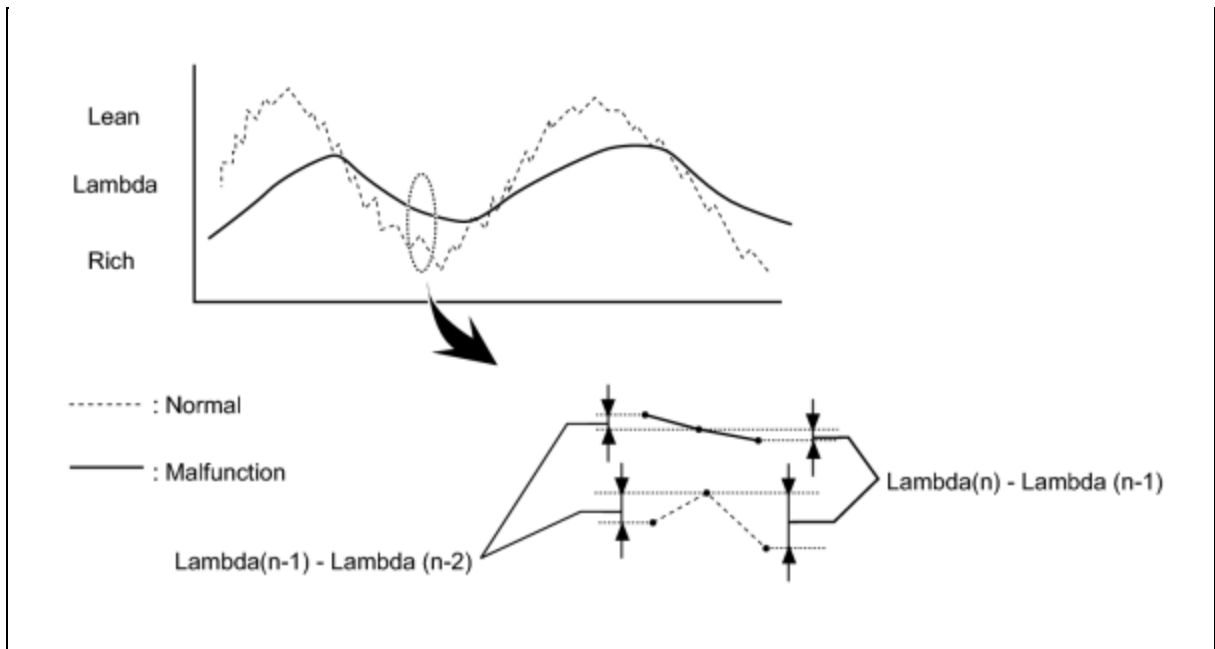


P014D:



P014C, P014D (Symmetric slow response)

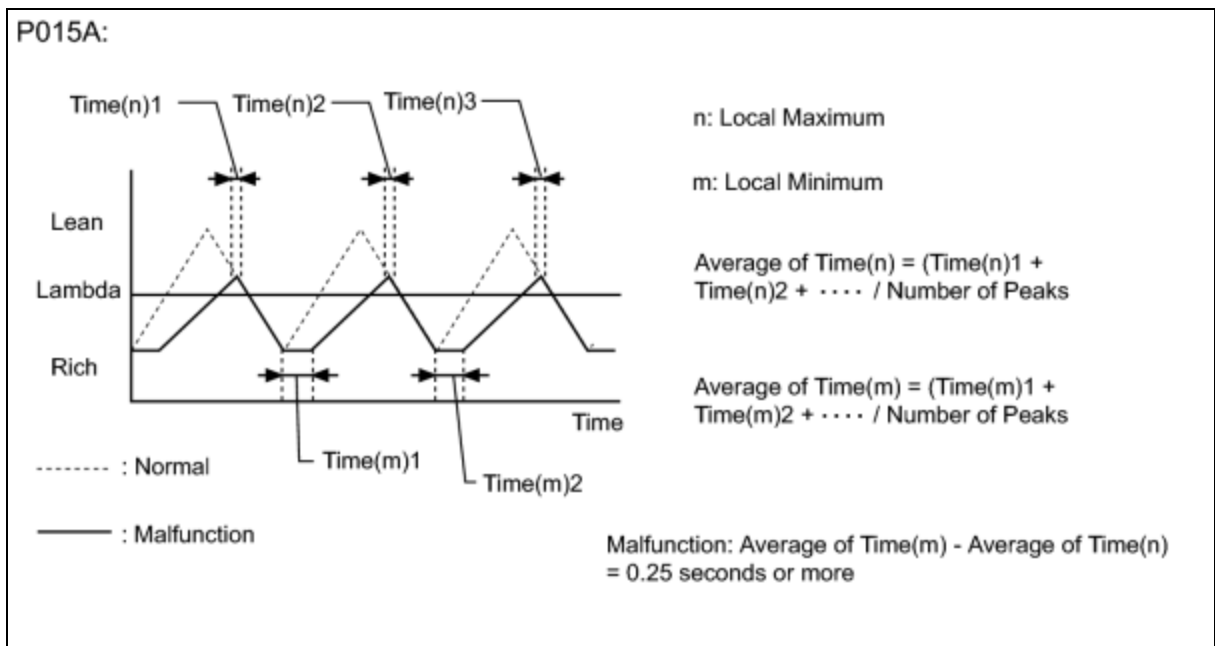
The ECM monitors the amount of change from the air fuel ratio sensor for each specified period, and when the total variation exceeds a specified value, P014C or P014D is stored.

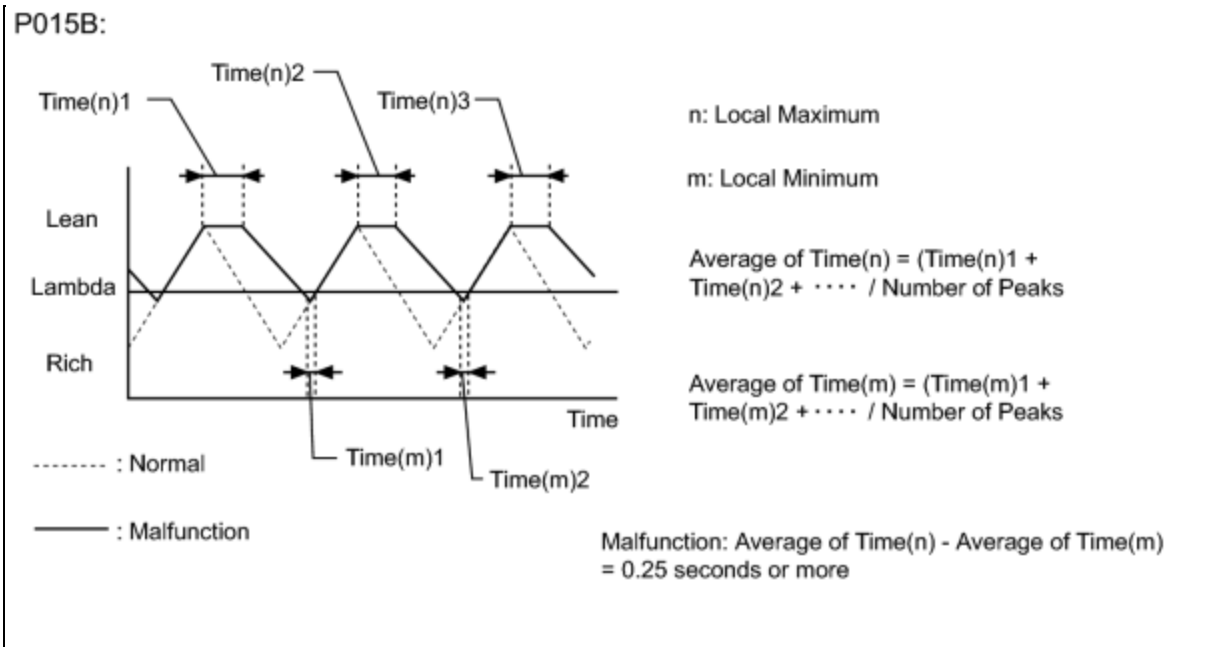


P015A, P015B (Asymmetric delayed start)

The ECM monitors the time that the air fuel ratio sensor output waveform is at its maximum and minimum as time(m) and time(n) respectively.

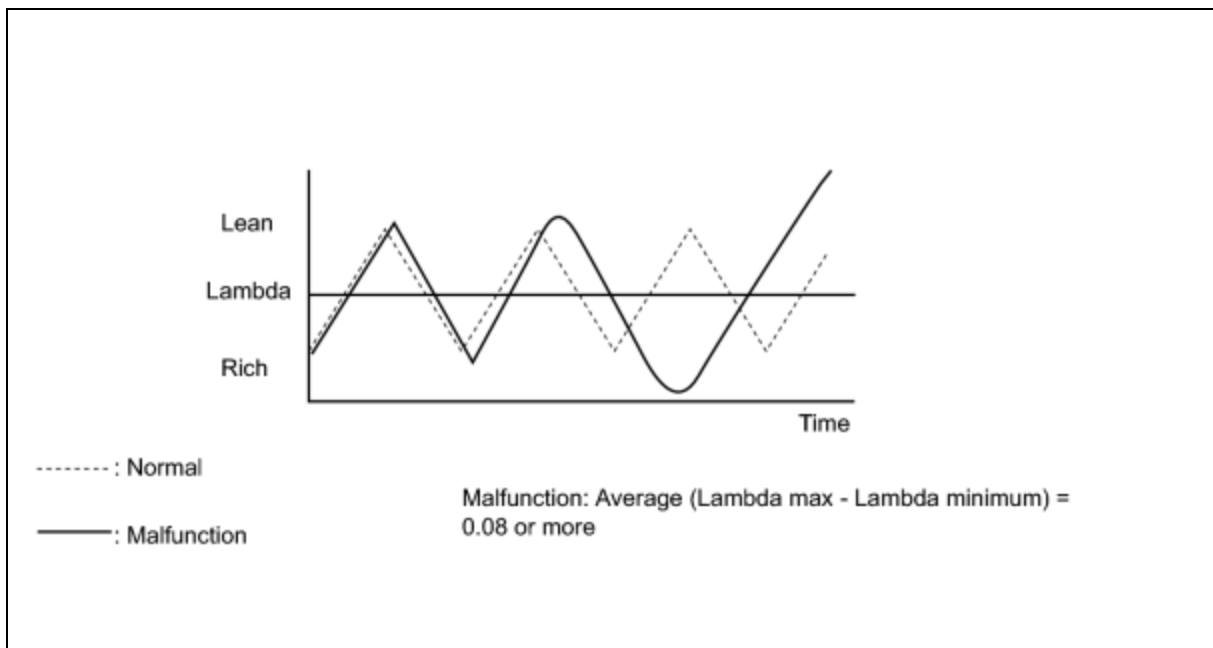
If the difference between the average time(m) and the average time(n) is the specified value or more, and time(m) is the specified value or more, then P015A is stored, and if time(n) is the specified value or more, then P015B is stored.





P015A, P015B (Symmetric delayed start)

If the average value for the Lambda maximum value and minimum value is the specified value or more, then P015A and P015B are stored.



MONITOR STRATEGY

Related DTCs

P014C: Primary oxygen sensor response (Asymmetric slow response Rich to Lean)
 P014D: Primary oxygen sensor response (Asymmetric slow response Lean to Rich)
 P014C and P014D: Primary oxygen sensor response (Symmetric slow response)
 P015A: Primary oxygen sensor response (Asymmetric delayed start)

	Rich to Lean) P015B: Primary oxygen sensor response (Asymmetric delayed start Lean to Rich) P015A and P015B: Primary oxygen sensor response (Symmetric delayed start)
Required Sensors/Components (Main)	Air fuel ratio sensor
Required Sensors/Components (Related)	Speed sensor Crankshaft position sensor
Frequency of Operation	Once per driving cycle
Duration	70 seconds: P014C, P014D 30 seconds: P015A, P015B (Asymmetric delayed start) 90 seconds: P015A, P015B (Symmetric delayed start)
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs not stored	None
Battery voltage	10.9 V or higher
Fuel system	Closed loop
Impedance of air fuel ratio sensor	0 to 65 Ω
Elapsed time after engine start	40 seconds or more
Engine coolant temperature	0°C or higher
Engine speed	1000 rpm or higher
Intake air mass per second	10 g/sec or more
Elapsed time for fuel cut not active	3 seconds or more
Engine	Not idling

P015A, P015B (Symmetric delayed start)

Learning value of EVAP density during purge	Less than 0.2
Total time of canister purge	20 seconds or more
Change of intake air mass during 1/2 engine revolution	Less than 0.02 g/rev

TYPICAL MALFUNCTION THRESHOLDS

P014C (Asymmetric slow response)

Sum of DL (time of decreasing lambda) / Sum of total time	Less than 0.39
Average of time(m) (local minimum) - Average of time(n) (local maximum)	0.08 seconds or more

P014D (Asymmetric slow response)

Sum of DL (time of decreasing lambda) / Sum of total time	0.63 or more
Average of time(n) (local maximum) - Average of time(m) (local minimum)	0.1 seconds or more

P014C, P014D (Symmetric slow response)

Sum of lambda $\{(\lambda(n) - \lambda(n-1)) - \{\lambda(n-1) - \lambda(n-2)\}\}$	Less than 7 (varies with accumulated value of lambda variation)
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P015A (Asymmetric delayed start)

Average of time(m) (local minimum)	0.35 seconds or more
Average of time(m) (local minimum) - Average of time(n) (local maximum)	0.25 seconds or more

P015B (Asymmetric delayed start)

Average of time(n) (local minimum)	0.35 seconds or more
Average of time(n) (local maximum) - Average of time(m) (local minimum)	0.25 seconds or more

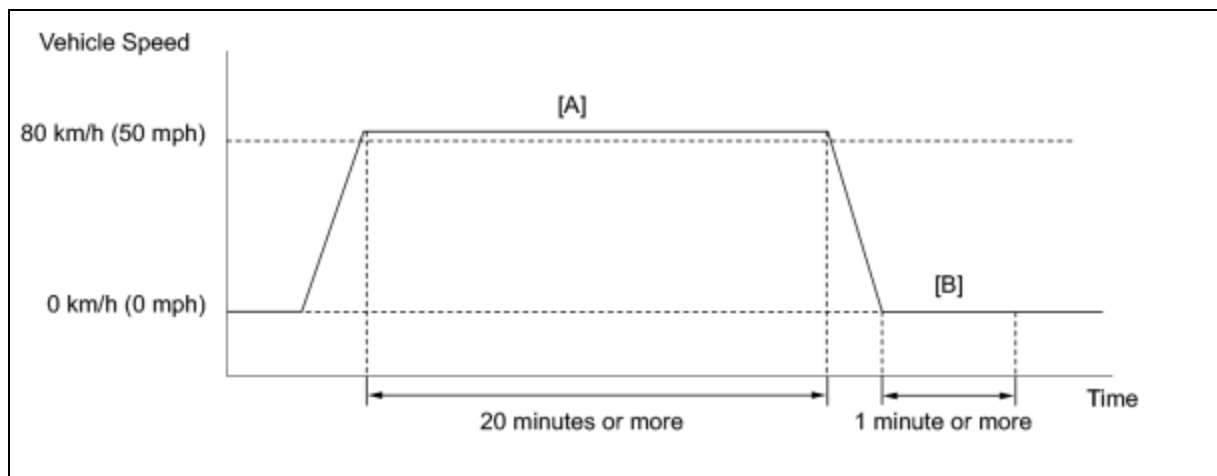
P015A, P015B (Symmetric delayed start)

Average of (maximum lambda - minimum lambda)	0.08 or more
--	--------------

MONITOR RESULT

Refer to Checking Monitor Status [INFO](#) .

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) [INFO](#) .
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.

HINT:

Check the engine coolant temperature is 20°C (68°F) or less at engine started.

7. Perform the following the confirmation driving pattern.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

- a. Drive the vehicle at 80 km/h (50 mph) or more for 20 minutes or more [A].
- b. Stop the vehicle.
- c. Idle the engine for 1 minute or more [B].

8. Enter the following menus: Powertrain / Engine / Trouble Codes.

9. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
- o If a pending DTC is not output, perform the following procedure.

10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.


11. Input the DTC: P014C, P014D, P015A or P015B.

12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none">o DTC judgment completedo System normal
ABNORMAL	<ul style="list-style-type: none">o DTC judgment completedo System abnormal
INCOMPLETE	<ul style="list-style-type: none">o DTC judgment not completedo Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none">o Unable to perform DTC judgmento Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM

Refer to DTC P0030 INFO.

INSPECTION PROCEDURE

HINT:

- A low air fuel ratio sensor voltage could be caused by a rich air fuel mixture. Check for conditions that would cause the engine to run rich.
- A high air fuel ratio sensor voltage could be caused by a lean air fuel mixture. Check for conditions that would cause the engine to run lean.
- Bank 1 refers to the bank that includes the No. 1 cylinder*.

*: The No. 1 cylinder is the cylinder which is farthest from transmission.

- Bank 2 refers to the bank that does not include the No. 1 cylinder.
- Sensor 1 refers to the sensor closest to the engine assembly.
- Sensor 2 refers to the sensor farthest away from the engine assembly.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was moving or stationary, whether the engine was warmed up or not, whether the air fuel ratio was lean or rich, as well as other data recorded at the time of a malfunction.

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P014C, P014D, P015A OR P015B)
-----------	--

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Trouble Codes.
- Read the DTCs.

Result:

RESULT	PROCEED TO
DTC P014C, P014D, P015A or P015B is output	A
DTC P014C, P014D, P015A or P015B and other DTCs are output	B

HINT:

If any DTCs other than DTC P014C, P014D, P015A or P015B are output, troubleshoot those DTCs first.

B  **GO TO DTC CHART**

A



2.	INSPECT AIR FUEL RATIO SENSOR (HEATER RESISTANCE)
-----------	--

(a) Inspect the air fuel ratio sensor INFO .

NG ▶ **REPLACE AIR FUEL RATIO SENSOR**

OK



3.	CHECK HARNESS AND CONNECTOR (AIR FUEL RATIO SENSOR - ECM) INFO
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NG ▶ **REPAIR OR REPLACE HARNESS OR
CONNECTOR (AIR FUEL RATIO SENSOR -
ECM)**

OK



4.	CHECK AIR FUEL RATIO SENSOR
-----------	------------------------------------

(a) Check that the proper air fuel ratio sensor is installed to the vehicle.

NG ▶ **SECURELY REINSTALL AIR FUEL RATIO
SENSOR**

OK



5.	PERFORM CONFIRMATION DRIVING PATTERN
-----------	---

(a) Drive the vehicle according to the Confirmation Driving Pattern.

NEXT



6.	CHECK WHETHER DTC OUTPUT RECURS (DTC P014C, P014D, P015A OR P015B)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes / Pending.
- (e) Read the DTCs.

Result:

RESULT	PROCEED TO
DTC P014C, P014D, P015A or P015B is output	A
DTC is not output	B

B **CHECK FOR INTERMITTENT PROBLEMS**

A



7.	REPLACE AIR FUEL RATIO SENSOR
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- (a) Replace the air fuel ratio sensor .

NEXT



8.	PERFORM CONFIRMATION DRIVING PATTERN
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- (a) Drive the vehicle according to the Confirmation Driving Pattern.

NEXT



	CHECK WHETHER DTC OUTPUT RECURS (DTC P014C, P014D, P014E, P014F,
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9.

P015A, P015B, P015C OR P015D)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes / Pending.
- (e) Read the DTCs.

Result:

RESULT	PROCEED TO
DTC is not output	A
DTC P014C, P014D, P015A or P015B is output	B

B ▶ CHECK ENGINE TO DETERMINE CAUSE OF
EXTREMELY RICH OR LEAN ACTUAL AIR FUEL
RATIO

A ▶ END



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDVOM3X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0016-P0019: Crankshaft Position - Camshaft Position Correlation (Bank 1 Sensor A) (2013 FR-S)		

DTC	P0016	Crankshaft Position - Camshaft Position Correlation (Bank 1 Sensor A)
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DTC	P0017	Crankshaft Position - Camshaft Position Correlation (Bank 1 Sensor B)
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DTC	P0018	Crankshaft Position - Camshaft Position Correlation (Bank 2 Sensor A)
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DTC	P0019	Crankshaft Position - Camshaft Position Correlation (Bank 2 Sensor B)
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DESCRIPTION

In the VVT (Variable Valve Timing) system, the appropriate intake and exhaust valve open and close timing is controlled by the ECM. The ECM performs intake and exhaust valve control by performing the following: 1) controlling the camshaft and camshaft timing oil control valve, and operating the camshaft timing gear; and 2) changing the relative positions of the camshaft and crankshaft.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0016	<p>One of the following conditions is met (2 trip detection logic):</p> <ul style="list-style-type: none"> Slip intake valve timing for 1 second (bank 1). Intake camshaft position has slipped from the central lock position for 1 second (bank 1). 	<ul style="list-style-type: none"> Valve timing Camshaft timing oil control valve (for intake side of bank 1) Oil control valve filter (bank 1) Camshaft timing gear assembly (for intake side of bank 1) ECM
P0017	<p>One of the following conditions is met (2 trip detection logic):</p> <ul style="list-style-type: none"> Slip exhaust valve timing for 5 seconds (bank 1). Exhaust camshaft position has slipped from the central lock position for 5 seconds (bank 1). 	<ul style="list-style-type: none"> Valve timing Camshaft timing oil control valve (for exhaust of bank 1) Oil control valve filter (bank 1) Camshaft timing gear assembly (for exhaust side of bank 1) ECM
		<ul style="list-style-type: none"> Valve timing

P0018	<p>One of the following conditions is met (2 trip detection logic):</p> <ul style="list-style-type: none"> • Slip intake valve timing for 1 second (bank 2). • Intake camshaft position has slipped from the central lock position for 1 second (bank 2). 	<ul style="list-style-type: none"> • Camshaft timing oil control valve (for intake side of bank 2) • Oil control valve filter (bank 2) • Camshaft timing gear assembly (for intake side of bank 2) • ECM
P0019	<p>One of the following conditions is met (2 trip detection logic):</p> <ul style="list-style-type: none"> • Slip exhaust valve timing for 5 seconds (bank 2). • Exhaust camshaft position has slipped from the central lock position for 5 seconds (bank 2). 	<ul style="list-style-type: none"> • Valve timing • Camshaft timing oil control valve (for exhaust side of bank 2) • Oil control valve filter (bank 2) • Camshaft timing gear assembly (for exhaust side of bank 2) • ECM

MONITOR DESCRIPTION

To monitor the correlation of the intake camshaft position and crankshaft position, the ECM checks the VVT learned value while the engine is idling. The VVT learned value is calibrated based on the camshaft position and crankshaft position. The intake valve timing is set to the most retarded angle while the engine is idling. If the VVT learned value is out of the specified range in consecutive driving cycles, the ECM illuminates the MIL and stores DTC P0016 (bank 1) or P0018 (bank 2).

To monitor the correlation of the exhaust camshaft position and crankshaft position, the ECM checks the VVT learned value while the engine is idling. The VVT learned value is calibrated based on the camshaft position and crankshaft position. The exhaust valve timing is set to the most advanced angle while the engine is idling. If the VVT learned value is out of the specified range in consecutive driving cycles, the ECM illuminates the MIL and stores DTC P0017 (bank 1) or P0019 (bank 2).

MONITOR STRATEGY

Related DTCs	<p>P0016: Crankshaft / Camshaft correlation (intake) functional check (Bank 1)</p> <p>P0017: Crankshaft / Camshaft correlation (exhaust) functional check (Bank 1)</p> <p>P0018: Crankshaft / Camshaft correlation (intake) functional check (Bank 2)</p> <p>P0019: Crankshaft / Camshaft correlation (exhaust) functional check (Bank 2)</p>
Required Sensors/Components (Main)	<p>Camshaft timing gear assembly</p> <p>Camshaft timing exhaust gear assembly</p>
Required Sensors/Components (Related)	<p>VVT sensor</p> <p>Crankshaft position sensor</p>
Frequency of Operation	Continuous
	1 second: P0016, P0018

Duration	5 second: P0017, P0019
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs not stored	None
Battery voltage	10.9 V or more
Elapsed time after engine start	60 seconds or more
Engine coolant temperature	50°C (122°F) or higher
VVT feedback control	Not active
VVT target position	Less than 0.01°CA
Learning experienced flag	Set
Duration of no power steering switch change	3 seconds or more
Duration of no neutral switch change	3 seconds or more

P0016, P0018

Engine speed	1400 to 3000 rpm
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P0017, P0019

Engine speed	500 to 1700 rpm
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TYPICAL MALFUNCTION THRESHOLDS

P0016, P0018 (One tooth misalignment)

Actual angle of camshaft - Learning value of the base position	10°CA or more
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P0016, P0018 (Two teeth misalignment)

Actual angle of camshaft	Less than 28°CA or more than 87°CA
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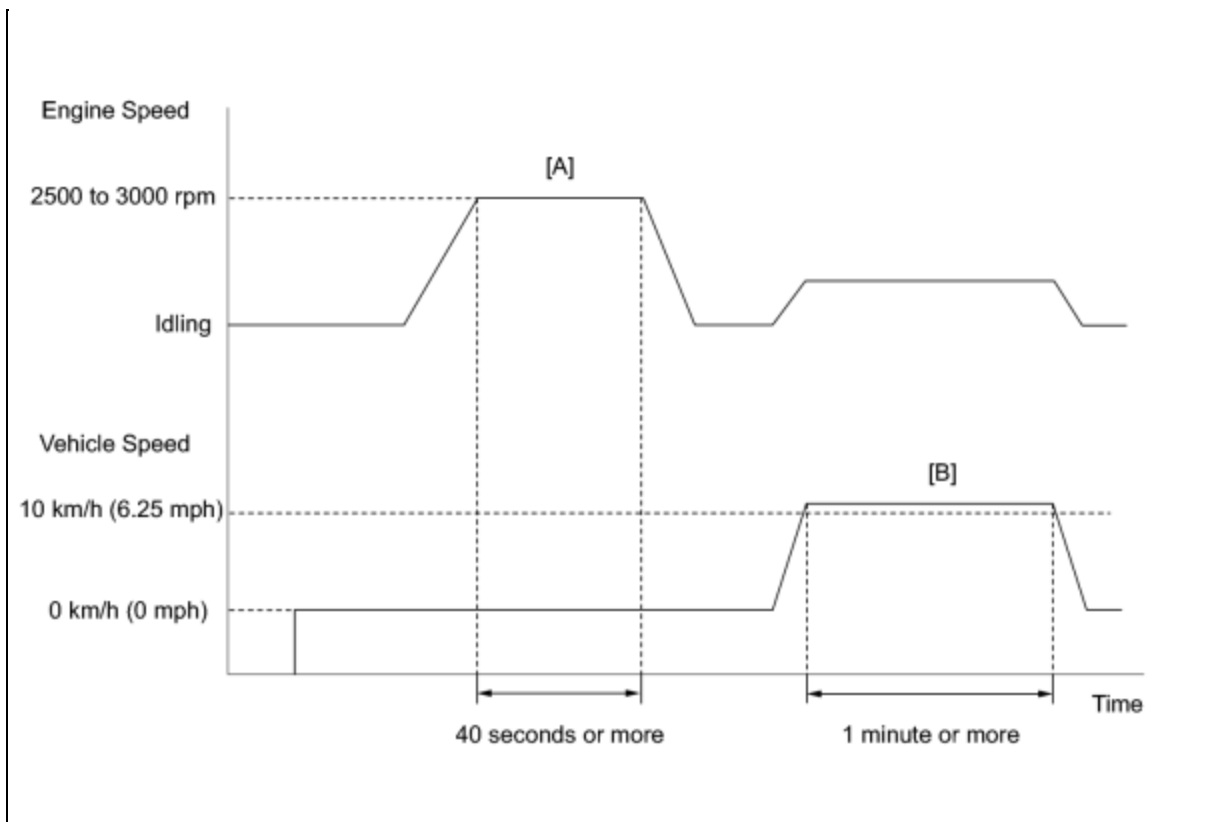
P0017, P0019 (One tooth misalignment)

Actual angle of camshaft - Learning value of the base position	10°CA or more
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P0017, P0019 (Two teeth misalignment)

Actual angle of camshaft	Less than 58°CA or more than 117°CA
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CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P0016, P0017, P0018 or P0019.
 13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal

ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs **INFO** .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM

Refer to DTC P0010 for the camshaft timing oil control valve (for intake camshaft) circuit **INFO** .

Refer to DTC P0013 for the camshaft timing oil control valve (for exhaust camshaft) circuit **INFO** .

INSPECTION PROCEDURE

HINT:

- If DTC P0016 or P0017 is displayed, check the intake camshaft circuit for the right bank VVT system (bank 1).
- If DTC P0018 or P0019 is displayed, check the intake camshaft circuit for the left bank VVT system (bank 2).
- Bank 1 refers to the bank that includes the No. 1 cylinder*.

*: The No. 1 cylinder is the cylinder which is farthest from transmission.

- Bank 2 refers to the bank that does not include the No. 1 cylinder.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0016, P0017, P0018 OR P0019)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Read DTCs.

Result

RESULT	PROCEED TO
DTC P0016, P0017, P0018 or P0019 is output	A
DTC P0016, P0017, P0018 or P0019 and other DTCs are output	B

HINT:

If any DTCs other than P0016, P0017, P0018 or P0019 are output, troubleshoot those DTCs first.

B  [GO TO DTC CHART](#)

A



2.	PERFORM ACTIVE TEST USING TECHSTREAM (OPERATE CAMSHAFT TIMING OIL CONTROL VALVE)
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HINT:

If the VVT system can be operated through the Active Test, it can be assumed that the VVT system is operating normally.

- (a) Connect the Techstream to the DLC3.
- (b) Start the engine.
- (c) Turn the A/C on.
- (d) Turn the Techstream on.
- (e) Warm up the engine.
- (f) Enter the following menus: Powertrain / Engine / Active Test / Control the VVT Linear (Bank 1) or Control the VVT Exhaust Linear (Bank 1) / VVT Change Angle #1, VVT Ex Chg Angle #1, VVT Change Angle #2, VVT Ex Chg Angle #2.
- (g) Perform the Active Test. Check that the displacement angle varies.
 - OK:
 - Displacement angle varies.

INSPECT CAMSHAFT TIMING OIL CONTROL

NG ▶ VALVE (FOR INTAKE OR EXHAUST CAMSHAFT)

OK
▼

3.	CHECK VALVE TIMING
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(a) Check the valve timing **INFO** .

Result

RESULT	PROCEED TO
NG	A
OK	B

B ▶ CHECK WHETHER DTC OUTPUT RECURS (DTC P0016, P0017, P0018 OR P0019)

A ▶ ADJUST VALVE TIMING

4.	INSPECT CAMSHAFT TIMING OIL CONTROL VALVE (FOR INTAKE OR EXHAUST CAMSHAFT)
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(a) Inspect the camshaft timing oil control valve (for intake or exhaust camshaft) **INFO** .

NG ▶ REPLACE CAMSHAFT TIMING OIL CONTROL VALVE (FOR INTAKE OR EXHAUST CAMSHAFT)

OK
▼

5.	INSPECT OIL CONTROL VALVE FILTER AND OIL PIPE
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(a) Check that the oil control valve filter and oil pipe are not clogged.

OK:


The oil control valve filter and oil pipe are not clogged.


NG ▶ CLEAN OR REPLACE OIL CONTROL VALVE FILTER AND OIL PIPE

OK



6.	INSPECT CAMSHAFT TIMING GEAR ASSEMBLY (FOR INTAKE OR EXHAUST CAMSHAFT)
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(a) Inspect the camshaft timing gear assembly (for intake camshaft or exhaust camshaft)  .

NG  **REPLACE CAMSHAFT TIMING GEAR ASSEMBLY (INTAKE OR EXHAUST CAMSHAFT)**

OK



7.	CHECK WHETHER DTC OUTPUT RECURS (DTC P0016, P0017, P0018 OR P0019)
----	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine and warm it up.
- (i) Drive the vehicle in accordance with the driving pattern described in the Confirmation Driving Pattern.
- (j) Enter the following menus: Powertrain / Engine / Trouble Codes / Pending.
- (k) Read pending DTCs.

Result

RESULT	PROCEED TO
DTC is not output	A
DTC P0016, P0017, P0018 or P0019 is output	B

B ▶ REPLACE ECM

A ▶ END



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WC10PBX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0030-P0032: A/F Sensor Heater Control Circuit (Bank 1 Sensor 1) (2013 FR-S)		

DTC	P0030	A/F Sensor Heater Control Circuit (Bank 1 Sensor 1)
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DTC	P0031	Oxygen (A/F) Sensor Heater Control Circuit Low (Bank 1 Sensor 1)
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DTC	P0032	Oxygen (A/F) Sensor Heater Control Circuit High (Bank 1 Sensor 1)
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DESCRIPTION

Refer to DTC P2195 .

HINT:

- When any of these DTCs is stored, the ECM enters fail-safe mode. The ECM turns off the air fuel ratio sensor heater in fail-safe mode. Fail-safe mode continues until the ignition switch is turned off.
- Although the DTC titles say oxygen sensor, these DTCs relate to the air fuel ratio sensor.
- Sensor 1 refers to the sensor mounted in front of the three-way catalytic converter and located near the engine assembly.
- The ECM provides a pulse width modulated control circuit to adjust the current through the heater. The air fuel ratio sensor heater circuit uses a relay on the +B side of the circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0030	Air fuel ratio sensor impedance is greater than 65 Ω for 10 seconds or more. (2 trip detection logic)	<ul style="list-style-type: none"> • Open or short in air fuel ratio sensor circuit • Air fuel ratio sensor • ECM
P0031	Air fuel ratio sensor heater voltage is less than 1.2 V for 1 second or more. (1 trip detection logic)	
P0032	Air fuel ratio sensor heater voltage is 1.2 V or more for 2 seconds or more. (1 trip detection logic)	

HINT:

- Sensor 1 refers to the sensor closest to the engine assembly.
- Sensor 2 refers to the sensor farthest away from the engine assembly.

MONITOR DESCRIPTION

The ECM uses information from the air fuel ratio sensor to regulate the air fuel ratio and keep it close to the stoichiometric level. This maximizes the ability of the three-way catalytic converter to purify the exhaust gases.

The air fuel ratio sensor detects oxygen levels in the exhaust gas and transmits the information to the ECM. The inner surface of the sensor element is exposed to the outside air. The outer surface of the sensor element is exposed to the exhaust gas. The sensor element is made of platinum-coated zirconia and includes an integrated heating element.

The zirconia element generates a small voltage when there is a large difference in the oxygen concentrations between the exhaust gas and outside air. The platinum coating amplifies this voltage generation.

The air fuel ratio sensor is more efficient when heated. When the exhaust gas temperature is low, the sensor cannot generate useful voltage signals without supplementary heating. The ECM regulates the supplementary heating using a duty-cycle approach to adjust the average current in the sensor heater element. If the heater current is outside the normal range, the signal transmitted by the air fuel ratio sensor becomes inaccurate. As a result, the ECM is unable to regulate the air fuel ratio properly.

When the current in the air fuel ratio sensor heater is outside the normal operating range, the ECM interprets this as a malfunction in the sensor heater and stores a DTC.

MONITOR STRATEGY

Related DTCs	P0030: Primary oxygen sensor - Heater functional check P0031: Primary oxygen sensor - Heater circuit continuity P0032: Primary oxygen sensor - Heater circuit continuity
Required Sensors/Components (Main)	Air fuel ratio sensor heater
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	10 seconds: P0030 1 second: P0031 2 seconds: P0032
MIL Operation	2 driving cycles: P0030 Immediate: P0031, P0032
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

P0030

Monitor runs whenever following DTCs not stored	P0122, P0123, P0222, P0223 (Throttle position sensor) P0300, P0301, P0302, P0303, P0304 (Misfire) P0604, P0605 (ROM in ECM) P1160 (Throttle return spring) P2101, P2102 (Throttle actuator control motor) P2109 (Throttle position sensor minimum stop) P2119 (Throttle actuator control) P2122, P2123, P2127, P2128 (Accelerator pedal position sensor (APPS) circuit) P2135 (Throttle position sensor (TPS) correlation) P2138 (Accelerator pedal position sensor (APPS) correlation)
Battery voltage	10.9 V or more

Heater energize continuously	Active
Elapsed time after fuel cut.	20 seconds or more

P0031

Monitor runs whenever following DTCs not stored	None
Battery voltage	10.9 V or more
Air fuel ratio sensor heater control duty	Less than 87.5%

P0032

Monitor runs whenever following DTCs not stored	None
Battery voltage	10.9 V or more
Air fuel ratio sensor heater control duty	12.5% or more

TYPICAL MALFUNCTION THRESHOLDS

P0030

Impedance of air fuel ratio sensor	65 Ω or higher
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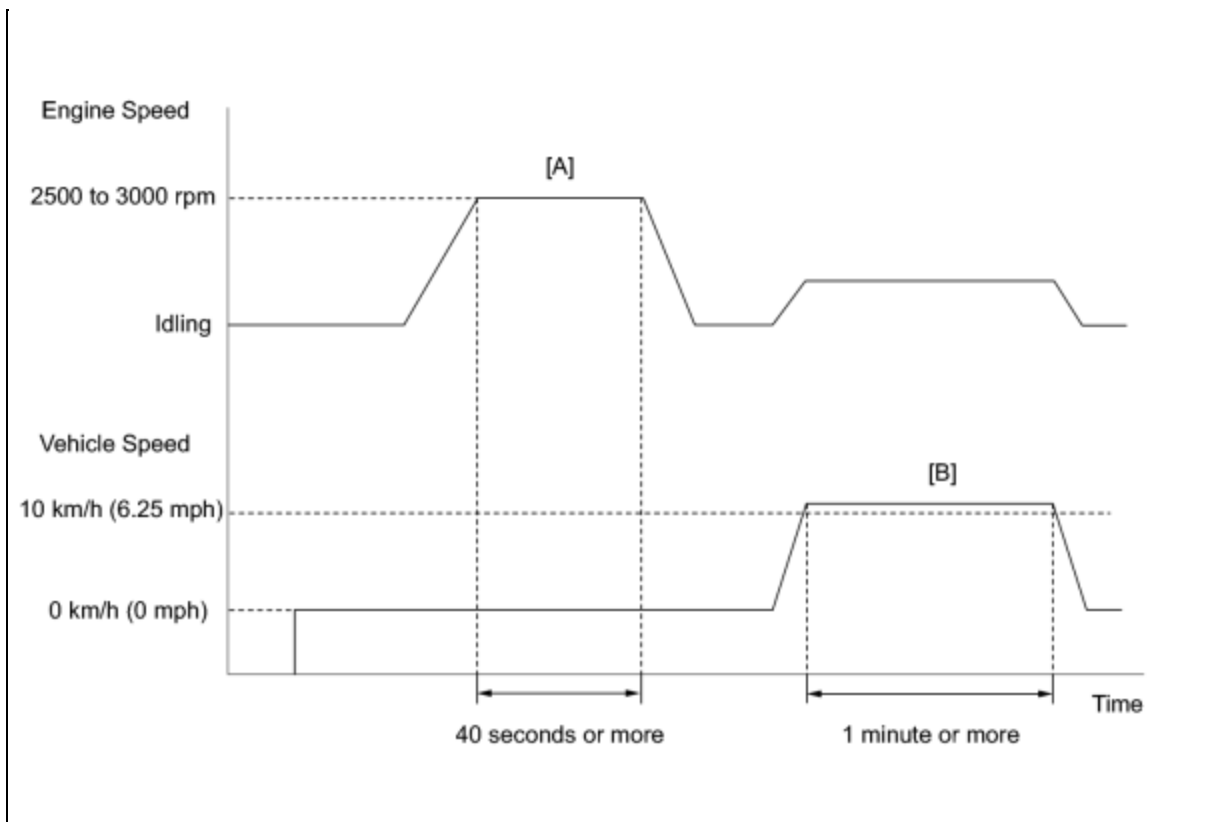
P0031

Air fuel ratio sensor heater ON voltage	Less than 1.2 V
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P0032

Air fuel ratio sensor heater ON voltage	1.2 V or higher
---	-----------------

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:


- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P0030, P0031 or P0032.
 13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal

ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

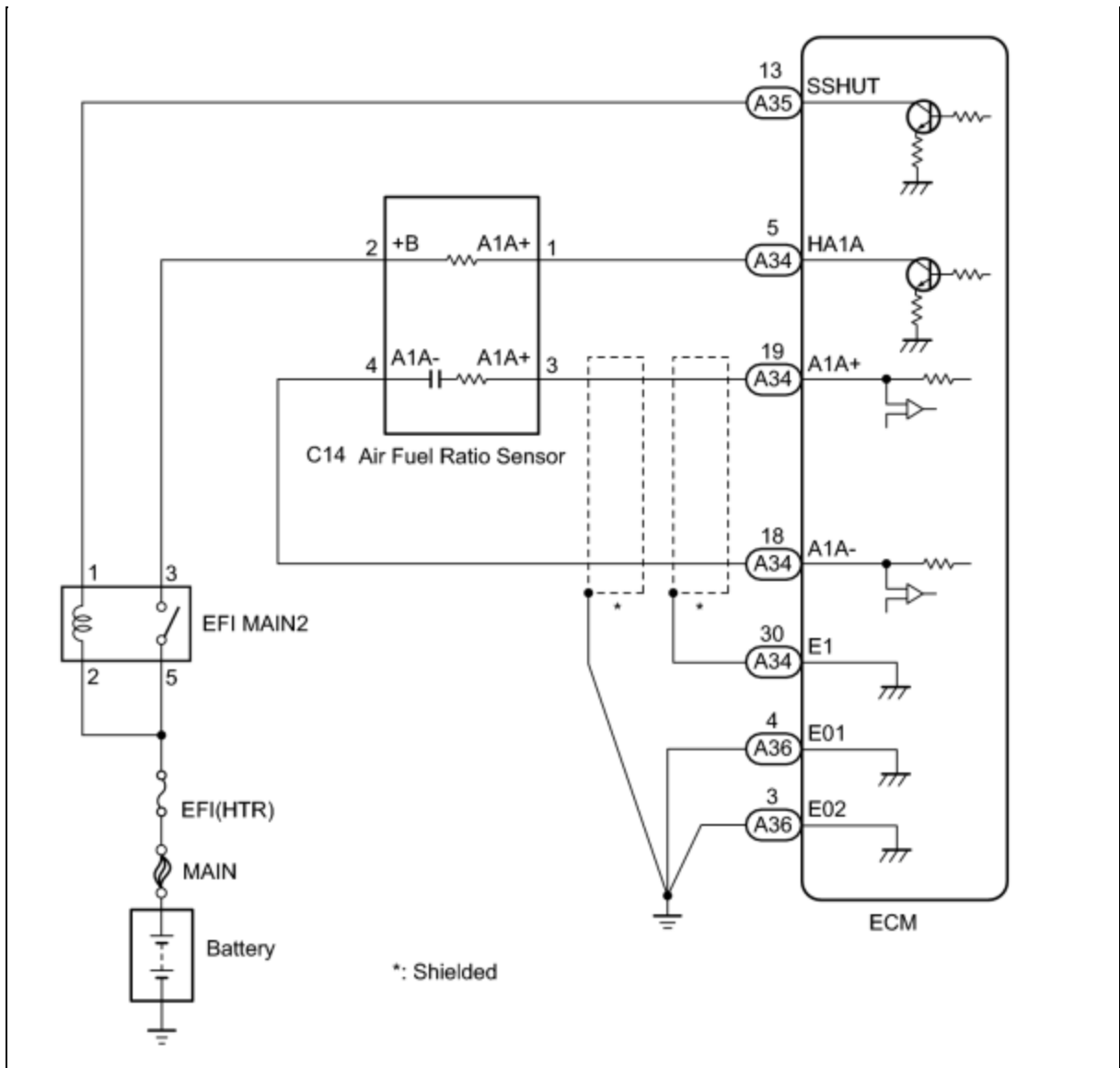
- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

- Refer to "Data List / Active Test" [A/F Heater Duty #1] [INFO](#) .
- Sensor 1 refers to the sensor closest to the engine assembly.
- Sensor 2 refers to the sensor farthest away from the engine assembly.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- Change the fuel injection volume using the Control the Injection Volume function provided in the Active Test and monitor the air fuel ratio sensor output voltage [INFO](#) . If the sensor output voltage does not change (almost no reaction) while performing the Active Test, the sensor may be malfunctioning.

PROCEDURE

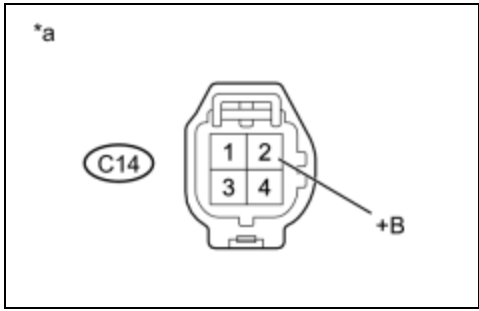
1. INSPECT AIR FUEL RATIO SENSOR (HEATER RESISTANCE)

(a) Inspect the air fuel ratio sensor INFO .

NG ▶ REPLACE AIR FUEL RATIO SENSOR

OK
▼

2. INSPECT TERMINAL VOLTAGE (POWER SOURCE OF AIR FUEL RATIO SENSOR)



(a) Disconnect the air fuel ratio sensor connector.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
C14-2 (+B) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Air Fuel Ratio Sensor)
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NG ▶ INSPECT RELAY (EFI MAIN2)

OK
▼

3. CHECK HARNESS AND CONNECTOR (AIR FUEL RATIO SENSOR - ECM)

- (a) Disconnect the air fuel ratio sensor connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-5 (HA1A) - C14-1(HA1A)	Always	Below 1 Ω

Standard Resistance (Check for short):


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-5 (HA1A) or C14-1 (HA1A) - Body ground	Always	10 kΩ or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



4.	CHECK WHETHER DTC OUTPUT RECURS (P0030, P0031 OR P0032)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine.
- (i) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (j) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (k) Read DTCs.

Result

RESULT	PROCEED TO
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DTC is not output	A
DTC P0030, P0031 or P0032 is output	B

B ▶ REPLACE ECM

A ▶ CHECK FOR INTERMITTENT PROBLEMS

5.	INSPECT RELAY (EFI MAIN2)
-----------	----------------------------------

(a) Check the EFI MAIN2 relay INFO.

NG ▶ REPLACE RELAY (EFI MAIN2)

OK



6.	CHECK HARNESS AND CONNECTOR (AIR FUEL RATIO SENSOR - EFI MAIN2 RELAY)
-----------	--

(a) Disconnect the air fuel ratio sensor connector.

(b) Remove the EFI MAIN2 relay from the engine room relay block assembly.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN2 relay terminal 3 - C14-2 (+B)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN2 relay terminal 3 or C14-2 (+B) - Body ground	Always	10 k Ω or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ CHECK ECM POWER SOURCE CIRCUIT

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PFA0P5X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0037,P0038,P0141: Oxygen Sensor Heater Control Circuit Low (Bank 1 Sensor 2) (2013 FR-S)		

DTC	P0037	Oxygen Sensor Heater Control Circuit Low (Bank 1 Sensor 2)
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DTC	P0038	Oxygen Sensor Heater Control Circuit High (Bank 1 Sensor 2)
------------	--------------	--

DTC	P0141	Oxygen Sensor Heater Circuit (Bank 1 Sensor 2)
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DESCRIPTION

Refer to DTC P0137 [INFO](#) .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0037	Heated oxygen sensor heater voltage is less than battery voltage X 0.3 V for 10 seconds or more. (2 trip detection logic)	<ul style="list-style-type: none"> • Open or short in heated oxygen sensor heater circuit • Heated oxygen sensor • ECM
P0038	Heated oxygen sensor heater voltage is battery voltage X 0.2 V or more for 10 seconds or more. (2 trip detection logic)	
P0141	Heated oxygen sensor heater voltage is less than battery voltage X 0.88 V for 10 seconds or more. (2 trip detection logic)	

MONITOR DESCRIPTION

The sensing portion of the heated oxygen sensor has a zirconia element which is used to detect the oxygen concentration in the exhaust gas. If the zirconia element is at the appropriate temperature, and the difference between the oxygen concentrations surrounding the inside and outside surfaces of the sensor is large, the zirconia element generates voltage signals. In order to increase the oxygen concentration detecting capacity of the zirconia element, the ECM supplements the heat from the exhaust with heat from a heating element inside the sensor.

The ECM monitors the current applied to the heated oxygen sensor heater to check the heater for malfunctions.

If the heater current is outside the normal range, the signal transmitted by the heated oxygen sensor becomes inaccurate. When the current in the heated oxygen sensor heater is outside the normal operating range, the ECM interprets this as a malfunction in the sensor heater and stores a DTC.

MONITOR STRATEGY

	P0037: Secondary oxygen sensor - Heater circuit continuity
--	--

Related DTCs	P0038: Secondary oxygen sensor - Heater circuit continuity P0141: Secondary oxygen sensor - Heater functional check
Required Sensors/Components (Main)	Heated oxygen sensor heater
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	10 seconds (8 msec. X 1250 count): P0037 2.56 seconds (8 msec. X 320 count): P0038 10 seconds (4 msec X 1250 count): P0141
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

P0037

Monitor runs whenever following DTCs not stored	None
Battery voltage	10.9 V or higher
Elapsed time after engine start	1 second or more
Heated oxygen sensor heater control duty	Less than 75%

P0038

Monitor runs whenever following DTCs not stored	None
Battery voltage	10.9 V or higher
Elapsed time after engine start	1 second or more
Heated oxygen sensor heater control duty	20% or more

P0141

Monitor runs whenever following DTCs not stored	None
Battery voltage	10.9 V or higher
Elapsed time after engine start	1 second or more
Engine coolant temperature	60°C (140 °F) or higher
Impedance of air fuel ratio sensor	Less than 65 Ω
Heated oxygen sensor heater control duty	Less than 70%
Air fuel ratio sensor heater control duty	Less than 75%

TYPICAL MALFUNCTION THRESHOLDS

P0037

Output voltage	Battery voltage X 0.2 or more
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P0038

Output voltage	Battery voltage X 0.3 or more
----------------	-------------------------------

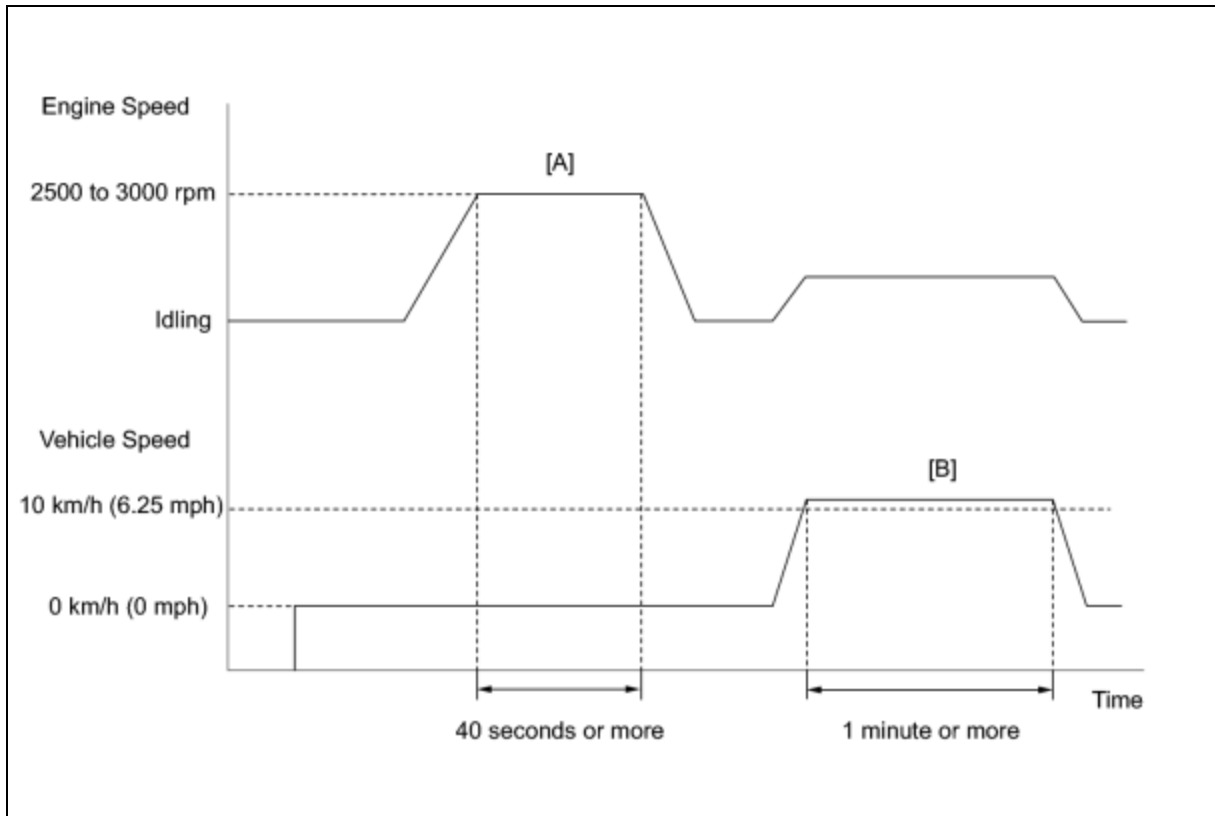
P0141

Judgement voltage	Less than Battery voltage X 0.88
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MONITOR RESULT

Refer to detailed information in Checking Monitor Status [INFO](#) .

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) [INFO](#) .
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:


- If a pending DTC is output, the system is malfunctioning.
- If a pending DTC is not output, perform the following procedure.

11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
12. Input the DTC: P0037, P0038 or P0141.
13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none">◦ DTC judgment completed◦ System normal
ABNORMAL	<ul style="list-style-type: none">◦ DTC judgment completed◦ System abnormal
INCOMPLETE	<ul style="list-style-type: none">◦ DTC judgment not completed◦ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none">◦ Unable to perform DTC judgment◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

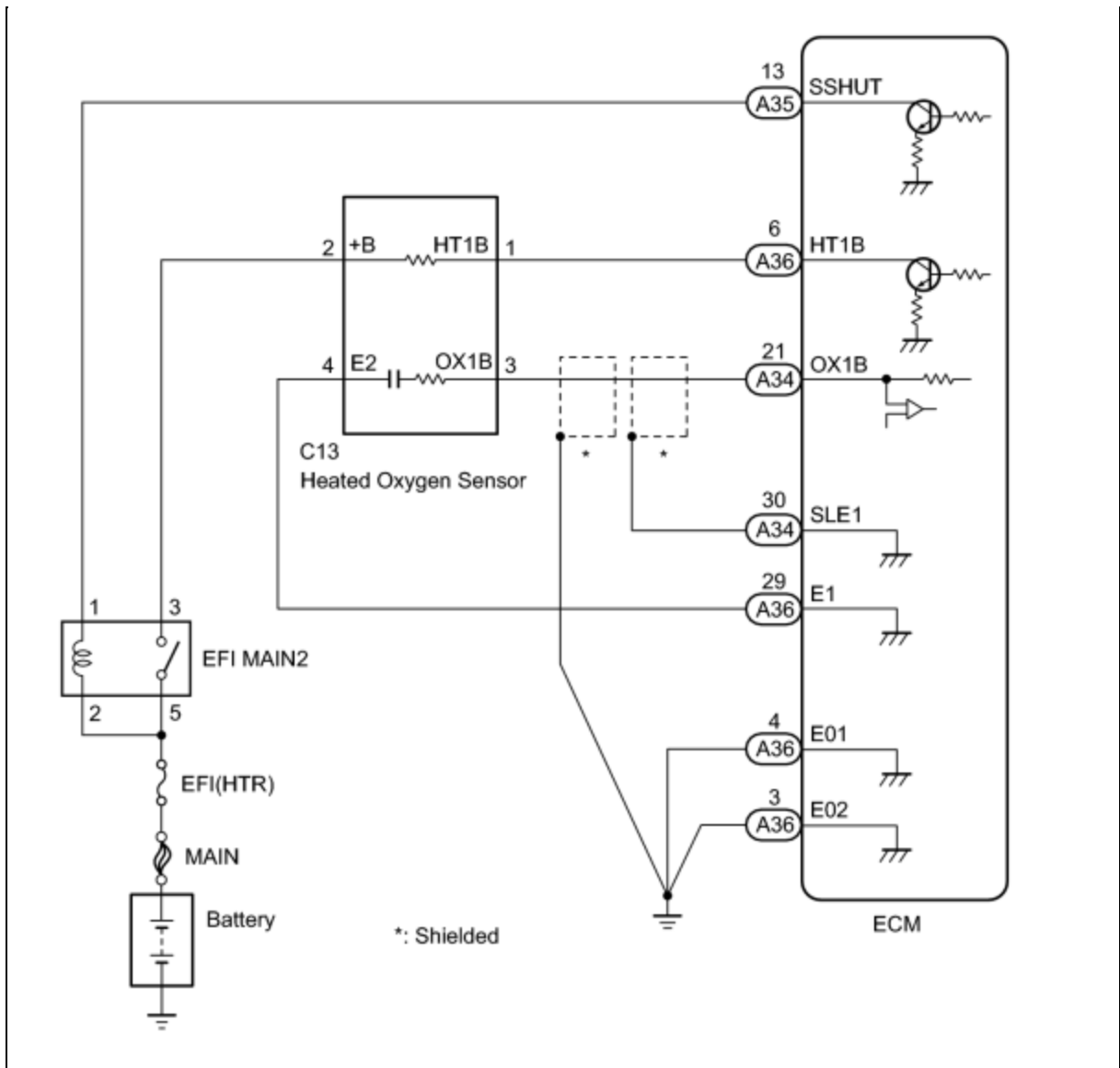
- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

- Sensor 1 refers to the sensor closest to the engine assembly.
- Sensor 2 refers to the sensor farthest away from the engine assembly.
- Refer to "Data List / Active Test" [O2 Heater B1S2 and O2 Heater Curr Val B1S2] INFO.
- When the values for the Data List item O2 Heater Curr Val B1S2 is not 0 A, the heater is on.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- Change the fuel injection volume using the Control the Injection Volume function provided in the Active Test and monitor the heated oxygen sensor output voltage INFO. If the sensor output voltage does not change (almost no reaction) while performing the Active Test, the sensor may be malfunctioning.

PROCEDURE

1. INSPECT HEATED OXYGEN SENSOR (HEATER RESISTANCE)

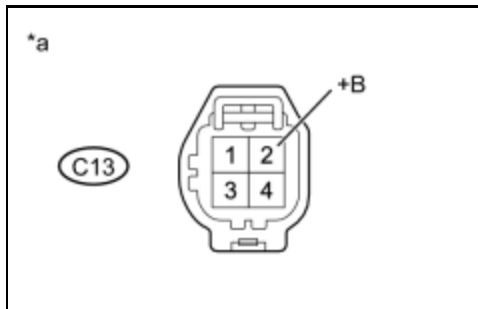
(a) Inspect the heated oxygen sensor INFO.

NG ▶ REPLACE HEATED OXYGEN SENSOR

OK



2. INSPECT TERMINAL VOLTAGE (POWER SOURCE OF HEATED OXYGEN SENSOR)



(a) Disconnect the heated oxygen sensor connector.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

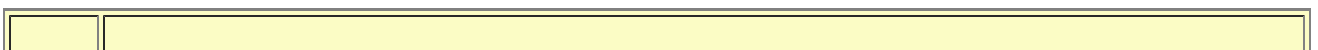
TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
C13-2 (+B) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Heated Oxygen Sensor)
----	---

NG ▶ INSPECT RELAY (EFI MAIN2)

OK



3. CHECK HARNESS AND CONNECTOR (HEATED OXYGEN SENSOR - ECM)

- (a) Disconnect the heated oxygen sensor connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-6 (HT1B) - C13-1 (HT1B)	Always	Below 1 Ω

Standard Resistance (Check for short):


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-6 (HT1B) or C13-1 (HT1B) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



4. CHECK WHETHER DTC OUTPUT RECURS (DTC P0037 OR P0038)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine.
- (i) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (j) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (k) Read pending DTCs.

Result

RESULT	PROCEED TO
DTC is not output	A
DTC P0037, P0038 or P0141 is output	B

B ▶ REPLACE ECM

A ▶ CHECK FOR INTERMITTENT PROBLEMS

5.	INSPECT RELAY (EFI MAIN2)
-----------	----------------------------------

(a) Check the EFI MAIN2 relay  .

NG ▶ REPLACE RELAY (EFI MAIN2)

OK



6.	CHECK HARNESS AND CONNECTOR (HEATED OXYGEN SENSOR - EFI MAIN2 RELAY)
-----------	---

(a) Disconnect the heated oxygen sensor connector.

(b) Remove the EFI MAIN2 relay from the engine room relay block assembly.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN2 relay terminal 3 - C13-2 (+B)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN2 relay terminal 3 or C13-2 (+B) - Body ground	Always	10 k Ω or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ CHECK ECM POWER SOURCE CIRCUIT



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001BFY08MX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P050A,P050B: Cold Start Idle Air Control System Performance (2013 FR-S)		

DTC	P050A	Cold Start Idle Air Control System Performance
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DTC	P050B	Cold Start Ignition Timing Performance
------------	--------------	---

DESCRIPTION

Cold start emission reduction strategy (CSERS) is employed to shorten the time to catalyst light-off from cold start. CSERS consists of retarded ignition timing and increased engine idle speed for a calibrated period of time. This monitor detects malfunctions of the estimated exhaust gas temperature, ECM commanded ignition timing and engine idle speed not reaching the target values.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P050A	The engine speed does not achieve the target engine speed for 7 seconds with engine cooled down. (2 trip detection logic)	<ul style="list-style-type: none"> • Throttle with motor body assembly • Mass air flow meter • PCV system • Air cleaner filter element • Intake system • VVT system • Wire harness or connector • ECM
P050B	The ignition timing is not retarded for 7 seconds, despite rapid warming control of the catalyst (to retard the ignition timing). (2 trip detection logic)	

MONITOR STRATEGY

Related DTCs	P050A: Cold start emission reduction strategy functional check P050B: Cold start emission reduction strategy functional check
Required Sensors/Components (Main)	Throttle with motor body assembly
Required Sensors/Components (Related)	Mass air flow meter Vacuum sensor assembly Engine coolant temperature sensor
Frequency of Operation	Once per driving cycle
Duration	14 seconds: P050A (Case 1) 7 seconds: P050A (Case 2) 10 seconds: P050B

MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs not stored	None
Atmospheric pressure	75.06 kPa(abs) [563 mmHg(abs)] or higher
Battery voltage	10.9 V or more
Vehicle speed	Less than 2 km/h (1.2 mph)
Throttle position	Less than 0.296%
Elapsed time after gear position change N ↔ D	3 seconds or more

P050A (Case 1)

Idle speed control	Active
Commanded ignition timing with CSERS	Less than 3°C A

P050A (Case 2)

Engine coolant temperature	Less than 80°C (176°F)
Integrated amount of intake air	Less than 800 g (varies with engine coolant temperature at engine start)
Elapsed time after engine start	2 seconds or more

P050B

Engine coolant temperature	Less than 80°C (176°F)
Integrated amount of intake air	Less than 800 g (varies with engine coolant temperature at engine start)
Commanded ignition timing with CSERS	Less than 3°C A

TYPICAL MALFUNCTION THRESHOLDS

P050A (Case 1)


Estimated exhaust gas temperature* *: (Manifold absolute pressure X Coefficient 1) + {(Actual engine speed - Target engine speed) X Coefficient 2}	Less than 298°C (568.4°F)
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P050A (Case 2)

Actual engine speed - Target engine speed	Less than -300 rpm
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P050B

CONFIRMATION DRIVING PATTERN

1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation)  .
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Enter the following menus: Powertrain / Engine / Data List / Coolant Temp, Intake Air.
7. Check that "Coolant Temp - Intake Air" is less than 5°C (9°F).

HINT:

If the conditions are not met, then turn the ignition switch off, and wait until the conditions are met.

8. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:

- If a pending DTC is output, the system is malfunctioning.
- If a pending DTC is not output, perform the following procedure.


11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
12. Input the DTC: P050A or P50B.
13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System normal
ABNORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System abnormal
INCOMPLETE	<ul style="list-style-type: none"> ◦ DTC judgment not completed ◦ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> ◦ Unable to perform DTC judgment ◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- If the judgment result shows **NORMAL**, the system is normal.
- If the judgment result shows **ABNORMAL**, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and

check for permanent DTCs  .

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

WIRING DIAGRAM

Refer to DTC P0102  .

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P050A OR P050B)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Read DTCs.

Result

RESULT	PROCEED TO
DTC P050A or P050B is output	A
DTC P050A or P050B and other DTCs are output	B

HINT:

If any DTCs other than P050A or P050B are output, troubleshoot those DTCs first.

B  **GO TO DTC CHART**

A



2. READ VALUE USING TECHSTREAM (FUEL TRIM)

HINT:

Calculate the total fuel trim values to check the characteristic deviation of the mass air flow meter.

- (a) Connect the Techstream to the DLC3.
- (b) Start the engine.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Data List / Short FT #1 and Long FT #1.
- (e) Read the values displayed on the Techstream at engine idle.
- (f) Add together the Short FT #1 and Long FT #1 values to obtain the total fuel trim.

Standard:
Total of Short FT #1 and Long FT #1 values is between -20% and 20%.

NG ► CHECK PCV SYSTEM

OK
▼

3. INSPECT THROTTLE WITH MOTOR BODY ASSEMBLY (THROTTLE VALVE)

- (a) Check that there are no deposits around the throttle valve and throttle valve condition.

OK:
No deposits around the throttle valve and throttle valve moves smoothly.


Result

RESULT	PROCEED TO
NG	A
OK	B

B ► CHECK WHETHER DTC OUTPUT RECURS (DTC P050A OR P050B)


A
▼

4. REPLACE THROTTLE WITH MOTOR BODY ASSEMBLY

(a) Replace the throttle with motor body assembly  .

NEXT  **CHECK WHETHER DTC OUTPUT RECURS (DTC P050A OR P050B)**

5.	CHECK PCV SYSTEM
-----------	-------------------------

(a) Check the PCV hose connections  .

OK:

PCV valve and hose are connected correctly and are not damaged.

NG  **REPAIR OR REPLACE PCV HOSE**

OK



6.	CHECK INTAKE SYSTEM
-----------	----------------------------

(a) Check the intake system for vacuum leaks  .

OK:

No leaks from the intake system.

NG  **REPAIR OR REPLACE INTAKE SYSTEM**

OK



7.	CHECK AIR CLEANER FILTER ELEMENT SUB-ASSEMBLY
-----------	--

(a) Visually check that the air cleaner filter element is not excessively contaminated with dirt or oil.

OK:

The air cleaner filter element is not excessively contaminated with dirt or oil.

NG  **REPLACE AIR CLEANER FILTER ELEMENT SUB-ASSEMBLY**

OK



8.	PERFORM ACTIVE TEST USING TECHSTREAM (OPERATE CAMSHAFT TIMING OIL CONTROL VALVE)
-----------	---

(a) Operate the VVT system through the Active test, and check if the VVT system is operating normally.

(1) Perform the Active Test, referring to DTC P000A inspection procedure (VVT system for intake camshaft) INFO .

(2) Perform the Active Test, referring to DTC P000B inspection procedure (VVT system for exhaust camshaft) INFO .

NG ▶ **CHECK AND REPAIR VVT SYSTEM**

OK
▼

9.	READ VALUE USING TECHSTREAM (MAF) INFO
-----------	---

OK ▶ **CHECK WHETHER DTC OUTPUT RECURS (DTC P050A OR P050B)**

NG ▶ **CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER CONNECTOR CONNECTION)**

10.	REPAIR OR REPLACE PCV HOSE
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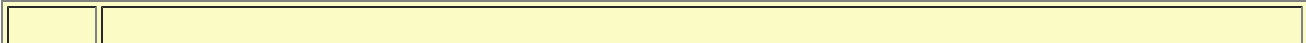
(a) Repair or replace the PCV valve or hose.

NEXT ▶ **CHECK WHETHER DTC OUTPUT RECURS (DTC P050A OR P050B)**

11.	REPAIR OR REPLACE INTAKE SYSTEM
------------	--

(a) Repair or replace the intake system.

NEXT ▶ **CHECK WHETHER DTC OUTPUT RECURS (DTC P050A OR P050B)**



12. REPLACE AIR CLEANER FILTER ELEMENT SUB-ASSEMBLY



(a) Replace the air cleaner filter element sub-assembly  .

NEXT  **CHECK WHETHER DTC OUTPUT RECURS (DTC P050A OR P050B)**

13. CHECK AND REPAIR VVT SYSTEM

(a) Check and repair the VVT system.

HINT:

- Refer to DTC P000A Inspection Procedure (VVT system for intake camshaft)  .
- Refer to DTC P000B Inspection Procedure (VVT system for exhaust camshaft)  .


NEXT



14. CHECK WHETHER DTC OUTPUT RECURS (DTC P050A OR P050B)

NOTICE:

In this operation, the engine must be cold (approximately the same as the engine coolant temperature recorded in the freeze frame data).

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (g) Enter the following menus: Powertrain / Engine / Utility / All Readiness.
- (h) Input the DTC: P050A or P050B.
- (i) Check the DTC judgment result.

Result

RESULT	PROCEED TO
NORMAL (DTC is not output)	A
ABNORMAL (DTC P050A or P050B is output)	B

B ▶ CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER CONNECTOR CONNECTION)

A ▶ CHECK FOR INTERMITTENT PROBLEMS

15.	CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER CONNECTOR CONNECTION)
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(a) Check the connection and terminal contact pressure of connectors and wire harnesses between the mass air flow meter and ECM **INFO** .

HINT:

Repair any problems.

NEXT



16.	CHECK WHETHER DTC OUTPUT RECURS (DTC P050A OR P050B)
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NOTICE:

In this operation, the engine must be cold (approximately the same as the engine coolant temperature recorded in the freeze frame data).

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs **INFO** .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (g) Enter the following menus: Powertrain / Engine / Utility / All Readiness.
- (h) Input the DTC: P050A or P050B.
- (i) Check the DTC judgment result.

Result

RESULT	PROCEED TO
ABNORMAL (DTC P050A or P050B is output)	A
NORMAL (DTC is not output)	B

END

B ▶

A



17. CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER - ECM) INFO

NG ▶ REPAIR OR REPLACE HARNESS OR
CONNECTOR

OK



18. REPLACE MASS AIR FLOW METER

(a) Replace the mass air flow meter INFO .

HINT:

If the results of the inspections performed in step 9 indicated no problem, proceed to the next step without replacing the mass air flow meter.

NEXT



19. CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED

NOTICE:

In this operation, the engine must be cold (approximately the same as the engine coolant temperature recorded in the freeze frame data).

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs INFO .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving

Pattern.

(g) Enter the following menus: Powertrain / Engine / Utility / All Readiness.

(h) Input the DTC: P050A or P50B.

(i) Check the DTC judgment result.

Result

RESULT	PROCEED TO
NORMAL (DTC is not output)	A
ABNORMAL (DTC P050A or P050B is output)	B

B ► REPLACE ECM

A ► END



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XH6022X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P062D,P1261-P1264: No. 1 Fuel Injector Driver Circuit Performance (2013 FR-S)		

DTC	P062D	No. 1 Fuel Injector Driver Circuit Performance
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DTC	P1261	DI Injector Circuit / Open - (Cylinder 1)
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DTC	P1262	DI Injector Circuit / Open - (Cylinder 2)
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DTC	P1263	DI Injector Circuit / Open - (Cylinder 3)
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DTC	P1264	DI Injector Circuit / Open - (Cylinder 4)
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DESCRIPTION

The D-4S system has two fuel injection methods. One is the in-cylinder direct injection method that directly injects pressurized fuel into the combustion chamber. The other is the intake port injection method. The ECM determines which fuel injection method to use in accordance with the engine conditions. For the in-cylinder direction injection method, the injector driver (EDU) in the engine room operates the fuel injectors (for direction injection) at high speeds. The EDU receives fuel injection request signals from the ECM and converts the signals to high voltage / high current injector operation signals to operate the fuel injectors (for direction injection).

The fuel injection sequence occurs in numerical order from No. 1 to No. 4.

The ECM monitors the EDU at all times. If drivers or fuel injectors are malfunctioning, the EDU sends fuel injector operation condition signals (fail signals IJF1 to IJF2) to the ECM. When the ECM receives the signals, the ECM stops the fuel injection control of the appropriate cylinders, cuts voltage to the appropriate injector relay, and illuminates the MIL.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P062D	When injection is finished in all cylinders, the diagnostic signal from the EDU does not change (open or short in the injector or EDU circuit). (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in injector driver (EDU) circuit • Injector driver (EDU) • ECM
		<ul style="list-style-type: none"> • Open or short in fuel injector (for direct injection) circuit (No.

P1261	When the injection of No. 1 cylinder is finished, the diagnostic signal from injector driver (EDU) does not change (open or short in No. 1 cylinder injector circuit). (1 trip detection logic)	<ul style="list-style-type: none"> 1 cylinder Injector driver (EDU) Fuel injector assembly (for direct injection) (No. 1 cylinder) ECM
P1262	When the injection of No. 2 cylinder is finished, the diagnostic signal from injector driver (EDU) does not change (open or short in No. 2 cylinder injector circuit). (1 trip detection logic)	<ul style="list-style-type: none"> Open or short in fuel injector (for direct injection) circuit (No. 2 cylinder) Injector driver (EDU) Fuel injector assembly (for direct injection) (No. 2 cylinder) ECM
P1263	When the injection of No. 3 cylinder is finished, the diagnostic signal from injector driver (EDU) does not change (open or short in No. 3 cylinder injector circuit). (1 trip detection logic)	<ul style="list-style-type: none"> Open or short in fuel injector (for direct injection) circuit (No. 3 cylinder) Injector driver (EDU) Fuel injector assembly (for direct injection) (No. 3 cylinder) ECM
P1264	When the injection of No. 4 cylinder is finished, the diagnostic signal from injector driver (EDU) does not change (open or short in No. 4 cylinder injector circuit). (1 trip detection logic)	<ul style="list-style-type: none"> Open or short in fuel injector (for direct injection) circuit (No. 4 cylinder) Injector driver (EDU) Fuel injector assembly (for direct injection) (No. 4 cylinder) ECM

MONITOR STRATEGY

Related DTCs	P062D: Fuel injector driver circuit functional check P1261: Direct fuel injector functional check (Cylinder 1) P1262: Direct fuel injector functional check (Cylinder 2) P1263: Direct fuel injector functional check (Cylinder 3) P1264: Direct fuel injector functional check (Cylinder 4)
Required Sensors/Components (Main)	Fuel injector assembly (for direct injection) Injector driver (EDU)

Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	0.225 seconds or more (varies with engine speed): P062D 20 counts [0.33 seconds or more (varies with engine speed)]: P1261, P1262, P1263, P1264
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs are not present	None
Battery voltage	8.7 V or more
Engine speed	Less than 7450 rpm
Injection time	0.7 msec or more

TYPICAL MALFUNCTION THRESHOLDS

P062D

Falling edge for all injectors	Not detected
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P1261, P1262, P1263, P1264

Falling edge of injector output signal from injector driver (EDU)	Not detected
---	--------------

CONFIRMATION DRIVING PATTERN

1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Record the Freeze Frame Data.
4. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure) INFO.
5. Turn the ignition switch off and wait for at least 30 seconds.
6. Turn the ignition switch to ON and turn the Techstream on.
7. Based on engine speed, engine load and other freeze frame data stored in the ECM, reproduce the conditions present when the DTC was stored.
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
9. Read the DTC.

HINT:

- o If a DTC is output, the system is malfunctioning.
- o If a DTC is not output, perform the following procedure.


10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
11. Input the DTC: P062D, P1261, P1262, P1263 or P1264.
12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
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NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal
ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU's memory limit

HINT:

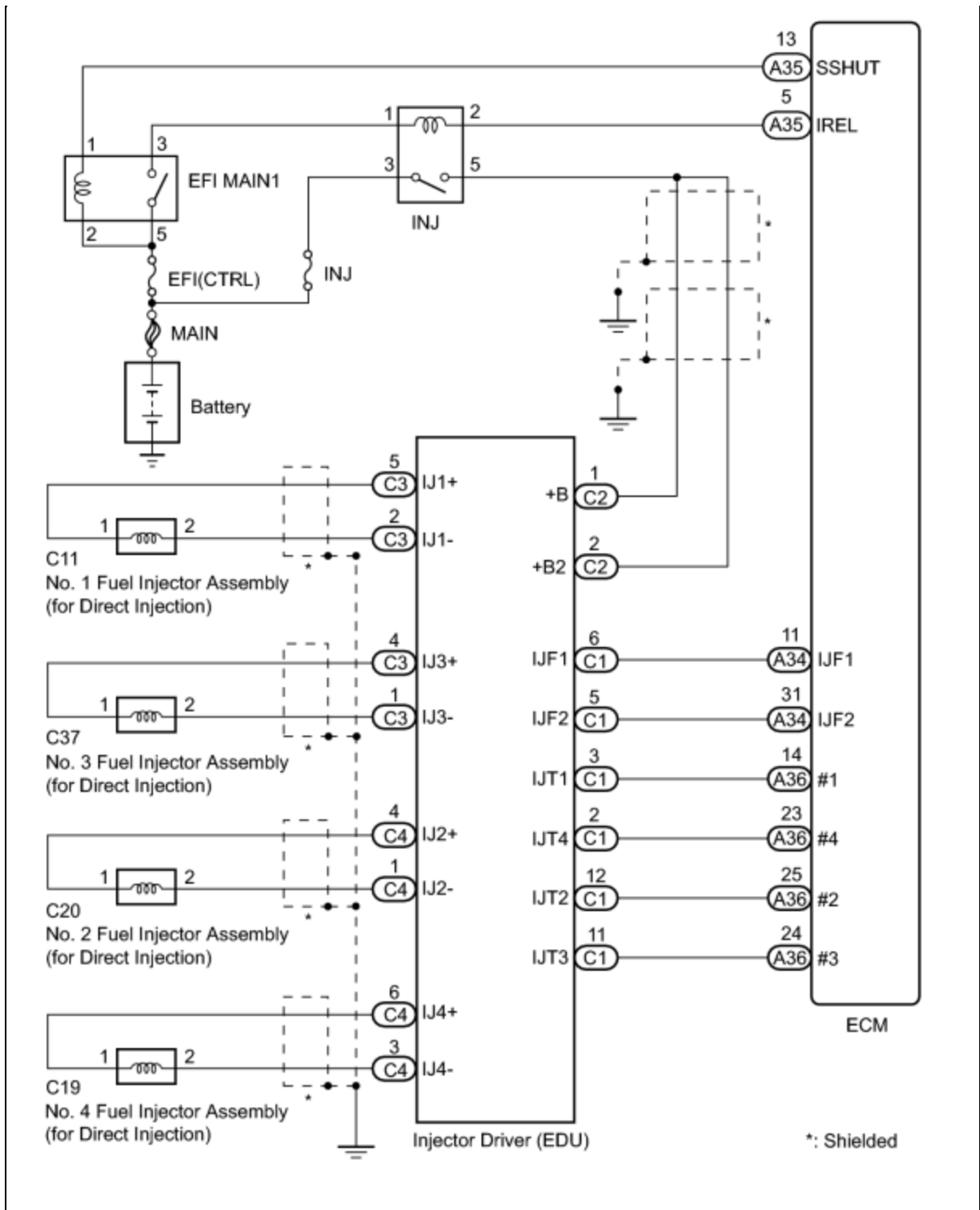
- o If the judgment result shown ABNORMAL, the system has a malfunction.
- o If the judgment result shows NORMAL, the system is normal.

13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTC P1261 is output, check the No. 1 fuel injector (for direct injection) (No. 1 cylinder) circuit.
- If DTC P1262 is output, check the No. 2 fuel injector (for direct injection) (No. 2 cylinder) circuit.
- If DTC P1263 is output, check the No. 3 fuel injector (for direct injection) (No. 3 cylinder) circuit.
- If DTC P1264 is output, check the No. 4 fuel injector (for direct injection) (No. 4 cylinder) circuit.
- If the current from the INJ relay is cut because DTC P062D is stored, DTC P1235 will be stored even if the fuel pump assembly (for high pressure) is normal.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition

information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	CHECK DTC OUTPUT
-----------	-------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Read the DTCs.

Result:

RESULT	PROCEED TO
P1261, P1262, P1263 and/or P1264 are output	A
DTC P062D is output	B

B ▶ **CHECK HARNESS OR CONNECTOR (ECM - INJECTOR DRIVER (EDU))**

A
▼

2.	CHECK HARNESS AND CONNECTOR
-----------	------------------------------------

- (a) Disconnect the injector driver (EDU) connectors.
- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C3-2 (IJ1-) - C3-5 (IJ1+)	20°C (68°F)	1.74 to 2.04 Ω
C4-1 (IJ2-) - C4-4 (IJ2+)	20°C (68°F)	1.74 to 2.04 Ω
C3-1 (IJ3-) - C3-4 (IJ3+)	20°C (68°F)	1.74 to 2.04 Ω
C4-3 (IJ4-) - C4-6 (IJ4+)	20°C (68°F)	1.74 to 2.04 Ω

HINT:

The standard values shown are fuel injector assembly resistance values.

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C3-2 (IJ1-) or C3-5 (IJ1+) - Body ground	20°C (68°F)	1 MΩ or higher
C4-1 (IJ2-) or C4-4 (IJ2+) - Body ground	20°C (68°F)	1 MΩ or higher
C3-1 (IJ3-) or C3-4 (IJ3+) - Body ground	20°C (68°F)	1 MΩ or higher
C4-3 (IJ4-) or C4-6 (IJ4+) - Body ground	20°C (68°F)	1 MΩ or higher

NG  **INSPECT FUEL INJECTOR ASSEMBLY (FOR DIRECT INJECTION)**

OK



3. CHECK HARNESS AND CONNECTOR (ECM - INJECTOR DRIVER (EDU))

- (a) Disconnect the ECM connectors.
- (b) Disconnect the injector driver (EDU) connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-14 (#1) - C1-3 (IJT1)	Always	Below 1 Ω
A36-25 (#2) - C1-12 (IJT2)	Always	Below 1 Ω
A36-24 (#3) - C1-11 (IJT3)	Always	Below 1 Ω
A36-23 (#4) - C1-2 (IJT4)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-14 (#1) or C1-3 (IJT1) - Body ground	Always	10 kΩ or higher
A36-25 (#2) or C1-12 (IJT2) - Body ground	Always	10 kΩ or higher
A36-24 (#3) or C1-11 (IJT3) - Body ground	Always	10 kΩ or higher
A36-23 (#4) or C1-2 (IJT4) - Body ground	Always	10 kΩ or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



4. CLEAR DTC

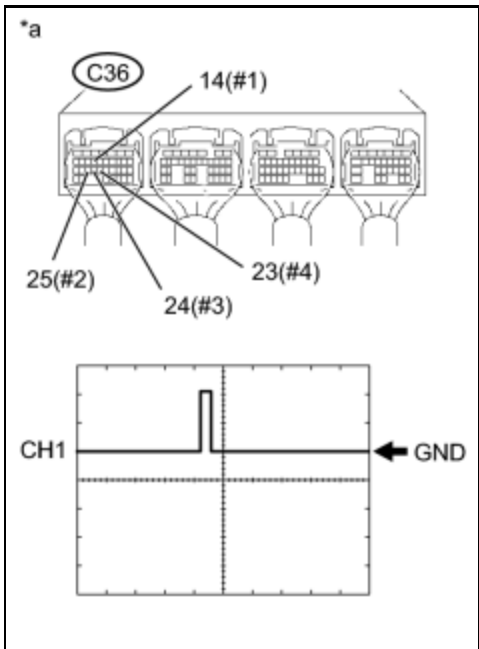
- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs INFO.
- (e) Turn the ignition switch off and wait for at least 30 seconds.

NEXT



5. CHECK ECM (ECM OUTPUT VOLTAGE)

- (a) Disconnect the injector driver (EDU) connector.



- (b) Inspect the ECM using an oscilloscope.

(1) While cranking the engine, check waveform the terminals of the ECM connector.

Standard:

Signal waveform appears as shown in the illustration.

ECM Terminal Name	A36-14 (#1) or A36-23 (#4) - Body ground A36-25 (#2) or A36-24 (#3) - Body ground
Tester Range	2 V/DIV., 4 ms./DIV.
Condition	Cranking

Text in Illustration

*a	Component with harness connected (ECM)
----	--

NG REPLACE ECM

OK REPLACE INJECTOR DRIVER (EDU)

6.	CHECK HARNESS OR CONNECTOR (ECM - INJECTOR DRIVER (EDU))
-----------	---

- (a) Disconnect the ECM connector.
- (b) Disconnect the injector driver (EDU) connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-11 (IJF1) - C1-6 (IJF1)	Always	Below 1 Ω
A34-31 (IJF2) - C1-5 (IJF2)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-11 (IJF1) or C1-6 (IJF1) - Body ground	Always	10 k Ω or higher
A34-31 (IJF2) or C1-5 (IJF2) - Body ground	Always	10 k Ω or higher

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

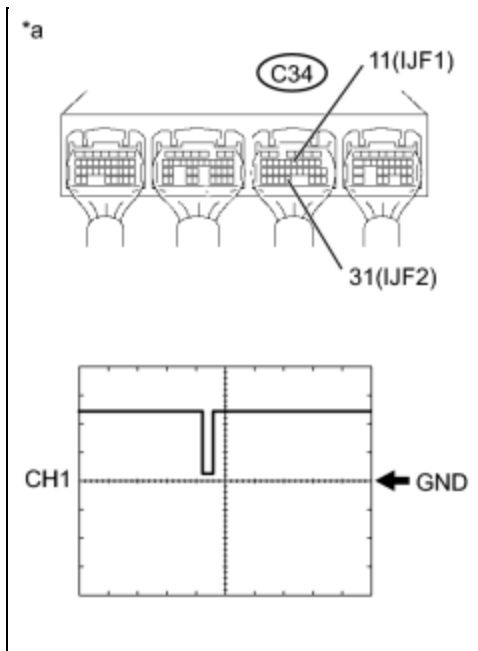
OK

7.	CHECK TERMINAL VOLTAGE (ECM OUTPUT VOLTAGE)
-----------	--

- (a) Disconnect the injector driver (EDU) connector.
- (b) Inspect the ECM using an oscilloscope.
 - (1) While start the engine, check waveform the terminals of the ECM connector.

Standard:
Signal waveform appears as shown in the illustration.

ECM Terminal Name	A34-11 (IJF1) - Body ground A34-31 (IJF2) - Body ground
Tester Range	2 V/DIV., 4 ms./DIV.
Condition	Idling



Text in Illustration

*a	Component with harness connected (ECM)
----	--

NG ► REPLACE ECM

OK ► REPLACE INJECTOR DRIVER (EDU)

8.	INSPECT FUEL INJECTOR ASSEMBLY (FOR DIRECT INJECTION)
-----------	--

(a) Inspect the resistance of the fuel injector (for direct injection) INFO .

NG ► REPLACE FUEL INJECTOR ASSEMBLY (FOR DIRECT INJECTION)

OK ► REPAIR OR REPLACE HARNESS OR CONNECTOR

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000U5B0MLX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0068: MAP / MAF - Throttle Position Correlation (2013 FR-S)		

DTC	P0068	MAP / MAF - Throttle Position Correlation
------------	--------------	--

DESCRIPTION

Refer to DTC P0107  .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0068	<p>One of the following conditions is met (2 trip detection logic):</p> <ul style="list-style-type: none"> Manifold absolute pressure sensor voltage is less than 1.25 V for 5 seconds or more when throttle position is 16° or more with driving. Manifold absolute pressure sensor voltage is more than 3.3 V for 10 seconds or more when throttle position is 5.13° or less with driving. 	<ul style="list-style-type: none"> Open or short in manifold absolute pressure sensor circuit Manifold absolute pressure sensor ECM

MONITOR DESCRIPTION

The manifold absolute pressure sensor is affixed to the intake manifold.

If the manifold absolute pressure is low in spite of driving conditions that would suggest this would be high, or if this is high in spite of driving conditions that would suggest this would be low, then this DTC is detected.

MONITOR STRATEGY

Related DTCs	P0068: Manifold absolute pressure sensor rationality check
Required Sensors/Components (Main)	Manifold absolute pressure sensor
Required Sensors/Components (Related)	Crankshaft position sensor
Frequency of Operation	Continuous
Duration	5 seconds: Low side monitor 10 seconds: High side monitor
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

	P0107, P0108 (Manifold absolute pressure (MAP) sensor) P0111, P0112, P0113 (Intake air temperature (IAT) sensor)
--	---

Monitor runs whenever following DTCs not stored

P0117, P0118 (Engine coolant temperature (ECT) sensor)
 P0122, P0123, P0222, P0223 (Throttle position sensor)
 P0604, P0605 (ROM in ECM)
 P1160 (Throttle return spring)
 P2101, P2102 (Throttle actuator control motor)
 P2109 (Throttle position sensor minimum stop)
 P2119 (Throttle actuator control)
 P2122, P2123, P2127, P2128 (Accelerator pedal position sensor (APPS) circuit)
 P2135 (Throttle position sensor (TPS) correlation)
 P2138 (Accelerator pedal position sensor (APPS) correlation)

Low Side Monitor

Engine coolant temperature	60°C (140°F) or more
Engine speed	Less than 2800 rpm
Intake air	0.36 g/rev or more
Throttle position	8% or more

High Side Monitor

Engine coolant temperature	60°C (140°F) or more
Engine speed	550 to 880 rpm
Intake air	Less than 0.35 g/rev
Throttle position	Less than 3.04%

TYPICAL MALFUNCTION THRESHOLDS

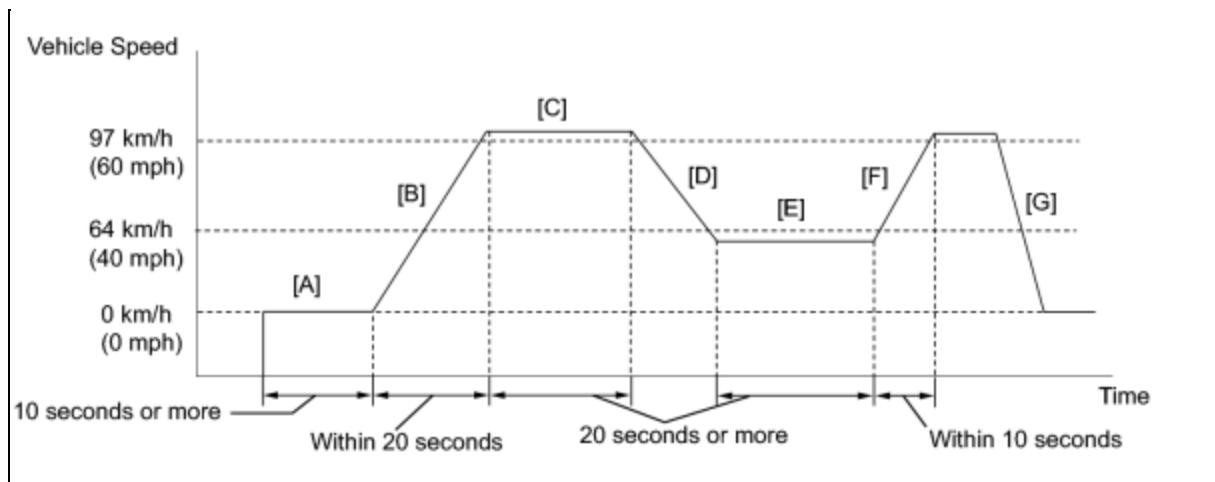
Low Side Monitor

Manifold absolute pressure sensor voltage [Manifold absolute pressure]	Less than 1.25 V [21.66 kPa (162 mmHg)]
--	---

High Side Monitor

Manifold absolute pressure sensor voltage [Manifold absolute pressure]	More than 3.3 V [21.66 kPa (162 mmHg)]
--	--

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. Perform the following the confirmation driving pattern.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

- a. Idle the engine for 10 seconds or more [A].
- b. Accelerate the vehicle to 97 km/h (60 mph) or more within 20 seconds [B].
- c. Drive the vehicle at 97 km/h (60 mph) or more for 20 seconds or more [C].
- d. Release the accelerator pedal to Decelerate until the vehicle speed decreases to less than 64 km/h (40 mph) [D].

HINT:

Release the accelerator pedal fully to perform the fuel-cut.

- e. Drive the vehicle at 60 km/h (40 mph) or less for 20 seconds or more [E].
 - f. Accelerate the vehicle to 97 km/h (60 mph) or more within 10 seconds [F].
 - g. Release the accelerator pedal and stop the vehicle [G].
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
 9. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
- o If a pending DTC is not output, perform the following procedure.

10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
11. Input the DTC: P0068.
12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal

ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs **INFO** .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM

Refer to P0107 **INFO** .

INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0068)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.

(e) Read DTCs.

Result

RESULT	PROCEED TO
DTC P0068 is output	A
DTC P0068 and other DTCs are output	B

B  **GO TO DTC CHART**

A



2.	CHECK INTAKE SYSTEM
-----------	----------------------------

(a) Check the intake system for vacuum leaks  .

OK:


PCV valve and hose are connected correctly and are not damaged.

NG  **REPAIR OR REPLACE INTAKE SYSTEM**

OK



3.	CHECK PCV HOSE CONNECTIONS
-----------	-----------------------------------

(a) Check the PCV hose connections  .

OK:

No leaks from intake system.

NG  **REPAIR OR REPLACE PCV HOSE**

OK



4.	REPLACE MANIFOLD ABSOLUTE PRESSURE SENSOR
-----------	--

(a) Replace the manifold absolute pressure sensor **INFO** .

NEXT



5. CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs **INFO** .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine and warm it up.
- (i) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (j) Enter the following menus: Powertrain / Engine / Utility / All Readiness.
- (k) Input the DTC: P0068.
- (l) Check the DTC judgment.

Result:

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none">• DTC judgment completed• System normal
ABNORMAL	<ul style="list-style-type: none">• DTC judgment completed• System abnormal
INCOMPLETE	<ul style="list-style-type: none">• DTC judgment not completed• Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none">• Unable to perform DTC judgment• Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

END

NEXT ▶



TOYOTA

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PG603AX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0087: Fuel Rail / System Pressure - Too Low (2013 FR-S)		

DTC	P0087	Fuel Rail / System Pressure - Too Low
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DESCRIPTION

The high-pressure fuel system consists of the spill control valve, pump plunger and fuel pressure sensor. The spill control valve opens and closes the low-pressure fuel line (from the fuel tank), the pump plunger (operated by the camshaft) pressurizes fuel and the fuel pressure sensor located on the fuel delivery pipe monitors fuel pressure.

The fuel pump assembly (for high pressure) is installed to the cylinder head cover (bank 2) and is driven by the cam located at the intake camshaft.

The plunger moves up and down by the camshaft rotations, and produces a vacuum to suck fuel and pressurizes the fuel. This fuel flows into the fuel delivery pipe. The ECM opens and closes the spill control valve to regulate the fuel pressure to the target fuel pressure. In order to obtain and maintain the target pressure, the ECM monitors the fuel pressure using the fuel pressure sensor and performs the feedback control.

HINT:

The spill control valve, pump plunger are built into the fuel pump assembly (for high pressure).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0087	Fuel pressure is lower than the target value. (1 trip detection logic)	<ul style="list-style-type: none"> • Leak of fuel • Fuel pipe (Fuel tank - Fuel pump assembly (for high pressure) [bank 1 or bank 2]) • Fuel pipe (Fuel pump assembly (for high pressure) - Fuel injector assembly [for direct injection]) • Fuel injector assembly (for direct injection) • Fuel pump assembly (for high pressure) • Injector driver (EDU) • Fuel pump assembly • ECM

MONITOR DESCRIPTION

If the fuel pressure decreases even after the ECM commands the high-pressure fuel pump to close the spill control valve, a DTC is output.

MONITOR STRATEGY

Related DTCs	P0087: High pressure fuel system monitor functional check (Pressure too low)
Required sensors/Components (Main)	Fuel pressure sensor

Required sensors/Components (Related)	-
Frequency of operation	Continuous
Duration	10 seconds
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTC not stored	None
Elapsed time after engine start	10 seconds
Elapsed time after fuel cut	2 seconds or more
Target fuel pressure change during 64 msec	Less than 2.4 MPa (24.4 kgf/cm ² , 348 psi)
Direct injection ratio	0% or more

TYPICAL MALFUNCTION THRESHOLDS

Actual fuel pressure - Target fuel pressure	Less than -3.5 MPa (-35.7 kgf/cm ² , -508 psi)
---	---

CONFIRMATION DRIVING PATTERN

1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Record the Freeze Frame Data.
4. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure) INFO.
5. Turn the ignition switch off and wait for at least 30 seconds.
6. Turn the ignition switch to ON and turn the Techstream on.
7. Based on engine speed, engine load and other freeze frame data stored in the ECM, reproduce the conditions present when the DTC was stored.
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
9. Read the DTC.

HINT:

- If a DTC is output, the system is malfunctioning.
- If a DTC is not output, perform the following procedure.


10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
11. Input the DTC: P0087.
12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System normal
ABNORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed

	<ul style="list-style-type: none"> System abnormal
INCOMPLETE	<ul style="list-style-type: none"> DTC judgment not completed Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> Unable to perform DTC judgment Number of DTCs which do not fulfill DTC preconditions has reached ECU's memory limit

HINT:

- If the judgment result shown ABNORMAL, the system has a malfunction.
- If the judgment result shows NORMAL, the system is normal.

13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs .

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was moving or stationary, whether the engine was warmed up or not, whether the air fuel ratio was lean or rich, as well as other data recorded at the time of a malfunction.

PROCEDURE

1.	CHECK FUEL LEAK (HIGH PRESSURE SIDE)
-----------	---

(a) Check around and beneath the car for fuel leaks, fumes, etc.

OK:

No fuel leaks present.

NG  **REPAIR OR REPLACE FUEL LEAK POINT**

OK



2.	CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0087)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and turn the Techstream on.
- (c) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (d) Read the DTCs.

Result:

RESULT	PROCEED TO
DTC P0087 is output	A
DTC P0087 and other DTCs are output	B

HINT:

If any DTCs other than P0087 are output, troubleshoot those DTCs first.

B ► [GO TO DTC CHART](#)

A



3.	CHECK IF VEHICLE HAS RUN OUT OF FUEL IN PAST
-----------	---

- (a) Has the vehicle run out of fuel in the past?

NO ► **DTC CAUSED BY RUNNING OUT OF FUEL**

YES



4.	READ VALUE USING TECHSTREAM (FUEL PRESS)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and turn the Techstream on.
- (c) Start the engine.
- (d) Enter the following menus: Powertrain / Engine / Data List / Fuel Press.
- (e) Read Fuel Press when racing the engine.

Result:

--	--

RESULT	PROCEED TO
Fuel Press value varies.	A
Fuel Press value does not increase.	B
Fuel Press value does not vary.	C

B ► CHECK FUEL LEAK (HIGH PRESSURE SIDE)

C ► REPLACE FUEL PRESSURE SENSOR

A



5.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and turn the Techstream on.
- (c) Start the engine.
- (d) Enter the following menus: Powertrain / Engine / Active Test / Control the Fuel Pump / Speed.
- (e) When performing the Active Test, check for an operating sound from the fuel pump.

NG ► CHECK FUEL PUMP OPERATION

OK



6.	CHECK FUEL PRESSURE (LOW PRESSURE SIDE)
-----------	--

- (a) Check the fuel pressure (low pressure side) INFO .

NG ► REPLACE FUEL PRESSURE REGULATOR

OK



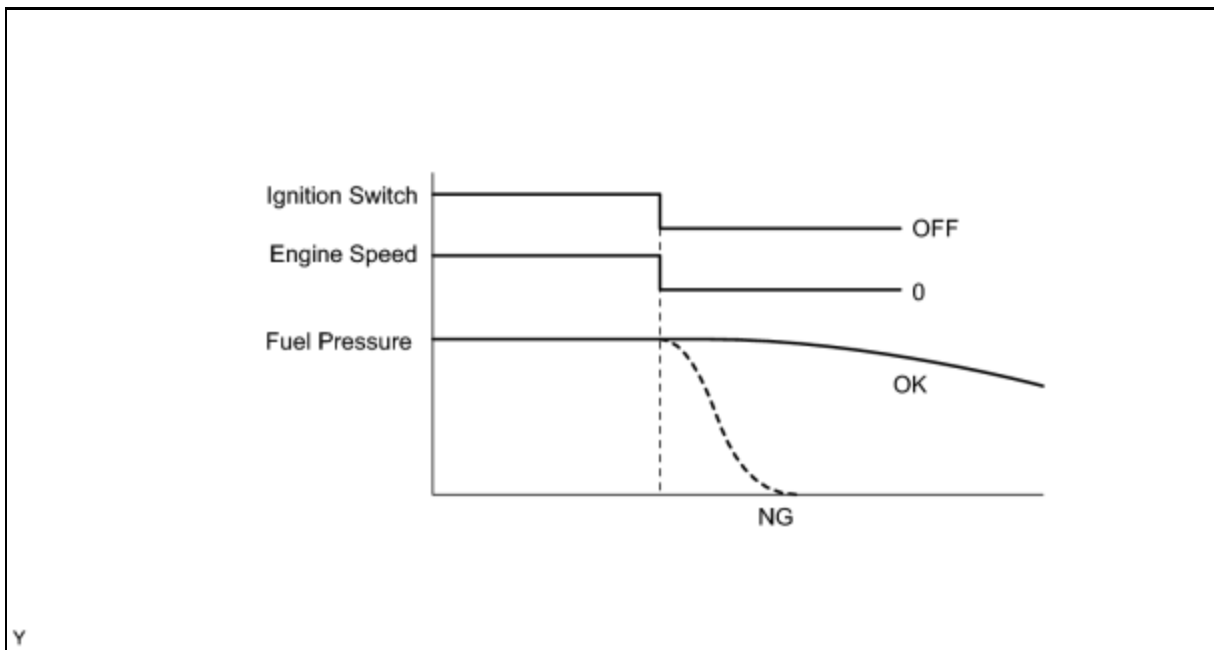
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7. CHECK FUEL LEAK (HIGH PRESSURE SIDE)

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON and turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Data List / Fuel Press.
- Check changes in the fuel pressure when the engine is stopped.

HINT:

Turn the ignition switch to ON immediately after turning the ignition switch off.



Result


RESULT	PROCEED TO
The fuel pressure drops immediately after turning the ignition switch off.	A
The fuel pressure is nearly maintained, or with moderate variations.	B

B ▶ REPLACE INJECTOR DRIVER (EDU)

A



8. INSPECT FUEL PUMP ASSEMBLY (FOR HIGH PRESSURE)

- Inspect the fuel pump assembly (for high pressure)  .

OK




9.	REPLACE INJECTOR DRIVER (EDU)
-----------	--------------------------------------

(a) Replace the fuel injector driver (EDU)  .

NEXT



10.	PERFORM CONFIRMATION DRIVING PATTERN
------------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON and turn the Techstream on.
- (g) Start the engine and warm it up.
- (h) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (i) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (j) Read the DTC.

Result:


RESULT	PROCEED TO
DTC P0087 is output	A
DTC is not output	B

B  **END**

A



11.	REPLACE FUEL PUMP ASSEMBLY (FOR HIGH PRESSURE)
------------	---

(a) Replace the fuel pump assembly (high pressure side)  .


HINT:

If the fuel pump assembly (for high pressure) has been replaced in step 8, then proceed to step 13 without replacing the fuel pump assembly (for high pressure).

NEXT



12.	PERFORM CONFIRMATION DRIVING PATTERN
------------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON and turn the Techstream on.
- (g) Start the engine and warm it up.
- (h) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (i) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (j) Read the DTC.

Result:

RESULT	PROCEED TO
DTC P0087 is output	A
DTC is not output	B

B  **END**

A

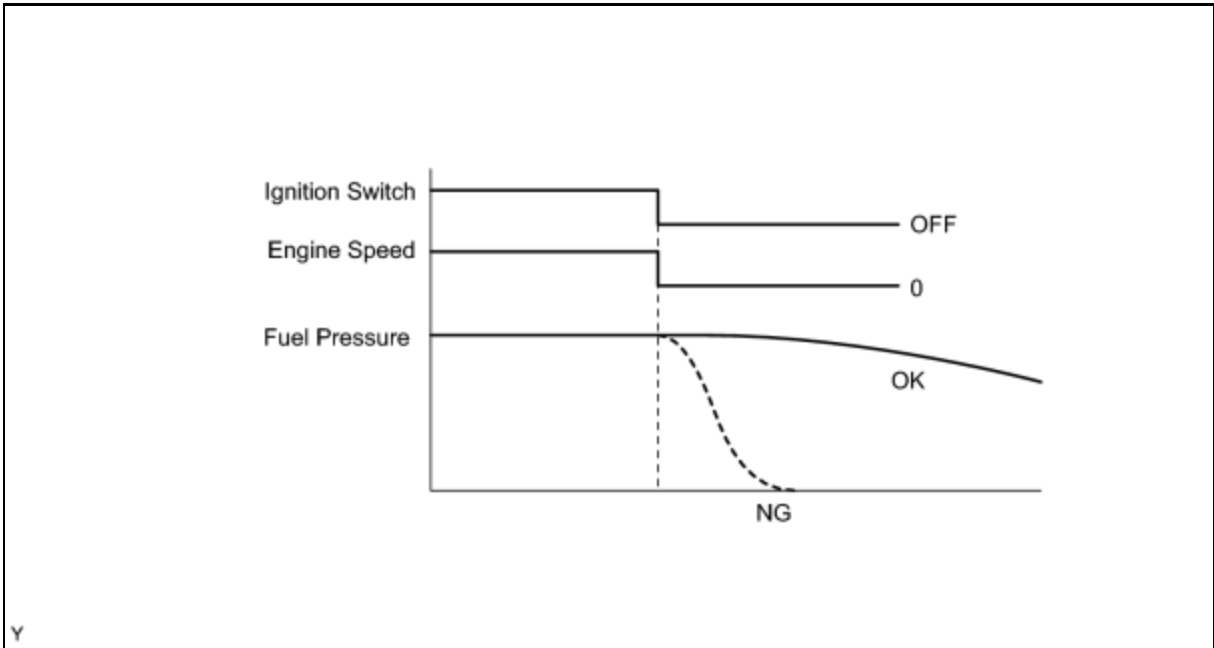


13. CHECK FUEL LEAK (HIGH PRESSURE SIDE)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and turn the Techstream on.
- (c) Enter the following menus: Powertrain / Engine / Data List / Fuel Press.
- (d) Check changes in the fuel pressure when the engine is stopped.

HINT:

Turn the ignition switch to ON immediately after turning the ignition switch off.



Result

RESULT	PROCEED TO
The fuel pressure drops immediately after turning the ignition off.	A
The fuel pressure is nearly maintained, or with moderate variations.	B

B ▶ REPLACE FUEL INJECTOR ASSEMBLY (FOR DIRECT INJECTION)

A ▶ REPLACE ECM

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PG7039X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0088: Fuel Rail / System Pressure - Too High (2013 FR-S)		

DTC	P0088	Fuel Rail / System Pressure - Too High
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DESCRIPTION

Refer to DTC P0087 [INFO](#) .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0088	Fuel pressure is higher than the target value for 10 seconds or more. (1 trip detection logic)	<ul style="list-style-type: none"> Fuel pump assembly (for high pressure) ECM

MONITOR DESCRIPTION

If the fuel pressure does not decrease even after the ECM commands the high-pressure fuel pump to open the spill control valve, a DTC is output.

If there is minimal difference between the fuel pressure before and after the fuel relief valve operates, a DTC is output.

MONITOR STRATEGY

Related DTCs	P0088: High pressure fuel system monitor functional check (Pressure too high)
Required sensors/Components (Main)	Fuel pressure sensor
Required sensors/Components (Related)	-
Frequency of operation	Continuous
Duration	10 seconds
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTC not stored	None
Elapsed time after engine start	10 seconds
Elapsed time after fuel cut	2 seconds or more
Target fuel pressure change during 64 msec	Less than 2.4 MPa (24.4 kgf/cm ² , 348 psi)
Direct injection ratio	0% or more

TYPICAL MALFUNCTION THRESHOLDS

Actual fuel pressure - Target fuel pressure	More than 6 MPa (61.2 kgf/cm ² , 871 psi)
---	--

CONFIRMATION DRIVING PATTERN

1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Record the Freeze Frame Data.
4. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure) **INFO** .
5. Turn the ignition switch off and wait for at least 30 seconds.
6. Turn the ignition switch to ON and turn the Techstream on.
7. Based on engine speed, engine load and other freeze frame data stored in the ECM, reproduce the conditions present when the DTC was stored.
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
9. Read the DTC.

HINT:

- If a DTC is output, the system is malfunctioning.
 - If a DTC is not output, perform the following procedure.
10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 11. Input the DTC: P0088.
 12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none">◦ DTC judgment completed◦ System normal
ABNORMAL	<ul style="list-style-type: none">◦ DTC judgment completed◦ System abnormal
INCOMPLETE	<ul style="list-style-type: none">◦ DTC judgment not completed◦ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none">◦ Unable to perform DTC judgment◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU's memory limit

HINT:

- If the judgment result shows ABNORMAL, the system has a malfunction.
 - If the judgment result shows NORMAL, the system is normal.
13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs **INFO** .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was moving or stationary, whether the engine was warmed up or not, whether the air fuel ratio was lean or rich, as well as other data recorded at the time of a malfunction.

PROCEDURE

1.	CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0088)
-----------	---

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON and turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Trouble Codes.
- Read the DTCs.

Result:

RESULT	PROCEED TO
DTC P0088 is output	A
DTC P0088 and other DTCs are output	B

HINT:

If any DTCs other than P0088 are output, troubleshoot those DTCs first.

B  **GO TO DTC CHART**

A



2.	PERFORM ACTIVE TEST USING TECHSTREAM
-----------	---

- Connect the Techstream to the DLC3.
- Start the engine and turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Active Test / Control the Target Fuel Pressure / Fuel Press.

(d) Check that the fuel pressure fluctuates when the target fuel pressure changes.

HINT:

The Active Test operation lowers the target fuel pressure by 12.5% or increase the target fuel pressure by 24.8%.

OK:

Fuel pressure fluctuates.

NG ► REPLACE FUEL PRESSURE SENSOR

OK



3.	REPLACE FUEL PUMP ASSEMBLY (FOR HIGH PRESSURE)
-----------	---

(a) Replace the fuel pump assembly (for high pressure) **INFO** .

NEXT



4.	CHECK IF DTC OUTPUT RECURS (SEE IF DTC P0088 IS OUTPUT AGAIN)
-----------	--

(a) Connect the Techstream to the DLC3.

(b) Turn the Techstream on.

(c) Clear the DTCs **INFO** .

(d) Drive the vehicle in accordance with the driving pattern described in the Confirmation Driving Pattern.

(e) Enter the following menus: Powertrain / Engine / Trouble Codes.

(f) Read the DTCs.

Result:

RESULT	PROCEED TO
DTC P0088 is output	A
DTC is not output	B

B ► END

A ► REPLACE ECM



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PF40ACX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0101: Mass Air Flow Circuit Range / Performance Problem (2013 FR-S)		

DTC	P0101	Mass Air Flow Circuit Range / Performance Problem
------------	--------------	--

DESCRIPTION

Refer to DTC P0102  .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0101	<p>One of the following conditions is met (2 trip detection logic):</p> <ul style="list-style-type: none"> • Mass air flow meter voltage is less than 1.13 V for 5 seconds or more when throttle position is 16° or more with driving. • Mass air flow meter voltage is more than 1.88 V for 10 seconds or more when throttle position is 5.13° or less with driving. 	<ul style="list-style-type: none"> • Mass air flow meter • Intake system • PCV hose connections

MONITOR DESCRIPTION

The mass air flow meter is a sensor that measures the amount of air flowing through the throttle valve. The ECM uses this information to determine the fuel injection time and to provide an appropriate air fuel ratio. Inside the mass air flow meter, there is a heated platinum wire which is exposed to the flow of intake air. By applying a specific electrical current to the wire, the ECM heats it to a specific temperature. The flow of incoming air cools both the wire and an internal thermistor, affecting their resistance. To maintain a constant current value, the ECM varies the voltage applied to the mass air flow meter. The voltage level is proportional to the airflow through the sensor, and the ECM uses it to calculate the intake air volume.

The ECM monitors the average engine load value ratio to check the mass air flow meter for malfunctions. The average engine load value ratio is obtained by comparing the average engine load calculated from the MAF meter output to the average engine load estimated from the driving conditions, such as the engine speed and the throttle opening angle. If the average engine load value ratio is below the threshold value, the ECM determines that the intake air volume is low, and if the average engine load value ratio is above the threshold value, the ECM determines that the intake air volume is high.

If this is detected in 2 consecutive driving cycles, the MIL is illuminated and the DTC is stored.

MONITOR STRATEGY

Related DTCs	P0101: Mass air flow meter rationality check
Required Sensors/Components (Main)	Mass air flow meter
Required Sensors/Components (Related)	Crankshaft position sensor VVT sensor Engine coolant temperature sensor Throttle position sensor

Frequency of Operation	Continuous
Duration	5 seconds: Low side monitor 10 seconds: High side monitor
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs not stored	P0068, P0107, P0108 (Manifold absolute pressure (MAP) sensor) P0102, P0103 (Mass air flow (MAF) sensor) P0117, P0118, P0125 (Engine coolant temperature (ECT) sensor) P0122, P0123, P0222, P0223 (Throttle position sensor) P0335, P0336 (Crankshaft position sensor) P0340, P0345 (Camshaft position sensor - Intake with variable valve timing (VVT)) P0506, P0507 (Idle speed control (ISC)) P0604, P0605 (ROM in ECM) P1160 (Throttle return spring) P2101, P2102 (Throttle actuator control motor) P2109 (Throttle position sensor minimum stop) P2119 (Throttle actuator control) P2122, P2123, P2127, P2128 (Accelerator pedal position sensor (APPS) circuit) P2135 (Throttle position sensor (TPS) correlation) P2138 (Accelerator pedal position sensor (APPS) correlation)
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Low Side Monitor

Engine speed	1500 rpm or higher
Throttle position	8% or more
Engine coolant temperature	60°C (140°F) or higher
Intake manifold pressure	53.32 kPa [400 mmHg] or higher

High Side Monitor

Engine speed	550 to 880 rpm
Throttle position	Less than 3.04%
Engine coolant temperature	60°C (140°F) or higher
Intake manifold pressure	Less than 53.32 kPa [400 mmHg]

TYPICAL MALFUNCTION THRESHOLDS

Low Side Monitor

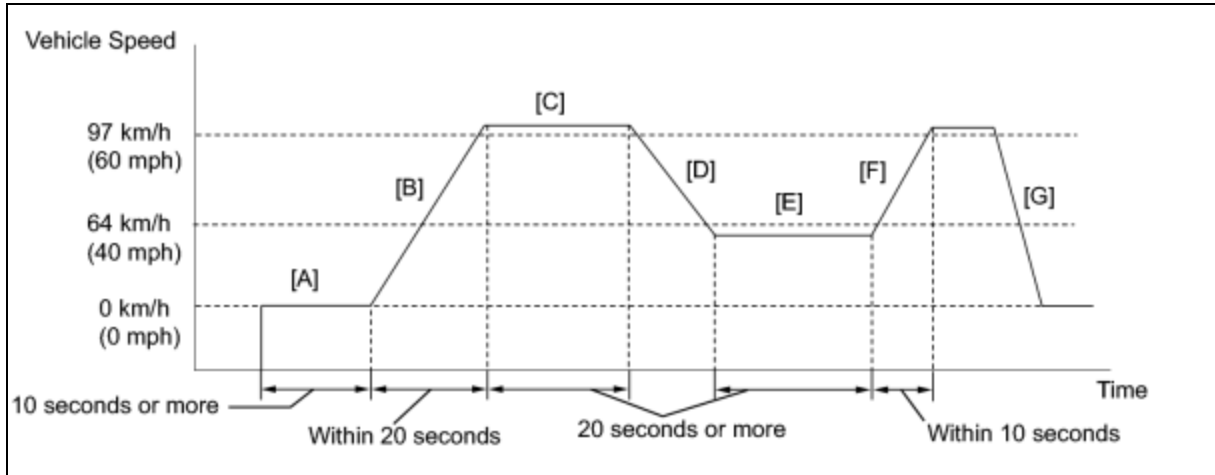
Mass air flow meter voltage [Mass air flow]	Less than 1.13 V [1.87 g/sec]
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High Side Monitor

Mass air flow meter voltage (fuel system in rich) [Mass air flow]

More than 1.88 V [10.6 g/sec]

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) .
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. Perform the following the confirmation driving pattern.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

- a. Idle the engine for 10 seconds or more [A].
- b. Accelerate the vehicle to 97 km/h (60 mph) or more within 20 seconds [B].
- c. Drive the vehicle at 97 km/h (60 mph) or more for 20 seconds or more [C].
- d. Release the accelerator pedal to Decelerate until the vehicle speed decreases to less than 64 km/h (40 mph) [D].

HINT:

Release the accelerator pedal fully to perform the fuel-cut.

- e. Drive the vehicle at 60 km/h (40 mph) or less for 20 seconds or more [E].
 - f. Accelerate the vehicle to 97 km/h (60 mph) or more within 10 seconds [F].
 - g. Release the accelerator pedal and stop the vehicle [G].
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
 9. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
- o If a pending DTC is not output, perform the following procedure.

10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.

11. Input the DTC: P0101.
12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ○ DTC judgment completed ○ System normal
ABNORMAL	<ul style="list-style-type: none"> ○ DTC judgment completed ○ System abnormal
INCOMPLETE	<ul style="list-style-type: none"> ○ DTC judgment not completed ○ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> ○ Unable to perform DTC judgment ○ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.

13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs INFO.

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

WIRING DIAGRAM

Refer to DTC P0102 INFO.

INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0101)
----	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Read DTCs.

Result

RESULT	PROCEED TO
DTC P0101 is output	A
DTC P0101 and other DTCs are output	B

HINT:

If any DTCs other than P0101 are output, troubleshoot those DTCs first.

B ► GO TO DTC CHART

A



2.	CHECK INTAKE SYSTEM
-----------	----------------------------

- (a) Check the intake system for vacuum leaks INFO.

OK:

No leaks from intake system.

NG ► REPAIR OR REPLACE INTAKE SYSTEM

OK



3.	CHECK PCV HOSE CONNECTIONS
-----------	-----------------------------------

- (a) Check the PCV hose connections INFO.

OK:


PCV valve and hose are connected correctly and are not damaged.

NG ► REPAIR OR REPLACE PCV HOSE

OK




4.	REPLACE MASS AIR FLOW METER
-----------	------------------------------------

(a) Replace the mass air flow meter  .

NEXT



5.	CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine and warm it up.
- (i) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (j) Enter the following menus: Powertrain / Engine / Utility / All Readiness.
- (k) Input the DTC: P0101.
- (l) Check the DTC judgment.

Result

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none">• DTC judgment completed• System normal
ABNORMAL	<ul style="list-style-type: none">• DTC judgment completed• System abnormal

INCOMPLETE	<ul style="list-style-type: none">• DTC judgment not completed• Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none">• Unable to perform DTC judgment• Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

NEXT  **END**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000U5B0MNX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0102,P0103: Mass or Volume Air Flow Circuit Low Input (2013 FR-S)		

DTC	P0102	Mass or Volume Air Flow Circuit Low Input
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DTC	P0103	Mass or Volume Air Flow Circuit High Input
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DESCRIPTION

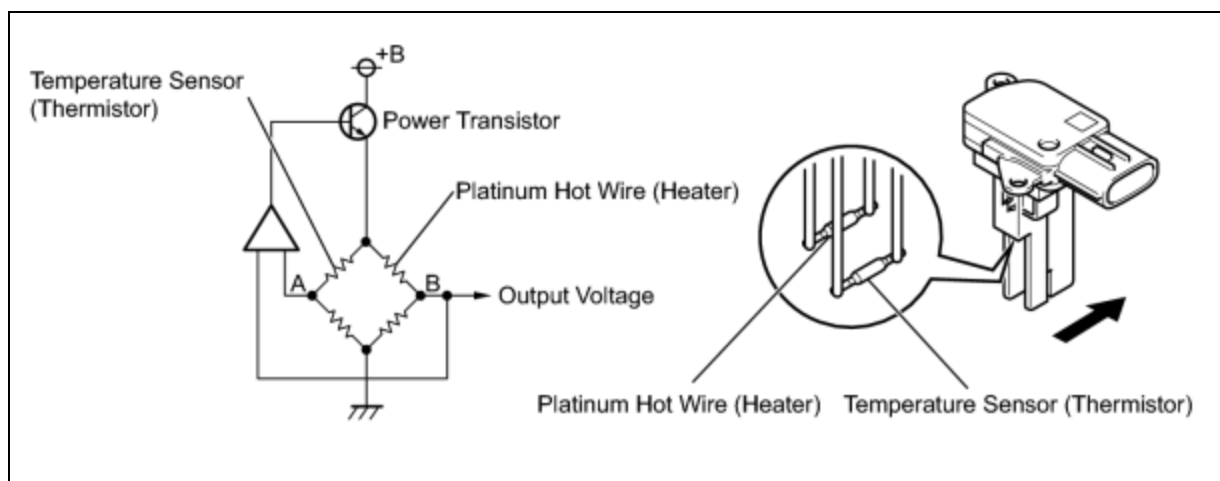
The mass air flow meter is a sensor that measures the amount of air flowing through the throttle valve. The ECM uses this information to determine the fuel injection time and to provide the appropriate air fuel ratio.

Inside the mass air flow meter, there is a heated platinum wire which is exposed to the flow of intake air. By applying a specific electrical current to the wire, the ECM heats it to a given temperature. The flow of incoming air cools both the wire and an internal thermistor, affecting their resistance. To maintain a constant current value, the ECM varies the voltage applied to the wire and internal thermistor. The voltage level is proportional to the airflow through the sensor, and the ECM uses it to calculate the intake air volume.

The circuit is constructed so that the platinum hot wire and the temperature sensor create a bridge circuit, and the power transistor is controlled so that the potentials of A and B remain equal to maintain the predetermined temperature.

HINT:

When any of these DTCs is stored, the ECM enters fail-safe mode. During fail-safe mode, the ignition timing is calculated by the ECM, according to the engine speed and throttle valve position. Fail-safe mode continues until a pass condition is detected.



DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA

P0102	Mass air flow meter voltage is 0.127 V or less for 0.5 seconds or more. (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in mass air flow meter circuit • Mass air flow meter • ECM
P0103	Mass air flow meter voltage is 4.723 V or more for 0.5 seconds or more. (1 trip detection logic)	

HINT:

When any of these DTCs are output, check the air-flow rate using the Techstream. Enter the following menus: Powertrain / Engine / Data List / MAF.

MASS AIR FLOW RATE (GM/SEC)	MALFUNCTION
Approximately 0.0	<ul style="list-style-type: none"> • Open in mass air flow meter power source circuit • Open or short in VG circuit
160.0 or more	<ul style="list-style-type: none"> • Open in E2G circuit

MONITOR DESCRIPTION

If there is a defect in the mass air flow meter or an open or short circuit, the voltage level deviates from the normal operating range. The ECM interprets this deviation as a malfunction in the mass air flow meter circuit and stores a DTC.

MONITOR STRATEGY

Related DTCs	P0102: Mass air flow meter circuit continuity (Low voltage) P0103: Mass air flow meter circuit continuity (High voltage)
Required Sensors/Components (Main)	Mass air flow meter
Required Sensors/Components (Related)	Crankshaft position sensor
Frequency of Operation	Continuous
Duration	0.5 seconds
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	None
---	------

TYPICAL MALFUNCTION THRESHOLDS

P0102

Mass air flow meter voltage [Mass air flow]	Less than 0.127 V [0.0 g/sec]
---	-------------------------------

P0103

--	--

Mass air flow meter voltage [Mass air flow]

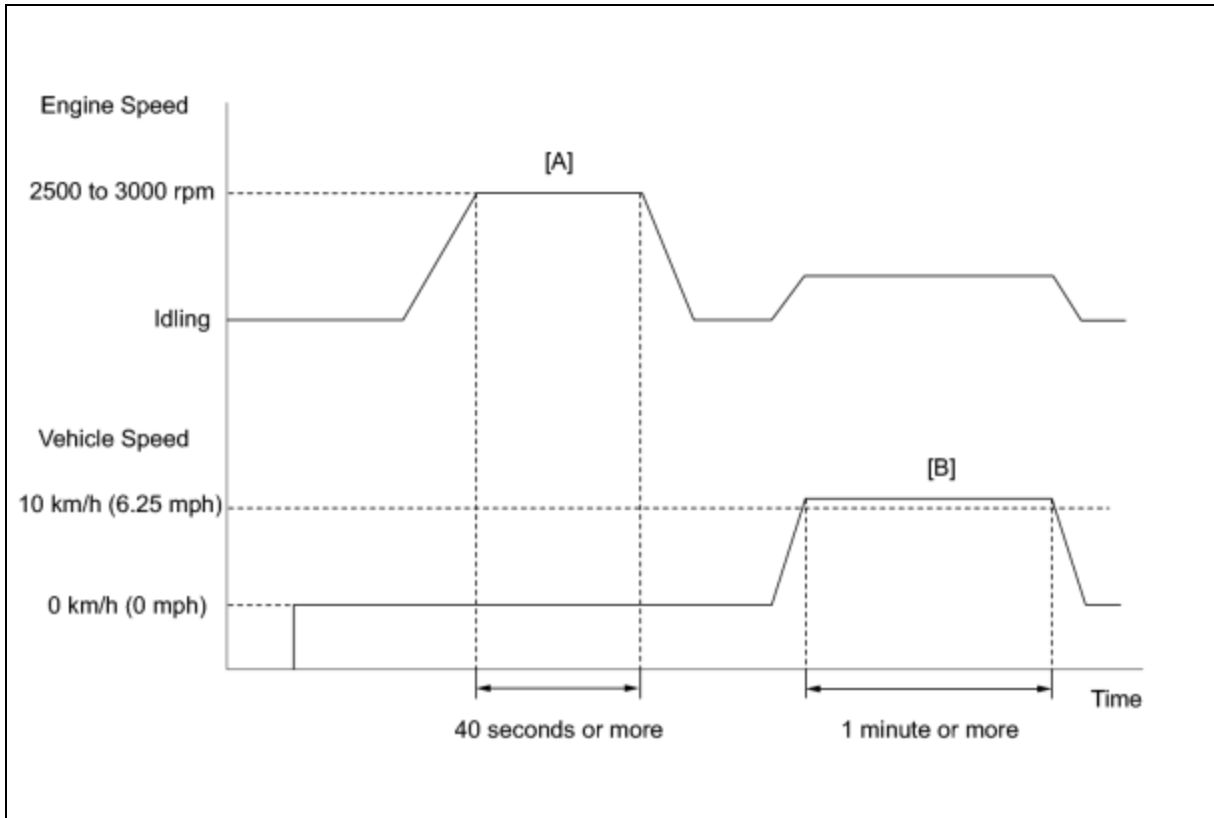
More than 4.723 V [248.1 g/sec]

COMPONENT OPERATING RANGE

Mass air flow meter voltage [Mass air flow]

0.127 to 4.651 V [0.01 to 235.37 g/sec]

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:


- If a pending DTC is output, the system is malfunctioning.
- If a pending DTC is not output, perform the following procedure.

11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
12. Input the DTC: P0102 or P0103.
13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ○ DTC judgment completed ○ System normal
ABNORMAL	<ul style="list-style-type: none"> ○ DTC judgment completed ○ System abnormal
INCOMPLETE	<ul style="list-style-type: none"> ○ DTC judgment not completed ○ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> ○ Unable to perform DTC judgment ○ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

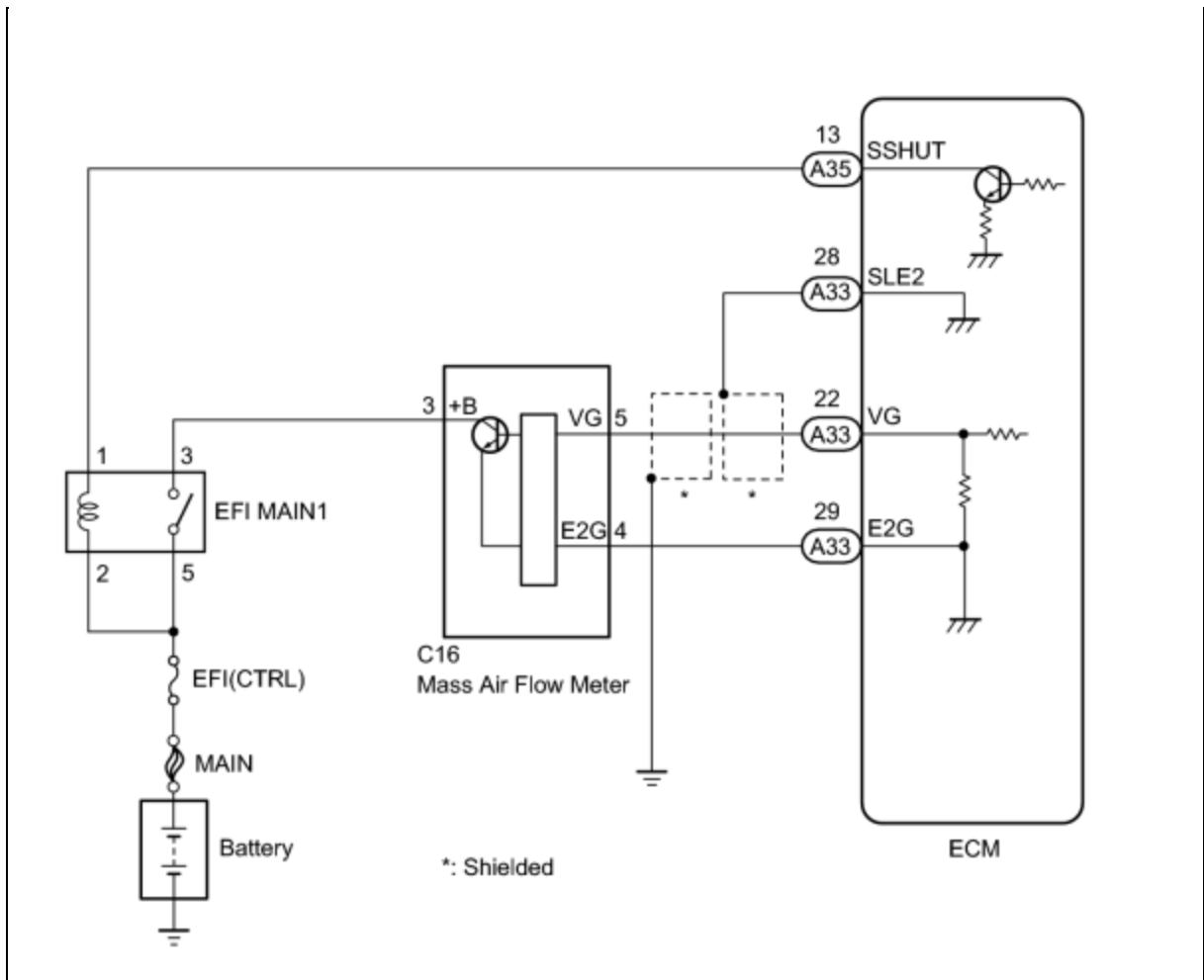
- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1. READ DTC OUTPUT

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Read DTCs.

Result

RESULT	PROCEED TO
DTC P0102 is output	A
DTC P0103 is output	B

B ► CHECK HARNESS AND CONNECTOR (SENSOR GROUND)

A ▼

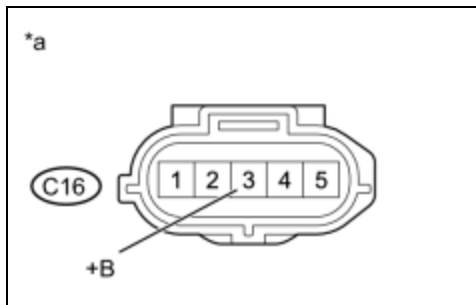
2.	CHECK TERMINAL VOLTAGE (POWER SOURCE OF MASS AIR FLOW METER)
-----------	---

(a) Disconnect the mass air flow meter connector.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:



TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
C16-3 (+B) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Mass Air Flow Meter)
----	---

NG ► CHECK RELAY (EFI MAIN1)

OK ▼

3.	CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER - ECM)
-----------	--

(a) Disconnect the mass air flow meter connector.

(b) Disconnect the ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C33-22 (VG) - C16-5 (VG)	Always	Below 1 Ω
C33-29 (E2G) - C16-4 (E2G)	Always	Below 1 Ω

Standard Resistance (Check for short):


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C33-22 (VG) or C16-5 (VG) - Body ground	Always	10 k Ω or higher
C33-29 (E2G) or C16-4 (E2G) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



4.	INSPECT MASS AIR FLOW METER
-----------	------------------------------------

(a) Inspect the mass air flow meter, referring to the On-vehicle Inspection for Mass Air Flow Meter  .

(b) Inspect the mass air flow meter, referring to the Inspection for Mass Air Flow Meter  .

(c) Inspect the function of the mass air flow meter.

(1) Connect the Techstream to the DLC3.

(2) Turn the ignition switch to ON.

(3) Turn the Techstream on.

(4) Enter the following menus: Powertrain / Engine / Data List / MAF.

(5) Start the engine.

(6) Check that the MAF value changes when the engine is raced.

OK:

The reading changes.

NG  **REPLACE MASS AIR FLOW METER**

OK ► REPLACE ECM

5. CHECK HARNESS AND CONNECTOR (SENSOR GROUND)

- (a) Disconnect the mass air flow meter connector.
- (b) Measure the resistance according to the value(s) in the table below.
- Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C16-4 (E2G) - Body ground	Always	Below 1 Ω

NG ► CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER - ECM)

OK ► REPLACE MASS AIR FLOW METER

6. CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER - ECM)

- (a) Disconnect the mass air flow meter connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.
- Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-29 (E2G) - C16-4 (E2G)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-29 (E2G) or C16-4 (E2G) - Body-ground	Always	10 k Ω or higher

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ► REPLACE ECM

7. CHECK RELAY (EFI MAIN1)

(a) Inspect the EFI MAIN1 relay  .

NG  **REPLACE RELAY (EFI MAIN1)**

OK



8.	CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER - EFI MAIN1 RELAY)
-----------	--

(a) Disconnect the mass air flow meter connector.

(b) Remove the EFI MAIN1 relay from the engine room relay block assembly.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN1 relay terminal 3 - C16-3 (+B)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN1 relay terminal 3 or C16-3 (+B) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **CHECK ECM POWER SOURCE CIRCUIT**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000U5B0MMX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0107,P0108: Manifold Absolute Pressure / Barometric Pressure Circuit Low Input (2013 FR-S)		

DTC	P0107	Manifold Absolute Pressure / Barometric Pressure Circuit Low Input
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DTC	P0108	Manifold Absolute Pressure / Barometric Pressure Circuit High Input
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DESCRIPTION

Manifold absolute pressure sensor uses a built-in sensor to detect the intake manifold pressure as a voltage. Additionally, because this measures the absolute pressure as the pressure within the intake manifold without detecting the atmospheric pressure as a standard value, this enables measurements without being influenced by changes in atmospheric pressure from altitude or other causes.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0107	Manifold absolute pressure sensor voltage is 0.61 V or less for 0.5 seconds or more. (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in manifold absolute pressure sensor circuit • Manifold absolute pressure sensor • ECM
P0108	Manifold absolute pressure sensor voltage is 3.906 V or more for 0.5 seconds or more. (1 trip detection logic)	

HINT:

When any of these DTCs are output, check the manifold absolute pressure using the Techstream. Enter the following menus: Powertrain / Engine / Data List / MAP.

MANIFOLD ABSOLUTE PRESSURE (KPA [MMHG])	MALFUNCTION
Approximately 0 [0]	Short in MAP circuit
141 [1058] or more	<ul style="list-style-type: none"> • Short in VC circuit • Open in PIM circuit • Open in E1 circuit

MONITOR DESCRIPTION

The ECM calculates the manifold absolute pressure based upon the manifold absolute pressure sensor output voltage. If the manifold absolute pressure output voltage is outside the normal range, there may be an abnormality with the manifold absolute pressure, or an open or short in the circuit. In these cases, the ECM will light the check engine warning light, and store the DTC.

MONITOR STRATEGY

	P0107: Manifold absolute pressure sensor range check (Low
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Related DTCs	voltage) P0108: Manifold absolute pressure sensor range check (High voltage)
Required Sensors/Components (Main)	Manifold absolute pressure sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	2 seconds
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	None
---	------

TYPICAL MALFUNCTION THRESHOLDS

P0107

Manifold absolute pressure sensor voltage [Manifold absolute pressure]	Less than 0.61 V [0.35 kPa (3 mmHg)]
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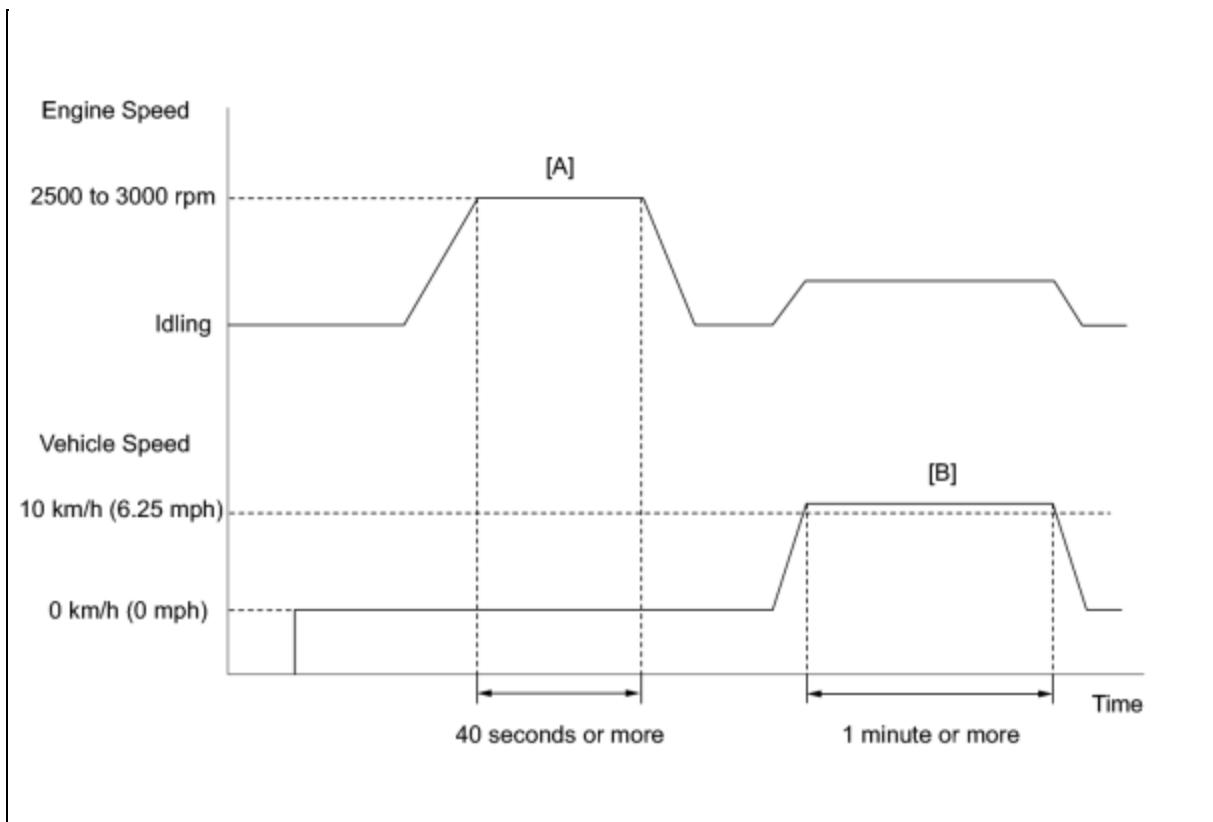
P0108

Manifold absolute pressure sensor voltage [Manifold absolute pressure]	More than 3.906 V [110.22 kPa (827 mmHg)]
--	---

COMPONENT OPERATING RANGE

Manifold absolute pressure sensor voltage [Manifold absolute pressure]	0.647 to 3.897 V [1.56 to 109.9 kPa (12 to 824 mmHg)]
--	---

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P0107 or P0108.
 13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal

ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

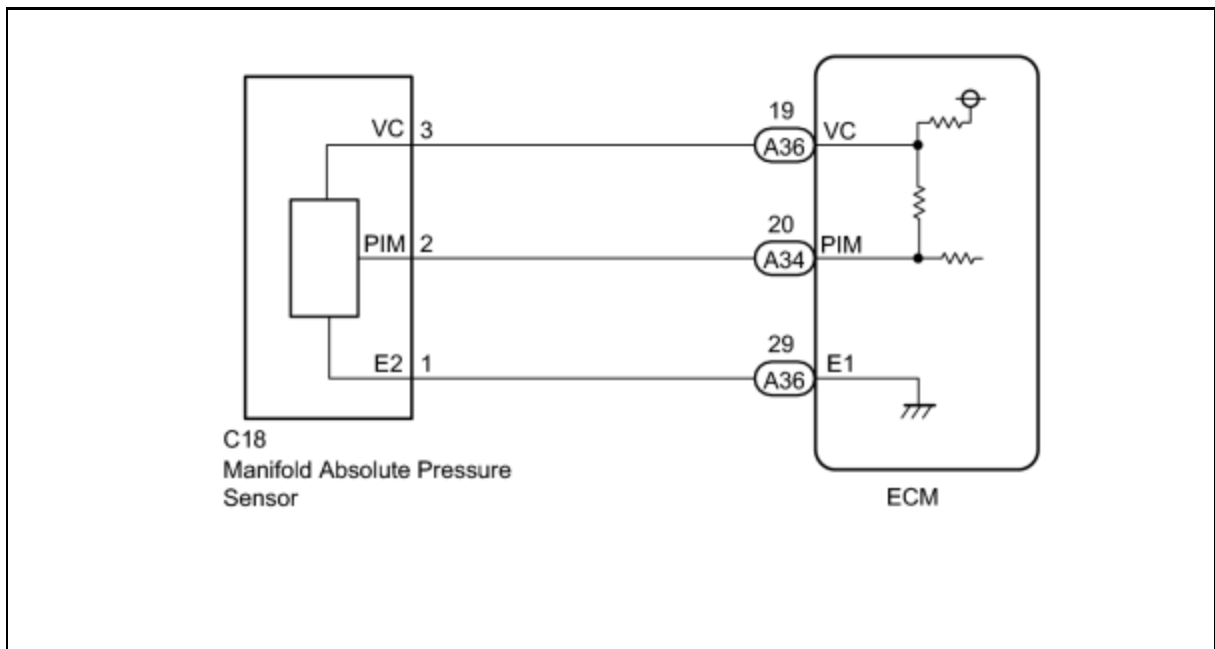
- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs INFO.

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	READ VALUE USING TECHSTREAM (MAP)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Data List / MAP.
- (e) Read the value displayed on the Techstream.

Standard:

Nearly equal to atmosphere pressure

Reference Value

CONDITION	MAP
Ignition switch ON	80 to 110 kPa

HINT:

Standard atmospheric pressure is 101 kPa (758 mmHg). For every 100 m (328 ft) increase in altitude, pressure drops by 1 kPa. This varies by weather.

NG ► **CHECK TERMINAL VOLTAGE (POWER SOURCE OF MANIFOLD ABSOLUTE PRESSURE SENSOR)**

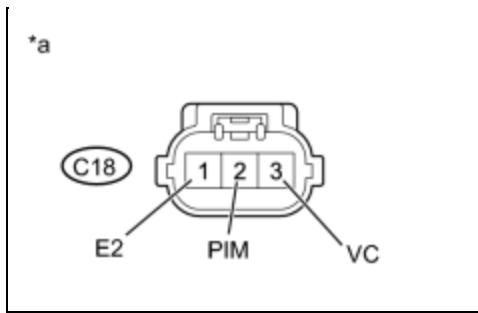
OK ► **CHECK INTERMITTENT PROBLEMS**

2.	CHECK TERMINAL VOLTAGE (POWER SOURCE OF MANIFOLD ABSOLUTE PRESSURE SENSOR)
-----------	---

- (a) Disconnect the manifold absolute pressure sensor connector.
- (b) Turn the ignition switch to ON.
- (c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH	SPECIFIED



	CONDITION	CONDITION
C18-3 (VC) - C18-1 (E2)	Ignition switch ON	4.5 to 5.5 V
C18-2 (PIM) - C18-1 (E2)	Ignition switch ON	4.0 to 5.0 V

Text in Illustration

*a	Front view of wire harness connector (to Manifold Absolute Pressure Sensor)
----	---

NG ► **CHECK HARNESS AND CONNECTOR (MANIFOLD ABSOLUTE PRESSURE SENSOR - ECM)**

OK



3. REPLACE MANIFOLD ABSOLUTE PRESSURE SENSOR

(a) Replace the manifold absolute pressure sensor **INFO**.

NEXT



4. PERFORM CONFIRMATION DRIVING PATTERN

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs **INFO**.
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON and turn the Techstream on.
- (g) Start the engine and warm it up.

(h) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.

(i) Enter the following menus: Powertrain / Engine / Trouble Codes.

(j) Read the DTC.

Result:

RESULT	PROCEED TO
DTC P0107 or P0108 is output	A
DTC is not output	B

B ► END

A ► REPLACE ECM

5.	CHECK HARNESS AND CONNECTOR (MANIFOLD ABSOLUTE PRESSURE SENSOR - ECM)
-----------	--

(a) Disconnect the manifold absolute pressure sensor connector.

(b) Disconnect the ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-19 (VC) - C18-3 (VC)	Always	Below 1 Ω
A34-20 (PIM) - C18-2 (PIM)	Always	Below 1 Ω
A36-29 (E1) - C18-1(E2)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-19 (VC) or C18-3 (VC) - Body ground	Always	10 k Ω or higher
A34-20 (PIM) or C18-2 (PIM) - Body ground	Always	10 k Ω or higher
A36-29 (E1) or C18-1 (E2) or Body ground	Always	10 k Ω or higher

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ► REPLACE ECM



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001WPH06PX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0111: Intake Air Temperature Sensor Gradient Too High (2013 FR-S)		

DTC	P0111	Intake Air Temperature Sensor Gradient Too High
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DESCRIPTION

The intake air temperature sensor, mounted on the mass air flow meter, monitors the intake air temperature. The intake air temperature sensor has a built-in thermistor with a resistance that varies according to the temperature of the intake air. When the intake air temperature is low, the resistance of the thermistor increases. When the temperature is high, the resistance drops. These variations in resistance are transmitted to the ECM as voltage changes.

The intake air temperature sensor is powered by a 5 V supply from the THA terminal of the ECM, via resistor R.

Resistor R and the intake air temperature sensor are connected in series. When the resistance value of the intake air temperature sensor changes, according to changes in the intake air temperature, the voltage at terminal THA also varies. Based on this signal, the ECM increases the fuel injection volume when the engine is cold to improve driveability.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0111	The difference between maximum and minimum values for inlet air temperature sensor voltage is less than 0.02 V for 1 second or more. (2 trip detection logic)	Mass air flow meter

MONITOR DESCRIPTION

The ECM performs OBD II monitoring based on the values from the intake air temperature sensor. If there is no change of the sensor value within the normal range, the ECM will not be able to perform OBD II monitoring or will misdiagnose that there is a malfunction in the sensor. The ECM detects when the intake air temperature sensor value is stuck by performing monitoring after the ignition switch is turned off or the engine is started (short soak or long soak).

MONITOR STRATEGY

Related DTCs	P0111: Intake air temperature sensor rationality check
Required Sensors/Components (Main)	Intake air temperature sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Once per driving cycle
Duration	Immediately
MIL Operation	2 driving cycles
Sequence of Operation	None

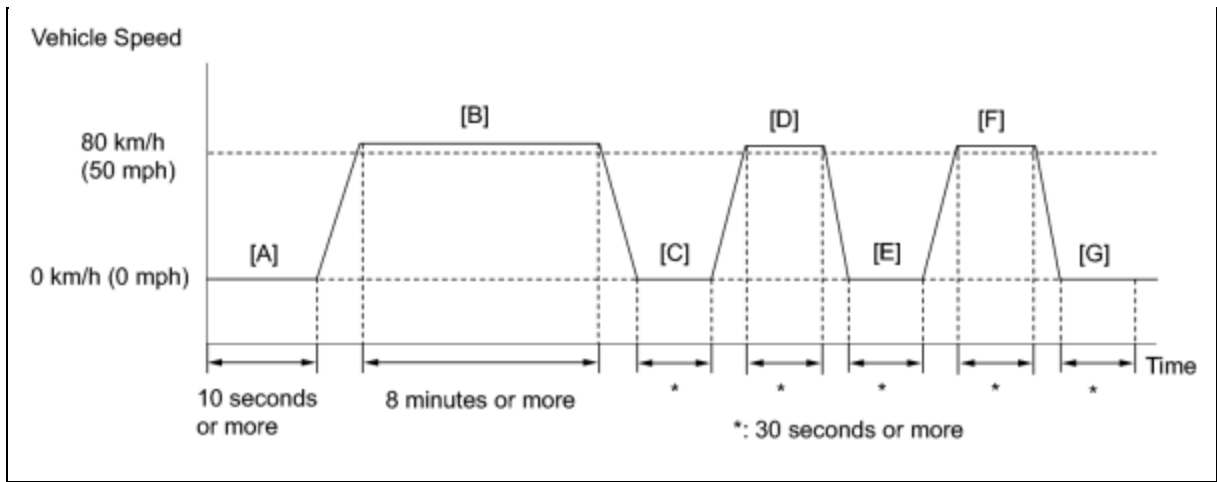
TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	P0112, P0113 (Intake air temperature (IAT) sensor) P0117, P0118, P0125 (Engine coolant temperature (ECT) sensor) P0122, P0123, P0222, P0223 (Throttle position sensor) P0500 (Vehicle speed sensor (VSS)) P0604, P0605 (ROM in ECM) P1160 (Throttle return spring) P2101, P2102 (Throttle actuator control motor) P2109 (Throttle position sensor minimum stop) P2119 (Throttle actuator control) P2122, P2123, P2127, P2128 (Accelerator pedal position sensor (APPS) circuit) P2135 (Throttle position sensor (TPS) correlation) P2138 (Accelerator pedal position sensor (APPS) correlation)
Battery voltage	10.9 V or more
Engine coolant temperature	60°C (140°F) or higher
Integrated amount of intake air	6500 g or more
Either of the following condition is met:	A or B
A. All of the following conditions are met:	(a), (b) and (c)
(a) Time period	10 seconds
(b) Vehicle speed	4 km/h (2.5 mph) or higher
(c) Intake air mass per second	10 g/sec or more
B. All of the following conditions are met:	(a) and (b)
(a) Time period	10 seconds
(b) Vehicle speed	Less than 40 km/h (24.9 mph)

TYPICAL MALFUNCTION THRESHOLDS

Intake air temperature sensor maximum voltage - Intake air temperature sensor minimum voltage	Less than 0.02 V
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CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Check that engine coolant temperature is 30°C (86°F) or less.
7. Start the engine.
8. Perform the following the confirmation driving pattern.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

- a. Idle the engine for 10 seconds or more [A].
 - b. Drive the vehicle at 80 km/h (50 mph) or more for 8 minutes or more [B].
 - c. Stop the vehicle and idle the engine for 30 seconds or more [C].
 - d. Drive the vehicle at 80 km/h (50 mph) or more for 30 seconds or more [D].
 - e. Stop the vehicle and idle the engine for 30 seconds or more [E].
 - f. Drive the vehicle at 80 km/h (50 mph) or more for 30 seconds or more [F].
 - g. Stop the vehicle and idle the engine for 30 seconds or more [G].
9. Enter the following menus: Powertrain / Engine / Trouble Codes.
 10. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P0111.
 13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal
ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal

INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs **INFO** .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM

Refer to P0112 **INFO** .

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0111)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Read DTCs.

Result

RESULT	PROCEED TO
DTC P0111 and other DTCs are output	A
DTC P0111 is output	B

HINT:

If any DTCs other than P0111 are output, troubleshoot those DTCs first.

B ▶ REPLACE MASS AIR FLOW METER

A ▶ GO TO DTC CHART



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PF30NNX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0112,P0113: Intake Air Temperature Circuit Low Input (2013 FR-S)		

DTC	P0112	Intake Air Temperature Circuit Low Input
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DTC	P0113	Intake Air Temperature Circuit High Input
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DESCRIPTION

The intake air temperature sensor, mounted on the mass air flow meter, monitors the intake air temperature. The intake air temperature sensor has a built-in thermistor with a resistance that varies according to the temperature of the intake air. When the intake air temperature is low, the resistance of the thermistor increases. When the temperature is high, the resistance drops. These variations in resistance are transmitted to the ECM as voltage changes.

The intake air temperature sensor is powered by a 5 V supply from the THA terminal of the ECM, via resistor.

Resistor and the intake air temperature sensor are connected in series. When the resistance value of the intake air temperature sensor changes, according to changes in the intake air temperature, the voltage at terminal THA also varies. Based on this signal, the ECM increases the fuel injection volume when the engine is cold to improve driveability.

HINT:

When DTC P0112 or P0113 is stored, the ECM enters fail-safe mode. During fail-safe mode, the intake air temperature is estimated to be 20°C (68°F) by the ECM. Fail-safe mode continues until a pass condition is detected.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0112	Intake air temperature sensor voltage is less than 0.4 V for 0.5 seconds or more. (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in intake air temperature sensor circuit • Intake air temperature sensor (built into mass air flow meter) • ECM
P0113	Intake air temperature sensor voltage is 4.707 V or more for 0.5 seconds or more. (1 trip detection logic)	

HINT:

When any of these DTCs are output, check the intake air temperature using the Techstream. Enter the following menus: Powertrain / Engine / Data List / Intake Air.

TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
215°C (419°F)	Short circuit

MONITOR DESCRIPTION

The ECM monitors the sensor voltage and uses this value to calculate the intake air temperature. When the sensor output voltage deviates from the normal operating range, the ECM interprets this as a malfunction in the intake air temperature sensor circuit and stores a DTC.

MONITOR STRATEGY

Related DTCs	P0112: Intake air temperature sensor range check (Low voltage) P0113: Intake air temperature sensor range check (High voltage)
Required Sensors/Components (Main)	Intake air temperature sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	0.5 seconds
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	None
---	------

TYPICAL MALFUNCTION THRESHOLDS

P0112

Intake air temperature sensor voltage [Intake air temperature]	Less than 0.4 V [Higher than 132.8°C (271°F)]
--	---

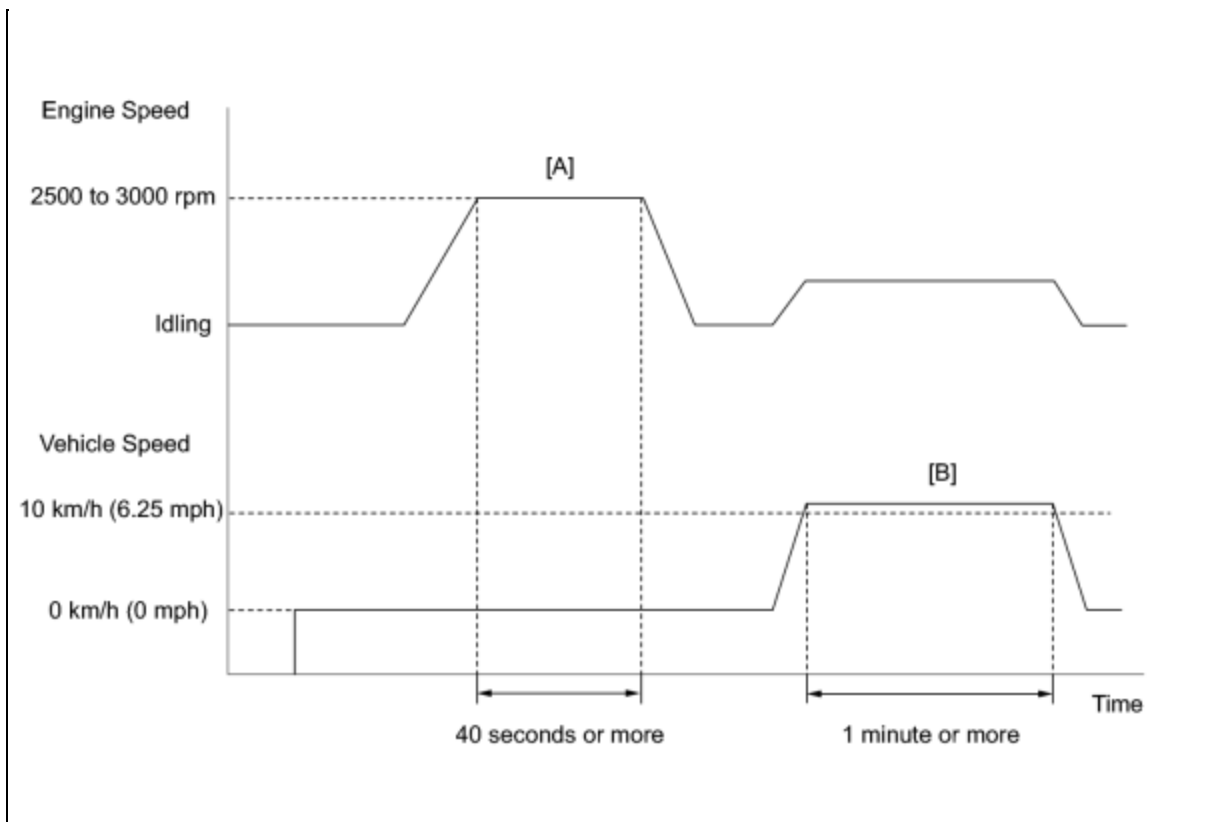
P0113

Intake air temperature sensor voltage [Intake air temperature]	More than 4.91 V [Below -46.9°C (-52.4°F)]
--	--

COMPONENT OPERATING RANGE

Intake air temperature sensor voltage [Intake air temperature]	0.435 to 4.698 V [-44.6 to 128.53°C (-48.3 to 263.4°F)]
--	---

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P0112 or P0113.
 13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal

ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

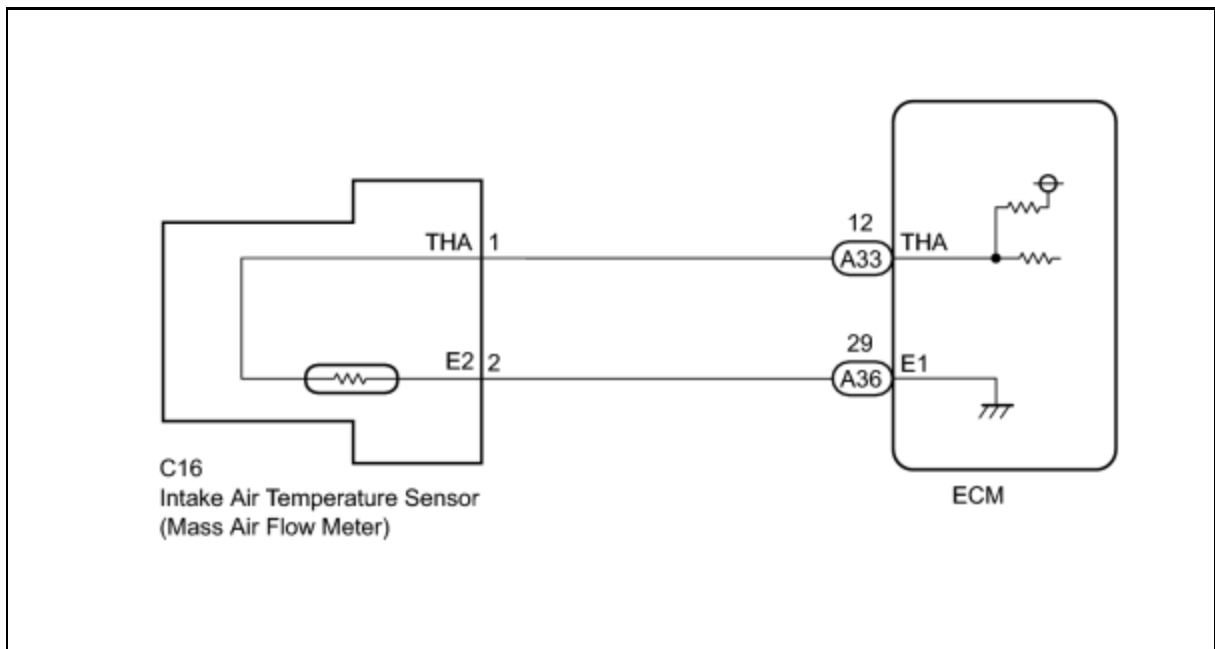
- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs INFO.

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the

air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1. READ VALUE USING TECHSTREAM (INTAKE AIR TEMPERATURE)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Data List / Intake Air.
- (e) Read the value displayed on the Techstream.

OK:

Same as actual intake air temperature.

Result

RESULT	PROCEED TO
-40°C (-40°F)	A
215°C (419°F)	B
Same as actual intake air temperature	C

HINT:

- If there is an open circuit, the Techstream indicates -40°C (-40°F).
- If there is a short circuit, the Techstream indicates 215°C (419°F).

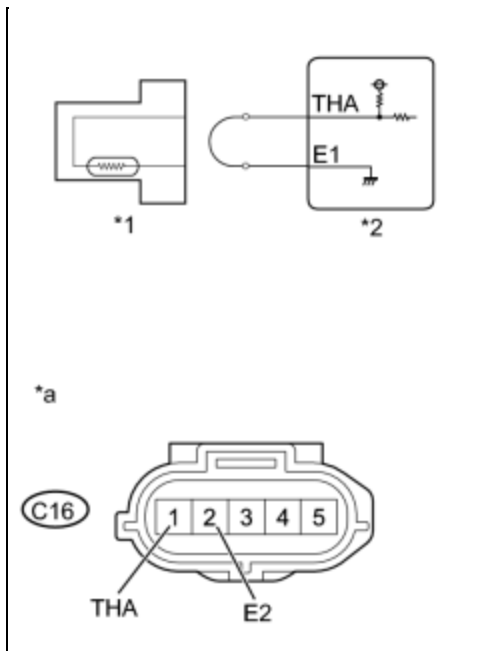
B ▶ READ VALUE USING TECHSTREAM (CHECK FOR SHORT IN WIRE HARNESS)

C ▶ CHECK FOR INTERMITTENT PROBLEMS

A



2. READ VALUE USING TECHSTREAM (CHECK FOR OPEN IN WIRE HARNESS)



(a) Disconnect the mass air flow meter connector.

- (b) Connect terminals 1 and 2 of the mass air flow meter connector on the wire harness side.
- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch to ON.
- (e) Turn the Techstream on.
- (f) Enter the following menus: Powertrain / Engine / Data List / Intake Air.
- (g) Read the value displayed on the Techstream.

Standard value:
215°C (419°F)

Text in Illustration

*1	Mass Air Flow Meter
*2	ECM
*a	Front view of wire harness connector (to Mass Air Flow Meter)

NG ► CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER - ECM)

OK ► REPLACE MASS AIR FLOW METER

3.	CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER - ECM)
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- (a) Disconnect the mass air flow meter connector.
- (b) Disconnect the ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

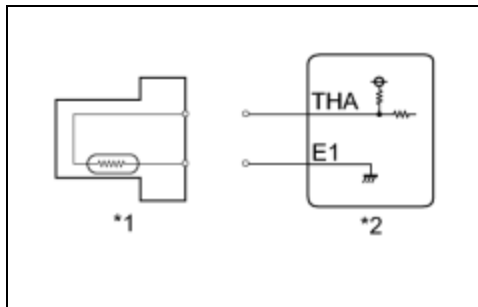
Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-12 (THA) - C16-1 (THA)	Always	Below 1 Ω
A36-29 (E1) - C16-2 (E2)	Always	Below 1 Ω

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ► REPLACE ECM

4. READ VALUE USING TECHSTREAM (CHECK FOR SHORT IN WIRE HARNESS)



(a) Disconnect the mass air flow meter connector.

(b) Connect the Techstream to the DLC3.

(c) Turn the ignition switch to ON.

(d) Turn the Techstream on.

(e) Enter the following menus: Powertrain / Engine / Data List / Intake Air.

(f) Read the value displayed on the Techstream.

Standard value:

-40°C (-40°F)

Text in Illustration

*1	Mass Air Flow Meter
*2	ECM

NG ► CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER - ECM)

OK ► REPLACE MASS AIR FLOW METER

5. CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER - ECM)

- (a) Disconnect the mass air flow meter connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-12 (THA) or C16-1(THA) - Body ground	Always	10 k Ω or higher
A36-29 (E1) or C16-2 (E2) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **REPLACE ECM**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PFB0PSX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0116: Engine Coolant Temperature Circuit Range / Performance Problem (2013 FR-S)		

DTC	P0116	Engine Coolant Temperature Circuit Range / Performance Problem
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DESCRIPTION

Refer to DTC P0117  .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0116	The engine coolant temperature has not dropped completely 6 hours after ignition switch turned off. (2 trip detection logic)	<ul style="list-style-type: none"> • Thermostat • Engine coolant temperature sensor

MONITOR DESCRIPTION

If the engine coolant temperature sensor value does not change after the warmed up engine is stopped and then the next cold engine start is performed, it is determined that a malfunction has occurred. If this is detected in 2 consecutive driving cycles, the MIL is illuminated and the DTC is stored.

MONITOR STRATEGY

Related DTCs	P0116: Engine coolant temperature sensor stuck rationality check
Required Sensors/Components (Main)	Engine coolant temperature sensor
Required Sensors/Components (Related)	Intake air temperature sensor
Frequency of Operation	Once per driving cycle
Duration	0.512 seconds
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	P0112, P0113 (Intake air temperature (IAT) sensor) P0117, P0118 (Engine coolant temperature (ECT) sensor) P0462, P0463 (Fuel level sensor (FL))
Battery voltage	10.9 V or higher
Soak time	6 hours or more
Elapsed time after electric circuit turned	

on (ignition switch ON)	Less than 60 seconds
Engine coolant temperature at the end of the previous driving cycle	70.2°C (158.2°F) or higher (varies with estimated ambient temperature at previous ignition switch off)

TYPICAL MALFUNCTION THRESHOLDS

Engine coolant temperature	45°C (113°F) or higher
Engine coolant temperature - Intake air temperature	15°C (59°F) or higher

CONFIRMATION DRIVING PATTERN

1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Enter the following menus: Powertrain / Engine / Data List / Coolant Temp.
4. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
5. Turn the ignition switch off and wait for at least 30 seconds.
6. Turn the ignition switch to ON and turn the Techstream on.
7. Start the engine and warm it up until the engine coolant temperature reaches 80°C (176°F) or higher.
8. Turn the ignition switch off and leave the vehicle for 6 hours or more.
9. Turn the ignition switch to ON and turn the Techstream on.
10. Enter the following menus: Powertrain / Engine / Trouble Codes.
11. Read pending DTCs.

HINT:

- If a pending DTC is output, the system is malfunctioning.
 - If a pending DTC is not output, perform the following procedure.
12. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 13. Input the DTC: P0116.
 14. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System normal
ABNORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System abnormal
INCOMPLETE	<ul style="list-style-type: none"> ◦ DTC judgment not completed ◦ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> ◦ Unable to perform DTC judgment ◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
 - o If the judgment result shows ABNORMAL, the system has a malfunction.
1. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs INFO.

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

INSPECTION PROCEDURE

HINT:

- If any of DTCs P0117, P0118 or P0125 are output simultaneously with DTC P0116, the engine coolant temperature sensor may have an open or a short circuit. Troubleshoot those DTCs first.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- When the DTC is output, check the engine coolant temperature using the Techstream. Enter the following menus: Powertrain / Engine / Data List / Coolant Temp. If the Coolant Temp value is lower than the actual engine coolant temperature, the engine coolant temperature sensor circuit may be malfunctioning. In this case, check the wire harnesses and connectors (and those connections) between the ECM and the engine coolant temperature sensor first.

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0116)
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- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Read DTCs.

Result

RESULT	PROCEED TO
DTC P0116 is output	A
DTC P0116 and other DTCs are output	B


HINT:

If any DTCs and other than P0116 are output, troubleshoot those DTCs first.

A



2.	INSPECT THERMOSTAT
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(a) Inspect the thermostat (thermostat opening temperature)  .

NG ► **REPLACE THERMOSTAT**

OK ► **REPLACE ENGINE COOLANT TEMPERATURE
SENSOR**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PF50PIX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0117,P0118: Engine Coolant Temperature Circuit Low Input (2013 FR-S)		

DTC	P0117	Engine Coolant Temperature Circuit Low Input
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DTC	P0118	Engine Coolant Temperature Circuit High Input
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DESCRIPTION

A thermistor, whose resistance value varies according to the engine coolant temperature, is built into the engine coolant temperature sensor. The structure of the sensor and its connection to the ECM are the same as those of the intake air temperature sensor.

HINT:

When any of DTCs P0117 and P0118 is stored, the ECM enters fail-safe mode. During fail-safe mode, the engine coolant temperature is estimated to be 70°C (158°F) by the ECM. Fail-safe mode continues until a pass condition is detected.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0117	Engine coolant temperature sensor voltage is less than 0.47 V for 0.5 seconds or more. (1 trip detection logic)	<ul style="list-style-type: none"> • Short in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM
P0118	Engine coolant temperature sensor voltage is more than 4.698 V for 0.5 seconds or more. (1 trip detection logic)	<ul style="list-style-type: none"> • Open in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM

HINT:

When any of these DTCs are output, check the engine coolant temperature using the Techstream. Enter the following menus: Powertrain / Engine / Data List / Coolant Temp.

TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
215°C (419°F)	Short circuit

MONITOR DESCRIPTION

The engine coolant temperature sensor is used to monitor the engine coolant temperature. The engine

coolant temperature sensor has a thermistor with a resistance that varies according to the temperature of the engine coolant. When the coolant temperature is low, the resistance in the thermistor increases. When the temperature is high, the resistance drops. These variations in resistance are reflected in the output voltage from the sensor. The ECM monitors the sensor voltage and uses this value to calculate the engine coolant temperature. When the sensor output voltage deviates from the normal operating range, the ECM interprets this as a fault in the engine coolant temperature sensor circuit and stores a DTC.

MONITOR STRATEGY

Related DTCs	P0117: Engine coolant temperature sensor range check (Low voltage) P0118: Engine coolant temperature sensor range check (High voltage)
Required Sensors/Components (Main)	Engine coolant temperature sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	0.5 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	None
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TYPICAL MALFUNCTION THRESHOLDS

P0117

Engine coolant temperature sensor voltage [Engine coolant temperature]	Less than 0.47 V [Higher than 122.8°C (253°F)]
--	--

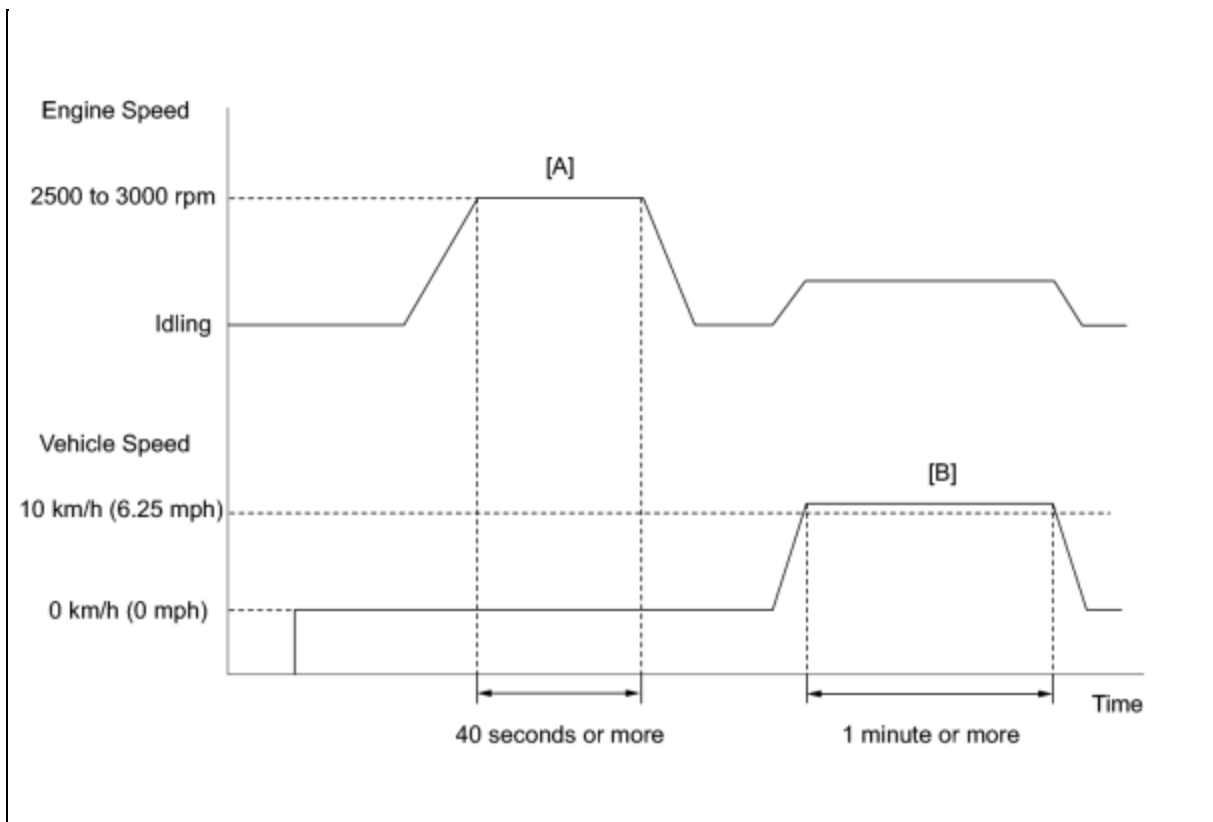
P0118

Engine coolant temperature sensor voltage [Engine coolant temperature]	More than 4.698 V [Below -46.2°C (-51.2°F)]
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COMPONENT OPERATING RANGE

Engine coolant temperature sensor voltage [Engine coolant temperature]	0.479 to 4.688 V [-43.85 to 121.85°C (-46.9 to 251.3°F)]
--	--

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P0117 or P0118.
 13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal

ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

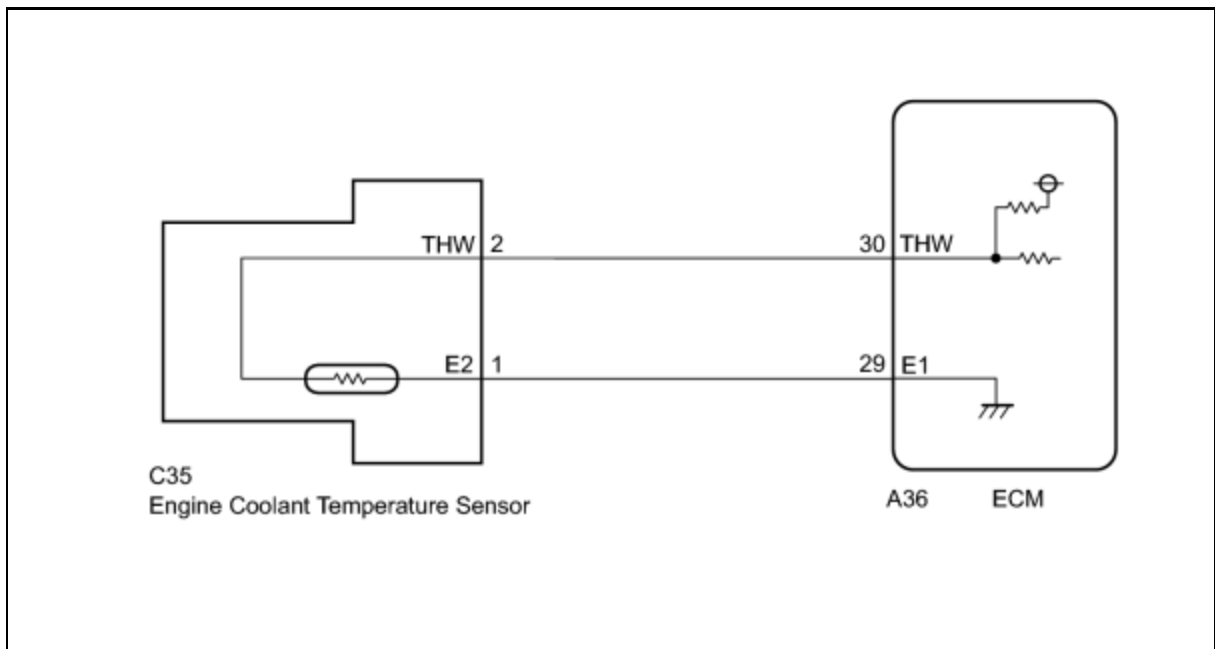
- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs INFO.

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or

- not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- If DTC P0117 is stored, check that the engine does not overheat (the DTC P0117 may be stored due to engine overheating).

PROCEDURE

1.	READ VALUE USING TECHSTREAM (ENGINE COOLANT TEMPERATURE)
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- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Data List / Coolant Temp.
- (e) Read the value displayed on the Techstream.

Standard value:

Between 75 and 100°C (167 and 212°F) with warm engine.

Result

RESULT	PROCEED TO
-40°C (-40°F)	A
215°C (419°F)	B
Between 75 and 100°C (167 and 212°F)	C

HINT:

- If there is an open circuit, the Techstream indicates -40°C (-40°F).
- If there is a short circuit, the Techstream indicates higher than 215°C (419°F).

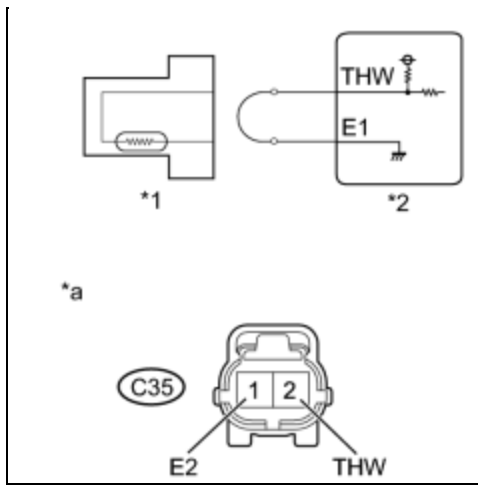
B ▶ **READ VALUE USING TECHSTREAM (CHECK FOR SHORT IN WIRE HARNESS)**

C ▶ **CHECK FOR INTERMITTENT PROBLEMS**

A



2.	READ VALUE USING TECHSTREAM (CHECK FOR OPEN IN WIRE HARNESS)
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(a) Disconnect the engine coolant temperature sensor connector.

- (b) Connect terminals 1 and 2 of the engine coolant temperature sensor connector on the wire harness side.
- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch to ON.
- (e) Turn the Techstream on.
- (f) Enter the following menus: Powertrain / Engine / Data List / Coolant Temp.
- (g) Read the value displayed on the Techstream.

Standard value:

Higher than 215°C (419°F)

Text in Illustration

*1	Engine Coolant Temperature Sensor
*2	ECM
*a	Front view of wire harness connector (to Engine Coolant Temperature Sensor)

NG ► CHECK HARNESS AND CONNECTOR (ENGINE COOLANT TEMPERATURE SENSOR - ECM)

OK ► REPLACE ENGINE COOLANT TEMPERATURE SENSOR

3.	CHECK HARNESS AND CONNECTOR (ENGINE COOLANT TEMPERATURE SENSOR - ECM)
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- (a) Disconnect the engine coolant temperature sensor connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

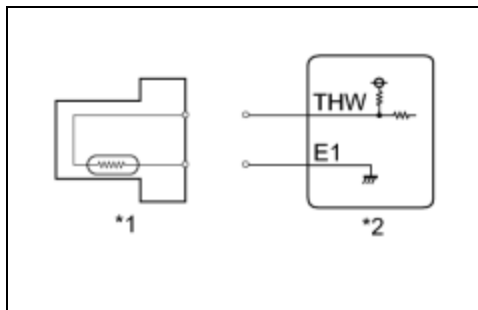
Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-30 (THW) - C35-2 (THW)	Always	Below 1 Ω
A36-29 (E1) - C35-1 (E2)	Always	Below 1 Ω

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ► REPLACE ECM

4. READ VALUE USING TECHSTREAM (CHECK FOR SHORT IN WIRE HARNESS)



(a) Disconnect the engine coolant temperature sensor connector.

- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Powertrain / Engine / Data List / Coolant Temp.
- (f) Read the value displayed on the Techstream.

Standard value:

-40°C (-40°F)

Text in Illustration

*1	Engine Coolant Temperature Sensor
*2	ECM

NG ► CHECK HARNESS AND CONNECTOR (ENGINE COOLANT TEMPERATURE SENSOR - ECM)

OK ► REPLACE ENGINE COOLANT TEMPERATURE SENSOR

5.	CHECK HARNESS AND CONNECTOR (ENGINE COOLANT TEMPERATURE SENSOR - ECM)
-----------	--

- (a) Disconnect the engine coolant temperature sensor connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-30 (THW) or C35-2 (THW) - Body ground	Always	10 kΩ or higher
A36-29 (E1) or C35-1 (E2) - Body ground	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

Last Modified: 4-14-2014	6.6 C	Doc ID: RM000004GKG01MX
Model Year: 2013	Model: FR-S	Prod Date Range: [05/2013 -]
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P119E,P119F,P219A; Bank 1 Air-Fuel Ratio Imbalance for Port Injection; 2013 MY FR-S [05/2013 -]		

DTC	P119E	Bank 1 Air-Fuel Ratio Imbalance for Port Injection
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DTC	P119F	Bank 1 Air-Fuel Ratio Imbalance for Direct Injection
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DTC	P219A	Bank 1 Air-Fuel Ratio Imbalance
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DESCRIPTION

Refer to DTC P0300 [INFO](#) .

Refer to DTC P2195 [INFO](#) .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P119E	Crankshaft position sensor signal fluctuates in port injection air fuel ratio feedback control.	<ul style="list-style-type: none"> • Fuel injector assembly (for port injection) • Fuel injector assembly (for direct injection) • Intake system • Gas leaks from exhaust system • Ignition system • Compression pressure • Air fuel ratio sensor • ECM
P119F	Crankshaft position sensor signal fluctuates in direct injection air fuel ratio feedback control.	
P219A	One of the following conditions is met (2 trip detection logic): <ul style="list-style-type: none"> • Air fuel ratio sensor signal fluctuates in air fuel ratio feedback control. • Crankshaft position sensor signal fluctuates in air fuel ratio feedback control. 	

MONITOR DESCRIPTION

Fuel System Air Fuel Ratio Cylinder Imbalance Monitor

The ECM uses the air fuel ratio sensor and crankshaft position sensor to monitor the difference in air fuel ratios between the cylinders caused by differences in injection volumes between the cylinders, leakage in the intake or exhaust system, etc.

When the air fuel ratios of the cylinders are lean or rich with respect to each other, the ECM determines that a problem is present and stores a DTC.

Air Fuel Ratio Sensor Monitoring Method

When the system detects a difference in air fuel ratios between the cylinders due to fluctuation in the air fuel ratio sensor output over 1 engine cycle (2 crankshaft revolutions), the system determines that there is a problem.

Crankshaft Position Sensor Monitoring Method

The system monitors the engine speed variation and when the variation becomes large, the system determines that there is a difference in air fuel ratios between the cylinders, which it determines to be a problem.

MONITOR STRATEGY

Related DTCs	P119E: Fuel system air fuel ratio cylinder imbalance functional check (for port fuel injection) P119F: Fuel system air fuel ratio cylinder imbalance functional check (for direct injection) P219A: Fuel system air fuel ratio cylinder imbalance functional check
Required Sensors/Components (Main)	Air fuel ratio sensor Crankshaft position sensor
Required Sensors/Components (Related)	Mass air flow meter Engine coolant temperature sensor Speed sensor
Frequency of Operation	Once per driving cycle
Duration	200 revolutions: Air fuel ratio sensor monitoring method 400 revolutions: Crankshaft position sensor monitoring method
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever the following DTCs are not stored	None
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P119E, P119F and P219A (Crankshaft Position Sensor Monitoring Method)

Accelerator pedal position	0%
Engine speed	500 rpm or higher
Estimated time after engine start	30 seconds or more
Engine coolant temperature	Higher than 60°C (140°F)
Fuel system status (Air fuel ratio sensor)	Closed loop

P219A (Air Fuel Ratio Sensor Monitoring Method)

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Estimated time after engine start	30 seconds or more
Engine speed	1600 to 3200 rpm
Engine coolant temperature	Higher than 60°C (140°F)
Fuel system status (Air fuel ratio sensor)	Closed loop
Intake air mass per revolution	0.55 to 0.8 g/rev (varies with engine speed)
Change of intake air mass during 1/2 engine revolution	Less than 0.005 g/rev

TYPICAL MALFUNCTION THRESHOLDS

P119E and P219A (Crankshaft Position Sensor Monitoring Method)

The average of the crankshaft speed fluctuation at port fuel injection	Higher than 30.7 rpm (for Automatic Transmission) (varies with engine speed) Higher than 18.3 rpm (for Manual Transmission) (varies with engine speed)
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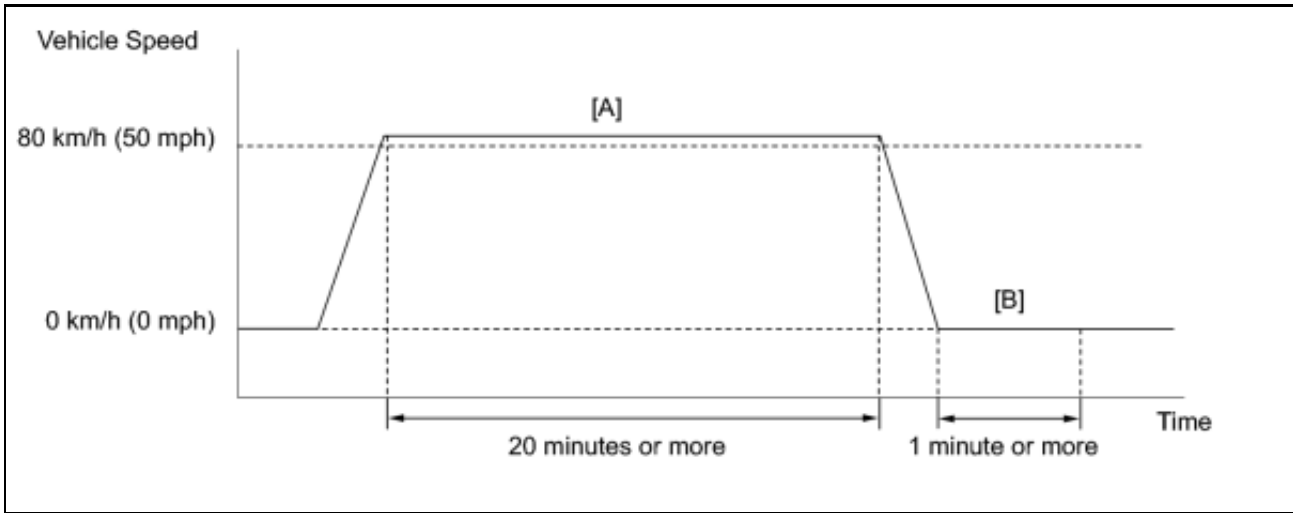
P119F and P219A (Crankshaft Position Sensor Monitoring Method)

The average of the crankshaft speed fluctuation at direct fuel injection	Higher than 25.5 rpm (for Automatic Transmission) (varies with engine speed) Higher than 16.5 rpm (for Manual Transmission) (varies with engine speed)
--	---

P219A (Air Fuel Ratio Sensor Monitoring Method)

Either following condition is met	A or B
A. The average of the positive gradient of air fuel ratio sensor output	More than 0.001125 (varies with engine speed and intake air mass per revolution)
B. The average of the negative gradient of air fuel ratio sensor output	Less than 0.000975 (varies with engine speed and intake air mass per revolution)

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO .
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.

HINT:

Check the engine coolant temperature is 20°C (68°F) or less at engine started.

7. Perform the following the confirmation driving pattern.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

- a. Drive the vehicle at 80 km/h (50 mph) or more for 20 minutes or more [A].
- b. Stop the vehicle.
- c. Idle the engine for 1 minute or more [B].

8. Enter the following menus: Powertrain / Engine / Trouble Codes.
9. Read pending DTCs.

HINT:

- If a pending DTC is output, the system is malfunctioning.
- If a pending DTC is not output, perform the following procedure.


10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
11. Input the DTC: P119E, P119F or P219A.
12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System normal
ABNORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System abnormal

INCOMPLETE	<ul style="list-style-type: none"> ◦ DTC judgment not completed ◦ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> ◦ Unable to perform DTC judgment ◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:


- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.


13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

WIRING DIAGRAM

Refer to P0030  .

Refer to P0335  .

INSPECTION PROCEDURE

HINT:

- Read freeze frame data using the Techstream. Freeze frame data records the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- Bank 1 refers to the bank that includes the No. 1 cylinder*.

*: The No. 1 cylinder is the cylinder which is farthest from the transmission.

- Bank 2 refers to the bank that does not include the No. 1 cylinder.
- Sensor 1 refers to the sensor closest to the engine assembly.
- Sensor 2 refers to the sensor farthest away from the engine assembly.

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P219A)
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- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.

(e) Read the DTCs.

Result

RESULT	PROCEED TO
DTC P119E, P119F or P219A is output	A
DTC P119E, P119F, P219A and other DTCs are output	B

HINT:

If any DTCs other than P219A are output, troubleshoot those DTCs first.

B  **GO TO DTC CHART**


A



2. READ VALUE USING TECHSTREAM (FREEZE FRAME DATA)

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored  .

Freeze Frame Data Items for DTC P119E, P119F and P219A

- Vehicle Speed
- Engine Speed
- Calculate Load
- Accelerator Idle Position
- Short FT #1
- Long FT #1
- Cylinder #1 Misfire Count to Cylinder #4 Misfire Count

HINT:

When the sum of Short FT and Long FT is positive, the engine is running lean, and when the sum is negative, the engine is running rich.

DTC stored during idling	It is possible to conclude that the problem was detected due to a "lean imbalance" (detected using crankshaft speed variation).
DTC stored while vehicle being driven	It is possible to conclude that the problem was detected due to a "rich imbalance" (detected using the air fuel ratio sensor).

NEXT



3. PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE INJECTION VOLUME)

- (a) Connect the Techstream to the DLC3.
- (b) Start the engine.
- (c) Turn the Techstream on.
- (d) Warm up the engine.

HINT:

The A/C switch and all accessory switches should be off and the shift lever should be in P, N or neutral position.

- (e) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Volume / Cylinder #1 to #4 Misfire Count.

HINT:

When the "Control the Injection Volume" Active Test is selected (injection volume is 0%), if a misfire count increases, proceed to step 6 (Check Intake System).

- (f) Perform the Control the Injection Volume operation with the engine idling.
- (g) Check the misfire counts ("Cylinder #1 Misfire Count" to "Cylinder #4 Misfire Count") while decreasing the injection volume in 5% increments.

NOTICE:

Do not decrease the injection volume by higher than 20%.

The cylinder whose misfire count has not increased can be assumed to be running rich. Therefore, perform inspections while focusing on that cylinder.

NEXT


4. CHECK FOR EXHAUST GAS LEAK

- (a) Check for exhaust gas leaks.
 - OK:
 - No gas leaks.

NG **REPAIR OR REPLACE EXHAUST SYSTEM**

OK

**5. CHECK INTAKE SYSTEM**

(a) Check the intake system for vacuum leaks  .

OK:

No leaks in the intake system.

NG  **REPAIR OR REPLACE INTAKE SYSTEM**

OK

**6. INSPECT SPARK PLUG**

(a) Inspect the spark plug of the cylinder causing the imbalance  .

NG  **REPLACE SPARK PLUG**

OK

**7. CHECK FOR SPARK (SPARK TEST)**


(a) Perform a spark test  .

HINT:

If the result of the spark test is normal, proceed to the next step.

NEXT

**8. CHECK CYLINDER COMPRESSION PRESSURE**

(a) Measure the cylinder compression pressure of the misfiring cylinder  .

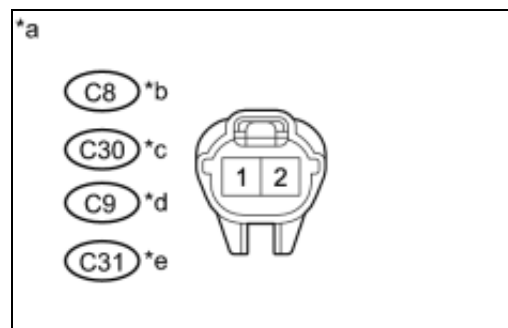
NG CHECK ENGINE TO DETERMINE CAUSE OF LOW COMPRESSION

OK



9. CHECK HARNESS AND CONNECTOR (POWER SOURCE VOLTAGE)

(a) Disconnect the fuel injector assembly (for port injection) connector.



(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C8-1 - Body ground	Ignition switch ON	11 to 14 V
C30-1 - Body ground	Ignition switch ON	11 to 14 V
C9-1 - Body ground	Ignition switch ON	11 to 14 V
C31-1 - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration



*a	Front view of wire harness connector (to Fuel Injector Assembly)
*b	No. 1 cylinder
*c	No. 2 cylinder
*d	No. 3 cylinder
*e	No. 4 cylinder

NG GO TO FUEL INJECTOR CIRCUIT

OK**10. CHECK HARNESS AND CONNECTOR (FUEL INJECTOR ASSEMBLY - ECM)**

- (a) Check the harness and connector of fuel injector assembly (for port injection)  .
- (b) Check the harness and connector of fuel injector assembly (for direct injection)  .

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****11. CHECK FUEL INJECTOR ASSEMBLY OF CYLINDER CAUSING IMBALANCE**

- (a) Check the fuel injector assembly (for port injection) [whether fuel volume is high or low, and whether injection pattern is poor]  .
- (b) Check the fuel injector assembly (for direct injection) [whether fuel volume is high or low, and whether injection pattern is poor]  .

Result

RESULT	PROCEED TO
OK	A
Fuel injector assembly (for port injection) is NG.	B
Fuel injector assembly (for direct injection) is NG.	C

B  **REPLACE FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)****C**  **REPLACE FUEL INJECTOR ASSEMBLY (FOR DIRECT INJECTION)****A**


12. CHECK FOR CAUSE OF FAILURE

- (a) If the cause of the problem has not been found even after performing the troubleshooting procedure, perform the inspection below.
- (b) Check the intake valve for deposits.

HINT:

As the DTC may have been stored due to deposits on the intake valve, remove the cylinder head and check the intake valve.

NEXT**13. CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED**

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (i) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (j) Check for DTCs.

P219A is not output.

NEXT  **END**

TOYOTA

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PF60PBX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0122,P0123,P0222,P0223,P2135: Throttle Position Sensor Circuit Low Input (2013 FR-S)		

DTC	P0122	Throttle Position Sensor Circuit Low Input
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DTC	P0123	Throttle / Pedal Position Sensor / Switch "A" Circuit High Input
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DTC	P0222	Throttle / Pedal Position Sensor / Switch "B" Circuit Low Input
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DTC	P0223	Throttle / Pedal Position Sensor / Switch "B" Circuit High Input
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DTC	P2135	Throttle / Pedal Position Sensor / Switch "A" / "B" Voltage Correlation
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DESCRIPTION

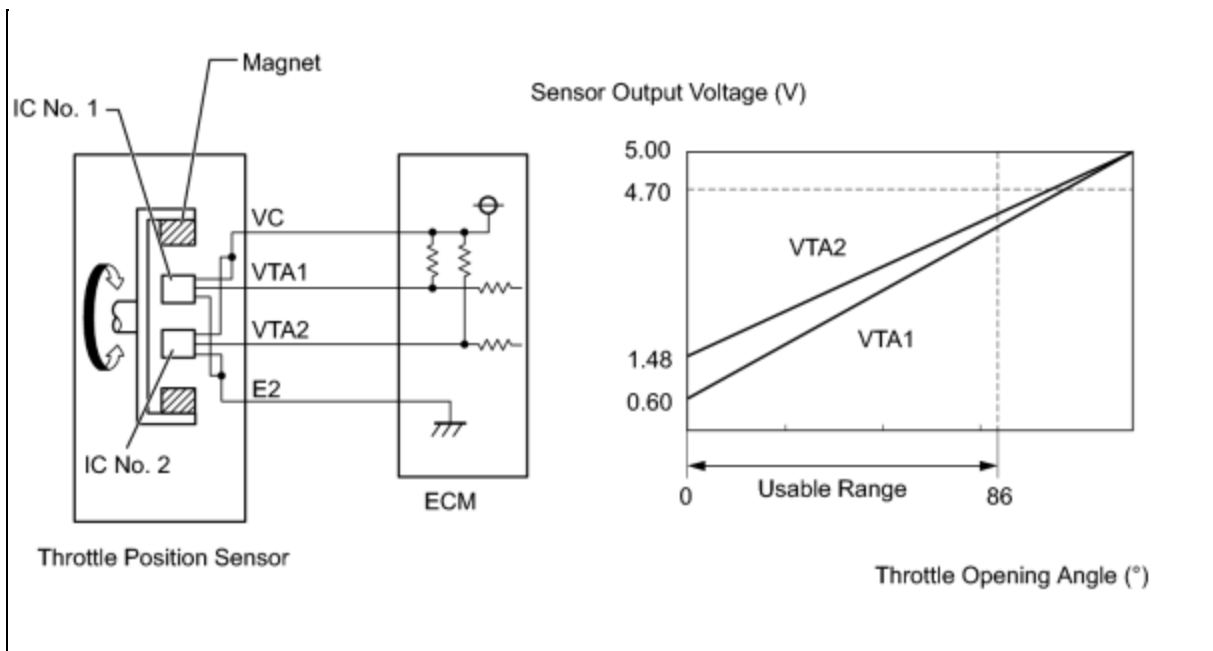
HINT:

These DTCs relate to the throttle position sensor.

The throttle position sensor is mounted on the throttle with motor body assembly, and detects the opening angle of the throttle valve. This sensor is a non-contact type sensor. It uses Hall-effect elements in order to yield accurate signals even in extreme driving conditions, such as at high speeds as well as very low speeds.

The throttle position sensor has 2 sensor circuits, each of which transmits a signal, VTA1 and VTA2. VTA1 is used to detect the throttle valve angle and VTA2 is used to detect malfunctions in VTA2. The sensor signal voltages vary between 0 V and 5 V in proportion to the throttle valve opening angle, and are transmitted to the VTA1 and VTA2 terminals of the ECM.

As the valve closes, the sensor output voltage decreases and as the valve opens, the sensor output voltage increases. The ECM calculates the throttle valve opening angle according to these signals and controls the throttle actuator in response to driver inputs. These signals are also used in calculations such as air fuel ratio correction, power increase correction and fuel-cut control.



DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0122	The voltage of VTA1 is 0.273 V or less for 0.024 seconds or more. (1 trip detection logic)	<ul style="list-style-type: none"> Throttle position sensor (built into throttle with motor body assembly) Short in VTA1 circuit Open in VC circuit ECM
P0123	The voltage of VTA1 is more than 4.736 V for 0.024 seconds or more. (1 trip detection logic)	<ul style="list-style-type: none"> Throttle position sensor (built into throttle with motor body assembly) Open in VTA1 circuit Open in E1 circuit Short between VC and VTA1 circuits ECM
P0222	The voltage of VTA2 is 1.153 V or less for 0.024 seconds or more. (1 trip detection logic)	<ul style="list-style-type: none"> Throttle position sensor (built into throttle with motor body assembly) Short in VTA2 circuit Open in VC circuit ECM
P0223	The voltage of VTA2 is 4.772 V or more for 0.024 seconds or more. (1 trip detection logic)	<ul style="list-style-type: none"> Throttle position sensor (built into throttle with motor body assembly) Open in VTA2 circuit Open in E1 circuit Short between VC and VTA2 circuits ECM
P2135	Deviation in voltages of VTA1 and VTA2 exceed thresholds for 0.212 seconds or more.	<ul style="list-style-type: none"> Short between VTA1 and VTA2 circuits Throttle position sensor (built into throttle with motor body assembly)

(1 trip detection logic)	throttle with motor body assembly) <ul style="list-style-type: none"> ECM
--------------------------	--

HINT:

- When any of these DTCs are output, check the throttle valve opening angle using the Techstream. Enter the following menus: Powertrain / Engine / Data List / Throttle Position No. 1 and Throttle Position No. 2.
- Throttle Position No. 1 is the VTA1 signal, and Throttle Position No. 2 is the VTA2 signal.
Reference (Normal Condition):

TECHSTREAM DISPLAY	ACCELERATOR PEDAL FULLY RELEASED	ACCELERATOR PEDAL FULLY DEPRESSED
Throttle Position No. 1	0.5 to 1.1 V	3.2 to 4.8 V
Throttle Position No. 2	1.5 to 2.2 V	4.0 to 4.5 V

MONITOR DESCRIPTION

The ECM uses the throttle position sensor to monitor the throttle valve opening angle. There are several checks that the ECM performs to confirm the proper operation of the throttle position sensor.

- A specific voltage difference is expected between the sensor terminals, VTA1 and VTA2, for each throttle valve opening angle. If the difference between VTA1 and VTA2 is incorrect, the ECM interprets this as a malfunction in the sensor circuit, and stores a DTC.
- VTA1 and VTA2 each have a specific voltage range. If VTA1 or VTA2 is outside the normal operating range, the ECM interprets this as a malfunction in the sensor circuit, and stores a DTC.
- VTA1 and VTA2 should never be close to the same voltage level. If VTA1 is within 0.02 V of VTA2, the ECM determines that there is a short circuit in the sensor circuit, and stores a DTC.

If the malfunction is not repaired successfully, a DTC is stored 10 seconds after the engine is next started.

MONITOR STRATEGY

Related DTCs	P0122: Throttle position sensor circuit continuity (Low Voltage) (Sensor 1) P0123: Throttle position sensor circuit continuity (High Voltage) (Sensor 1) P0222: Throttle position sensor circuit continuity (Low Voltage) (Sensor 2) P0223: Throttle position sensor circuit continuity (High Voltage) (Sensor 2) P2135: Throttle position sensor rationality check
Required Sensors/Components (Main)	Throttle position sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
	0.024 seconds: P0122, P0123, P0222, P0223

Duration	0.212 seconds: P2135
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	None
Battery voltage	6 V or more

TYPICAL MALFUNCTION THRESHOLDS

P0122

VTA1 voltage (Throttle position)	Less than 0.273 V (5.46%)
----------------------------------	---------------------------

P0123

VTA1 voltage (Throttle position)	More than 4.736 V (94.73%)
----------------------------------	----------------------------

P0222

VTA2 voltage (Throttle position)	Less than 1.153 V (3.82%)
----------------------------------	---------------------------

P0223

VTA2 voltage (Throttle position)	More than 4.772 V (94.30%)
----------------------------------	----------------------------

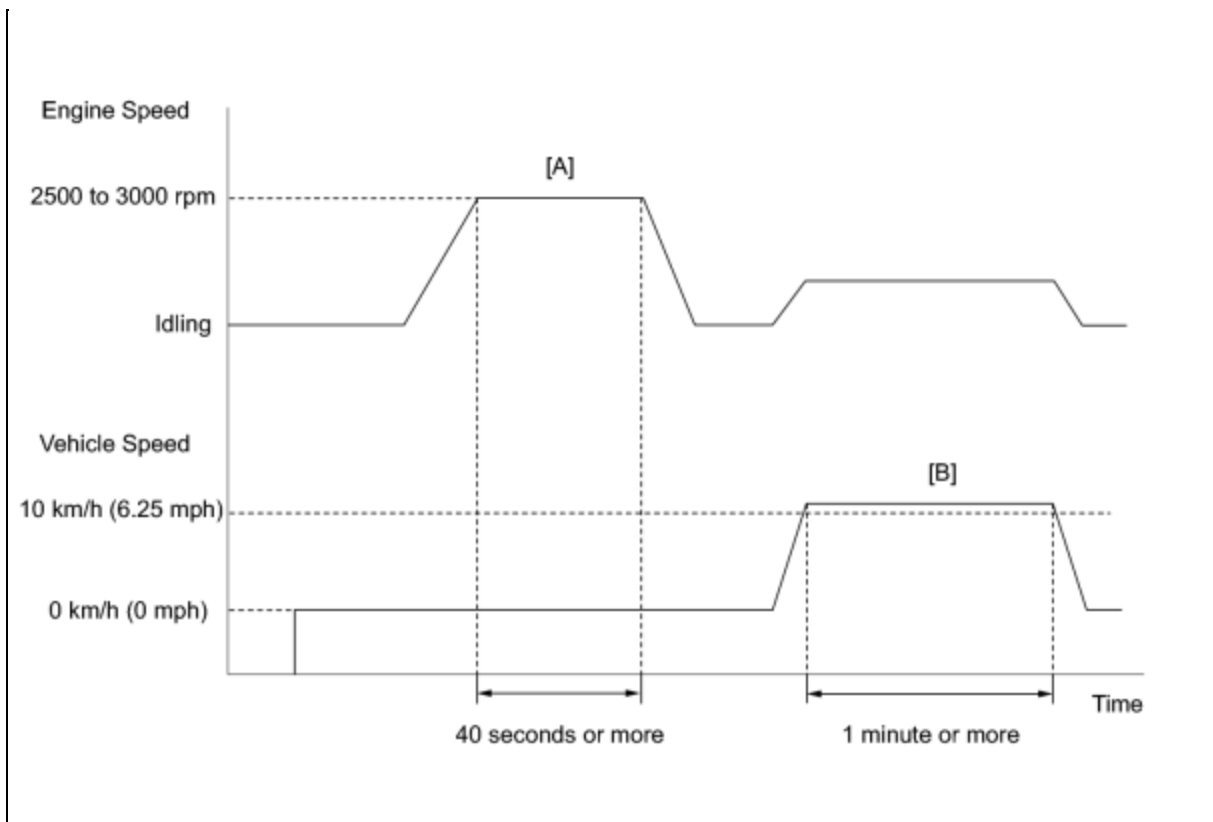
P2135

VTA2 - VTA1	Less than 3.79% (varies with VTA1)
-------------	------------------------------------

COMPONENT OPERATING RANGE

VTA1 voltage (Throttle position)	0.382 to 4.504 V (7.64 to 90.09%)
VTA2 voltage (Throttle position)	1.262 to 4.696 V (6.54 to 92.41%)

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:


- If a pending DTC is output, the system is malfunctioning.
 - If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P0122, P0123, P0222, P0223 or P2135.
 13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ○ DTC judgment completed ○ System normal

ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

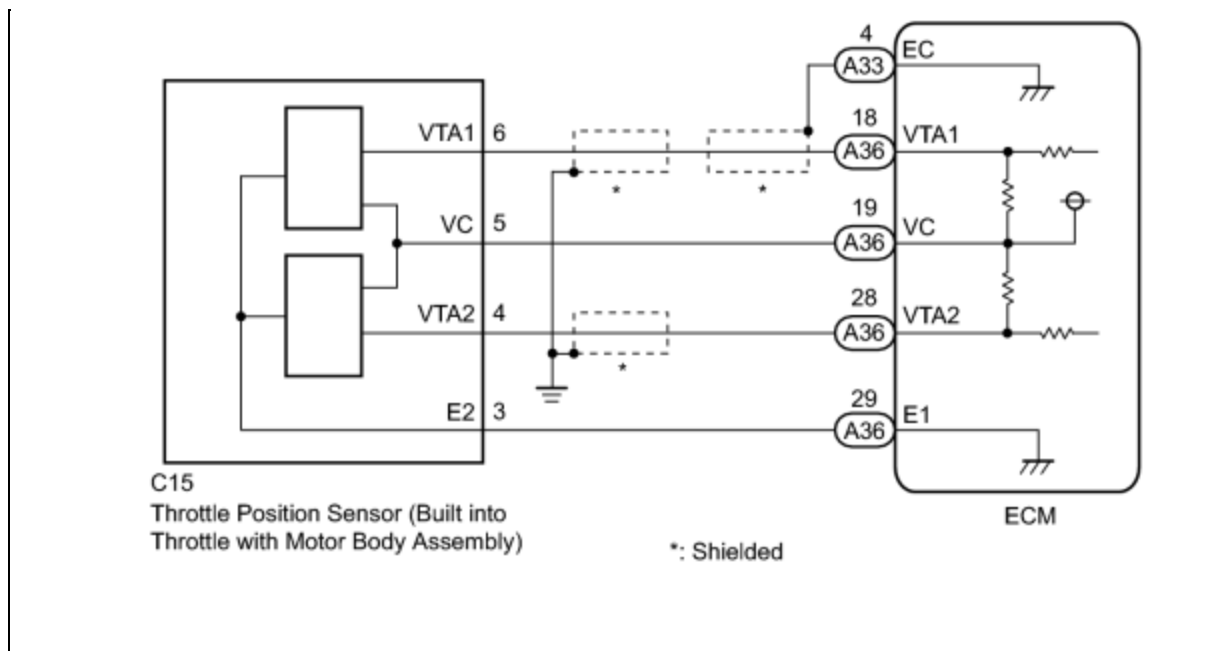
- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

FAIL-SAFE

When any of these DTCs or other DTCs relating to Electronic Throttle Control System (ETCS) malfunctions are stored, the ECM enters fail-safe mode. During fail-safe mode, the ECM cuts the current to the throttle actuator, and the throttle valve is returned to a specified throttle angle by the return spring. The ECM then adjusts the engine output by controlling the fuel injection (intermittent fuel-cut) and ignition timing, in accordance with the accelerator pedal angle, to allow the vehicle to continue at a minimal speed. If the accelerator pedal is depressed firmly and gently, the vehicle can be driven slowly.

Fail-safe mode continues until a pass condition is detected, and the ignition switch is then turned off.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1. READ VALUE USING TECHSTREAM (THROTTLE POSITION SENSOR)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Data List / Throttle Position No. 1 and Throttle Position No. 2.
- (e) Read the values displayed on the Techstream.

Result

WHEN ACCELERATOR PEDAL RELEASED		WHEN ACCELERATOR PEDAL DEPRESSED		TROUBLE AREA	PROCEED TO
THROTTLE POSITION NO. 1 (VTA1)	THROTTLE POSITION NO. 2 (VTA2)	THROTTLE POSITION NO. 1 (VTA1)	THROTTLE POSITION NO. 2 (VTA2)		
0 to 0.2 V	0 to 1.75 V	0 to 0.2 V	0 to 1.75 V	VC circuit open	
4.5 to 5.0 V	4.5 to 5.0 V	4.5 to 5.0 V	4.5 to 5.0 V	E2 circuit open	

0 to 0.2 V, or 4.5 to 5.0 V	1.9 V to 2.6 V (Fail-safe)	0 to 0.2 V, or 4.5 to 5.0 V	1.9 V to 2.6 V (Fail-safe)	VTA1 circuit open or ground short	A
0.6 V to 1.4 V (Fail-safe)	0 to 1.75V, or 4.8 to 5.0 V	0.6 V to 1.4 V (Fail-safe)	0 to 1.75 V, or 4.8 to 5.0 V	VTA2 circuit open or ground short	
0.5 to 1.1 V	1.5 to 2.2 V	3.2 to 4.8 V (Not fail-safe)	4.0 to 4.5 V (Not fail-safe)	Throttle position sensor circuit normal	B

B ▶ CHECK WHETHER DTC OUTPUT RECURS
(THROTTLE POSITION SENSOR DTCS)

A



2.	CHECK HARNESS AND CONNECTOR (THROTTLE POSITION SENSOR - ECM)
-----------	---

- (a) Disconnect the throttle with motor body assembly connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-19 (VC) - C15-5 (VC)	Always	Below 1 Ω
A36-18 (VTA1) - C15-6 (VTA1)	Always	Below 1 Ω
A36-28 (VTA2) - C15-4 (VTA2)	Always	Below 1 Ω
A36-29 (E1) - C15-3 (E2)	Always	Below 1 Ω

Standard Resistance (Check for short):

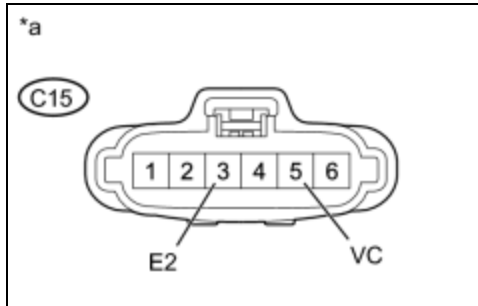
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-19(VC) or C15-5 (VC) - Body ground	Always	10 kΩ or higher
A36-18 (VTA1) or C15-6 (VTA1) - Body ground	Always	10 kΩ or higher
A36-29 (E1) or C15-3 (E2) - Body ground	Always	10 kΩ or higher
A36-29 (E1) or C15-4 (VTA2) - Body ground	Always	10 kΩ or higher

NG ▶ REPAIR OR REPLACE HARNESS OR
CONNECTOR

OK



3.	INSPECT ECM (VC VOLTAGE)
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(a) Disconnect the throttle with motor body assembly connector.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
C15-5 (VC) - C15-3 (E2)	Ignition switch ON	4.5 to 5.5 V

Text in Illustration

*a	Front view of wire harness connector (to Throttle with Motor Body Assembly)
----	--

NG **REPLACE ECM**

OK




4.	REPLACE THROTTLE WITH MOTOR BODY ASSEMBLY
-----------	--

(a) Replace the throttle with motor body assembly .

NEXT



5.	CHECK WHETHER DTC OUTPUT RECURS (THROTTLE POSITION SENSOR DTCS)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Start the engine.
- (f) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (g) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (h) Read DTCs.

Result

RESULT	PROCEED TO
DTC P0122, P0123, P0222, P0223 and/or P2135 are output	A
DTC is not output	B

B ► END

A ► REPLACE ECM



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000T9POBWX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0125: Insufficient Coolant Temperature for Closed Loop Fuel Control (2013 FR-S)		

DTC	P0125	Insufficient Coolant Temperature for Closed Loop Fuel Control
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DESCRIPTION

Refer to DTC P0117 WFO.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0125	Despite estimated engine coolant temperature is 20°C (68 °F) or more, engine coolant temperature sensor value is less than 20°C (68 °F) for 300 seconds or more. (2 trip detection logic)	<ul style="list-style-type: none"> • Cooling system • Engine coolant temperature sensor • Thermostat

MONITOR DESCRIPTION

The diagnostic system monitors for a functional check of the engine coolant temperature sensor. If the engine coolant temperature does not reach the temperature to enable the closed loop air/fuel ratio control within a predetermined time after engine start, the diagnostic system determines a malfunction of engine coolant temperature sensor and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0125: Engine coolant temperature sensor range check
Required Sensors/Components (Main)	Engine coolant temperature sensor Thermostat Cooling system
Required Sensors/Components (Related)	-
Frequency of Operation	Once per driving cycle
Duration	120 seconds: Closed loop temperature -10°C (14°F) 300 seconds: Closed loop temperature -10 to 20 °C (14 to 68°F)
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

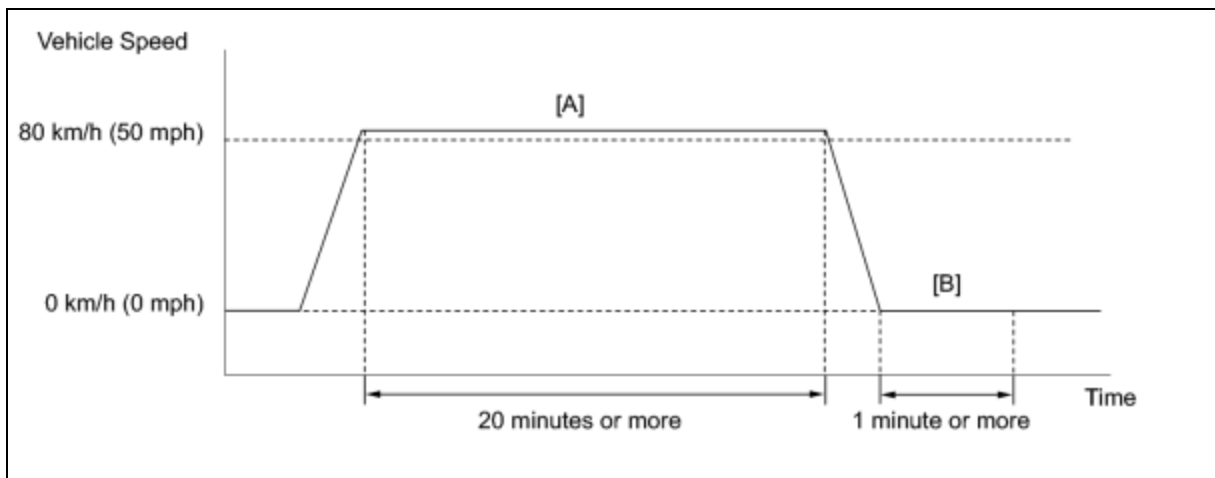
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Monitor runs whenever following DTCs are not present	P0117, P0118 (Engine coolant temperature (ECT) sensor) P0122, P0123, P0222, P0223 (Throttle position sensor) P0300, P0301, P0302, P0303, P0304 (Misfire) P0500 (Vehicle speed sensor (VSS)) P0604, P0605 (ROM in ECM) P1160 (Throttle return spring) P2101, P2102 (Throttle actuator control motor) P2109 (Throttle position sensor minimum stop) P2119 (Throttle actuator control) P2122, P2123, P2127, P2128 (Accelerator pedal position sensor (APPS) circuit) P2135 (Throttle position sensor (TPS) correlation) P2138 (Accelerator pedal position sensor (APPS) correlation)
Battery voltage	10.9 V or more
Engine speed	500 rpm or higher
Diagnostic value(n)	[Diagnostic value(n-1) + 64 + 7.9 (varies with vehicle speed and lowest engine coolant temperature)] or more

TYPICAL MALFUNCTION THRESHOLDS

Engine coolant temperature	Less than 20°C (68°F)
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CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.

HINT:

Check the engine coolant temperature is 20°C (68°F) or less at engine started.

7. Perform the following the confirmation driving pattern.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.


- a. Drive the vehicle at 80 km/h (50 mph) or more for 20 minutes or more [A].
 - b. Stop the vehicle.
 - c. Idle the engine for 1 minute or more [B].
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
9. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
11. Input the DTC: P0125.
12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none">o DTC judgment completedo System normal
ABNORMAL	<ul style="list-style-type: none">o DTC judgment completedo System abnormal
INCOMPLETE	<ul style="list-style-type: none">o DTC judgment not completedo Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none">o Unable to perform DTC judgmento Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
 - o If the judgment result shows ABNORMAL, the system has a malfunction.
13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM

Refer to DTC P0117  .

INSPECTION PROCEDURE

HINT:

- If any of DTCs P0116, P0117 or P0118 are set simultaneously with DTC P0125, the engine coolant temperature sensor may have an open or a short circuit. Troubleshoot those DTCs first.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0125)
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- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Read the DTCs.

Result:

RESULT	PROCEED TO
DTC P0125 is output	A
DTC P0125 and other DTCs are output	B

HINT:

If any DTCs other than P0125 are output, troubleshoot those DTCs first.

B ▶ **GO TO DTC CHART**

A



2.	INSPECT THERMOSTAT
-----------	---------------------------

- (a) Inspect the thermostat INFO.

NG ▶ **REPLACE THERMOSTAT**

OK



3. CHECK COOLING SYSTEM

(a) Check for defects in the cooling system that might cause the system to be too cold, such as abnormal radiator fan operation or any modifications.

NG ► REPAIR OR REPLACE COOLING SYSTEM

OK ► REPLACE ENGINE COOLANT TEMPERATURE
SENSOR



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000TB3096X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0128: Coolant Thermostat (Coolant Temperature Below Thermostat Regulating Temperature) (2013 FR-S)		

DTC	P0128	Coolant Thermostat (Coolant Temperature Below Thermostat Regulating Temperature)
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DESCRIPTION

At the same time as using the engine coolant temperature sensor to determine the engine coolant temperature, the ECM estimates the engine coolant temperature. If the difference between the estimated and actual engine coolant temperatures exceeds a predetermined value, then the DTC is stored, notifying of a malfunction in the functioning of the thermostat.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0128	Abnormal (open) thermostat functioning detected. (2 trip detection logic)	<ul style="list-style-type: none"> • Thermostat • Cooling system • Engine coolant temperature sensor • ECM

MONITOR DESCRIPTION

The ECM estimates the engine coolant temperature based on the starting temperature, engine loads, and engine speeds. The ECM then compares the estimated temperature with the actual engine coolant temperature. If the difference between the estimated engine coolant temperature and the actual engine coolant temperature exceeds the specified value, the ECM interprets this as a malfunction in the thermostat or the engine cooling system and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0128: Thermostat functional check
Required Sensors/Components (Main)	Thermostat Engine coolant temperature sensor
Required Sensors/Components (Related)	Intake air temperature sensor Speed sensor
Frequency of Operation	Once per driving cycle
Duration	Immediately
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs not stored	P0101, P0102, P0103 (Mass air flow (MAF) sensor) P0111, P0112, P0113 (Intake air temperature (IAT) sensor) P0117, P0118, P0125 (Engine coolant temperature (ECT) sensor) P0122, P0123, P0222, P0223 (Throttle position sensor) P0300, P0301, P0302, P0303, P0304 (Misfire) P0335, P0336 (Crankshaft position sensor) P0340, P0345 (Camshaft position sensor - Intake with variable valve timing (VVT)) P0500 (Vehicle speed sensor (VSS)) P0604, P0605 (ROM in ECM) P1160 (Throttle return spring) P2101, P2102 (Throttle actuator control motor) P2109 (Throttle position sensor minimum stop) P2119 (Throttle actuator control) P2122, P2123, P2127, P2128 (Accelerator pedal position sensor (APPS) circuit) P2135 (Throttle position sensor (TPS) correlation) P2138 (Accelerator pedal position sensor (APPS) correlation)
Battery voltage	10.9 V or higher
Ambient temperature	-7°C (19.4°F) or higher
Vehicle speed	30 km/h (18.6 mph) or higher

Case 1

Modeled engine coolant temperature	60°C (140°F) or higher
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Case 2

Modeled engine coolant temperature	70.2°C (158.4°F) or higher (varies with ambient temperature at engine start)
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Case 3

Modeled engine coolant temperature	47.1°C (116.8°F) or higher (varies with ambient temperature at engine start)
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TYPICAL MALFUNCTION THRESHOLDS

Case 1

Actual engine coolant temperature	Less than 60°C (140°F)
Sigma (Modeled engine coolant temperature - Actual engine coolant temperature)	1731.6°C (3148.9°F) or higher (varies with engine coolant temperature at engine start)

Case 2

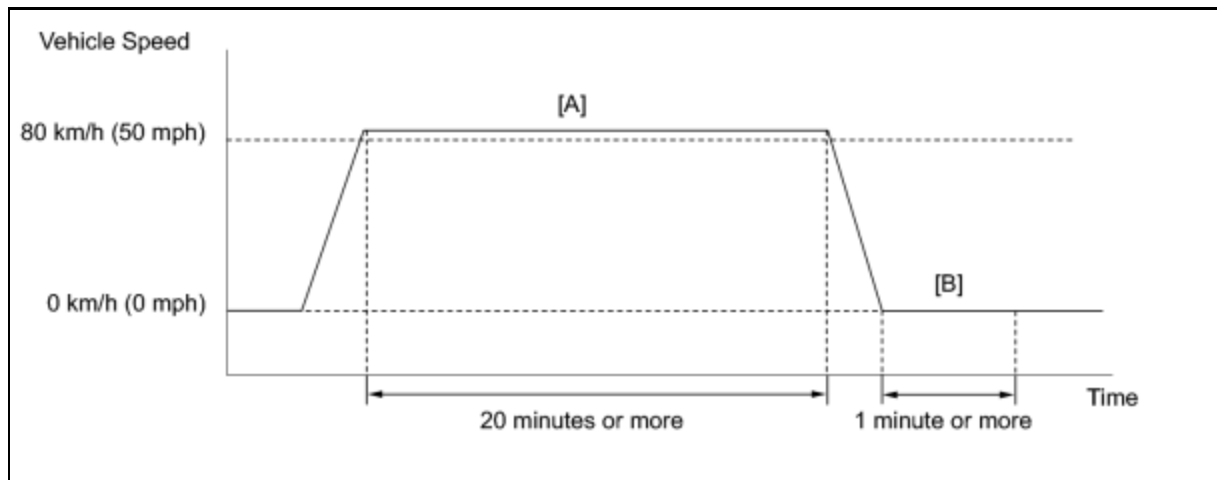
Actual engine coolant temperature	Less than 77.8°C (172°F) (varies with ambient temperature at engine start)
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Sigma (Modeled engine coolant temperature - Actual engine coolant temperature)	1731.6°C (3148.9°F) or higher (varies with engine coolant temperature at engine start)
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Case 3

Modeled engine coolant temperature - Actual engine coolant temperature	11.1 °C (52°F) or higher
Sigma (Modeled engine coolant temperature - Actual engine coolant temperature)	1731.6°C (3148.9°F) or higher (varies with engine coolant temperature at engine start)

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. Perform the following the confirmation driving pattern.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

- a. Drive the vehicle at 80 km/h (50 mph) or more for 20 minutes or more [A].
 - b. Stop the vehicle.
 - c. Idle the engine for 1 minute or more [B].
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
 9. Read pending DTCs.


HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 11. Input the DTC: P0128.
 12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal
ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

INSPECTION PROCEDURE

HINT:

- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- When the DTC is output, check the engine coolant temperature using the Techstream. Enter the following menus: Powertrain / Engine / Data List / Coolant Temp. If the Coolant Temp value is lower than the actual engine coolant temperature, the engine coolant temperature sensor circuit may be malfunctioning. In this case, check the wire harnesses and connectors (and those connections) between the ECM and the engine coolant temperature sensor first.

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0128)
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- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine / Trouble Codes.

(e) Read DTCs.

Result

RESULT	PROCEED TO
DTC P0128 is output	A
DTC P0128 and other DTCs are output	B

HINT:

If any DTCs other than P0128 are output, troubleshoot those DTCs first.

B ► GO TO DTC CHART

A



2.	CHECK COOLING SYSTEM
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(a) Check for defects in the cooling system that might cause the system to be too cold, such as abnormal cooling fan operation or any modifications.

NG ► REPAIR OR REPLACE COOLING SYSTEM

OK



3.	INSPECT THERMOSTAT
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(a) Inspect the thermostat (thermostat opening temperature) INFO .

NG ► REPLACE THERMOSTAT

OK ► REPLACE ECM

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000028K60CZX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0131,P0132,P0134: Oxygen Sensor Circuit Low Voltage (Bank 1 Sensor 1) (2013 FR-S)		

DTC	P0131	Oxygen Sensor Circuit Low Voltage (Bank 1 Sensor 1)
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DTC	P0132	Oxygen Sensor Circuit High Voltage Bank1 Sensor1
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DTC	P0134	Oxygen Sensor Circuit No Activity Detected (Bank 1 Sensor 1)
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DESCRIPTION

Refer to DTC P2195  .

HINT:

- o Although the DTC titles say oxygen sensor, these DTCs relate to the air fuel ratio sensor.
- o Sensor 1 refers to the sensor mounted in front of the three-way catalytic converter and located near the engine assembly.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0131	One of the following conditions is met for 1 second or more (1 trip detection logic): <ul style="list-style-type: none"> • The voltage of A1A+ is less than 0.4 V. • The voltage of A1A- is less than 0.4 V. • The difference between voltage of A1A+ and voltage of A1A- is less than 0.1 V and the voltage of A1A- is more than 3.8 V and less than 4.7 V. 	<ul style="list-style-type: none"> • Open or short in air fuel ratio sensor circuit • Air fuel ratio sensor • ECM
P0132	One of the following conditions is met for 1 second or more (1 trip detection logic): <ul style="list-style-type: none"> • The voltage of A1A+ is more than 4.7 V. • The voltage of A1A- is more than 4.7 V. 	
P0134	Air fuel ratio sensor impedance is 450 Ω or more for 5 seconds or more. (1 trip detection logic)	

MONITOR DESCRIPTION

These DTCs are output when there is an open or short in the air fuel ratio sensor circuit, or if the air fuel ratio sensor output drops. To detect these problems, the voltage of the air fuel ratio sensor is monitored when turning the ignition switch to ON, and the admittance (admittance is an electrical term that indicates the ease of flow of current) is checked while driving. If the voltage of the air fuel ratio sensor is between

0.6 V and 4.5 V, it is considered normal. If the voltage is out of the specified range, or the admittance is less than the standard value, the ECM determines that there is a malfunction in the air fuel ratio sensor. If the same malfunction is detected in next driving cycle, the MIL is illuminated and a DTC is stored.

MONITOR STRATEGY

Related DTCs	P0131: Primary oxygen sensor - ECM input voltage circuit continuity P0132: Primary oxygen sensor - ECM input voltage circuit continuity P0134: Primary oxygen sensor - Output voltage circuit continuity
Required Sensors/Components (Main)	Air fuel ratio sensor
Required Sensors/Components (Sub)	-
Frequency of Operation	Continuous
Duration	1 second: P0131, P0132 5 seconds: P0134
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs not stored	None
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P0131, P0132

Battery voltage	10.9 V or higher
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P0134

Battery voltage	10.9 V or higher
Accumulated variation of front lambda sensor heater control duty per 0.128 sec.	70% or higher for 36 seconds or more

TYPICAL MALFUNCTION THRESHOLDS

P0131

Either of following conditions is met:	A, B, C or D
A. A1A+ terminal voltage	Less than 0.4 V
B. A1A- terminal voltage	Less than 0.4 V
C. Difference of A1A+ terminal voltage and A1A- terminal voltage	Less than 0.1 V
D. A1A- terminal voltage	Less than 4.7 V and higher than 3.8 V

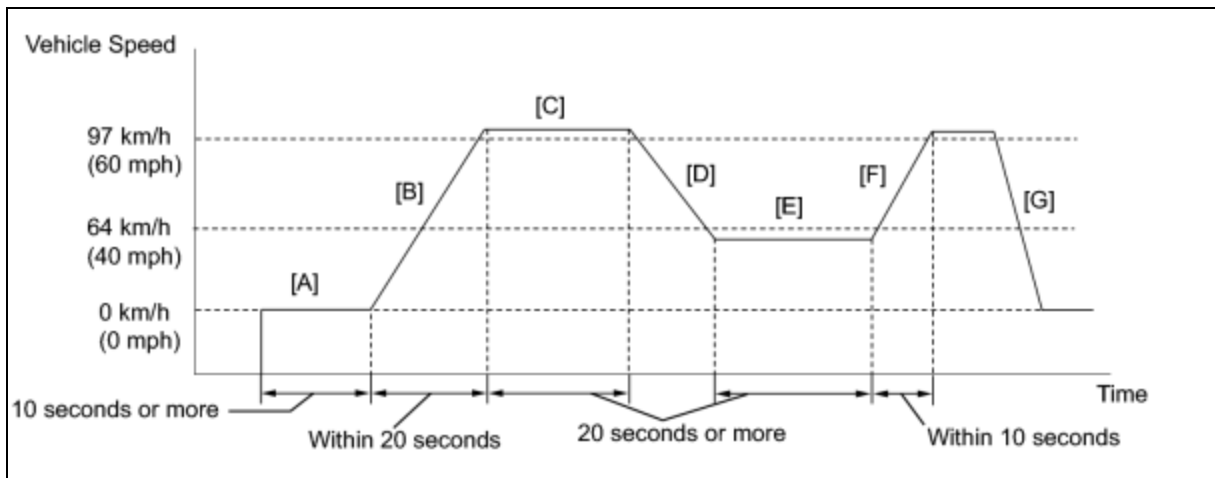
P0132

Either of following conditions is met:	A or B
A. A1A+ terminal voltage	4.7 V or higher
B. A1A- terminal voltage	4.7 V or higher

P0134

Impedance of air fuel ratio sensor	450 Ω or higher
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CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. Perform the following the confirmation driving pattern.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

- a. Idle the engine for 10 seconds or more [A].
- b. Accelerate the vehicle to 97 km/h (60 mph) or more within 20 seconds [B].
- c. Drive the vehicle at 97 km/h (60 mph) or more for 20 seconds or more [C].
- d. Release the accelerator pedal to Decelerate until the vehicle speed decreases to less than 64 km/h (40 mph) [D].

HINT:

Release the accelerator pedal fully to perform the fuel-cut.

- e. Drive the vehicle at 60 km/h (40 mph) or less for 20 seconds or more [E].
- f. Accelerate the vehicle to 97 km/h (60 mph) or more within 10 seconds [F].
- g. Release the accelerator pedal and stop the vehicle [G].

8. Enter the following menus: Powertrain / Engine / Trouble Codes.
9. Read pending DTCs.

HINT:


- If a pending DTC is output, the system is malfunctioning.
- If a pending DTC is not output, perform the following procedure.

10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
11. Input the DTC: P0131, P0132 or P0134.
12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System normal
ABNORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System abnormal
INCOMPLETE	<ul style="list-style-type: none"> ◦ DTC judgment not completed ◦ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> ◦ Unable to perform DTC judgment ◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.

13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

WIRING DIAGRAM

Refer to DTC P0030  .

INSPECTION PROCEDURE

HINT:

- Sensor 1 refers to the sensor closest to the engine assembly.
- Sensor 2 refers to the sensor farthest away from the engine assembly.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or

- not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- Refer to "Data List / Active Test" [AFS Voltage B1S1] **INFO** .

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CHECK HARNESS AND CONNECTOR (AIR FUEL RATIO SENSOR - ECM)
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- (a) Disconnect the air fuel ratio sensor connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-19 (A1A+) - C14-3 (A1A+)	Always	Below 1 Ω
A34-18 (A1A-) - C14-4 (A1A-)	Always	Below 1 Ω
A34-5 (HA1A) - C14-1 (HA1A)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-19 (A1A+) or C14-3 (A1A+) - Body ground	Always	10 kΩ or higher
A34-18 (A1A-) or C14-4 (A1A-) - Body ground	Always	10 kΩ or higher
A34-5 (HA1A) or C14-1 (HA1A) - Body ground	Always	10 kΩ or higher

**REPAIR OR REPLACE HARNESS OR
NG  CONNECTOR**

OK




2.	REPLACE AIR FUEL RATIO SENSOR
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- (a) Replace the air fuel ratio sensor **INFO** .

NEXT



3. CHECK WHETHER DTC OUTPUT RECURS (DTC P0131, P0132 OR P0134)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Drive the vehicle in accordance with the driving pattern described in the Confirmation Driving Pattern.
- (i) Enter the following menus: Powertrain / Engine / Utility / All Readiness.
- (j) Input the DTC: P0131, P0132 or P0134.
- (k) Check the DTC judgment.

Result

RESULT	PROCEED TO
NORMAL (DTC is not output)	A
ABNORMAL (DTC P0131, P0132 or P0134 is output)	B

B ► REPLACE ECM

A ► END

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WBYOGEX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0137,P0138,P013A,P013B,P013E,P013F,P0140: Oxygen Sensor Circuit Low Voltage (Bank 1 Sensor 2) (2013 FR-S)		

DTC	P0137	Oxygen Sensor Circuit Low Voltage (Bank 1 Sensor 2)
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DTC	P0138	Oxygen Sensor Circuit High Voltage (Bank 1 Sensor 2)
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DTC	P013A	Oxygen Sensor Slow Response - Rich to Lean Bank 1 Sensor 2
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DTC	P013B	O2 Sensor Slow Response - Lean to Rich (Bank 1 Sensor 2)
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DTC	P013E	O2 Sensor Delayed Response - Rich to Lean (Bank 1 Sensor 2)
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DTC	P013F	O2 Sensor Delayed Response - Lean to Rich (Bank 1 Sensor 2)
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DTC	P0140	Oxygen Sensor Circuit No Activity Detected (Bank 1 Sensor 2)
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DESCRIPTION

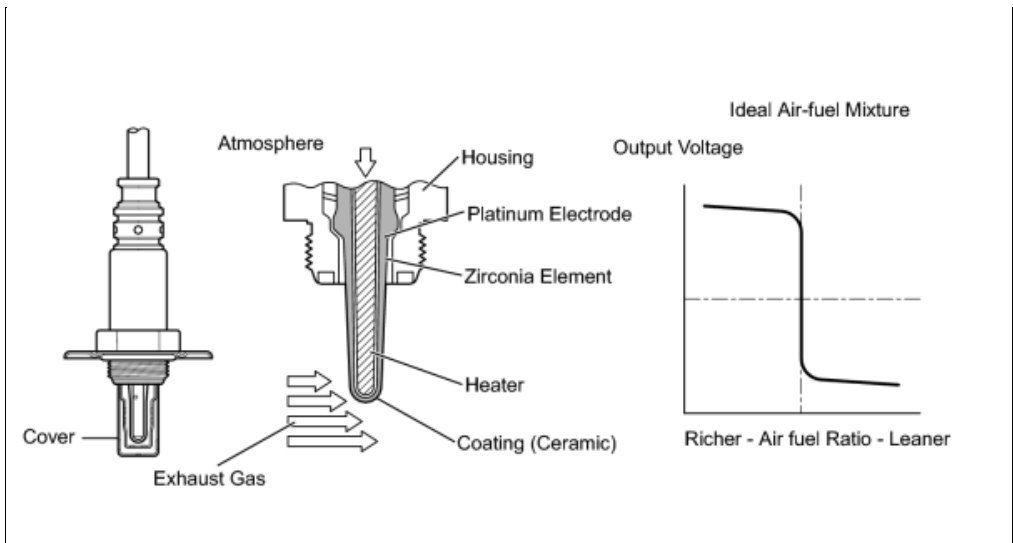
In order to obtain a high purification rate of the carbon monoxide (CO), hydrocarbon (HC) and nitrogen oxide (NOx) components in the exhaust gas, a TWC (Three-Way Catalytic Converter) is used. For the most efficient use of the TWC, the air fuel ratio must be precisely controlled so that it is always close to the stoichiometric air fuel level. For the purpose of helping the ECM to deliver accurate air fuel ratio control, a Heated Oxygen (HO2) sensor is used.

The HO2 sensor is located behind the TWC, and detects the oxygen concentration in the exhaust gas. Since the sensor is integrated with the heater that heats the sensing portion, it is possible to detect the oxygen concentration even when the intake air volume is low (the exhaust gas temperature is low).

When the air fuel ratio becomes lean, the oxygen concentration in the exhaust gas is rich. The HO2 sensor informs the ECM that the post-TWC air fuel ratio is lean (low voltage, i.e. less than 0.45 V).

Conversely, when the air fuel ratio is richer than the stoichiometric air fuel level, the oxygen concentration in the exhaust gas becomes lean. The HO2 sensor informs the ECM that the post-TWC air fuel ratio is rich (high voltage, i.e. more than 0.45 V). The HO2 sensor has the property of changing its output voltage drastically when the air fuel ratio is close to the stoichiometric level.

The ECM uses the supplementary information from the HO2 sensor to determine whether the air fuel ratio after the TWC is rich or lean, and adjusts the fuel injection time accordingly. Thus, if the HO2 sensor is working improperly due to internal malfunctions, the ECM is unable to compensate for deviations in the primary air fuel ratio control.

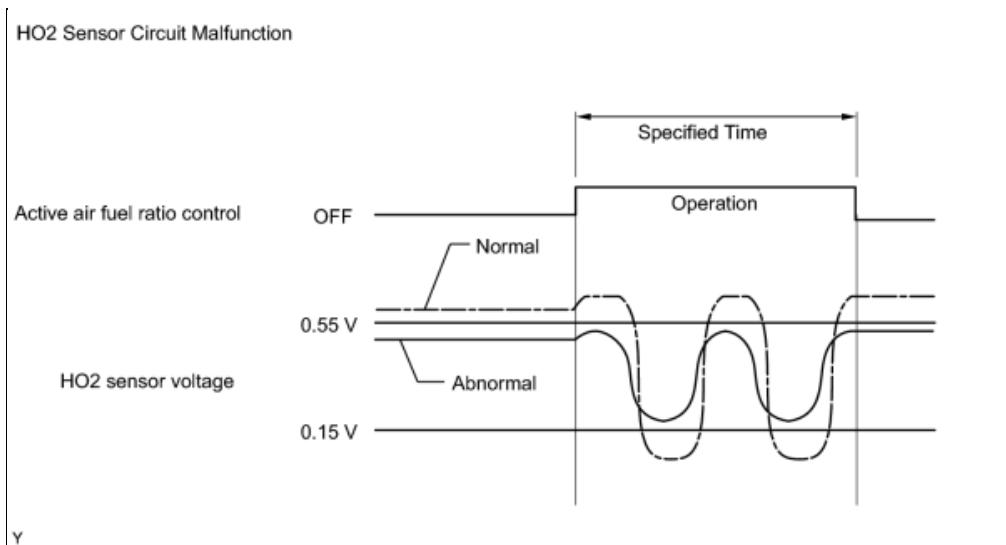


DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0137	Heated Oxygen (HO2) sensor voltage is less than 0.03 V. (2 trip detection logic)	<ul style="list-style-type: none"> • Heated oxygen sensor circuit • Heated oxygen sensor • Gas leak from exhaust system
P0138	Heated Oxygen (HO2) sensor voltage is 1.2 V or more for 2.5 seconds or more. (2 trip detection logic)	
P013A	The response rate for heated oxygen sensor voltage to change from 0.5 V (rich) to 0.2 V (lean) is slow for 2 seconds or more. (2 trip detection logic)	
P013B	The response rate for heated oxygen sensor voltage to change from 300 mV (lean) to 500 mV (rich) is slow for 4 seconds or more. (2 trip detection logic)	
P013E	Heated oxygen sensor voltage is slow in dropping to 0.5 V or less for 4 seconds or more. (2 trip detection logic)	
P013F	Heated oxygen sensor voltage is slow in increasing to 0.3V or more for 120 seconds. (2 trip detection logic)	
P0140	One of the following conditions is met for 180 seconds or more (2 trip detection logic): <ul style="list-style-type: none"> • The minimum voltage of heated oxygen sensor does not drop below 0.15 V. • The maximum voltage of heated oxygen sensor does not exceed 0.55 V. 	

MONITOR DESCRIPTION

1. Abnormal Voltage Output of Heated Oxygen (HO2) Sensor (DTC P013B, P013F or P0140)

If the sensor is not functioning properly, the voltage output variation is small. For example, when the HO2 sensor voltage does not decrease to less than 0.15 V and does not increase to more than 0.55 V, the ECM determines that the sensor voltage output is abnormal and stores DTC P013B, P013F or P0140.



2. Open in Heated Oxygen (HO2) Sensor Circuit (DTC P0137)

During active air fuel ratio control, the ECM calculates the Oxygen Storage Capacity (OSC)* of the Three-Way Catalytic Converter (TWC) by forcibly regulating the air fuel ratio to become rich or lean.

If the HO2 sensor has an open or short, or the voltage output of the sensor noticeably decreases, the OSC indicates an extraordinarily high value. Even if the ECM attempts to continue regulating the air fuel ratio to become rich or lean, the HO2 sensor output does not change.

While performing active air fuel ratio control, when the target air fuel ratio is rich and the HO2 sensor voltage output is 0.03 V or less (lean), the ECM interprets this as an abnormally low sensor output voltage and stores DTC P0137.

HINT:

*: The TWC has the capability to store oxygen. The OSC and the emission purification capacity of the TWC are mutually related. The ECM determines whether the catalyst has deteriorated, based on the calculated OSC value INFO.

3. Extremely High Output Voltage of Heated Oxygen (HO2) Sensor (DTC P0138)

The ECM continuously monitors the HO2 sensor output voltage while the engine is running.

DTC P0138 is stored if the HO2 sensor voltage output is more than 1.2 V.

4. Abnormal Voltage Output of Heated Oxygen (HO2) Sensor During Fuel-cut (DTC P013A or P013E)

The sensor output voltage drops to below 0.2 V (extremely lean status) immediately when the vehicle decelerates and fuel cut is operating. If the voltage does not drop to below 0.5 V for 4 seconds or more, or voltage does not drop from 0.5 V to 0.2 V, the ECM determines that the sensor response has deteriorated, illuminates the MIL and stores a DTC.

MONITOR STRATEGY

Related DTCs	P0137: Secondary oxygen sensor - A lack of circuit continuity output range check P0138: Secondary oxygen sensor - A lack of circuit continuity output range check P013A: Secondary oxygen sensor - Response rate functional check P013B: Secondary oxygen sensor - Response rate functional check P013E: Secondary oxygen sensor - Response rate functional check P013F: Secondary oxygen sensor - Response rate functional check P0140: Secondary oxygen sensor - Output voltage rationality check
Required Sensors/Components (Main)	Heated oxygen sensor
Required Sensors/Components (Related)	Crankshaft position sensor Engine coolant temperature sensor Mass air flow meter Throttle position sensor Air fuel ratio sensor
	Once per driving cycle: Active air fuel ratio control detection, heated oxygen sensor abnormal

Frequency of Operation	voltage during fuel cut. Continuous: Other
Duration	20 seconds: P0137 (Case 1) 40 seconds: P0137 (Case 2 and 3) 2.5 seconds: P0138 2 seconds: P013A 4 seconds: P013B, P013E 120 seconds: P013F 180 seconds: P0140
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

P0137 (Case 1)

Monitor runs whenever following DTC not stored	None
Fuel system	Closed loop
Short term fuel trim	0.7 to 1.35
Battery voltage	10.9 V or more
Intake air mass per second	10 g/sec

P0137 (Case 2)

Monitor runs whenever following DTC not stored	None
Fuel system	Closed loop
Short term fuel trim	0.7 to 1.35
Battery voltage	10.9 V or more
Intake air mass per second	10 g/sec
Continuous time of secondary oxygen sensor heating	30 seconds or more
Fuel shut-off	Not experienced

P0137 (Case 3)

Monitor runs whenever following DTC not stored	None
Fuel system	Closed loop
Short term fuel trim	0.7 to 1.35
Battery voltage	10.9 V or more
Intake air mass per second	10 g/sec
Continuous time of secondary oxygen sensor heating	30 seconds or more
Fuel shut-off	Experienced

P0138

Monitor runs whenever following DTC not stored	None
Fuel system	Closed loop
Short term fuel trim	0.7 to 1.35
Battery voltage	10.9 V or more

P013A

Monitor runs whenever following DTC not stored	None
Battery voltage	10.9 V or more

Fuel system	Closed loop
Integrated time of heated oxygen sensor heater operation	180 seconds or more
Engine speed when deceleration fuel cut starts	1000 rpm or higher
Heated oxygen sensor output voltage when fuel cut starts	0.55 V or more
Elapsed time for fuel cut	5 seconds or more
Engine coolant temperature when fuel cut starts	60°C (140°F) or higher
Estimated temperature of heated oxygen sensor element when fuel cut	500°C (932°F) or higher

P013B

Monitor runs whenever following DTC not stored	None
Battery voltage	10.9 V or more
Fuel system	Closed loop
Elapsed time for fuel cut	5 seconds or more
Fuel cut	Not active

P013E

Monitor runs whenever following DTC not stored	None
Battery voltage	10.9 V or more
Fuel system	Closed loop
Engine speed when deceleration fuel cut starts	1000 rpm or higher
Heated oxygen sensor output voltage when fuel cut starts	0.55 V or more
Elapsed time for fuel cut	5 seconds or more
Engine coolant temperature when fuel cut starts	60°C (140°F) or higher
Estimated temperature of heated oxygen sensor element when fuel cut	500°C (932°F) or higher
Air fuel ratio enrichment compensation	Not active

P013F

Monitor runs whenever following DTC not stored	None
Battery voltage	10.9 V or more
Fuel system	Closed loop
Engine speed when deceleration fuel cut finish	500 rpm or higher
Heated oxygen sensor output voltage when fuel cut finish	Less than 0.15 V
Elapsed time for fuel cut	5 seconds or more
Engine coolant temperature when fuel cut starts	60°C (140°F) or higher
Estimated temperature of heated oxygen sensor element when fuel cut	500°C (932°F) or higher
Fuel cut	Not active

P0140

Monitor runs whenever following DTCs not present	P0030 (Air fuel ratio sensor - heater) P0037, P0038 (Heated oxygen sensor - heater) P0068, P0107, P0108 (Manifold absolute pressure (MAP) sensor) P0101, P0102, P0103 (Mass air flow (MAF) sensor) P0111, P0112, P0113 (Intake air temperature (IAT) sensor) P0117, P0118 (Engine coolant temperature (ECT) sensor) P0122, P0123, P0222, P0223 (Throttle position sensor) P0300, P0301, P0302, P0303, P0304 (Misfire) P0604, P0605 (ROM in ECM)
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	P1160 (Throttle return spring) P2101, P2102 (Throttle actuator control motor) P2109 (Throttle position sensor minimum stop) P2119 (Throttle actuator control) P2122, P2123, P2127, P2128 (Accelerator pedal position sensor (APPS) circuit) P2135 (Throttle position sensor (TPS) correlation) P2195, P2196 (Air fuel ratio sensor - output voltage) P2138 (Accelerator pedal position sensor (APPS) correlation)
Engine coolant temperature	60°C (140°F) or higher
Target commanded output voltage of heated oxygen sensor	0.6 V or more
Intake air mass per second	10 g/sec or higher
Battery voltage	10.9 V or more
Fuel system status	Closed loop
All of the following conditions are experienced.	A, B and C
A. Time of fuel cut in deceleration	5 seconds or more
B. Engine speed	1000 rpm or higher
C. Short term fuel trim	0.7 to 1.35

TYPICAL MALFUNCTION THRESHOLDS

P0137

Minimum output voltage caused by a lack of circuit continuity	Less than 0.03 V
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P0138

Maximum output voltage caused by a lack of circuit continuity	1.2 V or more
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P013A

Response time from rich (0.5 V) to lean (0.2 V) if output voltage decrease from 0.55 V to 0.15 V	0.491 seconds or more
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P013B

Response time from lean (0.3 V) to rich (0.5 V) if output voltage increase from 0.25 V to 0.55 V	4 seconds or more
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P013E

Response time from fuel cut start to heated oxygen sensor output reaching 0.5 V	4 seconds or more
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P013F

Response time from fuel cut start to heated oxygen sensor output reaching 0.3 V	120 seconds or more (32 msec. X 3750 count)
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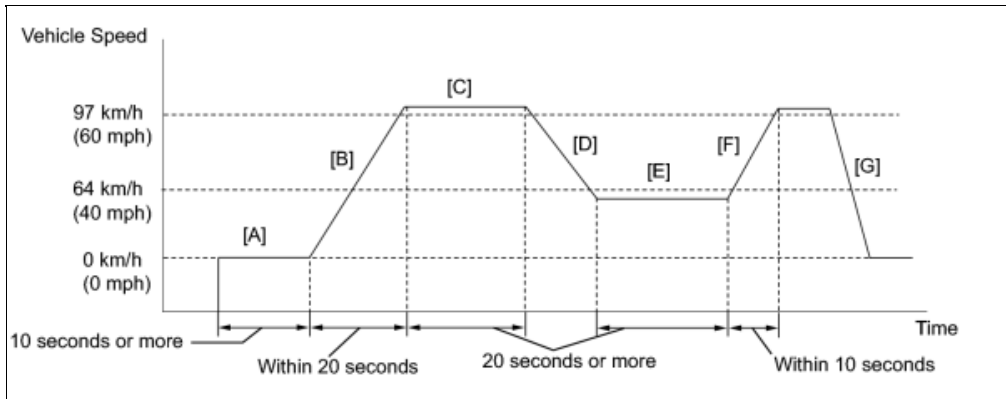
P0140

Either of the following condition is met:	A or B
A. Maximum output voltage	Less than 0.55 V
B. Minimum output voltage	0.15 V or more

MONITOR RESULT

Refer to Checking Monitor Status  .

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. Perform the following the confirmation driving pattern.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

- a. Idle the engine for 10 seconds or more [A].
- b. Accelerate the vehicle to 97 km/h (60 mph) or more within 20 seconds [B].
- c. Drive the vehicle at 97 km/h (60 mph) or more for 20 seconds or more [C].
- d. Release the accelerator pedal to Decelerate until the vehicle speed decreases to less than 64 km/h (40 mph) [D].

HINT:

Release the accelerator pedal fully to perform the fuel-cut.

- e. Drive the vehicle at 60 km/h (40 mph) or less for 20 seconds or more [E].
 - f. Accelerate the vehicle to 97 km/h (60 mph) or more within 10 seconds [F].
 - g. Release the accelerator pedal and stop the vehicle [G].
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
 9. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 11. Input the DTC: P0137, P0138 P13A, P013B, P013E, P013F or P0140.
 12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal
ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory

limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs

INFO

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM

Refer to DTC P0037 **INFO**

INSPECTION PROCEDURE

HINT:

Malfunctioning areas can be identified by performing the Control the Injection Volume function provided in the Active Test. The Control the Injection Volume function can help to determine whether the air fuel ratio sensor, heated oxygen sensor and other potential trouble areas are malfunctioning.

The following instructions describe how to conduct the Control the Injection Volume operation using the Techstream.

1. Connect the Techstream to the DLC3.
2. Start the engine.
3. Turn the Techstream on.
4. Warm up the engine at an engine speed of 2500 rpm for approximately 90 seconds.
5. Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Volume.
6. Perform the Active Test operation with the engine idling (press the RIGHT or LEFT button to change the fuel injection volume).
7. Monitor the output voltages of the air fuel ratio and heated oxygen sensors (AFS Voltage B1S1 and O2S B1S2) displayed on the Techstream.

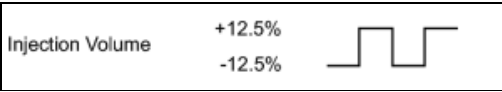

HINT:

- Change the fuel injection volume within the range of -12.5% to +12.5%. The injection volume can be changed in fine gradations.
- Each sensor reacts in accordance with increases and decreases in the fuel injection volume.

TECHSTREAM DISPLAY (SENSOR)	INJECTION VOLUME	STATUS	VOLTAGE
AFS Voltage B1S1 (Air fuel ratio)	+12.5%	Rich	Below 2.0 V
	-12.5%	Lean	Higher than 2.4 V
O2S B1S2 (Heated oxygen)	+12.5%	Rich	Higher than 0.55 V
	-12.5%	Lean	Below 0.4 V

NOTICE:

The air fuel ratio sensor has an output delay of a few seconds and the heated oxygen sensor has a maximum output delay of approximately 20 seconds.

CASE	AIR FUEL RATIO SENSOR OUTPUT VOLTAGE	HEATED OXYGEN SENSOR OUTPUT VOLTAGE	MAIN SUSPECTED TROUBLE AREA
1			-

	<p>Output Voltage</p> <p>Higher than 2.4 V</p> <p>Below 2.0 V</p>	<p>Output Voltage</p> <p>Higher than 0.55 V</p> <p>Below 0.4 V</p>	
2	<p>Injection Volume</p> <p>+12.5%</p> <p>-12.5%</p>	<p>Injection Volume</p> <p>+12.5%</p> <p>-12.5%</p>	<ul style="list-style-type: none"> • Air fuel ratio sensor • Air fuel ratio sensor heater • Air fuel ratio sensor circuit
	<p>Output Voltage</p> <p>Almost no reaction</p> <p>NG</p>	<p>Output Voltage</p> <p>Higher than 0.55 V</p> <p>Below 0.4 V</p>	
3	<p>Injection Volume</p> <p>+12.5%</p> <p>-12.5%</p>	<p>Injection Volume</p> <p>+12.5%</p> <p>-12.5%</p>	<ul style="list-style-type: none"> • Heated oxygen sensor • Heated oxygen sensor heater • Heated oxygen sensor circuit
	<p>Output Voltage</p> <p>Higher than 2.4 V</p> <p>Below 2.0 V</p>	<p>Output Voltage</p> <p>Almost no reaction</p> <p>NG</p>	
4	<p>Injection Volume</p> <p>+12.5%</p> <p>-12.5%</p>	<p>Injection Volume</p> <p>+12.5%</p> <p>-12.5%</p>	<ul style="list-style-type: none"> • Fuel injector assembly • Fuel pressure • Gas leak from exhaust system (air fuel ratio extremely rich or lean)
	<p>Output Voltage</p> <p>Almost no reaction</p> <p>NG</p>	<p>Output Voltage</p> <p>Almost no reaction</p> <p>NG</p>	

- Following the Control the Injection Volume procedure enables technicians to check and graph the voltage outputs of both the air fuel ratio and heated oxygen sensors.
- To display the graph, enter the following menus: Powertrain / Engine / Active Test / Control the Injection Volume / AFS Voltage B1S1 and O2S B1S2; and then press the graph button on the Data List view.

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

- Sensor 1 refers to the sensor closest to the engine assembly.
- Sensor 2 refers to the sensor farthest away from the engine assembly.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

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1. READ OUTPUT DTC (DTC P0137, P0138, P013A, P013B, P013E, P013F AND P0140)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Read DTCs.

Result

RESULT	PROCEED TO
P0137, P0138, P013A, P013B, P013E, P013F or P0140 is output	A
P0137, P0138, P013A, P013B, P013E, P013F or P0140 and other DTCs are output	B

HINT:

If any DTCs other than P0136, P0137, P0138 or P0139 are output, troubleshoot those DTCs first.

B  **GO TO DTC CHART**

A

**2. PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE INJECTION VOLUME)**

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Warm up the engine.
- (e) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Volume.
- (f) Change the fuel injection volume using the Techstream, and monitoring the voltage output of heated oxygen sensors displayed on the Techstream.
- (g) Read the heated oxygen (HO2) sensor output voltage while idling.

HINT:

- Change the fuel injection volume within the range of - 12.5% and +12.5%.
- The heated oxygen sensor is displayed as O2S B1S2, on the Techstream.
- The heated oxygen sensor has a maximum output delay of approximately 20 seconds.
- If the sensor output voltage does not change (almost no reaction) while performing the Active Test, the sensor may be malfunctioning.

Standard:

The heated oxygen (HO2) sensor output voltage alternates between more than 0.55 V and less than 0.4 V.

NG  **CHECK FOR EXHAUST GAS LEAK**

OK



3. PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE INJECTION VOLUME)

- Connect the Techstream to the DLC3.
- Start the engine.
- Turn the Techstream on.
- Warm up the engine.
- Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Volume.
- Change the fuel injection volume using the Techstream and monitor the voltage output of the air fuel ratio and heated oxygen sensors displayed on the Techstream.

HINT:

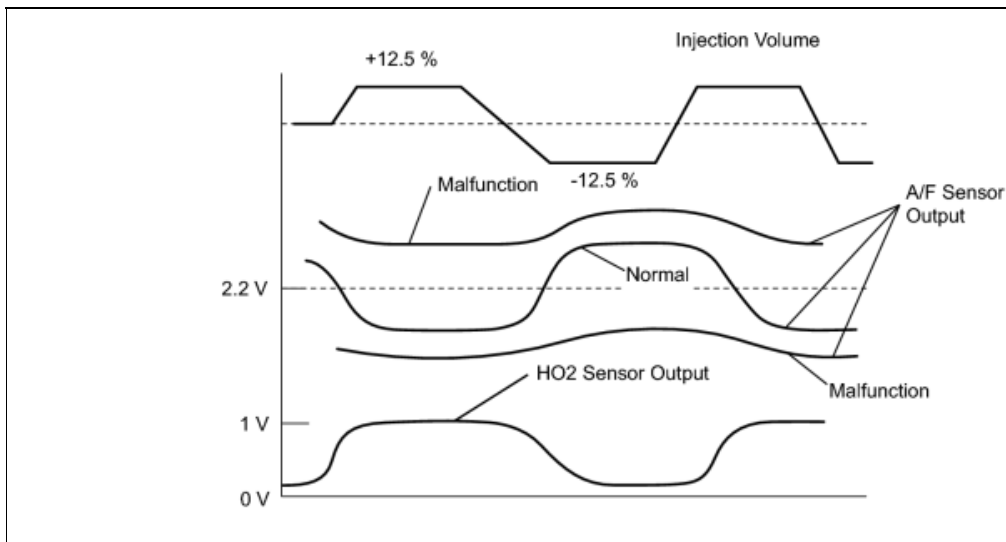
- Change the fuel injection volume within the range of -12% and +12%. The injection volume can be changed in fine gradations within the range.
- The air fuel ratio sensor is displayed as AFS Voltage B1S1, and the heated oxygen sensor is displayed as O2S B1S2, on the Techstream.
- The air fuel ratio sensor has an output delay of a few seconds and the heated oxygen sensor has a maximum output delay of approximately 20 seconds.
- If the sensor output voltage does not change (almost no reaction) while performing the Active Test, the sensor may be malfunctioning.

Result

TECHSTREAM DISPLAY (SENSOR)	VOLTAGE VARIATION	PROCEED TO
AFS Voltage B1S1 (A/F)	Alternates between more and less than 2.2 V	OK
	Remains at more than 2.2 V	NG
	Remains at less than 2.2 V	NG

HINT:

A normal heated oxygen sensor voltage (O2S B1S2) reacts in accordance with increases and decreases in fuel injection volumes. When the air fuel ratio sensor voltage remains at either less or more than 2.2 V despite the heated oxygen sensor indicating a normal reaction, the air fuel ratio sensor is malfunctioning.



NG ▶ REPLACE HEATED OXYGEN SENSOR

OK ▶ CHECK ENGINE TO DETERMINE CAUSE OF EXTREMELY RICH OR LEAN ACTUAL AIR FUEL RATIO (FUEL INJECTOR, FUEL SYSTEM, INTAKE SYSTEM, ETC.)

4. CHECK FOR EXHAUST GAS LEAK

(a) Inspect for exhaust gas leaks from the exhaust manifold sub-assembly and exhaust pipes.


OK:
No gas leakage.

NG ▶ REPAIR OR REPLACE EXHAUST GAS LEAK POINT

OK



5. INSPECT HEATED OXYGEN SENSOR (HEATER RESISTANCE)

(a) Inspect the heated oxygen sensor  .

NG ▶ REPLACE HEATED OXYGEN SENSOR

OK



6. CHECK HARNESS AND CONNECTOR (HEATED OXYGEN SENSOR - ECM)

(a) Disconnect the heated oxygen sensor connector.

(b) Disconnect the ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-6 (HT1B) - C13-1 (HT1B)	Always	Below 1 Ω
A34-21 (OX1B) - C13-3 (OX1B)	Always	Below 1 Ω
A36-29 (E1) - C13-4 (E2)	Always	Below 1 Ω

Standard Resistance (Check for short):


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-6 (HT1B) or C13-1 (HT1B) - Body ground	Always	10 k Ω or higher
A34-21 (OX1B) or C13-3 (OX1B) - Body ground	Always	10 k Ω or higher
A36-29 (E1) or C13-4 (E2) - Body ground	Always	10 k Ω or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK




7. REPLACE HEATED OXYGEN SENSOR

(a) Replace the heated oxygen sensor  .

NEXT



8. CHECK WHETHER DTC OUTPUT RECURS (P0137, P0138, P013A, P013B, P013E, P013F OR P0140)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine and warm it up.
- (i) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (j) Enter the following menus: Powertrain / Engine / Utility / All Readiness.
- (k) Input the DTC: P0137, P0138, P013A, P013B, P013E, P013F or P0140.
- (l) Check the DTC judgment result.


Result

RESULT	PROCEED TO
NORMAL (DTC is not output)	A
ABNORMAL (DTC P0137, P0138, P013A, P013B, P013E, P013F or P0140 is output)	B

B  **REPLACE AIR FUEL RATIO SENSOR**

A  **END**

9. REPLACE HEATED OXYGEN SENSOR

(a) Replace the heated oxygen sensor  .

NEXT



10. CHECK WHETHER DTC OUTPUT RECURS (P0137, P0138, P013A, P013B, P013E, P013F OR P0140)

(a) Connect the Techstream to the DLC3.

- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs INFO.
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine and warm it up.
- (i) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (j) Enter the following menus: Powertrain / Engine / Utility / All Readiness.
- (k) Input the DTC: P0137, P0138, P013A, P013B, P013E, P013F or P0140.
- (l) Check the DTC judgment result.

Result

RESULT	PROCEED TO
NORMAL (DTC is not output)	A
ABNORMAL (DTC P0137, P0138, P013A, P013B, P013E, P013F or P0140 is output)	B

B ▶ REPLACE HEATED OXYGEN SENSOR

A ▶ END

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WC30M6X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0171,P0172,P1170,P117B: System Too Lean (Bank 1) (2013 FR-S)		

DTC	P0171	System Too Lean (Bank 1)
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DTC	P0172	System Too Rich (Bank 1)
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DTC	P1170	Port Injector Fuel Performance
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DTC	P117B	Direct Injector Fuel Performance
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DESCRIPTION

The fuel trim is related to the feedback compensation value, not to the basic injection time. The fuel trim consists of both the short-term and the long-term fuel trim.

The short-term fuel trim is fuel compensation that is used to constantly maintain the air fuel ratio at stoichiometric levels. The signal from the air fuel ratio sensor indicates whether the air fuel ratio is rich or lean compared to the stoichiometric ratio. This triggers a reduction in the fuel injection volume if the air fuel ratio is rich and an increase in the fuel injection volume if it is lean.

Factors such as individual engine differences, wear over time and changes in operating environment cause short-term fuel trim to vary from the ideal theoretical value. The long-term fuel trim controls overall fuel compensation. The long-term fuel trim compensates for long term deviations of the fuel trim from the ideal theoretical value. These long term deviations result from the corrections made by the short-term fuel trim.

If both the short-term fuel and long-term fuel trim are lean or rich beyond predetermined values, it is interpreted as a malfunction, the ECM illuminates the MIL and sets a DTC.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0171	With warm engine and stable air fuel ratio feedback, fuel trim considerably in error to lean side. (2 trip detection logic)	<ul style="list-style-type: none"> • Intake system • Fuel injector assembly (for port injection) • Fuel injector assembly (for direct injection) • Mass air flow meter • Engine coolant temperature sensor • Fuel pressure • Gas leaks from exhaust system • Open or short in air fuel ratio sensor circuit • Air fuel ratio sensor • PCV valve and hose • PCV hose connections • ECM • Wire harness or connector
		<ul style="list-style-type: none"> • Mass air flow meter • Engine coolant temperature sensor • Fuel injector assembly (for port injection)

P0172	With warm engine and stable air fuel ratio feedback, fuel trim considerably in error to rich side. (2 trip detection logic)	<ul style="list-style-type: none"> Fuel injector assembly (for direct injection) Ignition system Fuel pressure Gas leaks from exhaust system Open or short in air fuel ratio sensor circuit Air fuel ratio sensor ECM Wire harness or connector
P1170	Although a DTC is stored for a rich or lean condition, the amount of fuel trim during direct injection is normal for 9 seconds. (1 trip detection logic)	<ul style="list-style-type: none"> Fuel injector assembly (for port injection) Fuel pressure ECM
P117B	Although a DTC is stored for a rich or lean condition, the amount of fuel trim during port injection is normal for 9 seconds. (1 trip detection logic)	<ul style="list-style-type: none"> Fuel injector assembly (for direct injection) Fuel pressure ECM

HINT:

- When DTC P0171 is set, the actual air-fuel ratio is on the lean side. When DTC P0172 is set, the actual air-fuel ratio is on the rich side.
- If the vehicle runs out of fuel, the air-fuel ratio is lean and DTC P0171 may be set. The MIL is then illuminated.
- When DTC P1170 or P117B is output, it may not be possible to precisely determine whether the port injection or the direct injection is malfunctioning, depending on the conditions. In this case, perform an Active Test (control the injection way) to determine which injection system is malfunctioning.

MONITOR DESCRIPTION

Under closed loop fuel control, fuel injection volumes that deviate from those estimated by the ECM cause changes in the long-term fuel trim compensation value. The long-term fuel trim is adjusted when there are persistent deviations in the short-term fuel trim values. Deviations from the ECM's estimated fuel injection volumes also affect the average fuel trim learning value, which is a combination of the average short-term fuel trim (fuel feedback compensation value) and the average long-term fuel trim (learning value of the air fuel ratio). If the average fuel trim learning value exceeds the malfunction threshold, the ECM interprets this as a malfunction in the fuel system and sets a DTC.

MONITOR STRATEGY

Related DTCs	P0171: Fuel system main feedback control functional check (System too lean) P0172: Fuel system main feedback control functional check (System too rich) P1170: Fuel system main feedback control functional check (Direct injection fail) P117B: Fuel system main feedback control functional check (Port injection fail)
Required Sensors/Components (Main)	Fuel system
Required Sensors/Components (Related)	Air fuel ratio sensor Mass air flow meter Crankshaft position sensor
Frequency of Operation	Continuous
Duration	9 seconds X 3 times: P0171 and P0172 9 seconds: P1170 and P117B
MIL Operation	2 driving cycles: P0171 and P0172 Immediately: P1170 and P117B
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs not present	P0030 (Air fuel ratio sensor - heater) P0068, P0107, P0108 (Manifold absolute pressure (MAP) sensor) P0102, P0103 (Mass air flow (MAF) sensor) P0111, P0112, P0113 (Intake air temperature (IAT) sensor) P0117, P0118 (Engine coolant temperature (ECT) sensor) P0122, P0123, P0222, P0223 (Throttle position sensor) P0300, P0301, P0302, P0303, P0304 (Misfire) P0458, P0459 (Solenoid valve for purge control) P0461, P0462, P0463 (Fuel level sensor (FL)) P0604, P0605 (ROM in ECM) P1160 (Throttle return spring) P2101, P2102 (Throttle actuator control motor) P2109 (Throttle position sensor minimum stop) P2119 (Throttle actuator control) P2122, P2123, P2127, P2128 (Accelerator pedal position sensor (APPS) circuit) P2135 (Throttle position sensor (TPS) correlation) P2138 (Accelerator pedal position sensor (APPS) correlation) P2195, P2196 (Air fuel ratio sensor - output voltage)
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P0171

Fuel system status	Closed loop
Engine coolant temperature	40°C (104°F) or higher
Intake air mass per revolution	More than 0.12 g/rev (varies with engine speed)
Change of intake air mass during 1/2 engine rev.	0.02 g/rev or less
Oil attenuation	Not determined

P0172

Fuel system status	Closed loop
Engine coolant temperature	40°C (104°F) or higher
Intake air mass per revolution	More than 0.12 g/rev (varies with engine speed)
Change of intake air mass during 1/2 engine rev.	0.02 g/rev or less
Oil attenuation	Not determined
Learning value of EVAP density during purge	Less than 0.2
Integrated time of canister purge after engine start	20 seconds or more

P1170

Enable condition to detect malfunction in P0171 or P0172	Satisfied
P0171 or P0172 malfunction	Detected
Direct injection ratio	100%

P117B

Enable condition to detect malfunction in P0171 or P0172	Satisfied
P0171 or P0172 malfunction	Detected
Port injection ratio	100%

TYPICAL MALFUNCTION THRESHOLDS**P0171**

Diagnostic value [Air fuel ratio sensor short term fuel trim + air fuel ratio sensor long term	30% or higher (varies with intake
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fuel trim + (measured lambda - target lambda)]

air mass per second)

P0172

Diagnostic value [Air fuel ratio sensor short term fuel trim + air fuel ratio sensor long term fuel trim + (measured lambda - target lambda)]

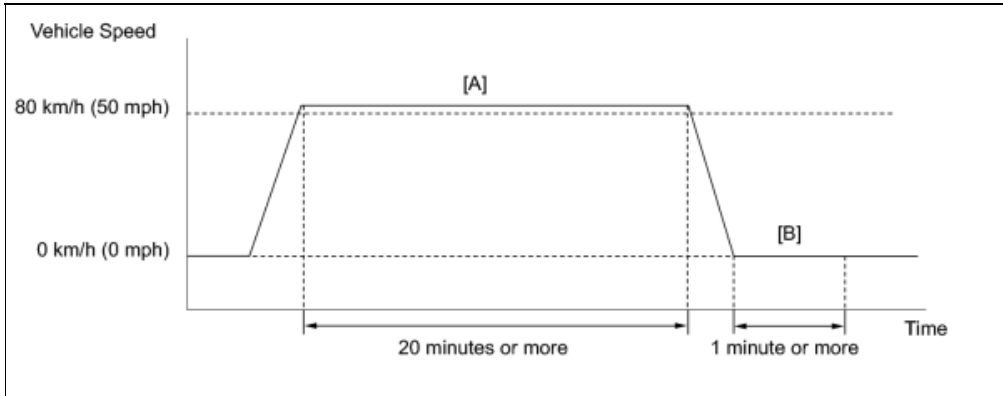
Less than -30% (varies with intake air mass per second)

P1170, P117B

Diagnostic value [Air fuel ratio sensor short term fuel trim + air fuel ratio sensor long term fuel trim + (measured lambda - target lambda)]

Less than 15% or higher than -15%

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.

HINT:

Check the engine coolant temperature is 20°C (68°F) or less at engine started.

7. Perform the following the confirmation driving pattern.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

- a. Drive the vehicle at 80 km/h (50 mph) or more for 20 minutes or more [A].
- b. Stop the vehicle.
- c. Idle the engine for 1 minute or more [B].
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
9. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 11. Input the DTC: P0171, P0172, P1170 or P117B.
 12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal

ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs

INFO

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

INSPECTION PROCEDURE

HINT:

Malfunctioning areas can be identified by performing the Control the Injection Volume for A/F Sensor function provided in the Active Test. The Control the Injection Volume for A/F Sensor function can help to determine whether the air fuel ratio sensor, heated oxygen sensor and other potential trouble areas are malfunctioning.

The following instructions describe how to conduct the Control the Injection Volume for A/F Sensor operation using the Techstream.

1. Connect the Techstream to the DLC3.
2. Start the engine.
3. Turn the Techstream on.
4. Warm up the engine at an engine speed of 2500 rpm for approximately 90 seconds.
5. Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Volume for A/F Sensor / Gas AF Control / AFS Voltage B1S1 and O2S B1S2.
6. Perform the Active Test operation with the engine idling (press the RIGHT or LEFT button to change the fuel injection volume).
7. Monitor the output voltages of the air fuel ratio and heated oxygen sensors (AFS Voltage B1S1 and O2S B1S2) displayed on the Techstream.

HINT:


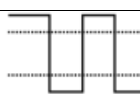

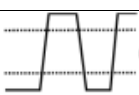

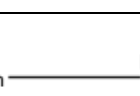

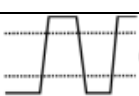



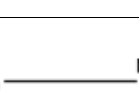

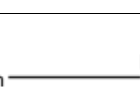

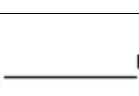
- Change the fuel injection volume within the range of -12.5% to +12.5%.
- Each sensor reacts in accordance with increases and decreases in the fuel injection volume.

TECHSTREAM DISPLAY (SENSOR)	INJECTION VOLUME	STATUS	VOLTAGE
AFS Voltage B1S1 (Air fuel ratio)	+12.5%	Rich	Below 2.0 V
	-12.5%	Lean	Higher than 2.4 V
O2S B1S2 (Heated oxygen)	+12.5%	Rich	Higher than 0.55 V
	-12.5%	Lean	Below 0.4 V

NOTICE:

The air fuel ratio sensor has an output delay of a few seconds and the heated oxygen sensor has a maximum output delay of approximately 20 seconds.

CASE	AIR FUEL RATIO SENSOR (SENSOR 1) OUTPUT VOLTAGE	HEATED OXYGEN SENSOR (SENSOR 2) OUTPUT VOLTAGE	MAIN SUSPECTED TROUBLE AREA

1	<p>Injection Volume +12.5% -12.5%</p>  <p>Output Voltage Higher than 2.4 V Below 2.0 V</p> 	<p>Injection Volume +12.5% -12.5%</p>  <p>Output Voltage Higher than 0.55 V Below 0.4 V</p> 	-
2	<p>Injection Volume +12.5% -12.5%</p>  <p>Output Voltage Almost no reaction NG</p> 	<p>Injection Volume +12.5% -12.5%</p>  <p>Output Voltage Higher than 0.55 V Below 0.4 V</p> 	<ul style="list-style-type: none"> • Air fuel ratio sensor • Air fuel ratio sensor heater • Air fuel ratio sensor circuit
3	<p>Injection Volume +12.5% -12.5%</p>  <p>Output Voltage Higher than 2.4 V Below 2.0 V</p> 	<p>Injection Volume +12.5% -12.5%</p>  <p>Output Voltage Almost no reaction NG</p> 	<ul style="list-style-type: none"> • Heated oxygen sensor • Heated oxygen sensor heater • Heated oxygen sensor circuit
4	<p>Injection Volume +12.5% -12.5%</p>  <p>Output Voltage Almost no reaction NG</p> 	<p>Injection Volume +12.5% -12.5%</p>  <p>Output Voltage Almost no reaction NG</p> 	<ul style="list-style-type: none"> • Fuel injector assembly • Fuel pressure • Gas leak from exhaust system (Air fuel ratio extremely rich or lean)

- Following the Control the Injection Volume for A/F Sensor procedure enables technicians to check and graph the voltage outputs of both the air fuel ratio and heated oxygen sensors.
- To display the graph, enter the following menus: Powertrain / Engine / Active Test / Control the Injection Volume for A/F Sensor / Gas AF Control / AFS Voltage B1S1 and O2S B1S2; and then press the graph button on the Data List view.

HINT:

- Bank 1 refers to the bank that includes the No. 1 cylinder*.

*: The No. 1 cylinder is the cylinder which is farthest from transmission.

- Bank 2 refers to the bank that does not include the No. 1 cylinder.
- Sensor 1 refers to the sensor closest to the engine assembly.
- Sensor 2 refers to the sensor farthest away from the engine assembly.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame

data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was moving or stationary, whether the engine was warmed up or not, whether the air fuel ratio was lean or rich, as well as other data recorded at the time of a malfunction.

- A low air fuel ratio sensor voltage could be caused by a rich air fuel mixture. Check for conditions that would cause the engine to run rich.
- A high air fuel ratio sensor voltage could be caused by a lean air fuel mixture. Check for conditions that would cause the engine to run lean.

PROCEDURE

1. CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0171, P0172, P1170 AND/OR P117B)

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Trouble Codes.
- Read the DTCs.

Result:

RESULT	PROCEED TO
P0171, P0172, P1170 or P117B	A
P0171, P0172, P1170 and/or P117B and other DTCs	B

HINT:

If any DTCs other than P0171, P0172, P1170 or P117B are output, troubleshoot those DTCs first.

B  [GO TO DTC CHART](#)

A



2. PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE INJECTION VOLUME FOR A/F SENSOR)

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn Techstream on.
- Warm up the engine and run the engine at an engine speed of 2500 rpm for approximately 90 seconds.
- Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Volume for A/F Sensor / AFS Voltage B1S1 and O2S B1S2.
- Perform the Control the Injection Volume for A/F Sensor operation with the engine in an idling.
- Monitor the output voltages of the A/F and HO2 sensors (AFS Voltage B1S1 and O2S B1S2) displayed on the Techstream.

HINT:

- Change the fuel injection volume within the range of -12.5% to 12.5%.
- The air fuel ratio sensor has an output delay of a few seconds and the heated oxygen sensor has a maximum output delay of approximately 20 seconds.
- If the sensor output voltage does not change (almost no reaction) while performing the Active Test, the sensor may be malfunctioning.

TECHSTREAM DISPLAY (SENSOR)	INJECTION VOLUME	STATUS	VOLTAGE
AFS Voltage B1S1 (A/F)	12.5%	Rich	Less than 2.0 V
	-12.5%	Lean	More than 2.4 V
O2S B1S2 (HO2)	12.5%	Rich	More than 0.55 V
	-12.5%	Lean	Less than 0.4 V

Result:

STATUS AFS VOLTAGE B1S1	STATUS O2S B1S2	A/F CONDITION AND A/F SENSOR CONDITION	SUSPECTED TROUBLE AREA	PROCEED TO
Lean/Rich	Lean/Rich	Normal	-	A
Lean	Lean	Actual air-fuel ratio lean	<ul style="list-style-type: none"> Ventilation valve and hose Ventilation hose connections Injector for port injection Gas leakage from exhaust system Air induction system Fuel pressure Mass Air Flow (MAF) meter Engine Coolant Temperature (ECT) sensor 	A
Rich	Rich	Actual air-fuel ratio rich	<ul style="list-style-type: none"> Gas leakage from exhaust system Ignition system Fuel pressure Mass air flow (MAF) meter Engine coolant temperature (ECT) sensor 	A
Lean	Lean/Rich	A/F sensor malfunction	<ul style="list-style-type: none"> Air fuel ratio sensor 	B
Rich	Lean/Rich	A/F sensor malfunction	<ul style="list-style-type: none"> Air fuel ratio sensor 	B

Lean: During the Control the Injection Volume for A/F Sensor Active Test, the air fuel ratio sensor output voltage (AFS Voltage) is consistently higher than 2.4 V, and the heated oxygen sensor output voltage (O2S) is consistently below 0.4 V.

Rich: During the Control the Injection Volume for A/F Sensor Active Test, the AFS Voltage is consistently below 2.0 V, and the O2S is consistently higher than 0.55 V.

Lean/Rich: During the Control the Injection Volume for A/F Sensor Active Test, the output voltage of the heated oxygen sensor alternates correctly.

HINT:

Refer to "Data List / Active Test" [AFS Voltage B1S1 and O2S B1S2]  .

B  **INSPECT AIR FUEL RATIO SENSOR**

A



3.	CHECK FREEZE FRAME DATA
-----------	--------------------------------

(a) Check freeze frame data, and understand the status of vehicles when abnormalities occur.

HINT:

- The 5 separate sets of freeze frame data can be used to check the engine status before and after storing of the DTC.

- Use freeze frame data to check if the engine was idling or running.

FREEZE FRAME DATA

Engine Speed	Fuel System Status #1	O2S B1S2
Calculate Load	Short FT #1	Evap Purge Flow
Vehicle Speed	Long FT #1	Shift Position Sig from ECT
MAF	AFS Voltage B1S1	Coolant Temp

NEXT



4.	CHECK VEHICLE CONDITION
-----------	--------------------------------

HINT:

When checking trouble during abnormal status, use the following procedure.

(a) Remove the EFI (+B) fuse, wait 60 seconds or more, and connect the fuse.

HINT:

- Clear the ECM feedback learning value.
- After clearing the DTC, initial diagnosis of the electronically controlled throttle is performed. Accordingly, engine start after clearing DTC takes place 10 seconds or more after turning the ignition switch ON.

(b) Connect the Techstream to the DLC3.

(c) Turn the ignition switch to ON.

(d) Turn Techstream on.

(e) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Volume.

(f) Increase or decrease injection quantities by 1 step.

HINT:

This operation stops feedback compensation and feedback learning, enabling checking of trouble.

(g) Start the engine.

(h) Refer to the running state freeze frame data, reproduce the conditions in which the abnormality occurred, and check the trouble.

Result:

RESULT	PROCEED TO
Trouble can be confirmed.	A
Trouble cannot be confirmed.	B

B **READ VALUE USING TECHSTREAM (SHORT FT #1 AND LONG FT #1)**

A




5.	CHECK VEHICLE CONDITION
-----------	--------------------------------

(a) Specify the location of the trouble from the following, then conduct inspections and replacements.

NOTICE:

If only the check light is lit, and it is not possible to specify the location of the trouble, then go to step 3.

TROUBLE AREA	SYMPTOM	CAUSE	TROUBLESHOOTING	DIAGNOSTIC NOTE
Mass air flow meter	<ul style="list-style-type: none"> • Rough idling • Pausing at start-up • MIL lights up only. 	Deviation in characteristic of the mass air flow meter	Refer to INFO .	-
Fuel injector assembly (for port injection or direct injection)	MIL lights up only.	Fuel injector assembly blockage	<ul style="list-style-type: none"> • Refer to INFO for port injection. • Refer to INFO for direct injection. 	<ul style="list-style-type: none"> • Very long unattended idle time • Long running distance • Long-term usage of regular gasoline <p>From the vehicle usage conditions above, there may be a blockage in the fuel injector assembly. During driving, the MIL lights up often.</p>
	<ul style="list-style-type: none"> • Engine stalls when the vehicle stops (restart is possible). • MIL lights up only. 	Problem with oil-tightness in fuel injector assembly	<ul style="list-style-type: none"> • Refer to INFO for port injection. • Refer to INFO for direct injection. 	<ul style="list-style-type: none"> • Problem with oil-tightness results in a rich side abnormality • If a high concentration of HC within the intake manifold after the engine stopped, this results in a rich side abnormality. • From scorching on the spark plug, there may be a fuel system abnormality. • DTC P0088 may have been stored.
Fuel pump assembly	<ul style="list-style-type: none"> • Engine stall • Poor acceleration 	<ul style="list-style-type: none"> • Fuel pump assembly malfunction • Low pressure side fuel pressure abnormality • Low pressure side fuel system blockage 	<ul style="list-style-type: none"> • Refer to INFO for fuel pump control circuit (low pressure side). • Refer to INFO for fuel pressure (low pressure side). 	-
		Air sucked in from the intake manifold	Check intake manifold gasket	-

Intake system	<ul style="list-style-type: none"> • Rough idling • MIL lights up only. 	gasket.	inspection.	
		<ul style="list-style-type: none"> • Damage to intake system hoses • Continuous the purge VSV stuck on 	Start the engine, and in idle condition block off individual hoses connected to the intake manifold, and check that the fuel compensation quantity (total of feedback compensated value and feedback learning value) decreases.	If air is being drawn into the hose, the fuel compensation quantity (total of feedback compensated value and feedback learning value) is large, and this drops with a racing condition.
Air fuel ratio sensor	Rough idling	Air fuel ratio sensor malfunction	Refer to  .	Air fuel ratio sensor system DTC may be stored.

(b) After the trouble area is repaired, Check that the trouble symptom is resolved.

Result

RESULT	PROCEED TO
Trouble symptom resolved	A
Trouble symptom not resolved	B

B  **READ VALUE USING TECHSTREAM (SHORT FT #1 AND LONG FT #1)**

A



6.	CLEAR DTC
-----------	------------------

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Clear the DTCs  .

NEXT



7.	READ VALUE USING TECHSTREAM (SHORT FT #1 AND LONG FT #1)
-----------	---

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Start the engine.

(e) Enter the following menus: Powertrain / Engine / Data List / Short #1, Long FT #1.

(f) Read the value Short #1 and Long FT #1.

Result:

TECHSTREAM DISPLAY	CONDITION	SPECIFIED CONDITION

Short FT #1 + Long FT #1	Vehicle condition when the malfunction occurs (Idling or driving)	-20% to +20%
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HINT:

If the trouble occurs during high speed driving, it is possible to take measurements at medium or low speeds by matching the intake air volume to that at the time of the trouble by shifting down.

NG ► **READ VALUE USING TECHSTREAM (SHORT FT #1 AND LONG FT #1)**

OK



8.	CHECK VEHICLE CONDITION
-----------	--------------------------------

(a) Check the diagnostic table and freeze frame data again, and if there is no abnormality, finish operations.

HINT:

- In the event of running out of gas, the fuel compensation quantity will increase by +35% or more, and if this continues for 2 trips, this is a lean abnormality, and P0171 may be stored.
- Repeated short trips (a short time between the ignition switch ON and turning it off or short distance driving) result in gasoline vaporizing at subsequent engine warm-up, and P0172 as a result of increased blow-by gas may be stored.

NEXT ► **END**

9.	READ VALUE USING TECHSTREAM (SHORT FT #1 AND LONG FT #1)
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(a) Connect the Techstream to the DLC3.

(b) Start the engine.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Way / Port.

(e) Read the value Short FT #1 and Long FT #1.

Standard:

TECHSTREAM DISPLAY	CONDITION	SPECIFIED CONDITION
Short FT #1 + Long FT #1	Idling	-20% to +20%

(f) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Way / Direct.

(g) Read the value Short FT #1 and Long FT #1.

Standard:

TECHSTREAM DISPLAY	CONDITION	SPECIFIED CONDITION
Short FT #1 + Long FT #1	Idling	-20% to +20%

Result:

CONTROL THE INJECTION WAY		PROCEED TO
PORT	DIRECT	
OK	OK	A
OK	NG	B

NG	OK	C
NG	NG	D

B ▶ READ VALUE USING TECHSTREAM (FUEL PRESS)

C ▶ INSPECT FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)

D ▶ CHECK EMISSION CONTROL SYSTEM

A
▼

10.	CHECK VEHICLE CONDITION
------------	--------------------------------

(a) Check the diagnostic table and freeze frame data again, and if there is no abnormality, finish operations.

HINT:

- In the event of running out of gas, the fuel compensation quantity will increase by +35% or more, and if this continues for 2 trips, this is a lean abnormality, and P0171 may be stored.
- Repeated short trips (a short time between turning the ignition switch ON and turning it off or short distance driving) result in gasoline vaporizing at subsequent engine warm-up, and P0172 as a result of increased blow-by gas may be stored.

NEXT ▶ END

11.	CHECK EMISSION CONTROL SYSTEM
------------	--------------------------------------

(a) Check emission control system INFO.

NG ▶ REPAIR OR REPLACE EMISSION CONTROL SYSTEM

OK
▼

12.	CHECK INTAKE SYSTEM
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(a) Check the intake system for vacuum leaks INFO.

OK:

No leaks in intake system.

NG ▶ REPAIR OR REPLACE INTAKE SYSTEM

OK
▼

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13. INSPECT ENGINE COOLANT TEMPERATURE SENSOR

(a) Inspect the engine coolant temperature sensor **INFO** .

NG ▶ **REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

OK
▼

14. READ VALUE USING TECHSTREAM (MAF)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Start the engine.
- (e) Enter the following menus: Powertrain / Engine / Data List / MAF.
- (f) Read MAF with the engine speed at 3000 rpm.

Standard:

TECHSTREAM DISPLAY	CONDITION	SPECIFIED CONDITION
MAF	Engine speed at 3000 rpm	8 to 13 g/s

NG ▶ **CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER CONNECTOR CONNECTION)**

OK
▼

15. CHECK IGNITION SYSTEM

(a) Check the ignition system **INFO** .

NG ▶ **REPAIR OR REPLACE IGNITION SYSTEM**

OK
▼

16. CHECK FOR EXHAUST GAS LEAK

(a) Check for exhaust gas leaks.


OK:
No gas leaks.
Result:

RESULT	PROCEED TO
Abnormal	A
Normal	B

B ▶ CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER CONNECTOR CONNECTION)

A ▶ REPAIR OR REPLACE EXHAUST SYSTEM

17.	INSPECT AIR FUEL RATIO SENSOR
------------	--------------------------------------

(a) Inspect the air fuel ratio sensor  .

NG ▶ REPLACE AIR FUEL RATIO SENSOR

OK
▼

18.	CHECK HARNESS AND CONNECTOR (AIR FUEL RATIO SENSOR - ECM)
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(a) Disconnect the air fuel ratio sensor connector.

(b) Disconnect the ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-19 (A1A+) - C14-3 (A1A+)	Always	Below 1 Ω
A34-18 (A1A-) - C14-4 (A1A-)	Always	Below 1 Ω
A34-5 (HA1A) - C14-1 (HA1A)	Always	Below 1 Ω


Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-19 (A1A+) or C14-3 (A1A+) - Body ground	Always	10 kΩ or higher
A34-18 (A1A-) or C14-4 (A1A-) - Body ground	Always	10 kΩ or higher
A34-5 (HA1A) or C14-1 (HA1A) - Body ground	Always	10 kΩ or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

19.	REPLACE AIR FUEL RATIO SENSOR
------------	--------------------------------------

- (a) Replace the air fuel ratio sensor  .

NEXT



20.	READ VALUE USING TECHSTREAM (SHORT FT #1 AND LONG FT #1)
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- (a) Connect the Techstream to the DLC3.
(b) Turn the ignition switch to ON.
(c) Turn the Techstream on.
(d) Start the engine.
(e) Enter the following menus: Powertrain / Engine / Data List / Short FT #1, Long FT #1.
(f) Read the value displayed on the Techstream.

Standard:

TECHSTREAM DISPLAY	CONDITION	SPECIFIED CONDITION
Short FT #1 + Long FT #1	Idling or racing	-20% to +20%


HINT:


If the trouble occurs during high speed driving, it is possible to take measurements at medium or low speeds by matching the intake air volume to that at the time of the trouble by shifting down.


NG  **CHECK FUEL PRESSURE (LOW PRESSURE SIDE)**

OK  **END**

21.	CHECK FUEL PRESSURE (LOW PRESSURE SIDE)
------------	--

- (a) Check the fuel pressure (low pressure side)  .

B  **CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER CONNECTOR CONNECTION)**

A  **REPAIR OR REPLACE FUEL SYSTEM (LOW PRESSURE SIDE)**

22.	READ VALUE USING TECHSTREAM (FUEL PRESS)
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- (a) Connect the Techstream to the DLC3.
(b) Turn the ignition switch to ON.
(c) Turn the Techstream on.
(d) Start the engine.
(e) Enter the following menus: Powertrain / Engine / Data List / Fuel Press.
(f) Read the value displayed on the Techstream.

Standard:

TECHSTREAM DISPLAY	CONDITION	SPECIFIED CONDITION
Fuel Press	Idling	3000 to 5000 kPa (30.6 to 50.9 kgf/cm ² , 436 to 725 psi)

HINT:

- The A/C switch and all accessory switches should be off, and the shift lever should be in the N, P or neutral position, and the engine should be fully warmed up.
- If the result is other than the standard value, there may be a fuel system (high pressure side) abnormality.

NG ► REPAIR OR REPLACE FUEL SYSTEM (HIGH PRESSURE SIDE)

OK



23.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE INJECTION WAY)
------------	---

- Connect the Techstream to the DLC3.
- Start the engine.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Way / Direct.
- Read the value Fuel Press Target Value, Short FT #1 and Long FT #1.

Standard:

TECHSTREAM DISPLAY		CONDITION	PROCEED TO
FUEL PRESSURE TARGET VALUE	SHORT FT #1 + LONG FT #1		
3 to 5 MPa (30.6 to 50.9 kgf/cm ² , 436 to 725 psi)	-	Idling	A
5 MPa (50.9 kgf/cm ² , 725 psi) or more	+20% or more		B
5 MPa (50.9 kgf/cm ² , 725 psi) or more	-20% or less		C
3 MPa (30.6 kgf/cm ² , 436 psi) or less	+20% or more		C
3 MPa (30.6 kgf/cm ² , 436 psi) or less	-20% or less		D

HINT:

The A/C switch and all accessory switches should be off, and the shift lever should be in the N, P or neutral position, and the engine should be fully warmed up.

B ► READ VALUE USING TECHSTREAM (FUEL PRESS)

C ► REPLACE FUEL PRESSURE SENSOR

D ► REPLACE FUEL INJECTOR ASSEMBLY (FOR DIRECT INJECTION)

A



24.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE INJECTION WAY)
------------	---

- (a) Connect the Techstream to the DLC3.
- (b) Start the engine.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Way / Direct.
- (e) Read the value Fuel Press Target Value, Short FT #1 and Long FT #1.

Standard:

TECHSTREAM DISPLAY		CONDITION	PROCEED TO
FUEL PRESSURE TARGET VALUE	SHORT FT #1 + LONG FT #1		
3 to 5 MPa (30.6 to 50.9 kgf/cm ² , 436 to 725 psi)	-25% or less	Idling	A
3 to 5 MPa (30.6 to 50.9 kgf/cm ² , 436 to 725 psi)	+30% or more		
5 MPa (50.9 kgf/cm ² , 725 psi) or more	-25% to 25%		B

HINT:

The A/C switch and all accessory switches should be off, and the shift lever should be in the N, P or neutral position, and the engine should be fully warmed up.

B ► CHECK FOR INTERMITTENT PROBLEMS

A ► REPLACE ECM

25.	READ VALUE USING TECHSTREAM (FUEL PRESS)
------------	---

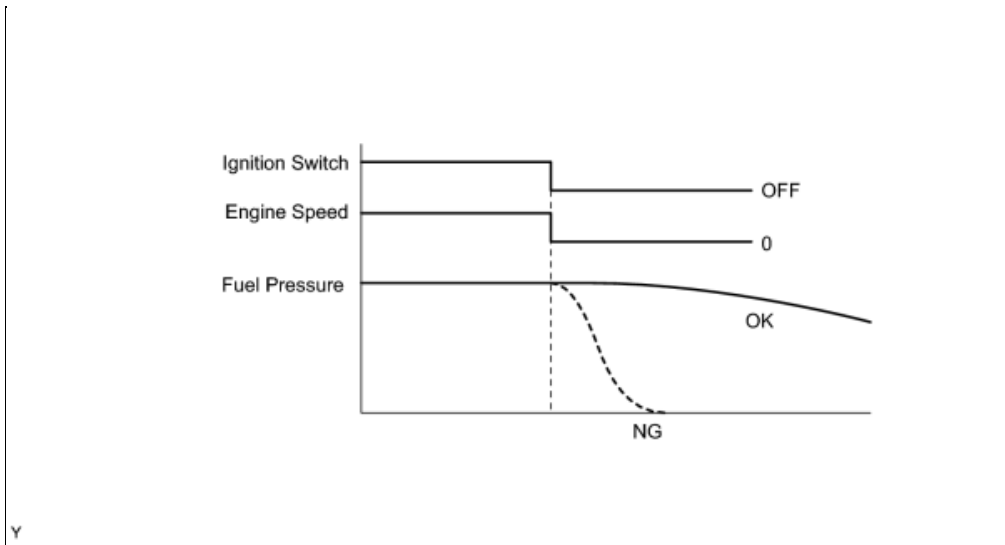
- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Start the engine.
- (e) Enter the following menus: Powertrain / Engine / Data List / Fuel Press.
- (f) Read the value displayed on the Techstream.

Standard:

TECHSTREAM DISPLAY	CONDITION	SPECIFIED CONDITION
Fuel Press	Engine running → Ignition switch OFF → Ignition switch ON	Fuel Press value decrease moderately.

HINT:

- Turn the ignition switch to ON immediately after turning the ignition switch off.
- After approximately 10 minutes, fuel pressure reaches 0 kPa.
- Depending on the vehicle condition, after turning the ignition switch to ON, fuel pressure may rise moderately.



Result:

RESULT	PROCEED TO
Fuel pressure rises or drops moderately.	A
Fuel pressure drops immediately after turning the ignition switch off.	B

B ▶ REPLACE FUEL PUMP ASSEMBLY (FOR HIGH PRESSURE)

A ▶ REPLACE FUEL INJECTOR ASSEMBLY (FOR DIRECT INJECTION)

26. INSPECT FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)

(a) Inspect the fuel injector assembly (for port injection) **INFO**.

NG ▶ REPLACE FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)

OK ▶ REPLACE ECM

27. CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER CONNECTOR CONNECTION)

(a) Check the connection and terminal contact pressure of connectors and wire harness between the mass air flow meter and ECM **INFO**.

HINT:

Repair any problems.

NEXT




28. CLEAR DTC

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Clear the DTCs .

NEXT



29.	READ VALUE USING TECHSTREAM (SHORT FT #1 AND LONG FT #1)
------------	---

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Start the engine.

(e) Enter the following menus: Powertrain / Engine / Data List / Short FT #1, Long FT #1

(f) Read the value displayed on the Techstream.

Standard:

TECHSTREAM DISPLAY	CONDITION	SPECIFIED CONDITION
Short FT #1 + Long FT #1	Vehicle condition when the malfunction occurs (Idling or driving)	-20% to +20%

NG  **CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER - ECM)**

OK  **END**

30.	CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER - ECM)
------------	--

(a) Disconnect the mass air flow meter connector.

(b) Disconnect the ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-22 (VG) - C16-5 (VG)	Always	Below 1 Ω
A33-29 (E2G) - C16-4 (E2G)	Always	Below 1 Ω

Standard Resistance (Check for short):


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-22 (VG) or C16-5 (VG) - Body ground	Always	10 k Ω or higher
A33-29 (E2G) or C16-4 (E2G) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



31.	REPLACE MASS AIR FLOW METER
------------	------------------------------------

(a) Replace the mass air flow meter  .


HINT:

If the result of the inspection performed in step 8 indicated no problem, proceed to the next step without replacing the mass air flow meter.

NEXT



32.	CLEAR DTC
------------	------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .

NEXT



33.	READ VALUE USING TECHSTREAM (SHORT FT #1 AND LONG FT #1)
------------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Start the engine.
- (e) Enter the following menus: Powertrain / Engine / Data List / Short FT #1, Long FT #1.
- (f) Read the value displayed on the Techstream.

Standard:

TECHSTREAM DISPLAY	CONDITION	SPECIFIED CONDITION
Short FT #1 + Long FT #1	Idling or racing	-20% to +20%

HINT:

If the trouble occurs during high speed driving, it is possible to take measurements at medium or low speeds by matching the intake air volume to that at the time of the trouble by shifting down.

NG  **REPLACE ECM**

OK  **END**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XH502XX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0191-P0193: Fuel Rail Pressure Sensor Circuit Range / Performance (2013 FR-S)		

DTC	P0191	Fuel Rail Pressure Sensor Circuit Range / Performance
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DTC	P0192	Fuel Rail Pressure Sensor Circuit Low Input
------------	--------------	--

DTC	P0193	Fuel Rail Pressure Sensor Circuit High Input
------------	--------------	---

DESCRIPTION

The fuel pressure sensor is installed on the delivery pipe. The sensor changes fuel pressure to an electrical signal and sends the signal to the ECM. Then the ECM controls the pump discharge using this feedback to maintain the fuel's target pressure. If the sensor output stops, the ECM will stop the high pressure side fuel pump and supply fuel using the low pressure side fuel pump.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0191	One of the following conditions is met (2 trip detection logic): <ul style="list-style-type: none"> Fuel pressure is 1.9 MPa or more 5 hours after ignition switch turned off. Fuel pressure is 1.84 MPa or less for 10 seconds or more with engine running when 5 hours or more elapsed after ignition switch turned off. 	<ul style="list-style-type: none"> Open or short in fuel pressure sensor circuit Fuel pressure sensor ECM
P0192	Fuel pressure sensor voltage is too low for 2.5 seconds or more. (1 trip detection logic)	<ul style="list-style-type: none"> Short in fuel pressure sensor circuit Fuel pressure sensor ECM
P0193	Fuel pressure sensor voltage is too high for 2.5 seconds or more. (1 trip detection logic)	<ul style="list-style-type: none"> Open in fuel pressure sensor circuit Fuel pressure sensor ECM

HINT:

After confirming DTC P0192 or P0193, use the Techstream to confirm the fuel pressure in the delivery

pipe by entering the following menus: Powertrain / Engine / Data List / Fuel Press.

FUEL PRESSURE (KPA)	MALFUNCTION
Approximately 0	<ul style="list-style-type: none"> PR, E1 circuit short
Approximately 26000	<ul style="list-style-type: none"> PR, VC circuit short

MONITOR DESCRIPTION

These DTCs are set if the fuel pressure sensor output voltage is out of the standard range. The DTCs stand for an open or short malfunction of the sensor circuit.

If these DTCs are set, the ECM enters fail-safe mode and limits the engine power. Fail-safe mode continues until the ignition switch is turned off.

MONITOR STRATEGY

Related DTCs	P0191: Fuel pressure sensor rationality check P0192: Fuel pressure sensor output range check (Low voltage) P0193: Fuel pressure sensor output range check (High voltage)
Required Sensors/Components (Main)	Fuel Pressure Sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Once per driving cycle: P0191 Continuous: P0192, P0193
Duration	0.1 seconds: P0191 (Stuck high monitor) 10 seconds: P0191 (Stuck low monitor) 2.5 seconds: P0192, P0193
MIL Operation	2 driving cycles: P0191 Immediately: P0192, P0193
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs are not present	None
--	------

P0191 (Stuck High Monitor)

Battery voltage	10.9 V or more
Soak time	5 hours or more
Elapsed time after ignition switch ON	0.1 seconds or more
High pressure fuel pump	Off

P0191 (Stuck Low Monitor)

Battery voltage	10.9 V or more
Soak time	5 hours or more
Target fuel pressure	4 MPa (40.8 kgf/cm ² , 581 psi) or higher
Engine speed	600 rpm or higher
Vehicle speed	30 km/h (18.6 mph) or more
Direct injection	Active
High pressure fuel pump	Off

TYPICAL MALFUNCTION THRESHOLDS

P0191 (Stuck High Monitor)

Fuel pressure sensor value	Higher than 1.9 MPa (19.4 kgf/cm ² , 276 psi)
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P0191 (Stuck Low Monitor)

Fuel pressure sensor value	Less than 1.84 MPa (18.7 kgf/cm ² , 267 psi)
----------------------------	---

P0192

Fuel rail pressure sensor voltage [Fuel pressure]	Less than 0.208 V [0 MPa (0 kgf/cm ² , 0 psi)]
---	---

P0193

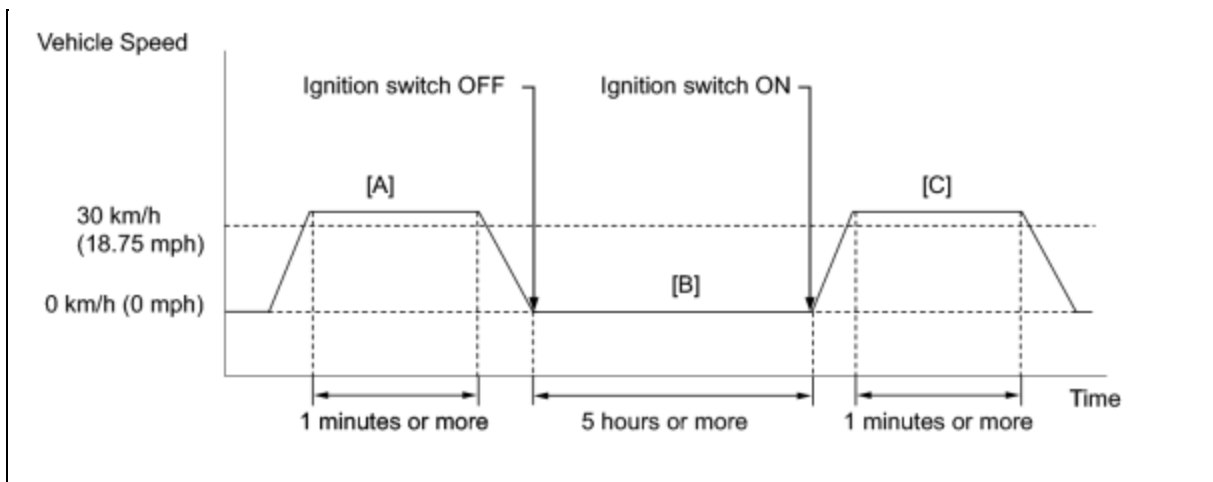
Fuel rail pressure sensor voltage [Fuel pressure]	More than 4.78 V [26.75 MPa (273 kgf/cm ² , 3880 psi)]
---	---

COMPONENT OPERATING RANGE

Fuel rail pressure sensor voltage [Fuel pressure]	0.306 to 4.639 V [0.00 to 25.87 MPa (0 to 263.8 kgf/cm ² , 0 to 3752 psi)]
---	---

CONFIRMATION DRIVING PATTERN

P0191



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more.
8. Drive the vehicle at 30 km/h (18.75 mph) or more for 1 minute or more [A].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Turn the ignition switch off and leave vehicle for 5 hours or more [B].
10. Turn the ignition switch to ON and turn the Techstream on.
11. Enter the following menus: Powertrain / Engine / Trouble Codes.
12. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
13. Drive the vehicle at 30 km/h (18.75 mph) or more for 1 minute or more [C].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

14. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
15. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 16. Input the DTC: P0191.
 17. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal

ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

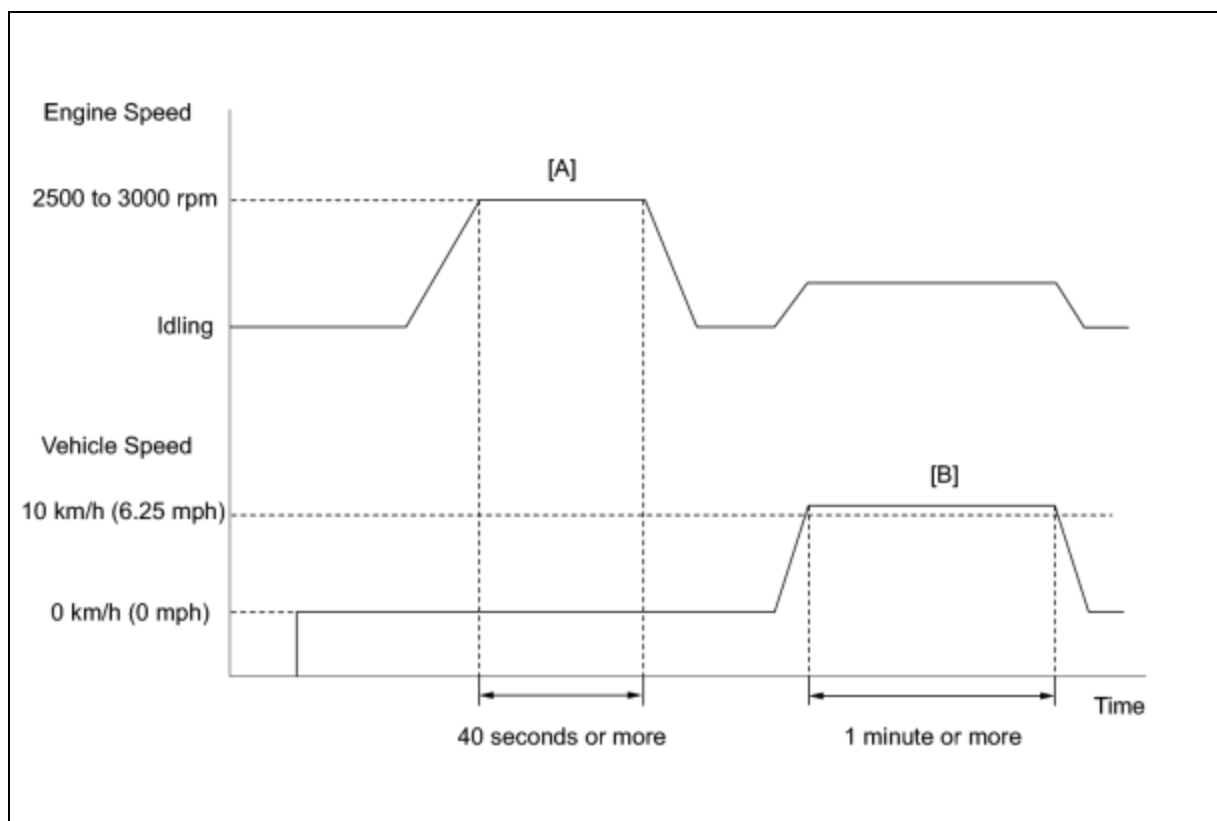
- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

18. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs **INFO** .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

P0192, P0193



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) **INFO** .

4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.


9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P0192 or P0193.
 13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal
ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

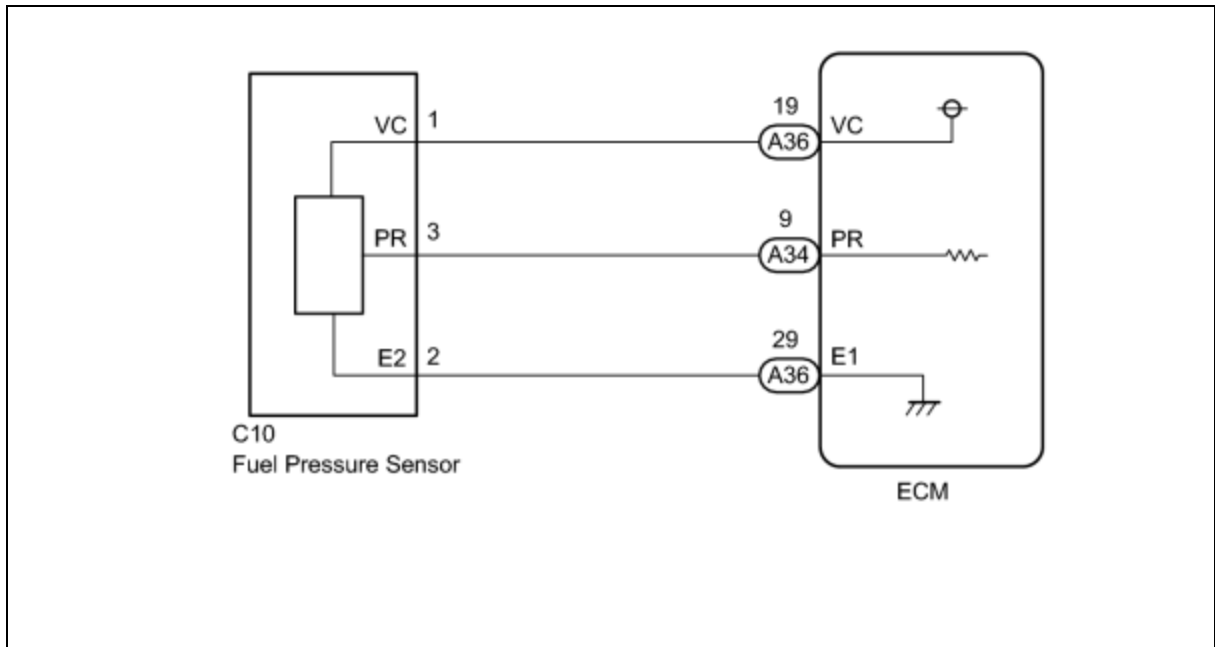
HINT:

- o If the judgment result shows NORMAL, the system is normal.
 - o If the judgment result shows ABNORMAL, the system has a malfunction.
14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	READ VALUE USING TECHSTREAM (FUEL PRESS)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Start the engine.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Data List / Fuel Press.
- (e) Read the values.

Result:

FUEL PRESSURE (KPA)	PROCEED TO
26000 or more	A
Approximately 0	
3000 to 5000*	B

HINT:

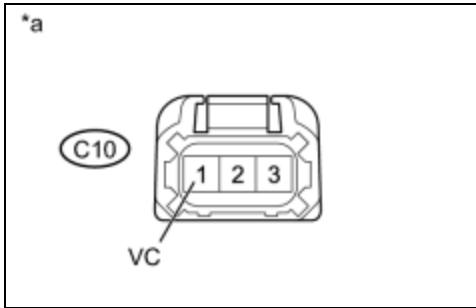
*: The value must change when the engine is moving or stationary.

B ▶ CHECK FOR INTERMITTENT PROBLEMS

A



2. INSPECT FUEL PRESSURE SENSOR (FUEL PRESSURE SENSOR POWER SOURCE)



(a) Disconnect the fuel pressure sensor connector.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
C10-1 (VC) - Body ground	Ignition switch ON	4.5 to 5.5 V

Text in Illustration

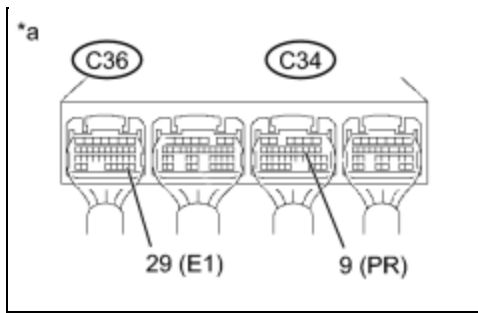
*a	Front view of wire harness connector (to Fuel Pressure Sensor)
----	---

NG ▶ CHECK HARNESS AND CONNECTOR (ECM - FUEL PRESSURE SENSOR)

OK



3. INSPECT ECM (PR VOLTAGE)



(a) Start the engine.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-9 (PR) - A36-29 (E1)	Idling with warm engine	1.0 to 1.7 V

Text in Illustration

*a	Component with harness connected (ECM)
----	--

HINT:

The fuel pressure in the delivery pipe is 3 to 5 MPa.

NG ► CHECK HARNESS AND CONNECTOR (ECM - FUEL PRESSURE SENSOR)

OK ► REPLACE ECM

4. CHECK HARNESS AND CONNECTOR (ECM - FUEL PRESSURE SENSOR)

(a) Disconnect the ECM connectors.

(b) Disconnect the fuel pressure sensor connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-9 (PR) - C10-3 (PR)	Always	Below 1 Ω
A36-29 (E1) - C10-2 (E2)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-9 (PR) or C10-3 (PR) - body ground	Always	10 kΩ or higher
A34-29 (E1) or C10-2 (E2) - body ground	Always	10 kΩ or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (ECM - FUEL PRESSURE SENSOR)

OK ▶ REPLACE FUEL PRESSURE SENSOR

5. CHECK HARNESS AND CONNECTOR (ECM - FUEL PRESSURE SENSOR)

- (a) Disconnect the fuel pressure sensor connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-19 (VC) - C10-1 (VC)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-19 (VC) or C10-1 (VC) - Body ground	Always	10 k Ω or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (ECM - FUEL PRESSURE SENSOR)

OK ▶ REPLACE ECM

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PFB0PRX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0196-P0198: Engine Oil Temperature Sensor (Range/Performance) (2013 FR-S)		

DTC	P0196	Engine Oil Temperature Sensor (Range/Performance)
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DTC	P0197	Engine Oil Temperature Sensor Low
------------	--------------	--

DTC	P0198	Engine Oil Temperature Sensor High
------------	--------------	---

DESCRIPTION

The resistance of the thermistor within the oil temperature sensor changes in accordance with variations in the oil temperature. The method for connecting the oil temperature sensor and the ECM is the same as for the intake air temperature sensor.

HINT:

If any DTC is stored, the ECM enters fail-safe mode. During operation of fail-safe mode, the ECM sets the engine oil temperature determined value at 70°C (158°F). Operation of fail-safe mode continues until the ECM restores normal operation.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0196	Despite estimated engine oil temperature is higher than 45°C (113°F), engine oil temperature sensor value is lower than 45°C (113°F). (2 trip detection logic)	<ul style="list-style-type: none"> • Engine oil temperature sensor • ECM
P0197	Engine oil temperature sensor voltage is less than 0.203 V for 0.5 seconds or more. (1 trip detection logic)	
P0198	Engine oil temperature sensor voltage is more than 4.698 V for 0.5 seconds or more. (1 trip detection logic)	

MONITOR DESCRIPTION

P0196

When a cold engine start is performed and then the engine is warmed up, if the Engine oil temperature sensor value is less than specified value, it is determined that a malfunction has occurred. If this is detected in 2 consecutive driving cycles, the ECM interprets this as a malfunction in the engine oil temperature sensor and stores a DTC.

P0197, P0198

The ECM monitors the sensor voltage and uses this value to calculate the engine oil temperature. When the sensor output voltage deviates from the normal operating range, the ECM interprets this as a malfunction in the engine oil temperature sensor circuit and stores a DTC.

MONITOR STRATEGY

Related DTCs	P0196: Engine oil temperature sensor functional check P0197: Engine oil temperature sensor functional check (Low voltage) P0198: Engine oil temperature sensor functional check (High voltage)
Required Sensors/Components (Main)	Engine oil temperature sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Once per driving cycle: P0196 Continuous: P0197, P0198
Duration	250 to 550 seconds: P0196 0.5 seconds: P0197, P0198
MIL Operation	Immediately: P0196 2 driving cycles: P0197, P0198
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

P0196

Monitor runs whenever following DTCs not stored	P0112, P0113 (Intake air temperature (IAT) sensor) P0117, P0118, P0125 (Engine coolant temperature (ECT) sensor) P0122, P0123, P0222, P0223 (Throttle position sensor) P0197, P0198 (Engine oil temperature (EOT) sensor) P0604, P0605 (ROM in ECM) P1160 (Throttle return spring) P2101, P2102 (Throttle actuator control motor) P2109 (Throttle position sensor minimum stop) P2119 (Throttle actuator control) P2122, P2123, P2127, P2128 (Accelerator pedal position sensor (APPS) circuit) P2135 (Throttle position sensor (TPS) correlation) P2138 (Accelerator pedal position sensor (APPS) correlation)
Battery voltage	10.9 V or more

Engine speed	500 rpm or higher
Diagnostic value (n) [Diagnostic value (n-1) + 64 + 3.0 (varies with lowest engine oil temperature and vehicle speed)]	1732125 - (39285 X Lowest engine oil coolant after engine start)

P0197, P0198

Monitor runs whenever following DTCs not stored	None
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TYPICAL MALFUNCTION THRESHOLDS

P0196

Actual engine oil temperature	Less than 45°C (113°F)
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P0197

Engine oil temperature sensor voltage [Engine oil temperature]	Less than 0.203 V [165.54°C (330°F)]
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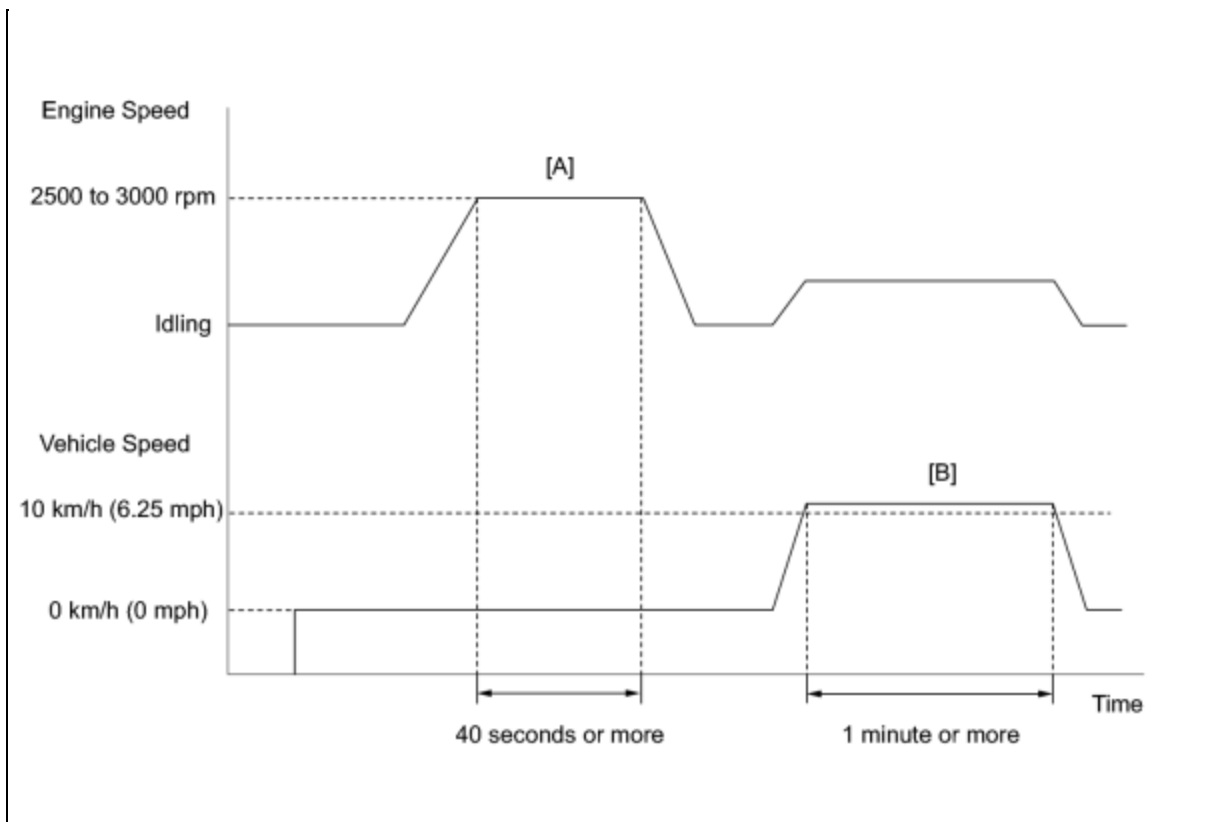
P0198

Engine oil temperature sensor voltage [Engine oil temperature]	More than 4.698 V [-46.24°C (-51.2°F)]
--	--

COMPONENT OPERATING RANGE

Engine oil temperature sensor voltage [Engine oil temperature]	0.210 to 4.688 V [163.70 to -43.85 °C (326.7 to -46.9°F)]
--	---

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine oil temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P0196, P0197 or P0198.
 13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal

ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

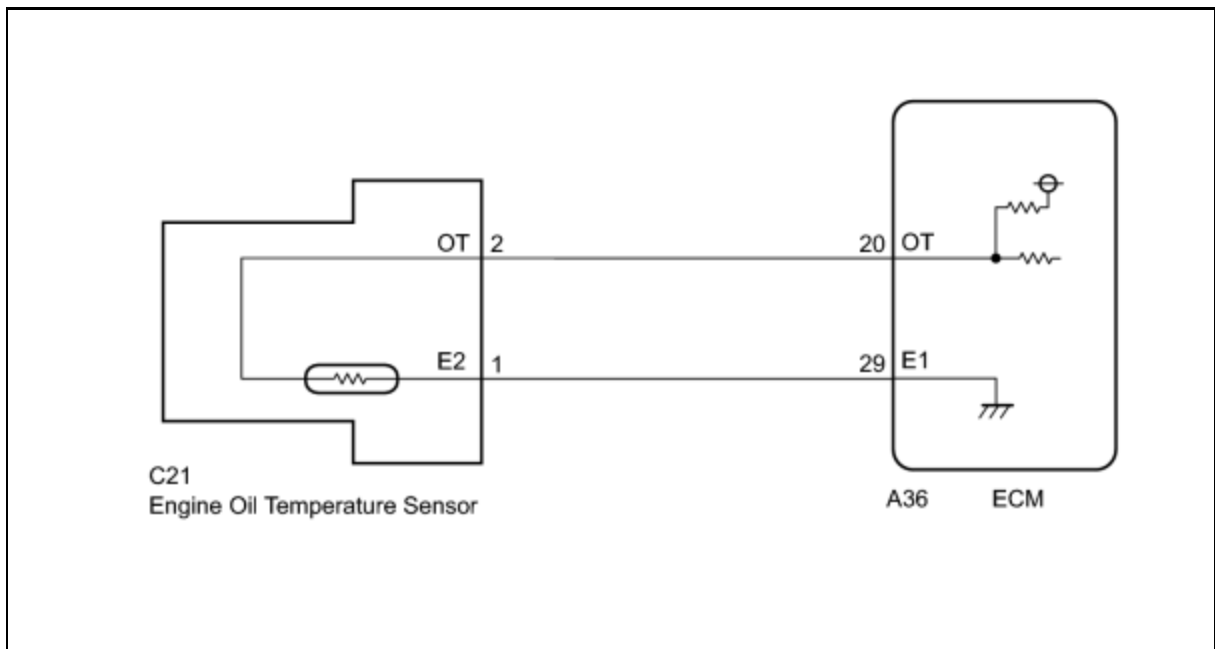
- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs INFO.

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or

- not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- When the DTC is output, check the engine oil temperature using the Techstream. Enter the following menus: Powertrain / Engine / Data List / Engine Oil Temperature. If the Engine Oil Temperature value is lower than the actual engine oil temperature, the engine oil temperature sensor circuit may be malfunctioning. In this case, check the wire harnesses and connectors (and those connections) between the ECM and the engine oil temperature sensor first.

PROCEDURE

1.	READ VALUE USING TECHSTREAM (ENGINE OIL TEMPERATURE)
-----------	---

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Data List / Engine Oil Temperature.
- Read the value displayed on the Techstream.

Result

RESULT	PROCEED TO
-40°C (-40°F)	A
215°C (419°F)	B
Between 75 and 100°C (167 and 212°F)	C

HINT:

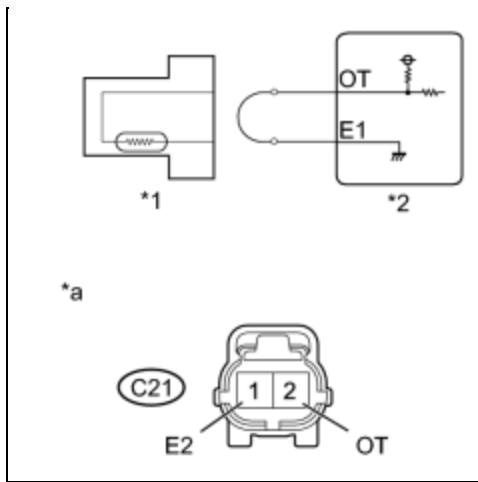
- If there is an open circuit, the Techstream indicates -40°C (-40°F).
- If there is a short circuit, the Techstream indicates higher than 215°C (419°F).

B ▶ **READ VALUE USING TECHSTREAM (ENGINE OIL TEMPERATURE)**

C ▶ **CHECK INTERMITTENT PROBLEMS**

A
▼

2.	READ VALUE USING TECHSTREAM (ENGINE OIL TEMPERATURE)
-----------	---



(a) Disconnect the Engine oil temperature sensor connector.

(b) Connect terminals 1 and 2 of the Engine oil temperature sensor connector on the wire harness side.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine / Data List / Engine Oil Temperature.

(g) Read the value displayed on the Techstream.

Standard value:

215°C (419°F)

Text in Illustration

*1	Engine oil temperature sensor
*2	ECM
*a	Front view of wire harness connector (to Engine oil temperature sensor)

NG ► CHECK HARNESS AND CONNECTOR (ECM - ENGINE OIL TEMPERATURE SENSOR)

OK ► REPLACE ENGINE OIL TEMPERATURE SENSOR

3. CHECK HARNESS AND CONNECTOR (ECM - ENGINE OIL TEMPERATURE SENSOR)

(a) Disconnect the engine oil temperature sensor connector.

(b) Disconnect the ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

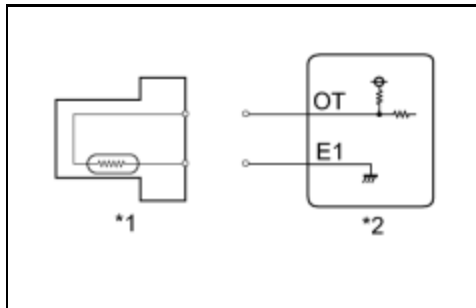
Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-20 (OT) - C21-2 (OT)	Always	Below 1 Ω
A36-29 (E1) - C21-1 (E2)	Always	Below 1 Ω

NG ► REPAIR OR REPLACE HARNESS AND CONNECTOR

OK ► REPLACE ECM

4.	READ VALUE USING TECHSTREAM (ENGINE OIL TEMPERATURE)
-----------	---



(a) Disconnect the Engine oil temperature sensor connector.

- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Powertrain / Engine / Data List / Engine Oil Temperature.
- (f) Read the value displayed on the Techstream.

Standard Value:

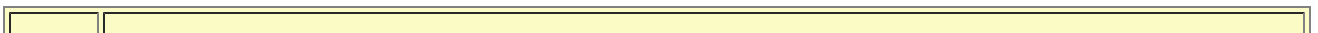
-40°C (-40°F)

Text in Illustration

*1	Engine oil temperature sensor
*2	ECM

NG ► CHECK HARNESS AND CONNECTOR (ECM - ENGINE OIL TEMPERATURE SENSOR)

OK ► REPLACE ENGINE OIL TEMPERATURE SENSOR



5. CHECK HARNESS AND CONNECTOR (ECM - ENGINE OIL TEMPERATURE SENSOR)

- (a) Disconnect the engine oil temperature sensor connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-20 (OT) or C21-2 (OT) - Body ground	Always	10 kΩ or higher

NG  **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK  **REPLACE ECM**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001O9K02AX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0201-P0204: Injector Circuit / Open - (Cylinder 1) (2013 FR-S)		

DTC	P0201	Injector Circuit / Open - (Cylinder 1)
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DTC	P0202	Injector Circuit / Open - (Cylinder 2)
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DTC	P0203	Injector Circuit / Open - (Cylinder 3)
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DTC	P0204	Injector Circuit / Open - (Cylinder 4)
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DESCRIPTION

The D-4S system has two injection systems. One is the in-cylinder direct injection system that directly injects pressurized fuel into the combustion chamber. The other is the intake port injection system. The ECM determines the percentage of in-cylinder direct injection to the intake port injection systems in accordance with the engine speed and load.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0201	Received diagnostic information (open circuit detected / GND short / +B short or overheating) from the fuel injector IC continuously 10 times or more (No. 1 cylinder). (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in fuel injector (for port injection) circuit (No. 1 cylinder) • INJ fuse • Fuel injector assembly (for port injection) (No. 1 cylinder) • ECM
P0202	Received diagnostic information (open circuit detected / GND short / +B short or overheating) from the fuel injector IC continuously 10 times or more (No. 2 cylinder). (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in fuel injector (for port injection) circuit (No. 2 cylinder) • INJ fuse • Fuel injector assembly (for port injection) (No. 2 cylinder) • ECM

P0203	Received diagnostic information (open circuit detected / GND short / +B short or overheating) from the fuel injector IC continuously 10 times or more (No. 3 cylinder). (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in fuel injector (for port injection) circuit (No. 3 cylinder) • INJ fuse • Fuel injector assembly (for port injection) (No. 3 cylinder) • ECM
P0204	Received diagnostic information (open circuit detected / GND short / +B short or overheating) from the fuel injector IC continuously 10 times or more (No. 4 cylinder). (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in fuel injector (for port injection) circuit (No. 4 cylinder) • INJ fuse • Fuel injector assembly (for port injection) (No. 4 cylinder) • ECM

MONITOR DESCRIPTION

The ECM monitors the injection control of the port injector. If a malfunction is detected in the port injector circuit, the ECM cancels the injection control for the corresponding cylinder and turns on the MIL.

MONITOR STRATEGY

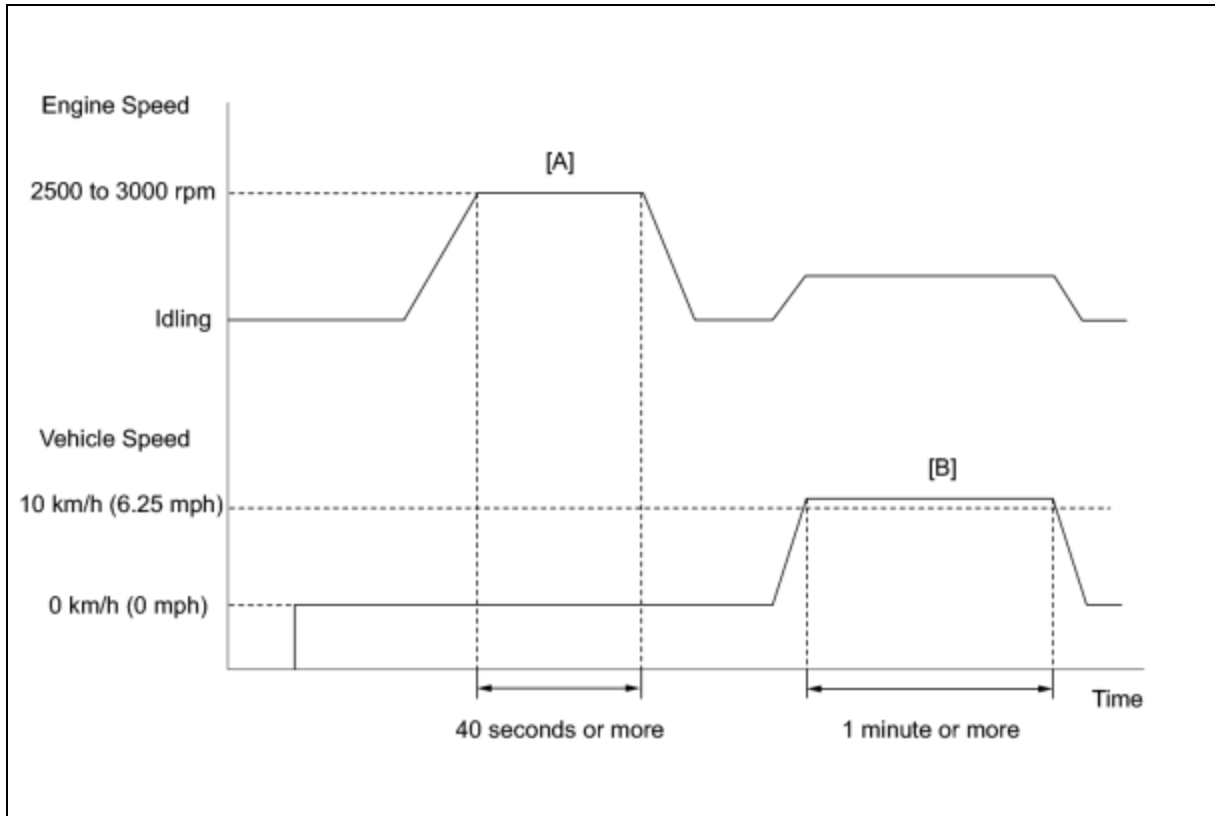
Related DTCs	P0201: Fuel injector circuit continuity (Cylinder 1) P0202: Fuel injector circuit continuity (Cylinder 2) P0203: Fuel injector circuit continuity (Cylinder 3) P0204: Fuel injector circuit continuity (Cylinder 4)
Required sensors/Components (Main)	Fuel injector assembly (for port injection) (cylinder 1 to 4)
Required sensors/Components (Sub)	None
Frequency of operation	Continuous
Duration	2.5 seconds
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs are not present	None
Battery voltage	10.9 V or more
Elapsed time after engine start	1 second or more
Engine speed	500 rpm or higher
Injection time	0.001 seconds or more

TYPICAL MALFUNCTION THRESHOLDS

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:


- If a pending DTC is output, the system is malfunctioning.
- If a pending DTC is not output, perform the following procedure.

11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
12. Input the DTC: P0201, P0202, P0203 or P0204.
13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal
ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

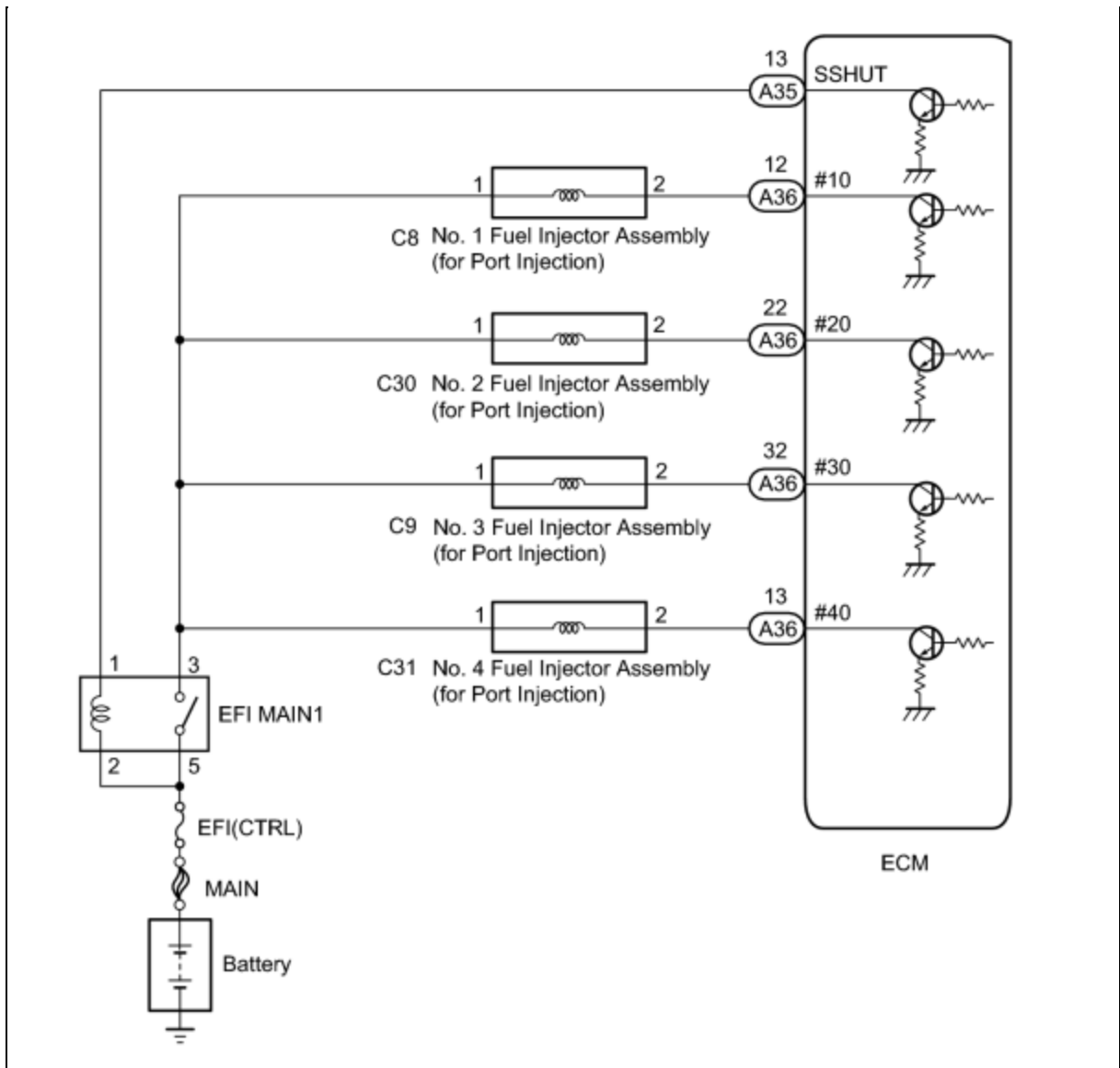
- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTC P0201 is output, check the No. 1 fuel injector assembly (for port injection) (No. 1 cylinder) circuit.
- If DTC P0202 is output, check the No. 2 fuel injector assembly (for port injection) (No. 2 cylinder) circuit.
- If DTC P0203 is output, check the No. 3 fuel injector assembly (for port injection) (No. 3 cylinder) circuit.
- If DTC P0204 is output, check the No. 4 fuel injector assembly (for port injection) (No. 4 cylinder) circuit.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1. CHECK ANY OTHER DTCS OUTPUT

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Read the DTCs.

Result:

RESULT	PROCEED TO
P0201, P0202, P0203 and P0204 are output	A
P0201, P0202, P0203 or P0204 is output	B
P0201, P0202, P0203 or P0204 and other DTCs are output	C

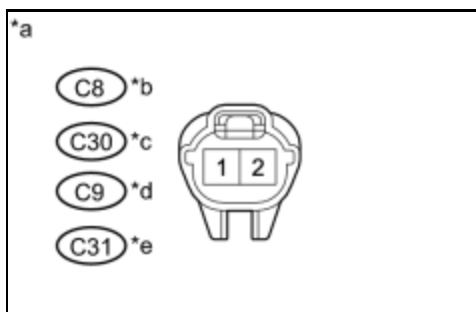
B ▶ **INSPECT RELAY (EFI MAIN1)**

C ▶ **GO TO DTC CHART**

A



2. CHECK FUEL INJECTOR ASSEMBLY (POWER SOURCE VOLTAGE)



(a) Disconnect the fuel injector assembly (for port injection) connector.

- (b) Turn the ignition switch to ON.
- (c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C8-1 - Body ground	Ignition switch ON	11 to 14 V

C30-1 - Body ground	Ignition switch ON	11 to 14 V
C9-1 - Body ground	Ignition switch ON	11 to 14 V
C31-1 - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Fuel Injector Assembly)
*b	No. 1 cylinder
*c	No. 2 cylinder
*d	No. 3 cylinder
*e	No. 4 cylinder

NG  **INSPECT RELAY (EFI MAIN1)**

OK



3.	CHECK HARNESS AND CONNECTOR (ECM - FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION))
-----------	--

- (a) Disconnect the ECM connector.
- (b) Disconnect the fuel injector assembly (for port injection) connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-12 (#10) - C8-2	Always	Below 1 Ω
A36-22 (#20) - C30-2	Always	Below 1 Ω
A36-32 (#30) - C9-2	Always	Below 1 Ω
A36-13 (#40) - C31-2	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-12 (#10) or C8-2 - Body ground	Always	10 k Ω or higher
A36-22 (#20) or C30-2 - Body ground	Always	10 k Ω or higher
A36-32 (#30) or C9-2 - Body ground	Always	10 k Ω or higher
A36-13 (#40) or C31-2 - Body ground	Always	10 k Ω or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

4.	INSPECT FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)
-----------	--

(a) Inspect the fuel injector assembly (for port injection) **INFO** .

NG ▶ REPLACE FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)

OK ▶ REPLACE ECM

5.	INSPECT RELAY (EFI MAIN1)
-----------	----------------------------------

(a) Inspect the EFI MAIN1 relay **INFO** .

NG ▶ REPLACE RELAY (EFI MAIN1)

OK
▼

6.	CHECK HARNESS AND CONNECTOR (EFI MAIN1 RELAY - FUEL INJECTOR ASSEMBLY)
-----------	---

(a) Disconnect the fuel injector assembly (for port injection) connector.

(b) Remove the EFI MAIN1 relay from the engine room relay block assembly.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C8-1 - EFI MAIN1 relay terminal 3	Always	Below 1 Ω
C30-1 - EFI MAIN1 relay terminal 3	Always	Below 1 Ω
C9-1 - EFI MAIN1 relay terminal 3	Always	Below 1 Ω

C31-1 - EFI MAIN1 relay terminal 3	Always	Below 1 Ω
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Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C8-1 or EFI MAIN1 relay terminal 3 - Body ground	Always	10 k Ω or higher
C30-1 or EFI MAIN1 relay terminal 3 - Body ground	Always	10 k Ω or higher
C9-1 or EFI MAIN1 relay terminal 3 - Body ground	Always	10 k Ω or higher
C31-1 or EFI MAIN1 relay terminal 3 - Body ground	Always	10 k Ω or higher

**REPAIR OR REPLACE HARNESS OR
NG ► CONNECTOR**

OK ► GO TO ECM POWER SOURCE CIRCUIT

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000T8X0C9X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0230: Fuel Pump Primary Circuit (2013 FR-S)		

DTC	P0230	Fuel Pump Primary Circuit
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DESCRIPTION

When a malfunction in the fuel pump control circuit (low pressure side) is detected, DTC P0230 is stored.

The fuel pump control circuit (low pressure side) consists of the ECM, fuel pump assembly and fuel pump control ECU (which operates the fuel pump assembly). Based on the engine output, the ECM determines the fuel pump speed. The speed is then converted to a duty signal and sent to the fuel pump control ECU. Based on the signal sent from the ECM, the fuel pump control ECU adjusts the fuel pump assembly operation speed among 3 settings. The fuel pump control ECU also has a self-diagnosis function. Based on the fuel pump control circuit (low pressure side) condition, the fuel pump control ECU outputs a diagnostic signal to the ECM, and the ECM determines if there is a malfunction in the fuel pump control circuit (low pressure side).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0230	Open or short in fuel pump circuit for 2.5 seconds or more. (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in fuel pump control circuit (low pressure side) • C/OPEN relay • Fuel pump assembly • Fuel pump control ECU • ECM

MONITOR DESCRIPTION

To monitor the fuel pump control circuit (low pressure side), the ECM checks the fuel pump control signal (FPC) and diagnostic signal (DI). The FPC voltage varies between approximately 0 V and approximately 12 V (duty signal). Based on the condition of the fuel pump control ECU malfunction, the DI voltage varies between approximately 0 V and approximately 12 V. The ECM then compares the variation of the FPC voltage and DI voltage, and determines if the fuel pump control circuit (low pressure side) is malfunctioning. When the ECM determines that the fuel pump control circuit (low pressure side) is malfunctioning, a DTC is stored immediately.

MONITOR STRATEGY

Related DTCs	P0230: Fuel pump control circuit continuity
Required sensors/Components (Main)	Fuel pump control ECU
Required sensors/Components (Related)	-
Frequency of operation	Continuous
Duration	2.5 seconds
MIL operation	2 driving cycles

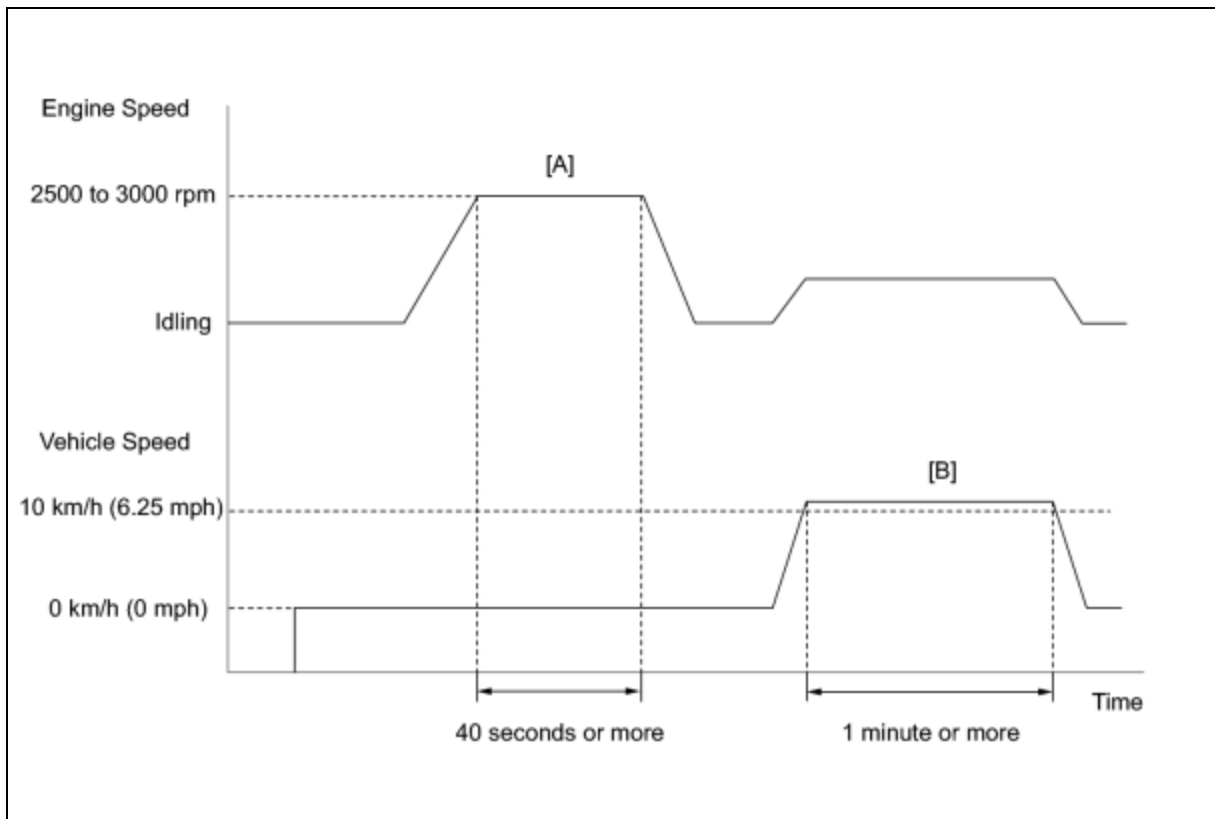
TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	None
Battery voltage	8 V or more
Fuel level	15% or more
After engine starting	180 seconds or more
Fuel pump control	On

TYPICAL MALFUNCTION THRESHOLDS

Fuel control ECU output diagnostic signal	Low
---	-----

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
- o If a pending DTC is not output, perform the following procedure.

11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
12. Input the DTC: P0230.
13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none">o DTC judgment completedo System normal
ABNORMAL	<ul style="list-style-type: none">o DTC judgment completedo System abnormal
INCOMPLETE	<ul style="list-style-type: none">o DTC judgment not completedo Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none">o Unable to perform DTC judgmento Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs **INFO** .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM

Refer to Fuel Pump Control Circuit **INFO** .

INSPECTION PROCEDURE

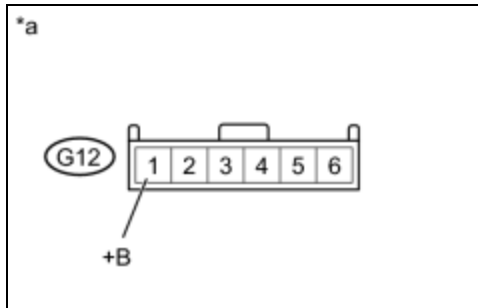
This troubleshooting procedure is based on the premise that the engine is started. If the engine is not started, proceed to Problem Symptoms Table **INFO** .

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. INSPECT TERMINAL VOLTAGE (+B OF FUEL PUMP CONTROL ECU)



(a) Disconnect the fuel pump control ECU connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
G12-1 (+B) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Fuel Pump Control ECU)
----	---

NG ▶ **INSPECT RELAY (C/OPEN)**

OK



2. CHECK HARNESS AND CONNECTOR (FUEL PUMP CONTROL ECU - BODY GROUND)

(a) Disconnect the fuel pump control ECU connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G12-4 (E) - Body ground	Always	Below 1 Ω

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



3.	CHECK HARNESS AND CONNECTOR (ECM - FUEL PUMP CONTROL ECU)
-----------	--

- (a) Disconnect the ECM connector.
- (b) Disconnect the fuel pump control ECU connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-10 (DI) - G12-3 (DI)	Always	Below 1 Ω
A35-19 (FPC) - G12-2 (FPC)	Always	Below 1 Ω

Standard Resistance (Check for short):


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-10 (DI) or G12-3 (DI) - Body ground	Always	10 k Ω or higher
A35-19 (FPC) or G12-2 (FPC) - Body ground	Always	10 k Ω or higher


NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



4.	INSPECT FUEL PUMP ASSEMBLY
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- (a) Inspect the fuel pump assembly .

NG  **CHECK HARNESS AND CONNECTOR (FUEL PUMP CONTROL ECU - FUEL PUMP ASSEMBLY)**

OK




5.	REPLACE FUEL PUMP CONTROL ECU
-----------	--------------------------------------

(a) Replace the fuel pump control ECU  .

NEXT



6.	CONFIRM WHETHER DTC OUTPUT RECURS
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- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and turn the Techstream on.
- (c) Clear the DTCs  .
- (d) Crank the engine for 15 seconds.
- (e) Idle the engine for 1 minute.
- (f) Enter the following menus: Powertrain / Engine / DTC.
- (g) Read the DTCs.

Result

RESULT	PROCEED TO
No DTC output	A
DTC P0230 output	B

B  **REPLACE ECM**

A  **END**

7.	CHECK HARNESS AND CONNECTOR (FUEL PUMP CONTROL ECU - FUEL PUMP ASSEMBLY)
-----------	---

- (a) Disconnect the fuel pump control ECU connector.
- (b) Disconnect the fuel pump assembly connectors.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G12-5 (FP-) - G7-4 (FP-)	Always	Below 1 Ω
G12-6 (FP+) - G7-3 (FP+)	Always	Below 1 Ω


Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G12-5 (FP-) or G7-4 (FP-) - Body ground	Always	10 k Ω or higher
G12-6 (FP+) or G7-3 (FP+) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **REPLACE FUEL PUMP ASSEMBLY**

8.	INSPECT RELAY (C/OPEN)
-----------	-------------------------------

(a) Inspect the C/OPEN relay  .

NG  **REPLACE RELAY (C/OPEN)**

OK


9.	INSPECT RELAY (C/OPEN RELAY OPERATION)
-----------	---

(a) Check the relay operation sound when the ignition switch is turned to ON.

Result:

ITEM	CONDITION	STANDARD
C/OPEN RELAY	Ignition switch OFF → Ignition switch ON	Operation sound is heard.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK
▼

10.	CHECK HARNESS AND CONNECTOR (C/OPEN RELAY - FUEL PUMP CONTROL ECU)
------------	---

- (a) Remove the C/OPEN relay from the engine room relay block assembly.
- (b) Disconnect the fuel pump control ECU connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C/OPEN relay terminal 3 - G12-1	Always	Below 1 Ω
C/OPEN relay terminal 1 - Body ground	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C/OPEN relay terminal 3 or G12-1 - Body ground	Always	10 k Ω or higher

NG ► **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ► **GO TO ECM POWER SOURCE CIRCUIT**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XH30QQX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0300-P0304: Random / Multiple Cylinder Misfire Detected (2013 FR-S)		

DTC	P0300	Random / Multiple Cylinder Misfire Detected
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DTC	P0301	Cylinder 1 Misfire Detected
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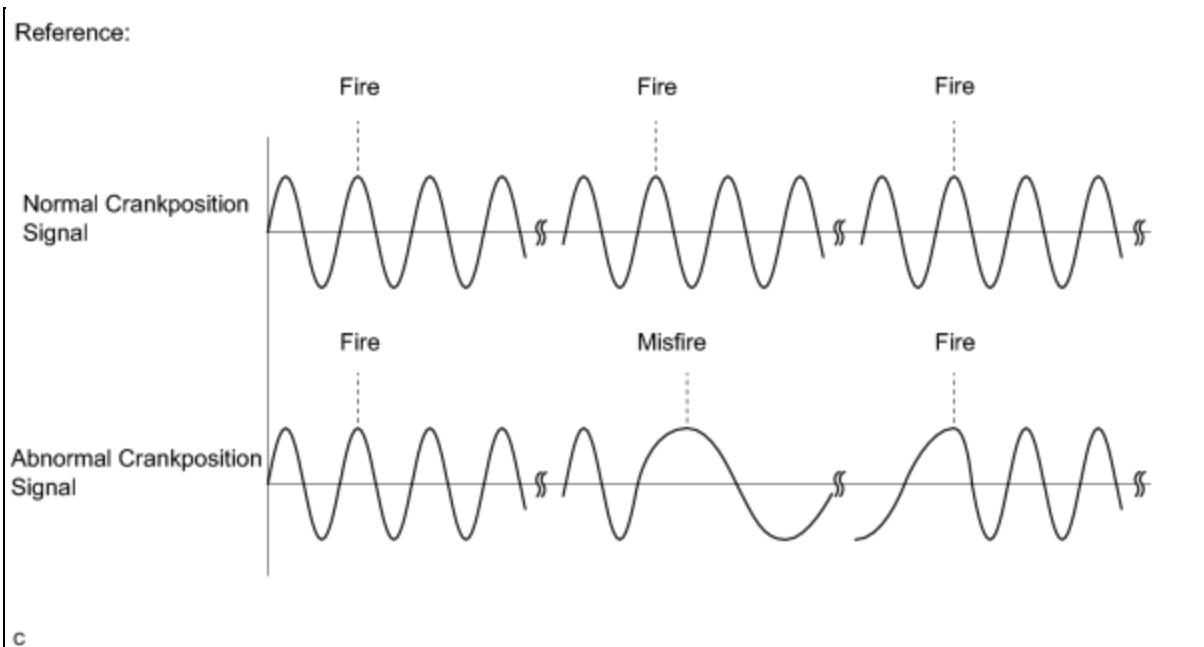
DTC	P0302	Cylinder 2 Misfire Detected
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DTC	P0303	Cylinder 3 Misfire Detected
------------	--------------	------------------------------------

DTC	P0304	Cylinder 4 Misfire Detected
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DESCRIPTION

When the engine misfires, high concentrations of hydrocarbons (HC) enter the exhaust gas. Extremely high hydrocarbon concentration levels can cause an increase in exhaust emission levels. Extremely high concentrations of hydrocarbons can also cause increases in the three-way catalytic converter temperature, which may cause damage to the three-way catalytic converter. To prevent this increase in emissions and to limit the possibility of thermal damage, the ECM monitors the misfire count. When the temperature of the three-way catalytic converter reaches the point of thermal degradation, the ECM blinks the MIL. To monitor misfires, the ECM uses both the VVT sensor and the crankshaft position sensor. The VVT sensor is used to identify any misfiring cylinders and the crankshaft position sensor is used to measure variations in the crankshaft rotation speed. Misfires are counted when the crankshaft rotation speed variations exceed predetermined thresholds. If the misfire count exceeds the threshold levels, and could cause emission control system performance deterioration, the ECM illuminates the MIL and stores a DTC.



DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0300	Simultaneous misfiring of several cylinders occurs and one of the following conditions is met (2 trip detection logic): <ul style="list-style-type: none"> • A misfire occurs that may damage the three-way catalytic converter (MIL blinks). • An emission deterioration misfire occurs (MIL illuminates). 	<ul style="list-style-type: none"> • Open or short in engine wire harness • Connector connection • Vacuum hose connections • Ignition system • Fuel injector assembly (for port injection) • Fuel injector assembly (for direct injection) • Fuel pressure (low pressure side) • Fuel pressure (high pressure side) • Mass air flow meter • Engine coolant temperature sensor • Compression pressure • Valve timing • PCV valve and hose • PCV hose connections • Intake system
P0301	Misfiring of the No. 1 cylinder occurs and one of the following conditions is met (2 trip detection logic): <ul style="list-style-type: none"> • A misfire occurs that may damage the three-way catalytic converter (MIL blinks). • An emission deterioration misfire occurs (MIL illuminates). 	
P0302	Misfiring of the No. 2 cylinder occurs and one of the following conditions is met (2 trip detection logic): <ul style="list-style-type: none"> • A misfire occurs that may damage the three-way catalytic converter (MIL blinks). • An emission deterioration misfire occurs (MIL illuminates). 	
P0303	Misfiring of the No. 3 cylinder occurs and one of the following conditions is met (2 trip detection logic): <ul style="list-style-type: none"> • A misfire occurs that may damage the three-way catalytic converter (MIL blinks). • An emission deterioration misfire occurs (MIL illuminates). 	
	Misfiring of the No. 4 cylinder occurs and one of the following conditions is met (2 trip detection logic):	

P0304	<ul style="list-style-type: none"> • A misfire occurs that may damage the three-way catalytic converter (MIL blinks). • An emission deterioration misfire occurs (MIL illuminates). 	<ul style="list-style-type: none"> • ECM
-------	---	---

When DTCs for misfiring cylinders are randomly stored, but DTC P0300 is not stored, it indicates that misfires have been detected in different cylinders at different times. DTC P0300 is only stored when several misfiring cylinders are detected at the same time.

MONITOR DESCRIPTION

The ECM illuminates the MIL and stores a DTC when either one of the following conditions, which could cause emission deterioration, is detected (2 trip detection logic).

- Within the first 1000 crankshaft revolutions after the engine starts, an excessive number of misfires (approximately 20 to 50 misfires per 1000 crankshaft revolutions) occurs once.
- An excessive number of misfires (approximately 20 to 50 misfires per 1000 crankshaft revolutions) occurs a total of 4 times.

The ECM flashes the MIL and stores a DTC when either one of the following conditions, which could cause damage to the three-way catalytic converter, is detected (2 trip detection logic).

- At a high engine speed, a sufficient amount of misfires to damage the catalyst occurring within 200 crankshaft revolutions is detected once.
- At a normal engine speed, a sufficient amount of misfires to damage the catalyst occurring within 200 crankshaft revolutions is detected 3 times.

MONITOR STRATEGY

Related DTCs	P0300: Multiple cylinder misfire P0301: Cylinder 1 misfire (crankshaft speed fluctuation) P0302: Cylinder 2 misfire (crankshaft speed fluctuation) P0303: Cylinder 3 misfire (crankshaft speed fluctuation) P0304: Cylinder 4 misfire (crankshaft speed fluctuation)
Required Sensors/Components (Main)	Crankshaft position sensor VVT sensor
Required Sensors/Components (Related)	Engine coolant temperature sensor Intake air temperature sensor Mass air flow meter
Frequency of Operation	Continuous
Duration	1000 crankshaft revolutions (Emissions-related misfire) 200 crankshaft revolutions (Catalyst-damaging misfire)
MIL Operation	2 driving cycles: Emission-related misfire MIL flashes immediately: Catalyst-damaging misfire
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

	P0011, P0021 (VVT intake method (A) with mid-position start)
--	--

<p>Monitor runs whenever following DTCs not stored</p>	<p>P0030, P0031, P0032 (Air fuel ratio sensor - heater) P0068, P0107, P0108 (Manifold absolute pressure (MAP) sensor) P0101, P0102, P0103 (Mass air flow (MAF) sensor) P0111, P0112, P0113 (Intake air temperature (IAT) sensor) P0117, P0118, P0125 (Engine coolant temperature (ECT) sensor) P0122, P0123, P0222, P0223 (Throttle position sensor) P0131, P0132 (Air fuel ratio sensor - ECM input voltage) P0134, P2195, P2196 (Air fuel ratio sensor - output voltage) P0171, P0172 (Fuel system main feedback control) P0335, P0336 (Crankshaft position sensor) P0340, P0345 (Camshaft position sensor - intake with VVT) P0365, P0390 (Camshaft position sensor - exhaust with VVT) P0458, P0459 (Solenoid valve for purge control) P0461, P0462, P0463 (Fuel level sensor (FL)) P0604, P0605 (ROM in ECM) P0851, P0852 (Neutral position switch) P1160 (Throttle return spring) P2101, P2102 (Throttle actuator control motor) P2109 (Throttle position sensor minimum stop) P2119 (Throttle actuator control) P2122, P2123, P2127, P2128 (Accelerator pedal position sensor (APPS) circuit) P2135 (Throttle position sensor (TPS) correlation) P2138 (Accelerator pedal position sensor (APPS) correlation)</p>
<p>Change of manifold absolute pressure (MAP) during 1/2 engine rev.</p>	<p>Less than 13.3 kPa (100 mmHg)</p>
<p>Throttle position change during 16 ms</p>	<p>Less than 16.8%</p>
<p>Fuel cut</p>	<p>Not active</p>
<p>VSC or A/T torque control</p>	<p>Not active</p>
<p>EVAP system monitoring</p>	<p>Not active</p>
<p>Battery voltage</p>	<p>8 V or higher</p>
<p>Engine speed</p>	<p>500 to 7450 rpm</p>
<p>Fuel level</p>	<p>15% or more</p>
<p>MAP</p>	<p>21.7 kPa (163 mmHg) or more (A/T) (varies with engine speed) 20.9 kPa (157 mmHg) or more (M/T) (varies with engine speed)</p>

TYPICAL MALFUNCTION THRESHOLDS

Monitor Period of Emission-related Misfire

Misfire percentage in 1000 rev.	1.9% or more
---------------------------------	--------------

Monitor Period of Catalyst-damaging Misfire (MIL Blinks)

Misfire percentage in 200 rev.	5% or more (varies with engine speed)
--------------------------------	---------------------------------------

MONITOR RESULT

Refer to detailed information in Checking Monitor Status [INFO](#) .

CONFIRMATION DRIVING PATTERN

1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON.
3. Turn the Techstream on.
4. Record the DTC(s) and freeze frame data.
5. Clear DTCs (even if no DTCs are stored, perform the Clear DTC procedure) [INFO](#) .
6. Using the Techstream, switch the ECM from normal mode to check mode [INFO](#) .
7. Read the misfire counts of each cylinder, Cylinder #1 Misfire Count to Cylinder #4 Misfire Count, with the engine idling. If any misfire count is displayed, skip the following confirmation driving pattern.
8. Drive the vehicle so that the vehicle conditions displayed in Engine Speed and Calculate Load of the Data List are the same as the freeze frame data. Perform this step several times.

HINT:

In order to store misfire DTCs, it is necessary to operate the vehicle for the period of time shown in the table below, confirm the Misfire RPM and Misfire Load in the Data List.

ENGINE SPEED	DURATION
Idling	8.0 minutes or more
1000	4.5 minutes or more
2000	2.5 minutes or more
3000	1.5 minutes or more

9. Check whether misfires have occurred by checking DTCs and freeze frame data.

HINT:

Do not turn the ignition switch off until the output DTC(s) and freeze frame data have been recorded. When the ECM returns to normal mode (default), the stored DTC(s), freeze frame data and other data are cleared.

10. Record the DTC(s), freeze frame data and misfire counts.
11. Turn the ignition switch off and wait for at least 30 seconds.
12. Clear DTCs (even if no DTCs are stored, perform the Clear DTC procedure) [INFO](#) .

INSPECTION PROCEDURE

HINT:

- If any DTCs other than misfire DTCs are output, troubleshoot those DTCs first.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- If the misfire does not recur when the vehicle is brought to the workshop, reproduce the conditions stored in the ECM as freeze frame data.
- If the misfire still cannot be reproduced even though the conditions stored in the ECM as freeze frame data have been reproduced, one of the following factors is considered to be a possible cause of the problem:
 - a. There was insufficient fuel in the tank.
 - b. Improper fuel was used.
 - c. The spark plugs have been contaminated.
 - d. The problem requires further diagnosis.
- After finishing repairs, check the misfire counts of the cylinders (Cylinder #1 Misfire Count to Cylinder #4 Misfire Count).
- Be sure to confirm that no misfiring cylinder DTCs are stored again by conducting the confirmation driving pattern after finishing repairs.
- When one of Short FT #1 or Long FT #1 in the freeze frame data is outside the range of +/-15%, the air fuel ratio may be rich (-15% or less) or lean (+15% or more).
- When Coolant Temp in the freeze frame data is below 75°C (167°F), the misfires have occurred only while warming up the engine.
- An extremely imbalanced drive wheel which causes body vibration may cause misfire DTCs to be stored.

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO MISFIRE DTCS)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Read DTCs.

Result

RESULT	PROCEED TO
DTC P0300, P0301, P0302, P0303 and/or P0304 are output	A
DTC P0300, P0301, P0302, P0303 and/or P0304 and other DTCs are output	B

HINT:


If any DTCs other than P0300, P0301, P0302, P0303 and P0304 are output, troubleshoot those DTCs first.

B ► GO TO DTC CHART

A



2.	CHECK PCV HOSE CONNECTIONS
-----------	-----------------------------------

(a) Check the PCV hose connections  .

OK:

PCV valve and hose are correctly connected and are not damaged.

NG ► REPAIR OR REPLACE PCV HOSE

OK



3.	READ VALUE USING TECHSTREAM (PORT INJECTION)
-----------	---

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Way / Port.

(e) Start the engine and allow the engine to idle.

(f) Read the Cylinder #1 Misfire Count to Cylinder #4 Misfire Count or DTCs displayed on the Techstream.

Result

MISFIRE COUNT	PROCEED TO
Most misfires occur in only 1 or 2 cylinders	A
3 cylinders or more have equal misfire counts	A
There are no misfire counts	B

B ► READ VALUE USING TECHSTREAM (CYLINDER MISFIRE COUNT)

A



4.	READ VALUE USING TECHSTREAM (DIRECT INJECTION)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Way / Direct.
- (e) Start the engine and allow the engine to idle.
- (f) Read the Cylinder #1 Misfire Count to Cylinder #4 Misfire Count or DTCs displayed on the Techstream.

Result

MISFIRE COUNT		PROCEED TO
PORT	DIRECT	
Most misfires occur in only 1 or 2 cylinders	Most misfires occur in only 1 or 2 cylinders	A
3 cylinders or more have equal misfire counts	3 cylinders or more have equal misfire counts	B
Most misfires occur in only 1 or 2 cylinders	There are no misfire counts	C
3 cylinders or more have equal misfire counts	There are no misfire counts	D

B ▶ CHECK INTAKE SYSTEM


C ▶ REPLACE FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)

D ▶ CHECK FUEL PRESSURE (LOW PRESSURE SIDE)

A



5.	INSPECT SPARK PLUG
-----------	---------------------------

- (a) Inspect the spark plug of the misfiring cylinder  .

OK



6.	CHECK FOR SPARK (SPARK TEST)
----	------------------------------

(a) Perform a spark test  .


HINT:

If the result of the spark test is normal, proceed to the next step.

NEXT




7.	CHECK CYLINDER COMPRESSION PRESSURE
----	-------------------------------------

(a) Measure the cylinder compression pressure of the misfiring cylinder  .

NG ► CHECK ENGINE TO DETERMINE CAUSE OF LOW COMPRESSION

OK ► REPLACE ECM

8.	CHECK INTAKE SYSTEM
----	---------------------

(a) Check the intake system for vacuum leaks  .

OK:

No leaks from intake system.

NG ► REPAIR OR REPLACE INTAKE SYSTEM

OK



9.	READ VALUE USING TECHSTREAM (COOLANT TEMP)
----	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Data List / Coolant Temp.
- (e) Read the Coolant Temp twice, when the engine is both cold and warmed up.

Standard:

With cold engine

Same as ambient air temperature.

With warm engine

Between 75 and 100°C (167 and 212°F)

NG  **REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

OK




10.	READ VALUE USING TECHSTREAM (MAF)
------------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Start the engine.
- (e) Enter the following menus: Powertrain / Engine / Data List / MAF, Coolant Temp and Engine Speed.
- (f) Allow the engine to idle until Coolant Temp reaches 75°C (167°F) or higher.
- (g) Read MAF with the engine speed at 3000 rpm.

Standard:

Between 13.0 gm/sec and 14.0 gm/sec (shift lever: N, A/C: Off).

NG  **CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER CONNECTOR CONNECTION)**

OK



11.	CHECK VALVE TIMING
------------	---------------------------

(a) Check the valve timing  .

Result

RESULT	PROCEED TO
ABNORMAL	A
NORMAL	B

B ► CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER CONNECTOR CONNECTION)

A ► ADJUST VALVE TIMING


12. CHECK FUEL PRESSURE (LOW PRESSURE SIDE)

(a) Check the fuel pressure (low pressure side)  .

NG ► INSPECT FUEL PUMP ASSEMBLY

OK ► REPLACE FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)

13. INSPECT FUEL PUMP ASSEMBLY

(a) Inspect the fuel pump assembly  .

NG ► REPLACE FUEL PUMP ASSEMBLY

OK ► GO TO FUEL INJECTOR CIRCUIT

14. READ VALUE USING TECHSTREAM (CYLINDER MISFIRE COUNT)

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Way / Direct.

(e) Start the engine and allow the engine to idle.

(f) Read the Cylinder #1 Misfire Count to Cylinder #4 Misfire Count or DTCs displayed on the

Techstream.


Result

MISFIRE COUNT		PROCEED TO
PORT	DIRECT	
There are no misfire counts	There are misfire counts	A
There are no misfire counts	There are no misfire counts	B

B ▶ READ VALUE USING TECHSTREAM (CYLINDER MISFIRE COUNT)

A ▶ REPLACE FUEL INJECTOR ASSEMBLY (FOR DIRECT INJECTION)

15.	READ VALUE USING TECHSTREAM (CYLINDER MISFIRE COUNT)
------------	---

- (a) Connect the Techstream to the DLC3.
- (b) Start the engine and turn the Techstream on.
- (c) Clear DTCs ().
- (d) Enter the following menus: Powertrain / Engine / Data List / Misfire RPM, Misfire Load, Cylinder #1 to #4 Misfire Count and Injection Way.
- (e) Monitor all of the misfire count values or DTCs and Injection Way displayed on the Techstream.

Result

MISFIRE COUNTS	INJECTION WAY	PROCEED TO
There are no misfire counts	-	A
Most misfires occur in only 1 or 2 cylinders	Either	B
3 cylinders or more have equal misfire counts	Either	C
There are misfire counts	Direct	D

B ▶ INSPECT SPARK PLUG


C ▶ CHECK INTAKE SYSTEM

D ▶ REPLACE FUEL INJECTOR ASSEMBLY (FOR DIRECT INJECTION)

A ▶ CHECK FOR INTERMITTENT PROBLEMS

--	--

16. INSPECT SPARK PLUG

(a) Inspect the spark plug of the misfiring cylinder  .

NG  REPLACE SPARK PLUG

OK



17. CHECK FOR SPARK (SPARK TEST)

(a) Perform a spark test  .


HINT:

If the result of the spark test is normal, proceed to the next step.

NEXT



18. CHECK CYLINDER COMPRESSION PRESSURE

(a) Measure the cylinder compression pressure of the misfiring cylinder  .

NG  CHECK ENGINE TO DETERMINE CAUSE OF
LOW COMPRESSION

OK  REPLACE ECM

19. CHECK INTAKE SYSTEM

(a) Check the intake system for vacuum leaks  .

OK:

No leaks from intake system.

NG  REPAIR OR REPLACE INTAKE SYSTEM

OK



20.	READ VALUE USING TECHSTREAM (COOLANT TEMP)
------------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Data List / Coolant Temp.
- (e) Read the Coolant Temp twice, when the engine is both cold and warmed up.

Standard:

With cold engine

Same as ambient air temperature.

With warm engine

Between 75 and 100°C (167 and 212°F)

NG ► **REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

OK



21.	READ VALUE USING TECHSTREAM (MAF)
------------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Start the engine.
- (e) Enter the following menus: Powertrain / Engine / Data List / MAF, Coolant Temp and Engine Speed.
- (f) Allow the engine to idle until Coolant Temp reaches 75°C (167°F) or higher.
- (g) Read MAF with the engine speed at 3000 rpm.

Standard:


Between 13.0 gm/sec and 14.0 gm/sec (shift lever: N, A/C: Off).

NG ► **CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER CONNECTOR CONNECTION)**

OK



22.	CHECK VALVE TIMING
-----	---------------------------


(a) Check the valve timing  .

NG  **ADJUST VALVE TIMING**

OK



23.	CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER CONNECTOR CONNECTION)
-----	---

(a) Check the connection and terminal contact pressure of connectors and wire harnesses between the mass air flow meter and ECM  .


HINT:

Repair any problems.

NEXT



24.	CHECK WHETHER DTC OUTPUT RECURS
-----	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine.
- (i) Warm up the engine.
- (j) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.

(k) Enter the following menus: Powertrain / Engine / Utility / All Readiness.

(l) Input the DTC: P0300, P0301, P0302, P0303 or P0304.

(m) Check the DTC judgment result.

Result

RESULT	PROCEED TO
ABNORMAL (P0300, P0301, P0302, P0303 or P0304 output)	A
NORMAL (No DTC output)	B

B  **END**

A



25.	CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER - ECM)
------------	--

(a) Disconnect the mass air flow meter connector.

(b) Disconnect the ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-12 (THA) - C16-1 (THA)	Always	Below 1 Ω
A36-29 (E1) - C16-2 (E2)	Always	Below 1 Ω

Standard Resistance (Check for short):


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-12 (THA) or C16-1 (THA) - Body ground	Always	10 k Ω or higher
A36-29 (E1) or C16-2 (E2) - Body ground	Always	10 k Ω or higher

**REPAIR OR REPLACE HARNESS OR
NG  CONNECTOR**

OK



26.	REPLACE MASS AIR FLOW METER
------------	------------------------------------

(a) Replace the mass air flow meter  .


HINT:

If the results of the inspections performed in steps 15 and 20 indicated no problem, proceed to the next step without replacing the mass air flow meter.

NEXT



27.	CHECK WHETHER DTC OUTPUT RECURS
------------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine.
- (i) Warm up the engine.
- (j) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (k) Enter the following menus: Powertrain / Engine / Utility / All Readiness.
- (l) Input the DTC: P0300, P0301, P0302, P0303 or P0304.
- (m) Check the DTC judgment result.

Result

RESULT	PROCEED TO
NORMAL (No DTC output)	A
ABNORMAL (P0300, P0301, P0302, P0303 or P0304 output)	B

B ▶ REPLACE ECM

A ▶ END



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000SVTONQX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0327,P0328,P0332,P0333: Knock Sensor 1 Circuit Low Input (Bank 1 or Single Sensor) (2013 FR-S)		

DTC	P0327	Knock Sensor 1 Circuit Low Input (Bank 1 or Single Sensor)
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DTC	P0328	Knock Sensor 1 Circuit High Input (Bank 1 or Single Sensor)
------------	--------------	--

DTC	P0332	Knock Sensor 2 Circuit Low Input (Bank 2)
------------	--------------	--

DTC	P0333	Knock Sensor 2 Circuit High Input (Bank 2)
------------	--------------	---

DESCRIPTION

A flat-type knock sensor (non-resonant type) has a structure that can detect vibrations between approximately 5 kHz and 15 kHz.

Knock sensor is fitted onto the engine block to detect engine knocking.

The knock sensor contains a piezoelectric element which generates a voltage when it becomes deformed.

The voltage is generated when the engine block vibrates due to knocking. Any occurrence of engine knocking can be suppressed by delaying the ignition timing.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0327	Knock sensor voltage is less than 0.154 V for 1 second or more (bank 1). (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in knock sensor circuit (bank 1) • Knock sensor (bank 1) • ECM
P0328	Knock sensor voltage is more than 4.838 V for 1 second or more (bank 1). (1 trip detection logic)	
P0332	Knock sensor voltage is less than 0.154 V for 1 second or more (bank 2). (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in knock sensor circuit (bank 2) • Knock sensor (bank 2) • ECM
P0333	Knock sensor voltage is more than 4.838 V for 1 second or more (bank 2). (1 trip detection logic)	

HINT:

When DTC P0327, P0328, P332 or P0333 is stored, the ECM enters fail-safe mode. During fail-safe mode, the ignition timing is delayed to its maximum retardation. Fail-safe mode continues until the ignition switch is turned off.

MONITOR DESCRIPTION

If the output voltage transmitted by the knock sensor remains low or high for more than 1 second, the ECM interprets this as a malfunction in the sensor circuit and the ECM illuminates the MIL and sets a DTC.

MONITOR STRATEGY

Related DTCs	P0327: Knock sensor range check (Low voltage) (Bank 1) P0328: Knock sensor range check (High voltage) (Bank 1) P0332: Knock sensor range check (Low voltage) (Bank 2) P0333: Knock sensor range check (High voltage) (Bank 2)
Required Sensors/Components (Main)	Knock sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	1 second
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	None
---	------

TYPICAL MALFUNCTION THRESHOLDS

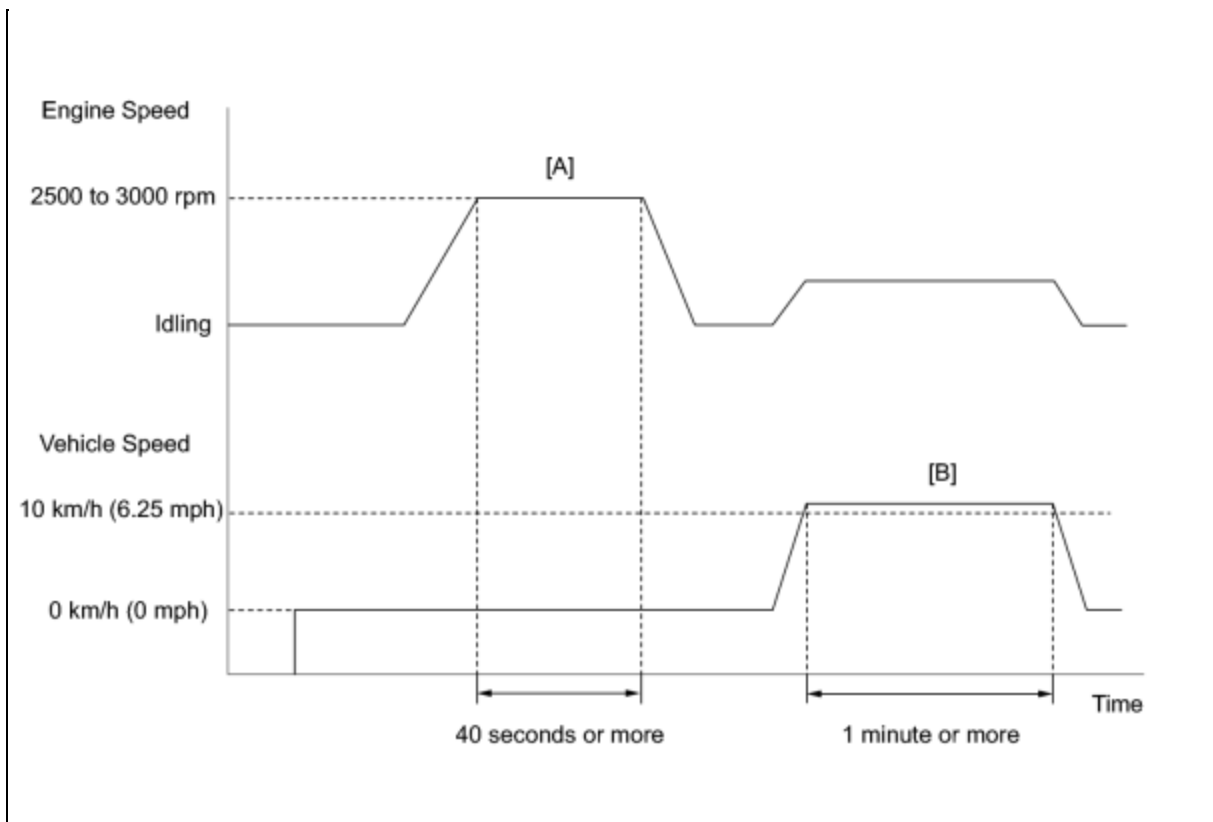
P0327, P0332

Knock sensor voltage	Less than 0.154 V
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P0328, P0333

Knock sensor voltage	More than 4.838 V
----------------------	-------------------

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:


- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P0327, P0328, P0332 or P0333.
 13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal

ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

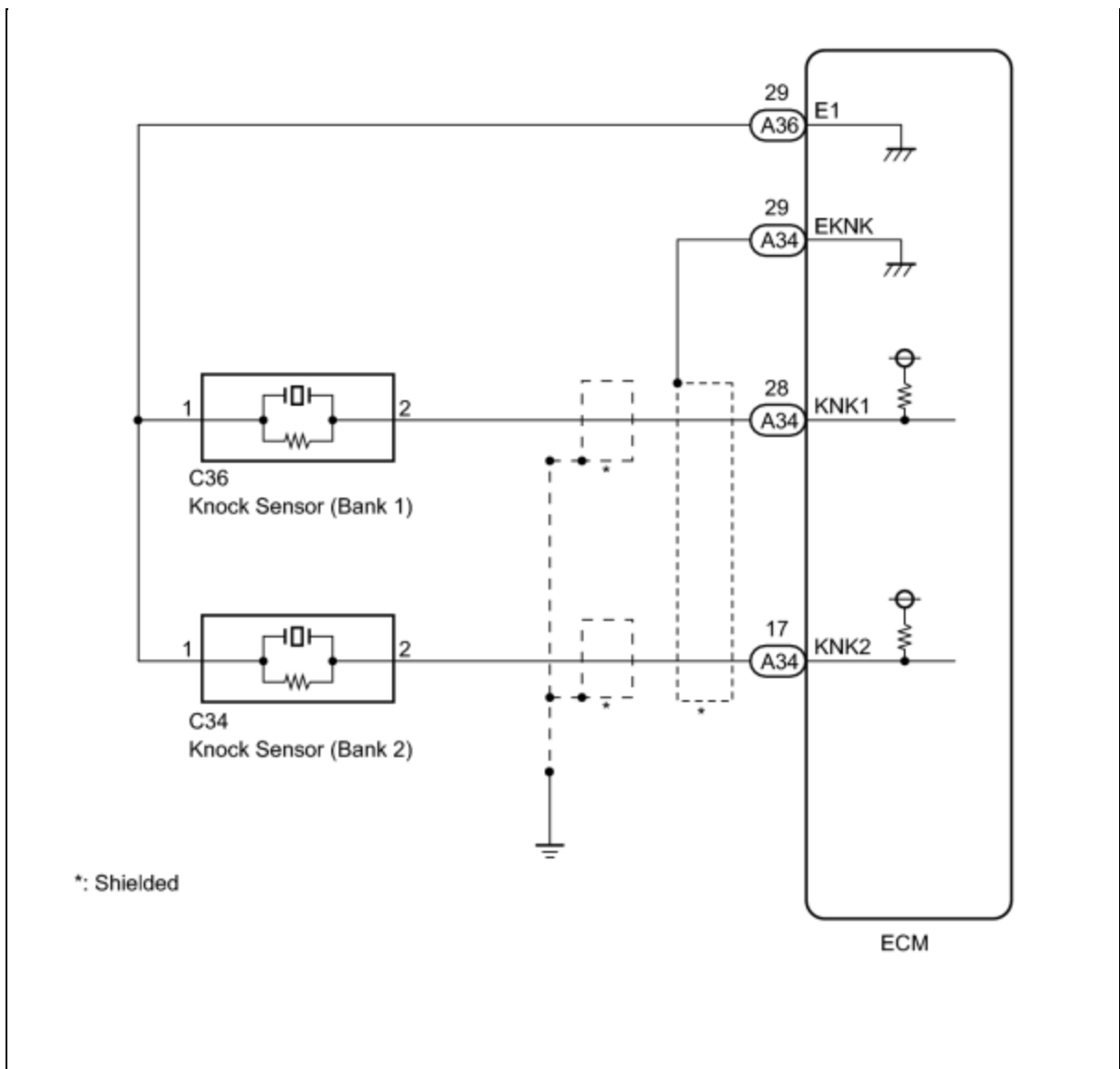
- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



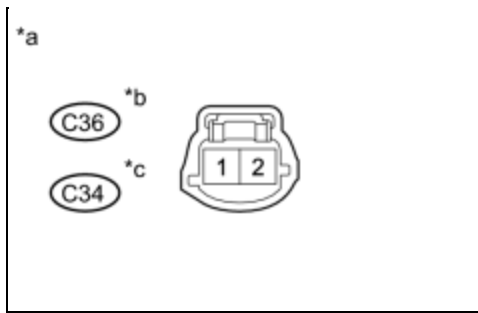
INSPECTION PROCEDURE

HINT:

- If DTC P0327 or P0332 is displayed, check the knock sensor circuit for the right bank (bank 1).
- If DTC P0328 or P0333 is displayed, check the knock sensor circuit for the left bank (bank 2).
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	CHECK TERMINAL VOLTAGE (+B OF KNOCK SENSOR)
----	--



(a) Disconnect the knock sensor connector.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
C36-1 - C36-2	Ignition switch ON	2.4 to 2.6 V
C34-1 - C34-2	Ignition switch ON	2.4 to 2.6 V

Text in Illustration


*a	Front view of wire harness connector (to Knock Sensor)
*b	Bank 1
*c	Bank 2

NG ► CHECK HARNESS AND CONNECTOR (ECM - KNOCK SENSOR)

OK



2.	INSPECT KNOCK SENSOR
-----------	-----------------------------


(a) Inspect the knock sensor  .

NG ► REPLACE KNOCK SENSOR

OK



3.	CHECK WHETHER DTC OUTPUT RECURS
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine.
- (i) Warm up the engine.
- (j) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (k) Enter the following menus: Powertrain / Engine / Utility / All Readiness.
- (l) Input the DTC: P0327, P0328, P0332, or P0333.
- (m) Check the DTC judgment result.

Result

RESULT	PROCEED TO
NORMAL (No DTC output)	A
ABNORMAL (P0327, P0328, P0332, or P0333 output)	B

B ► REPLACE ECM

A ► CHECK FOR INTERMITTENT PROBLEMS

4.	CHECK HARNESS AND CONNECTOR (ECM - KNOCK SENSOR)
-----------	---

- (a) Disconnect the knock sensor connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-28 (KNK1) - C36-2	Always	Below 1 Ω
A34-17 (KNK2) - C34-2	Always	Below 1 Ω

A36-29 (E1) - C36-1	Always	Below 1 Ω
A36-29 (E1) - C34-1	Always	Below 1 Ω

Standard Resistance (Check for short):


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-28 (KNK1) or C36-2 - Body ground	Always	10 kΩ or higher
A34-17 (KNK2) or C34-2 - Body ground	Always	10 kΩ or higher
A36-29 (E1) or C36-1 - Body ground	Always	10 kΩ or higher
A36-29 (E1) or C34-1 - Body ground	Always	10 kΩ or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



5.	CHECK WHETHER DTC OUTPUT RECURS
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine.
- (i) Warm up the engine.
- (j) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (k) Enter the following menus: Powertrain / Engine / Utility / All Readiness.
- (l) Input the DTC: P0327, P0328, P0332 or P0333.
- (m) Check the DTC judgment result.

Result

RESULT	PROCEED TO
--------	------------

NORMAL (No DTC output)	A
ABNORMAL (P0327, P0328, P0332, or P0333 output)	B

B ▶ REPLACE ECM

A ▶ CHECK FOR INTERMITTENT PROBLEMS



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000TCW0R7X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0335,P0336: Crankshaft Position Sensor "A" Circuit (2013 FR-S)		

DTC	P0335	Crankshaft Position Sensor "A" Circuit
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DTC	P0336	Crankshaft Position Sensor Range / Performance
------------	--------------	---

DESCRIPTION

The crankshaft position sensor system consists of a No. 1 crankshaft position sensor plate and Magnetoresistive Element (MRE) type sensor. The crankshaft angle sensor plate is installed on the crankshaft. The crankshaft position sensor generates 30 signals per crankshaft revolution. The ECM uses the camshaft position signal to distinguish between the cylinders, and uses the crankshaft position signal to detect the crankshaft position and engine speed.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0335	No crankshaft position sensor signal is sent to the ECM while cranking for 3 seconds or more. (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Crankshaft angle sensor plate (crankshaft sub-assembly) • ECM
P0336	Crankshaft position sensor signal is not 30 counts per 1 revolution of crankshaft. (2 trip detection logic)	<ul style="list-style-type: none"> • Crankshaft position sensor • Crankshaft angle sensor plate (crankshaft sub-assembly) • ECM

MONITOR DESCRIPTION

If there is no signal from the crankshaft position sensor despite the crankshaft revolving, the ECM interprets this as a malfunction of the sensor and the ECM illuminates the MIL and sets a DTC.

MONITOR STRATEGY

Related DTCs	P0335: Crankshaft position sensor circuit continuity P0336: Crankshaft position sensor rationality check
Required sensors/Components (Main)	Crankshaft position sensor
Required sensors/Components (Related)	VVT sensor
Frequency of operation	Continuous
Duration	3 seconds: P0335 10 revolutions: P0336

MIL operation	Immediately: P335 2 driving cycles: P336
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

P0335

Monitor runs whenever following DTCs not present	None
Battery voltage	8 V or more
Starter switch	On

P0336

Monitor runs whenever following DTCs not present	P0122, P0123, P0222, P0223 (Throttle position sensor) P0335 (Crankshaft position sensor) P0604, P0605 (ROM in ECM) P1160 (Throttle return spring) P2101, P2102 (Throttle actuator control motor) P2109 (Throttle position sensor minimum stop) P2119 (Throttle actuator control) P2122, P2123, P2127, P2128 (Accelerator pedal position sensor (APPS) circuit) P2135 (Throttle position sensor (TPS) correlation) P2138 (Accelerator pedal position sensor (APPS) correlation)
Engine speed	Less than 4000 rpm
Battery voltage	8 V or more

TYPICAL MALFUNCTION THRESHOLDS


P0335

Crankshaft position sensor signal	No signal
-----------------------------------	-----------

P0336

Crankshaft position sensor signal during 1 revolution	Not 30
---	--------

CONFIRMATION DRIVING PATTERN

1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation)  .
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine.

HINT:

If the engine could not be started, crank engine for 10 seconds.

7. Idle the engine for 20 seconds or more.
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
9. Read pending DTCs.

HINT:

- If a pending DTC is output, the system is malfunctioning.
- If a pending DTC is not output, perform the following procedure.

10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
11. Input the DTC: P0335 or P0336.
12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System normal
ABNORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System abnormal
INCOMPLETE	<ul style="list-style-type: none"> ◦ DTC judgment not completed ◦ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> ◦ Unable to perform DTC judgment ◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

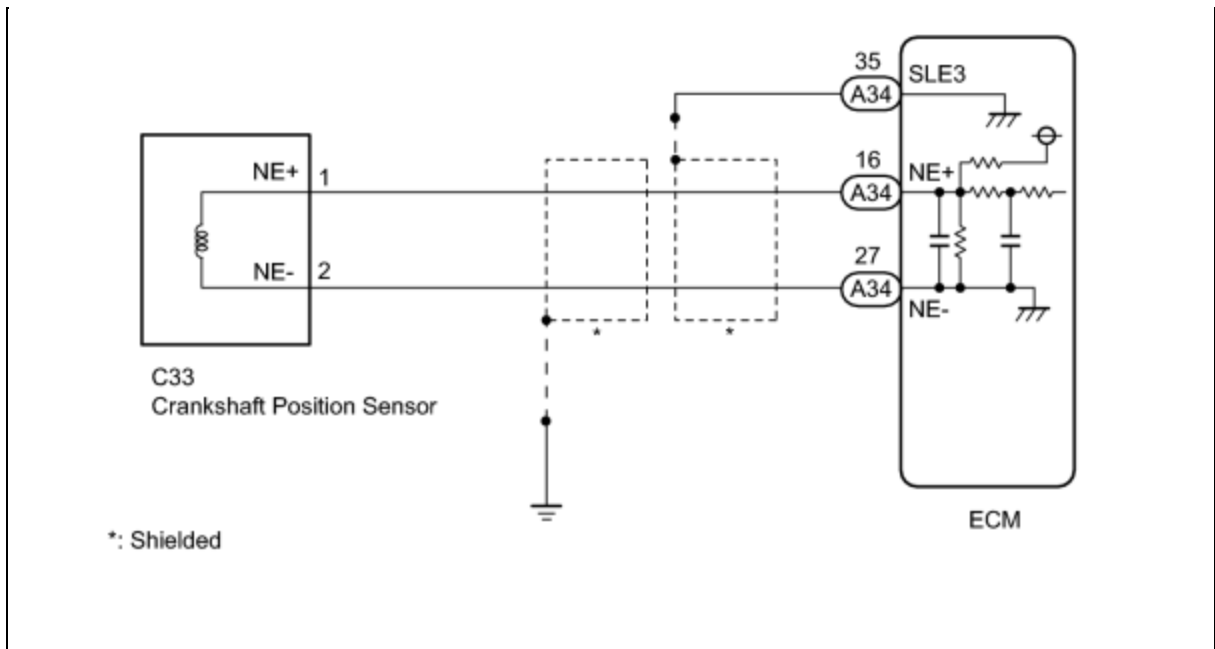
- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.

13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs INFO.

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If no problem is found by this diagnostic troubleshooting procedure, check for problems by referring to the engine mechanical section.
- The engine speed can be checked by using the Techstream. To perform the check, follow the procedures below:
 - a. Connect the Techstream to the DLC3.
 - b. Start the engine.
 - c. Turn the Techstream on.
 - d. Enter the following menus: Powertrain / Engine / Data List / Engine Speed.

The engine speed may be indicated as zero despite the engine running normally. This is caused by a lack of NE signals from the crankshaft position sensor. Alternatively, the engine speed may be indicated as lower than the actual engine speed if the crankshaft position sensor output voltage is insufficient.

- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	READ VALUE USING TECHSTREAM (ENGINE SPEED)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Data List / Engine Speed.

(e) Start the engine.

(f) Read the values displayed on the Techstream while the engine is running.

OK:

Correct values are displayed.

Result

RESULT	PROCEED TO
NG	A
OK	B

HINT:

- To check the engine speed change, display the graph on the Techstream.
- If the engine does not start, check the engine speed while cranking.
- If the engine speed indicated on the Techstream remains zero (0), there may be an open or short in the Crankshaft Position sensor circuit.

B ► CHECK FOR INTERMITTENT PROBLEMS

A



2.	INSPECT CRANKSHAFT POSITION SENSOR
-----------	---

(a) Inspect the crankshaft position sensor  .

NG ► REPLACE CRANKSHAFT POSITION SENSOR

OK



3.	CHECK HARNESS AND CONNECTOR (CRANKSHAFT POSITION SENSOR - ECM)
-----------	---

(a) Disconnect the ECM connector.

(b) Disconnect the crankshaft position sensor connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C34-16 (NE+) - C33-1 (NE+)	Always	Below 1 Ω

C34-27 (NE-) - C33-2 (NE-)

Always

Below 1 Ω

Standard Resistance (Check for short):

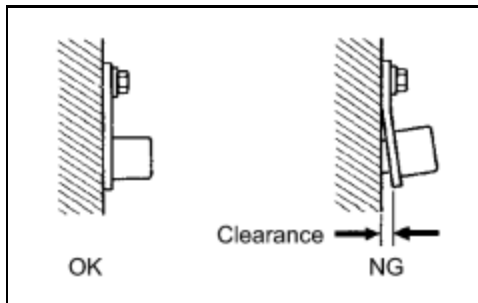
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C34-16 (NE+) or C33-1 (NE+) - Body ground	Always	10 k Ω or higher
C34-27 (NE-) or C33-2 (NE-) - Body ground	Always	10 k Ω or higher

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK



4. CHECK SENSOR INSTALLATION (CRANKSHAFT POSITION SENSOR)



(a) Check the crankshaft position sensor installation.

OK:

Sensor is installed correctly.

NG ► SECURELY REINSTALL SENSOR

OK



5. INSPECT CRANKSHAFT (TEETH OF SENSOR PLATE)

(a) Check the teeth of the No. 1 crankshaft position sensor plate.

OK:


Sensor plate does not have any cracks or deformation.

NG ► REPLACE NO. 1 CRANKSHAFT POSITION SENSOR PLATE

OK




6.	REPLACE CRANKSHAFT POSITION SENSOR
-----------	---

(a) Replace the crankshaft position sensor  .

NEXT



7.	CHECK WHETHER DTC OUTPUT RECURS (DTC P0335 OR P0336)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON and turn the tester on.
- (g) Start the engine.
- (h) Drive the vehicle in accordance with the driving pattern described in the Confirmation Driving Pattern.
- (i) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (j) Read DTCs.

Result

RESULT	PROCEED TO
No DTC is output	A
P0335 or P0336 is output	B

HINT:

If the engine does not start, replace the ECM.

B  REPLACE ECM

A  END



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WBZOJFX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0340,P0341,P0345,P0346: Camshaft Position Sensor Circuit Malfunction (2013 FR-S)		

DTC	P0340	Camshaft Position Sensor Circuit Malfunction
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DTC	P0341	Camshaft Position Sensor "A" Circuit Range / Performance (Bank 1 or Single Sensor)
------------	--------------	---

DTC	P0345	Camshaft Position Sensor "A" Circuit (Bank 2)
------------	--------------	--

DTC	P0346	Camshaft Position Sensor "A" Circuit Range / Performance (Bank 2)
------------	--------------	--

DESCRIPTION

The intake camshaft VVT sensors consist of a magnet and MRE (Magnetic Resistive Element).

The VVT camshaft drive gear has a sensor plate with 3 teeth on its outer circumference. When the gear rotates, changes occur in the air gaps between the sensor plate and MRE, which affects the magnetic field. As a result, the resistance of the MRE material fluctuates. The VVT sensor converts the gear rotation data to pulse signals, uses the pulse signals to determine the camshaft angle, and sends it to the ECM.

The crank angle sensor generates 30 signals for each engine rotation. Based on combination of the VVT sensor signals and crankshaft position sensor signals, the ECM detects the crankshaft angle. Then the ECM uses this data to control fuel injection time and injection timing. Also, based on the crankshaft position sensor signal, the ECM detects the engine speed.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0340	One of the following conditions is met (1 trip detection logic): <ul style="list-style-type: none"> No VVT sensor for intake side signal input during crankshaft 1.5 rotations (bank 1). No VVT sensor for intake side signal is sent to the ECM while cranking for 3 seconds or more (bank 1). 	<ul style="list-style-type: none"> Open or short in VVT sensor circuit (for intake side of bank 1) VVT sensor (for intake side of bank 1) Camshaft timing gear assembly (bank 1) Jumped tooth of timing chain for intake camshaft (bank 1) ECM
P0341	VVT sensor for intake side signal is not 3 during crankshaft 2 rotations (bank 1). (1 trip detection logic)	<ul style="list-style-type: none"> ECM
	One of the following conditions is met (1 trip detection logic): <ul style="list-style-type: none"> No VVT sensor for intake side signal input 	<ul style="list-style-type: none"> Open or short in VVT sensor circuit (for intake side of bank 2)

P0345	<p>during crankshaft 1.5 rotations (bank 2).</p> <ul style="list-style-type: none"> No VVT sensor for intake side signal is sent to the ECM while cranking for 3 seconds or more (bank 2). 	<ul style="list-style-type: none"> VVT sensor (for intake side of bank 2) Camshaft timing gear assembly (bank 2) Jumped tooth of timing chain for intake camshaft (bank 2) ECM
P0346	VVT sensor for intake side signal is not 3 during crankshaft 2 rotations (bank 2). (1 trip detection logic)	

MONITOR DESCRIPTION

If no signal is transmitted by the VVT sensor despite the engine running, or the rotations of the camshaft and the crankshaft are not synchronized, the ECM interprets this as a malfunction of the sensor.

MONITOR STRATEGY

Related DTCs	<p>P0340: Camshaft position sensor - Intake with VVT circuit continuity (Bank 1)</p> <p>P0341: Camshaft position sensor - Intake with VVT rationality check (Bank 1)</p> <p>P0345: Camshaft position sensor - Intake with VVT circuit continuity (Bank 2)</p> <p>P0346: Camshaft position sensor - Intake with VVT rationality check (Bank 2)</p>
Required Sensors/Components (Main)	VVT sensor (Bank 1 and 2)
Required Sensors/Components (Sub)	Crankshaft position sensor
Frequency of Operation	<p>Once per driving cycle: P340, P0345 (First monitor)</p> <p>Continuous: P340, P0345 (Second monitor)</p> <p>Continuous: P341, P0346</p>
Duration	<p>3 seconds: P340, P0345 (First monitor)</p> <p>7 revolutions: P340, P0345 (Second monitor)</p> <p>2 revolutions: P341, P0346</p>
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs are not present	None
Battery voltage	8 V or more

P0340, P0345 (First monitor)

Starter	On
Elapsed time after engine start	0.2 seconds or more

P0341, P0346

Elapsed time after engine start	0.2 seconds or more
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TYPICAL MALFUNCTION THRESHOLDS

P0340, P0345 (First monitor)

Intake VVT sensor signal	No signal
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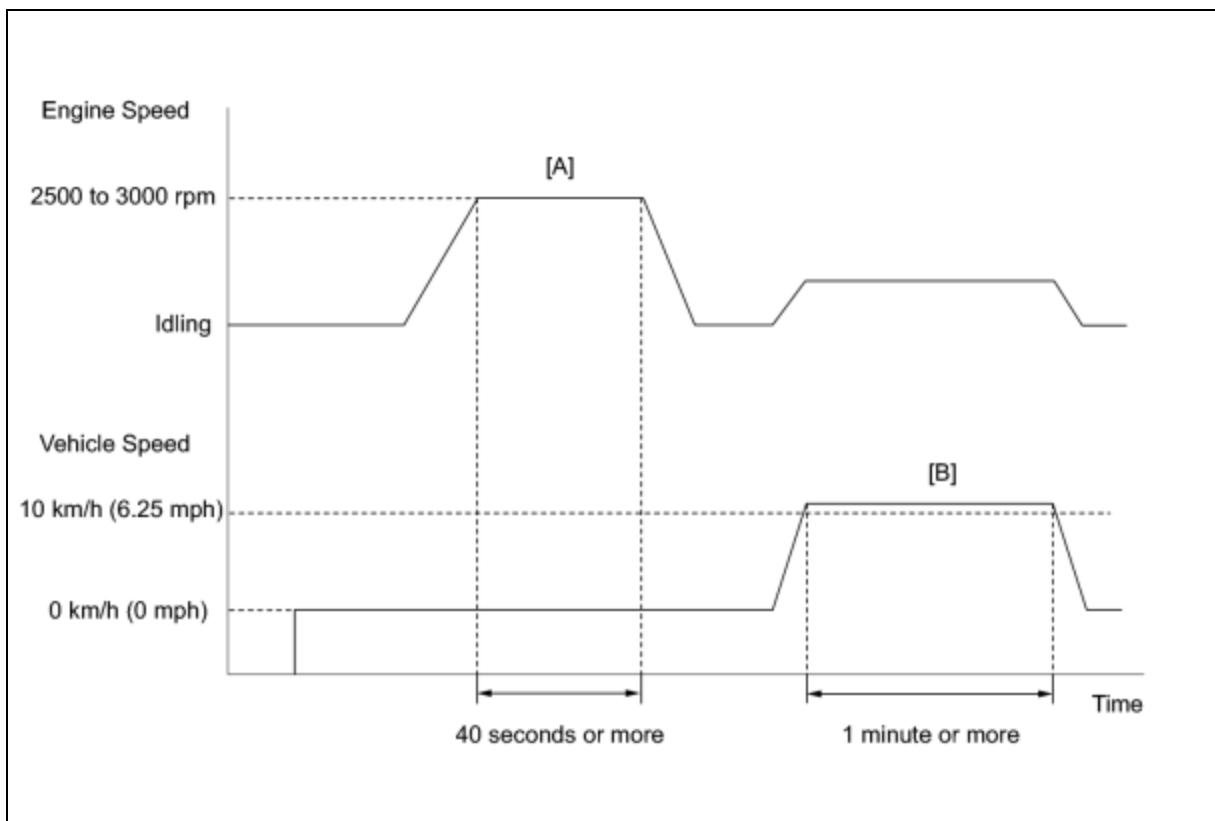
P0340, P0345 (Second monitor)

Intake VVT sensor signal during 1.5 revolutions	No signal
---	-----------

P0341, P0346

Intake VVT sensor signal during 2 revolutions	Not 3
---	-------

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of

between 2500 and 3000 rpm for 40 seconds or more [A].

8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.


9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:

- If a pending DTC is output, the system is malfunctioning.
 - If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P0340, P0341, P0345 or P0346.
 13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none">◦ DTC judgment completed◦ System normal
ABNORMAL	<ul style="list-style-type: none">◦ DTC judgment completed◦ System abnormal
INCOMPLETE	<ul style="list-style-type: none">◦ DTC judgment not completed◦ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none">◦ Unable to perform DTC judgment◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

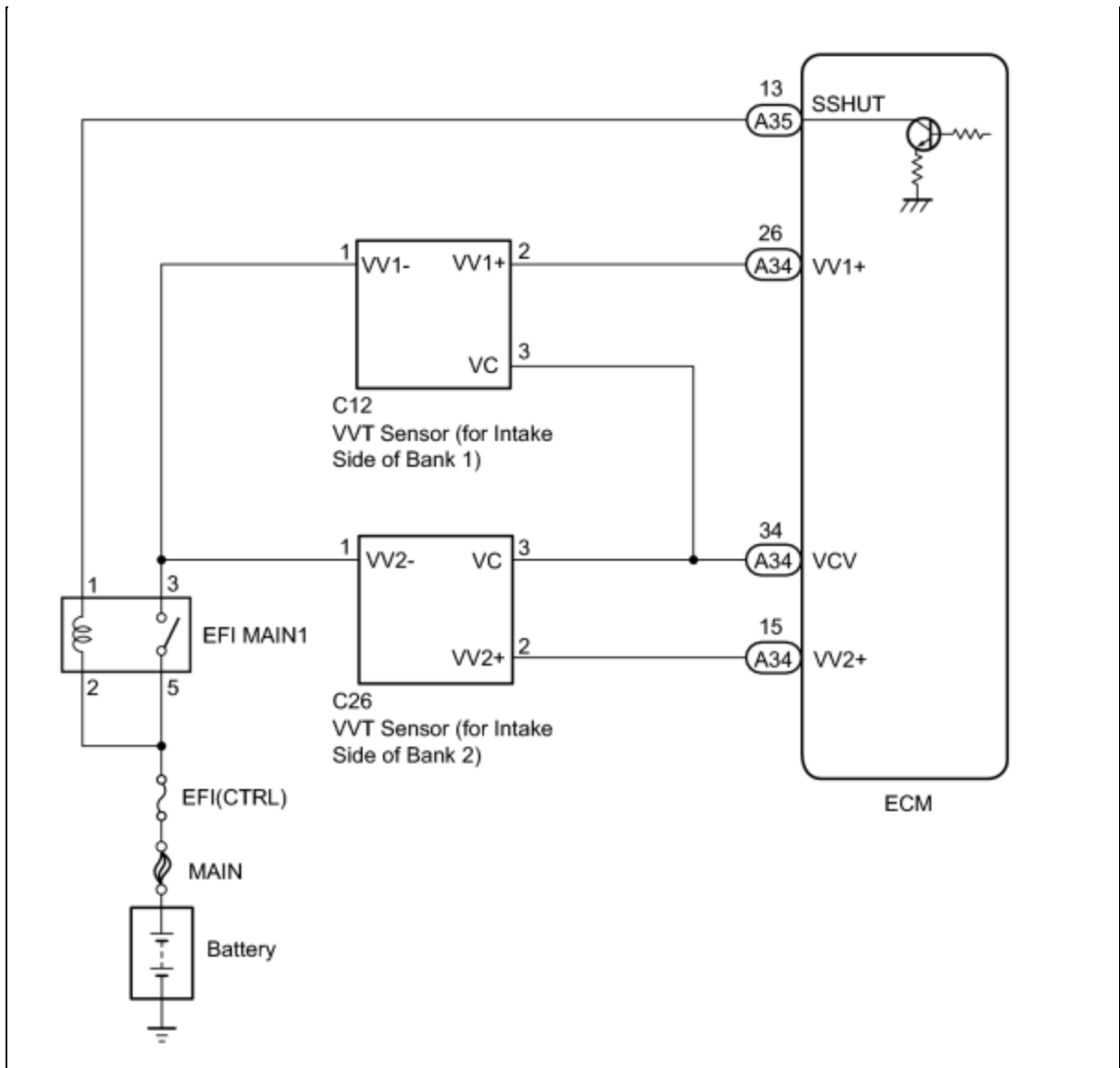
HINT:

- If the judgment result shows NORMAL, the system is normal.
 - If the judgment result shows ABNORMAL, the system has a malfunction.
14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTC P0340 or P0341 is displayed, check the VVT sensor for intake side circuit for the right bank (bank 1).
- If DTC P0345 or P0346 is displayed, check the VVT sensor for intake side circuit for the left bank (bank 2).
- Bank 1 refers to the bank that includes the No. 1 cylinder*.

*: The No. 1 cylinder is the cylinder which is farthest from transmission.

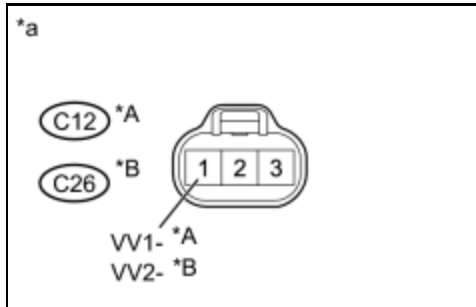
- Bank 2 refers to the bank that does not include the No. 1 cylinder.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- If no problem is found by this diagnostic troubleshooting procedure, troubleshoot the engine mechanical system.

PROCEDURE

1. CHECK VVT SENSOR FOR INTAKE SIDE (SENSOR POWER SOURCE)

- (a) Disconnect the VVT sensor connector.
- (b) Turn the ignition switch to ON.
- (c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:



TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
C12-1 (VV1-) - Body ground	Ignition switch ON	11 to 14 V
C26-1 (VV2-) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	Bank 1
*B	Bank 2
*a	Front view of wire harness connector (to VVT Sensor for Intake Side)

NG ▶ INSPECT RELAY (EFI MAIN1)

OK



2. CHECK HARNESS AND CONNECTOR (VVT SENSOR FOR INTAKE SIDE - ECM)

- (a) Disconnect the ECM connector.
- (b) Disconnect the VVT sensor connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-26 (VV1+) - C12-2 (VV1+)	Always	Below 1 Ω
A34-15 (VV2+) - C26-2 (VV2+)	Always	Below 1 Ω
A34-34 (VCV) - C12-3 (VC)	Always	Below 1 Ω
A34-34 (VCV) - C26-3 (VC)	Always	Below 1 Ω

Standard Resistance (Check for short):

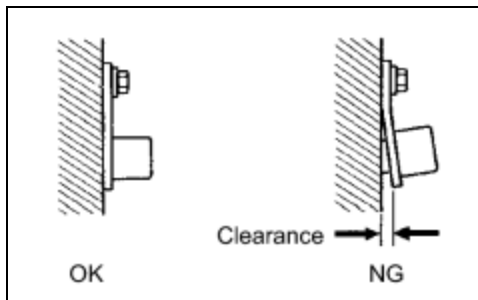
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-26 (VV1+) or C12-2 (VV1+) - Body ground	Always	10 kΩ or higher
A34-15 (VV2+) or C26-2 (VV2+) - Body ground	Always	10 kΩ or higher
A34-34 (VCV) or C12-3 (VC) - Body ground	Always	10 kΩ or higher
A34-34 (VCV) or C26-3 (VC) - Body ground	Always	10 kΩ or higher

NG ► **REPAIR OR REPLACE HARNESS OR CONNECTOR (VVT SENSOR FOR INTAKE SIDE - ECM)**

OK



3. CHECK SENSOR INSTALLATION (VVT SENSOR FOR INTAKE SIDE)



(a) Check the VVT sensor installation.

OK:

Sensor is installed correctly.

NG ► **SECURELY REINSTALL VVT SENSOR FOR INTAKE SIDE**

OK



4. CHECK CAMSHAFT TIMING GEAR ASSEMBLY (TEETH OF PLATE)

(a) Check the teeth of the sensor plate.

OK:

Sensor plate teeth do not have any cracks or deformation.

OK



5.	CHECK VALVE TIMING
-----------	---------------------------

(a) Check the valve timing  .

NG ► ADJUST VALVE TIMING

OK




6.	REPLACE VVT SENSOR FOR INTAKE SIDE
-----------	---

(a) Replace the VVT sensor  .

NEXT



7.	CHECK WHETHER DTC OUTPUT RECURS (DTC P0340, P0341, P0345 AND/OR P0346)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Start the engine.
- (g) Turn the Techstream on
- (h) Drive the vehicle in accordance with the driving pattern described in the Confirmation Driving Pattern.
- (i) Enter the following menus: Powertrain / Engine / Trouble Codes.

(j) Read the DTCs.

Result:

RESULT	PROCEED TO
DTC is not output	A
DTC P0340, P0341, P0345 or P0346 is output	B

HINT:

If the engine does not start, replace the ECM.

B ► REPLACE ECM

A ► END

8.	INSPECT RELAY (EFI MAIN1)
-----------	----------------------------------

(a) Inspect the EFI MAIN1 relay  .

NG ► REPLACE RELAY (EFI MAIN1)

OK
▼

9.	CHECK HARNESS AND CONNECTOR (VVT SENSOR FOR INTAKE SIDE - EFI MAIN1 RELAY)
-----------	---

(a) Disconnect the VVT sensor for intake side connector.

(b) Remove the EFI MAIN1 relay from the engine room relay block assembly.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN1 relay terminal 3 - C12-1 (VV1-)	Always	Below 1 Ω
EFI MAIN1 relay terminal 3 - C26-1 (VV2-)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN1 relay terminal 3 or C12-1 (VV1-) - Body ground	Always	10 k Ω or higher

EFI MAIN1 relay terminal 3 or C26-1 (VV2-) - Body ground	Always	10 kΩ or higher
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NG ▶ **REPAIR OR REPLACE HARNESS OR
CONNECTOR (VVT SENSOR FOR INTAKE
SIDE - ECM)**

OK ▶ **GO TO ECM POWER SOURCE CIRCUIT**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XH40PUX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0351-P0354: Ignition Coil "A" Primary / Secondary Circuit (2013 FR-S)		

DTC	P0351	Ignition Coil "A" Primary / Secondary Circuit
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DTC	P0352	Ignition Coil "B" Primary / Secondary Circuit
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DTC	P0353	Ignition Coil "C" Primary / Secondary Circuit
------------	--------------	--

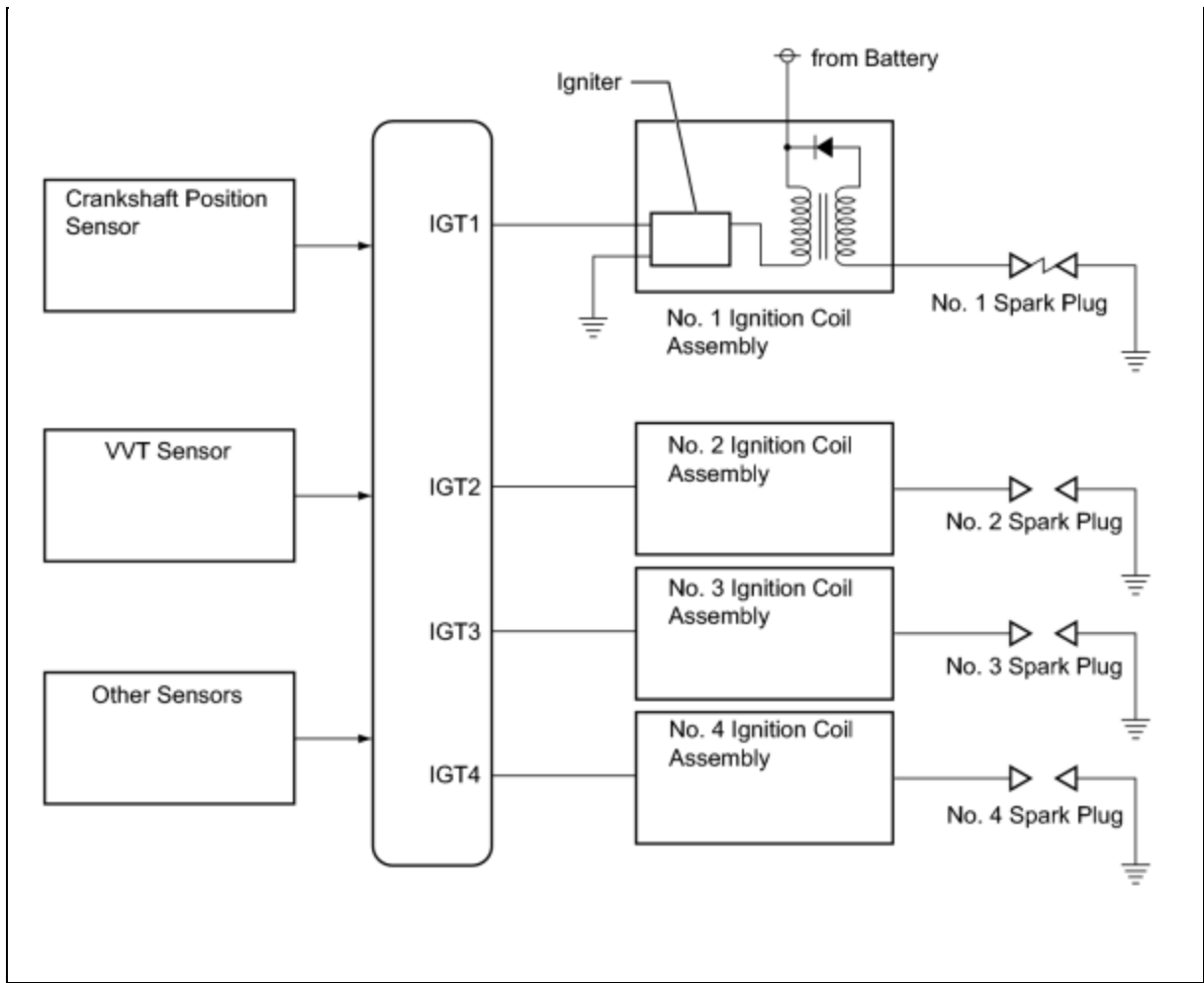
DTC	P0354	Ignition Coil "D" Primary / Secondary Circuit
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DESCRIPTION

A Direct Ignition System (DIS) is used on this vehicle.

The DIS is a 1-cylinder ignition system in which each cylinder is ignited by one ignition coil and one spark plug is connected to the end of each secondary wiring. A powerful voltage, generated in the secondary wiring, is applied directly to each spark plug. The spark current of the spark plugs passes from the ground electrodes to the center electrode.

The ECM determines the ignition timing and transmits the ignition (IGT) signals to each cylinder. Using the IGT signal, the ECM turns the power transistor inside the igniter on and off. The power transistor, in turn, switches on and off the current to the primary coil. When the current to the primary coil is cut off, a powerful voltage is generated in the secondary coil. This voltage is applied to the spark plugs, causing them to spark inside the cylinders.



DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0351	Received diagnostic information (open circuit detected / GND short / +B short or overheating) from the ignition coil driver IC for No. 1 ignition coil assembly continuously 10 times or more. (1 trip detection logic)	<ul style="list-style-type: none"> • Ignition system • Open or short in IGT circuit (1 to 4) between ignition coil and ECM • Ignition coil (No. 1 to No. 4 cylinder) • ECM
P0352	Received diagnostic information (open circuit detected / GND short / +B short or overheating) from the ignition coil driver IC for No. 2 ignition coil assembly continuously 10 times or more. (1 trip detection logic)	
P0353	Received diagnostic information (open circuit detected / GND short / +B short or overheating) from the ignition coil driver IC for No. 3 ignition coil assembly continuously 10 times or more. (1 trip detection logic)	
P0354	Received diagnostic information (open circuit detected / GND short / +B short or overheating) from the ignition coil driver IC for No. 4 ignition coil assembly continuously 10 times or more. (1 trip detection logic)	

MONITOR DESCRIPTION

If the ECM receives the malfunction signal from the ignition coil driver IC, it interprets this as a fault in the

igniter and stores a DTC.

MONITOR STRATEGY

Related DTCs	P0351: Ignition Coil "A" Primary / Secondary Circuit P0352: Ignition Coil "B" Primary / Secondary Circuit P0353: Ignition Coil "C" Primary / Secondary Circuit P0354: Ignition Coil "D" Primary / Secondary Circuit
Required Sensors/Components (Main)	Igniter
Required Sensors/Components (Related)	Crankshaft position sensor
Frequency of Operation	Continuous
Duration	2.5 seconds (256 msec. X 10 counts)
MIL Operation	Immediately
Sequence of Operation	None

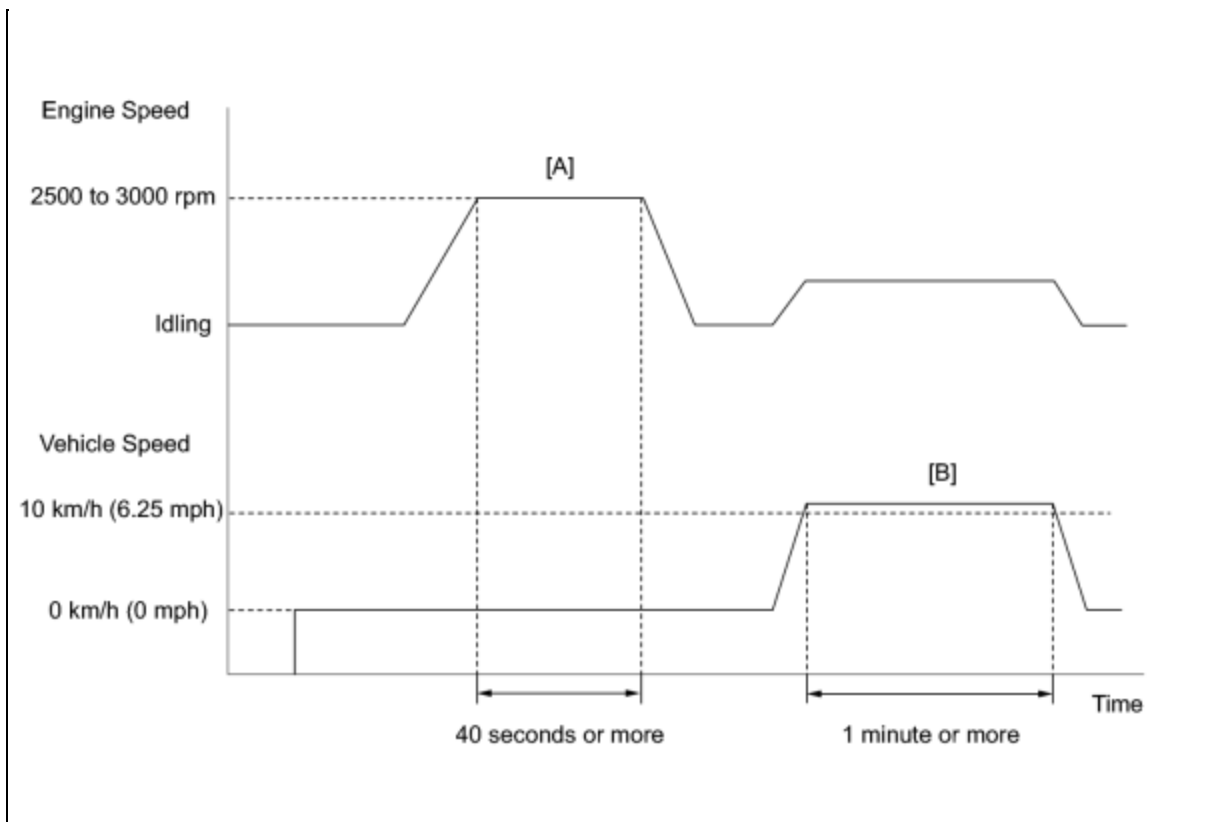
TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	None
Battery voltage	10.9 V or more
Elapsed time after engine start	1 second or more
Engine speed	500 rpm or higher
Ignition dwell time	0.002 seconds or more
Ignition cut	Not active

TYPICAL MALFUNCTION THRESHOLDS

Signal of malfunction from ignition coil driver IC	On
--	----

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:


- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P0351, P0352, P0353 or P0354.
 13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal

ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

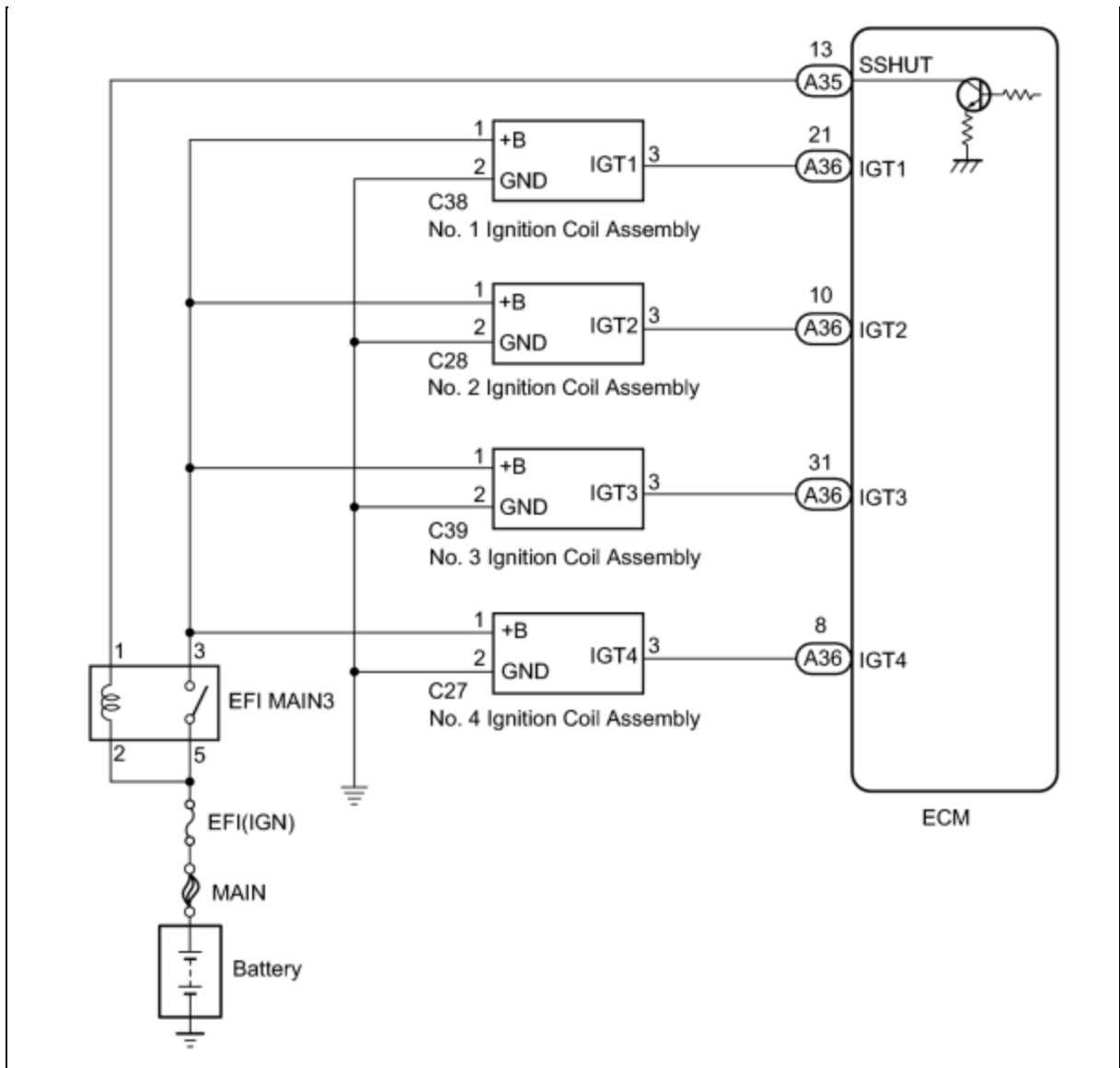
- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

- These DTCs indicate malfunctions relating to the primary circuit.
- If DTC P0351 is output, check the No. 1 ignition coil (No. 1 cylinder) circuit.
- If DTC P0352 is output, check the No. 2 ignition coil (No. 2 cylinder) circuit.
- If DTC P0353 is output, check the No. 3 ignition coil (No. 3 cylinder) circuit.
- If DTC P0354 is output, check the No. 4 ignition coil (No. 4 cylinder) circuit.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	CHECK WHETHER DTC OUTPUT RECURS
----	---------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs INFO.
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Shuffle the arrangement of the ignition coils (among No. 1 to No. 4 cylinders).

NOTICE:

Do not change the location of the connectors.

- (g) Drive the vehicle in accordance with the driving pattern described in the Confirmation Driving Pattern.
- (h) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (i) Read DTCs.

Result

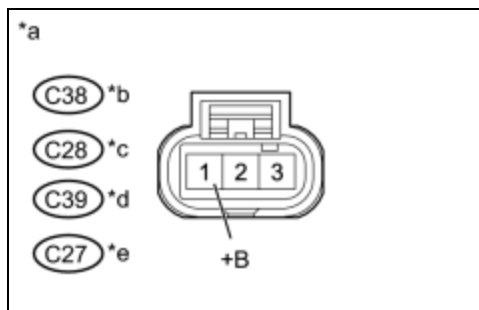
RESULT	PROCEED TO
Same DTC output	A
Different ignition coil DTC output	B

B ▶ REPLACE IGNITION COIL

A



2. INSPECT TERMINAL VOLTAGE (POWER SOURCE OF IGNITION COIL)



(a) Disconnect the ignition coil connectors.

- (b) Turn the ignition switch to ON.
- (c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
C38-1 (+B) - Body ground	Ignition switch ON	11 to 14 V
C28-1 (+B) - Body ground	Ignition switch ON	11 to 14 V
C39-1 (+B) - Body ground	Ignition switch ON	11 to 14 V
C27-1 (+B) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Ignition Coil)
*b	No. 1 cylinder
*c	No. 2 cylinder
*d	No. 3 cylinder
*e	No. 4 cylinder

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



3.	CHECK HARNESS AND CONNECTOR (IGNITION COIL - BODY GROUND)
-----------	--

- (a) Disconnect the ignition coil connectors.
 (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C38-2 (GND) - Body ground	Always	Below 1 Ω
C28-2 (GND) - Body ground	Always	Below 1 Ω
C39-2 (GND) - Body ground	Always	Below 1 Ω
C27-2 (GND) - Body ground	Always	Below 1 Ω

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



4.	CHECK HARNESS AND CONNECTOR (IGNITION COIL - ECM)
-----------	--

- (a) Disconnect the ECM connector.
- (b) Disconnect the ignition coil connectors.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-21 (IGT1) - C38-3 (IGT1)	Always	Below 1 Ω
A36-10 (IGT2) - C28-3 (IGT2)	Always	Below 1 Ω
A36-31 (IGT3) - C39-3 (IGT3)	Always	Below 1 Ω
A36-8 (IGT4) - C27-3 (IGT4)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-21 (IGT1) or C38-3 (IGT1) - Body ground	Always	10 k Ω or higher
A36-10 (IGT2) or C28-3 (IGT2) - Body ground	Always	10 k Ω or higher
A36-31 (IGT3) or C39-3 (IGT3) - Body ground	Always	10 k Ω or higher
A36-8 (IGT4) or- C27-3 (IGT4) - Body ground	Always	10 k Ω or higher

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK **REPLACE ECM**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000YTB0FIX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0365,P0366,P0390,P0391: Camshaft Position Sensor "B" Circuit (Bank 1) (2013 FR-S)		

DTC	P0365	Camshaft Position Sensor "B" Circuit (Bank 1)
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DTC	P0366	Camshaft Position Sensor "B" Circuit Range / Performance (Bank 1)
------------	--------------	--

DTC	P0390	Camshaft Position Sensor "B" Circuit (Bank 2)
------------	--------------	--

DTC	P0391	Camshaft Position Sensor "B" Circuit Range / Performance (Bank 2)
------------	--------------	--

DESCRIPTION

The exhaust camshaft VVT sensors consist of a magnet and MRE (Magnetic Resistive Element).

The exhaust camshaft has a sensor plate with 2 teeth on its outer circumference.

When the exhaust camshaft rotates, changes occur in the air gaps between the 2 teeth and MRE, which affects the magnet. As a result, the resistance of the MRE material fluctuates. The VVT sensor converts the exhaust camshaft rotation data to pulse signals, uses the pulse signals to determine the camshaft angle, and sends it to the ECM.

The crank angle sensor generates 30 signals for each engine rotation. Based on combination of the VVT signals and NE signal, the ECM detects the crankshaft angle. Then the ECM uses this data to control fuel injection time and injection timing. Also, based on the NE signal, the ECM detects the engine speed.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0365	No VVT sensor for exhaust side signal input during crankshaft 7.5 rotations (bank 1). (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in VVT sensor circuit (for exhaust side of bank 1) • VVT sensor (for exhaust side of bank 1) • Exhaust camshaft (bank 1) • Jumped tooth of timing chain • ECM
P0366	2 VVT sensor for exhaust side signals are not output during crankshaft 2 rotations (bank 1). (1 trip detection logic)	
P0390	No VVT sensor for exhaust side signal input during crankshaft 7.5 rotations (bank 2). (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in VVT sensor circuit (for exhaust side of bank 2) • VVT sensor (for exhaust side of bank 2) • Exhaust camshaft (bank 2)
P0391	2 VVT sensor for exhaust side signals are not output during crankshaft 2 rotations (bank 2).	

(1 trip detection logic)

- Jumped tooth of timing chain
- ECM

MONITOR DESCRIPTION

If no signal is transmitted by the VVT sensor despite the engine running, or the rotations of the camshaft and the crankshaft are not synchronized, the ECM interprets this as a malfunction of the sensor and the ECM illuminates the MIL and sets a DTC.

MONITOR STRATEGY

Related DTCs	P0365: Camshaft Position Sensor "B" Circuit (Bank 1) P0366: Camshaft Position Sensor "B" Circuit Range / Performance (Bank 1) P0390: Camshaft Position Sensor "B" Circuit (Bank 2) P0391: Camshaft Position Sensor "B" Circuit Range / Performance (Bank 2)
Required sensors/Components (Main)	VVT sensor for exhaust side (bank 1 and 2)
Required sensors/Components (Related)	Crankshaft position sensor
Frequency of operation	Continuous
Duration	7.5 revolutions: P0365, P0390 2 revolutions: P0366, P0391
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs are not present	None
Battery voltage	10.9 V or more
Elapsed time after engine start	0.2 seconds or more

TYPICAL MALFUNCTION THRESHOLDS

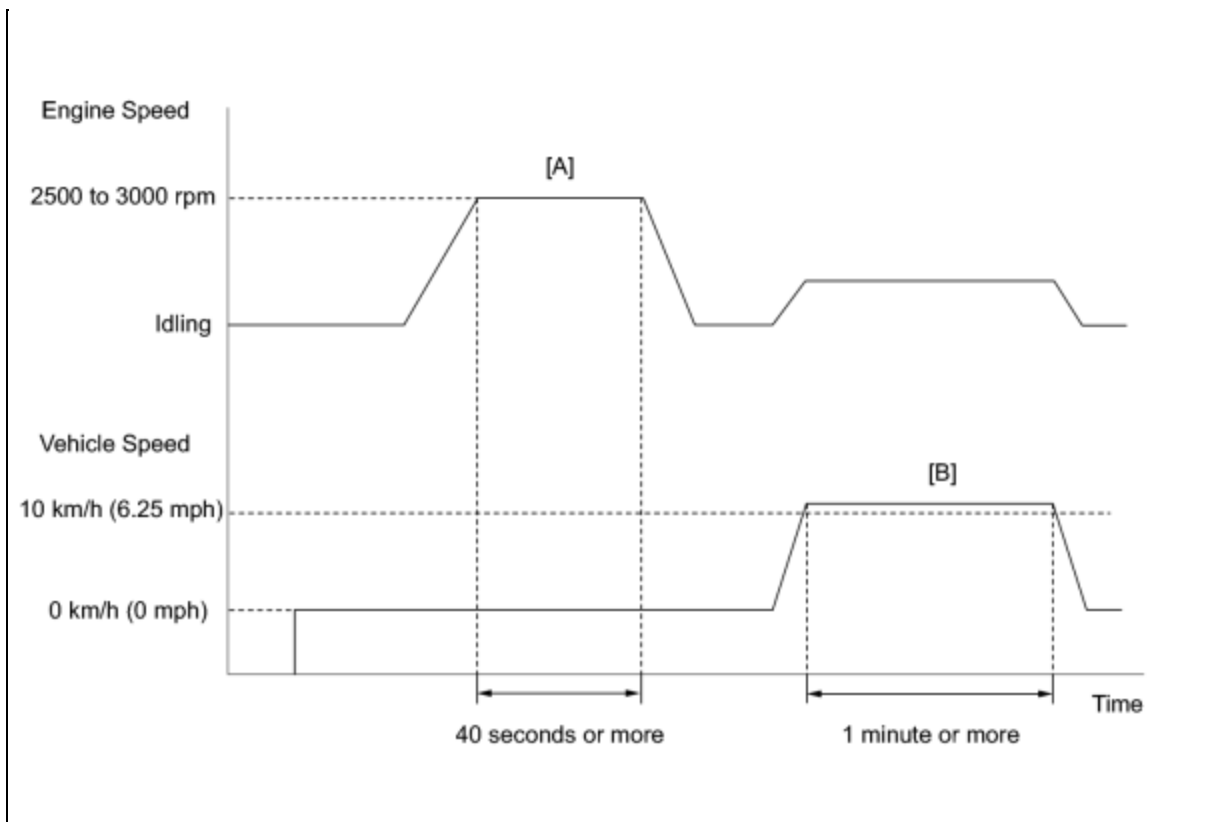
P0365, P0390

Exhaust VVT sensor signal	No signal
---------------------------	-----------

P0366, P0391

Exhaust VVT sensor signal during 2 revolutions	Not 2
--	-------

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:


- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P0365, P0366, P0390 or P0391.
 13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal

ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

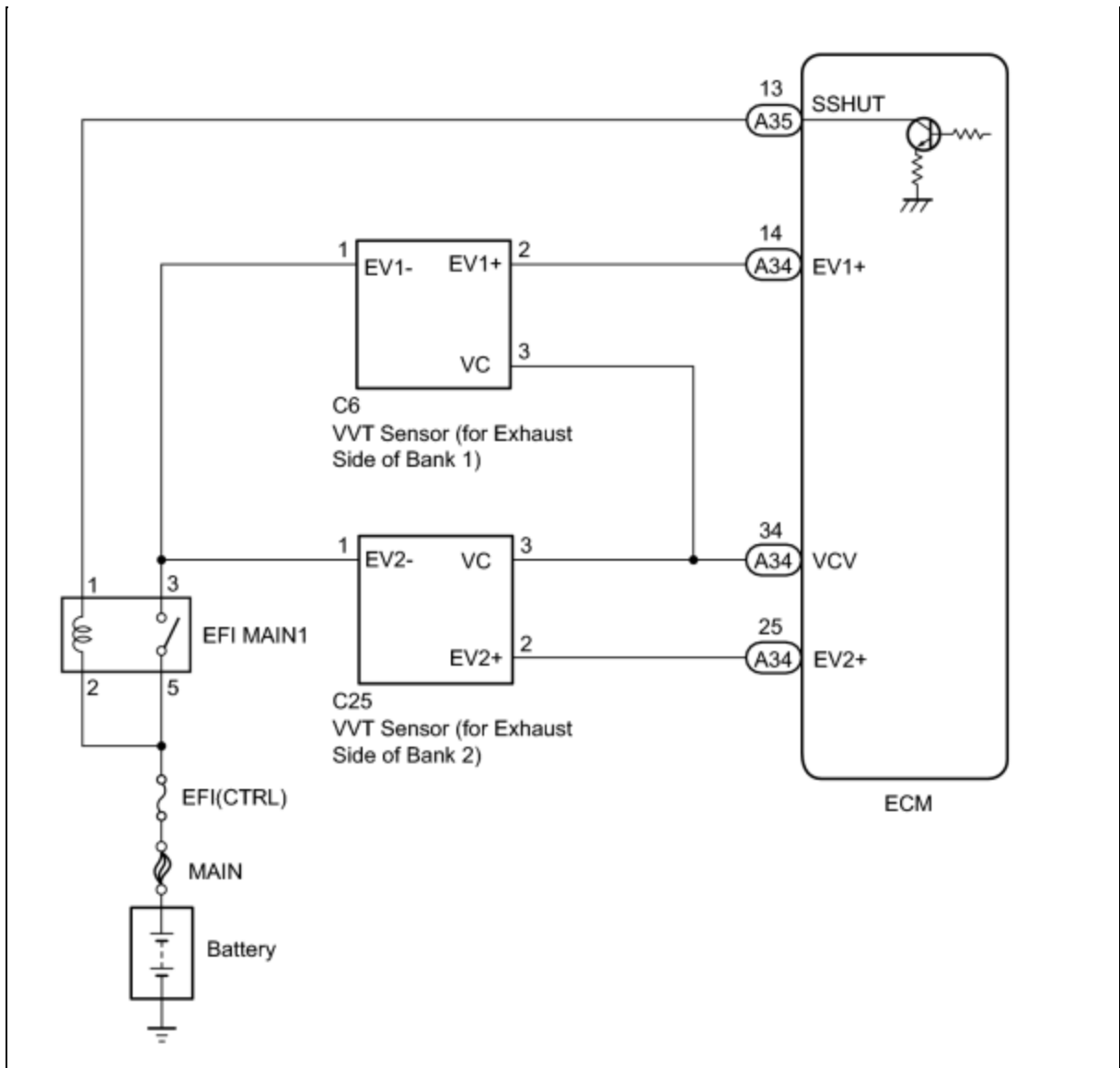
- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

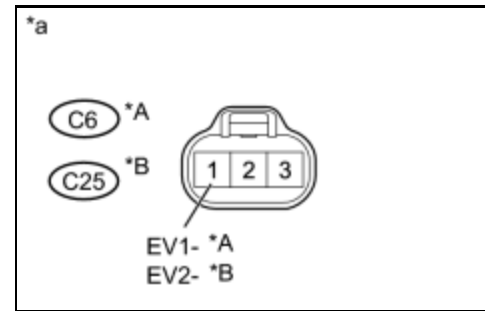
- If DTC P0365 or P0366 is displayed, check the VVT sensor circuit for the right bank (bank 1).
- If DTC P0390 or P0391 is displayed, check the VVT sensor circuit for the left bank (bank 2).
- Bank 1 refers to the bank that includes the No. 1 cylinder*.

*: The No. 1 cylinder is the cylinder which is farthest from transmission.

- Bank 2 refers to the bank that does not include the No. 1 cylinder.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- If no problem is found by this diagnostic troubleshooting procedure, troubleshoot the engine mechanical system.

PROCEDURE

- | | |
|----|--|
| 1. | CHECK VVT SENSOR FOR EXHAUST SIDE (SENSOR POWER SOURCE) |
|----|--|



(a) Disconnect the VVT sensor for exhaust side connector.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
C6-1 (EV1-) - Body ground	Ignition switch ON	11 to 14 V
C25-1 (EV2-) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	Bank 1
*B	Bank 2
*a	Front view of wire harness connector (to VVT Sensor for Exhaust Side)

NG ▶ **INSPECT RELAY (EFI MAIN1)**

OK



2.	CHECK HARNESS AND CONNECTOR (VVT SENSOR FOR EXHAUST SIDE - ECM)
-----------	--

(a) Disconnect the ECM connector.

(b) Disconnect the VVT sensor connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-14 (EV1+) - C6-2 (EV1+)	Always	Below 1 Ω
A34-25 (EV2+) - C25-2 (EV2+)	Always	Below 1 Ω

A34-34 (VCV) - C6-3 (VC)	Always	Below 1 Ω
A34-34 (VCV) - C25-3 (VC)	Always	Below 1 Ω

Standard Resistance (Check for short):

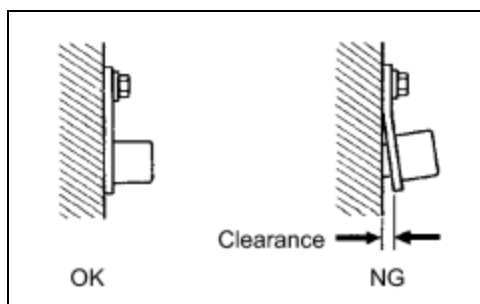
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-14 (EV1+) or C6-2 (EV1+) - Body ground	Always	10 k Ω or higher
A34-25 (EV2+) or C25-2 (EV2+) - Body ground	Always	10 k Ω or higher
A34-34 (VCV) or C6-3 (VC) - Body ground	Always	10 k Ω or higher
A34-34 (VCV) or C25-3 (VC) - Body ground	Always	10 k Ω or higher

NG ► **REPAIR OR REPLACE HARNESS OR CONNECTOR (VVT SENSOR FOR EXHAUST SIDE - ECM)**

OK



3.	CHECK SENSOR INSTALLATION (VVT SENSOR FOR EXHAUST SIDE)
-----------	--



(a) Check the VVT sensor installation.

OK:

Sensor is installed correctly.

NG ► **SECURELY REINSTALL VVT SENSOR FOR EXHAUST SIDE**

OK



4.	CHECK CAMSHAFT TIMING GEAR ASSEMBLY (TEETH OF PLATE)
-----------	---

(a) Check the teeth of the sensor plate.

OK:

Sensor plate teeth do not have any cracks or deformation.

NG ► **REPLACE CAMSHAFT TIMING GEAR ASSEMBLY**

OK



5.	CHECK VALVE TIMING
-----------	---------------------------

(a) Check the valve timing **INFO** .

NG ► **ADJUST VALVE TIMING**

OK



6.	REPLACE VVT SENSOR FOR EXHAUST SIDE
-----------	--

(a) Replace the VVT sensor for exhaust side **INFO** .

NEXT



7.	CHECK WHETHER DTC OUTPUT RECURS (DTC P0365, P0366, P0390 OR P0391)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs **INFO** .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Start the engine.
- (g) Turn the Techstream on.
- (h) Drive the vehicle in accordance with the driving pattern described in the Confirmation Driving Pattern.

(i) Enter the following menus: Powertrain / Engine / Trouble Codes / Pending.

(j) Read the DTC.

Result:

RESULT	PROCEED TO
DTC is not output	A
DTC P0365, P0366, P0390 or P0391 is output	B

HINT:

If the engine does not start, replace the ECM.

B ► REPLACE ECM

A ► END

8.	INSPECT RELAY (EFI MAIN1)
-----------	----------------------------------

(a) Inspect the EFI MAIN1 relay  .

NG ► REPLACE RELAY (EFI MAIN1)

OK



9.	CHECK HARNESS AND CONNECTOR (VVT SENSOR FOR EXHAUST SIDE - EFI MAIN1 RELAY)
-----------	--

(a) Disconnect the VVT sensor for exhaust side connector.

(b) Remove the EFI MAIN1 relay from the engine room relay block assembly.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN1 relay terminal 3 - C6-1 (EV1-)	Always	Below 1 Ω
EFI MAIN1 relay terminal 3 - C25-1 (EV2-)	Always	Below 1 Ω

Standard Resistance (Check for short):

--	--	--

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN1 relay terminal 3 or C6-1 (EV1-) - Body ground	Always	10 kΩ or higher
EFI MAIN1 relay terminal 3 or C25-1 (EV2-) - Body ground	Always	10 kΩ or higher

NG ► **REPAIR OR REPLACE HARNESS OR
CONNECTOR (VVT SENSOR FOR EXHAUST
SIDE - ECM)**

OK ► **GO TO ECM POWER SOURCE CIRCUIT**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000220S035X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0420: Catalyst System Efficiency Below Threshold (Bank 1) (2013 FR-S)		

DTC	P0420	Catalyst System Efficiency Below Threshold (Bank 1)
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DESCRIPTION

The ECM uses sensors mounted in front of and behind the Three-Way Catalytic Converter (TWC) to monitor its efficiency.

The first sensor, the air fuel ratio sensor, sends pre-catalyst information to the ECM. The second sensor, the heated oxygen sensor, sends post-catalyst information to the ECM.

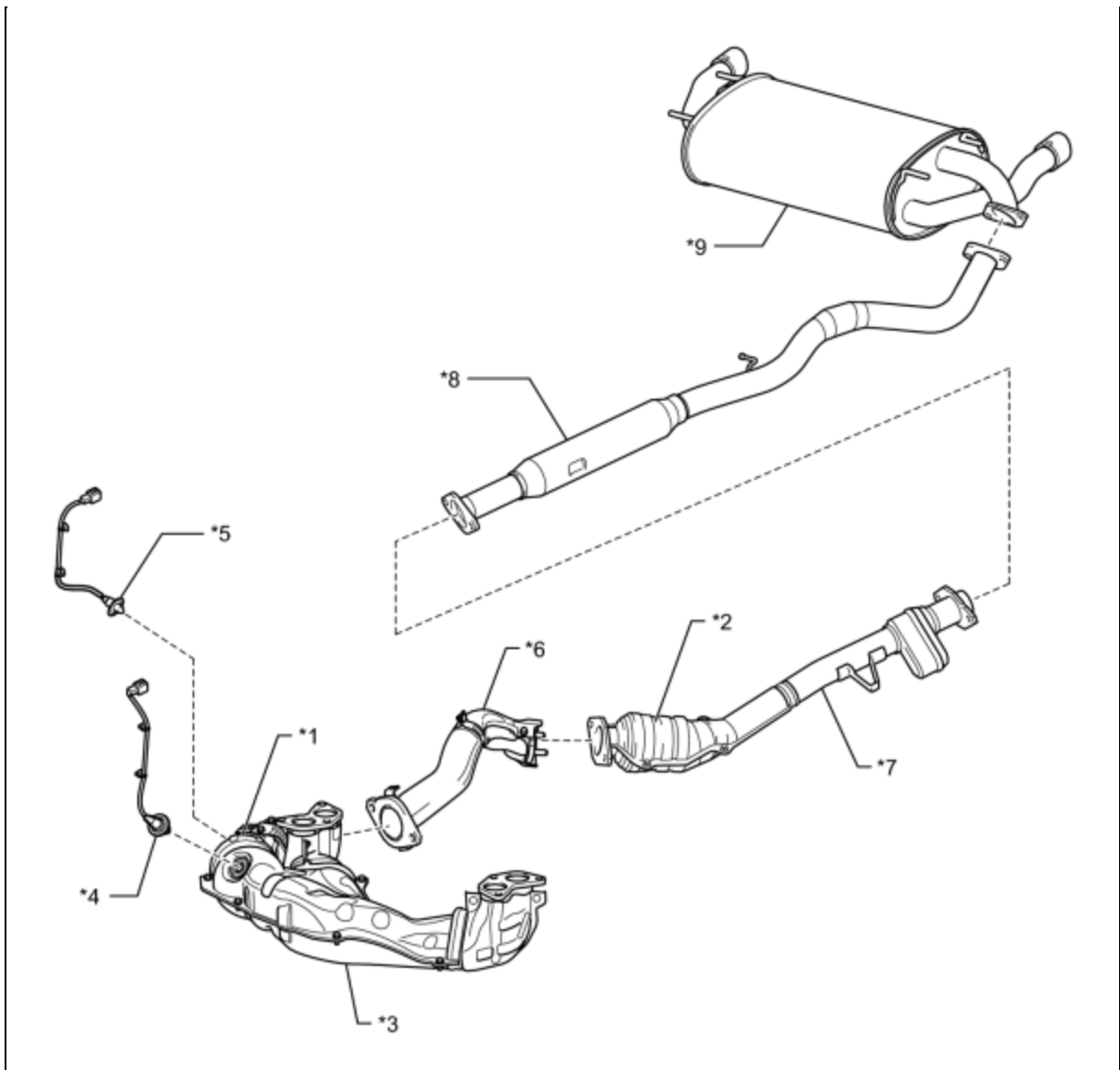
In order to detect any deterioration in the three-way catalytic converter, the ECM calculates the oxygen storage capacity of the three-way catalytic converter. This calculation is based on the voltage output of the heated oxygen sensor while performing active air fuel ratio control.

The ECM uses the oxygen storage capacity value to determine the state of the three-way catalytic converter. If any deterioration has occurred, the ECM illuminates the MIL and stores the DTC.

This system determines the deterioration of the entire catalyst system (including the front and rear catalysts), by using the oxygen storage capacity value of the front catalyst, that is more sensitive than the rear catalyst, as the representative value. Therefore, be sure to replace the front and rear catalysts together when catalyst replacement is necessary.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0420	Diagnostic value is more than the standard value under active air-fuel ratio control. (2 trip detection logic)	<ul style="list-style-type: none"> • Gas leakage from exhaust system • Air fuel ratio sensor • Heated oxygen sensor • Front exhaust manifold assembly (TWC: Front catalyst) and front exhaust pipe assembly (TWC: Rear catalyst)

CATALYST LOCATION

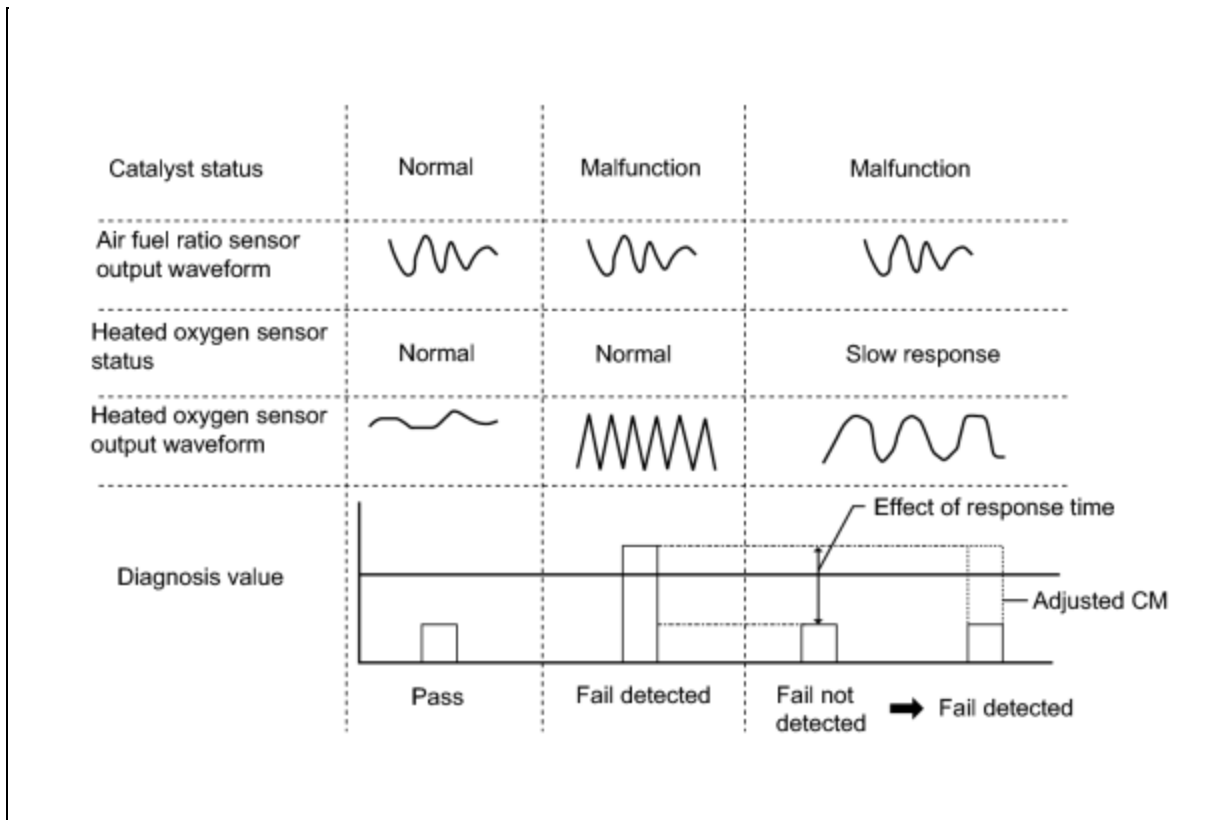


Text in Illustration

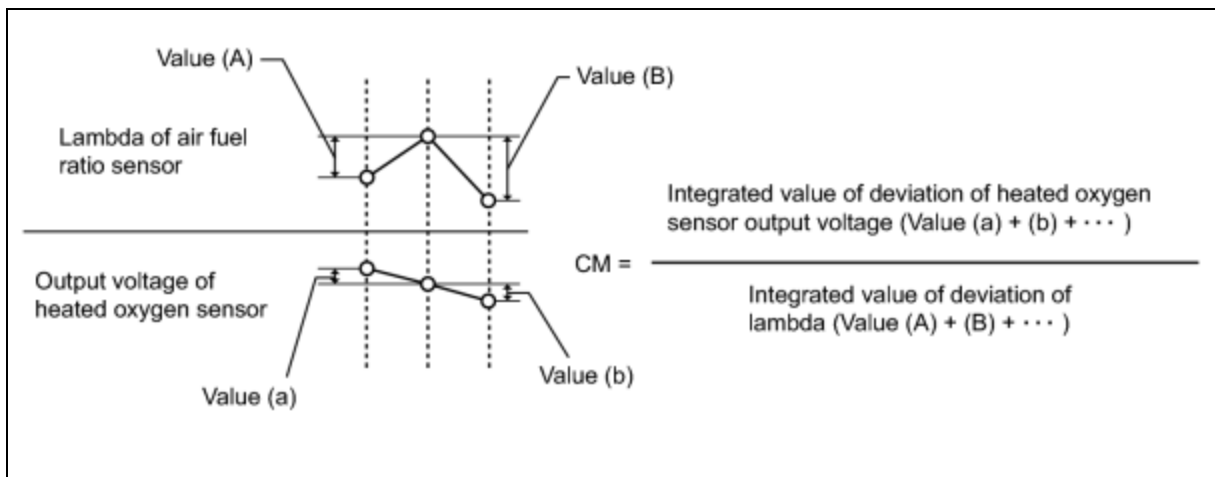
*1	TWC: Front Catalyst	*2	TWC: Rear Catalyst
*3	Exhaust Manifold	*4	Air Fuel Ratio Sensor
*5	Heated Oxygen Sensor	*6	Front Exhaust Pipe Sub-Assembly
*7	Front Exhaust Pipe Assembly	*8	Center Exhaust Pipe Assembly
*9	Tail Exhaust pipe Assembly	-	-

MONITOR DESCRIPTION

The ECM uses diagnostic values to determine deterioration of the catalyst. If the diagnostic value exceeds a specified value, the catalyst is considered deteriorated, and the DTC is stored.



The diagnostic values are based upon the catalyst monitor value (CM) calculated by changes in the air fuel ratio sensor lambda and changes in the heated oxygen sensor output voltage, and in the response rate calculated from the heated oxygen sensor response time.



*: Diagnostic Value = CM X (1 + Response rate)

MONITOR STRATEGY

Related DTCs	P0420: Catalyst monitor with sufficient sensor performance for other monitors functional check
Required Sensors/Components (Main)	Air fuel ratio sensor Heated oxygen sensor
	Intake air temperature sensor

Required Sensors/Components (Related)	Mass air flow meter Manifold absolute pressure sensor Crankshaft position sensor Engine coolant temperature sensor
Frequency of Operation	Once per driving cycle
Duration	30 to 55 seconds
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs are not present	P0030, P0031, P0032 (Air fuel ratio sensor - heater) P0037, P0038 (Heated oxygen sensor - heater) P0068, P0107, P0108 (Manifold absolute pressure (MAP) sensor) P0101, P0102, P0103 (Mass air flow (MAF) sensor) P0111, P0112, P0113 (Intake air temperature (IAT) sensor) P0117, P0118, P0125 (Engine coolant temperature (ECT) sensor) P0122, P0123, P0222, P0223 (Throttle position sensor) P0131, P0132 (Air fuel ratio sensor - ECM input voltage) P0134, P2195, P2196 (Air fuel ratio sensor - output voltage) P0137, P0138 (Heated oxygen sensor - a lack of circuit continuity) P0140 (Heated oxygen sensor - output voltage) P0461, P0462, P0463 (Fuel level sensor (FL)) P0500 (Vehicle speed sensor (VSS)) P0604, P0605 (ROM in ECM) P1160 (Throttle return spring) P2096, P2097 (Post catalyst fuel trim system) P2101, P2102 (Throttle actuator control motor) P2109 (Throttle position sensor minimum stop) P2119 (Throttle actuator control) P2122, P2123, P2127, P2128 (Accelerator pedal position sensor (APPS) circuit) P2135 (Throttle position sensor (TPS) correlation) P2138 (Accelerator pedal position sensor (APPS) correlation)
Engine coolant temperature	60°C (140°F) or more
Battery voltage	10.9 V or more
Fuel system status	Closed loop
Intake air mass per second	5 g/sec or more, and less than 30 g/sec
Estimated exhaust gas temperature in a catalyst	440°C (824°F) or more
Elapsed time	

(difference between actual and target lambda < 0.15)	1 second
Vehicle speed	70 km (43.4 mph) or higher
Change of intake air mass during 1/2 engine rev.	Less than 0.02 g/rev
Heated oxygen sensor output change, lean to rich after fuel cut	Experienced
Evaporative system monitor	Not active
Integrated time of canister purge after engine start	35 seconds or more
Learning value of EVAP density during purge	Less than 0.2
Estimated temperature of secondary oxygen sensor element	500°C or higher
Integrated amount of intake air per second	4800 g or more (varies with estimated ambient temperature)
Atmospheric pressure	75.06 kPa [563 mmHg] or more

TYPICAL MALFUNCTION THRESHOLDS

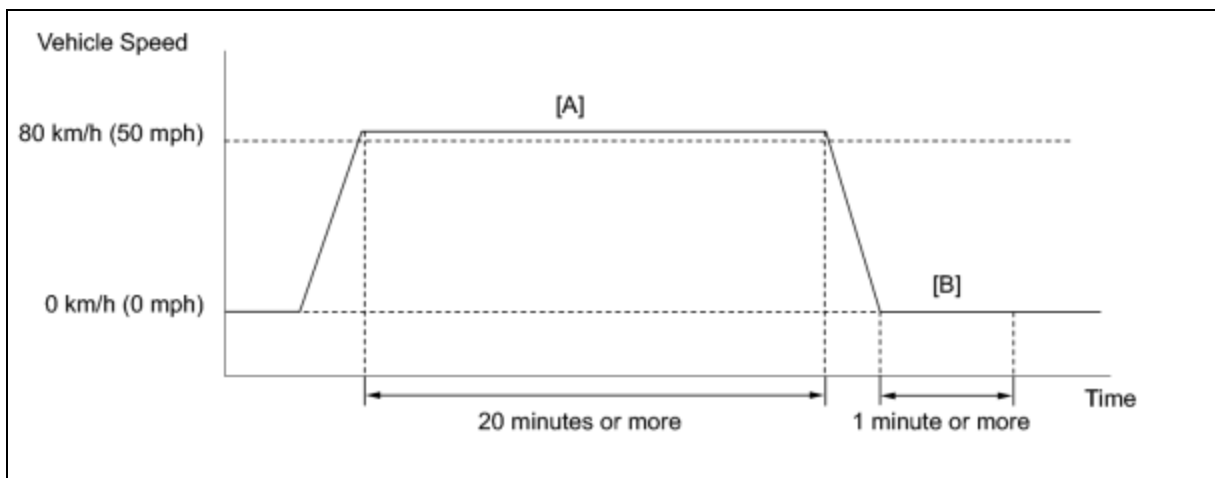
Diagnostic value*	10 or more
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*: Refer to Monitor Description

MONITOR RESULT

Refer to Checking Monitor Status INFO.

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.

6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.

HINT:

Check the engine coolant temperature is 20°C (68°F) or less at engine started.

7. Perform the following the confirmation driving pattern.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

- a. Drive the vehicle at 80 km/h (50 mph) or more for 20 minutes or more [A].
 - b. Stop the vehicle.
 - c. Idle the engine for 1 minute or more [B].
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
 9. Read pending DTCs.

HINT:


- o If a pending DTC is output, the system is malfunctioning.
- o If a pending DTC is not output, perform the following procedure.

10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
11. Input the DTC: P0420.
12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal
ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

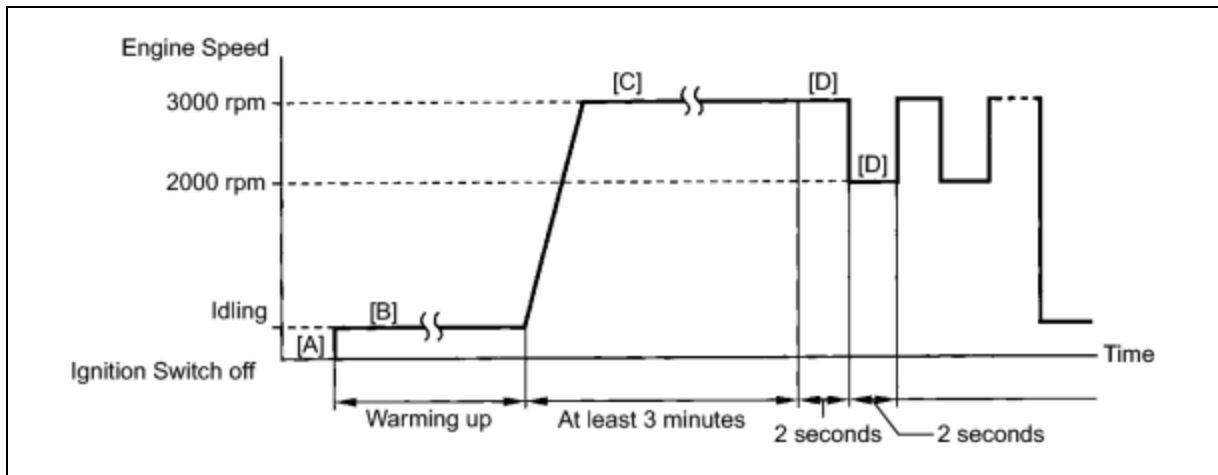
13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.

If no permanent DTC is output, the system is normal.

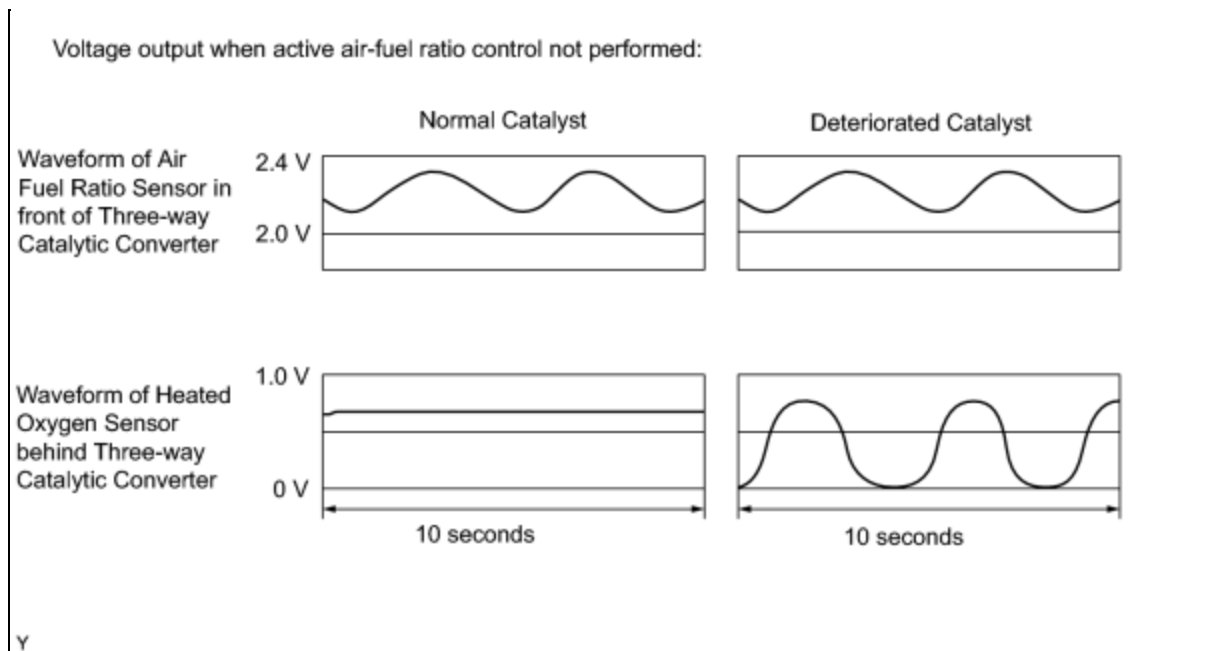
CONDITIONING FOR SENSOR TESTING



1. Connect the Techstream to the DLC3 [A].
2. Start the engine and warm it up with all the accessories switched off, until the engine coolant temperature stabilizes [B].
3. Run the engine at an engine speed of between 2500 rpm and 3000 rpm for at least 3 minutes [C].
4. While running the engine at 3000 rpm and 2000 rpm for 2 seconds, check the waveforms of the air fuel ratio and heated oxygen sensors using the Techstream [D].

HINT:

- If either of the voltage outputs of either the air fuel ratio or heated oxygen sensor does not fluctuate, or either of the sensors makes a noise, the sensor may be malfunctioning.
- If the voltage outputs of both the sensors remain lean or rich, the air fuel ratio may be extremely lean or rich. In such cases, enter the following menus: Powertrain / Engine / Active Test / Control the Injection Volume for A/F Sensor.
- If the three-way catalytic converter has deteriorated, the heated oxygen sensor (located behind the three-way catalytic converter) voltage output fluctuates up and down frequently, even under normal driving conditions (active air fuel ratio control is not performed).



INSPECTION PROCEDURE

HINT:

- If a malfunction cannot be found when troubleshooting DTC P0420, a lean or rich abnormality may be the cause. Perform troubleshooting by following the inspection procedure for P0171 (System Too Lean) and P0172 (System Too Rich).
- Bank 1 refers to the bank that includes the No. 1 cylinder*.

*: The No. 1 cylinder is the cylinder which is farthest from transmission.

- Bank 2 refers to the bank that does not include the No. 1 cylinder.
- Sensor 1 refers to the sensor closest to the engine assembly.
- Sensor 2 refers to the sensor farthest away from the engine assembly.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT
-----------	------------------------------------

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Trouble Codes.
- Read the DTCs.

Result:

RESULT	PROCEED TO
--------	------------

DTC P0420 is output	A
DTC P0420 and other DTCs are output	B

HINT:

If any DTCs other than P0420 are output, troubleshoot those DTCs first.

B  **GO TO DTC CHART**

A



2.	PERFORM ACTIVE TEST USING TECHSTREAM (Control the Injection Volume)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Start the engine and warm it up.
- (c) Turn the Techstream on.
- (d) Run the engine at an engine speed of 2500 rpm for approximately 90 seconds.
- (e) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Volume
- (f) Perform the Active Test operation with the engine idling (press the RIGHT or LEFT button to change the fuel injection volume).
- (g) Monitor the voltage outputs of the air fuel ratio sensor and heated oxygen sensor (AFS Voltage B1S1 and O2S B1S2) displayed on the Techstream.

HINT:

- Change the fuel injection volume within the range of - 12.5% to +12.5%.
- Each sensor reacts in accordance with increases and decreases in the fuel injection volume.
- The air fuel ratio sensor has an output delay of a few seconds and the heated oxygen sensor has a maximum output delay of approximately 20 seconds.
- If the sensor output voltage does not change (almost no reaction) while performing the Active Test, the sensor may be malfunctioning.

Standard:

TECHSTREAM DISPLAY (SENSOR)	INJECTION VOLUME	STATUS	VOLTAGE
AFS Voltage B1S1 (Air fuel ratio)	+12.5%	Rich	Below 2.0 V
	-12.5%	Lean	Higher than 2.4 V
O2S B1S2 (Heated oxygen)	+12.5%	Rich	Higher than 0.55 V
	-12.5%	Lean	Below 0.4 V

Result:

STATUS AFS VOLTAGE B1S1	STATUS O2S B1S2	A/F CONDITION AND A/F AND HO2 SENSOR CONDITIONS	MISFIRE	MAIN SUSPECTED TROUBLE AREAS	PROCEED TO
Lean/Rich	Lean/Rich	Normal	-	<ul style="list-style-type: none"> • Three-Way Catalytic Converter (TWC) • Gas leakage from exhaust system 	A
Lean	Lean/Rich	Air fuel ratio sensor malfunction	-	<ul style="list-style-type: none"> • Air fuel ratio sensor 	B
Rich	Lean/Rich	Air fuel ratio sensor malfunction	-	<ul style="list-style-type: none"> • Air fuel ratio sensor 	
Lean/Rich	Lean	Heated oxygen sensor malfunction	-	<ul style="list-style-type: none"> • Heated oxygen sensor • Gas leakage from exhaust system 	C
Lean/Rich	Rich	Heated oxygen sensor malfunction	-	<ul style="list-style-type: none"> • Heated oxygen sensor • Gas leakage from exhaust system 	
Lean	Lean	Actual air-fuel ratio lean	May occur	<ul style="list-style-type: none"> • Extremely rich or lean actual air-fuel ratio • Gas leakage from exhaust system 	D
Rich	Rich	Actual air-fuel ratio lean	-	<ul style="list-style-type: none"> • Extremely rich or lean actual air-fuel ratio • Gas leakage from exhaust system 	

Lean: During Control the Injection Volume for A/F Sensor, the air fuel ratio sensor output voltage (AFS Voltage B1S1) is consistently higher than 2.4 V, and the heated oxygen sensor output voltage (O2S B1S2) is consistently below 0.4 V.

Rich: During Control the Injection Volume for A/F Sensor, the AFS Voltage B1S1 is consistently below 2.0 V, and the O2S B1S2 is consistently higher than 0.55 V.

Lean/Rich: During Control the Injection Volume for A/F Sensor of the Active Test, the output voltage of the air fuel ratio sensor and heated oxygen sensor alternate correctly.

B ► REPLACE AIR FUEL RATIO SENSOR

C ► CHECK FOR EXHAUST GAS LEAK

D ► CHECK FOR EXHAUST GAS LEAK

A



3.	CHECK FOR EXHAUST GAS LEAK
-----------	-----------------------------------

(a) Check for exhaust gas leaks.

OK:

No gas leaks.

NG **REPAIR OR REPLACE EXHAUST GAS LEAK POINT**

OK



4.	REPLACE EXHAUST MANIFOLD (TWC: FRONT CATALYST)
-----------	---

(a) Replace the exhaust manifold (TWC: front catalyst) .

NEXT **REPLACE FRONT EXHAUST PIPE ASSEMBLY (TWC: REAR CATALYST)**

5.	CHECK FOR EXHAUST GAS LEAK
-----------	-----------------------------------

(a) Check for exhaust gas leaks.

OK:

No gas leaks.

NG **REPAIR OR REPLACE EXHAUST GAS LEAK POINT**

OK **REPLACE HEATED OXYGEN SENSOR**

6.	CHECK FOR EXHAUST GAS LEAK
-----------	-----------------------------------

(a) Check for exhaust gas leaks.

OK:

No gas leaks.

NG ▶ REPAIR OR REPLACE EXHAUST GAS LEAK
POINT

OK ▶ CHECK CAUSE OF EXTREMELY RICH OR
LEARN ACTUAL AIR FUEL RATIO




Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000SWF0AFX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0441: Evaporative Emission Control System Incorrect Purge Flow (2013 FR-S)		

DTC	P0441	Evaporative Emission Control System Incorrect Purge Flow
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DTC SUMMARY

DTC NO.	MONITORING ITEM	MALFUNCTION DETECTION CONDITION	TROUBLE AREA	DETECTION TIMING	DETECTION LOGIC
P0441	Purge flow	<p>While engine running, following conditions successively met:</p> <ul style="list-style-type: none"> The pressure difference between non-purge and purge is less than 0.075 kPa (gauge) [1 mmHg (gauge)]. Regardless of forced vent valve on (close) and purge being carried out, the pressure difference between non-purge and purge is less than 0.075 kPa (gauge) [1 mmHg (gauge)]. 	<ul style="list-style-type: none"> Purge valve Purge line Connector/wire harness (Purge valve - ECM) ECM Leak from EVAP system 	While engine running	2 trip

DESCRIPTION

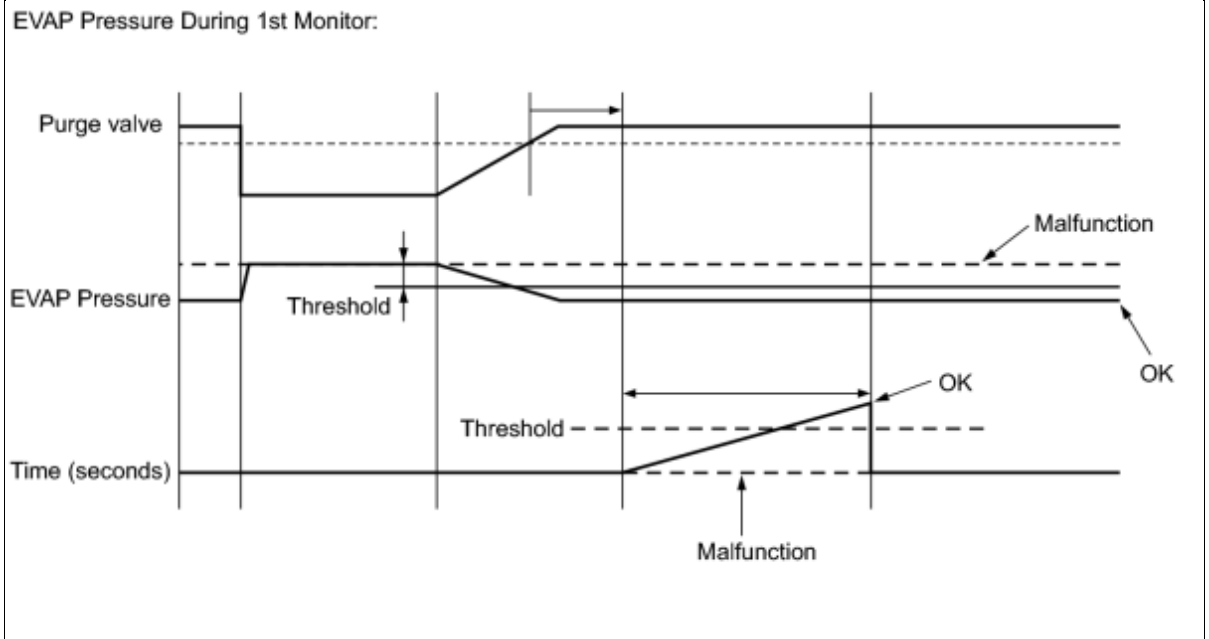
The description can be found in EVAP (Evaporative Emission) System  .

MONITOR DESCRIPTION

The purge flow monitor runs while the engine is running. The purge flow monitor consists of 2 monitors. The 1st monitor is conducted every time and the 2nd monitor is activated if necessary.

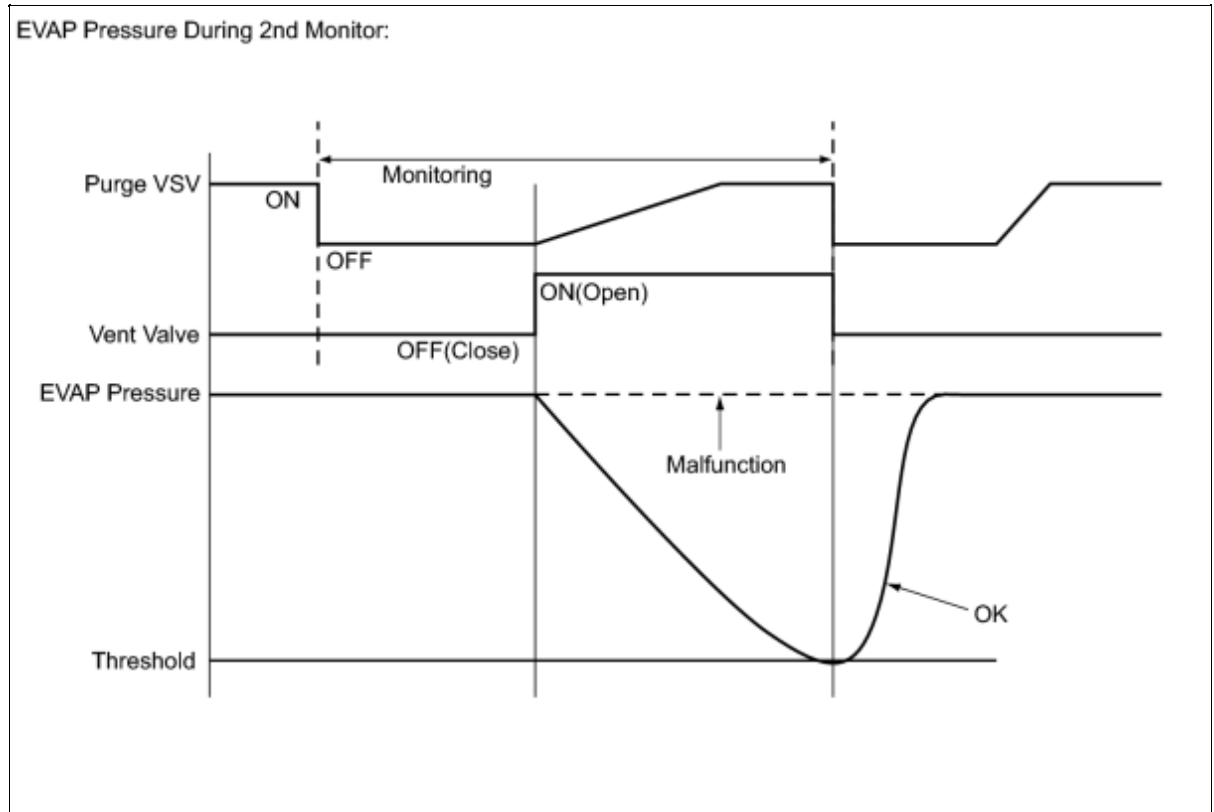
- The 1st monitor

While the engine is running and the purge valve is on (open), the ECM monitors the purge flow by measuring the EVAP pressure change. If the variation in the pressure is more than threshold, the ECM begins the 2nd monitor.



- The 2nd monitor

The vent valve is turned on (closed) and the EVAP pressure is then measured. If the variation in the pressure is more than threshold, the ECM interprets this as the purge valve being stuck closed, and illuminates the MIL and stores DTC P0441 (2 trip detection logic).



MONITOR STRATEGY

Related DTC	P0441: Incorrect purge flow in ELCM functional check
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Required Sensors/Components (Main)	Purge valve Canister pump module
Required Sensors/Components (Related)	-
Frequency of Operation	Once per driving cycle
Duration	26 seconds: 1st stage 21 seconds: 2nd stage
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs are not present	None
--	------

1st Stage

Battery voltage	10.9 V or higher
Atmospheric pressure	75.06 kPa(abs) [563 mmHg(abs)] or higher
Learning value of EVAP density during purge	Less than 0.2
Integrated time of canister purge after engine start	120 seconds or more

2nd Stage

Battery voltage	10.9 V or higher
Atmospheric pressure	75.06 kPa(abs) [563 mmHg(abs)] or higher
Engine speed	1050 rpm or higher
Vehicle speed	30 km/h (18.6 mph) or higher
Integrated time of canister purge after engine start	120 seconds or more
Learning value of EVAP density during purge	Less than 0.2
Fuel system status	Closed loop
Lambda	0.76 to 1.25
Ambient temperature	-25.0°C (-13°F) or higher
Short-term fuel trim	0.9 or higher

TYPICAL MALFUNCTION THRESHOLDS


1st Stage

Pressure without purge - Pressure with purge	Less than 0.075 kPa(gauge) [1 mmHg(gauge)]
--	--


2nd Stage

Pressure without purge - Pressure with purge	Less than 0.666 kPa(gauge) [5 mmHg(gauge)]
--	--

MONITOR RESULT

Refer to Checking Monitor Status  .

CONFIRMATION DRIVING PATTERN

1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC procedure)  .
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and wait 15 minutes or more.
7. Enter the following menus: Powertrain / Engine / Trouble Codes.
8. Read pending DTCs.

HINT:

- If a pending DTC is output, the system is malfunctioning.
 - If a pending DTC is not output, perform the following procedure.
9. Enter the following menus: Powertrain / Engine / Utility / All readiness.
 10. Input the DTC: P0441.
 11. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none">◦ DTC judgment completed◦ System normal
ABNORMAL	<ul style="list-style-type: none">◦ DTC judgment completed◦ System abnormal
INCOMPLETE	<ul style="list-style-type: none">◦ DTC judgment not completed◦ You should perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none">◦ Unable to perform DTC judgment◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit


HINT:

- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.
- If the judgment result shows INCOMPLETE or N/A, perform the following procedure.

NOTICE:

- The Evaporative System Check (Automatic Mode) consists of 5 steps performed automatically by the Techstream. It takes a maximum of approximately 24 minutes.
- Do not perform the Evaporative System Check when the fuel tank is more than 90% full because the cut-off valve may be closed, making the fuel tank leak check unavailable.
- Do not run the engine during this operation.
- When the temperature of the fuel is 35°C (95°F) or higher, a large amount of vapor forms


and any check results become inaccurate. When performing the Evaporative System Check, keep the fuel temperature below 35°C (95°F).

12. Clear DTCs (even if no DTCs are stored, perform the clear DTC procedure)  .
13. Turn the ignition switch off and wait for at least 30 seconds.
14. Turn the ignition switch to ON and turn the Techstream on.
15. Enter the following menus: Powertrain / Engine / Utility / Evaporative System Check / Automatic Mode.
16. After the Evaporative System Check is completed, check for All Readiness by entering the following menus: Powertrain / Engine / Utility / All Readiness.
17. Input the DTC: P0441.
18. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none">◦ DTC judgment completed◦ System normal
ABNORMAL	<ul style="list-style-type: none">◦ DTC judgment completed◦ System abnormal
INCOMPLETE	<ul style="list-style-type: none">◦ DTC judgment not completed◦ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none">◦ Unable to perform DTC judgment◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.

19. If the judgment result is INCOMPLETE or N/A and no pending DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

INSPECTION PROCEDURE

PROCEDURE

1.	PERFORM ACTIVE TEST USING TECHSTREAM (ACTIVATE THE VSV FOR EVAP CONTROL)
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- (a) Connect a Techstream to the DLC3.

(b) Disconnect the vacuum hose (canister side) from the purge valve.

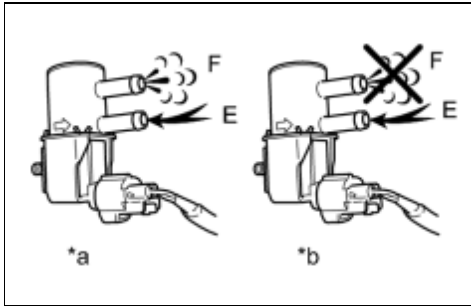
(c) Start the engine.

(d) Turn the Techstream on.

(e) Enter the following menus: Powertrain / Engine / Active Test / Activate the VSV for EVAP Control.

(f) When the purge valve is operated using the Techstream, check whether the port of the purge valve applies suction to your finger.

OK:



TESTER OPERATION	TESTER OPERATION
VSV ON	Purge valve port applies suction to finger
VSV OFF	Purge valve port applies no suction to finger

Text in Illustration

*a	Purge valve ON
*b	Purge valve OFF

NG ► REPLACE PURGE VALVE

OK



2. INSPECT EVAP LEAK PART

(a) Check for leakage from EVAP system (hose, disconnection, cracks, etc.).

OK:


No leakages in the EVAP purge line

NG ► REPAIR OR REPLACE EVAP PURGE LINE

OK



3. REPLACE PURGE VALVE

(a) Replace the purge valve  .

NEXT ► **PERFORM EVAP SYSTEM CHECK (AUTOMATIC MODE)**

4.	REPAIR OR REPLACE EVAP PURGE LINE
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NEXT



5.	PERFORM EVAP SYSTEM CHECK (AUTOMATIC MODE)
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NOTICE:

- The Evaporative System Check (Automatic Mode) consists of 5 steps performed automatically by the Techstream. It takes a maximum of approximately 24 minutes.
- Do not perform the Evaporative System Check when the fuel tank is more than 90% full because the cut-off valve may be closed, making the fuel tank leak check unavailable.
- Do not run the engine in this step.
- When the temperature of the fuel is 35°C (95°F) or more, a large amount of vapor forms and any check results become inaccurate. When performing an Evaporative System Check, keep the fuel temperature below 35°C (95°F).

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Enter the following menus: Powertrain / Engine / Utility / Evaporative System Check / Automatic Mode.
- (f) After the Evaporative System Check is completed, check for pending DTCs by entering the following menus: Powertrain / Engine / Trouble Codes.

Result

RESULT	PROCEED TO
EVAP system DTCs are output	A
No DTCs output (No pending DTCs output)	B

B ► **END**

A



6. REPLACE ECM

(a) Replace the ECM  .

NEXT



7. PERFORM EVAP SYSTEM CHECK (AUTOMATIC MODE)


NOTICE:

- The Evaporative System Check (Automatic Mode) consists of 5 steps performed automatically by the Techstream. It takes a maximum of approximately 24 minutes.
- Do not perform the Evaporative System Check when the fuel tank is more than 90% full because the cut-off valve may be closed, making the fuel tank leak check unavailable.
- Do not run the engine in this step.
- When the temperature of the fuel is 35°C (95°F) or more, a large amount of vapor forms and any check results become inaccurate. When performing an Evaporative System Check, keep the fuel temperature below 35°C (95°F).

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Clear the DTCs  .

(e) Enter the following menus: Powertrain / Engine / Utility / Evaporative System Check / Automatic Mode.

(f) After the Evaporative System Check is completed, check for pending DTCs by entering the following menus: Powertrain / Engine / Trouble Codes.

HINT:

If no pending DTCs are found, the repair has been successfully completed.

NEXT  END

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000012MC083X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0451-P0453: Evaporative Emission Control System Pressure Sensor Range / Performance (2013 FR-S)		

DTC	P0451	Evaporative Emission Control System Pressure Sensor Range / Performance
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DTC	P0452	Evaporative Emission Control System Pressure Sensor / Switch Low Input
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DTC	P0453	Evaporative Emission Control System Pressure Sensor / Switch High Input
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DTC SUMMARY

DTC NO.	MONITORING ITEM	MALFUNCTION DETECTION CONDITION	TROUBLE AREA	DETECTION TIMING	DETECTION LOGIC
P0451	Difference between canister pressure sensor output value and manifold absolute pressure sensor output value	The difference between the canister pressure sensor output value and the manifold absolute pressure sensor output value with the ignition switch ON is large.	<ul style="list-style-type: none"> • Canister pump module • Connector/wire harness (Canister pump module - ECM) • EVAP system hose (pipe from air inlet port to canister pump module, canister filter, fuel tank vent hose) • ECM 	<ul style="list-style-type: none"> • EVAP monitoring (ignition switch off) • Engine running 	2 trip
P0452	Canister pressure sensor low input	EVAP pressure sensor less than 0.973 V for 1 second.		<ul style="list-style-type: none"> • Ignition switch ON • EVAP monitoring (ignition switch off) 	1 trip
P0453	Canister pressure sensor high input	EVAP pressure sensor more than 4.095 V for 1 second.		<ul style="list-style-type: none"> • Ignition switch ON • EVAP monitoring (ignition switch off) 	1 trip

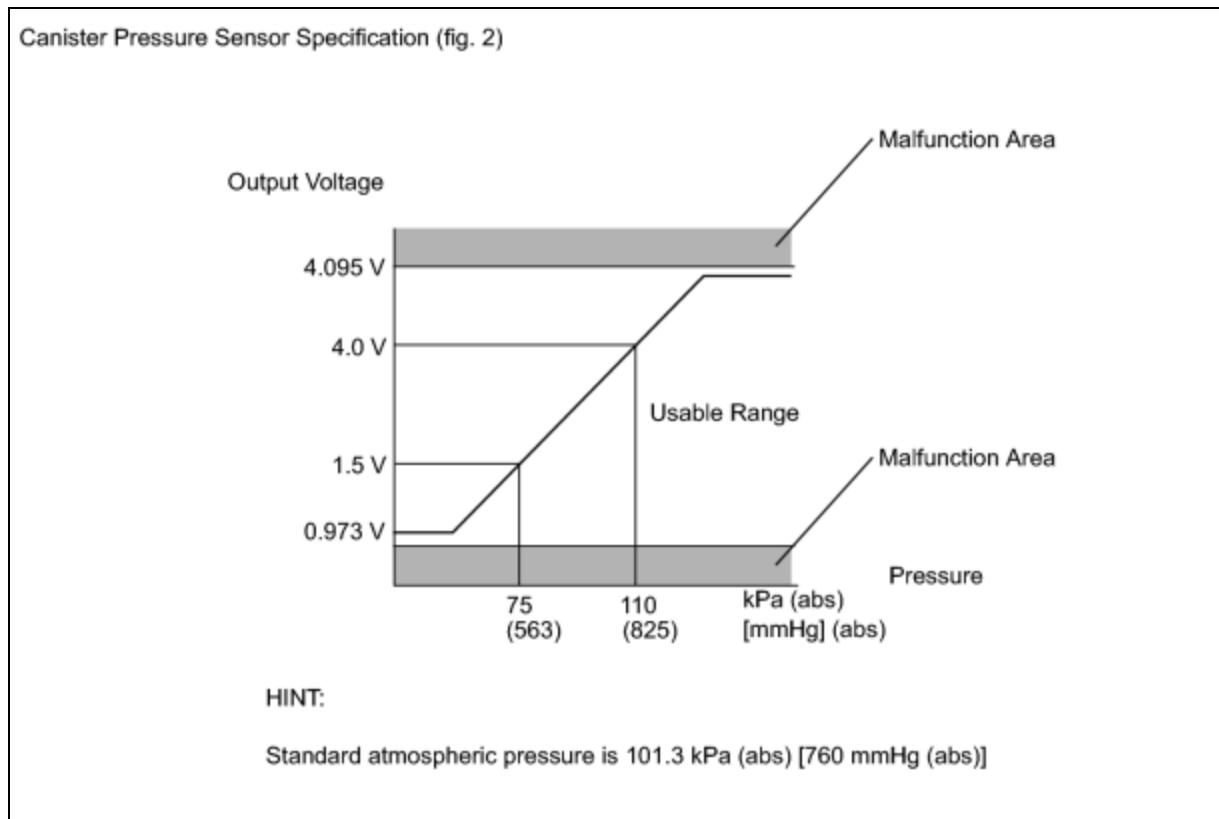
HINT:

The canister pressure sensor is built into the canister pump module.

DESCRIPTION

The description can be found in EVAP (Evaporative Emission) System INFO.

MONITOR DESCRIPTION



1. DTC P0451: Difference between canister pressure sensor output value and manifold absolute pressure sensor output value

If the difference between the atmospheric pressure calculated using the canister pressure sensor and that calculated using the MAP sensor exceeds the specified value, then the ECM determines there is a canister pressure sensor abnormality. The ECM then illuminates the MIL and stores the DTC (2 trip detection logic).

2. DTC P0452: Canister pressure sensor voltage low

If the canister pressure sensor voltage output (pressure) is below 0.973 V: 51.71 kPa(abs) [388 mmHg(abs)], the ECM interprets this as an open or short circuit in the canister pressure sensor or its circuit, and stops the EVAP system monitor. The ECM then illuminates the MIL and stores the DTC (1 trip detection logic).

3. DTC P0453: Canister pressure sensor voltage high

If the canister pressure sensor voltage output (pressure) is 4.095 V: 108.99 kPa(abs) [818 mmHg(abs)] or more, the ECM interprets this as an open or short circuit in the canister pressure sensor or its circuit, and stops the EVAP system monitor. The ECM then illuminates the MIL and stores the DTC (1 trip detection logic).

MONITOR STRATEGY

Related DTC	P0452: ELCM pressure sensor range check (Low voltage) P0453: ELCM pressure sensor range check (High voltage)
Required Sensors/Components (Main)	Canister pump module
Required Sensors/Components (Related)	-
Frequency of Operation	Once per driving cycle: P0451 Continuous: P0452, P0453
Duration	0.328 seconds: P0451 1 second: P0452, P0453
MIL Operation	2 driving cycles: P0451 Immediately: P0452, P0453
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs not stored	None
---	------

P0451

Ignition switch	On
Elapsed time after ignition switch ON	0.5 to 60 seconds
Soak time	60 seconds or more
ELCM vacuum pump	Not active
ELCM switching valve	Off (Open)
Purge control	Not active

P0452, P0453

Battery voltage	10.9 V or more
Either of the following conditions is met:	A or B
A. Ignition switch	On
B. Activated by soak timer	Satisfied

TYPICAL MALFUNCTION THRESHOLDS

P0451

ELCM pressure at ignition switch ON - MAP at ignition switch ON	Higher than 4.7329 KPa (36 mmHg)
---	----------------------------------

P0452

ELCM pressure sensor output voltage [ELCM pressure]	Less than 0.973 V [51.71 KPa (388 mmHg)]
---	--

P0453


--	--

ELCM pressure sensor output voltage [ELCM pressure]	More than 4.095 V [108.99 KPa (818 mmHg)]
---	---

COMPONENT OPERATING RANGE

ELCM pressure sensor output voltage [ELCM pressure]	1.016 to 4.087 V [52.49 to 108.85 KPa (394 to 817 mmHg)]
---	--


MONITOR RESULT

Refer to Checking Monitor Status  .

CONFIRMATION DRIVING PATTERN

NOTICE:


- The Evaporative System Check (Automatic Mode) consists of 5 steps performed automatically by the Techstream. It takes a maximum of approximately 24 minutes.
- Do not perform the Evaporative System Check when the fuel tank is more than 90% full because the cut-off valve may be closed, making the fuel tank leak check unavailable.
- Do not run the engine during this operation.
- When the temperature of the fuel is 35°C (95°F) or higher, a large amount of vapor forms and any check results become inaccurate. When performing the Evaporative System Check, keep the fuel temperature below 35°C (95°F).

1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Enter the following menus: Powertrain / Engine / Data List / Intake Air.
4. Check that the intake air temperature is between 4.4 and 35°C (40 and 95°F).
5. Clear DTCs (even if no DTCs are stored, perform the clear DTC procedure)  .
6. Turn the ignition switch off and wait for at least 30 seconds.
7. Turn the ignition switch to ON and turn the Techstream on.
8. Enter the following menus: Powertrain / Engine / Utility / Evaporative System Check / Automatic Mode.
9. After the Evaporative System Check is completed, check for All Readiness by entering the following menus: Powertrain / Engine / Utility / All readiness.
10. Input the DTC: P0451, P0452 or P0453.
11. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System normal
ABNORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System abnormal
INCOMPLETE	<ul style="list-style-type: none"> ◦ DTC judgment not completed ◦ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> ◦ Unable to perform DTC judgment ◦ Number of DTCs which do not fulfill DTC preconditions has

HINT:

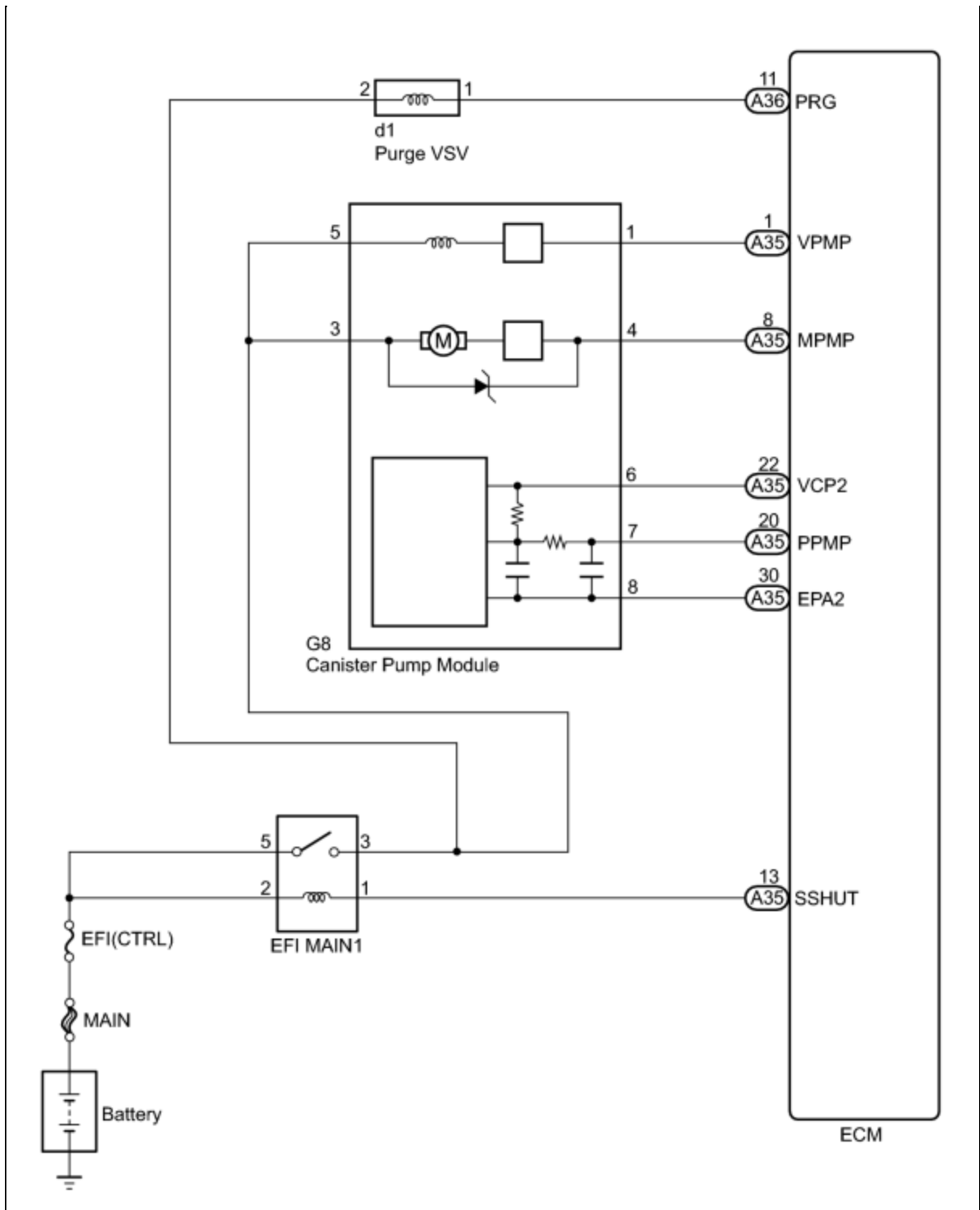
- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.

12. If the judgment result is INCOMPLETE or N/A and no pending DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- When a vehicle is brought into the workshop, leave it as it is. Do not change the vehicle condition. For example, do not tighten the fuel cap.
- Do not disassemble the canister pump module.
- The Techstream is required to conduct the following diagnostic troubleshooting procedure.
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CONFIRM DTC AND EVAP PRESSURE
-----------	--------------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON (do not start the engine).
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Read DTCs.
- (f) Enter the following menus: Powertrain / Engine / Data List / Vapor Pressure Pump.
- (g) Read the EVAP (Evaporative Emission) pressure displayed on the Techstream.

Result

DISPLAY (DTC OUTPUT)	TEST RESULT	SUSPECTED TROUBLE AREA	PROCEED TO
P0451	-	<ul style="list-style-type: none"> • Canister pressure sensor • Manifold absolute pressure sensor 	C
P0452	Below 75 kPa(abs) [563 mmHg(abs)]	<ul style="list-style-type: none"> • Wire harness/connector (ECM - Canister pressure sensor) • Canister pressure sensor • Short in ECM circuit 	A
P0453	Higher than 110 kPa(abs) [825 mmHg(abs)]	<ul style="list-style-type: none"> • Wire harness/connector (ECM - Canister pressure sensor) • Canister pressure sensor • Open in ECM circuit 	B

B ► **CHECK HARNESS AND CONNECTOR (CANISTER PUMP MODULE - ECM)**

C ► **READ VALUE USING TECHSTREAM (ATMOSPHERE PRESSURE)**

A



2.	CHECK HARNESS AND CONNECTOR (CANISTER PUMP MODULE - ECM)
-----------	---

- (a) Turn the ignition switch off.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Result

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	SUSPECTED TROUBLE AREA	PROCEED TO
A35-20 (PPMP) - Body ground	Always	Below 10 Ω	<ul style="list-style-type: none"> • Wire harness/connector (ECM - Canister pressure sensor) • Short in canister pressure sensor circuit 	A
		10 k Ω or higher	<ul style="list-style-type: none"> • Wire harness/connector (ECM - Canister pressure sensor) • Short in ECM circuit 	B

B ► **READ VALUE USING TECHSTREAM
(ATMOSPHERE PRESSURE)**

A
▼

3.	CHECK HARNESS AND CONNECTOR (CANISTER PUMP MODULE - ECM)
-----------	---

- (a) Disconnect the canister pump module connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

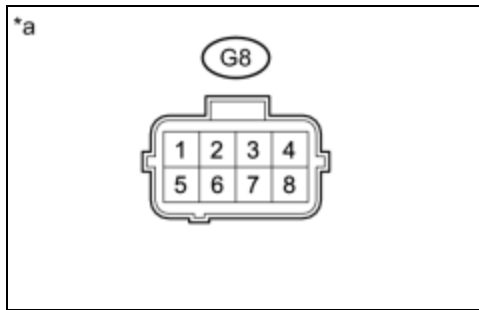
Result

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	SUSPECTED TROUBLE AREA	PROCEED TO
A35-20 (PPMP) - Body ground	Always	10 k Ω or higher	Short in canister pressure sensor circuit	A
		Below 10 Ω	Short in wire harness/connector (ECM - Canister pressure sensor)	B

A ► **REPAIR OR REPLACE HARNESS OR
CONNECTOR (CANISTER PUMP MODULE - ECM)**

B ► **REPLACE ECM**

4.	CHECK HARNESS AND CONNECTOR (CANISTER PUMP MODULE - ECM)
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(a) Disconnect the canister pump module connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G8-8 - Body ground	Always	100 Ω or less

(c) Turn the ignition switch to ON.

(d) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
G8-6 - Body ground	Ignition switch ON	4.5 to 5.5 V
G8-7 - Body ground	Ignition switch ON	4.5 to 5.5 V

Result

TEST RESULT	SUSPECTED TROUBLE AREA	PROCEED TO
Voltage and resistance within standard ranges	Open in canister pressure sensor circuit	A
Voltage and/or resistance outside standard ranges	Open in wire harness/connector (ECM - Canister pressure sensor)	B

Text in Illustration

*a	Front view of wire harness connector (to Canister Pump Module)
----	---

B ▶ REPLACE ECM

A



5.	REPLACE CANISTER PUMP MODULE
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(a) Replace the canister pump module  .

NEXT  **CHECK WHETHER DTC OUTPUT RECURS (AFTER REPAIR)**

6.	REPAIR OR REPLACE HARNESS OR CONNECTOR (CANISTER PUMP MODULE - ECM)
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NEXT  **CHECK WHETHER DTC OUTPUT RECURS (AFTER REPAIR)**

7.	REPLACE ECM
-----------	--------------------

(a) Replace the ECM  .

NEXT  **CHECK WHETHER DTC OUTPUT RECURS (AFTER REPAIR)**

8.	READ VALUE USING TECHSTREAM (ATMOSPHERE PRESSURE)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Data List / Atmosphere Pressure.
- (e) Compares Atmosphere Pressure displayed with the Techstream to the actual atmosphere pressure.

Result

RESULT	PROCEED TO
Difference with the actual atmosphere pressure is less than 27 kPa (abs) [203 mmHg (abs)].	A
Difference with the actual atmosphere pressure is 27 kPa (abs) [203 mmHg (abs)] or more.	B

A
▼

9.	READ VALUE USING TECHSTREAM (MAP)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Data List / MAP.
- (e) Compares the MAP displayed with the Techstream to the actual atmosphere pressure.

Result

RESULT	PROCEED TO
Difference with the actual atmosphere pressure is less than 27 kPa (abs) [203 mmHg (abs)].	A
Difference with the actual atmosphere pressure is 27 kPa (abs) [203 mmHg (abs)] or more.	B

B ▶ REPLACE MANIFOLD ABSOLUTE PRESSURE SENSOR

A ▶ CHECK INTERMITTENT PROBLEMS

10.	REPLACE CANISTER PUMP MODULE
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- (a) Replace the canister pump module  .


NEXT ▶ CHECK WHETHER DTC OUTPUT RECURS (AFTER REPAIR)

11.	REPLACE MANIFOLD ABSOLUTE PRESSURE SENSOR
------------	--

- (a) Replace the manifold absolute pressure sensor  .

NEXT ▶ CHECK WHETHER DTC OUTPUT RECURS (AFTER REPAIR)

12. CHECK WHETHER DTC OUTPUT RECURS (AFTER REPAIR)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Perform the Evaporative System Check using the Techstream, referring to the Confirmation Driving Pattern.
- (i) Enter the following menus: Powertrain / Engine / Utility / All Readiness.
- (j) Input the DTC: P0451, P0452 or P0453.
- (k) Check the DTC judgment result.

Result

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none">• DTC judgment completed• System normal
ABNORMAL	<ul style="list-style-type: none">• DTC judgment completed• System abnormal
INCOMPLETE	<ul style="list-style-type: none">• DTC judgment not completed• Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none">• Unable to perform DTC judgment• Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

NEXT  END



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000SWH09OX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0455,P0456,P1451,P2404: Evaporative Emission Control System Leak Detected (Gross Leak) (2013 FR-S)		

DTC	P0455	Evaporative Emission Control System Leak Detected (Gross Leak)
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DTC	P0456	Evaporative Emission Control System Leak Detected (Very Small Leak)
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DTC	P1451	Fuel Tank Pressure Sensor Range/Performance
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DTC	P2404	Evaporative Emission System Leak Detection Pump Sense Circuit Range / Performance
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DTC SUMMARY

DTC NO.	MONITORING ITEM	MALFUNCTION DETECTION CONDITION	TROUBLE AREA	DETECTION TIMING	DETECTION LOGIC
P0455	EVAP gross leak	Leak detection pump creates negative pressure (vacuum) in EVAP system and EVAP system pressure is measured. Reference pressure is measured at start and end of leak check. If stabilized pressure is higher than [second reference pressure x 0.377], ECM determines that EVAP system has a large leak.	<ul style="list-style-type: none"> Fuel cap (loose) Leakage from EVAP line (canister - fuel tank) Leakage from EVAP line (purge valve - canister) Leakage from canister pump module Leakage from fuel tank Leakage from 	While ignition switch off	2 trip
P0456	EVAP small leak	Leak detection pump creates negative pressure (vacuum) in EVAP system and EVAP system pressure is measured. Reference pressure measured at start and end of leak check. If stabilized pressure is higher than second reference pressure, ECM determines that EVAP system has a small leak.		While ignition switch on	2 trip

			canister		
P1451	EVAP clogged	A blockage in the EVAP system pipe is detected.	<ul style="list-style-type: none"> • Blockage in EVAP line (canister - fuel tank) • Blockage in EVAP line (purge valve - canister) • Blockage in canister pump module 	While ignition switch on	2 trip
P2404	EVAP malfunction	<p>Leak detection pump ending pressure is more than the threshold.</p> <p>The difference between the leak detection pump highest pressure and lowest pressure is the threshold value or more.</p> <p>The vent valve abnormality is detected.</p>	<ul style="list-style-type: none"> • Leak detection pump 	While ignition switch on	2 trip

DESCRIPTION

The description can be found in EVAP (Evaporative Emission) System  .

MONITOR DESCRIPTION

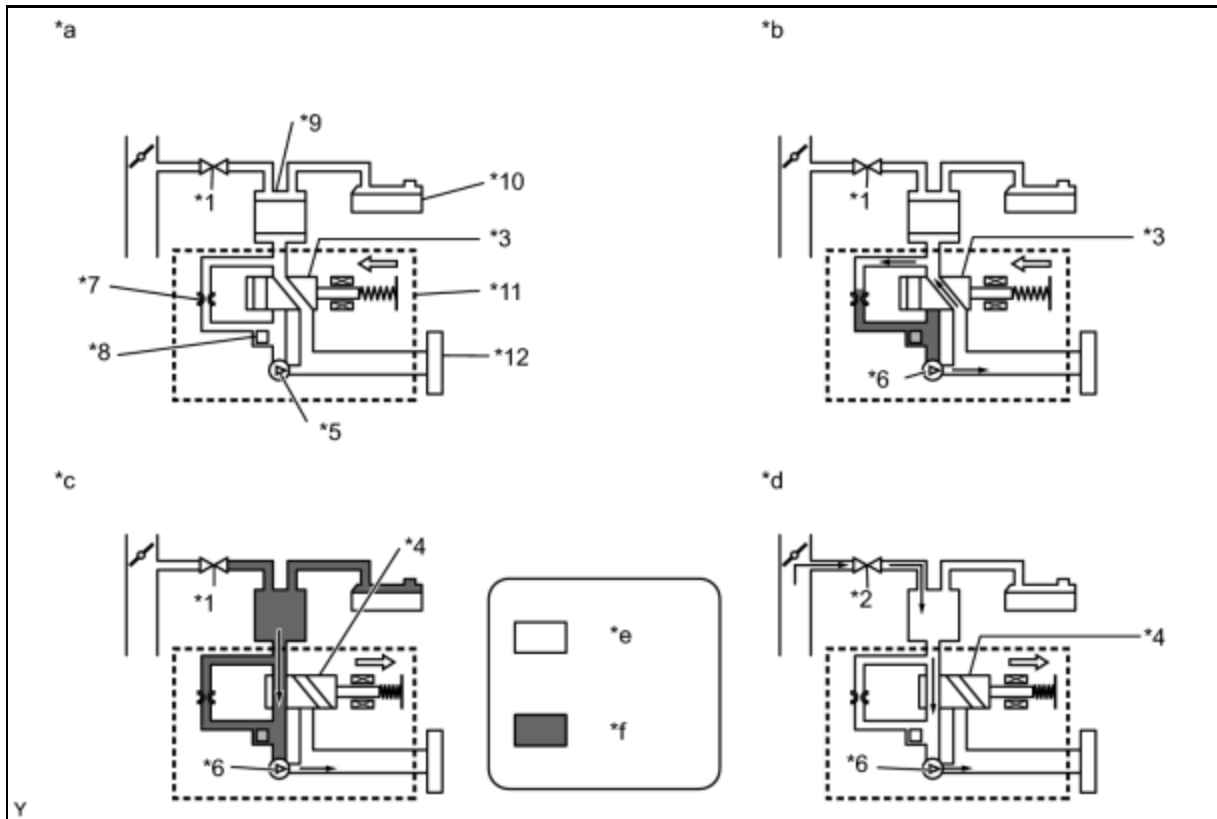
5 hours*1 after the ignition switch is turned off, the leak detection pump creates negative pressure (vacuum) in the EVAP (Evaporative Emission) system. The ECM monitors for leaks and actuator malfunctions based on the EVAP pressure.

HINT:

***: If the enable conditions are not satisfied 5 hours after the ignition switch is turned off, the monitor check starts 2 hours later. If the enable conditions are still not satisfied 7 hours after the ignition switch is turned off, the monitor check starts 2.5 hours later.**

SEQUENCE	OPERATION	DURATION
A	Leak detection pump monitor	300 seconds
B	First reference pressure measurement	40 seconds
C	Vent valve monitor	12 seconds
D	Pipe clogging monitor	900 seconds

*: If only a small amount of fuel is in the fuel tank, it takes longer for the EVAP pressure to stabilize.



Text in Illustration

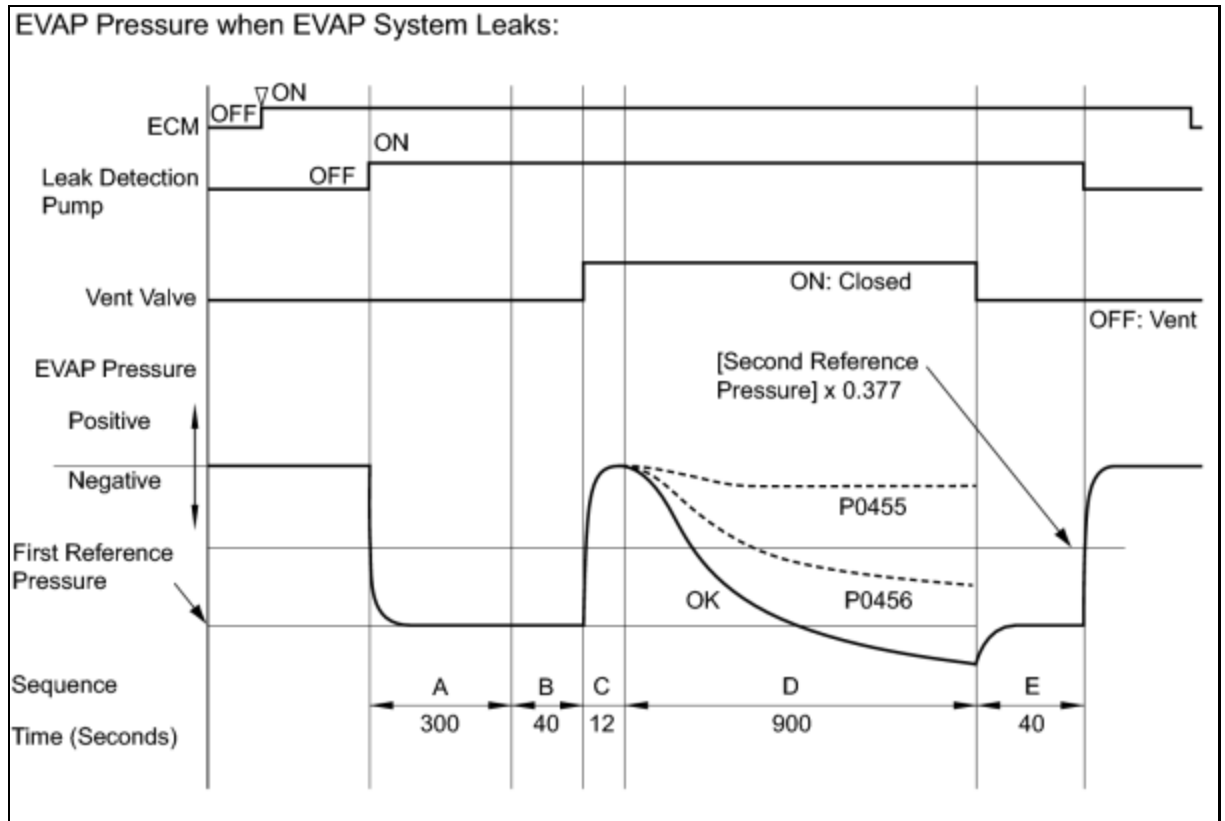
*1	Purge valve: OFF (closed)	*2	Purge valve: ON (open)
*3	Vent Valve: OFF (vent)	*4	Vent Valve: ON (closed)
*5	Leak Detection Pump: OFF	*6	Leak Detection Pump: ON
*7	Reference Orifice (0.02 inch)	*8	Canister Pressure Sensor
*9	Canister	*10	Fuel Tank
*11	Canister Pump Module	*12	Canister Filter
*a	Operation A: Atmospheric Pressure Measurement	*b	Operation B, E: Reference Pressure Measurement
*c	Operation C: EVAP System Pressure Measurement	*d	Operation D: Purge valve Monitor
*e	Atmospheric Pressure	*f	Negative Pressure

(a) P0455: EVAP (Evaporative Emission) gross leak

In operation C, the leak detection pump creates negative pressure (vacuum) in the EVAP system and the EVAP system pressure is measured. If the stabilized system pressure is higher than [second reference pressure x 0.377] (near atmospheric pressure), the ECM determines that the EVAP system has a large leak, illuminates the MIL and stores the DTC (2 trip detection logic).

(b) P0456: EVAP very small leak

In operation C, the leak detection pump creates negative pressure (vacuum) in the EVAP system and the EVAP system pressure is measured. If the stabilized system pressure is higher than second reference pressure, the ECM determines that the EVAP system has a small leak, illuminates the MIL and stores the DTC (2 trip detection logic).



MONITOR STRATEGY

Related DTC	P0455: Evaporative system functional check (0.040 inch leak) P0456: Evaporative system functional check (0.020 inch leak) P1451: Evaporative system functional check (Pipe clogging) P2404: Evaporative system functional check (ELCM performance)
Required Sensors/Components (Main)	Purge valve Canister pump module
Required Sensors/Components (Related)	-
Frequency of Operation	Once per driving cycle: P0455, P0456, P1451 and P2404
Duration	23 minutes
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs not stored	None
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P0455, P0456, P1451, P2404

Soak time	5, 7 or 9.5 hours
Battery voltage	10.9 V or higher
Engine coolant temperature	4.4 to 45°C (39.9 to 113°F)
Intake air temperature	4.4°C (39.9°F) or higher
Atmospheric pressure	75.06 to 110 kPa(abs) [563 to 825 mmHg(abs)]
EVAP density learning during previous driving cycle	Completed
Learning value of EVAP density during purge in previous driving cycle	Less than 0.2
Integrated value of purge airflow during previous driving cycle	3000 or higher (varies with engine coolant temperature)
EVAP leak check diagnostic	Not completed

TYPICAL MALFUNCTION THRESHOLDS

P0455

Tank pressure	Higher than [reference pressure x 0.377 - (-45.5)]
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P0456

Tank pressure	Less than (reference pressure x 0.377 - (-45.5))
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P1451

Time it takes to become [reference pressure for functional check - 0.941 kPa or 4.9726 kPa [7 mmHg or 37 mmHg]]	Less than 27 seconds
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P2404

Either of following conditions met	A, B, C or D
A: Operation A ending pressure	-0.224 kPa [-2 mmHg] or higher
B. Maximum pressure - minimum pressure at operation B and E	0.314 kPa [2 mmHg] or higher
C. Ending pressure at operation B and E	Less than -3.9717 kPa [-30 mmHg] or higher than -0.9419 kPa [-7 mmHg] (varies with atmospheric pressure)
D. Operation C ending pressure - reference pressure for functional check	Less than 0.224 kPa [2 mmHg]

MONITOR RESULT

Refer to Checking Monitor Status  .

CONFIRMATION DRIVING PATTERN


NOTICE:

- The Evaporative System Check (Automatic Mode) consists of 5 steps performed automatically by the Techstream. It takes a maximum of approximately 24 minutes.
- Do not perform the Evaporative System Check when the fuel tank is more than 90% full because the cut-off valve may be closed, making the fuel tank leak check unavailable.
- Do not run the engine during this operation.
- When the temperature of the fuel is 35°C (95°F) or higher, a large amount of vapor forms and any check results become inaccurate. When performing the Evaporative System Check, keep the fuel temperature below 35°C (95°F).

1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC procedure).
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Enter the following menus: Powertrain / Engine / Utility / Evaporative System Check / Automatic Mode.
7. After the Evaporative System Check is completed, check for All Readiness by entering the following menus: Powertrain / Engine / Utility / All Readiness.
8. Input the DTC: P0455, P0456, P1451 or P2404.
9. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none">◦ DTC judgment completed◦ System normal
ABNORMAL	<ul style="list-style-type: none">◦ DTC judgment completed◦ System abnormal
INCOMPLETE	<ul style="list-style-type: none">◦ DTC judgment not completed◦ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none">◦ Unable to perform DTC judgment◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- If the judgment result shows NORMAL, the system is normal.
 - If the judgment result shows ABNORMAL, the system has a malfunction.
10. If the judgment result is INCOMPLETE or N/A and no pending DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

INSPECTION PROCEDURE

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT
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- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Read the DTCs.

Result:

RESULT	PROCEED TO
DTC P0455, P0456, P1451 or P2404 is output	A
DTC P0455, P0456, P1451 or P2404 and other DTCs are output	B

B ▶ **GO TO DTC CHART**

A ▶ **GO TO EVAP SYSTEM**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VSO0FWX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0458,P0459: Evaporative Emission System Purge Control Valve Circuit Low (2013 FR-S)		

DTC	P0458	Evaporative Emission System Purge Control Valve Circuit Low
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DTC	P0459	Evaporative Emission System Purge Control Valve Circuit High
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DESCRIPTION

To reduce hydrocarbon emissions, evaporated fuel from the fuel tank is routed through a charcoal canister to the intake manifold for combustion in the cylinders.

The ECM changes the duty signals to the purge valve (Vacuum Switching Valve for Purge Control) so that the intake amount of hydrocarbon emissions is appropriate for the driving conditions (engine load, engine speed, vehicle speed, etc.) after the engine is warmed up.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0458	The voltage of purge valve circuit is low for 2.5 seconds or more. (2 trip detection logic)	<ul style="list-style-type: none"> • Open or short in purge valve circuit • purge valve • ECM
P0459	The voltage of purge valve circuit is high for 2.5 seconds or more. (2 trip detection logic)	

MONITOR DESCRIPTION

The ECM monitors the output terminal voltage when the vacuum switching valve assembly is actuated. By turning the FET in the ECM on and off, the purge valve assembly is subject to duty control. If the ECM control value (drive signal) and the output terminal voltage duty cycle continue to not match, then the ECM interprets this as a malfunction in the vacuum switching valve circuit, illuminates the MIL, and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0458: Solenoid valve for purge control functional check P0459: Solenoid valve for purge control functional check
Required sensors/Components (Main)	Purge valve
Required sensors/Components (Related)	-
Frequency of operation	Continuous
Duration	2.5 seconds
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs not stored	None
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P0458

Battery voltage	10.9 V or more
After engine starting	1 second or more
Purge valve control duty ratio	Less than 75%

P0459

Battery voltage	10.9 V or more
After engine starting	1 second or more
Purge valve control duty ratio	More than 25%

TYPICAL MALFUNCTION THRESHOLDS

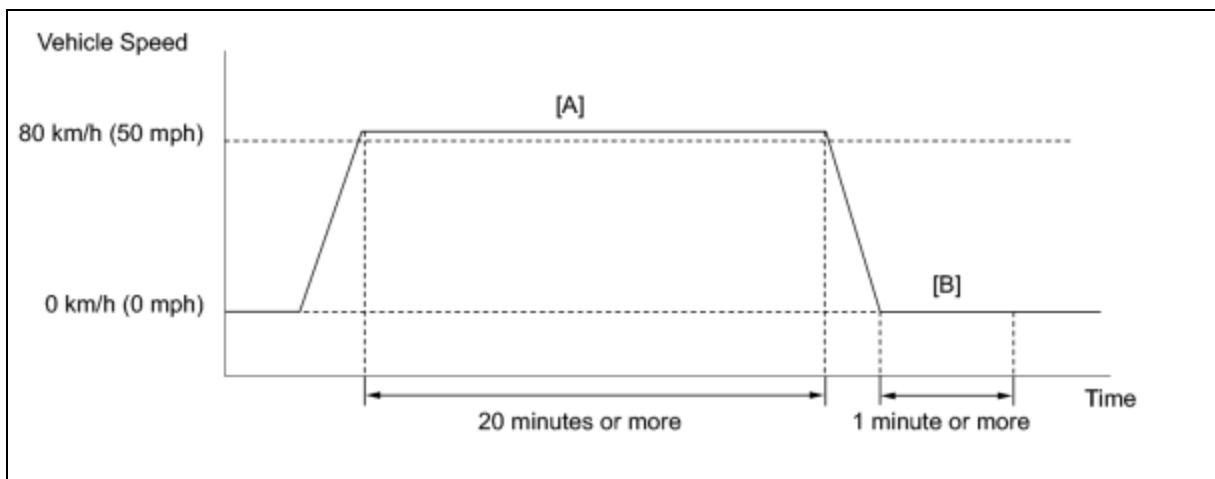
P0458

Drain voltage of FET for purge valve	Less than battery voltage X 0.38
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P0459

Current of FET for purge valve	More than 3.5 A
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CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.

6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.

HINT:

Check the engine coolant temperature is 20°C (68°F) or less at engine started.

7. Perform the following the confirmation driving pattern.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

- a. Drive the vehicle at 80 km/h (50 mph) or more for 20 minutes or more [A].
 - b. Stop the vehicle.
 - c. Idle the engine for 1 minute or more [B].
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
 9. Read pending DTCs.

HINT:


- o If a pending DTC is output, the system is malfunctioning.
- o If a pending DTC is not output, perform the following procedure.

10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
11. Input the DTC: P0458 or P0459.
12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal
ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

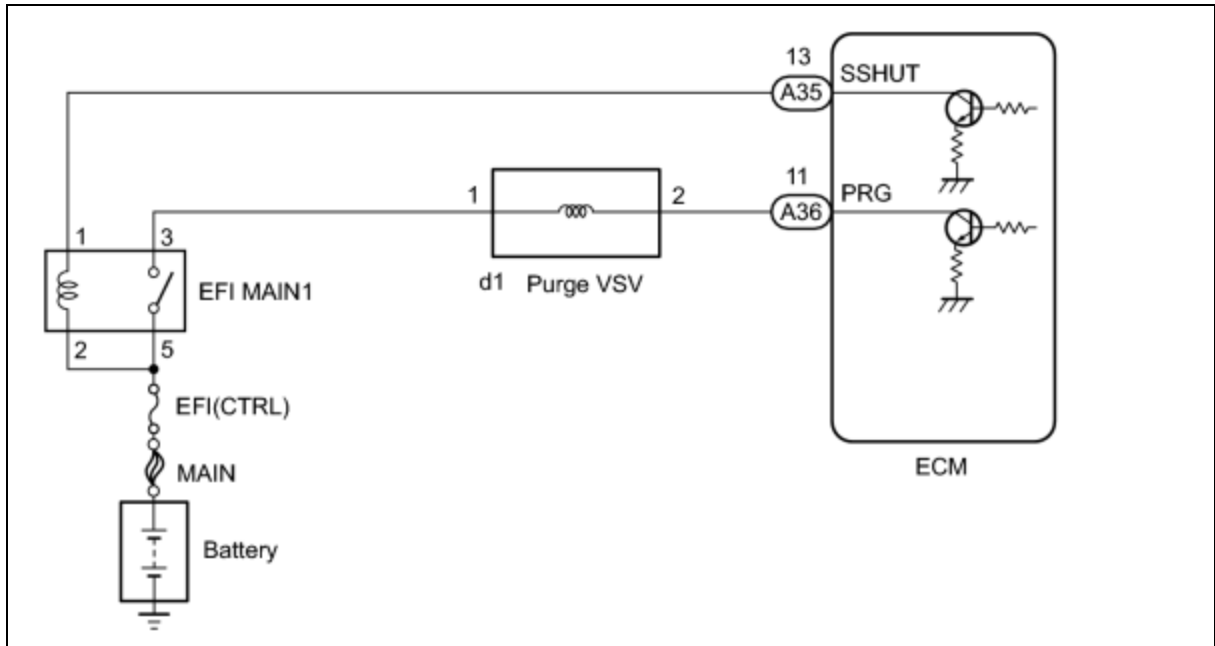
13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.

- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

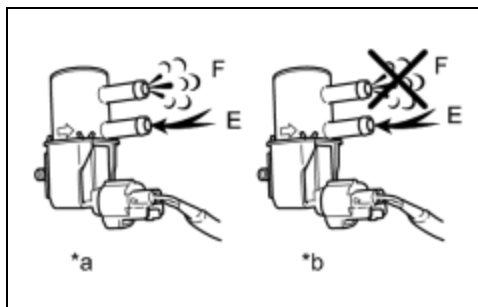
Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

Read freeze frame data using the Techstream. Freeze frame data records the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	PERFORM ACTIVE TEST USING TECHSTREAM (ACTIVATE THE VSV FOR EVAP CONTROL)
----	---



(a) Connect a Techstream to the DLC3.

- (b) Disconnect the vacuum hose (canister side) from the purge valve.
- (c) Start the engine.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Powertrain / Engine / Active Test / Activate the VSV for EVAP Control.
- (f) When the purge valve is operated using the Techstream, check whether the port of the purge valve applies suction to your finger.

OK:

TESTER OPERATION	SPECIFIED CONDITION
VSV ON	Purge valve port applies suction to finger
VSV OFF	Purge valve port applies no suction to finger

Text in Illustration

*a	Purge valve ON
*b	Purge valve OFF

Result

RESULT	PROCEED TO
NG	A
OK	B

B ► CHECK HARNESS AND CONNECTOR (PURGE VALVE - EFI MAIN1 RELAY)

A



2.	INSPECT PURGE VALVE
-----------	----------------------------

- (a) Inspect the purge valve INFO.

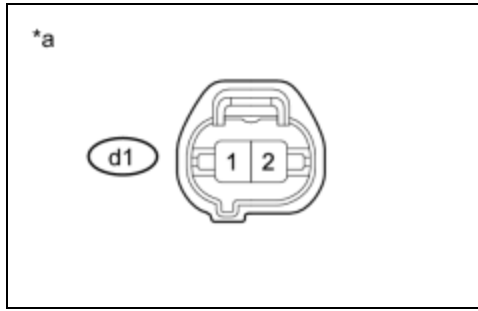
NG ► REPLACE PURGE VALVE

OK



--	--

3. INSPECT PURGE VALVE (POWER SOURCE)



(a) Disconnect the purge valve connector.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
d1-1 - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Purge valve)
----	--

NG **INSPECT RELAY (EFI MAIN1)**

OK



4. CHECK HARNESS AND CONNECTOR (PURGE VALVE - ECM)

(a) Disconnect the ECM connector.

(b) Disconnect the purge valve connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-11 (PRG) - d1-2	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
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A36-11 (PRG) or d1-2 - Body ground

Always


10 kΩ or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



5. CHECK WHETHER DTC OUTPUT RECURS

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON and turn the tester on.
- (g) Start the engine.
- (h) Drive the vehicle in accordance with the driving pattern described in the Confirmation Driving Pattern.
- (i) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (j) Read DTCs.

Result

RESULT	PROCEED TO
No DTC is output	A
P0458 or P0459 is output	B

HINT:

If the engine does not start, replace the ECM.

B  **REPLACE ECM**

A  **CHECK FOR INTERMITTENT PROBLEMS**

6. INSPECT RELAY (EFI MAIN1)

(a) Inspect the EFI MAIN1 relay  .

NG  **REPLACE RELAY (EFI MAIN1)**

OK


7.	CHECK HARNESS AND CONNECTOR (PURGE VALVE - EFI MAIN1 RELAY)
-----------	--

- (a) Disconnect the purge valve connector.
- (b) Remove the EFI MAIN1 relay from the engine room relay block assembly.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
d1-1 - EFI MAIN1 relay terminal 3	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
d1-1 or EFI MAIN1 relay terminal 3 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **GO TO ECM POWER SOURCE CIRCUIT**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PF60PCX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0461-P0463: Fuel Level Sensor "A" Circuit Range / Performance (2013 FR-S)		

DTC	P0461	Fuel Level Sensor "A" Circuit Range / Performance
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DTC	P0462	Fuel Level Sensor "A" Circuit Low
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DTC	P0463	Fuel Level Sensor "A" Circuit High
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DESCRIPTION

The signal output from the sender gauge assembly installed in the fuel tank is converted to a CAN communication signal using the combination meter assembly, and this signal is input into the ECM as a remaining fuel signal.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0461	Compared with the estimated fuel consumption, the actual variation in the fuel sender gauge assembly signal is small. (2 trip detection logic)	<ul style="list-style-type: none"> • Fuel sender gauge assembly • Fuel sender gauge assembly No. 2 • Combination meter assembly • ECM
P0462	Fuel sender gauge assembly voltage is less than 0.35 V for 2.5 seconds or more. (2 trip detection logic)	
P0463	Fuel sender gauge assembly voltage is higher than 7.183 V for 1 second or more. (2 trip detection logic)	

MONITOR DESCRIPTION

The ECM uses the fuel sender gauge to monitor the amount of fuel. There are several checks that the ECM performs to confirm the proper operation of the fuel sender gauge.

P0461

If the fuel sender gauge variation is lower than the estimated fuel consumption calculated from the fuel injection quantity and the engine speed, the ECM interprets this as a malfunction in the fuel sender gauge, and stores the DTC.

P0462, P0463

If an open or short in the fuel sender gauge signal line is detected, the ECM interprets this as a malfunction in the fuel sender gauge, and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0461: Fuel level sensor rationality check P0462: Fuel level sensor range check (Low voltage) P0463: Fuel level sensor range check (High voltage)
Required Sensors/Components (Main)	Fuel sender gauge assembly Fuel sender gauge assembly No. 2
Required Sensors/Components (Related)	Combination meter assembly
Frequency of Operation	Continuous
Duration	Immediately: P0461 2.5 seconds: P0462 1 second: P0463
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

P0461

Monitor runs whenever following DTCs not stored	P0068, P0107, P0108 (Manifold absolute pressure (MAP) sensor) P0111, P0112, P0113 (Intake air temperature (IAT) sensor) P0122, P0123, P0222, P0223 (Throttle position sensor) P0462, P0463 (Fuel level sensor (FL)) P0500 (Vehicle speed sensor (VSS)) P0604, P0605 (ROM in ECM) P1160 (Throttle return spring) P2101, P2102 (Throttle actuator control motor) P2109 (Throttle position sensor minimum stop) P2119 (Throttle actuator control) P2122, P2123, P2127, P2128 (Accelerator pedal position sensor (APPS) circuit) P2135 (Throttle position sensor (TPS) correlation) P2138 (Accelerator pedal position sensor (APPS) correlation) U0073, U0155, U0423 (CAN system)
Elapsed time after engine start	5 seconds or more
Battery voltage	10.9 V or more
Fuel cut	Not active
Integrated amount of intake air mass	165375 g or more

P0462, P0463

Monitor runs whenever following DTCs not stored	U0073, U0155, U0423 (CAN system)
Battery voltage	10.9 V or more
Elapsed time after engine start	3 seconds or more

TYPICAL MALFUNCTION THRESHOLDS

P0461

Maximum fuel level - Minimum fuel level	Less than 5.2%
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P0462

Fuel sender gauge voltage (Resistance)	Less than 0.35 V (10.5 Ω)
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P0463


Fuel sender gauge voltage (Resistance)	More than 7.183 V (432 Ω)
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COMPONENT OPERATING RANGE

Fuel sender gauge voltage (Resistance)	0.398 to 7.051 V (12 to 416 Ω)
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CONFIRMATION DRIVING PATTERN

P0461

1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) .
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. Drive the vehicle and consume more than 30 liters (31.7 US qts) of the fuel.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

8. Enter the following menus: Powertrain / Engine / Trouble Codes.
9. Read pending DTCs.

HINT:

- If a pending DTC is output, the system is malfunctioning.
 - If a pending DTC is not output, perform the following procedure.
10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 11. Input the DTC: P0461.
 12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none">◦ DTC judgment completed◦ System normal
ABNORMAL	<ul style="list-style-type: none">◦ DTC judgment completed

	<ul style="list-style-type: none"> System abnormal
INCOMPLETE	<ul style="list-style-type: none"> DTC judgment not completed Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> Unable to perform DTC judgment Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

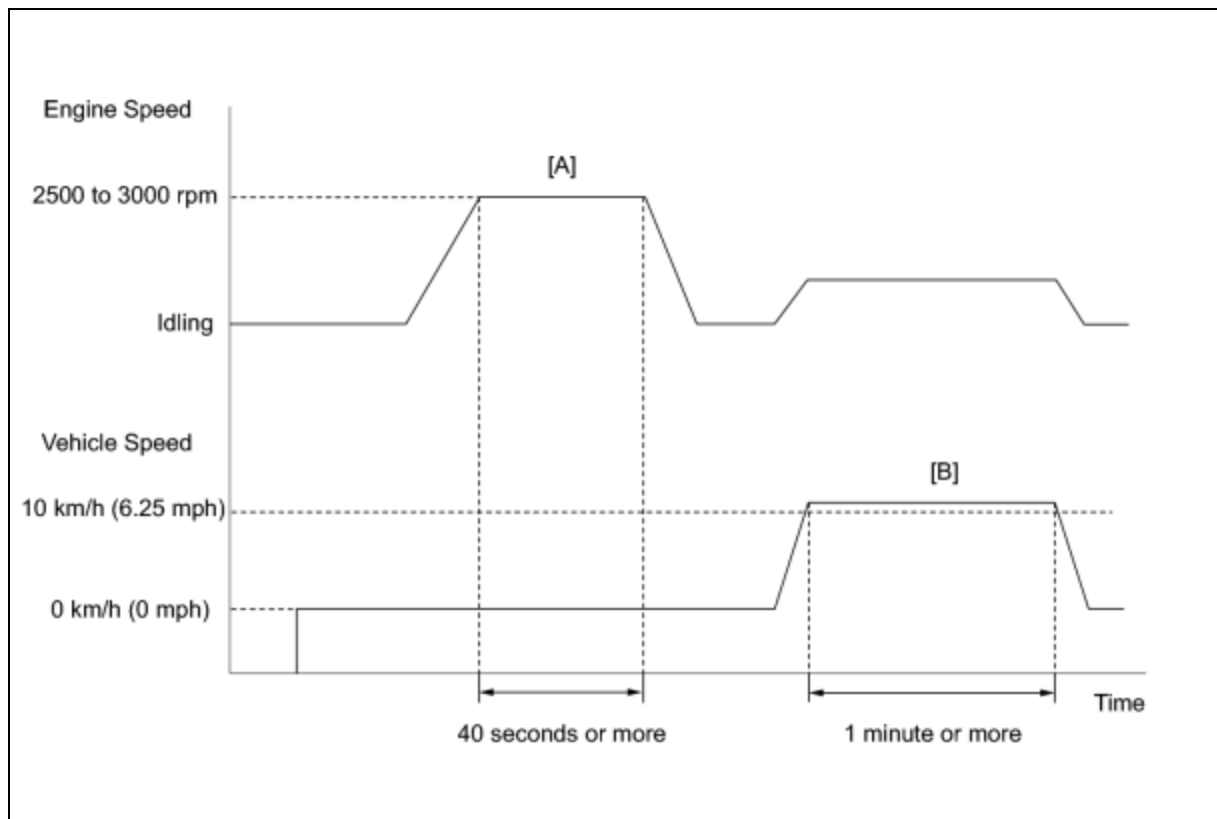
- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.

13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs INFO.

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

P0462, P0463



- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON and turn the Techstream on.
- Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
- Turn the ignition switch off and wait for at least 30 seconds.

5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher .
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.


9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P462 or P0463.
 13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal
ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

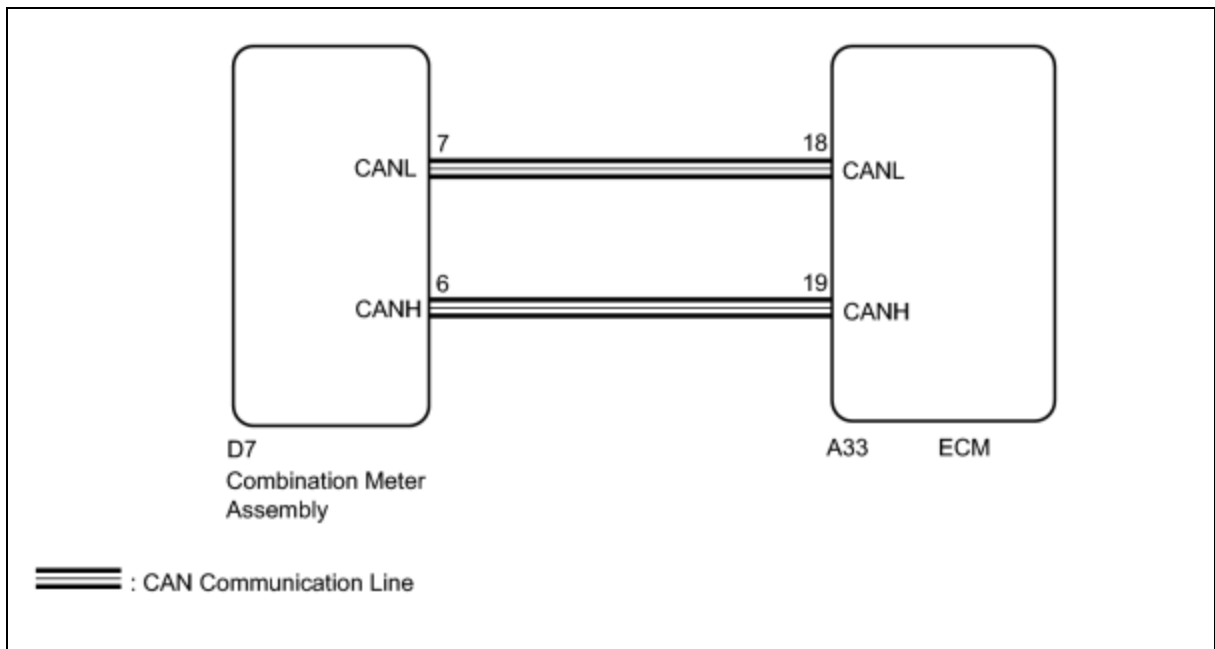
HINT:

- o If the judgment result shows NORMAL, the system is normal.
 - o If the judgment result shows ABNORMAL, the system has a malfunction.
14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT
-----------	------------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Read the DTCs.

Result:

RESULT	PROCEED TO
DTC P0461, P0462 or P0463 is output	A
DTC P0461, P0462 or P0463 and other DTCs are output	B

B ► **GO TO DTC CHART**

A ► **GO TO FUEL GAUGE MALFUNCTION**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000012ME0EVX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0500: Vehicle Speed Sensor "A" (2013 FR-S)		

DTC	P0500	Vehicle Speed Sensor "A"
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DESCRIPTION

Vehicles, which are equipped with ABS (Anti-lock Brake System), detect the vehicle speed using the skid control ECU (brake actuator assembly) and wheel speed sensor. The wheel speed sensor monitors the wheel rotation speed and sends a signal to the skid control ECU. The skid control ECU converts the wheel speed signal into a 4-pulse signal and transmits it to the ECM. The ECM determines the vehicle speed based on the frequency of the pulse signal.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0500	The vehicle speed signal from the driving wheels is 300 km/h or more for 2.5 seconds or more. (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in wheel speed signal circuit • Skid control ECU (Brake actuator assembly) • Speed sensor

MONITOR DESCRIPTION

If the driving wheel speed signal input from the skid control ECU indicates speed of 300 km/h (186.42 mph) or more, the ECM interprets this as a malfunction in the speed signal circuit. The ECM then illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0500: Vehicle speed sensor (VSS) range check
Required Sensors/Components (Main)	Speed sensor Combination meter Skid control ECU
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	2.5 seconds
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

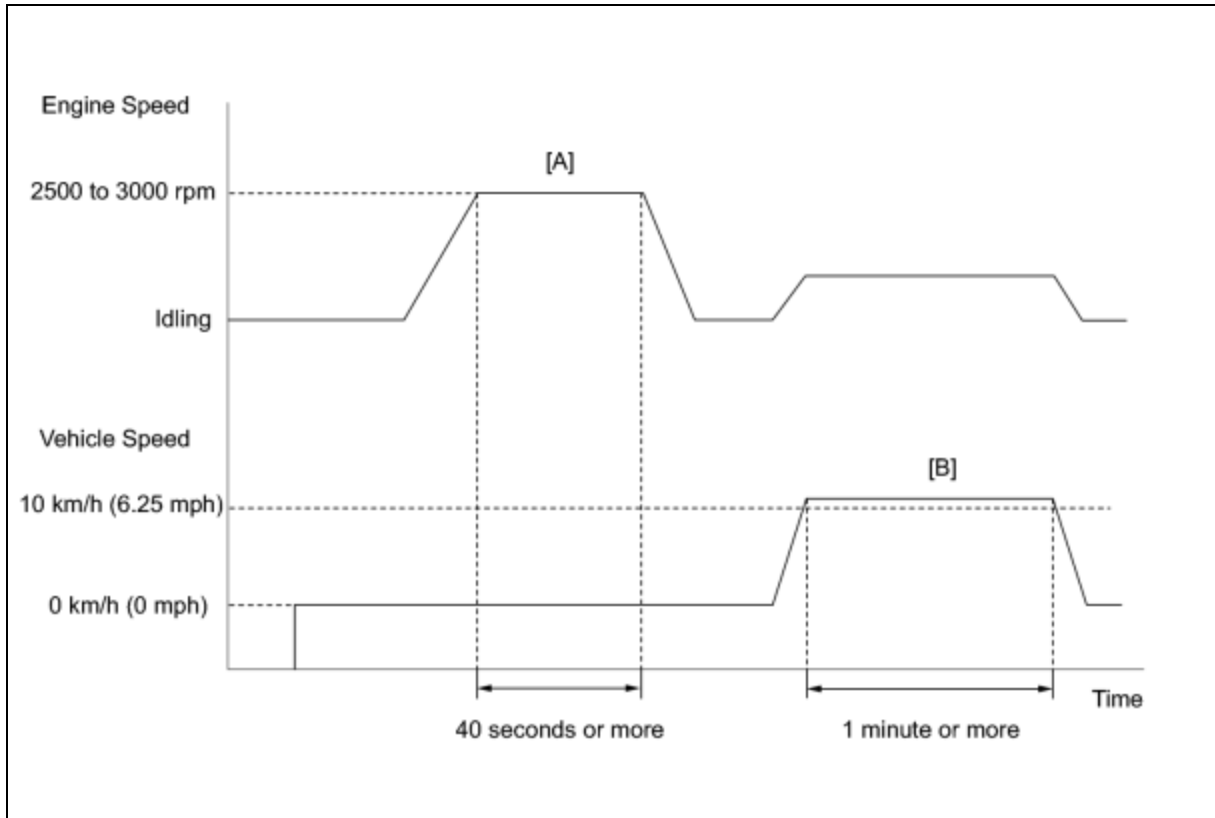
Monitor runs whenever following DTCs not present	U0073, U0122, U0416 (CAN system)
Battery voltage	10.9 V or more

TYPICAL MALFUNCTION THRESHOLDS

Vehicle speed

More than 300 km/h (186.42 mph)

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:


- If a pending DTC is output, the system is malfunctioning.
- If a pending DTC is not output, perform the following procedure.

11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
12. Input the DTC: P0500.
13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ○ DTC judgment completed ○ System normal
ABNORMAL	<ul style="list-style-type: none"> ○ DTC judgment completed ○ System abnormal
INCOMPLETE	<ul style="list-style-type: none"> ○ DTC judgment not completed ○ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> ○ Unable to perform DTC judgment ○ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

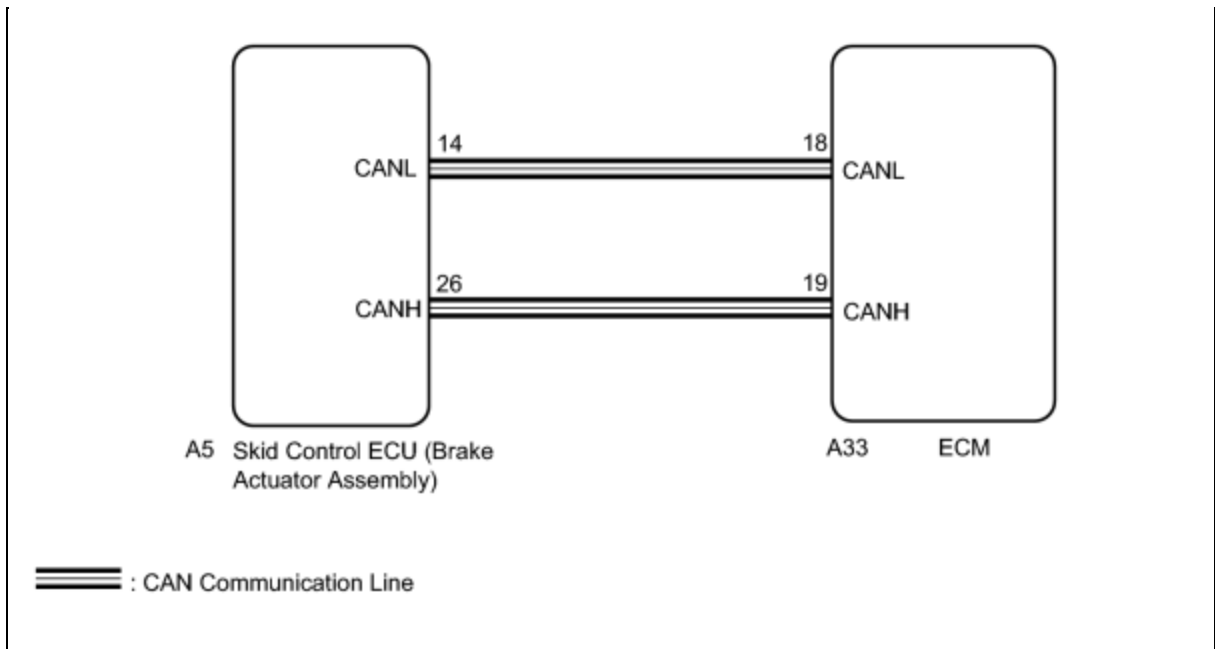
- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	READ VALUE USING TECHSTREAM (VEHICLE SPEED)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and turn the Techstream on.
- (c) Enter the following menus: Powertrain / Engine / Data List / Vehicle Speed.
- (d) Drive the vehicle.
- (e) Read the value displayed on the Techstream.

Result


RESULT	PROCEED TO
Values displayed on Techstream and speedometer display not equal	A
Values displayed on Techstream and speedometer display equal	B

B CHECK FOR INTERMITTENT PROBLEMS

A



2.	CHECK DTC OUTPUT (VEHICLE STABILITY CONTROL SYSTEM)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Chassis / ABS/VSC/TRAC / Trouble Codes.
- (e) Read DTCs  .

Result


RESULT	PROCEED TO
No DTC is output	A
No DTCs are output	B

B  **GO TO VEHICLE STABILITY CONTROL SYSTEM**

A



3.	CHECK WHETHER DTC OUTPUT RECURS
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine and warm it up.
- (i) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (j) Enter the following menus: Powertrain / Engine / Trouble Codes.

Result:

RESULT	PROCEED TO
DTC is not output	A
DTC P0500 is output	B

B ▶ REPLACE ECM

A ▶ CHECK FOR INTERMITTENT PROBLEMS



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000T8MOMVX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0506,P0507: Idle Air Control System RPM Lower than Expected (2013 FR-S)		

DTC	P0506	Idle Air Control System RPM Lower than Expected
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DTC	P0507	Idle Air Control System RPM Higher than Expected
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DESCRIPTION

The idling speed is controlled by the ETCS (Electronic Throttle Control System). The ETCS is comprised of: 1) the one valve type throttle body; 2) the throttle actuator, which operates the throttle valve; 3) the throttle position sensor, which detects the opening angle of the throttle valve; 4) the accelerator pedal position sensor, which detects the accelerator pedal position; and 5) the ECM, which controls the ETCS. Based on the target idling speed, the ECM controls the throttle actuator to provide the proper throttle valve opening angle.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0506	The engine speed is not close to the target engine speed for 30 seconds or more (Actual engine speed - target engine speed) < -100 rpm). (2 trip detection logic)	<ul style="list-style-type: none"> • Electronic throttle control system • Intake system • PCV hose connections • ECM
P0507	The engine speed is not close to the target engine speed for 30 seconds or more (Actual engine speed - target engine speed) >= 200 rpm). (2 trip detection logic)	

MONITOR DESCRIPTION

The ECM monitors the idling speed and idling air flow volume to conduct Idle Speed Control (ISC). The ECM determines that the ISC system is malfunctioning if the difference between the target engine idling speed and actual engine idling speed exceeds the threshold for 30 seconds or more.

MONITOR STRATEGY

Related DTCs	P0506: Idle speed control (ISC) functional check P0507: Idle speed control (ISC) functional check
Required Sensors/Components (Main)	Electronic throttle control system
Required Sensors/Components (Related)	Crankshaft position sensor Engine coolant temperature sensor Speed sensor
Frequency of Operation	Continuous

Duration	30 seconds
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	P0030, P0031, P0032 (Air fuel ratio sensor - heater) P0068, P0107, P0108 (Manifold absolute pressure (MAP) sensor) P0117, P0118, P0125 (Engine coolant temperature (ECT) sensor) P0122, P0123, P0222, P0223 (Throttle position sensor) P0131, P0132 (Air fuel ratio sensor - ECM input voltage) P0134, P2195, P2196 (Air fuel ratio sensor - output voltage) P0300, P0301, P0302, P0303, P0304 (Misfire) P0461, P0462, P0463 (Fuel level sensor (FL)) P0500 (Vehicle speed sensor (VSS)) P0604, P0605 (ROM in ECM) P0851, P0852 (Neutral position switch) P1160 (Throttle return spring) P2101, P2102 (Throttle actuator control motor) P2109 (Throttle position sensor minimum stop) P2119 (Throttle actuator control) P2122, P2123, P2127, P2128 (Accelerator pedal position sensor (APPS) circuit) P2135 (Throttle position sensor (TPS) correlation) P2138 (Accelerator pedal position sensor (APPS) correlation)
Fuel level	15% or more
Atmospheric pressure	75.06 kPa [563 mmHg] or more
Battery voltage	10.9 V or more
Engine coolant temperature	60°C (140°F) or higher
Elapsed time after engine start	10.49 seconds or more
Closed control in ISC	Active
Lambda	0.81 to 1.1
Elapsed time after A/C switch OFF ↔ ON	5.1 seconds or more
Elapsed time after changing intake manifold pressure =< 4 kPa (30 mmHg)	5.1 seconds or more
Vehicle speed	0 km/h (0 mph)
Elapsed time after neutral switch OFF ↔ ON	5.1 seconds or more

TYPICAL MALFUNCTION THRESHOLDS

P0506

Actual engine speed - Target engine speed

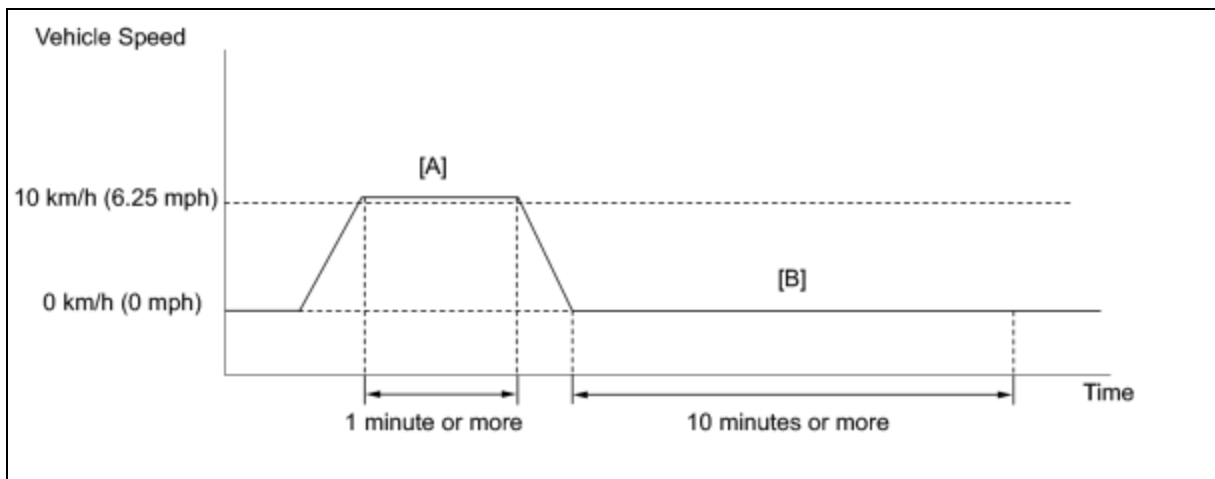
Less than -100 rpm

P0507

Actual engine speed - Target engine speed

More than 200 rpm

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. Perform the following the confirmation driving pattern.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

- a. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [A].
 - b. Stop the vehicle.
 - c. Idle the engine for 10 minutes or more [B].
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
 9. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 11. Input the DTC: P0506 or P0507.
 12. Check the DTC judgment result.

TECHSTREAM
DISPLAY

DESCRIPTION

NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal
ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs **INFO** .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

INSPECTION PROCEDURE

HINT:

- The following conditions may also cause DTC DTC P0506 or P0507 to be stored:
 - a. The floor carpet overlapping slightly onto the accelerator pedal, causing the accelerator pedal to be slightly depressed and therefore the throttle valve position to be slightly open.
 - b. The accelerator pedal being not fully released.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- Refer to "Data List / Active Test" [Engine Speed, ISC Feedback Value and ISC Learning Value] **INFO**

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0506 AND P0507)
-----------	---

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine / Trouble Codes.

(e) Read DTCs.

Result

RESULT	PROCEED TO
DTC P0506 or P0507 is output	A
DTC P0506 or P0507 and other DTCs are output	B

HINT:


If any DTCs other than P0506 or P0507 are output, troubleshoot those DTCs first.

B ► GO TO DTC CHART

A



2.	CHECK PCV HOSE CONNECTIONS
-----------	-----------------------------------

(a) Check the PCV hose connections  .

OK:

PCV valve and hose are connected correctly and are not damaged.

NG ► REPAIR OR REPLACE PCV HOSE

OK



3.	CHECK INTAKE SYSTEM
-----------	----------------------------

(a) Check the intake system for vacuum leaks  .

OK:

No leaks from the intake system.

NG ► REPAIR OR REPLACE INTAKE SYSTEM

OK



4.	INSPECT THROTTLE WITH MOTOR BODY ASSEMBLY (THROTTLE VALVE)
-----------	---

(a) Check the throttle with motor body assembly condition INFO.

OK:

Throttle valve is not contaminated with foreign objects and moves smoothly.

NG ▶ **REPLACE THROTTLE WITH MOTOR BODY ASSEMBLY**

OK



5.	CONFIRM WHETHER DTC OUTPUT RECURS
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (e) Read DTCs.

Result

RESULT	PROCEED TO
DTC P0506 or P0507 is output	A
No DTC is output	B

B ▶ **END**

A ▶ **CHECK FOR INTERMITTENT PROBLEMS**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000T8P0ZQX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0560: System Voltage (2013 FR-S)		

DTC	P0560	System Voltage
------------	--------------	-----------------------

MONITOR DESCRIPTION

The battery supplies electricity to the ECM even when the ignition switch is off. This power allows the ECM to store data such as DTC history, freeze frame data and fuel trim values. If the battery voltage falls below a minimum level, the memory is cleared and the ECM determines that there is a malfunction in the power supply circuit. When the engine is next started, the ECM illuminates the MIL and stores the DTC.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0560	Back up power source terminal voltage is 3.5 V or less with the engine running for 2.5 seconds or more. (1 trip detection logic)	<ul style="list-style-type: none"> • Open in back up power source circuit • Battery • Battery terminals • ECM

HINT:

If DTC P0560 is stored, the ECM does not store other DTCs or the data stored in the ECM is partly cleared.

MONITOR STRATEGY

Related DTCs	P0560: Back-up power supply for memory of ECM functional check
Required Sensors/Components (Main)	ECM
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	2.5 seconds
MIL Operation	Immediately
Sequence of Operation	None

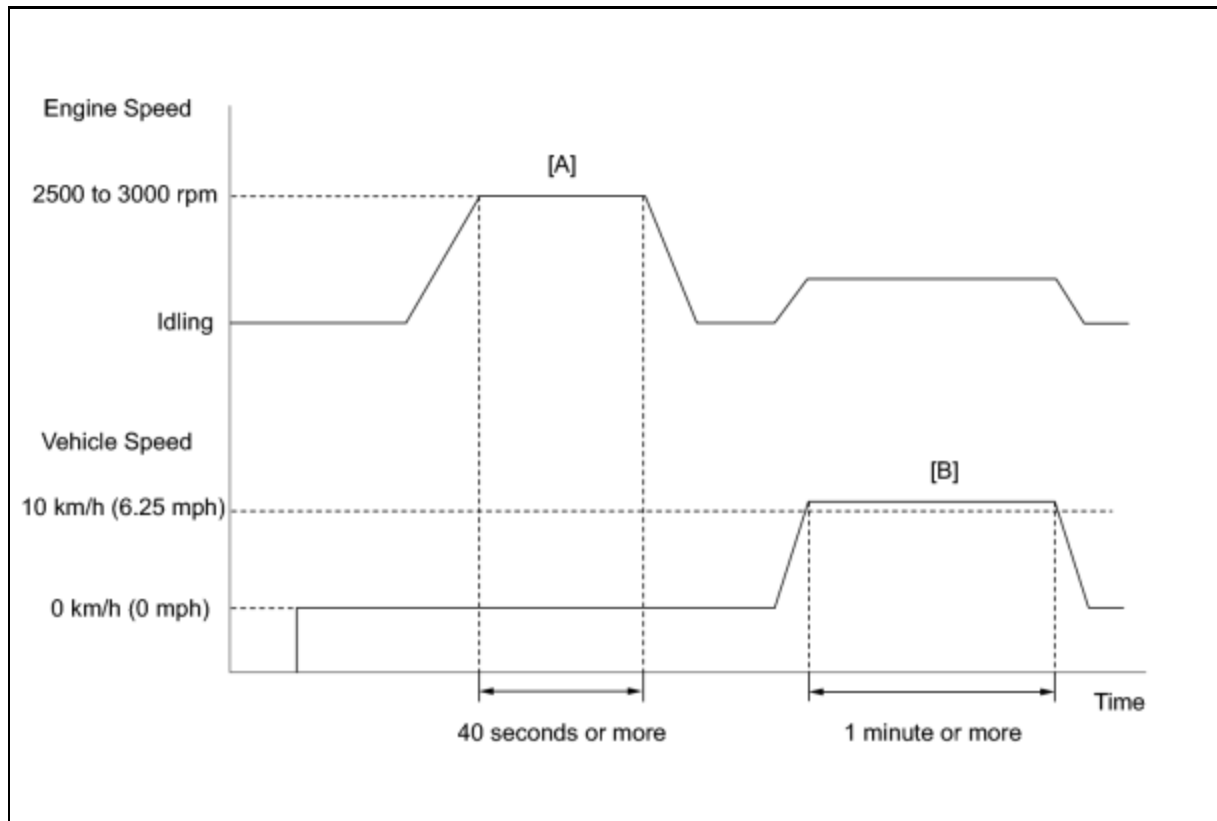
TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	None
Engine speed	500 rpm or higher
Battery voltage	10.9 V or more

TYPICAL MALFUNCTION THRESHOLDS

Voltage of back-up power	Less than 3.5 V
--------------------------	-----------------

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. With the vehicle stationary, depress the accelerator pedal and maintain an engine speed of between 2500 and 3000 rpm for 40 seconds or more [A].
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P0560.

13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ○ DTC judgment completed ○ System normal
ABNORMAL	<ul style="list-style-type: none"> ○ DTC judgment completed ○ System abnormal
INCOMPLETE	<ul style="list-style-type: none"> ○ DTC judgment not completed ○ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> ○ Unable to perform DTC judgment ○ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

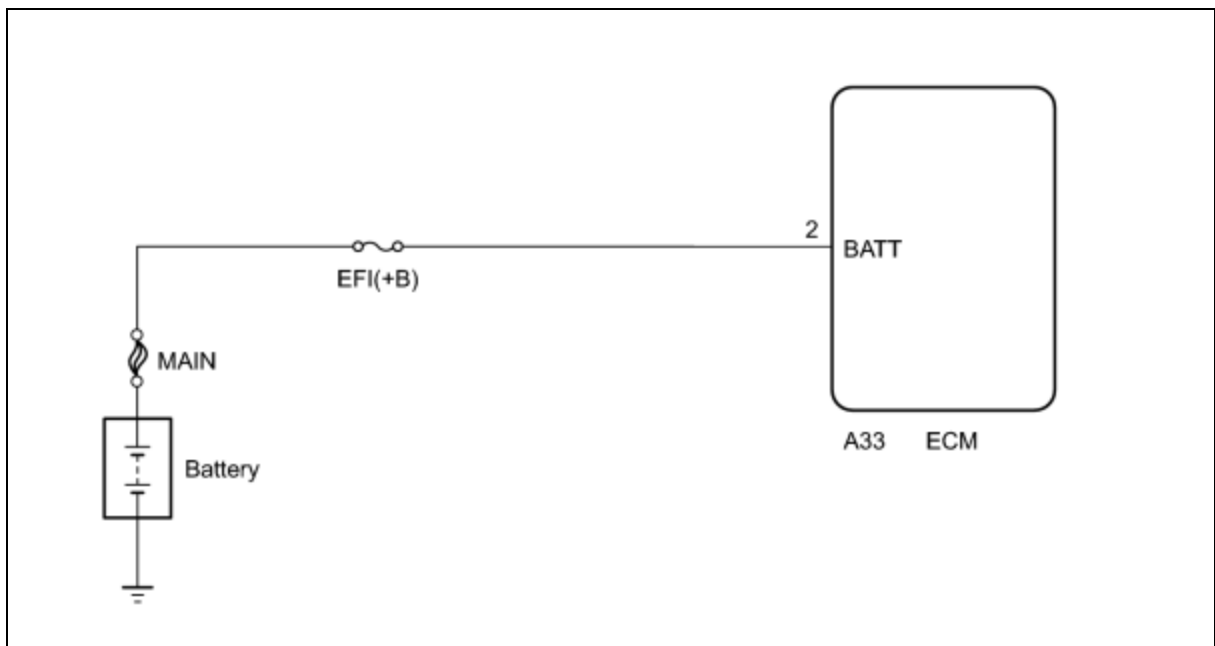
- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs NFC.

HINT:


- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Inspect the fuses for circuits related to this system before performing the following inspection procedure.
- After turning ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work .


HINT:


Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	CHECK HARNESS AND CONNECTOR (ECM - BATTERY)
-----------	--

NOTICE:

After turning ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work .

- (a) Disconnect the cable from the negative (-) battery terminal .
- (b) Disconnect the cable from the positive (+) battery terminal.
- (c) Disconnect the ECM connector.
- (d) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-2 (BATT) - Battery positive (+) terminal	Always	Below 1 Ω

Standard Resistance (Check for short):


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-2 (BATT) or Battery positive (+) terminal - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK




2.	INSPECT CHARGING SYSTEM
-----------	--------------------------------

(a) Inspect the charging system  .

NG  **REPAIR OR REPLACE MALFUNCTIONING PARTS**

OK


3.	CHECK WHETHER DTC OUTPUT RECURS
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON and turn the Techstream on.
- (g) Drive the vehicle in accordance with the driving pattern described in the Confirmation Driving Pattern.
- (h) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (i) Read DTCs.

Result

RESULT	PROCEED TO
DTC is not output	A
DTC P0560 is output	B

B  **REPLACE ECM**

A  **CHECK FOR INTERMITTENT PROBLEMS**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W950HAX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0604-P0606,P060A,P060B,P062F: Internal Control Module Random Access Memory (RAM) Error (2013 FR-S)		

DTC	P0604	Internal Control Module Random Access Memory (RAM) Error
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DTC	P0605	Internal Control Module Read Only Memory (ROM) Error
------------	--------------	---

DTC	P0606	ECM / PCM Processor
------------	--------------	----------------------------

DTC	P060A	Internal Control Module Monitoring Processor Performance
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DTC	P060B	Internal Control Module A/D Processing Performance
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DTC	P062F	Internal Control Module EEPROM Error
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DESCRIPTION

P0604

The ECM continuously monitors its internal memory status. This self-check ensures that the ECM functioning properly. It is diagnosed by internal "mirroring" of the main CPU and sub CPU to detect the Random Access Memory (RAM) errors. If outputs from these CPUs are different and deviate from the standard, the ECM stores the DTC.

P0605

The ECM continuously monitors its internal memory status. This self-check ensures that the ECM functioning properly. It is diagnosed by internal "mirroring" of the main CPU and sub CPU to detect the Read Only Memory (ROM) errors. If outputs from these CPUs are different and deviate from the standard, the ECM stores the DTC.

P0606

The ECM continuously monitors its main and sub CPUs. This self-check ensures that the ECM is functioning properly. If outputs from the CPUs are different and deviate from the standard, the ECM stores the DTC.

P060A

The main CPU and sub CPU of the ECM perform data communication between each other. The main CPU monitors the communications and WDC pulses from the sub CPU. If the malfunction is detected, the ECM stores the DTC.

P060B

If a communication error occurs in the ECM, the ECM stores the DTC.

P062F

The ECM monitors its internal operation. If the ECM detects an internal malfunction, the ECM stores the DTC.

DTC	DTC SETTING CONDITION	TROUBLE AREA
P0604	ECM internal error (RAM) (1 trip detection logic)	ECM
P0605	ECM internal error (ROM) (1 trip detection logic)	ECM
P0606	ECM internal error (Processor) (1 trip detection logic)	ECM
P060A	ECM internal error (Monitoring processor) (1 trip detection logic)	ECM
P060B	ECM internal error (A/D processor) (1 trip detection logic)	ECM
P062F	ECM internal error (EEPROM) (1 trip detection logic)	ECM

MONITOR STRATEGY

Related DTCs	P0604: RAM in ECM functional check P0605: ROM in ECM functional check P0606: Control module processor functional check P060A: Internal control module monitoring processor performance functional check P060B: Internal control A/D processing performance functional check P062F: Internal control EEPROM error functional check
Required Sensors/Components (Main)	ECM
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous: P0604, P0605, P0606, P060A, P060B Once per driving cycle: P062F
Duration	0.512 seconds: P0604, P0605 2 times: P0606 (Instruction check) (Case 1) 0.512 seconds: P0606 (Instruction check) (Case 2) 0.504 seconds: P0606 (Software flow check) 0.048 seconds: P0606 (Output driver communication check) 0.048 seconds: P0606 (CAN register check) 0.024 seconds: P060A (Disable function observation IC) 0.016 seconds: P060A (Malfunction of observation IC calculation) 0.2 seconds: P060A (Observation IC resistor monitoring)

	0.2 seconds: P060B 2 driving cycles: P062F
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs are not present	None
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P0604, P0605

Ignition switch	OFF to ON
-----------------	-----------

P0606 (Instruction Check) (Case 1)

Ignition switch	OFF to ON
-----------------	-----------

P0606 (Instruction Check) (Case 2)

ETCS relay	On
Battery voltage	6.2 V or more

P0606 (Software Monitor Check)

ETCS relay	On
Battery voltage	6.2 V or more

P060A (Disable Function Observation IC)

Battery voltage	6 V or more
Main throttle sensor circuit continuity	No failure
Sub throttle sensor circuit continuity	No failure
Throttle sensor rationality check	No failure
Microcomputer disable	Off
Observation IC disable	On

P060A (Malfunction of Observation IC Calculation)

Battery voltage	6 V or more
Microcomputer disable	On

P060A (Observation IC Resister Monitoring)

Battery voltage	6 V or more
-----------------	-------------

P060B

Battery voltage	6 V or more
-----------------	-------------

TYPICAL MALFUNCTION THRESHOLDS**P0604**

Setting value can be written in all RAM area, and the values can be read correctly	Fail to read correctly
--	------------------------

P0605

Comparing Check sum data on ROM with Calculated sum data	Not equal
--	-----------

P0606 (Instruction Check) (Case 1)

Instruction error	Detect
-------------------	--------

P0606 (Instruction Check) (Case 2)

Calculated data through CPU and FPU (Floating point number Processing Unit) are compared with expectation	Not equal
---	-----------

P0606 (Software Flow Check)

Software flow error	Detect
---------------------	--------

P0606 (Output Driver Communication Check)

Driver IC communication	Malfunction
Port voltage of driver IC check	Low

P0606 (CAN Resister Check)

Comparison of data written to CAN register with data read from the CAN register	Not equal
---	-----------

P060A (Disable Function Observation IC)

Throttle angle - Memory throttle angle when monitoring	More than 1.6%
--	----------------

P060A (Malfunction of Observation IC Calculation)

TAC disable request from observation IC	Not detected
---	--------------

P060A (Observation IC Resister Monitoring)

Comparison of data written to observation IC register with data read from the observation IC register	Not equal
---	-----------

P060B


--	--

Either of the following conditions is met:	A or B
A. A/D voltages for monitoring - 0 at target A/D voltages 0 V	More than 0.01953 V
B. 5 - A/D voltages for monitoring at target A/D voltages 5 V	More than 4.97925 V

P062F (Observation IC Resister Monitoring)

Fail writing to EEPROM	Yes
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CONFIRMATION DRIVING PATTERN

1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation)  .
4. Turn the Techstream off.
5. Turn the ignition switch off.
6. Disconnect the Techstream.
7. Disconnect the cable from the negative (-) battery terminal and wait for 1 minute.
8. Connect the cable to the negative (-) battery terminal.
9. Connect the Techstream to the DLC3.
10. Turn the ignition switch to ON and turn the Techstream on.
11. Wait 16 seconds or more.
12. Enter the following menus: Powertrain / Engine / Trouble Codes.
13. Read the pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
14. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 15. Input the DTC: P0604, P0605, P0606, P060A, P060B or P062F.
 16. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal
ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.

17. If the judgment result is INCOMPLETE or N/A and no pending DTC is output, perform a universal trip and check for permanent DTCs **INFO** .

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

INSPECTION PROCEDURE

Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	READ DTC OUTPUT (DTC P0604, P0605, P0606, P060A, P060B AND/OR P062F)
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- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs **INFO** .
- (e) Turn the ignition switch off.
- (f) Turn the Techstream off.
- (g) Disconnect the Techstream.
- (h) Disconnect the cable from the negative (-) battery terminal and wait for 1 minute.
- (i) Connect the cable to the negative (-) battery terminal.
- (j) Connect the Techstream to the DLC3.
- (k) Turn the ignition switch to ON.
- (l) Turn the Techstream on.
- (m) Wait for 16 seconds or more.
- (n) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (o) Read the DTCs.



Result:

RESULT	PROCEED TO
DTC is not output	A
DTC DTC P0604, P0605, P0606, P060A, P060B or P062F is output	B

B ▶ REPLACE ECM

A ▶ CHECK FOR INTERMITTENT PROBLEMS



 **TOYOTA** 

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000TA0123X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0616,P0617: Starter Relay Circuit Low (2013 FR-S)		

DTC	P0616	Starter Relay Circuit Low
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DTC	P0617	Starter Relay Circuit High
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MONITOR DESCRIPTION

While the engine is being cranked, battery voltage is applied to terminal STA of the ECM. If the ECM detects the starter control (STA) signal after the engine is started, it determines that there is a malfunction in the STA circuit. The ECM then illuminates the MIL and stores the DTC.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0616	No starter signal is input when engine started. (1 trip detection logic)	<ul style="list-style-type: none"> • Starter system • ST relay circuit • ECM
P0617	Starter signal remains input after engine started. (1 trip detection logic)	<ul style="list-style-type: none"> • Starter system • ST relay circuit • ECM

MONITOR STRATEGY

Related DTCs	P0616: Starter switch circuit without push start system functional check P0617: Starter switch circuit without push start system functional check
Required Sensors/Components (Main)	ST relay Park/neutral position switch assembly Ignition or starter switch assembly
Required Sensors/Components (Related)	Speed sensor Crankshaft position sensor
Frequency of Operation	Continuous
Duration	Immediately: P0616 60 seconds: P0617
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

P0616

Monitor runs whenever following DTCs not stored	P0500 (Vehicle speed sensor (VSS))
Battery voltage	8 V or more
Engine condition	Stop to Run
Vehicle speed	Less than 1 km/h (0.6 mph)

P0617

Monitor runs whenever following DTCs not stored	P0500 (Vehicle speed sensor (VSS))
Battery voltage	8 V or more
Engine condition	Run

TYPICAL MALFUNCTION THRESHOLDS

P0616

Starter signal 1	Off
------------------	-----

P0617

Starter signal 1	On
------------------	----

CONFIRMATION DRIVING PATTERN

1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC procedure) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Idle the engine for 1 second or more.
7. Enter the following menus: Powertrain / Engine / Trouble Codes.
8. Read pending DTCs.

HINT:

- If a pending DTC is output, the system is malfunctioning.
 - If a pending DTC is not output, perform the following procedure.
9. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 10. Input the DTC: P0616 or P0617.
 11. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System normal
ABNORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System abnormal

INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

12. If the judgment result is INCOMPLETE or N/A and no pending DTC is output, perform a universal trip and check for permanent DTCs **INFO** .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM

Refer to Starter Signal Circuit **INFO** .

INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

- The following troubleshooting flowchart is based on the premise that the engine can be cranked normally.

If the engine does not crank, proceed to Problem Symptoms Table **INFO** .

- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	READ VALUE USING TECHSTREAM (STARTER SIGNAL, STARTER SWITCH)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Data List / Starter Signal and Starter Switch.

(e) Read the value displayed on the Techstream when the ignition switch is turned to ON and cranking.

OK:

TECHSTREAM DISPLAY	CONDITION	NORMAL CONDITION
Starter Signal	Ignition switch ON	OFF
	Cranking	ON
Starter Switch	Ignition switch ON	OFF
	Cranking	ON

Result

RESULT	PROCEED TO
NG	A
OK	B

B ► CHECK WHETHER DTC OUTPUT RECURS

A



2.	INSPECT RELAY (ST)
-----------	---------------------------

(a) Inspect the ST relay  .

NG ► REPLACE RELAY (ST)

OK



3.	CHECK HARNESS AND CONNECTOR (ST RELAY - ECM)
-----------	---

(a) Remove the ST relay from the engine room relay block assembly.

(b) Disconnect the ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
-------------------	-----------	---------------------

ST relay terminal 3 - A33-17 (STSW2)	Always	Below 1 Ω
ST relay terminal 1 - A35-26 (STA)	Always	Below 1 Ω


Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
ST relay terminal 3 or A33-17 (STSW2) - Body ground	Always	10 kΩ or higher
ST relay terminal 1 or A35-26 (STA) - Body ground	Always	10 kΩ or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **CHECK STARTER SIGNAL CIRCUIT**

4.	CHECK WHETHER DTC OUTPUT RECURS
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON and turn the tester on.
- (g) Start the engine.
- (h) Drive the vehicle in accordance with the driving pattern described in the Confirmation Driving Pattern.
- (i) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (j) Read DTCs.

Result

RESULT	PROCEED TO
No DTC is output	A
P0616 or P0617 is output	B

HINT:

If the engine does not start, replace the ECM.

B  **REPLACE ECM**

A  **CHECK FOR INTERMITTENT PROBLEMS**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002KQO09CX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0700: Transmission Control System (MIL Request) (2013 FR-S)		

DTC	P0700	Transmission Control System (MIL Request)
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DESCRIPTION

The ECM and TCM communicate with each other via the CAN communication line. If the TCM detects an automatic transmission malfunction, the ECM receives this signal.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0700	Automatic transmission system malfunction received from the TCM (1 trip detection logic)	<ul style="list-style-type: none"> Automatic transmission system ECM

MONITOR STRATEGY

Related DTCs	P0700: Transmission control system (MIL request) functional check
Required Sensors/Components (Main)	ECM
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	2.5 seconds
MIL Operation	Immediately
Sequence of Operation	None

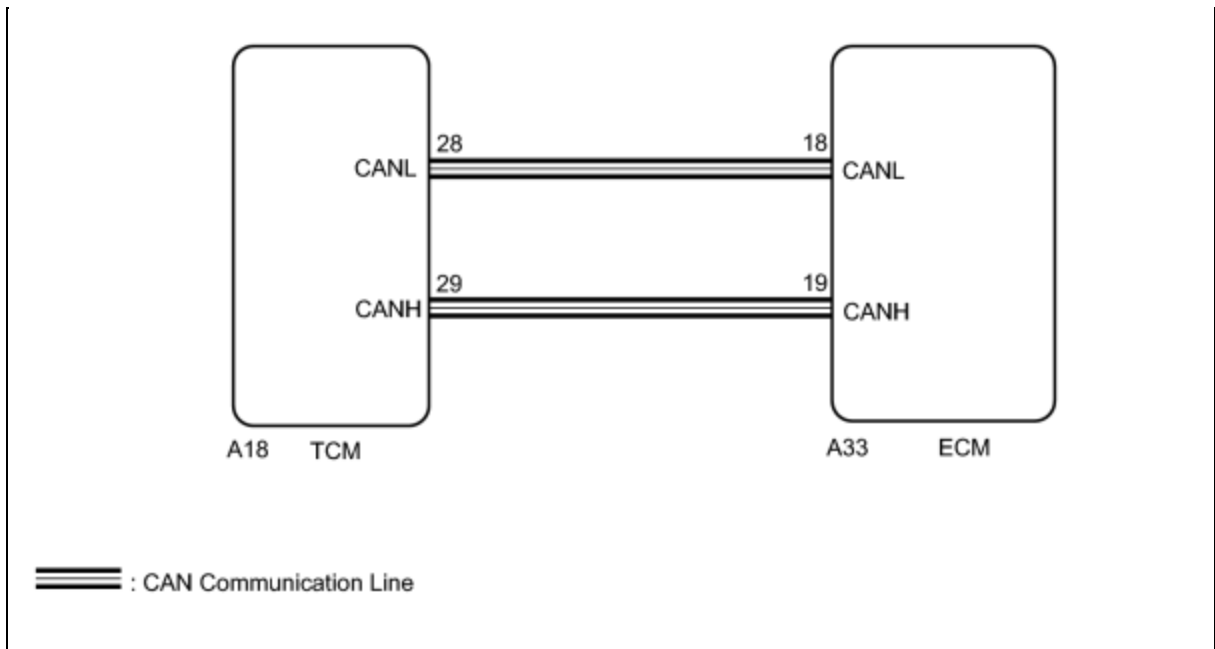
TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	U0073, U0101, U0402 (CAN system)
Battery voltage	10.9 V or more

TYPICAL MALFUNCTION THRESHOLDS

MIL request flag from TCM	Set
---------------------------	-----

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After turning ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

HINT:

Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	CHECK DTC OUTPUT (AUTOMATIC TRANSMISSION SYSTEM)
-----------	---


- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / ECT / Trouble Codes.
- (e) Read DTCs.

Result

RESULT	PROCEED TO
DTC is not output	A
DTC is output	B

A

2.	READ OUTPUT DTC
-----------	------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTC  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (i) Read DTCs.

Result

RESULT	PROCEED TO
DTC is not output	A
DTC P0700 is output	B

B ▶ REPLACE ECM**A ▶ CHECK FOR INTERMITTENT PROBLEMS**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XCTOQKX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P0851,P0852: Park / Neutral Switch Input Circuit Low (2013 FR-S)		

DTC	P0851	Park / Neutral Switch Input Circuit Low
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DTC	P0852	Park / Neutral Switch Input Circuit High
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DESCRIPTION

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0851	<p>Manual Transmission</p> <p>No non-neutral position detected in shift change running state (judged based on changes in the relationship between vehicle speed and engine speed) (2 trip detection logic)</p> <p>Automatic Transmission</p> <p>The CAN data received from the TCM is "P or N" position signal while the park/neutral position switch assembly is not in P or N position. (2 trip detection logic)</p>	<p>Manual Transmission</p> <ul style="list-style-type: none"> • Open or short in neutral position switch signal circuit • Neutral position switch • ECM <p>Automatic Transmission</p> <ul style="list-style-type: none"> • Open or short in park/neutral position switch signal circuit • Park/neutral position switch assembly • ECM • TCM
	<p>Manual Transmission</p> <p>No neutral position detected in shift change running state</p>	<p>Manual Transmission</p> <ul style="list-style-type: none"> • Open or short in neutral position switch signal circuit • Neutral position switch

P0852	(judged based on changes in the relationship between vehicle speed and engine speed) (2 trip detection logic)	<ul style="list-style-type: none"> • ECM
	<p>Automatic Transmission</p> <p>The CAN data received from the TCM is other than "P or N" position signal while the park/neutral position switch assembly is in P or N position. (2 trip detection logic)</p>	<p>Automatic Transmission</p> <ul style="list-style-type: none"> • Open or short in park / neutral position switch signal circuit • Park/neutral position switch assembly • ECM • TCM

MONITOR DESCRIPTION

Manual Transmission

The ECM detects the shift change status from the neutral position switch signal, and detects the current selected gear from the engine speed and vehicle speed. If the neutral position switch signal and the shift change status cannot be coordinated, the ECM interprets this as a malfunction, illuminates the MIL, and stores the DTC.

Automatic Transmission

If the ECM cannot coordinate the N, P or neutral information from the park/neutral position switch signal with the shift information sent from the TCM through CAN communication, then the ECM interprets this as a malfunction, illuminates the MIL, and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0851: Neutral position switch circuit continuity (Low voltage) P0852: Neutral position switch circuit continuity (High voltage)
Required Sensors/Components (Main)	Park/neutral position switch assembly Neutral position switch
Required Sensors/Components (Related)	-
Frequency of Operation	Once per driving cycle
Duration	3 counts: Manual transmission 6.4 seconds: Automatic transmission
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Manual Transmission

Monitor runs whenever following DTCs not present	P0500 (Vehicle speed sensor (VSS))
ST relay	Off

Starter	Off
Battery voltage	10.9 V or more
Driving condition change from the following condition A to B:	-
A. All of the following conditions are met:	(a) and (b)
(a) Vehicle speed	Less than 0 km/h (0 mph)
(b) Engine speed	550 to 880 rpm
B. All of the following conditions are met:	(a) and (b)
(a) Vehicle speed	64 km/h (39.8 mph) or more
(b) Engine speed	1600 to 2600 rpm

Automatic Transmission

Monitor runs whenever following DTCs not present	U0073, U0101, U0402 (CAN system)
ST relay	Off
Starter	Off
Battery voltage	10.9 V or more
Range switch on automatic transmission (TCM)	ON
Engine speed	500 rpm or more

TYPICAL MALFUNCTION THRESHOLDS

P0851 (Manual Transmission)

Switch signal for manual transmission	Less than battery voltage X 0.19
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P0852 (Manual Transmission)

Switch signal for manual transmission	More than battery voltage X 0.6
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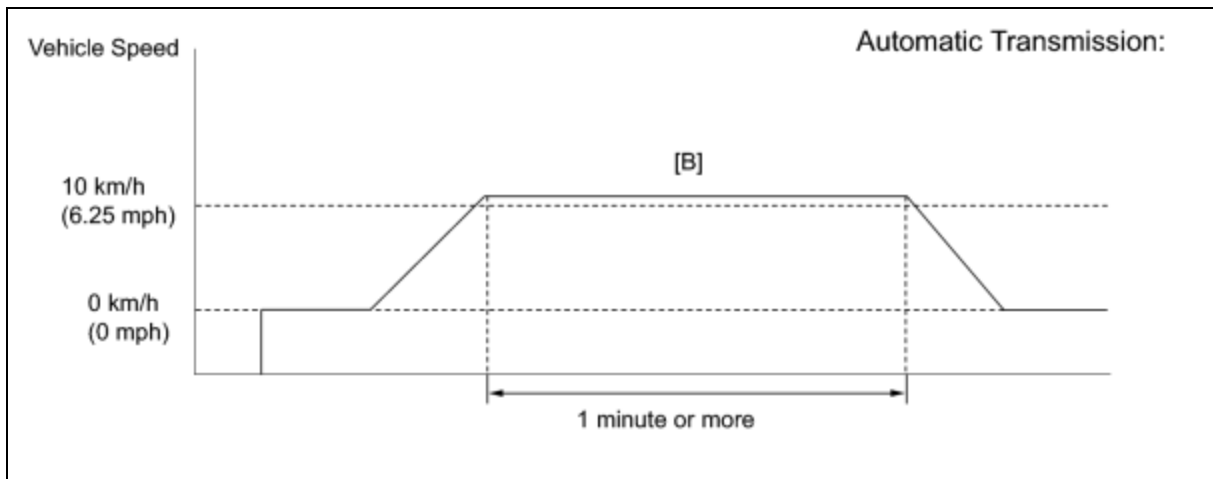
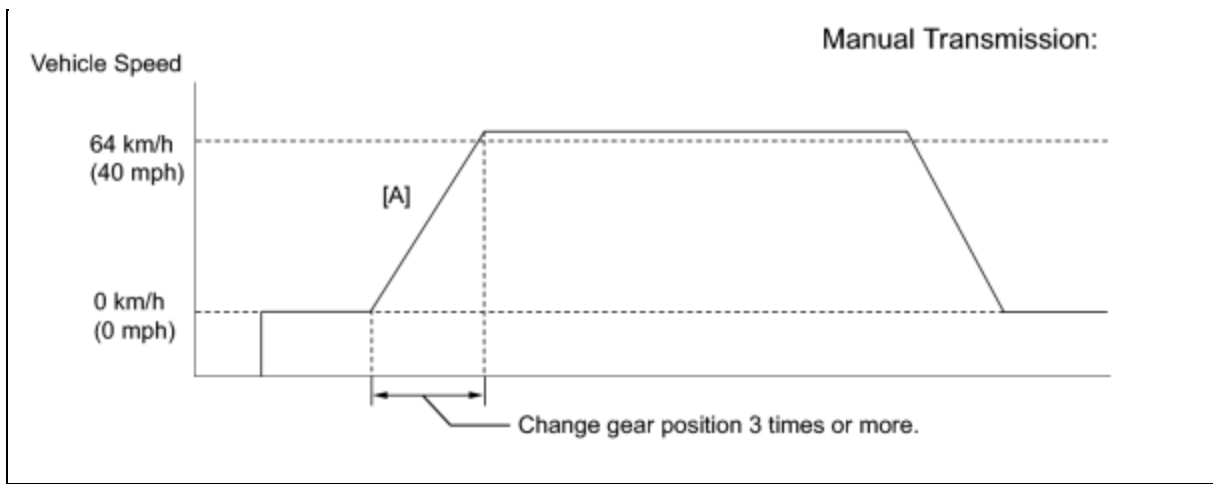
P0851 (Automatic Transmission)

Park/neutral position switch signal	Less than battery voltage X 0.19
Park/neutral position from TCM	On

P0852 (Automatic Transmission)

Park/neutral position switch signal	More than battery voltage X 0.6
Park/neutral position from TCM	Off

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. Change gear position 3 times or more during Accelerating vehicle to 64 km/h (40 mph) [A]. (for Manual Transmission)

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [B]. (for Automatic Transmission)

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.


HINT:

- o If a pending DTC is output, the system is malfunctioning.
- o If a pending DTC is not output, perform the following procedure.

11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
12. Input the DTC: P0851 or P0852.
13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal
ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

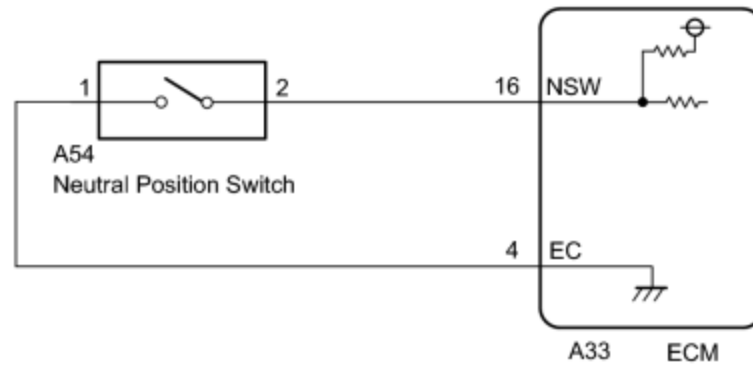
- o If the judgment result shows NORMAL, the system is normal.
 - o If the judgment result shows ABNORMAL, the system has a malfunction.
14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

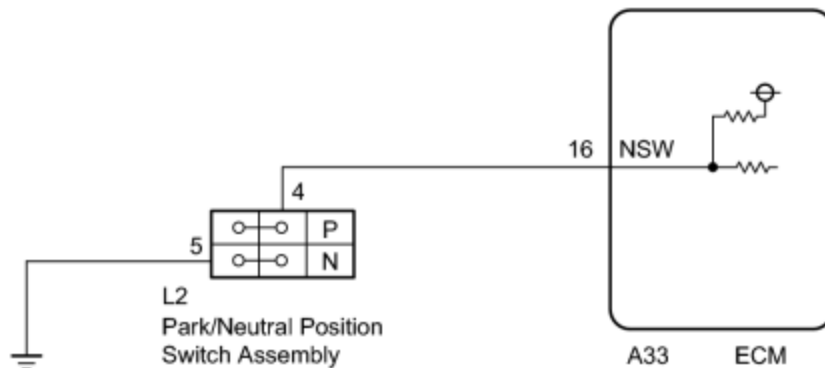
- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM

for Manual Transmission:



for Automatic Transmission:



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- Stop light switch assembly conditions can be checked using the Techstream.
 - a. Connect the Techstream to the DLC3.
 - b. Turn the ignition switch to ON.
 - c. Turn the Techstream on.

- d. Enter the following menus: Powertrain / Engine / Data List / Stop Light Switch and ST1.
- e. Check the Data List indication when the brake pedal is depressed and released.

BRAKE PEDAL OPERATION	STOP LIGHT SWITCH	ST1
Depressed	ON	ON
Released	OFF	OFF

PROCEDURE

1.	CHECK VEHICLE TYPE
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(a) Confirm the transmission.

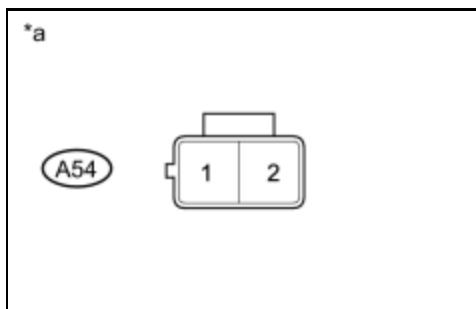
Result

RESULT	PROCEED TO
Manual Transmission	A
Automatic Transmission	B

B ▶ **INSPECT TERMINAL VOLTAGE (POWER SOURCE OF PARK/NEUTRAL POSITION SWITCH ASSEMBLY)**

A
▼

2.	INSPECT TERMINAL VOLTAGE (POWER SOURCE OF NEUTRAL POSITION SWITCH)
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(a) Disconnect the neutral position switch connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A54-1 - A54-2	Ignition switch ON	11 to 14 V


Text in Illustration

*a	Front view of wire harness connector (to Neutral Position Switch)
----	--

NG ► **CHECK HARNESS AND CONNECTOR
(NEUTRAL POSITION SWITCH - ECM)**

OK
▼

3.	INSPECT NEUTRAL POSITION SWITCH
-----------	--

(a) Inspect the neutral position switch  .

NG ► **REPLACE NEUTRAL POSITION SWITCH**

OK ► **CHECK FOR INTERMITTENT PROBLEMS**

4.	CHECK HARNESS AND CONNECTOR (NEUTRAL POSITION SWITCH - ECM)
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(a) Disconnect the ECM connector.

(b) Disconnect the neutral position switch connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

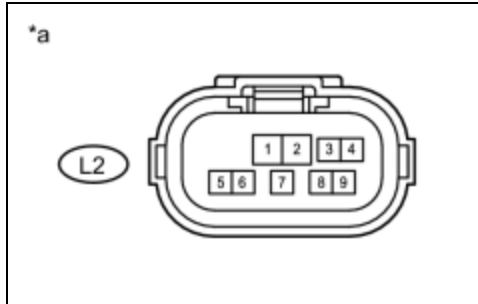
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-16 (NSW) - A54-2	Always	Below 1 Ω
A33-4 (EC) - A54-1	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-16 (NSW) or A54-2 - Body ground	Always	10 k Ω or higher
A33-4 (EC) or A54-1 - Body ground	Always	10 k Ω or higher

NG ► **REPAIR OR REPLACE HARNESS OR
CONNECTOR**

5. INSPECT TERMINAL VOLTAGE (POWER SOURCE OF PARK/NEUTRAL POSITION SWITCH ASSEMBLY)



(a) Disconnect the park/neutral position switch assembly connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
L2-4 - L2-5	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Park/Neutral Position Switch Assembly)
----	--

NG ► CHECK HARNESS AND CONNECTOR (PARK/NEUTRAL POSITION SWITCH ASSEMBLY - ECM - BODY GROUND)

OK
▼

6. INSPECT PARK/NEUTRAL POSITION SWITCH ASSEMBLY

(a) Inspect the park/neutral position switch assembly INFO.

NG ► REPLACE PARK/NEUTRAL POSITION SWITCH ASSEMBLY

OK ► CHECK FOR INTERMITTENT PROBLEMS

7.

CHECK HARNESS AND CONNECTOR (PARK/NEUTRAL POSITION SWITCH ASSEMBLY - ECM - BODY GROUND)

- (a) Disconnect the ECM connector.
- (b) Disconnect the park/neutral position switch assembly connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-16 (NSW) - L2-4	Always	Below 1 Ω
L2-5 - Body ground	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-16 (NSW) or L2-4 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **REPLACE ECM**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000043HM01EX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P1109,P2109: Throttle Deposit Malfunction (2013 FR-S)		

DTC	P1109	Throttle Deposit Malfunction
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DTC	P2109	Throttle / Pedal Position Sensor "A" Minimum Stop Performance
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DESCRIPTION

The idling speed is controlled by the Electronic Throttle Control System (ETCS). The ETCS is comprised of a throttle actuator, which operates the throttle valve, and a throttle position sensor, which detects the opening amount of the throttle valve. The ECM controls the throttle actuator to adjust the throttle valve opening amount so that the idling speed is maintained at the target idling speed.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P1109	ISC learning value is 95% or more of the maximum learning ISC learning value, and 50% or more deposit is accumulated for 10 seconds continuously. (5 trip detection logic)	Throttle with motor body assembly
P2109	One of the following conditions is met (1 trip detection logic): <ul style="list-style-type: none"> The throttle position sensor opening angle when learning the fully-closed position is less than 9.975° or more than 20.025°. When the throttle actuator current is off, the difference between the actual throttle position and the fully-closed position is less than 1.162°. 	Throttle with motor body assembly

HINT:

- The ISC learned value is the calculated intake air amount corresponding to the throttle opening amount necessary to maintain the idling speed.
- This malfunction is only detected once per trip. After it has been detected once, the system will not monitor for the malfunction for the rest of the trip.
- The system uses the throttle with motor body assembly and mass air flow meter assembly to detect this malfunction.

MONITOR DESCRIPTION

If there are deposits in the throttle valve, a decrease in the ISC flow rate may cause engine stall or unstable idling. Therefore, the necessary ISC flow rate for idling is maintained using the ISC learned value and feedback. The ECM stores this DTC if the ISC learned value approaches its limit.

MONITOR STRATEGY

Related DTCs	P2109: Throttle position sensor minimum stop rationality check
Required Sensors/Components (Main)	Throttle position sensor

Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	0.008 seconds: Case 1 0.08 seconds: Case 2
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	None
Battery voltage	6 V or more

TYPICAL MALFUNCTION THRESHOLDS

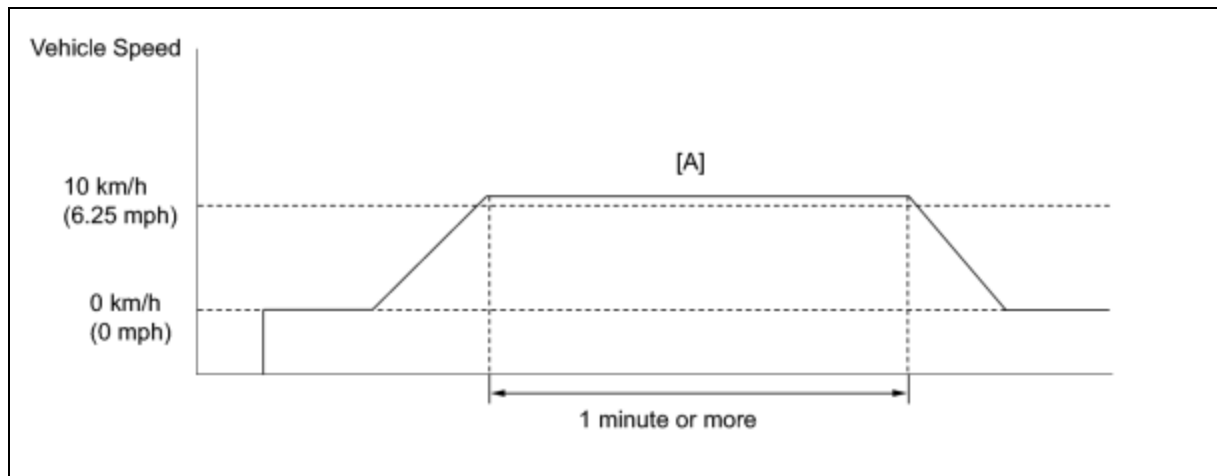
Case 1

Throttle minimum stop position	Less than -4.02% (0.399 V) or more than 4.02% (0.801 V)
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Case 2

Throttle position at ignition switch OFF to ON - Throttle minimum stop position	Less than 0.71% (0.035 V)
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CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. Depress the accelerator pedal fully and release the accelerator pedal.
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [A].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.


9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P1109 or P2109.
 13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none">o DTC judgment completedo System normal
ABNORMAL	<ul style="list-style-type: none">o DTC judgment completedo System abnormal
INCOMPLETE	<ul style="list-style-type: none">o DTC judgment not completedo Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none">o Unable to perform DTC judgmento Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
 - o If the judgment result shows ABNORMAL, the system has a malfunction.
14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

INSPECTION PROCEDURE

NOTICE:

Never clean the throttle with motor body assembly.

HINT:

- Read freeze frame data using the Techstream. Freeze frame data records engine conditions when a malfunction occurs. This information can be useful when troubleshooting.
- Since a pending DTC is not stored for this DTC, it takes time to confirm whether the malfunction

has been successfully repaired by checking for this DTC. When confirming whether the malfunction has been successfully repaired, compare "ISC Learning Value" recorded in the freeze frame data with "ISC Learning Value" in the Data List after repairs have been made to save time.

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO P2109)
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- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Read DTCs.

Result

RESULT	PROCEED TO
DTC P1109 or P2109 is output	A
DTC P1109 or P2109 and other DTCs are output	B

HINT:

If any DTCs other than P1109 or P2109 are output, troubleshoot those DTCs first.

B ► GO TO DTC CHART

A ► REPLACE THROTTLE WITH MOTOR BODY ASSEMBLY



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PFX0SWX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P1160,P2119: Throttle Valve Return Spring Malfunction (2013 FR-S)		

DTC	P1160	Throttle Valve Return Spring Malfunction
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DTC	P2119	Throttle Actuator Control Throttle Body Range / Performance
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DESCRIPTION

The electronic throttle control system is composed of the throttle actuator, throttle position sensor, accelerator pedal position sensor, and ECM. The ECM operates the throttle actuator to regulate the throttle valve in response to driver inputs. The throttle position sensor detects the opening angle of the throttle valve, and provides the ECM with feedback so that the throttle valve can be appropriately controlled by the ECM.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P1160	After setting throttle valve opening angle at 40% in throttle actuator control, the change in opening angle is less than 2° after throttle actuator has been off. (1 trip detection logic)	Throttle with motor body assembly
P2119	The throttle valve opening angle continues to vary greatly from the target opening angle. (1 trip detection logic)	<ul style="list-style-type: none"> • Electronic throttle control system • Wire harness or connector • ECM

MONITOR DESCRIPTION

P1160

When the ECM cuts the power supply to the throttle actuator, the throttle valve returns to the fully-closed position by the spring. If the throttle valve does not return with ETCS relay off, the ECM judges throttle valve is stuck and then the ECM illuminates the MIL and stores the DTC.

P2119

The ECM determines the actual opening angle of the throttle valve from the throttle position sensor signal. The actual opening angle is compared to the target opening angle commanded by the ECM. If the difference between these two values is outside the standard range, the ECM interprets this as a malfunction in the electronic throttle control system. The ECM then illuminates the MIL and stores the

DTC.

MONITOR STRATEGY

Related DTCs	P1160: Throttle return spring functional check P2119: Throttle actuator control functional check
Required Sensors/Components (Main)	Throttle actuator (throttle with motor body assembly)
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	Immediately: P1160 5 seconds: P2119 (Case 1 and Case 5) 2 seconds: P2119 (Case 2) More than 248 msec (varies with throttle position): P2119 (Case 3) 1 second: P2119 (Case 4)
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs not stored	None
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P1160

Ignition switch	Off
Time after ignition switch off	3.392 seconds
Throttle position sensor 1 circuit DTC	Not detected
Throttle position sensor 2 circuit DTC	Not detected
Throttle position sensor rationality DTC	Not detected
Battery voltage	6 V or more

P2119 (Case 1)

Battery voltage	6.2 V or more
ETCS relay	On
Engine speed	Less than 500 rpm

P2119 (Case 2)

Battery voltage	6.2 V or more
ETCS relay	On
Engine speed	500 rpm or higher

P2119 (Case 3)

ETCS relay	On
Engine speed	500 rpm or higher
Battery voltage	6.2 V or more
Throttle position sensor 1 value	More than target throttle position

P2119 (Case 4)

ETCS relay	On
Engine speed	500 rpm or higher
Battery voltage	6.2 V or more
Throttle position sensor 1 value	Less than target throttle position

P2119 (Case 5):

ETCS relay	On
Engine speed	Less than 300 rpm
Battery voltage	6.2 V or more

TYPICAL MALFUNCTION THRESHOLDS

P1160

Throttle position sensor 1 at diagnosis start - throttle position sensor 1	Less than 1.6%
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P2119 (Case 1 and Case 2)

Throttle motor control duty	More than 95%
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P2119 (Case 3, Case 4 and Case 5)

Target throttle position - throttle position sensor 1	More than 3.72% (varies with target throttle position)
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CONFIRMATION DRIVING PATTERN

1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) .
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. Depress the accelerator pedal fully and release the accelerator pedal.
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic

laws.


9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:

- If a pending DTC is output, the system is malfunctioning.
 - If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P1160 or P2119.
 13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none">◦ DTC judgment completed◦ System normal
ABNORMAL	<ul style="list-style-type: none">◦ DTC judgment completed◦ System abnormal
INCOMPLETE	<ul style="list-style-type: none">◦ DTC judgment not completed◦ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none">◦ Unable to perform DTC judgment◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- If the judgment result shows NORMAL, the system is normal.
 - If the judgment result shows ABNORMAL, the system has a malfunction.
14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

FAIL-SAFE

When this DTC or other DTCs relating to Electronic Throttle Control System (ETCS) malfunctions are stored, the ECM enters fail-safe mode. During fail-safe mode, the ECM cuts the current to the throttle actuator, and the throttle valve is returned to a fully closed throttle angle by the return spring. The ECM then adjusts the engine output by controlling the fuel injection (intermittent fuel-cut) and ignition timing, in accordance with the accelerator pedal opening angle, to allow the vehicle to continue running at a minimal speed. If the accelerator pedal is depressed firmly and gently, the vehicle can be driven slowly.

Fail-safe mode continues until a pass condition is detected, and the ignition switch is then turned off.

WIRING DIAGRAM


Refer to DTC P2101  .

INSPECTION PROCEDURE

NOTICE:

- Never clean the throttle with motor body assembly.
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

- Refer to "Data List / Active Test" [Throttle Position Commanded, Throttle Position No. 1, Throttle Motor Current, Throttle Motor Duty (Open) and Throttle Motor Duty (Close)]  .
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P1160 OR P2119)
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- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Trouble Codes.
- Read DTCs.

Result

RESULT	PROCEED TO
DTC P1160 and/or P2119 is output	A
DTC P1160 and/or P2119 and other DTCs are output	B

HINT:

If any DTCs other than P1160 and/or P2119 are output, troubleshoot those DTCs first.

B  **GO TO DTC CHART**

A



2.	READ VALUE USING TECHSTREAM (THROTTLE POSITION)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs INFO.
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Enter the following menus: Powertrain / Engine / Data List / Throttle Position No. 1 and Throttle Position Command.
- (h) Read the values displayed on the Techstream while fully depressing and releasing the accelerator pedal quickly.

Result

RESULT	PROCEED TO
Throttle Position No. 1 does not change	A
Throttle Position No. 1 changes even a little	B

HINT:

When a DTC is output, the system changes to fail-safe mode. Therefore, only use the data up until the time the DTC is stored for confirmation.

B ▶ **INSPECT THROTTLE WITH MOTOR BODY ASSEMBLY (VISUALLY CHECK THROTTLE VALVE)**

A
▼

3.	INSPECT THROTTLE WITH MOTOR BODY ASSEMBLY (RESISTANCE OF THROTTLE ACTUATOR)
-----------	--

- (a) Inspect the throttle with motor body assembly INFO.

NG ▶ **REPLACE THROTTLE WITH MOTOR BODY ASSEMBLY**

OK
▼

4.	INSPECT THROTTLE WITH MOTOR BODY ASSEMBLY (VISUALLY CHECK THROTTLE VALVE)
-----------	--

(a) Check for contamination between the throttle valve and housing. If necessary, clean the throttle with motor body assembly. Also, check that the throttle valve moves smoothly.

OK:

Throttle valve is not contaminated with foreign objects and moves smoothly.

NG ▶ **REPLACE THROTTLE WITH MOTOR BODY ASSEMBLY**

OK



5.	READ VALUE USING TECHSTREAM (THROTTLE POSITION)
-----------	--

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Clear the DTCs INFO.

(e) Turn the ignition switch off and wait for at least 30 seconds.

(f) Turn the ignition switch to ON.

(g) Enter the following menus: Powertrain / Engine / Data List / Throttle Position No. 1, Throttle Position No. 2 and Throttle Position Command.

(h) Read the values displayed on the Techstream while wiggling the ECM wire harness.

(i) Enter the following menus: Powertrain / Engine / Trouble Codes.

(j) Read DTCs.

Result

RESULT	PROCEED TO
Value in Data List changes when wire harness is wiggled, or DTC is output	A
Other than above	B

B ▶ **CHECK WHETHER DTC OUTPUT RECURS**

A




6.	REPAIR OR REPLACE HARNESS OR CONNECTOR (ECM - THROTTLE WITH MOTOR BODY ASSEMBLY)
-----------	---

(a) As the DTC was stored due to a change in the contact resistance of the connector, repair or replace the wire harness or connector.


NEXT  **END**

7.	REPLACE THROTTLE WITH MOTOR BODY ASSEMBLY
-----------	--

(a) Replace the throttle with motor body assembly  .

NEXT


8.	CHECK WHETHER DTC OUTPUT RECURS
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (i) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (j) Read DTCs.

Result

RESULT	PROCEED TO
DTC is not output	A
DTC P1160 and/or P2119 is output	B

B ▶ REPLACE ECM

A ▶ END



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XCU02ZX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P1235: High Pressure Fuel Pump Circuit (2013 FR-S)		

DTC	P1235	High Pressure Fuel Pump Circuit
------------	--------------	--

DESCRIPTION

The fuel pump assembly (for high pressure) is attached to the insulator, which is attached to the cylinder head cover. The pump activates according to the position of the cam on the intake side camshaft (bank 2).

The fuel pump assembly (for high pressure) increases the pressure of the fuel supplied from the fuel pump in the fuel tank to the specified fuel pressure according to the operating condition, and it feeds the fuel to the fuel delivery pipe.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P1235	When fuel pump for high pressure is operating, the diagnostic signal from injector driver (EDU) does not change (open or short in the fuel pump (for high pressure) circuit). (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in fuel pump (for high pressure) • Fuel pump assembly (for high pressure) • ECM

MONITOR STRATEGY

Related DTCs	P1235: High pressure fuel pump functional check
Required Sensors/Components (Main)	Fuel pump assembly (for high pressure)
Required Sensors/Components (Related)	Injector driver (EDU)
Frequency of Operation	Continuous
Duration	20 counts [More than 0.1 seconds (varies with engine speed)]
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever these DTCs are not present	None
Battery voltage	10.5 V or more
Elapsed time after engine start	5 seconds or more

Starter	Off
Active crank angle of high pressure fuel pump	More than 7°CA (varies with engine speed) and less than 148°CA

TYPICAL MALFUNCTION THRESHOLDS

High pressure fuel pump output signal	No falling edge detected
---------------------------------------	--------------------------

CONFIRMATION DRIVING PATTERN

1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Record the Freeze Frame Data.
4. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure) INFO.
5. Turn the ignition switch off and wait for at least 30 seconds.
6. Turn the ignition switch to ON and turn the Techstream on.
7. Based on engine speed, engine load and other freeze frame data stored in the ECM, reproduce the conditions present when the DTC was stored.
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
9. Read the DTC.

HINT:

- If a DTC is output, the system is malfunctioning.
- If a DTC is not output, perform the following procedure.

10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
11. Input the DTC: P1235.
12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System normal
ABNORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System abnormal
INCOMPLETE	<ul style="list-style-type: none"> ◦ DTC judgment not completed ◦ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> ◦ Unable to perform DTC judgment ◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU's memory limit

HINT:

- If the judgment result shown ABNORMAL, the system has a malfunction.
- If the judgment result shows NORMAL, the system is normal.

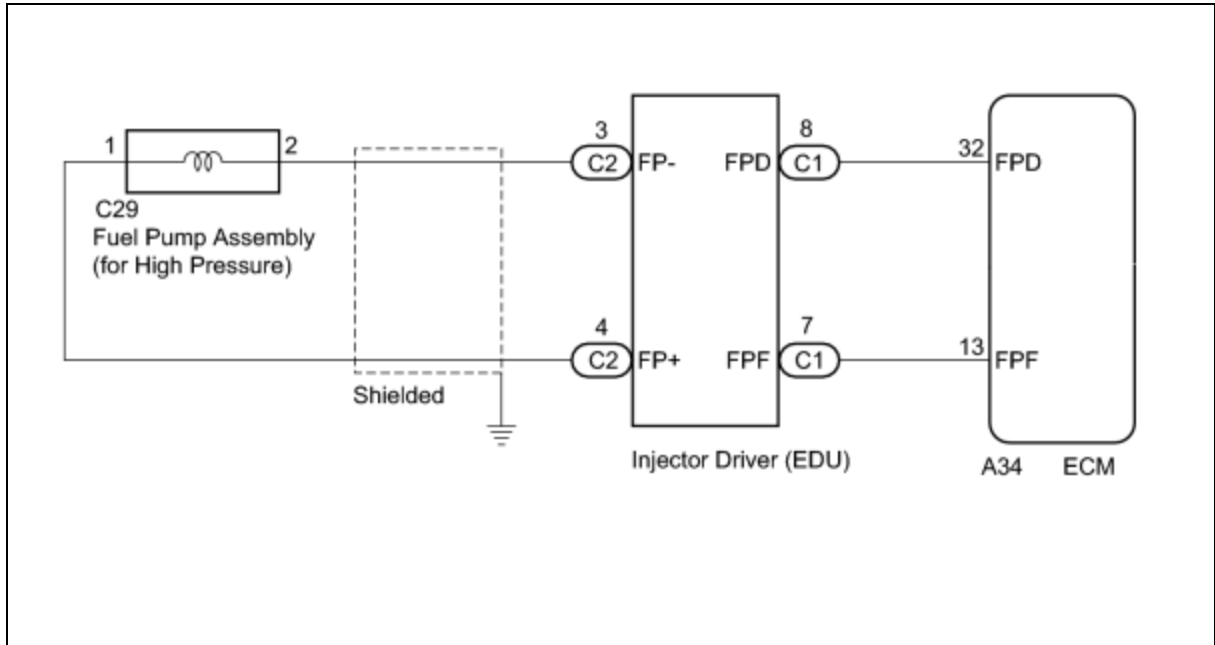
13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and

check for permanent DTCs INFO .

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If the current from the INJ relay is cut because DTC P062D is stored, DTC P1235 will be stored even if the fuel pump assembly (for high pressure) is normal.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	INSPECT FUEL PUMP ASSEMBLY (FOR HIGH PRESSURE)
-----------	---

(a) Inspect the fuel pump assembly (for high pressure) INFO .

NG ▶ **REPLACE FUEL PUMP ASSEMBLY (FOR HIGH PRESSURE)**

OK
▼

2.	CHECK HARNESS AND CONNECTOR (INJECTOR DRIVER (EDU) - FUEL PUMP ASSEMBLY)
-----------	---

- (a) Disconnect the injector driver (EDU) connector.
- (b) Disconnect the fuel pump assembly (for high pressure) connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C2-3 (FP-) - C29-2	Always	Below 1 Ω
C2-4 (FP+) - C29-1	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C2-3 (FP-) or C29-2 - Body ground	Always	10 k Ω or higher
C2-4 (FP+) or C29-1 - Body ground	Always	10 k Ω or higher

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3.	CHECK HARNESS AND CONNECTOR (ECM - INJECTOR DRIVER (EDU))
-----------	--

- (a) Disconnect the ECM connector.
- (b) Disconnect the injector driver (EDU) connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-32 (FPD) - C1-8 (FPD)	Always	Below 1 Ω
A34-13 (FPF) - C1-7 (FPF)	Always	Below 1 Ω

Standard Resistance (Check for short):

--	--	--

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-32 (FPD) or C1-8 (FPD) - Body ground	Always	10 kΩ or higher
A34-13 (FPF) or C1-7 (FPF) - Body ground	Always	10 kΩ or higher

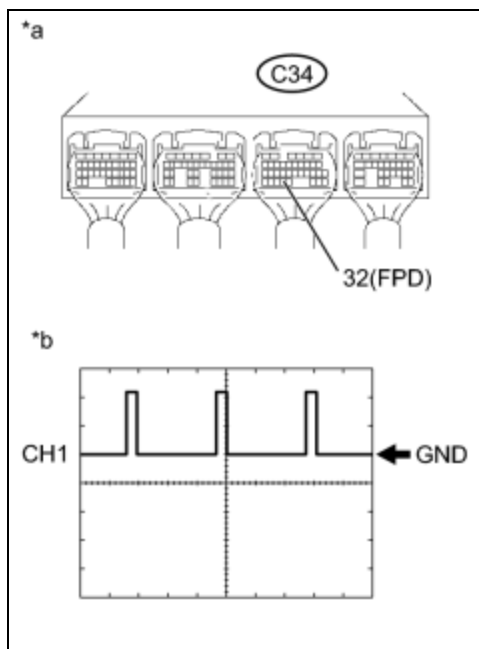
NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

4. INSPECT ECM (FPD VOLTAGE)

- (a) Turn the ignition switch to ON.
 (b) Inspect the ECM using an oscilloscope.

(1) While idling the engine, check the waveform the terminals of the ECM connector.



ECM Terminal Name	A34-32 (FPD) - Body ground
Tester Range	2 V/DIV., 20 ms./DIV.
Condition	Idling

Text in Illustration

*a	Component with harness connected (ECM)
*b	FPD Terminal Waveform Normal Waveform

Standard:
 Signal waveform appears as shown in the illustration.

HINT:

The FPD terminal waveform is output only right after the engine starts. If this DTC is stored when the engine is started from ignition switch off, the system enters fail-safe mode and the waveform is not output.

NG ► INSPECT ECM (FPD VOLTAGE)

OK
▼

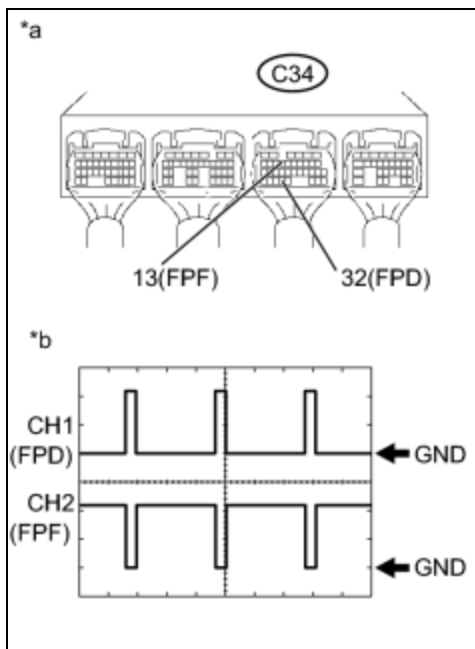
5. INSPECT ECM (FPF VOLTAGE)

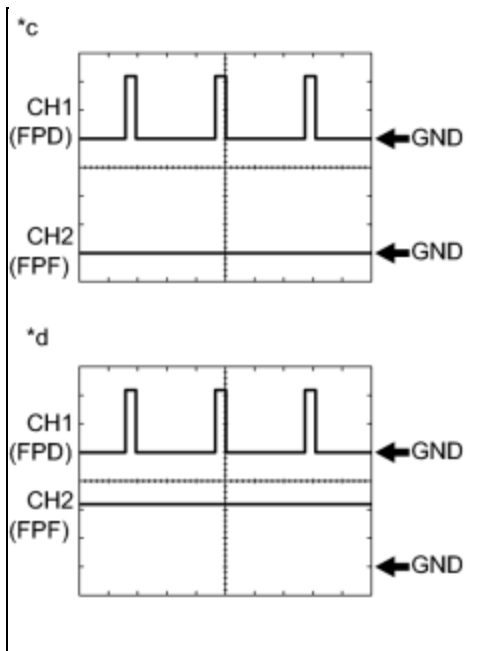
(a) Turn the ignition switch to ON.

(b) Inspect the ECM using an oscilloscope.

(1) While idling the engine, check the waveform the terminals of the ECM connector.

ECM Terminal Name	CH1: A34-32 (FPD) - Body ground CH2: A34-13 (FPF) - Body ground
Tester Range	2 V/DIV., 20 ms./DIV.
Condition	Idling





Text in Illustration

*a	Component with harness connected (ECM)
*b	FPD Terminal and FPF Terminal Waveform Normal Waveform
*c	FPF Terminal Waveform NG Waveform 1
*d	FPF Terminal Waveform NG Waveform 2

HINT:

***: If the FPF terminal waveform is similar to the FPF terminal waveform NG waveform 1, stop the engine and disconnect injector driver (EDU) connector. Then, while cranking the engine, check to see if there is a difference between the FPF terminal waveform and the previous one.**

Result:

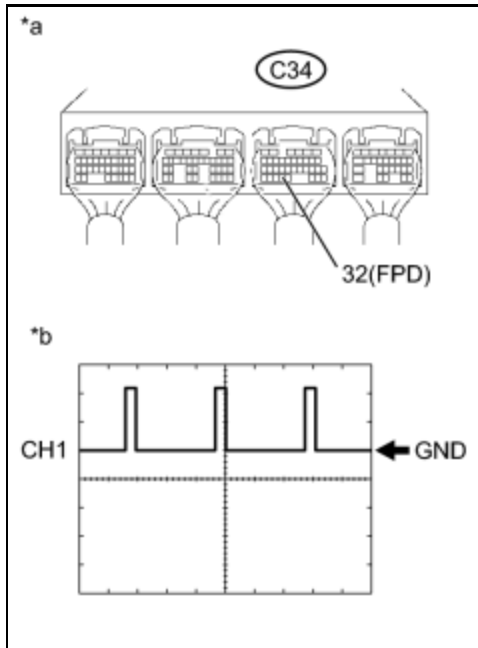
FPD TERMINAL WAVEFORM	FPF TERMINAL WAVEFORM		PROCEED TO
OK	OK		A
OK	NG waveform 1*	Does not change from NG waveform 1 (FPF terminal waveform remains at GND even after disconnecting the injector driver (EDU) connector and cranking the engine)	A
		Changes to NG waveform 2 (FPF terminal waveform rises from GND after disconnecting the injector driver (EDU) connector and cranking the engine)	B
OK	NG waveform 2		B

B ► REPLACE INJECTOR DRIVER (EDU)

A ► REPLACE ECM

6. INSPECT ECM (FPD VOLTAGE)

- (a) Turn the ignition switch to ON.
- (b) Disconnect the injector driver (EDU) connector.
- (c) Inspect the ECM using an oscilloscope.



(1) While cranking the engine, check the waveform the terminals of the ECM connector.

ECM Terminal Name	A34-32 (FPD) - Body ground
Tester Range	2 V/DIV., 20 ms./DIV.
Condition	Cranking

Text in Illustration

*a	Component with harness connected (ECM)
*b	FPD Terminal Waveform Normal Waveform

Standard:

Signal waveform appears as shown in the illustration.

NG ► REPLACE ECM

OK ► REPLACE INJECTOR DRIVER (EDU)

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000005967000X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P1449: Evaporative Emission System Lid Open Switch Stuck ON (2013 FR-S)		

DTC	P1449	Evaporative Emission System Lid Open Switch Stuck ON
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DTC SUMMARY

DTC NO.	MONITORING ITEM	MALFUNCTION DETECTION CONDITION	TROUBLE AREA	DETECTION TIMING	DETECTION LOGIC
P1449	Canister filter clogged	The canister pressure sensor output value has rapidly changed.	<ul style="list-style-type: none"> • Clogged on EVAP line (drain tube) • Clogged on EVAP line (canister pump module - drain separator) • Clogged on canister pump module (drain separator) 	While ignition switch off	2 trip

DESCRIPTION

The description can be found in EVAP (Evaporative Emission) System [INFO](#) .

MONITOR DESCRIPTION

The ECM monitors for canister filter in the canister pump module. The pressure is checked every 5 seconds and if the pressure difference becomes more than threshold, stops the EVAP system monitor. The ECM then illuminates the MIL and stores the DTC (2 trip detection logic).

MONITOR STRATEGY

Related DTC	P1449: Evaporative Emission System Lid Open Switch Stuck ON
Required Sensors/Components (Main)	Purge valve Canister pump module
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	6 seconds
MIL Operation	2 driving cycles
Sequence of Operation	None


TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	None
Battery voltage	10.9 V or higher
Elapsed time after engine	20 seconds or more
ELCM vacuum pump	Not active
ELCM switching valve	Off (Open)
All of the following condition are met	A and B
A. Pressure difference in 0.064 seconds	Less than 0.66661 kPa [5 mmHg]
B. Period to satisfy above condition	18.12 seconds or more

TYPICAL MALFUNCTION THRESHOLDS

Pressure difference in 5 seconds	1.21 kPa [9 mmHg] or more
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MONITOR RESULT

Refer to Checking Monitor Status  .

CONFIRMATION DRIVING PATTERN

NOTICE:

- The Evaporative System Check (Automatic Mode) consists of 5 steps performed automatically by the Techstream. It takes a maximum of approximately 24 minutes.
- Do not perform the Evaporative System Check when the fuel tank is more than 90% full because the cut-off valve may be closed, making the fuel tank leak check unavailable.
- Do not run the engine during this operation.
- When the temperature of the fuel is 35°C (95°F) or higher, a large amount of vapor forms and any check results become inaccurate. When performing the Evaporative System Check, keep the fuel temperature below 35°C (95°F).


1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC procedure).
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Enter the following menus: Powertrain / Engine / Utility / Evaporative System Check / Automatic Mode.
7. After the Evaporative System Check is completed, check for All Readiness by entering the following menus: Powertrain / Engine / Utility / All Readiness.
8. Input the DTC: P1449.
9. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System normal
ABNORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System abnormal

INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
- o If the judgment result shows ABNORMAL, the system has a malfunction.

10. If the judgment result is INCOMPLETE or N/A and no pending DTC is output, perform a universal trip and check for permanent DTCs .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

INSPECTION PROCEDURE

PROCEDURE

1.	INSPECT EVAP HOSE (DRAIN TUBE)
-----------	---------------------------------------

(a) Check for filter blockage in the drain tube.

OK:

OK: No blockages in the drain tube.

NG  **REPLACE EVAP HOSE (DRAIN TUBE)**

OK



2.	INSPECT EVAP HOSE (CANISTER PUMP MODULE - DRAIN SEPARATOR)
-----------	---

(a) Check for filter blockage in the EVAP purge line between the canister pump module and drain separator.

OK:

No blockages in the EVAP purge line between the canister pump module and drain separator.

NG  **REPLACE EVAP HOSE (CANISTER PUMP MODULE - DRAIN SEPARATOR)**

OK



3.	INSPECT DRAIN SEPARATOR
-----------	--------------------------------

(a) Check for filter blockage in the drain separator.

OK:

No blockages in the drain separator.

NG ► **REPLACE DRAIN SEPARATOR**

OK



4.	REPLACE CANISTER PUMP MODULE
-----------	-------------------------------------

(a) Replace the canister pump module  .

NEXT ► **PERFORM EVAP SYSTEM**

5.	REPLACE EVAP HOSE (DRAIN TUBE)
-----------	---------------------------------------

NEXT ► **PERFORM EVAP SYSTEM**

6.	REPLACE EVAP HOSE (CANISTER PUMP MODULE - DRAIN SEPARATOR)
-----------	---

NEXT ► **PERFORM EVAP SYSTEM**

7.	REPLACE DRAIN SEPARATOR
-----------	--------------------------------

(a) Replace the drain separator.

NEXT




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8. PERFORM EVAP SYSTEM

NOTICE:

- The Evaporative System Check (Automatic Mode) consists of 5 steps performed automatically by the Techstream. It takes a maximum of approximately 24 minutes.
- Do not perform the Evaporative System Check when the fuel tank is more than 90% full because the cut-off valve may be closed, making the fuel tank leak check unavailable.
- Do not run the engine in this step.
- When the temperature of the fuel is 35°C (95°F) or more, a large amount of vapor forms and any check results become inaccurate. When performing an Evaporative System Check, keep the fuel temperature below 35°C (95°F).

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Enter the following menus: Powertrain / Engine / Utility / Evaporative System Check / Automatic Mode.
- (f) After the Evaporative System Check is completed, check for pending DTCs by entering the following menus: Powertrain / Engine / Trouble Codes.

HINT:

If no pending DTCs are found, the repair has been successfully completed.

NEXT  **END**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000021140ENX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P1603: Engine Stall History (2013 FR-S)		

DTC	P1603	Engine Stall History
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DESCRIPTION

After starting the engine, this DTC is stored when the engine stops without the ignition switch being operated.

Using the Techstream, the conditions present when the DTC was stored can be confirmed by referring to the freeze frame data. Freeze frame data records engine conditions when a malfunction occurs. This information can be useful when troubleshooting.

It is necessary to check if the vehicle has run out of fuel before performing troubleshooting, as this DTC is also stored when the engine stalls due to running out of fuel.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P1603	After monitoring for startability problems (P1604) finishes and starting the engine, with the engine running, the engine stops (the engine speed drops to 300 rpm or less) without the ignition switch being operated. (1 trip detection logic)	<ul style="list-style-type: none"> • Air leak in intake system • Purge valve • Brake booster • Mass air flow meter • Engine coolant temperature sensor • Thermostat • Power supply circuit (purge valve, air fuel ratio sensor, fuel injector assembly, ignition coil assembly) • Fuel pump assembly) • Fuel pump control circuit (low pressure side) • Fuel line • PCV valve and hose • Camshaft timing oil control valve • Knock sensor • Ignition system • Air conditioning system • Power steering system • Electrical load signal system • Charging system • Automatic

- transmission system
- Park/neutral position switch assembly
- ECM
- Wire harness or connector
- Engine immobiliser system

INSPECTION PROCEDURE


HINT:

- In contrast to normal malfunction diagnosis for components, circuits and systems, DTCs P1603 is used to determine the malfunctioning area from the problem symptoms and freeze frame data when the user mentions problems such as engine stall.

As these DTCs can be stored as a result of certain user actions, even if these DTCs are output, if the customer makes no mention of problems, clear these DTCs without performing any troubleshooting and return the vehicle to the customer.

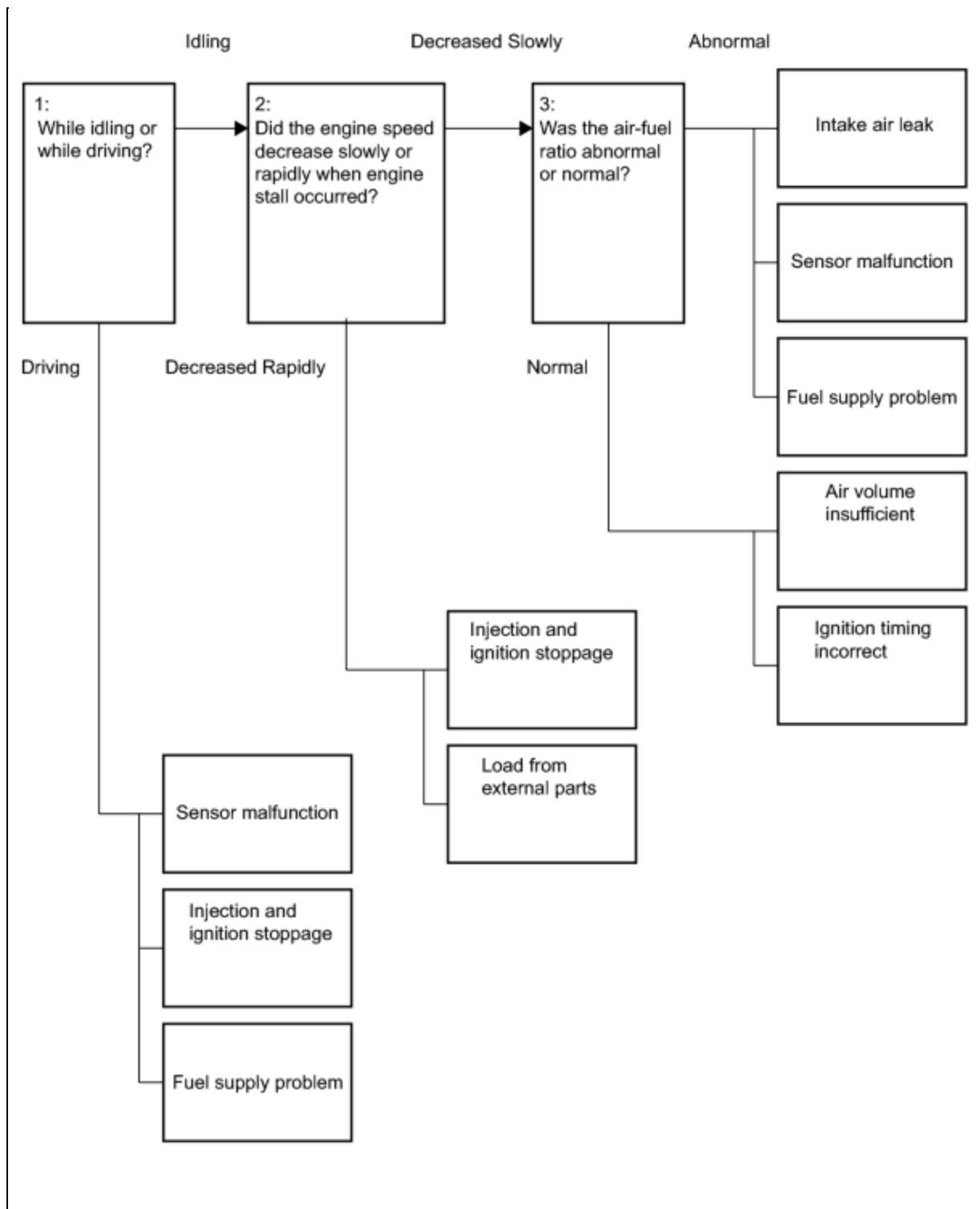
- If any other DTCs are output, perform troubleshooting for those DTCs first.
- Use any information from the customer problem analysis about the condition of the vehicle at the time when the problem occurred (how the engine stopped, conditions when the engine was restarted, etc.) as a reference.

SYMPTOM	SUSPECTED AREA
Engine vibration occurs and engine stops	Air-fuel ratio abnormal
Engine stops with no engine vibration	Ignition system, injection stoppage, high load from external parts
Engine can be started with accelerator pedal depressed	Insufficient air volume
Rough idling after engine started	Air-fuel ratio abnormal, abnormal combustion

- Read freeze frame data using the Techstream. Freeze frame data records engine conditions when a malfunction occurs. This information can be useful when troubleshooting.
- When confirming the freeze frame data, be sure to check all 5 sets of freeze frame data .
- When confirming freeze frame data, if there are multiple items related to the cause of the malfunction, perform troubleshooting for all related items.
- Try to operate the vehicle under the conditions recorded in the freeze frame data which were present when the malfunction occurred. Confirm the data at this time and the data when the engine is idling (engine warmed up, no load, and shift lever in D, N or neutral) and compare these data with the freeze frame data.
- Inspections take into account the fact that the malfunction may not have reoccurred and place emphasis on checking the vehicle conditions present at the time when the malfunction occurred.
- When performing inspections, jiggle the relevant wire harnesses and connectors in an attempt to reproduce malfunctions that do not always occur.

Inspection flow:

Using freeze frame data, narrow down the parts to be inspected according to the vehicle conditions at the time when the malfunction occurred.



1:

- If the engine stalled when the intake air volume was low (during idling or deceleration), there may be a decrease in torque due to an incorrect air-fuel ratio, etc.
- If the engine stalled when the intake air volume was high (during driving or acceleration), there may be a major malfunction such as continuous misfire due to ignition stoppage, fuel injection stoppage, etc. and the torque drops to zero.

2:

- If the engine speed decreased slowly, there may have been a decrease in torque due to an air-fuel ratio that was incorrect (by approximately 20 to 30%), etc.
- If the engine speed decreased rapidly, there may have been a malfunction such as when the engine misfires almost continuously due to ignition stoppage, fuel injection stoppage, etc., or when the external load increases due to an external part malfunctioning.

3:

- If the air-fuel ratio is abnormal, there may have been an intake air leak, sensor malfunction, or fuel supply problem.
- If the vehicle was normal, the air volume may have been insufficient or the ignition timing may have been incorrect.

P1603 inspection flow: Narrow down the parts to be inspected according to the vehicle conditions at the time when the malfunction occurred (freeze frame data).

VEHICLE STATE	ENGINE SPEED	SUSPECTED AREA		PRIMARY PARTS TO INSPECT	PROCEDURE
Idling or decelerating	Slowly decreases and engine stalls	Ignition system abnormal	Igniter abnormal	<ul style="list-style-type: none"> • Power supply circuit • Ignition coil assemblies • Spark plug 	10, 38, 52
		Air-fuel ratio abnormal	Air suction	<ul style="list-style-type: none"> • Intake system connections • Purge valve system • Brake booster 	5 to 9
			Sensor malfunction (value from sensor too lean)	<ul style="list-style-type: none"> • Mass air flow meter • Engine coolant temperature sensor • Air fuel ratio sensor system • Thermostat 	11 to 23
			Sensor malfunction (value from sensor too rich)		39 to 51
			Fuel supply problem	<ul style="list-style-type: none"> • Fuel pump control circuit • Purge valve system • Fuel line • ECM 	24 to 37
		Intake air volume insufficient	Problem with air passage	<ul style="list-style-type: none"> • Intake system connections • Mass air flow meter • Brake booster • PCV valve and hose • Purge valve system 	53 to 55

			Excessive valve overlap	<ul style="list-style-type: none"> • Camshaft timing oil control valve 	56 to 59
		Ignition timing incorrect	Does not operate as expected	<ul style="list-style-type: none"> • Knock sensor • Engine coolant temperature sensor • Mass air flow meter 	60 to 64
	Rapidly decreases and engine stalls*	Ignition and injection stops (electrical system malfunction)	Power temporarily cut	<ul style="list-style-type: none"> • Power supply circuit (fuel injector assembly (for port injection), ignition coil assembly) 	65, 66
		External part malfunctioning	Increase in load	<ul style="list-style-type: none"> • Air conditioning system • Electrical load signal system • Power steering system • Automatic transmission system • Park/neutral position switch assembly 	67 to 69
Accelerating	-	Crankshaft position sensor or VVT sensor malfunction	Power temporarily cut	<ul style="list-style-type: none"> • Check DTCs 	1
		Mass air flow meter	Foreign matter adhesion	<ul style="list-style-type: none"> • Mass air flow meter 	70 to 73
		Ignition and injection stops (electrical system malfunction)	Power temporarily cut	<ul style="list-style-type: none"> • Power supply circuit (fuel injector assembly (for port injection), ignition coil assembly) 	74, 75
		Fuel supply problem	Fuel leak, clog	<ul style="list-style-type: none"> • Fuel pump control circuit • Fuel line 	76 to 80

*: If the engine stalls immediately after the injection method is switched from port injection to direct injection, the injector driver (EDU) may be malfunctioning.

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection

procedure.

PROCEDURE

1. CHECK FOR ANY OTHER DTCS OUTPUT

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Read the DTCS .

Result

RESULT	PROCEED TO
Only DTC P1603 is output	A
DTCs other than P1603 are output	B

HINT:

If any DTCs other than P1603 are output, troubleshoot those DTCs first.

B  [GO TO DTC CHART](#)


A



2. CHECK FREEZE FRAME DATA

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored .

OK:

Immobiliser Fuel Cut is OFF.

Result

RESULT	PROCEED TO
Abnormal	A
Normal	B

B  [READ FREEZE FRAME DATA](#)

A



3.	CHECK ENGINE IMMOBILISER SYSTEM
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Start the engine.
- (c) Idle the engine
- (d) Enter the following menus: Powertrain / Engine / Data List / Immobiliser Communication and Immobiliser Fuel Cut.
- (e) Check the Data List indication.

Result

DATA LIST ITEM	RESULT
Immobiliser Communication	ON
Immobiliser Fuel Cut	OFF

NG **CHECK ENGINE IMMOBILISER SYSTEM**

OK



4.	READ FREEZE FRAME DATA
-----------	-------------------------------

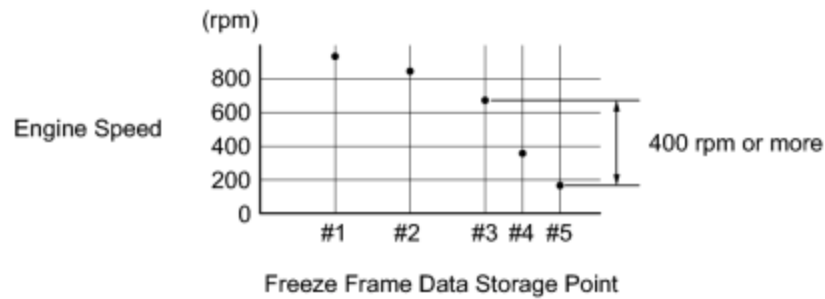
- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored INFO.

Result

PROBLEM SYMPTOM	FREEZE FRAME DATA ITEM			SUSPECTED AREA	PROCEED TO
	CLOSED THROTTLE POSITION SW	ENGINE SPEED	TOTAL OF SHORT FT AND LONG FT		
				<ul style="list-style-type: none"> Air suction Sensor 	

When idling or decelerating, engine speed slowly decreases and engine stalls	All 5 sets of freeze frame data are ON	Decreases slowly*1	All 5 sets of freeze frame data are +15% or more*2	malfunction (value from sensor too lean) • Fuel supply problem	A
			At least 1 of the 5 sets of freeze frame data is -15% or less*3	Sensor malfunction (value from sensor too rich)	B
			All 5 sets of freeze frame data are from -15% to +15%	• Intake air volume insufficient • Ignition timing incorrect	C
When idling or decelerating, engine speed rapidly decreases and engine stalls		Decreases rapidly*1	-	• Injection stoppage, ignition stoppage • Load from external parts	D
When accelerating or driving at constant speed, engine stalls	At least one is OFF	-	-	• Sensor malfunction • Injection stoppage, ignition stoppage • Fuel supply problem	E

Rapid Decrease in Engine Speed



HINT:

- *1: A rapid decrease in engine speed may be caused by an electrical fault in the shared wiring of all or a number of cylinders, an increase in load from external parts, etc. The engine speed is considered to have decreased rapidly if either of the following conditions applies.

Otherwise, the engine speed is considered to have decreased slowly.

- a. In the freeze frame data, the decrease in engine speed from #3 to #5 is 400 rpm or more.
 - b. In the freeze frame data, the engine speed at #5 is 120 rpm or less.
- If the vehicle speed is 30 km/h or less and the difference between Engine Speed and SPD (NT) is 100 rpm or less, inspect the automatic transmission. (Depending on the rate of vehicle deceleration, the engine speed may have decreased due to the A/T lock-up release being late.)
 - *2: When a DTC is stored, feedback compensation increases because the air-fuel ratio is determined to be lean.
 - *3: When a DTC is stored, feedback compensation decreases because the air-fuel ratio is determined to be rich.

B ► CHECK IGNITION SYSTEM

C ► CHECK IGNITION SYSTEM

D ► CHECK TERMINAL VOLTAGE (FUEL INJECTOR POWER SOURCE)

E ► CHECK FREEZE FRAME DATA

A



5. CHECK INTAKE SYSTEM

(a) Check for air leakage in the intake system [vacuum hose disconnection, cracks, damaged

gaskets, etc.] **INFO** .

HINT:

- If the accelerator pedal is released after racing the engine, the inspection is easier to perform because the vacuum inside the intake pipes increases and the air suction noise becomes louder.
- If Short FT and Long FT are largely different from the normal values when idling (the intake air volume is small) and almost the same as the normal values when racing the engine (the intake air volume is high), air leakage may be present.

OK:

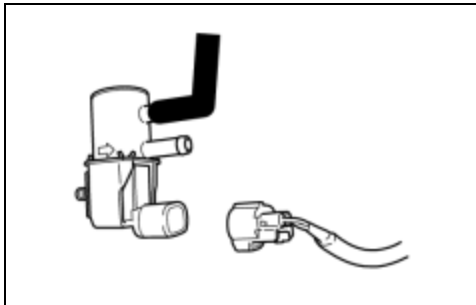
There is no air leakage.

NG ▶ REPAIR OR REPLACE INTAKE SYSTEM

OK



6.	CHECK PURGE VALVE
-----------	--------------------------



(a) Disconnect the purge hose (on the canister side) of the purge valve.

- (b) Start the engine.
- (c) Idle the engine.
- (d) Disconnect the connector of the purge valve.
- (e) Check if air flows through the purge valve.
 - OK:
Air does not flow.
- (f) Connect the connector of the purge valve.
- (g) Connect the purge hose of the purge valve.

HINT:

When this inspection is performed, the MIL may illuminate. After finishing the inspection, check and clear DTCs **INFO** .

OK
▼

7. READ FREEZE FRAME DATA

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored **INFO** .

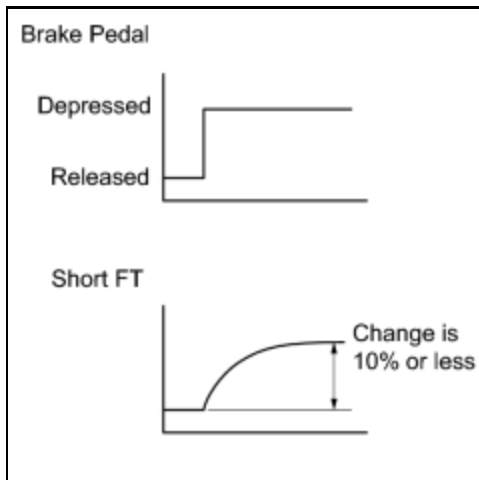
Result

FREEZE FRAME DATA ITEM	RESULT	SUSPECTED AREA	PROCEED TO
Stop Light Switch	At least 1 of the 5 sets of freeze frame data is ON	Air suction from brake booster	A
	All 5 sets of freeze frame data are OFF	-	B

B ▶ CHECK IGNITION SYSTEM

A
▼

8. READ VALUE USING TECHSTREAM (SHORT FT)



- (a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Start the engine and warm it up until the engine coolant temperature stabilizes.

HINT:

The A/C switch and all accessory switches should be off.

(d) Idle the engine.

(e) Using the Techstream, read the value of Short FT #1 in the Data List while depressing the brake pedal.

Standard:

Short FT #1 changes by +10% or less.

HINT:

When air leakage from the brake booster is present, the feedback compensation increases because the air-fuel ratio becomes lean.

NG  **INSPECT BRAKE BOOSTER ASSEMBLY**

OK



9.	PERFORM DRIVE TEST
-----------	---------------------------

(a) Connect the Techstream to the DLC3.

(b) Start the engine and warm it up until the engine coolant temperature stabilizes.

HINT:

The A/C switch and all accessory switches should be off.

(c) Idle the engine.

(d) Using the Techstream, read the value of Short FT #1 in the Data List.

Standard:


DATA LIST	CONDITION	SPECIFIED CONDITION
Short FT #1 + Long FT #1	The conditions of the vehicle are matched to those present when the problem occurs	-15 to +15%

NG  **INSPECT BRAKE BOOSTER ASSEMBLY**

OK



10.	CHECK IGNITION SYSTEM
------------	------------------------------


(a) Perform ignition system On-vehicle Inspection  .

**REPAIR OR REPLACE MALFUNCTIONING
NG  PARTS, COMPONENT AND AREA**

OK



11.	READ FREEZE FRAME DATA
------------	-------------------------------


- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored  .

Result

FREEZE FRAME DATA ITEM	RESULT	SUSPECTED AREA	PROCEED TO
Calculate Load	Below 90% of the current value of the vehicle*1	Mass air flow meter	A
AFS Voltage B1S1	2.2 V or higher*2	<ul style="list-style-type: none"> Air fuel ratio sensor Wire harness or connector 	B

HINT:

- *1: If the mass air flow meter is malfunctioning and incorrectly measures the pressure to be less than the actual intake manifold pressure, the freeze frame data will show a low engine load value.
- *2: If the air fuel ratio sensor is malfunctioning and constantly outputs a value indicating the air-fuel ratio is lean, the actual air-fuel ratio will become rich and the engine may stall.

**B  PERFORM ACTIVE TEST USING TECHSTREAM
(CONTROL THE INJECTION VOLUME FOR A/F SENSOR)**

A



12.	CHECK MASS AIR FLOW METER
------------	----------------------------------

- (a) Remove the mass air flow meter.
- (b) Check for foreign matter in the airflow passage of the mass airflow meter.

Result

RESULT	PROCEED TO
Visible foreign matter is not present	A
Visible foreign matter is present	B

B **REPLACE MASS AIR FLOW METER**

A



13.	CHECK HARNESS AND CONNECTOR (ECM - MASS AIR FLOW METER)
------------	--

- (a) Disconnect the ECM.
- (b) Disconnect the mass air flow meter connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-22 (VG) - C16-5 (VG)	Always	Below 1 Ω
A33-29 (E2G) - C16-4 (E2G)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-22 (VG) or C16-5 (VG) - Body ground	Always	10 k Ω or higher
A33-29 (E2G) or C16-4 (E2G) - Body ground	Always	10 k Ω or higher

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

OK



14.	PERFORM DRIVE TEST
------------	---------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Start the engine and warm it up until the engine coolant temperature stabilizes.

HINT:

The A/C switch and all accessory switches should be off.

- (c) Idle the engine.
- (d) Using the Techstream, read the value of Calculate Load in the Data List.

Standard:

DATA LIST	SPECIFIED CONDITION
Calculate Load	90 to 110% of the current value of the vehicle

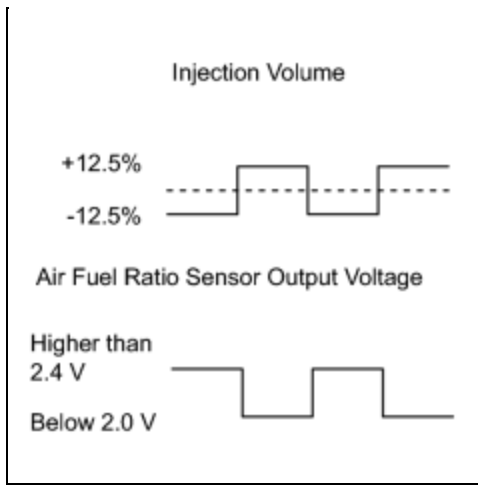
Result

RESULT	PROCEED TO
Abnormal	A
Normal	B

B  **READ FREEZE FRAME DATA**

A  **REPLACE MASS AIR FLOW METER**

15.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE INJECTION VOLUME FOR A/F SENSOR)
------------	---



(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Start the engine, turn off all accessory switches and warm up the engine until the engine coolant temperature stabilizes.

(d) Idle the engine.

(e) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Volume for A/F Sensor.

(f) Read the output voltage from the air fuel ratio sensor when increasing and decreasing the fuel injection volume.

Standard:

TECHSTREAM DISPLAY	SPECIFIED CONDITION
Control the Injection Volume for A/F Sensor (+12.5%)	Air fuel ratio sensor output voltage is below 2.0 V
Control the Injection Volume for A/F Sensor (-12.5%)	Air fuel ratio sensor output voltage is higher than 2.4 V

Result

RESULT	PROCEED TO
Abnormal	A
Normal	B

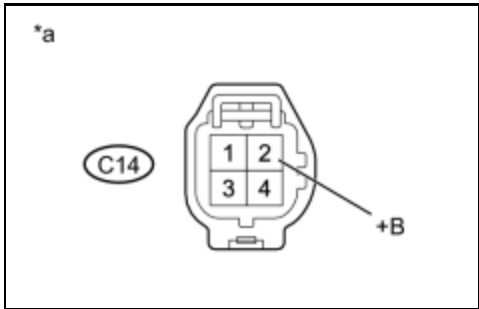
HINT:

The air fuel ratio sensor has an output delay of a few seconds and the heated oxygen sensor has a maximum output delay of approximately 20 seconds.

B ▶ READ FREEZE FRAME DATA

A
▼

16. CHECK TERMINAL VOLTAGE (AIR FUEL RATIO SENSOR POWER SOURCE)



(a) Disconnect the air fuel ratio sensor connector.

(b) Turn ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C14-2 (+B) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Air Fuel Ratio Sensor)
----	--

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG REPAIR AIR FUEL RATIO SENSOR POWER SOURCE CIRCUIT

OK

17. CHECK HARNESS AND CONNECTOR (AIR FUEL RATIO SENSOR - ECM)

(a) Disconnect the ECM.

(b) Disconnect the air fuel ratio sensor connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-18 (A1A-) - C14-4 (A1A-)	Always	Below 1 Ω
A34-19 (A1A+) - C14-3 (A1A+)	Always	Below 1 Ω
A34-5 (HA1A) - C14-2 (HA1A)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-18 (A1A-) or C14-4 (A1A-) - Body ground	Always	10 k Ω or higher
A34-19 (A1A+) or C14-3 (A1A+) - Body ground	Always	10 k Ω or higher
A34-5 (HA1A) or C14-2 (HA1A) - Body ground	Always	10 k Ω or higher

HINT:


- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



18.	READ FREEZE FRAME DATA
------------	-------------------------------

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored  .

Result

FREEZE FRAME DATA ITEM	RESULT	PROCEED TO
Initial Engine Coolant Temp, Ambient Temp for A/C, Initial Intake Air Temp	Difference in temperature between each item is less than 10°C*1	A
	Difference in temperature between each item is 10°C or more*2	B

HINT:

- *1: A long time had elapsed after stopping the engine.
- *2: A long time had not elapsed after stopping the engine.

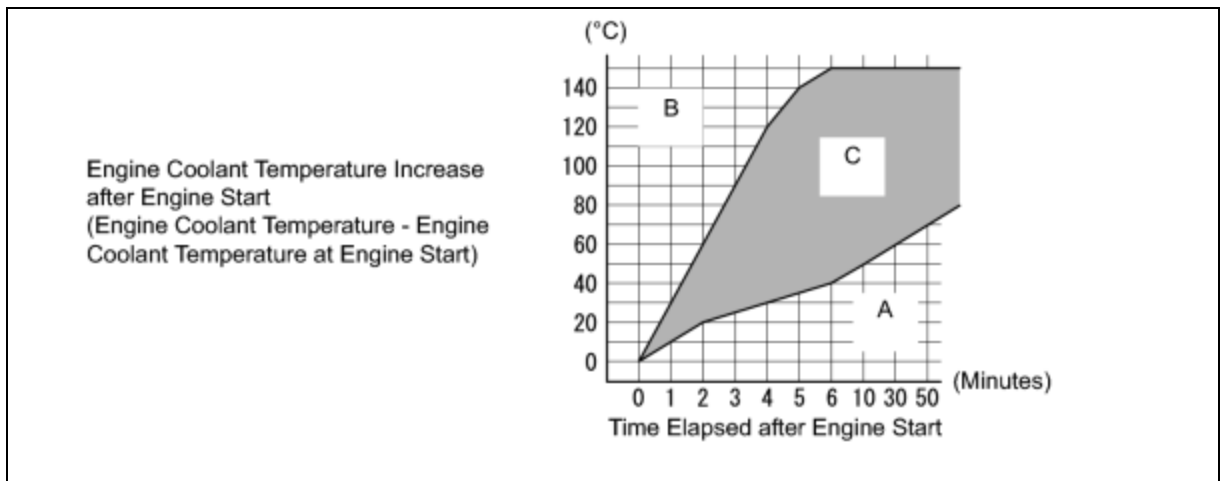
B ▶ READ FREEZE FRAME DATA

A



19. READ FREEZE FRAME DATA

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored **INFO**.



Result

FREEZE FRAME DATA ITEM	RESULT	SUSPECTED AREA	PROCEED TO
Initial Engine Coolant Temp, Coolant Temp, Engine Run Time	Range A	<ul style="list-style-type: none"> • Engine coolant temperature sensor • Thermostat 	A
	Range B	Engine coolant temperature sensor	B
	Range C	-	C

HINT:

This step is not directly related to engine stall.

B ▶ INSPECT ENGINE COOLANT TEMPERATURE SENSOR

C ▶ READ FREEZE FRAME DATA

A



20.	INSPECT THERMOSTAT
------------	---------------------------

HINT:

For the thermostat inspection, refer to the following procedures  .


Result

RESULT	PROCEED TO
Abnormal	A
Normal	B

B ▶ INSPECT ENGINE COOLANT TEMPERATURE SENSOR

A ▶ REPLACE THERMOSTAT

21.	READ FREEZE FRAME DATA
------------	-------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored  .

Result

FREEZE FRAME DATA ITEM	RESULT	SUSPECTED AREA	PROCEED TO
Coolant Temp	120°C or higher	Engine coolant temperature sensor	A
Coolant Temp, Ambient Temp for A/C	Engine coolant temperature is lower than outside temperature by 15°C or more	Engine coolant temperature sensor	
Both freeze frame data items listed above	Values are other than above	-	B

A



22.	INSPECT ENGINE COOLANT TEMPERATURE SENSOR
------------	--

(a) Inspect the engine coolant temperature sensor INFO.

NG ▶ REPLACE ENGINE COOLANT TEMPERATURE SENSOR

OK



23.	CHECK HARNESS AND CONNECTOR (ECM - ENGINE COOLANT TEMPERATURE SENSOR)
------------	--

- (a) Disconnect the ECM connector.
- (b) Disconnect the engine coolant temperature sensor connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-30 (THW) - C35-2 (THW)	Always	Below 1 Ω
A36-29 (E1) - C35-1 (E2)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-30 (THW) or C35-2 (THW) - Body ground	Always	10 kΩ or higher
A36-29 (E1) or C35-1 (E2) - Body ground	Always	10 kΩ or higher


HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

REPAIR OR REPLACE HARNESS OR

OK
▼

24.	READ FREEZE FRAME DATA
-----	-------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored  .

Result

FREEZE FRAME DATA ITEM	RESULT	SUSPECTED AREA	PROCEED TO
EVAP (Purge) VSV	At least 1 of the 5 sets of freeze frame data is not 0%	Purge valve	A
	All 5 sets of freeze frame data are 0%	-	B

HINT:

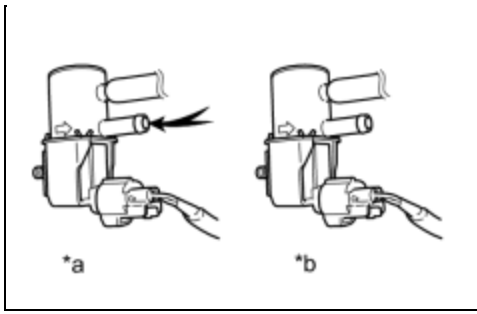
If the purge valve is stuck closed, air-fuel ratio compensation by the purge valve is incorrectly adjusted, and then the air-fuel ratio becomes lean and the engine may stall.

B  **PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP DUTY)**

A
▼

25.	PERFORM ACTIVE TEST USING TECHSTREAM (ACTIVATE THE VSV FOR EVAP CONTROL)
-----	---

- (a) Disconnect the purge hose (on the canister side) of the purge valve.



- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Start the engine.
- (e) Enter the following menus: Powertrain / Engine / Active Test / Activate the VSV for Evap Control.
- (f) Operate the purge valve and check the airflow.

OK:

ACTIVATE THE VSV FOR EVAP CONTROL	SPECIFIED CONDITION
ON	Air flows
OFF	Air does not flow

Result

RESULT	PROCEED TO
NG	A
OK	B

Text in Illustration

*a	Purge valve ON (Air flows)
*b	Purge valve OFF (Air does not flow)


HINT:

Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.

B ▶ **PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP DUTY)**

A
▼

26. INSPECT PURGE VALVE

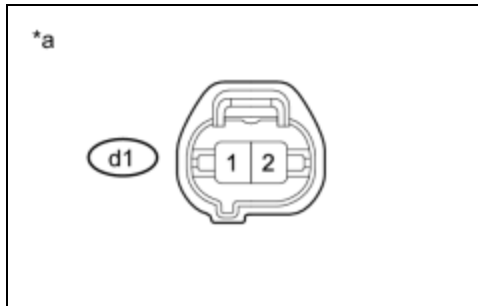
(a) Inspect the purge valve  .

NG  **REPLACE PURGE VALVE**

OK



27. CHECK TERMINAL VOLTAGE (PURGE VALVE POWER SOURCE)



(a) Disconnect the purge valve connector.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
d1-1 - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Purge Valve)
----	--

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG  **REPAIR PURGE VALVE POWER SOURCE
CIRCUIT**

OK



28.	CHECK HARNESS AND CONNECTOR (PURGE VALVE - ECM)
------------	--

- (a) Disconnect the purge valve connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-11 (PRG) - d1-2	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-11 (PRG) or d1-2 - Body ground	Always	10 k Ω or higher

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



29.	CLEAR DTC
------------	------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs .

NEXT



30. READ VALUE USING TECHSTREAM (EVAP (Purge) VSV)

- (a) Connect the Techstream to the DLC3.
- (b) Start the engine and warm it up until the engine coolant temperature stabilizes.

HINT:

The A/C switch and all accessory switches should be off.

- (c) Idle the engine for 15 minutes or more.
- (d) Using the Techstream, read the value of EVAP (Purge) VSV in the Data List.

Standard:

DATA LIST	SPECIFIED CONDITION
EVAP (Purge) VSV	Value other than 0% is displayed

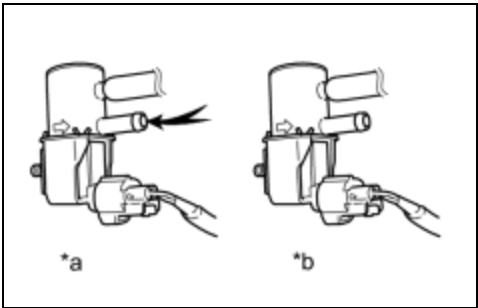
Result

RESULT	PROCEED TO
Abnormal	A
Normal	B

B ▶ CHECK FOR INTERMITTENT PROBLEMS

A
▼

31. PERFORM ACTIVE TEST USING TECHSTREAM



- (a) Disconnect the purge hose (on the canister side) of the purge valve.

- (b) Connect the Techstream to the DLC3.

(c) Turn the ignition switch to ON.

(d) Start the engine.

(e) Enter the following menus: Powertrain / Engine / Active Test / Activate the VSV for Evap Control.

(f) Operate the purge valve and check the airflow.

OK:

ACTIVATE THE VSV FOR EVAP CONTROL	SPECIFIED CONDITION
ON	Air flows
OFF	Air does not flow

Result

RESULT	PROCEED TO
NG	A
OK	B

Text in Illustration

*a	VSV ON (Air flows)
*b	VSV OFF (Air does not flow)

HINT:

Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.

B ► CHECK FOR INTERMITTENT PROBLEMS

A



32.	CHECK CONNECTOR CONNECTION CONDITION (ECM)
------------	---

(a) Check the ECM connector connection condition.

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG ► RECONNECT CONNECTOR CORRECTLY

33.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP DUTY)
------------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Active Test / Control the Fuel Pump Duty.
- (e) When performing the Active Test, check for an operating sound from the fuel pump.

Standard:

CONTROL THE FUEL PUMP DUTY	SPECIFIED CONDITION
25 or 80%	Operating sound heard
OFF	Operating sound not heard

Result

RESULT	PROCEED TO
Abnormal	A
Normal	B


HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- While performing the Active Test, make sure that there is no fuel leakage from the pipes, no signs that fuel has leaked, and no fuel smell.
- If the fuel pump operating noise is abnormal, proceed to step 34.

A



34.	INSPECT FUEL PUMP ASSEMBLY
------------	-----------------------------------

- (a) Inspect the fuel pump assembly  .

35.	CHECK FUEL SYSTEM
------------	--------------------------

(a) Check the fuel system.

- Check the fuel pump operation.
- Check the fuel leaks.
- Check the fuel pressure (low pressure side).
- Check the fuel pressure (high pressure side).
- Perform the Active Test [D-4S (Fuel Cut)].

HINT:

For the fuel system On-vehicle Inspection, refer to the following procedures .

Result

RESULT	PROCEED TO
Abnormal	A
Normal	B

B  CHECK FOR INTERMITTENT PROBLEMS

A



36.	CHECK FUEL SYSTEM
------------	--------------------------

(a) Check for foreign matter such as iron particles around the fuel pump assembly (fuel pump, fuel pump filter and inside the fuel tank), and for signs that the fuel pump was stuck.

Result

RESULT	PROCEED TO
There is foreign matter or signs that fuel pump was stuck	A
There is no foreign matter and no signs that fuel pump was stuck	B

HINT:

If there is foreign matter such as iron particles on the fuel pump, fuel filter or fuel tank, remove the foreign matter.

B  REPAIR OR REPLACE FUEL SYSTEM

A



37. CHECK FUEL SYSTEM

(a) Check the fuel system.

- Check the fuel pump operation.
- Check the fuel leaks.
- Check the fuel pressure (low pressure side).
- Check the fuel pressure (high pressure side).
- Perform the Active Test [D-4S (Fuel Cut)].


HINT:

For the fuel system On-vehicle Inspection, refer to the following procedures  .

NG  **REPAIR OR REPLACE MALFUNCTIONING PARTS, COMPONENT AND AREA**

OK  **END**

38. CHECK IGNITION SYSTEM

(a) Perform ignition system On-vehicle Inspection  .

NG  **REPAIR OR REPLACE MALFUNCTIONING PARTS, COMPONENT AND AREA**


OK



39. READ FREEZE FRAME DATA

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored  .

Result

FREEZE FRAME DATA ITEM	RESULT	SUSPECTED AREA	PROCEED TO
Calculate Load	110% or more of the current value of the vehicle*1	Mass air flow meter	A
AFS Voltage B1S1	Below 2.4 V*2	<ul style="list-style-type: none"> Air fuel ratio sensor Harness and connector 	B
Both freeze frame data items listed above	Values are other than above	-	C

HINT:

- *1: If the mass air flow meter is malfunctioning and incorrectly measures the intake air volume to be higher than the actual volume of air flowing through the intake manifold, the freeze frame data will show a high engine load value.
- *2: As the air fuel ratio sensor output is low before the sensor warms up, the value at that time cannot be used for diagnosis. If the air fuel ratio sensor is malfunctioning and constantly outputs a value indicating the air-fuel ratio is rich, the actual air-fuel ratio will become lean and the engine may stall.

B ► PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE INJECTION VOLUME FOR A/F SENSOR)

C ► READ FREEZE FRAME DATA

A ▼

40.	CHECK MASS AIR FLOW METER
------------	----------------------------------

- Remove the mass airflow meter.
- Check for foreign matter in the airflow passage of the mass air flow meter.

Result

RESULT	PROCEED TO
Visible foreign matter is not present	A
Visible foreign matter is present	B

B ► REPLACE MASS AIR FLOW METER

A



41.	CHECK HARNESS AND CONNECTOR (ECM - MASS AIR FLOW METER)
------------	--

- (a) Disconnect the mass air flow meter connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-22 (VG) - C16-5 (VG)	Always	Below 1 Ω
A33-29 (E2G) - C16-4 (E2G)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-22 (VG) or C16-5 (VG) - Body ground	Always	10 k Ω or higher
A33-29 (E2G) or C16-4 (E2G) - Body ground	Always	10 k Ω or higher

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

**REPAIR OR REPLACE HARNESS OR
NG CONNECTOR**

OK



42.	PERFORM DRIVE TEST
------------	---------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Start the engine and warm it up until the engine coolant temperature stabilizes.

HINT:

The A/C switch and all accessory switches should be off.

(c) Idle the engine.

(d) Using the Techstream, read the value of Calculate Load in the Data List.

Standard:

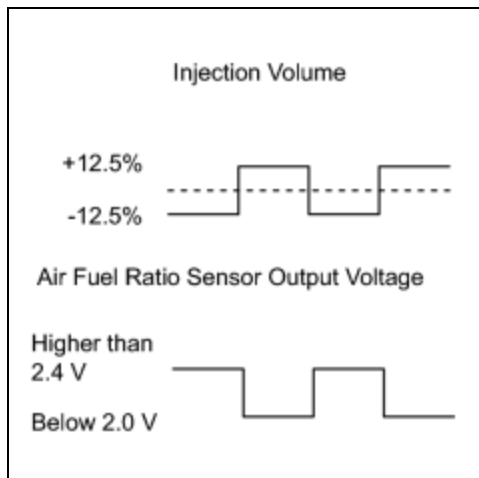
DATA LIST	SPECIFIED CONDITION
Calculate Load	90 to 110% of the current value of the vehicle

NG  **REPLACE MASS AIR FLOW METER**

OK



43.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE INJECTION VOLUME FOR A/F SENSOR)
-----	---



(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Start the engine, turn off all accessory switches and warm up the engine until the engine coolant temperature stabilizes.

(d) Idle the engine.

(e) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Volume for A/F Sensor.

(f) Read the output voltage from the air fuel ratio sensor when increasing and decreasing the fuel injection volume.

Standard:

TECHSTREAM DISPLAY	SPECIFIED CONDITION
Control the Injection Volume for A/F Sensor	

(+12.5%)	Air fuel ratio sensor output voltage is below 2.0 V
Control the Injection Volume for A/F Sensor (-12.5%)	Air fuel ratio sensor output voltage is higher than 2.4 V

Result

RESULT	PROCEED TO
Abnormal	A
Normal	B

HINT:

The air fuel ratio sensor has an output delay of a few seconds and the heated oxygen sensor has a maximum output delay of approximately 20 seconds.

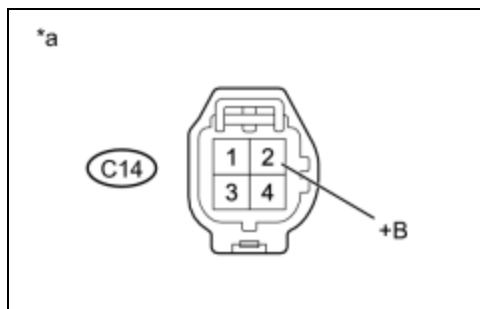
B ▶ READ FREEZE FRAME DATA

A



44.	CHECK TERMINAL VOLTAGE (AIR FUEL RATIO SENSOR POWER SOURCE)
------------	--

(a) Disconnect the air fuel ratio sensor connector.



(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
C14-2 (+B) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Air Fuel Ratio Sensor)
----	--

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG  **REPAIR AIR FUEL RATIO SENSOR POWER SOURCE CIRCUIT**

OK



45.	CHECK HARNESS AND CONNECTOR (AIR FUEL RATIO SENSOR - ECM)
------------	--

- (a) Disconnect the air fuel ratio sensor connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-18 (A1A-) - C14-4 (A1A-)	Always	Below 1 Ω
A34-19 (A1A+) - C14-3 (A1A+)	Always	Below 1 Ω
A34-5 (HA1A) - C14-2 (HA1A)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-18 (A1A-) or C14-4 (A1A-) - Body ground	Always	10 k Ω or higher
A34-19 (A1A+) or C14-3 (A1A+) - Body ground	Always	10 k Ω or higher
A34-5 (HA1A) or C14-2 (HA1A) - Body ground	Always	10 k Ω or higher

HINT:


- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



46.	READ FREEZE FRAME DATA
------------	-------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored  .

Result

FREEZE FRAME DATA ITEM	RESULT	PROCEED TO
Initial Engine Coolant Temp, Ambient Temp for A/C, Initial Intake Air Temp	Difference in temperature between each item is less than 10°C*1	A
	Difference in temperature between each item is 10°C or more*2	B

HINT:


- *1: A long time had elapsed after stopping the engine.
- *2: A long time had not elapsed after stopping the engine.

B  **READ FREEZE FRAME DATA**

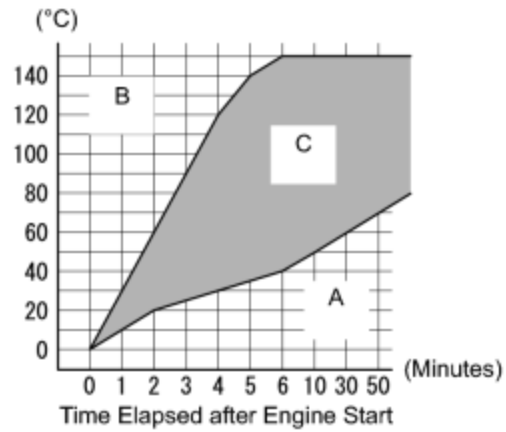
A



47.	READ FREEZE FRAME DATA
------------	-------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored  .

Engine Coolant Temperature Increase after Engine Start
(Engine Coolant Temperature - Engine Coolant Temperature at Engine Start)



Result

FREEZE FRAME DATA ITEM	RESULT	SUSPECTED AREA	PROCEED TO
Initial Engine Coolant Temp, Coolant Temp, Engine Run Time	Range A	<ul style="list-style-type: none"> Engine coolant temperature sensor Thermostat 	A
	Range B	Engine coolant temperature	B
	Range C	-	C

HINT:

This step is not directly related to engine stall.

B ▶ INSPECT ENGINE COOLANT TEMPERATURE SENSOR

C ▶ CHECK FUEL SYSTEM

A



48.	INSPECT THERMOSTAT
------------	---------------------------

HINT:

For the thermostat inspection, refer to the following procedures [INFO](#) .

Result

RESULT	PROCEED TO
--------	------------

Abnormal	A
Normal	B

HINT:

This step is not directly related to engine stall.

B ▶ **INSPECT ENGINE COOLANT TEMPERATURE SENSOR**

A ▶ **REPLACE THERMOSTAT**

49. READ FREEZE FRAME DATA

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored **INFO** .

Result

FREEZE FRAME DATA ITEM	RESULT	SUSPECTED AREA	PROCEED TO
Coolant Temp	120°C or higher	Engine coolant temperature sensor	A
Coolant Temp, Ambient Temp for A/C	Engine coolant temperature is lower than outside temperature by 15°C or more	Engine coolant temperature sensor	
Both freeze frame data items listed above	Values are other than above	-	B

B ▶ **CLEAR DTC**

A



50. INSPECT ENGINE COOLANT TEMPERATURE SENSOR

HINT:

For the engine coolant temperature sensor inspection, refer to the following procedures **INFO** .

Result

--	--

RESULT	PROCEED TO
Normal	A
Abnormal	B

B ► REPLACE ENGINE COOLANT TEMPERATURE SENSOR

A



51.	CHECK HARNESS AND CONNECTOR (ECM - ENGINE COOLANT TEMPERATURE SENSOR)
------------	--

- (a) Disconnect the ECM connector.
- (b) Disconnect the engine coolant temperature sensor connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-30 (THW) - C35-2 (THW)	Always	Below 1 Ω
A36-29 (E1) - C35-1 (E2)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-30 (THW) or C35-2 (THW) - Body ground	Always	10 kΩ or higher
A36-29 (E1) or C35-1 (E2) - Body ground	Always	10 kΩ or higher


HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ► CHECK FOR INTERMITTENT PROBLEMS

52.	CHECK IGNITION SYSTEM
------------	------------------------------

(a) Perform ignition system On-vehicle Inspection  .

NG  **REPAIR OR REPLACE MALFUNCTIONING PARTS, COMPONENT AND AREA**


OK



53.	READ FREEZE FRAME DATA
------------	-------------------------------

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored  .

Result


FREEZE FRAME DATA ITEM	RESULT	SUSPECTED AREA	PROCEED TO
Total of ISC Learning Value and ISC Feedback Value	Below 80% of the current value of the vehicle	Intake air volume insufficient	A
	80% or more of the current value of the vehicle		B

B  **PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE VVT LINEAR)**

A



54.	CHECK INTAKE SYSTEM
------------	----------------------------

(a) Check for air leakage in the intake system [vacuum hose disconnection, cracks, damaged gaskets, etc.]  .

HINT:

- If the accelerator pedal is released after racing the engine, the inspection is easier to perform because the vacuum inside the intake pipes increases and the air suction noise becomes louder.
- If Short FT and Long FT are largely different from the normal values when idling (the intake air volume is small) and almost the same as the normal values when racing the engine (the intake air

volume is high), air leakage may be present.

OK:

There is no air leakage.

NG ► REPAIR OR REPLACE INTAKE SYSTEM

OK



55.	CHECK INTAKE SYSTEM
------------	----------------------------

(a) Check the intake system.

- Inspect the brake booster assembly **INFO** .
- Inspect the mass air flow meter **INFO** .
- Check the PCV hose **INFO** .
- Inspect the PCV valve **INFO** .
- Inspect the purge valve **INFO** .

Result

RESULT	PROCEED TO
Abnormal	A
Normal	B

B ► READ FREEZE FRAME DATA

A ► REPAIR OR REPLACE MALFUNCTIONING PARTS, COMPONENT AND AREA

56.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE VVT LINEAR)
------------	--

(a) Connect the Techstream to the DLC3.

(b) Turn the Techstream on.

(c) Warm up the engine.

(d) Enter the following menus: Powertrain / Engine / Active Test / Control the VVT Linear (Bank1) or Control the VVT Linear (Bank2).

HINT:

When performing the Active Test, make sure the A/C is on and the shift lever is in P, N or neutral.

(e) Check the engine speed while operating the camshaft timing oil control valve using the Techstream.

OK:

TECHSTREAM OPERATION	SPECIFIED CONDITION
0 deg (CA)	Normal engine speed
36 deg (CA)	Engine idles roughly or stalls

HINT:

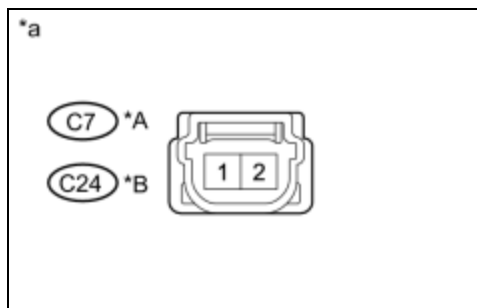
- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- When the results of the inspection using the Active Test are normal but the valve operating noise is abnormal, check the valve for any signs of problems.
- If the camshaft timing oil control valve is stuck on, the valve overlap increases and combustion worsens due to the internal EGR which may cause rough idle or cause the engine to stall.

NG ▶ **REPLACE CAMSHAFT TIMING OIL CONTROL VALVE**

OK



57.	CHECK HARNESS AND CONNECTOR (CAMSHAFT TIMING OIL CONTROL VALVE - ECM)
------------	--



(a) Disconnect the camshaft timing oil control valve connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C7-1 - Body ground	Ignition switch ON	11 to 14 V
C24-1 - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	Bank 1
*B	Bank 2
*a	Front view of wire harness connector (to Camshaft Timing Oil Control Valve for Intake Side)

(c) Disconnect the ECM connector.

(d) Measure the voltage according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-17 (OC1) - C7-2	Always	Below 1 Ω
A36-16 (OC2) - C24-2	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-17 (OC1) or C7-2 - Body ground	Always	10 k Ω or higher
A36-16 (OC2) or C24-2 - Body ground	Always	10 k Ω or higher

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



58.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE VVT EXHAUST LINEAR)
------------	--

(a) Connect the Techstream to the DLC3.

(b) Turn the Techstream on.

(c) Warm up the engine.

(d) Enter the following menus: Powertrain / Engine / Active Test / Control the VVT Exhaust Linear (Bank1) or Control the VVT Exhaust Linear (Bank2).

HINT:

When performing the Active Test, make sure the A/C is on and the shift lever is in P, N or neutral position.

(e) Check the engine speed while operating the camshaft timing oil control valve using the Techstream.

OK:

TECHSTREAM OPERATION	SPECIFIED CONDITION
0 deg (CA)	Normal engine speed
51 deg (CA)	Engine idles roughly or stalls

HINT:

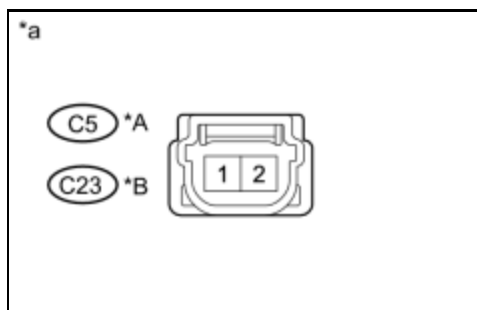
- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- When the results of the inspection using the Active Test are normal but the valve operating noise is abnormal, check the valve for any signs of problems.
- If the camshaft timing oil control valve is stuck on, the valve overlap increases and combustion worsens due to the internal EGR which may cause rough idle or cause the engine to stall.

NG ▶ **REPLACE CAMSHAFT TIMING OIL CONTROL VALVE**

OK



59.	CHECK HARNESS AND CONNECTOR (CAMSHAFT TIMING OIL CONTROL VALVE - ECM)
------------	--



(a) Disconnect the camshaft timing oil control valve connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C5-1 - Body ground	Ignition switch ON	11 to 14 V
C23-1 - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	Bank 1
*B	Bank 2
*a	Front view of wire harness connector (to Camshaft Timing Oil Control Valve for Exhaust Side)

(c) Disconnect the ECM connector.

(d) Measure the voltage according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-7 (OE1) - C5-2	Always	Below 1 Ω
A36-5 (OE2) - C23-2	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-7 (OE1) or C5-2 - Body ground	Always	10 k Ω or higher
A36-5 (OE2) or C23-2 - Body ground	Always	10 k Ω or higher

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**


OK



60.	READ FREEZE FRAME DATA
------------	-------------------------------

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored  .

Result

--	--	--

FREEZE FRAME DATA ITEM		SUSPECTED AREA	PROCEED TO
IGN ADVANCE	KNOCK CORRECT LEARN VALUE		
Differs from the current value of the vehicle by 10° or more	Less than 3°	<ul style="list-style-type: none"> • Engine coolant temperature sensor • Mass air flow meter • Knock sensor 	A
	3° or more	-	B
Differs from the current value of the vehicle by less than 10°	-	-	

B ▶ CHECK FOR INTERMITTENT PROBLEMS

A



61.	INSPECT ENGINE COOLANT TEMPERATURE SENSOR
------------	--

HINT:

For the engine coolant temperature sensor inspection, refer to the following procedures INFO.

NG ▶ REPLACE ENGINE COOLANT TEMPERATURE SENSOR

OK



62.	CHECK HARNESS AND CONNECTOR (ECM - ENGINE COOLANT TEMPERATURE SENSOR)
------------	--

- (a) Disconnect the ECM connector.
- (b) Disconnect the engine coolant temperature sensor connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-30 (THW) - C35-2 (THW)	Always	Below 1 Ω
A36-29 (E1) - C35-1 (E2)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-30 (THW) or C35-2 (THW) - Body ground	Always	10 kΩ or higher
A36-29 (E1) or C35-1 (E2) - Body ground	Always	10 kΩ or higher

HINT:


- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



63.	INSPECT MASS AIR FLOW METER (INTAKE AIR TEMPERATURE SENSOR)
------------	--

(a) Inspect the mass air flow meter  .

HINT:

If the intake air temperature sent to the ECM is higher than the standard due to the mass air flow meter (intake air temperature sensor) malfunctioning, the ignition timing may become delayed.

NG  **REPLACE MASS AIR FLOW METER**

OK



64.	READ VALUE USING TECHSTREAM
------------	------------------------------------

(a) Connect the Techstream to the DLC3.

(b) Start the engine and warm it up until the engine coolant temperature stabilizes.

HINT:

The A/C switch and all accessory switches should be off.

(c) Idle the engine.

(d) Using the Techstream, read the value of IGN Advance and Knock Correct Learn Value in the Data List.

Result

FREEZE FRAME DATA ITEM		PROCEED TO
IGN ADVANCE	KNOCK CORRECT LEARN VALUE	
Differs from the current value of the vehicle by 10° or more	Less than 3°	A
	3° or more	B
Differs from the current value of the vehicle by less than 10°	-	

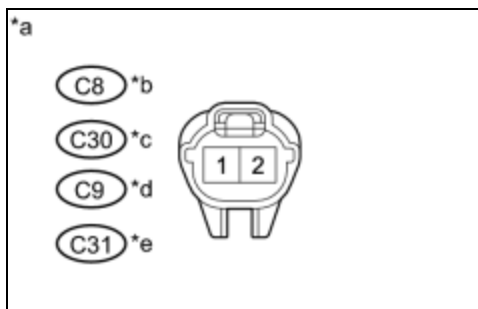
HINT:

If the results of the checks performed in steps 56 to 64 were all normal and the sum of ISC Feedback Value and ISC Learning Value in the Data List is 120% of the normal value or more, check for carbon deposits in the throttle with motor body assembly. If there are carbon deposits, clean them off to finish the troubleshooting procedure.

B ► END

A ► CHECK KNOCK SENSOR CIRCUIT

65. CHECK TERMINAL VOLTAGE (FUEL INJECTOR POWER SOURCE)



(a) Disconnect the fuel injector assembly connectors.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

CYLINDER	TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
No. 1	C8-1 - Body ground	Ignition switch ON	11 to 14 V
No. 2	C30-1 - Body ground	Ignition switch ON	11 to 14 V
No. 3	C9-1 - Body ground	Ignition switch ON	11 to 14 V

No. 4	C31-1 - Body ground	Ignition switch ON	11 to 14 V
-------	---------------------	--------------------	------------

Text in Illustration

*a	Front view of wire harness connector (to Fuel Injector Assembly (for Port Injection))
*b	No. 1 cylinder
*c	No. 2 cylinder
*d	No. 3 cylinder
*e	No. 4 cylinder


HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.
- A rapid decrease in engine speed may have been caused by a malfunction in all or multiple cylinders. (There may be an electrical malfunction in the wiring shared by all the cylinders.)

NG  **REPAIR FUEL INJECTOR POWER SOURCE CIRCUIT**

OK


66.	CHECK IGNITION SYSTEM
------------	------------------------------


(a) Perform ignition system On-vehicle Inspection  .

NG  **REPAIR OR REPLACE MALFUNCTIONING PARTS, COMPONENT AND AREA**

OK


67.	CHECK FREEZE FRAME DATA
------------	--------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which

were present when the DTC was stored  .

Result

FREEZE FRAME DATA ITEM		SUSPECTED AREA	PROCEED TO
A/C SIGNAL	AIR CONDITIONER FB VAL		
A/C Signal display does not change from OFF	-	Except for A/C system	A
A/C Signal display changes from OFF to ON*1	Value displayed for Air Conditioner FB Val does not increase		
	Value displayed for Air Conditioner FB Val increases	A/C system	B

HINT:


- *1: Check not only the on/off state of the air conditioner but also the change in air conditioner load.
- The normal value for the ISC learned value is engine displacement (liters) x 0.9.
- Even if the results are normal, the power steering system and/or A/C system may have been malfunctioning. If there are no problems with other parts, inspect the power steering system and/or A/C system.

B  **CHECK AIR CONDITIONING SYSTEM**

A



68.	CHECK FREEZE FRAME DATA
------------	--------------------------------

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored  .

Result

FREEZE FRAME DATA ITEM			SUSPECTED AREA	PROCEED TO	
ELECTRIC LOAD FEEDBACK VAL	DIFFERENCE BETWEEN ENGINE SPEED AND SPD (NT)	VEHICLE SPEED			
Electrical Load Signal display	Value displayed for Electric Load Val changes	-	-	Electrical load signal circuit	C
		At least 1 of the 5	Less than 30	Automatic transmission	B

changes from OFF to ON*3, or value displayed for Electric Load Feedback Val increases*1	Value displayed for Electric Load Val does not change	sets of freeze frame data is less than 100 rpm	km/h	system	
			30 km/h or more	-	A
		All 5 sets of freeze frame data are 100 rpm or more	-	-	A
Electrical Load Signal display does not change from OFF, or value displayed for Electric Load Feedback Val does not increase	-	At least 1 of the 5 sets of freeze frame data is less than 100 rpm	Less than 30 km/h	Automatic transmission system	B
			30 km/h or more	-	A
		All 5 sets of freeze frame data are 100 rpm or more	-	-	A

HINT:

- *1: If the Electrical Load Signal display changes from OFF to ON, or the "Electric Load Feedback Val" increases, it probably is a malfunction due to a change in electrical load. Check the generator and the continuity and connections between the generator and ECM.
- The normal value for the ISC learned value is engine displacement (liters) x 0.9.
- Even if the results are normal, the electrical load signal system and/or Automatic transmission system may have been malfunctioning. If there are no problems with other parts, inspect the electrical load system and/or Automatic transmission system.

B ► CHECK AUTOMATIC TRANSMISSION SYSTEM

C ► CHECK GENERATOR CIRCUIT

A



69.	CHECK FREEZE FRAME DATA
------------	--------------------------------

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored .

Result

FREEZE FRAME DATA ITEM		SUSPECTED AREA	PROCEED TO
SHIFT SW STATUS (P RANGE) SHIFT SW STATUS (N RANGE)	NEUTRAL POSITION SW SIGNAL		

P and N position are both OFF in at least one data set	In D or R, NSW is ON	Park/neutral position switch assembly	A
	In D or R, NSW is OFF	Automatic transmission system	B
All 5 sets of freeze frame data are ON	-	-	C

HINT:

Even if the results are normal, the park/neutral position switch assembly and/or Automatic transmission system may have been malfunctioning. If there are no problems with other parts, inspect the park/neutral position switch assembly and/or Automatic transmission system.

B ▶ CHECK AUTOMATIC TRANSMISSION SYSTEM

C ▶ CHECK FOR INTERMITTENT PROBLEMS

A ▶ INSPECT PARK/NEUTRAL POSITION SWITCH ASSEMBLY

70.	CHECK FREEZE FRAME DATA
------------	--------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored INFO.

Result

FREEZE FRAME DATA ITEM	RESULT	SUSPECTED AREA	PROCEED TO
Throttle Sensor Position, Calculate Load	Calculate Load decreases while Throttle Sensor Position increases	Mass air flow meter	A
	Calculate Load does not decrease while Throttle Sensor Position increases	-	B

B ▶ CHECK TERMINAL VOLTAGE (FUEL INJECTOR POWER SOURCE)

A
▼

71.	CHECK MASS AIR FLOW METER
------------	----------------------------------

(a) Remove the mass air flow meter.

(b) Check for foreign matter in the airflow passage of the mass air flow meter.

Result

RESULT	PROCEED TO
Visible foreign matter is not present	A
Visible foreign matter is present	B

B ▶ REPLACE MASS AIR FLOW METER

A



72.	CHECK HARNESS AND CONNECTOR (ECM - MASS AIR FLOW METER)
------------	--

(a) Disconnect the mass air flow meter connector.

(b) Disconnect the ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-22 (VG) - C16-5 (VG)	Always	Below 1 Ω
A33-29 (E2G) - C16-4 (E2G)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-22 (VG) or C16-5 (VG) - Body ground	Always	10 k Ω or higher
A33-29 (E2G) or C16-4 (E2G) - Body ground	Always	10 k Ω or higher

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK



73.	PERFORM DRIVE TEST
------------	---------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Start the engine and warm it up until the engine coolant temperature stabilizes.

HINT:

The A/C switch and all accessory switches should be off.

- (c) Idle the engine.
- (d) Using the Techstream, read the value of Calculate Load in the Data List.

Standard:

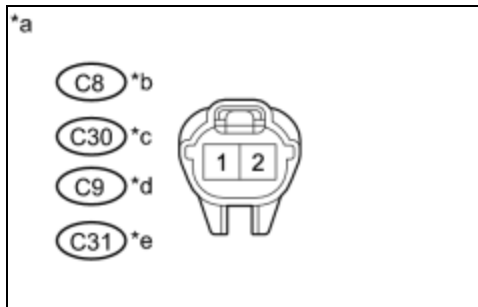
DATA LIST	SPECIFIED CONDITION
Calculate Load	90 to 110% of the current value of the vehicle

NG **REPLACE MASS AIR FLOW METER**

OK



74.	CHECK TERMINAL VOLTAGE (FUEL INJECTOR POWER SOURCE)
------------	--



(a) Disconnect the fuel injector assembly connectors.

- (b) Turn the ignition switch to ON.
- (c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

CYLINDER	TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
No. 1	C8-1 - Body ground	Ignition switch ON	11 to 14 V

No. 2	C30-1 - Body ground	Ignition switch ON	11 to 14 V
No. 3	C9-1 - Body ground	Ignition switch ON	11 to 14 V
No. 4	C31-1 - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Fuel Injector Assembly (for Port Injection))
*b	No. 1 cylinder
*c	No. 2 cylinder
*d	No. 3 cylinder
*e	No. 4 cylinder

HINT:


- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.
- A rapid decrease in engine speed may have been caused by a malfunction in all or multiple cylinders. (There may be an electrical malfunction in the wiring shared by all the cylinders.)

NG  **REPAIR FUEL INJECTOR POWER SOURCE CIRCUIT**

OK



75.	CHECK IGNITION SYSTEM
------------	------------------------------

(a) Perform ignition system On-vehicle Inspection  .

NG  **REPAIR OR REPLACE MALFUNCTIONING PARTS, COMPONENT AND AREA**

OK



76.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP DUTY)
------------	--

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine / Active Test / Control the Fuel Pump Duty.

(e) When performing the Active Test, check for an operating sound from the fuel pump.

Standard:

CONTROL THE FUEL PUMP DUTY	SPECIFIED CONDITION
25 or 80%	Operating sound heard
OFF	Operating sound not heard

Result

RESULT	PROCEED TO
Abnormal	A
Normal	B

HINT:


- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- While performing the Active Test, make sure that there is no fuel leakage from the pipes, no signs that fuel has leaked, and no fuel smell.
- If the fuel pump operating noise is abnormal, proceed to step 77.

B ► CHECK FUEL SYSTEM

A



77.	INSPECT FUEL PUMP ASSEMBLY
------------	-----------------------------------

(a) Inspect the fuel pump assembly .

NG ► REPLACE FUEL PUMP ASSEMBLY

OK ► CHECK FUEL PUMP CONTROL CIRCUIT (LOW PRESSURE SIDE)

78.	CHECK FUEL SYSTEM
------------	--------------------------

(a) Check the fuel system.

- Check the fuel pump operation.
- Check the fuel leaks.
- Check the fuel pressure.
- Check the fuel pressure (for high pressure).
- Perform the Active Test [D-4S (Fuel Cut)].

HINT:

For the fuel system On-vehicle Inspection, refer to the following procedures  .

Result

RESULT	PROCEED TO
Abnormal	A
Normal	B

B ▶ CHECK FOR INTERMITTENT PROBLEMS

A



79.	CHECK FUEL SYSTEM
------------	--------------------------

(a) Check for foreign matter such as iron particles around the fuel pump assembly (fuel pump, fuel pump filter and inside the fuel tank), and for signs that the fuel pump was stuck.

Result

RESULT	PROCEED TO
There is foreign matter or signs that fuel pump was stuck	A
There is no foreign matter and no signs that fuel pump was stuck	B

HINT:

If there is foreign matter such as iron particles on the fuel pump, fuel filter or fuel tank, remove the foreign matter.

B ▶ REPAIR OR REPLACE FUEL SYSTEM

A



80.	CHECK FUEL SYSTEM
------------	--------------------------

(a) Check the fuel system.

- Check the fuel pump operation.
- Check the fuel leaks.
- Check the fuel pressure.
- Check the fuel pressure (for high pressure).
- Perform the Active Test [D-4S (Fuel Cut)].

HINT:

For the fuel system On-vehicle Inspection, refer to the following procedures .

NG  **REPAIR OR REPLACE MALFUNCTIONING PARTS, COMPONENT AND AREA**


OK  **END**

81.	CLEAR DTC
------------	------------------

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Clear the DTCs .

NEXT  **END**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000021150D5X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P1604: Startability Malfunction (2013 FR-S)		

DTC	P1604	Startability Malfunction
-----	-------	--------------------------

DESCRIPTION

This DTC is stored when the engine does not start even though the starter signal is input or when the engine takes a long time to start, and when the engine speed is low or the engine stalls just after the engine starts.

Using the Techstream, the conditions present when the DTC was stored can be confirmed by referring to the freeze frame data. Freeze frame data records engine conditions when a malfunction occurs. This information can be useful when troubleshooting.

It is necessary to check if the vehicle ran out of fuel before performing troubleshooting, as this DTC is also stored when there is engine starting trouble due to running out of fuel.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P1604	<p>One of the following conditions is met (1 trip detection logic):</p> <ul style="list-style-type: none"> The engine speed is less than 500 rpm with the starter signal on for a certain amount of time (Depending on the engine coolant temperature and atmospheric pressure). After the engine starts (engine speed is 500 rpm or more), the engine speed drops to 300 rpm or less immediately. 	<ul style="list-style-type: none"> Engine immobiliser system Engine assembly (excess friction, compression loss) Starter assembly Crankshaft position sensor VVT sensor Engine coolant temperature sensor Fuel pump assembly Fuel pump control circuit (low pressure side) Fuel pipes Fuel injector assembly (for port injection) Throttle with motor body assembly Pressure regulator Battery Flywheel (for Manual Transmission) Drive plate (for Automatic

- Transmission)
- Spark plug
- Ignition coil circuit
- Intake system
- Camshaft timing oil control valve
- Mass air flow meter
- Air fuel ratio sensor
- Valve timing
- Fuel
- Purge valve
- Intake valve
- Exhaust valve
- ECM

INSPECTION PROCEDURE

HINT:

- In contrast to normal malfunction diagnosis for components, circuits and systems, DTC P1604 is used to determine the malfunctioning area from the problem symptoms and freeze frame data when the user mentions problems such as starting difficulty.

As these DTCs can be stored as a result of certain user actions, even if these DTCs are output, if the customer makes no mention of problems, clear these DTCs without performing any troubleshooting and return the vehicle to the customer.

- If any other DTCs are output, perform troubleshooting for those DTCs first.
- When the Data List item "Immobiliser Fuel Cut" is ON, the engine cannot be started.
- Read freeze frame data using the Techstream. Freeze frame data records engine conditions when a malfunction occurs. This information can be useful when troubleshooting.
- When confirming the freeze frame data, be sure to check all 5 sets of freeze frame data INFO.
- When confirming freeze frame data, if there are multiple items related to the cause of the malfunction, perform troubleshooting for all related items.
- Try to start the vehicle under the conditions recorded in the freeze frame data which were present when the malfunction occurred. Confirm the data at this time and compare it with the freeze frame data.
- If the malfunction does not reoccur, carefully check the vehicle conditions from when the malfunction occurred using freeze frame data.
- When performing inspections, jiggle the relevant wire harnesses and connectors in an attempt to reproduce malfunctions that do not always occur.
- If the same inspection or replacement procedure appears 2 times when performing an inspection procedure, it is not necessary to repeat the procedure the second time.

1. Malfunction Recurrence and Inspection Areas

(a) Freeze frame data exists, but the malfunction (starting difficulty) has not reoccurred and the malfunction conditions are unknown.

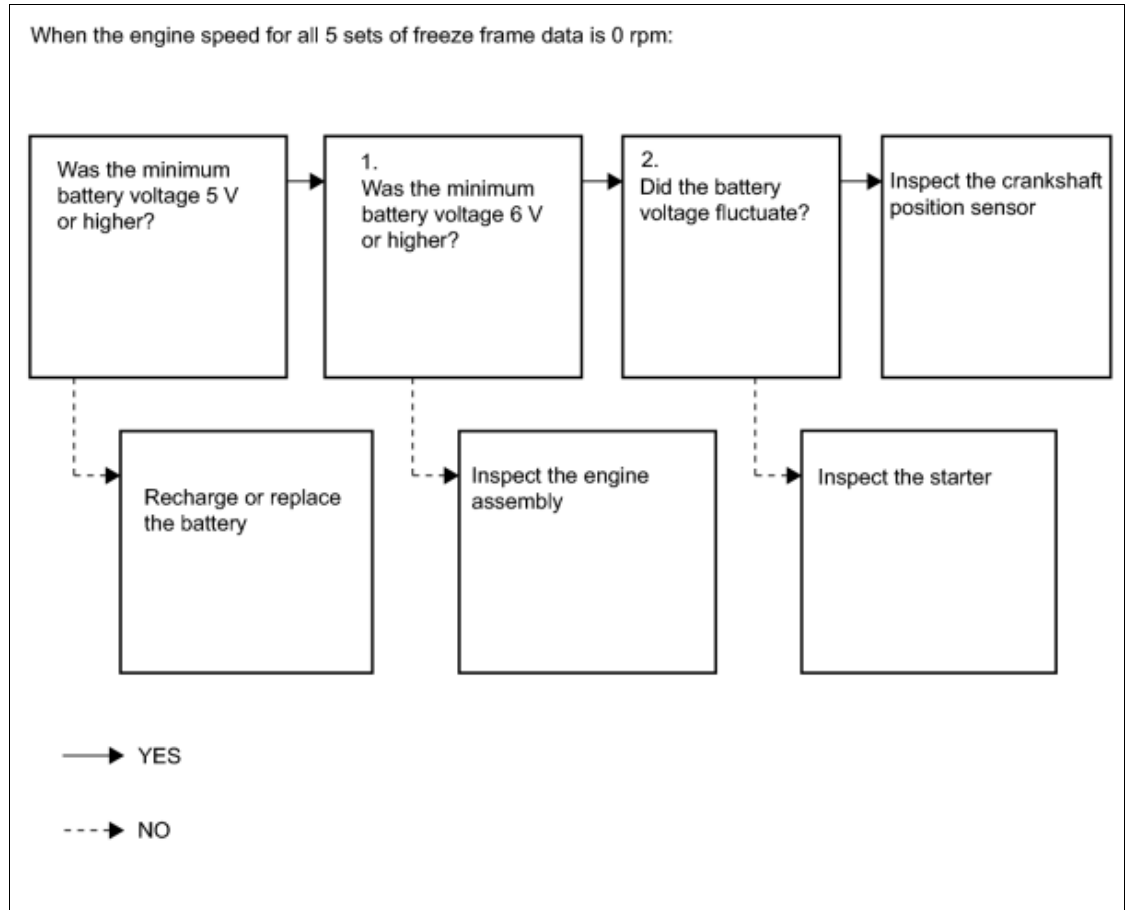
(1) The engine speed recorded in the freeze frame data is 0 rpm (the engine does not crank).

HINT:

One of the following problems may be present: battery depletion, excess engine friction, a starter malfunction or a crankshaft position sensor malfunction.

- If the battery voltage is less than 9 V during cranking, there is a high probability that engine friction is abnormal.
- If the battery voltage drops to 5 V or less when starting the engine, the battery may be malfunctioning.

- If the battery voltage fluctuates while cranking the engine, it can be concluded that cranking is being performed. When the engine speed is 0 rpm, the crankshaft position sensor and/or ECM may be malfunctioning.

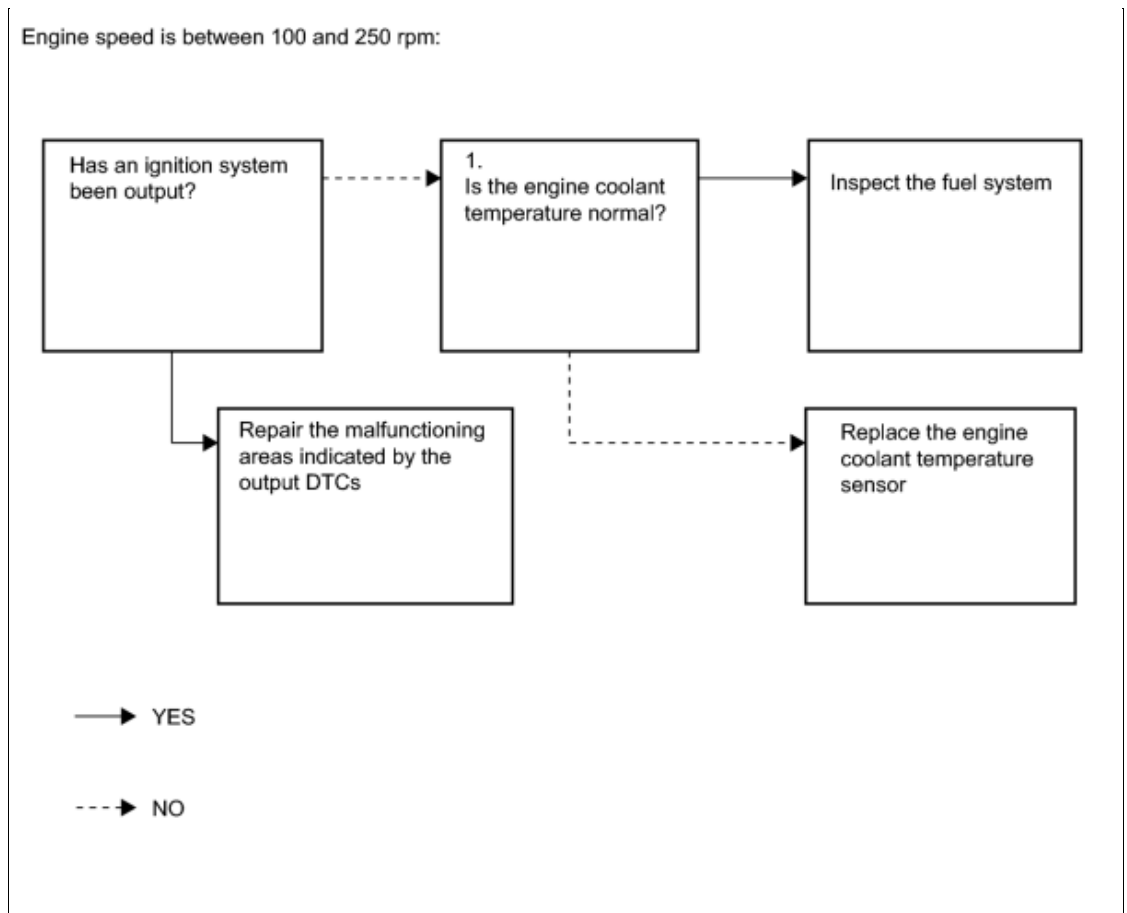


- (2) All engine speeds recorded in the freeze frame data are between 100 and 250 rpm (the engine cranks but there is no combustion).

HINT:

If the engine speed is between 100 and 250 rpm (no initial combustion), there may be a wiring problem or a complete failure of an ignition or fuel system part.

- Due to an engine coolant temperature sensor malfunction, the fuel injection volume is extremely high or low and the engine may not be able to be started.



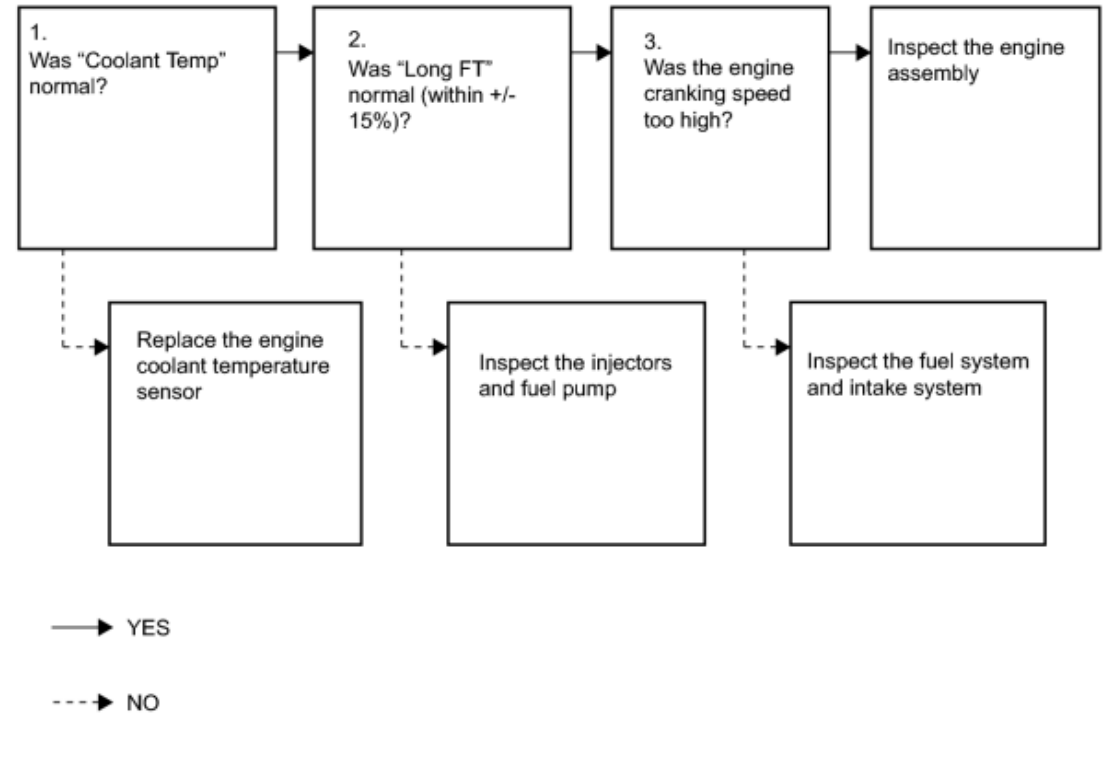
(3) The engine speed recorded in the freeze frame data is 250 rpm or higher (the initial combustion and starter turnoff timing is too late).

HINT:

If the engine speed is 250 rpm or higher (combustion occurs but the initial combustion and starter turnoff timing is too late), the fuel injection volume is often incorrect (too low or too high) and determining the cause of the malfunction is often difficult.

- Due to an engine coolant temperature sensor malfunction, the fuel injection volume is extremely high or low and engine starting trouble may occur.
- If Long FT is incorrect, there may be a fuel supply problem due to the injectors or fuel pump being clogged, etc.
- If the engine cranking speed is too high, compression loss may have occurred due to carbon interfering with the valve operation.

Engine speed is 250 rpm or higher:



(b) When the malfunction (starting difficulty) can be reproduced, or malfunction conditions are known, perform the following inspections ("Problem Symptoms" and "Systems to Inspect").

(1) Problem Symptoms

1. The engine does not crank.

HINT:

The starter is normal if a noise that indicates the starter pinion gear is extending is heard. The battery may be fully depleted or there may be excess engine friction.

2. The engine cranking speed is abnormal.

HINT:

If the engine cranking speed is too high (for example, 300 rpm or higher with no combustion), compression loss may have occurred because carbon interfered with valve operation, etc.

3. There is no initial combustion.

HINT:

If there is no initial combustion, there is probably a wiring problem or an ignition or fuel system part malfunction.

4. The engine stalls after starter turnoff.

HINT:

If the engine stalls after starter turnoff, the air-fuel ratio may be incorrect or the VVT may have a problem returning.

5. The initial combustion and starter turnoff occur late.

HINT:

If the initial combustion and starter turnoff occur late, the fuel injection volume is probably incorrect (too low or too high).

HINT:

Causes of fuel system malfunctions according to conditions present at the time of the malfunction.

- When 2 to 3 minutes have elapsed after stopping the engine: Fuel pressure loss due to the pressure regulator failing to maintain the fuel pressure.
- When 15 to 120 minutes have elapsed after stopping the engine: Problem with injector fuel seal.
- When a long time has elapsed after stopping the engine: Pressure regulator is stuck open.

(2) Systems to Inspect

1. Intake system
2. Ignition system
3. Fuel system

2. INSPECTION FLOW

(a) Freeze frame data exists, but the malfunction (starting difficulty) has not reoccurred and the malfunction conditions are unknown.

FREEZE FRAME DATA ITEM	RESULT	SUSPECTED AREA	PROCEDURE
Engine Speed	0 rpm (no engine cranking at all)	<ul style="list-style-type: none">• Battery fully depleted• Engine assembly (excess friction)• Starter assembly• Engine immobiliser system• Crankshaft position sensor• ECM	4 to 9
	100 to 250 rpm (engine cranks but no initial combustion*1)	<ul style="list-style-type: none">• Fuel pump control circuit (Low pressure side)• Ignition system• Engine coolant temperature sensor• Fuel injection system	10 to 14
	250 rpm or higher (combustion occurs but initial combustion and starter turnoff*2 occur late)	<ul style="list-style-type: none">• Engine assembly (compression loss)• Fuel injection system• Fuel pump control circuit (low pressure side)	15 to 23

HINT:

- *1: First combustion after cranking begins.
- *2: Condition when engine speed increases and starter can be turned off.

(b) When the malfunction (starting difficulty) can be reproduced, or when malfunction conditions are known.

(1) Problem Symptoms

PROBLEM SYMPTOM	SUSPECTED AREA	SUSPECTED COMPONENT	PROCEDURE
The engine does not crank	Battery malfunction	<ul style="list-style-type: none"> Battery fully depleted 	26 to 31
	Starting system	<ul style="list-style-type: none"> Starter assembly (includes pinion gear wear or tooth damage) Starting system 	
	Engine immobiliser system	<ul style="list-style-type: none"> Engine immobiliser system 	
	Engine assembly	<ul style="list-style-type: none"> Engine assembly (excess friction) Drive plate wear or tooth damage 	
Cranking speed too low	Battery malfunction	<ul style="list-style-type: none"> Battery fully depleted 	32 to 34
	Starting system	<ul style="list-style-type: none"> Starter assembly 	
	Engine assembly	<ul style="list-style-type: none"> Engine assembly (excess friction) 	
Cranking speed too high	Engine assembly	<ul style="list-style-type: none"> Engine assembly (compression loss) 	
There is no initial combustion	Fuel supply problem	<ul style="list-style-type: none"> Cannot maintain pressure due to pressure regulator malfunction Fuel injector leak Fuel leak from fuel line Fuel pump control circuit (Low pressure side) Fuel pump assembly 	35 to 49
	Ignition system malfunction	<ul style="list-style-type: none"> Spark plug Crankshaft position sensor Ignition coil assembly 	
Engine stalls after starter turnoff	Air suction	<ul style="list-style-type: none"> Intake system connections 	50 to 56
	Deposits in throttle body	<ul style="list-style-type: none"> Throttle with motor body assembly 	
	VVT valve does not return properly	<ul style="list-style-type: none"> Camshaft timing oil control valve 	
	Mass air flow meter malfunction	<ul style="list-style-type: none"> Mass air flow meter 	
	Engine coolant temperature sensor malfunction	<ul style="list-style-type: none"> Engine coolant temperature sensor 	
	Mass air flow meter malfunction	<ul style="list-style-type: none"> Mass air flow meter 	
	Abnormal A/F learned value	<ul style="list-style-type: none"> Air fuel ratio sensor 	

The initial combustion and starter turnoff occur late	Deviation from fuel injection characteristics	<ul style="list-style-type: none"> Fuel injector assembly (for port injection) 	57 to 71
	Wet-fouled or dry-fouled spark plug	<ul style="list-style-type: none"> Spark plug 	
	Lack of fuel pressure	<ul style="list-style-type: none"> Pressure regulator Fuel pump assembly Fuel pump control circuit (low pressure side) 	

(2) Systems to Inspect

TROUBLESHOOTING BY SYSTEM	SUSPECTED AREA	SUSPECTED COMPONENT	PROCEDURE
Fuel system troubleshooting A	Abnormal A/F learned value	<ul style="list-style-type: none"> Fuel injector assembly (for port injection) 	87 to 94 95 to 102
	Rough idling	<ul style="list-style-type: none"> Crankshaft position sensor 	
	Abnormal fuel pressure	<ul style="list-style-type: none"> Fuel Fuel leak from fuel line Fuel pump assembly Pressure regulator 	
Fuel system troubleshooting B	Abnormal concentration of HC in surge tank	<ul style="list-style-type: none"> Purge valve system Fuel injector assembly (for port injection) Intake valve 	103 to 105
Fuel system troubleshooting C	Injection signal system malfunction	<ul style="list-style-type: none"> Fuel injector assembly (for port injection) Crankshaft position sensor VVT sensor ECM 	73 to 76
Intake system troubleshooting	Difference between ISC target value and opening angle when idling	<ul style="list-style-type: none"> Engine assembly (compression loss) Valve timing Engine coolant temperature sensor ECM 	84 to 86 106 to 108
Ignition system troubleshooting	Camshaft and/or crankshaft position sensor signal malfunction	<ul style="list-style-type: none"> Crankshaft position sensor system (including sensor installation) VVT sensor system (including sensor installation) ECM 	77 to 83 109 to 115

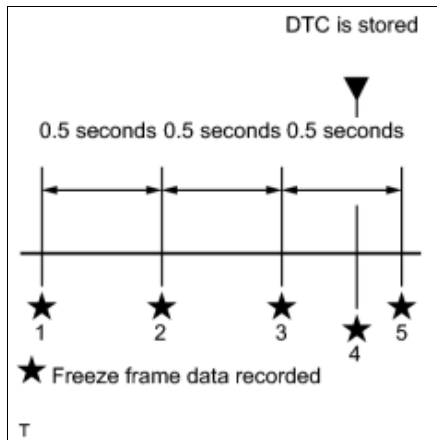
PROCEDURE

--

1. CHECK FOR ANY OTHER DTCS OUTPUT AND RECORD FREEZE FRAME DATA

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Enter the following menus: Powertrain / Engine / Trouble Codes.

(d) Read the DTCs and record the freeze frame data.



HINT:

- This freeze frame data shows the actual engine conditions when engine starting trouble occurred.
- When confirming the freeze frame data, be sure to check all 5 data sets of freeze frame data.
- The fourth set of freeze frame data is the data recorded when the DTC is stored.

Result

RESULT	PROCEED TO
Only DTC P1604 is output	A
DTCs other than P1604 are output	B

B ► GO TO DTC CHART

A
▼

2. CHECK ENGINE IMMOBILISER SYSTEM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Data List / Immobiliser Fuel Cut.
- Read the value displayed on the Techstream.

OK:

Immobiliser Fuel Cut is OFF.

HINT:

After reconnecting the battery cable, if the engine is started immediately (without waiting 1.8 seconds after turning the ignition switch to ON), the engine will stop (due to the key verification process). The engine can be started after that.

NG ► REPAIR ENGINE IMMOBILISER SYSTEM

OK



3.	CHECK MALFUNCTION CONDITION
-----------	------------------------------------

(a) Confirm the problem symptoms.

Result

RESULT	PROCEED TO
Freeze frame data exists, but the starting difficulty cannot be reproduced and it is unknown what kind of starting difficulty occurred	A
The problem symptoms can be reproduced, or the malfunction conditions are known	B

B **CONFIRM PROBLEM SYMPTOM**

A



4.	CHECK FREEZE FRAME DATA
-----------	--------------------------------

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored .

Result

FREEZE FRAME DATA ITEM		SUSPECTED AREA	PROCEED TO
ENGINE SPEED	BATTERY VOLTAGE		
	Minimum voltage is below 5 V	Battery fully depleted	A
	Minimum voltage is 5 V or higher	<ul style="list-style-type: none"> • Starter malfunction • Crankshaft position sensor system • Excess engine friction • Engine immobiliser system • ECM 	B
60 to 250 rpm (engine cranks but no initial combustion)	-	<ul style="list-style-type: none"> • Fuel pump control circuit (low pressure side) • Ignition system • Engine coolant 	C

		<ul style="list-style-type: none"> temperature sensor Engine immobiliser system Fuel injection system 	
250 rpm or higher (combustion occurs but initial combustion and starter turnoff occur late)	-	<ul style="list-style-type: none"> Engine assembly Fuel injection system Fuel pump control circuit (low pressure side) 	D

HINT:

When DTC P1604 is stored, either "Engine Start Hesitation"*1 or "Low Rev for Eng Start"*2 in the freeze frame data will be ON. If "Low Rev for Eng Start" is ON, proceed to E.

*1: This value turns ON when the engine speed does not reach a certain value for a certain period of time when starting the engine.

*2: This value turns ON when the engine stalls immediately after starting the engine. If "Low Rev for Eng Start" is ON, as there is a possibility that the low engine speed or engine stall was caused by the user, confirm the following freeze frame data items.

- Immobiliser Fuel Cut
- Engine Speed (Starter Off)
- Shift SW Status (R, D Range)

B ► CHECK FREEZE FRAME DATA

C ► CHECK FREEZE FRAME DATA

D ► CHECK FREEZE FRAME DATA

A ► CHARGE OR REPLACE BATTERY

5.	CHECK FREEZE FRAME DATA
-----------	--------------------------------

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored INFO.

Result

FREEZE FRAME DATA ITEM	RESULT	SUSPECTED AREA	PROCEED TO
Battery Voltage	Minimum voltage is 9 V or higher and voltage fluctuates*2, *3	<ul style="list-style-type: none"> Crankshaft position sensor system ECM 	A
	Minimum voltage is 9 V or higher and voltage does not fluctuate*1	Starter system	B

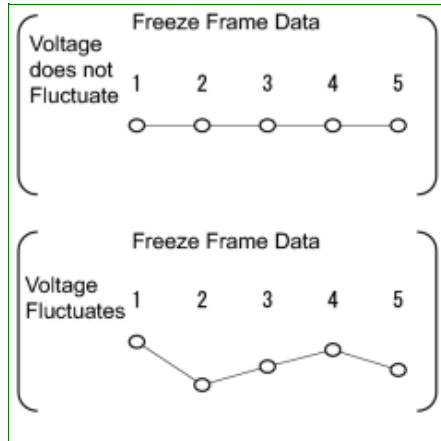
Minimum voltage is 5 to 9 V*4

- Excess engine friction
- Battery fully depleted

C

HINT:

- *1: The 5 sets of freeze frame data show approximately the same battery voltage.



- *2: The 5 sets of freeze frame data show different battery voltages.
- *3: If the voltage fluctuates, it can be determined that cranking is being performed. When the engine speed is 0 rpm, the crankshaft position sensor system and/or the ECM may be malfunctioning.
- *4: There may be excess engine friction. Make sure that the crankshaft rotates smoothly when turning it by hand. Excess engine friction may have occurred temporarily. Remove the cylinder head cover and oil pan, and check for foreign matter such as iron fragments. If there is a malfunction or signs of a malfunction present, perform a detailed inspection by disassembling all the parts.

B ► CHECK STARTER SIGNAL CIRCUIT

C ► CHECK AND REPAIR ENGINE OR BATTERY

A
▼

6. CHECK CRANKSHAFT POSITION SENSOR (SENSOR INSTALLATION)

- (a) Check the tightening and installation condition of the crankshaft position sensor bolt.
- (b) Check the connection of the crankshaft position sensor connector.

Result

RESULT	PROCEED TO
Normal	A
Abnormal	B

B ► SECURELY REINSTALL SENSOR

A



7.	CHECK CRANKSHAFT POSITION SENSOR
-----------	---

(a) Disconnect the crankshaft position sensor connector.

(b) Check for oil on the connector terminals.

OK:

No oil on the terminals.

NG **REPLACE CRANKSHAFT POSITION SENSOR**

OK



8.	CHECK HARNESS AND CONNECTOR (CRANKSHAFT POSITION SENSOR - ECM)
-----------	---

(a) Disconnect the crankshaft position sensor connector.

(b) Disconnect the ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-16 (NE+) - C33-1 (NE+)	Always	Below 1 Ω
A34-27 (NE-) - C33-2 (NE-)	Always	Below 1 Ω

Standard Resistance (Check for short):

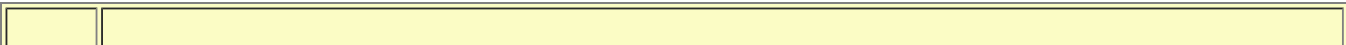
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-16 (NE+) or C33-1 (NE+) - Body ground	Always	10 k Ω or higher
A34-27 (NE-) or C33-2 (NE-) - Body ground	Always	10 k Ω or higher

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



9. CHECK CRANKSHAFT POSITION SENSOR

- (a) Replace the crankshaft position sensor **INFO** .
- (b) Check the engine start operation.

OK:

Malfunction has been repaired successfully.

NG ▶ REPLACE ECM

OK ▶ END (CRANKSHAFT POSITION SENSOR IS DEFECTIVE)

10. CHECK FREEZE FRAME DATA

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored **INFO** .

Result

FREEZE FRAME DATA ITEM			SUSPECTED AREA	PROCEED TO
COOLANT TEMP, AMBIENT TEMP FOR A/C, INTAKE AIR	COOLANT TEMP, AMBIENT TEMP FOR A/C	FUEL PUMP DUTY		
Difference between Coolant Temp, Ambient Temp for A/C and Intake Air is 10°C or more*1	Coolant Temp is 125°C or higher, or below Ambient Temp for A/C by 15°C or more	-	Engine coolant temperature sensor	A
	Other than above	No sets of freeze frame data are 0%	-	B
		At least 1 of the 5 sets of freeze frame data is 0%	Fuel pump control circuit (low pressure side)	C
Difference between Coolant Temp, Ambient Temp for A/C and Intake Air is less than 10°C*2	-	At least 1 of the 5 sets of freeze frame data is 0%	Fuel pump control circuit (low pressure side)	C
		No sets of freeze frame data are 0%	-	B

HINT:

- *1: A long time had not elapsed after stopping the engine.
- *2: A long time had elapsed after stopping the engine.

B ▶ PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)

C ▶ CHECK FUEL PUMP CONTROL CIRCUIT (LOW PRESSURE SIDE)

A ▶ REPLACE ENGINE COOLANT TEMPERATURE SENSOR

11. PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Enter the following menus: Powertrain / Engine / Active Test / Control the Fuel Pump / Speed.
- (d) When performing the Active Test, check for an operating sound from the fuel pump.

OK:

CONTROL THE FUEL PUMP / SPEED	SPECIFIED CONDITION
ON	Operating sound heard
OFF	Operating sound not heard

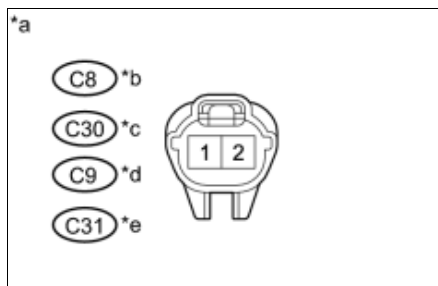
HINT:

Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.

NG ▶ REPAIR FUEL PUMP CONTROL CIRCUIT (LOW PRESSURE SIDE)

OK

12. CHECK TERMINAL VOLTAGE (FUEL INJECTOR POWER SOURCE)



(a) Disconnect the fuel injector assembly connectors.

- (b) Turn the ignition switch to ON.
- (c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

CYLINDER	TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
No. 1	C8-1 - Body ground	Ignition switch ON	11 to 14 V
No. 2	C30-1 - Body ground	Ignition switch ON	11 to 14 V

No. 3	C9-1 - Body ground	Ignition switch ON	11 to 14 V
No. 4	C31-1 - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Fuel Injector Assembly)
*b	No. 1 cylinder
*c	No. 2 cylinder
*d	No. 3 cylinder
*e	No. 4 cylinder

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG  **REPAIR FUEL INJECTOR POWER SOURCE CIRCUIT**

OK



13.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)
------------	---

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Enter the following menus: Powertrain / Engine / Active Test / Control the Fuel Pump / Speed.
- When performing the Active Test, check for fuel leakage from the fuel pipes.

Result

RESULT	PROCEED TO
Fuel leakage or signs of fuel leakage are present	A
No fuel leakage or signs of fuel leakage	B

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- When performing the Active Test, if there is no operating noise from the fuel pump, the fuel pump system may be malfunctioning.
- Check if the vehicle ran out of fuel, as engine starting trouble due to running out of fuel is also detected.

B  **CHECK FUEL SYSTEM**

A  **REPAIR OR REPLACE FUEL LINE**

14.	CHECK FUEL SYSTEM
------------	--------------------------

(a) Check for foreign matter such as iron particles around the fuel pump assembly (fuel pump, fuel pump filter, and inside the fuel tank), and for signs that the fuel pump was stuck.

Result

RESULT	PROCEED TO
There is foreign matter or signs that fuel pump was stuck	A
There is no foreign matter and no signs that fuel pump was stuck	B

B ► **PERFORM SIMULATION TEST**

A ► **REPAIR OR REPLACE FUEL SYSTEM**

15.	CHECK FREEZE FRAME DATA
------------	--------------------------------

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored INFO.

Result

FREEZE FRAME DATA ITEM				SUSPECTED AREA	PROCEED TO
COOLANT TEMP, AMBIENT TEMP FOR A/C, INTAKE AIR	COOLANT TEMP, AMBIENT TEMP FOR A/C	LONG FT	ENGINE SPEED		
Difference between Coolant Temp, Ambient Temp for A/C and Intake Air is 10°C or more	Coolant Temp is 125°C or higher, or below Ambient Temp for A/C by 15°C or more	-	-	Engine coolant temperature sensor	A
	Other than above	-15% or less, or +15% or more	-	<ul style="list-style-type: none"> Fuel pump control circuit (low pressure side) Fuel injector assembly (for port injection) 	B
		Minimum speed is 300 rpm or			Engine assembly

		-15 to +15%	more*1		
			Minimum speed is less than 300 rpm	<ul style="list-style-type: none"> Fuel system Intake air system 	D
Difference between Coolant Temp, Ambient Temp for A/C and Intake Air is less than 10°C	-	-15% or less, or +15% or more	-	<ul style="list-style-type: none"> Fuel pump control circuit (low pressure side) Fuel injector assembly (for port injection) 	B
			Minimum speed is 300 rpm or more*1	Engine assembly	C
		-15 to +15%	Minimum speed is less than 300 rpm	<ul style="list-style-type: none"> Fuel system Intake air system 	D

HINT:

*1: Compression loss may have occurred in the engine assembly.

B ▶ INSPECT FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)

C ▶ CHECK AND REPAIR ENGINE

D ▶ CHECK FREEZE FRAME DATA

A ▶ REPLACE ENGINE COOLANT TEMPERATURE SENSOR

16.	INSPECT FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)
------------	--

(a) Check that no carbon is stuck to the fuel injector assembly (for port injection).

OK:

No carbon present.

NG ▶ REPLACE FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)

OK



17.	CHECK FUEL SYSTEM
------------	--------------------------

(a) Check for foreign matter such as iron particles around the fuel pump assembly (fuel pump, fuel pump filter, and inside the fuel tank), and for signs that the fuel pump was stuck.

Result

RESULT	PROCEED TO
There is foreign matter or signs that fuel pump was stuck	A
There is no foreign matter and no signs that fuel pump was stuck	B

B ► **PERFORM SIMULATION TEST**

A ► **REPAIR OR REPLACE FUEL SYSTEM**

18.	CHECK FREEZE FRAME DATA
------------	--------------------------------

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Using the Techstream, confirm the vehicle conditions recorded in the freeze frame data which were present when the DTC was stored INFO.

Result

FREEZE FRAME DATA ITEM	RESULT	SUSPECTED AREA	PROCEED TO
Coolant Temp	Engine coolant temperature is 40°C or less*1	Pressure regulator	A
	Engine coolant temperature is 40 to 90°C*2	Fuel injector	B
	Engine coolant temperature is 90°C or higher*3	Pressure regulator	A

HINT:

*1: If the engine coolant temperature is 40°C or less (after stopping the engine and the vehicle has not been driven for a long period of time), the pressure regulator may be stuck open. Attach a fuel pressure gauge and check the ability of the system to maintain fuel pressure after stopping the engine.

*2: If the engine coolant temperature is 40 to 90°C (15 to 120 minutes have passed after stopping the engine), there may be fuel leaking from a fuel injector.

*3: If the engine coolant temperature is 90°C or more (2 to 5 minutes have passed after stopping the engine), there may be a problem with the pressure regulator failing to maintain the fuel pressure. Attach a fuel pressure gauge and check the ability of the pressure regulator to maintain fuel pressure after stopping the engine.

B ► **CHECK FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)**

A



19.	CHECK FUEL PRESSURE (LOW PRESSURE SIDE)
------------	--

HINT:

For the fuel pressure inspection, refer to the following procedures INFO.

(a) Attach a fuel pressure gauge and check the fuel pressure after stopping the engine.

Standard:

147 kPa (1.5 kgf/cm²) or higher (5 minutes after stopping the engine)

HINT:

If the engine cannot be started, read the values after cranking the engine.

Result

RESULT	PROCEED TO
Abnormal	A
Normal	B

B ► **PERFORM SIMULATION TEST**

A ► **REPLACE FUEL PRESSURE REGULATOR ASSEMBLY**

20.	CHECK FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)
------------	--

(a) Clean the inside of the surge tank with compressed air.

(b) After stopping the engine, measure the HC concentration inside the surge tank for 15 minutes.

Result

RESULT	PROCEED TO
4000 ppm or more	A
Less than 4000 ppm	B

HINT:


If the concentration is 4000 ppm or more, a fuel injector assembly may have a sealing problem.

B ► **CHECK THROTTLE WITH MOTOR BODY ASSEMBLY**

A



21. CHECK FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)

(a) Inspect the fuel injector assemblies (for port injection)  .

Result

RESULT	PROCEED TO
Abnormal	A
Normal	B

B  **CHECK THROTTLE WITH MOTOR BODY ASSEMBLY**

A  **REPLACE FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)**

22. CHECK THROTTLE WITH MOTOR BODY ASSEMBLY

(a) Check if carbon is in the airflow passage.

Result

RESULT	PROCEED TO
Carbon in passage	A
No carbon present	B

B  **CHECK INTAKE SYSTEM**

A  **REPLACE THROTTLE WITH MOTOR BODY ASSEMBLY**

23. CHECK INTAKE SYSTEM

(a) Check the intake system for vacuum leaks  .

OK:

No leaks in intake system.

NG  **REPAIR OR REPLACE INTAKE SYSTEM**

OK

**24. PERFORM SIMULATION TEST**

(a) Check if the engine can be started.

Result

RESULT	PROCEED TO
Engine can be started	A
Engine cannot be started	B

B ► CONFIRM PROBLEM SYMPTOM

A ► END

25.	CONFIRM PROBLEM SYMPTOM
------------	--------------------------------

(a) Confirm the problem symptoms.

HINT:

The problem symptoms below can be determined by reading the freeze frame data.

Result

PROBLEM SYMPTOM	SUSPECTED AREA	PROCEED TO
The engine does not crank	<ul style="list-style-type: none"> • Battery fully depleted • Starter assembly (includes pinion gear wear or tooth damage) • Starter system • Engine assembly (excess friction) • Flywheel wear or tooth damage (for Manual Transmission) • Drive plate wear or tooth damage (for Automatic Transmission) 	A
Abnormal cranking speed	<ul style="list-style-type: none"> • Battery fully depleted • Starter assembly • Engine assembly (excess friction, compression loss) 	B
There is no initial combustion (combustion does not occur even once)*1	<ul style="list-style-type: none"> • Pressure regulator fuel pressure maintenance • Fuel injector leak • Fuel leak from fuel line • Fuel pump control circuit (low pressure side) • Fuel pump assembly • Spark plug • Crankshaft position sensor system • Ignition coil system 	C
	<ul style="list-style-type: none"> • Intake system connections 	

The engine stalls after starter turnoff (engine stalls immediately after the first time the engine speed increases)*2	<ul style="list-style-type: none"> • Throttle with motor body assembly • Camshaft timing oil control valve • Mass air flow meter system 	D
The initial combustion and starter turnoff occur late*3	<ul style="list-style-type: none"> • Engine coolant temperature sensor • Mass air flow meter • Air fuel ratio sensor • Heated oxygen sensor • Fuel injector assembly (for port injection) • Spark plug • Pressure regulator • Fuel pump assembly • Fuel pump control circuit (low pressure side) 	E

HINT:

- If there is hesitation (cranking speed is slow and combustion occurs before passing TDC) during the initial cranking period, the battery charge may be insufficient or the starter may be malfunctioning.
- *1: If there is no initial combustion, a wire harness may be malfunctioning, or the ignition or fuel system may be malfunctioning.
- *2: If the engine stalls after starter turnoff, the air-fuel ratio may be incorrect or the camshaft timing oil control valve may have a problem returning.
- *3: If the initial combustion and starter turnoff occur late, the fuel injection volume may be incorrect (too low or too high).

B ► **PERFORM SIMULATION TEST**

C ► **CHECK FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)**

D ► **INSPECT MASS AIR FLOW METER**

E ► **INSPECT ENGINE COOLANT TEMPERATURE SENSOR**

A
▼

26.	PERFORM SIMULATION TEST
-----	--------------------------------

(a) When cranking the engine, check for a noise indicating that the starter pinion gear is extending, and check that the starter pinion gear is not spinning freely.

Result

PROBLEM SYMPTOM	SUSPECTED AREA	PROCEED TO
A noise indicating that the starter pinion gear is extending is heard and	<ul style="list-style-type: none"> • Battery • Excess engine friction 	A

the starter pinion gear is not spinning freely*1	<ul style="list-style-type: none"> • Starter assembly 	
A noise indicating that the starter pinion gear is extending is heard but the starter pinion gear is spinning freely	<ul style="list-style-type: none"> • Fly wheel (for Manual Transmission) • Drive plate (for Automatic Transmission) • Starter assembly 	B
A noise indicating that the starter pinion gear is extending is not heard	<ul style="list-style-type: none"> • Battery • Starter assembly • Starter system 	C

HINT:

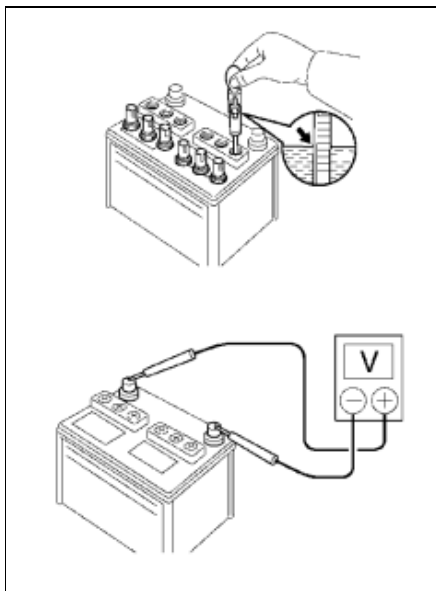
*1: The battery may be fully depleted or there may be excess engine friction.

B ► CHECK STARTER ASSEMBLY

C ► INSPECT BATTERY

A
▼

27. INSPECT BATTERY



(a) Check the electrolyte quantity.

OK:

Electrolyte quantity is within the specified range.

(b) Inspect the specific gravity.

(1) Inspect the specific gravity of each cell.

Standard specific gravity:

1.25 to 1.29 (electrolyte is at 20°C (68°F))

HINT:

- If the result is not as specified, recharge or replace the battery.
- It is not necessary to inspect a maintenance-free battery.

(c) Inspect the battery voltage.

(1) Turn the ignition switch off and turn on the headlights for 20 to 30 seconds. This will remove the surface charge from the battery.

(2) Measure the battery voltage.

Standard voltage:

12.5 to 12.9 V (electrolyte is at 20°C (68°F))

HINT:

If the result is not as specified, recharge or replace the battery.

(3) Measure the battery voltage when cranking the engine.

Standard:

Approximately 6 V or higher (0°C (32°F) or higher)

HINT:

When the battery is depleted, the horn becomes quieter.

NG ► CHARGE OR REPLACE BATTERY

OK



28.	CHECK ENGINE ASSEMBLY
------------	------------------------------

(a) Check that the crankshaft rotates smoothly when rotating it by hand.

OK:

Crankshaft rotates smoothly.

HINT:

Excess engine friction may have occurred temporarily. Remove the cylinder head cover and oil pan, and check for foreign matter such as iron fragments. If there is a malfunction or signs of a malfunction present, perform a detailed inspection by disassembling all the parts.

NG ► REPAIR OR REPLACE ENGINE ASSEMBLY

OK ► INSPECT STARTER ASSEMBLY

29.	CHECK STARTER ASSEMBLY
------------	-------------------------------

(a) Remove the starter assembly  .

(b) Check for starter pinion gear wear and damage.

OK:

There is no wear or damage.

Result

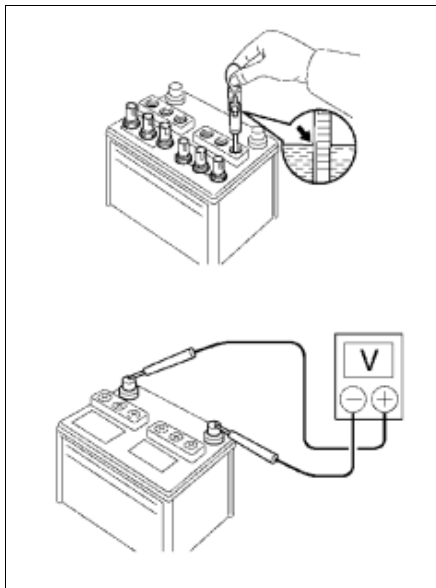
RESULT	PROCEED TO
Abnormal	A
Normal (for Manual Transmission)	B
Normal (for Automatic Transmission)	C

B ▶ REPLACE FLYWHEEL SUB-ASSEMBLY

C ▶ REPLACE DRIVE PLATE AND RING GEAR SUB-ASSEMBLY

A ▶ REPLACE STARTER ASSEMBLY

30. INSPECT BATTERY



(a) Check the electrolyte quantity.

OK:

Electrolyte quantity is within the specified range.

(b) Inspect the specific gravity.

(1) Inspect the specific gravity of each cell.

Standard specific gravity:

1.25 to 1.29 (electrolyte is at 20°C (68°F))

HINT:

- If the result is not as specified, recharge or replace the battery.
- It is not necessary to inspect a maintenance-free battery.

(c) Inspect the battery voltage.

(1) Turn the ignition switch off and turn on the headlights for 20 to 30 seconds. This will remove the surface charge from the battery.

(2) Measure the battery voltage.

Standard voltage:

12.5 to 12.9 V (electrolyte is at 20°C (68°F))

HINT:

If the result is not as specified, recharge or replace the battery.

(3) Measure the battery voltage when cranking the engine.

Standard:

Approximately 6 V or higher (0°C (32°F) or higher)

HINT:

When the battery is depleted, the horn becomes quieter.

NG ► CHARGE OR REPLACE BATTERY

OK



31.	INSPECT STARTER ASSEMBLY
------------	---------------------------------

(a) Inspect the starter assembly  .

NG ► REPLACE STARTER ASSEMBLY

OK ► CHECK STARTER SIGNAL CIRCUIT

32.	PERFORM SIMULATION TEST
------------	--------------------------------

(a) Check the cranking speed.

Result

PROBLEM SYMPTOM	SUSPECTED AREA	PROCEED TO
Cranking speed is slow (100 rpm or less)	<ul style="list-style-type: none">• Battery• Starter assembly• Excess engine friction	A
Cranking speed is fast (300 rpm or more)*1	Engine compression loss	B

HINT:

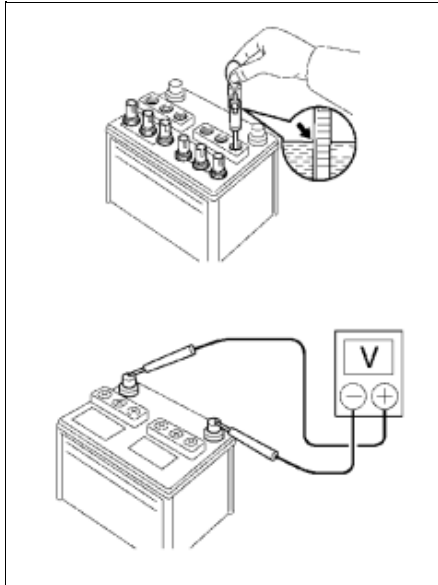
*1: If the cranking speed is fast, there may be compression loss.

B ► CHECK AND REPAIR ENGINE ASSEMBLY

A



33. INSPECT BATTERY



(a) Check the electrolyte quantity.

OK:

Electrolyte quantity is within the specified range.

(b) Inspect the specific gravity.

(1) Inspect the specific gravity of each cell.

Standard specific gravity:

1.25 to 1.29 (electrolyte is at 20°C (68°F))

HINT:

- If the result is not as specified, recharge or replace the battery.
- It is not necessary to inspect a maintenance-free battery.

(c) Inspect the battery voltage.

(1) Turn the ignition switch off and turn on the headlights for 20 to 30 seconds. This will remove the surface charge from the battery.

(2) Measure the battery voltage.

Standard voltage:

12.5 to 12.9 V (electrolyte is at 20°C (68°F))

HINT:

If the result is not as specified, recharge or replace the battery.

(3) Measure the battery voltage when cranking the engine.

Standard:

Approximately 6 V or higher (0°C (32°F) or higher)

HINT:

When the battery is depleted, the horn becomes quieter.

NG ► CHARGE OR REPLACE BATTERY

OK
▼

34.	CHECK ENGINE ASSEMBLY
-----	-----------------------

(a) Check that the crankshaft rotates smoothly when rotating it by hand.

OK:

Crankshaft rotates smoothly.

HINT:

Excess engine friction may have occurred temporarily. Remove the cylinder head cover and oil pan, and check for foreign matter such as iron fragments. If there is a malfunction or signs of a malfunction present, perform a detailed inspection by disassembling all the parts.

NG ► REPAIR OR REPLACE ENGINE ASSEMBLY

OK ► INSPECT STARTER ASSEMBLY

35.	CHECK FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)
-----	---

(a) Using a sound scope or screwdriver, check for fuel injector operating noise while cranking the engine.

OK:

Fuel injector operating noise is heard.

NG ► READ VALUE USING TECHSTREAM (ENGINE SPEED)

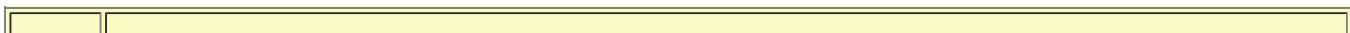
OK
▼

36.	CHECK FUEL PRESSURE (LOW PRESSURE SIDE)
-----	---


(a) Inspect the fuel pressure INFO.

NG ► PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)

OK
▼



37. CHECK SPARK PLUG AND SPARK

(a) Check for sparks  .

NG  **CHECK SPARK PLUG**

OK

**38. CONFIRM VEHICLE CONDITION**

(a) Confirm the conditions present when the malfunction occurred based on the customer problem analysis.

Result

PROBLEM SYMPTOM	SUSPECTED AREA	PROCEED TO
When the engine is stopped and a long time has passed, engine starting trouble occurs*1	Pressure regulator is stuck open	A
When the engine is stopped and approximately 15 to 120 minutes have passed, engine starting trouble occurs*2	Fuel injector leak	B
When the engine is stopped and approximately 2 to 3 minutes have passed, engine starting trouble occurs*3	Failure to maintain fuel pressure by pressure regulator	A
Condition other than above, or there is an inconsistency in the conditions present when engine starting trouble occurs	-	C*4

HINT:

*1: The pressure regulator may be stuck open. Attach a fuel pressure gauge and check the ability of the system to maintain fuel pressure after stopping the engine.

*2: Fuel may be leaking from a fuel injector assembly.

*3: The pressure regulator may not be able to maintain the fuel pressure. Attach a fuel pressure gauge and check the ability of the pressure regulator to maintain fuel pressure after stopping the engine.

*4: From step 72, perform fuel system troubleshooting C (steps 73 to 76).

B  **CHECK FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)**

C  **CHECK MALFUNCTION CONDITION**

A

**39. CHECK FUEL PRESSURE (LOW PRESSURE SIDE)**

HINT:

For the fuel pressure inspection, refer to the following procedures  .

(a) Attach a fuel pressure gauge and check the fuel pressure after stopping the engine.

Result

RESULT	PROCEED TO
Below 147 kPa (1.5 kgf/cm ²) (5 minutes after stopping the engine)	A
147 kPa (1.5 kgf/cm ²) or higher (5 minutes after stopping the engine)	B*1

HINT:

- If the engine cannot be started, check the fuel pressure after cranking the engine.
- *1: From step 72, perform fuel system troubleshooting C (steps 73 to 76).

B  CHECK MALFUNCTION CONDITION

A  REPLACE FUEL PRESSURE REGULATOR ASSEMBLY

40.	CHECK FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)
------------	--

(a) After stopping the engine, measure the HC concentration inside the surge tank for 15 minutes.

Result

RESULT	PROCEED TO
4000 ppm or more	A
Less than 4000 ppm	B*1


HINT:

- If the concentration is 4000 ppm or more, a fuel injector assembly may have a sealing problem.
- *1: From step 72, perform fuel system troubleshooting C (steps 73 to 76).

B  CHECK MALFUNCTION CONDITION

A  REPLACE FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)

41.	CHECK SPARK PLUG
------------	-------------------------

(a) Inspect the spark plugs  .

HINT:

Even if the spark plug of only one cylinder is malfunctioning, replace the spark plugs of all cylinders.

NG  REPLACE SPARK PLUG

OK


42. READ VALUE USING TECHSTREAM (ENGINE SPEED)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Enter the following menus: Powertrain / Engine / Data List / Engine Speed.
- (d) Start the engine.
- (e) While running the engine, read the value of Engine Speed.
 - OK:
 - A value that matches the actual engine speed is constantly output.

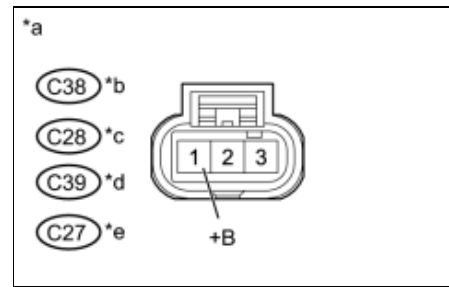
HINT:

- Check the engine speed using a line graph.
- If the engine cannot be started, check the engine speed while cranking the engine.
- If the engine speed is 0 rpm, the crankshaft position sensor may have an open or short circuit.

NG ► CHECK CRANKSHAFT POSITION SENSOR CIRCUIT

OK
▼

43. CHECK TERMINAL VOLTAGE (IGNITION COIL POWER SOURCE)



(a) Disconnect the ignition coil assembly connectors.

- (b) Turn the ignition switch to ON.
- (c) Measure the voltage according to the value(s) in the table below.
 - Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
C38-1 - Body ground	Ignition switch ON	11 to 14 V
C28-1 - Body ground	Ignition switch ON	11 to 14 V
C39-1 - Body ground	Ignition switch ON	11 to 14 V
C27-1 - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Ignition Coil Assembly)
*b	No. 1 cylinder
*c	No. 2 cylinder
*d	No. 3 cylinder
*e	No. 4 cylinder

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG  **CHECK IGNITION COIL POWER SOURCE CIRCUIT**

OK



44.	CHECK HARNESS AND CONNECTOR (IGNITION COIL ASSEMBLY - ECM)
------------	---

- (a) Disconnect the ignition coil assembly connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-21 (IGT1) - C38-3	Always	Below 1 Ω
A36-10 (IGT2) - C28-3	Always	Below 1 Ω
A36-31 (IGT3) - C39-3	Always	Below 1 Ω
A36-8 (IGT4) - C27-3	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-21 (IGT1) or C38-3 - Body ground	Always	10 k Ω or higher
A36-10 (IGT2) or C28-3 - Body ground	Always	10 k Ω or higher
A36-31 (IGT3) or C39-3 - Body ground	Always	10 k Ω or higher
A36-8 (IGT4) or C27-3 - Body ground	Always	10 k Ω or higher

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

OK



45.	CHECK HARNESS AND CONNECTOR (IGNITION COIL ASSEMBLY - BODY GROUND)
------------	---

- (a) Disconnect the ignition coil assembly connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C38-2 - Body ground	Always	Below 1 Ω
C28-2 - Body ground	Always	Below 1 Ω
C39-2 - Body ground	Always	Below 1 Ω
C27-2 - Body ground	Always	Below 1 Ω

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.
- If the wire harness is normal, after replacing the ignition coil assembly, check if engine starting trouble occurs again. If engine starting trouble occurs again, proceed to step 72 and perform troubleshooting for the ignition system (steps 78 to 83).

46.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)
------------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Enter the following menus: Powertrain / Engine / Active Test / Control the Fuel Pump / Speed.
- (d) When performing the Active Test, check for an operating sound from the fuel pump.

OK:

CONTROL THE FUEL PUMP / SPEED	SPECIFIED CONDITION
ON	Operating sound heard
OFF	Operating sound not heard

HINT:

Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.

NG ▶ CHECK FUEL PUMP CONTROL CIRCUIT (LOW PRESSURE SIDE)

OK
▼

47. PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Enter the following menus: Powertrain / Engine / Active Test / Control the Fuel Pump / Speed.
- (d) When performing the Active Test, check for fuel leakage from the fuel pipes.

Result

RESULT	PROCEED TO
Fuel leakage or signs of fuel leakage are present	A
No fuel leakage or signs of fuel leakage	B

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Check if the vehicle ran out of fuel, as engine starting trouble due to running out of fuel is also detected.
- If there are no fuel leaks, after inspecting the fuel pump control circuit, check if engine starting trouble occurs again. If engine starting trouble occurs again, proceed to step 72 and perform fuel system troubleshooting C (steps 73 to 77).

B ▶ CHECK FUEL PUMP CONTROL CIRCUIT (LOW PRESSURE SIDE)

A ▶ REPAIR OR REPLACE FUEL LINE

48. READ VALUE USING TECHSTREAM (ENGINE SPEED)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Enter the following menus: Powertrain / Engine / Data List / Engine Speed.
- (d) Start the engine.
- (e) While running the engine, read the value of Engine Speed.

OK:

A value that matches the actual engine speed is constantly output.

HINT:

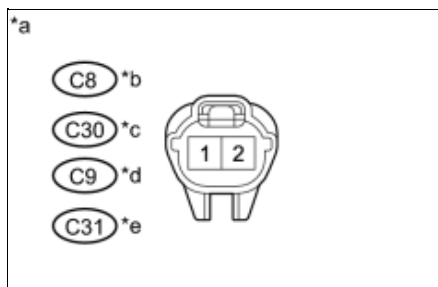
- Check the engine speed using a line graph.
- If the engine cannot be started, check the engine speed while cranking the engine.
- If the engine speed is 0 rpm, the crankshaft position sensor may have an open or short circuit.

NG ▶ **REPLACE CRANKSHAFT POSITION SENSOR**

OK



49. CHECK TERMINAL VOLTAGE (FUEL INJECTOR POWER SOURCE)



(a) Disconnect the fuel injector assembly connectors.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

CYLINDER	TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
No. 1	C8-1 - Body ground	Ignition switch ON	11 to 14 V
No. 2	C30-1 - Body ground	Ignition switch ON	11 to 14 V
No. 3	C9-1 - Body ground	Ignition switch ON	11 to 14 V
No. 4	C31-1 - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Fuel Injector Assembly)
*b	No. 1 cylinder
*c	No. 2 cylinder
*d	No. 3 cylinder
*e	No. 4 cylinder

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

OK
▼

50.	INSPECT MASS AIR FLOW METER
-----	------------------------------------

(a) Inspect the mass air flow meter INFO.

NG ► INSPECT ENGINE COOLANT TEMPERATURE SENSOR

OK
▼

51.	CHECK INTAKE SYSTEM
-----	----------------------------

(a) Check for air leakage in the intake system [vacuum hose disconnection, cracks, damaged gaskets, etc.] INFO.

HINT:

- If the accelerator pedal is released after racing the engine, the inspection is easier to perform because the vacuum inside the intake manifold increases and the air suction noise becomes louder.
- If Short FT and Long FT are largely different from the normal values (differ by more than 15%) when idling (intake air volume is small) and almost the same as the normal values when racing the engine (for example, when maintaining a speed of 3000 rpm) (intake air volume is high), air leakage may be present.

OK:

There is no air leakage.

NG ► REPAIR OR REPLACE INTAKE SYSTEM

OK
▼

52.	CHECK THROTTLE WITH MOTOR BODY ASSEMBLY
-----	--

(a) Disconnect the throttle with motor body assembly connector.

HINT:

When the connector is disconnected, the vehicle enters fail-safe mode.

(b) Crank the engine and check that it starts.

Result

RESULT	PROCEED TO
Engine starts	A
Engine does not start	B

(c) Connect the throttle with motor body assembly connector.

HINT:

When this inspection is performed, the MIL may illuminate. After finishing the inspection, check and clear DTCs



B ► **PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE VVT LINEAR)**

A
▼

53.	CHECK THROTTLE WITH MOTOR BODY ASSEMBLY
------------	--

(a) Check if carbon is in the airflow passage.

OK:

No carbon present.

NG ► **REPLACE THROTTLE WITH MOTOR BODY ASSEMBLY**

OK
▼

54.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE VVT LINEAR)
------------	--

(a) Connect the Techstream to the DLC3.

(b) Turn the Techstream on.

(c) Warm up the engine.

(d) Enter the following menus: Powertrain / Engine / Active Test / Control the VVT Linear (Bank1) or Control the VVT Linear (Bank2).

HINT:

When performing the Active Test, make sure the A/C is on and the shift lever is in P, N or neutral position.

(e) Check the engine speed while operating the camshaft timing oil control valve using the Techstream.

OK:

TECHSTREAM OPERATION	SPECIFIED CONDITION
0 deg (CA)	Normal engine speed
36 deg (CA)	Engine idles roughly or stalls

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- When the results of the inspection using the Active Test are normal but the valve operating noise is abnormal, check the valve for any signs of problems.
- If the camshaft timing oil control valve is stuck on, the valve overlap increases and combustion worsens due to the internal EGR which may cause the engine to stall.

NG ▶ **REPLACE CAMSHAFT TIMING OIL CONTROL VALVE (FOR INTAKE SIDE)**

OK



55.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE VVT EXHAUST LINEAR)
------------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the Techstream on.
- (c) Warm up the engine.
- (d) Enter the following menus: Powertrain / Engine / Active Test / Control the VVT Exhaust Linear (Bank1) or Control the VVT Exhaust Linear (Bank2).

HINT:

When performing the Active Test, make sure the A/C is on and the shift lever is in P, N or neutral position.

- (e) Check the engine speed while operating the camshaft timing oil control valve using the Techstream.

OK*1:

TECHSTREAM OPERATION	SPECIFIED CONDITION
0 deg (CA)	Normal engine speed
51 deg (CA)	Engine idles roughly or stalls

Result

RESULT	PROCEED TO
NG	A
OK	B

HINT:

- *1: From step 72, perform intake system troubleshooting (steps 84 to 86). If engine starting trouble still occurs, perform fuel system troubleshooting A (steps 87 to 94).
- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- When the results of the inspection using the Active Test are normal but the valve operating noise is abnormal, check the valve for any signs of problems.
- If the camshaft timing oil control valve is stuck on, the valve overlap increases and combustion worsens due to the internal EGR which may cause the engine to stall.

B ▶ CHECK MALFUNCTION CONDITION**A ▶ REPLACE CAMSHAFT TIMING OIL CONTROL VALVE (FOR EXHAUST SIDE)****56. CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER - ECM)**

- (a) Disconnect the mass air flow meter connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-22 (VG) - C16-5 (VG)	Always	Below 1 Ω
A33-29 (E2G) - C16-4 (E2G)	Always	Below 1 Ω


Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-22 (VG) or C16-5 (VG) - Body ground	Always	10 kΩ or higher
A33-29 (E2G) or C16-4 (E2G) - Body ground	Always	10 kΩ or higher

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.
- If the wire harness is normal, after replacing the mass air flow meter, check if engine starting trouble occurs again. If engine starting trouble occurs again, proceed to step 72 and perform intake system troubleshooting (steps 84 to 86). If engine starting trouble still occurs, perform fuel system troubleshooting A (steps 87 to 94).

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR**OK ▶ REPLACE MASS AIR FLOW METER****57. INSPECT ENGINE COOLANT TEMPERATURE SENSOR**

- (a) Inspect the engine coolant temperature sensor .

HINT:

If the engine coolant temperature sensor is malfunctioning, after replacing it, check if engine starting trouble occurs again. If engine starting trouble occurs, replace the ECM. If engine starting trouble still occurs, proceed to step 72 and perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 114), in that order.

REPLACE ENGINE COOLANT TEMPERATURE SENSOR

OK



58.	CHECK HARNESS AND CONNECTOR (ENGINE COOLANT TEMPERATURE SENSOR - ECM)
------------	--

- (a) Disconnect the engine coolant temperature sensor connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-30 (THW) - C35-2 (THW)	Always	Below 1 Ω
A36-29 (E1) - C35-1 (E2)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-30 (THW) or C35-2 (THW) - Body ground	Always	10 kΩ or higher
A36-29 (E1) or C35-1 (E2) - Body ground	Always	10 kΩ or higher

HINT:


- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.
- If the wire harness or connector is malfunctioning, after replacing or repairing it, check if engine starting trouble occurs again. If engine starting trouble occurs, replace the ECM. If engine starting trouble still occurs, proceed to step 72 and perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 115), in that order.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



59.	INSPECT MASS AIR FLOW METER
------------	------------------------------------

- (a) Inspect the mass air flow meter  .

HINT:

If the mass air flow meter is malfunctioning, after replacing it, check if engine starting trouble occurs again. If

engine starting trouble occurs, replace the ECM. If engine starting trouble still occurs, proceed to step 72 and perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 115), in that order.

NG  **REPLACE MASS AIR FLOW METER**

OK



60.	CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER - ECM)
------------	--

- (a) Disconnect the mass air flow meter connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-22 (VG) - C16-5 (VG)	Always	Below 1 Ω
A33-29 (E2G) - C16-4 (E2G)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-22 (VG) or C16-5 (VG) - Body ground	Always	10 k Ω or higher
A33-29 (E2G) or C16-4 (E2G) - Body ground	Always	10 k Ω or higher

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.
- If the wire harness or connector is malfunctioning, after replacing or repairing it, check if engine starting trouble occurs again. If engine starting trouble occurs, replace the ECM. If engine starting trouble still occurs, proceed to step 72 and perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 115), in that order.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



61.	READ VALUE USING TECHSTREAM
------------	------------------------------------

- (a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Enter the following menus: Powertrain / Engine / Data List / Atmospheric Pressure and Long FT.

Result

DATA LIST ITEM	RESULT	SUSPECTED AREA	PROCEED TO
Long FT	+25% or more or less than -25%	<ul style="list-style-type: none"> • Air fuel ratio sensor • Heated oxygen sensor • Mass air flow meter • Fuel injector assembly (for port injection) • ECM 	A
Atmosphere Pressure	80 kPa or less (when elevation is 0 m)		
Both Data List items listed above	Values are other than above	-	B

B ► CHECK FUEL PRESSURE (LOW PRESSURE SIDE)

A
▼

62.	PERFORM SIMULATION TEST
------------	--------------------------------

(a) Remove the EFI MAIN and ETCS fuses from the engine room relay block assembly.

(b) After 60 seconds or more elapse, install the EFI MAIN and ETCS fuses.

(c) Check if the engine can be started.

Result

RESULT	PROCEED TO
Engine can be started	A
Engine cannot be started	B

B ► CHECK FUEL PRESSURE (LOW PRESSURE SIDE)

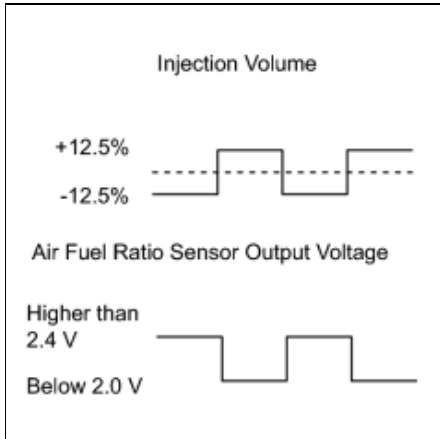
A
▼

63.	INSPECT AIR FUEL RATIO SENSOR
------------	--------------------------------------

(a) Connect the Techstream to the DLC3.

(b) Start the engine.

- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Data List / Fuel System Status #1.
- (e) Confirm that Fuel System Status #1 is CL.
- (f) Enter the following menus: Powertrain / Engine / Data List / AF Lambda B1S1.
- (g) Confirm that AF Lambda B1S1 is both within the range of 0.95 to 1.05 when idling.
- (h) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Volume for A/F sensor.



- (i) Read the output voltage from the air fuel ratio sensor when increasing and decreasing the fuel injection volume.

Standard:

TECHSTREAM DISPLAY	INJECTION VOLUME	SPECIFIED CONDITION
AFS Voltage B1S1	+12.5%	Air fuel ratio sensor output voltage is below 2.0 V
	-12.5%	Air fuel ratio sensor output voltage is higher than 2.4 V

Result

RESULT	PROCEED TO
Normal	A
Abnormal	B

HINT:

- The air fuel ratio sensor has an output delay of a few seconds and the heated oxygen sensor has a maximum output delay of approximately 20 seconds.
- If the air fuel ratio sensor is malfunctioning, after replacing it, check if engine starting trouble occurs again. If engine starting trouble occurs, replace the ECM. If engine starting trouble still occurs, proceed to step 72 and perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 115), in that order.

B ▶ REPLACE AIR FUEL RATIO SENSOR

A
▼

64.	PERFORM SIMULATION TEST
-----	-------------------------

(a) Check if the idling speed is stable after starting the engine.

OK:

Speed is stable.

HINT:

After replacing the fuel injector assembly or mass air flow meter, check if engine starting trouble occurs again. If engine starting trouble occurs, replace the ECM. If engine starting trouble still occurs, proceed to step 72 and perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 115), in that order.

NG ► REPLACE FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)

OK ► REPLACE MASS AIR FLOW METER

65.	CHECK FUEL PRESSURE (LOW PRESSURE SIDE)
------------	--

(a) Inspect the fuel pressure INFO.

NG ► PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)

OK



66.	CHECK SPARK PLUG
------------	-------------------------

(a) Inspect the spark plugs INFO.

Result

RESULT	PROCEED TO
All cylinders are normal	A
One cylinder is abnormal*1	B
All cylinders are abnormal*2, *3	C

HINT:

- *1: If one cylinder is abnormal, replace the spark plug of that cylinder and inspect the ignition and fuel system for that cylinder. After performing repairs, check if engine starting trouble occurs again. If engine starting trouble still occurs, proceed to step 72 and perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 115), in that order.
- *2: If all cylinders are abnormal, replace the spark plugs of all cylinders and check if engine starting trouble occurs again. If engine starting trouble still occurs, proceed to step 72 and perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 115), in that order.
- *3: Engine starting trouble may occur if the vehicle is driven extremely short distances repeatedly.

B ▶ REPLACE SPARK PLUG (ABNORMAL CYLINDER)

C ▶ REPLACE SPARK PLUG (ALL)

A



67.	CONFIRM VEHICLE CONDITION
------------	----------------------------------

(a) Confirm the conditions present when the malfunction occurred based on the customer problem analysis.

Result

PROBLEM SYMPTOM	SUSPECTED AREA	PROCEED TO
When the engine is stopped and a long time has passed, engine starting trouble occurs*1	Pressure regulator is stuck open	A
When the engine is stopped and approximately 15 to 120 minutes have passed, engine starting trouble occurs*2	Fuel injector leak	B
When the engine is stopped and approximately 2 to 3 minutes have passed, engine starting trouble occurs*3	Failure to maintain fuel pressure by pressure regulator	A
Condition other than above, or there is an inconsistency in the conditions present when engine starting trouble occurs	-	C*4

HINT:

*1: The pressure regulator may be stuck open. Attach a fuel pressure gauge and check the ability of the system to maintain fuel pressure after stopping the engine.

*2: Fuel may be leaking from a fuel injector assembly.

*3: The pressure regulator may not be able to maintain the fuel pressure. Attach a fuel pressure gauge and check the ability of the pressure regulator to maintain fuel pressure after stopping the engine.

*4: From step 72, perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 114), in that order.

B ▶ CHECK PURGE VALVE

C ▶ CHECK MALFUNCTION CONDITION

A



68.	CHECK FUEL PRESSURE (LOW PRESSURE SIDE)
------------	--

HINT:

For the fuel pressure inspection, refer to the following procedures **INFO** .

(a) Attach a fuel pressure gauge and check the fuel pressure after stopping the engine.

Result

RESULT	PROCEED TO
Below 147 kPa (1.5 kgf/cm ²) (5 minutes after stopping the engine)	A
147 kPa (1.5 kgf/cm ²) or higher (5 minutes after stopping the engine)	B*1

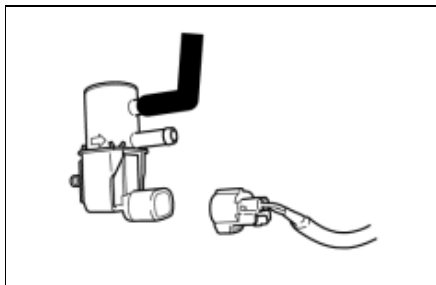
HINT:

- If the engine cannot be started, check the fuel pressure after cranking the engine.
- *1: From step 72, perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 114), in that order.

B ▶ CHECK MALFUNCTION CONDITION

A ▶ REPLACE FUEL PRESSURE REGULATOR ASSEMBLY

69.	CHECK PURGE VALVE
------------	--------------------------



(a) Disconnect the purge hose (on the canister side) of the purge valve.

- (b) Start the engine.
- (c) Idle the engine.
- (d) Disconnect the connector of the purge valve.
- (e) Check if air flows through the purge valve.
 - OK:
Air does not flow.
- (f) Connect the connector of the purge valve.
- (g) Connect the purge hose of the purge valve.

HINT:

When this inspection is performed, the MIL may illuminate. After finishing the inspection, check and clear DTCs

INFO .

NG ▶ REPLACE ENGINE COOLANT TEMPERATURE SENSOR

OK



70.	CHECK FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)
------------	--

- (a) Clean the inside of the surge tank with compressed air.
- (b) After stopping the engine, measure the HC concentration inside the surge tank for 15 minutes.

Result

RESULT	PROCEED TO
4000 ppm or more	A
Less than 4000 ppm	B*1

HINT:

- If the concentration is 4000 ppm or more, a fuel injector assembly may have a sealing problem.
- *1: From step 72, perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 115), in that order.

B ▶ CHECK MALFUNCTION CONDITION

A ▶ REPLACE FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)

71.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)
------------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Enter the following menus: Powertrain / Engine / Active Test / Control the Fuel Pump / Speed.
- (d) When performing the Active Test, check for fuel leakage from the fuel pipes.

Result

RESULT	PROCEED TO
Fuel leakage or signs of fuel leakage are present	A
No fuel leakage or signs of fuel leakage	B

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Check if the vehicle ran out of fuel, as engine starting trouble due to running out of fuel is also detected.
- If there are no fuel leaks, after inspecting the fuel pump control circuit, check if engine starting trouble occurs again. If engine starting trouble still occurs, proceed to step 72 and perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 114), in that order.

B ▶ CHECK FUEL PUMP CONTROL CIRCUIT (LOW PRESSURE SIDE)

A ▶ REPAIR OR REPLACE FUEL LINE

72.	CHECK MALFUNCTION CONDITION
------------	------------------------------------

(a) If the malfunction could not be identified during the inspections in steps 38, 39, 40 and 47, perform fuel system troubleshooting C (steps 73 to 76).

Result

PERFORMED STEP	TROUBLESHOOTING BY SYSTEM	PROCEDURE	PROCEED TO
Steps 38, 39, 40 and 47	Fuel system troubleshooting C	73 to 76	A

(b) If the malfunction could not be identified during the inspection in step 45, perform ignition system troubleshooting (steps 77 to 83).

Result

PERFORMED STEP	TROUBLESHOOTING BY SYSTEM	PROCEDURE	PROCEED TO
Step 45	Ignition system troubleshooting	77 to 83	B

(c) If the malfunction could not be identified during the inspections in steps 55, 56 and 57, perform intake air system troubleshooting (steps 84 to 86). If engine starting trouble still occurs, perform fuel system troubleshooting A (steps 87 to 94).

Result

PERFORMED STEP	TROUBLESHOOTING BY SYSTEM	PROCEDURE	PROCEED TO
Step 55, 56, 57	Intake air system troubleshooting	84 to 86	C
	Fuel system troubleshooting A	87 to 94	

(d) If the malfunction could not be identified during the inspections in steps 58, 59, 60, 63, 64, 66, 67, 68, 70 and 71, perform fuel system troubleshooting A (steps 95 to 102), fuel system troubleshooting B (steps 103 to 105), intake air system troubleshooting (steps 106 to 108), and ignition system troubleshooting (steps 109 to 115), in that order.

Result

PERFORMED STEP	TROUBLESHOOTING BY SYSTEM	PROCEDURE	PROCEED TO
Steps 57, 58, 59, 60, 63, 64, 66, 67, 68, 70 and 71	Fuel system troubleshooting A	95 to 102	D
	Fuel system troubleshooting B	103 to 105	
	Intake air system troubleshooting	106 to 108	
	Ignition system troubleshooting	109 to 115	

B ▶ CHECK CRANKSHAFT POSITION SENSOR

C ▶ READ VALUE USING TECHSTREAM (ISC LEARNING VALUE)

D ▶ CHECK FUEL PRESSURE (LOW PRESSURE SIDE)

A



73.	INSPECT FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)
------------	--

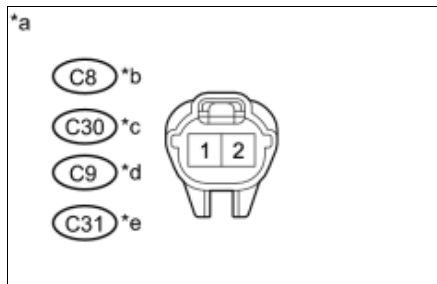
(a) Inspect the fuel injector assemblies (for port injection) INFO .

NG ▶ **REPLACE FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)**

OK



74.	CHECK TERMINAL VOLTAGE (FUEL INJECTOR POWER SOURCE)
------------	--



(a) Disconnect the fuel injector assembly connectors.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

CYLINDER	TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
No. 1	C8-1 - Body ground	Ignition switch ON	11 to 14 V
No. 2	C30-1 - Body ground	Ignition switch ON	11 to 14 V
No. 3	C9-1 - Body ground	Ignition switch ON	11 to 14 V
No. 4	C31-1 - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Fuel Injector Assembly)
*b	No. 1 cylinder
*c	No. 2 cylinder
*d	No. 3 cylinder
*e	No. 4 cylinder

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG ▶ REPAIR FUEL INJECTOR POWER SOURCE CIRCUIT

OK



75. CHECK CRANKSHAFT POSITION SENSOR

(a) Replace the crankshaft position sensor **INFO** .

(b) Check the engine start operation.

OK:

Malfunction has been repaired successfully.

NG ▶ CHECK VVT SENSOR

OK ▶ END (CRANKSHAFT POSITION SENSOR IS DEFECTIVE)

76. CHECK VVT SENSOR

(a) Replace the VVT sensor **INFO** .

(b) Check the engine start operation.

OK:

Malfunction has been repaired successfully.

NG ▶ REPLACE ECM

OK ▶ END (VVT SENSOR IS DEFECTIVE)

77. CHECK CRANKSHAFT POSITION SENSOR

(a) Check the tightening and installation condition of the crankshaft position sensor bolt.

(b) Check the connection of the crankshaft position sensor connector.

OK:

Sensor is installed correctly.

NG ▶ SECURELY REINSTALL SENSOR

OK



78.	CHECK VVT SENSOR
------------	-------------------------

- (a) Check the tightening and installation condition of the VVT sensor bolt.
- (b) Check the connection of the VVT sensor connector.

OK:

Sensor is installed correctly.

NG **SECURELY REINSTALL SENSOR**

OK



79.	CHECK HARNESS AND CONNECTOR (CRANKSHAFT POSITION SENSOR - ECM)
------------	---

- (a) Disconnect the crankshaft position sensor connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-16 (NE+) - C33-1 (NE+)	Always	Below 1 Ω
A34-27 (NE-) - C33-2 (NE-)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-16 (NE+) or C33-1 (NE+) - Body ground	Always	10 k Ω or higher
A34-27 (NE-) or C33-2 (NE-) - Body ground	Always	10 k Ω or higher

HINT:

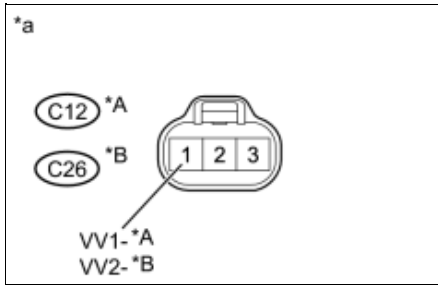
- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



80.	CHECK HARNESS AND CONNECTOR (VVT SENSOR (INTAKE SIDE) - ECM)
------------	---



(a) Disconnect the VVT sensor connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C12-1 (VV1-) - Body ground	Ignition switch ON	11 to 14 V
C26-1 (VV2-) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	Bank 1
*B	Bank 2
*a	Front view of wire harness connector (to VVT Sensor (Intake Side))

(c) Disconnect the ECM connector.

(d) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-26 (VV1+) - C12-2 (VV1+)	Always	Below 1 Ω
A34-34 (VCV) - C12-3 (VC)	Always	Below 1 Ω
A34-15 (VV2+) - C26-2 (VV2+)	Always	Below 1 Ω
A34-34 (VCV) - C26-3 (VC)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-26 (VV1+) or C12-2 (VV1+) - Body ground	Always	10 k Ω or higher
A34-34 (VCV) or C12-3 (VC) - Body ground	Always	10 k Ω or higher
A34-15 (VV2+) or C26-2 (VV2+) - Body ground	Always	10 k Ω or higher
A34-34 (VCV) or C26-3 (VC) - Body ground	Always	10 k Ω or higher

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always

occur.

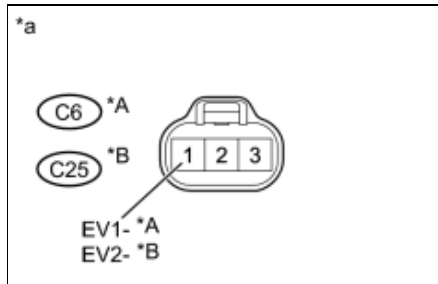
- Make sure there is not an excessive amount of force applied to the wire harness.

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK



81. CHECK HARNESS AND CONNECTOR (VVT SENSOR (EXHAUST SIDE) - ECM)



(a) Disconnect the VVT sensor connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C6-1 (EV1-) - Body ground	Ignition switch ON	11 to 14 V
C25-1 (EV2-) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	Bank 1
*B	Bank 2
*a	Front view of wire harness connector (to VVT Sensor (Exhaust Side))

(c) Disconnect the ECM connector.

(d) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-14 (EV1+) - C6-2 (EV1+)	Always	Below 1 Ω
A34-34 (VCV) - C6-3 (VC)	Always	Below 1 Ω
A34-25 (EV2+) - C25-2 (EV2+)	Always	Below 1 Ω
A34-34 (VCV) - C25-3 (VC)	Always	Below 1 Ω

Standard Resistance (Check for short):



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-14 (EV1+) or C6-2 (EV1+) - Body ground	Always	10 kΩ or higher
A34-34 (VCV) or C6-3 (VC) - Body ground	Always	10 kΩ or higher
A34-25 (EV2+) or C25-2 (EV2+) - Body ground	Always	10 kΩ or higher
A34-34 (VCV) or C25-3 (VC) - Body ground	Always	10 kΩ or higher

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK



82.	CHECK CRANKSHAFT POSITION SENSOR
------------	---

(a) Replace the crankshaft position sensor INFO.

(b) Check the engine start operation.

OK:

Malfunction has been repaired successfully.

NG ► CHECK VVT SENSOR

OK ► END (CRANKSHAFT POSITION SENSOR IS DEFECTIVE)

83.	CHECK VVT SENSOR
------------	-------------------------

(a) Replace the VVT sensor INFO.

(b) Check the engine start operation.

OK:

Malfunction has been repaired successfully.

NG ► REPLACE ECM

OK ► END (VVT SENSOR IS DEFECTIVE)

84.	READ VALUE USING TECHSTREAM (ISC LEARNING VALUE)
------------	---

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Start the engine and warm it up until the engine coolant temperature stabilizes with the A/C switch and all the accessory switches off.

(d) Enter the following menus: Powertrain / Engine / Data List / ISC Learning Value.

Result

DATA LIST ITEM	RESULT	SUSPECTED AREA	PROCEED TO
ISC Learning Value	(engine displacement (liters) x 0.9) or more	<ul style="list-style-type: none">• Valve timing• Compression	A
	Less than (engine displacement (liters) x 0.9)	-	B

B ▶ INSPECT ENGINE COOLANT TEMPERATURE SENSOR

A




85.	CHECK CYLINDER COMPRESSION PRESSURE
------------	--

(a) Inspect the compression  .

NG ▶ REPAIR OR REPLACE ENGINE ASSEMBLY

OK ▶ ADJUST VALVE TIMING

86.	INSPECT ENGINE COOLANT TEMPERATURE SENSOR
------------	--

(a) Inspect the engine coolant temperature sensor  .

NG ▶ REPLACE ENGINE COOLANT TEMPERATURE SENSOR

OK



87.	CHECK FUEL PRESSURE (LOW PRESSURE SIDE)
------------	--

HINT:

For the fuel pressure inspection, refer to the following procedures  .

(a) Attach a fuel pressure gauge and check the fuel pressure when cranking the engine and after stopping the engine.

Result

VEHICLE STATE	SPECIFIED CONDITION
Cranking engine	304 to 343 kPa (3.1 to 3.5 kgf/cm ²)
5 minutes after stopping engine	147 kPa (1.5 kgf/cm ²) or higher

NG ► **PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)**

OK
▼

88.	READ VALUE USING TECHSTREAM (LONG FT)
------------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Enter the following menus: Powertrain / Engine / Data List / Long FT.

Result

DATA LIST ITEM	RESULT	SUSPECTED AREA	PROCEED TO
Long FT	-15 to +15%	<ul style="list-style-type: none"> • Wire harness or connector • Fuel 	A
	+15% or more, or less than -15%	Fuel injector assembly	B

B ► **REPLACE FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)**

A
▼

89.	PERFORM SIMULATION TEST
------------	--------------------------------

- (a) Check if the idling speed is stable after starting the engine and if an unstable idling speed has ever occurred in the past.

Result

PROBLEM SYMPTOM	SUSPECTED AREA	PROCEED TO
Current unstable idling speed or history of unstable idling speed	Crankshaft position sensor system	A
All current and past idling speeds are stable	Fuel	B

HINT:

Through the customer problem analysis, confirm the fuel being used and the location at which the fuel was added to check if the malfunction is caused by the fuel in the vehicle.

B ▶ REPLACE FUEL

A
▼

90. CHECK CRANKSHAFT POSITION SENSOR

- (a) Check the tightening and installation condition of the crankshaft position sensor bolt.
- (b) Check the connection of the crankshaft position sensor connector.

OK:
Sensor is installed correctly.

NG ▶ SECURELY REINSTALL SENSOR

OK
▼

91. CHECK HARNESS AND CONNECTOR (CRANKSHAFT POSITION SENSOR - ECM)

- (a) Disconnect the crankshaft position sensor connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-16 (NE+) - C33-1 (NE+)	Always	Below 1 Ω
A34-27 (NE-) - C33-2 (NE-)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-16 (NE+) or C33-1 (NE+) - Body ground	Always	10 k Ω or higher
A34-27 (NE-) or C33-2 (NE-) - Body ground	Always	10 k Ω or higher

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.


REPAIR OR REPLACE HARNESS OR CONNECTOR

NG ▶

OK



92.	CHECK CRANKSHAFT POSITION SENSOR
-----	---

(a) Replace the crankshaft position sensor  .

(b) Check the engine start operation.

OK:

Malfunction has been repaired successfully.

NG ▶ **REPLACE ECM**

OK ▶ **END (CRANKSHAFT POSITION SENSOR IS DEFECTIVE)**

93.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)
-----	---

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Enter the following menus: Powertrain / Engine / Active Test / Control the Fuel Pump / Speed.

(d) When performing the Active Test, check for fuel leakage from the fuel pipes.

Result

RESULT	PROCEED TO
Fuel leakage or signs of fuel leakage are present	A
No fuel leakage or signs of fuel leakage	B


HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- When performing the Active Test, if there is no operating noise from the fuel pump, the fuel pump system may be malfunctioning.
- Check if the vehicle ran out of fuel, as engine starting trouble due to running out of fuel is also detected.

B ▶ **INSPECT FUEL PUMP ASSEMBLY**

A ▶ **REPAIR OR REPLACE FUEL LINE**

94.	INSPECT FUEL PUMP ASSEMBLY
-----	-----------------------------------

(a) Inspect the fuel pump assembly  .

HINT:

- Make sure there is no foreign matter such as iron particles on the fuel pump assembly and no signs that the fuel pump was stuck.
- Make sure the internal connector is securely connected.
- Make sure the fuel pump filter is not clogged.

NG  **REPLACE FUEL PUMP ASSEMBLY**

OK  **REPLACE FUEL PRESSURE REGULATOR ASSEMBLY**

95.	CHECK FUEL PRESSURE (LOW PRESSURE SIDE)
------------	--

HINT:

For the fuel pressure inspection, refer to the following procedures  .

(a) Attach a fuel pressure gauge and check the fuel pressure after stopping the engine.

Result

RESULT	PROCEED TO
147 kPa (1.5 kgf/cm ²) or higher (5 minutes after stopping the engine)	A
Below 147 kPa (1.5 kgf/cm ²) (5 minutes after stopping the engine)	B

B  **PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)**

A


96.	READ VALUE USING TECHSTREAM (LONG FT)
------------	--

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Enter the following menus: Powertrain / Engine / Data List / Long FT.

Result

DATA LIST ITEM	RESULT	SUSPECTED AREA	PROCEED TO
Long FT	-15 to +15%	<ul style="list-style-type: none">• Wire harness or connector• Fuel	A
	+15% or more, or less than -15%	Fuel injector assembly	B

REPLACE FUEL INJECTOR ASSEMBLY (FOR PORT

B ▶ INJECTION)

A
▼

97. PERFORM SIMULATION TEST

(a) Check if the idling speed is stable after starting the engine and if an unstable idling speed has ever occurred in the past.

Result

PROBLEM SYMPTOM	SUSPECTED AREA	PROCEED TO
Current unstable idling speed or history of unstable idling speed	Crankshaft position sensor system	A
All current and past idling speeds are stable	Fuel	B

HINT:

Through the customer problem analysis, confirm the fuel being used and the location at which the fuel was added to check if the malfunction is caused by the fuel in the vehicle.

B ▶ REPLACE FUEL

A
▼

98. CHECK CRANKSHAFT POSITION SENSOR

(a) Check the tightening and installation condition of the crankshaft position sensor bolt.

(b) Check the connection of the crankshaft position sensor connector.

OK:

Sensor is installed correctly.

NG ▶ SECURELY REINSTALL SENSOR

OK
▼

99. CHECK HARNESS AND CONNECTOR (CRANKSHAFT POSITION SENSOR - ECM)

(a) Disconnect the crankshaft position sensor connector.

(b) Disconnect the ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-16 (NE+) - C33-1 (NE+)	Always	Below 1 Ω
A34-27 (NE-) - C33-2 (NE-)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-16 (NE+) or C33-1 (NE+) - Body ground	Always	10 k Ω or higher
A34-27 (NE-) or C33-2 (NE-) - Body ground	Always	10 k Ω or higher

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK



100.	CHECK CRANKSHAFT POSITION SENSOR
-------------	---

(a) Replace the crankshaft position sensor .

(b) Check the engine start operation.

OK:

Malfunction has been repaired successfully.

NG ► REPLACE ECM

OK ► END (CRANKSHAFT POSITION SENSOR IS DEFECTIVE)

101.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE FUEL PUMP / SPEED)
-------------	---

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Enter the following menus: Powertrain / Engine / Active Test / Control the Fuel Pump / Speed.

(d) When performing the Active Test, check for fuel leakage from the fuel pipes.

Result



RESULT	PROCEED TO
Fuel leakage or signs of fuel leakage are present	A
No fuel leakage or signs of fuel leakage	B

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- When performing the Active Test, if there is no operating noise from the fuel pump, the fuel pump system may be malfunctioning.
- Check if the vehicle ran out of fuel, as engine starting trouble due to running out of fuel is also detected.

B ► INSPECT FUEL PUMP ASSEMBLY

A ► REPAIR OR REPLACE FUEL LINE

102.	INSPECT FUEL PUMP ASSEMBLY
-------------	-----------------------------------

(a) Inspect the fuel pump assembly INFO.

HINT:

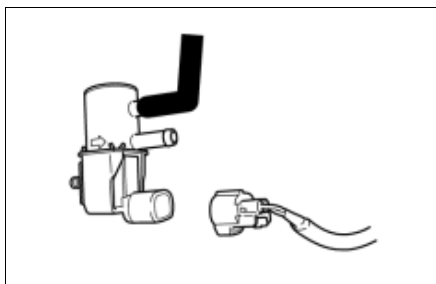
- Make sure there is no foreign matter such as iron particles on the fuel pump assembly and no signs that the fuel pump was stuck.
- Make sure the internal connector is securely connected.
- Make sure the fuel pump filter is not clogged.

NG ► REPLACE FUEL PUMP ASSEMBLY

OK



103.	CHECK PURGE VALVE
-------------	--------------------------



(a) Disconnect the vacuum hose (on the canister side) of the purge valve.

(b) Start the engine.

(c) Idle the engine.

- (d) Disconnect the connector of the purge valve.
- (e) Check if air flows through the purge valve.
 - OK:
 - Air does not flow
- (f) Connect the connector of the purge valve.
- (g) Connect the vacuum hose of the purge valve.

HINT:

When this inspection is performed, the MIL may illuminate. After finishing the inspection, check and clear DTCs

INFO

NG ▶ INSPECT PURGE VALVE

OK
▼

104.	CHECK FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)
-------------	--

- (a) Clean the inside of the surge tank with compressed air.
- (b) After stopping the engine, measure the HC concentration inside the surge tank for 15 minutes.

Result

RESULT	PROCEED TO
4000 ppm or more	A
Less than 4000 ppm	B

HINT:

If the concentration is 4000 ppm or more, a fuel injector assembly may have a sealing problem.

B ▶ CHECK INTAKE VALVE

A ▶ REPLACE FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)

105.	CHECK INTAKE VALVE
-------------	---------------------------

- (a) Check if carbon is on the intake valves.

Result

RESULT	PROCEED TO
Carbon present	A
No carbon present	B

B ▶ READ VALUE USING TECHSTREAM (ISC LEARNING VALUE)

A ▶ CLEAN INTAKE VALVE

106. READ VALUE USING TECHSTREAM (ISC LEARNING VALUE)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Start the engine, turn off all accessory switches and warm up the engine until the engine coolant temperature stabilizes.
- (d) Enter the following menus: Powertrain / Engine / Data List / ISC Learning Value.

Result

DATA LIST ITEM	RESULT	SUSPECTED AREA	PROCEED TO
ISC Learning Value	(engine displacement (liters) x 0.9) or more	<ul style="list-style-type: none">• Valve timing• Compression	A
	Less than (engine displacement (liters) x 0.9)	-	B

B ▶ INSPECT ENGINE COOLANT TEMPERATURE SENSOR

A ▼

107. CHECK CYLINDER COMPRESSION PRESSURE

- (a) Inspect the compression **INFO**.

NG ▶ REPAIR OR REPLACE ENGINE ASSEMBLY

OK ▶ ADJUST VALVE TIMING

108. INSPECT ENGINE COOLANT TEMPERATURE SENSOR

- (a) Inspect the engine coolant temperature sensor **INFO**.

NG ▶ REPLACE ENGINE COOLANT TEMPERATURE SENSOR

OK ▼

109. CHECK CRANKSHAFT POSITION SENSOR

- (a) Check the tightening and installation condition of the crankshaft position sensor bolt.
- (b) Check the connection of the crankshaft position sensor connector.

OK:
Sensor is installed correctly.

NG  **SECURELY REINSTALL SENSOR**

OK

**110. CHECK VVT SENSOR**

- (a) Check the tightening and installation condition of the VVT sensor bolt.
- (b) Check the connection of the VVT sensor connector.

OK:
Sensor is installed correctly.

NG  **SECURELY REINSTALL SENSOR**

OK

**111. CHECK HARNESS AND CONNECTOR (CRANKSHAFT POSITION SENSOR - ECM)**

- (a) Disconnect the crankshaft position sensor connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-16 (NE+) - C33-1 (NE+)	Always	Below 1 Ω
A34-27 (NE-) - C33-2 (NE-)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-16 (NE+) or C33-1 (NE+) - Body ground	Always	10 k Ω or higher
A34-27 (NE-) or C33-2 (NE-) - Body ground	Always	10 k Ω or higher

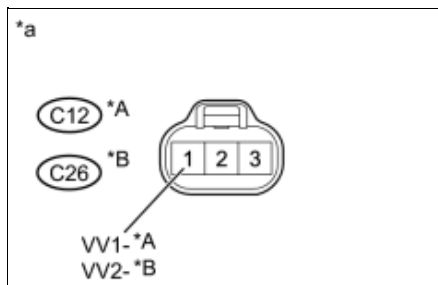
HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

112. CHECK HARNESS AND CONNECTOR (VVT SENSOR (INTAKE SIDE) - ECM)



(a) Disconnect the VVT sensor connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C12-1 (VV1-) - Body ground	Ignition switch ON	11 to 14 V
C26-1 (VV2-) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	Bank 1
*B	Bank 2
*a	Front view of wire harness connector (to VVT Sensor (Intake Side))

(c) Disconnect the ECM connector.

(d) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-26 (VV1+) - C12-2 (VV1+)	Always	Below 1 Ω
A34-34 (VCV) - C12-3 (VC)	Always	Below 1 Ω
A34-15 (VV2+) - C26-2 (VV2+)	Always	Below 1 Ω
A34-34 (VCV) - C26-3 (VC)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-26 (VV1+) or C12-2 (VV1+) - Body ground	Always	10 kΩ or higher
A34-34 (VCV) or C12-3 (VC) - Body ground	Always	10 kΩ or higher
A34-15 (VV2+) or C26-2 (VV2+) - Body ground	Always	10 kΩ or higher
A34-34 (VCV) or C26-3 (VC) - Body ground	Always	10 kΩ or higher

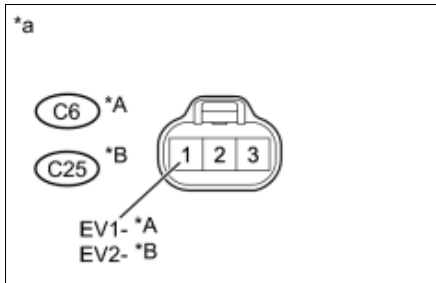
HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

113. CHECK HARNESS AND CONNECTOR (VVT SENSOR (EXHAUST SIDE) - ECM)



(a) Disconnect the VVT sensor connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C6-1 (EV1-) - Body ground	Ignition switch ON	11 to 14 V
C25-1 (EV2-) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	Bank 1
*B	Bank 2
*a	Front view of wire harness connector (to VVT Sensor (Exhaust Side))

(c) Disconnect the ECM connector.

(d) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-14 (EV1+) - C6-2 (EV1+)	Always	Below 1 Ω
A34-34 (VCV) - C6-3 (VC)	Always	Below 1 Ω
A34-25 (EV2+) - C25-2 (EV2+)	Always	Below 1 Ω
A34-34 (VCV) - C25-3 (VC)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-14 (EV1+) or C6-2 (EV1+) - Body ground	Always	10 k Ω or higher
A34-34 (VCV) or C6-3 (VC) - Body ground	Always	10 k Ω or higher
A34-25 (EV2+) or C25-2 (EV2+) - Body ground	Always	10 k Ω or higher
A34-34 (VCV) or C25-3 (VC) - Body ground	Always	10 k Ω or higher

HINT:

- Jiggle the wire harness and connector to increase the likelihood of detecting malfunctions that do not always occur.
- Make sure there is not an excessive amount of force applied to the wire harness.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



114. CHECK CRANKSHAFT POSITION SENSOR

(a) Replace the crankshaft position sensor  .

(b) Check the engine start operation.

OK:

Malfunction has been repaired successfully.

NG  **CHECK VVT SENSOR**

OK  **END (CRANKSHAFT POSITION SENSOR IS DEFECTIVE)**

115. CHECK VVT SENSOR

(a) Replace the VVT sensor  .

(b) Check the engine start operation.

OK:

Malfunction has been repaired successfully.

NG ▶ REPLACE ECM

OK ▶ END (VVT SENSOR IS DEFECTIVE)



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WC30M5X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P2096,P2097: Post Catalyst Fuel Trim System Too Lean (Bank 1) (2013 FR-S)		

DTC	P2096	Post Catalyst Fuel Trim System Too Lean (Bank 1)
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DTC	P2097	Post Catalyst Fuel Trim System Too Rich (Bank 1)
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DESCRIPTION

The sub fuel trim is related to the feedback compensation value, not to the basic injection time. The sub fuel trim consists of both the short-term and the long-term fuel trim between the front catalyst and rear catalyst.

The short-term fuel trim is fuel compensation that is used to constantly maintain the air fuel ratio at stoichiometric levels. The signal from the air fuel ratio sensor indicates whether the air fuel ratio is rich or lean compared to the stoichiometric ratio. This triggers a reduction in the fuel injection volume if the air fuel ratio is rich and an increase in the fuel injection volume if it is lean.

Factors such as individual engine differences, wear over time and changes in operating environment cause short-term fuel trim to vary from the ideal theoretical value. The long-term fuel trim controls overall fuel compensation. The long-term fuel trim compensates for long term deviations of the fuel trim from the ideal theoretical value. These long term deviations result from the corrections made by the short-term fuel trim.

If both the short-term fuel and long-term fuel trim are lean or rich beyond predetermined values, it is interpreted as a malfunction, the ECM illuminates the MIL and sets a DTC.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2096	With warm engine and stable air fuel ratio feedback, sub fuel trim considerably in error to lean side (2 trip detection logic)	<ul style="list-style-type: none"> • Intake system • Fuel injector assembly (for port injection) • Fuel injector assembly (for direct injection) • Mass air flow meter • Engine coolant temperature sensor • Fuel pressure • Gas leaks from exhaust system • Open or short in air fuel ratio sensor circuit • Air fuel ratio sensor • PCV valve and hose • PCV hose connections • ECM • Wire harness or connector
P2097	With warm engine and stable air fuel ratio feedback, sub fuel trim considerably in error to rich side (2 trip detection logic)	

HINT:

- When DTC P2096 is set, the actual air-fuel ratio is on the lean side. When DTC P2097 is set, the actual air-fuel ratio is on the rich side.
- If the vehicle runs out of fuel, the air-fuel ratio is lean and DTC P2096 may be set. The MIL is then illuminated.

MONITOR DESCRIPTION

Under closed loop fuel control, fuel injection volumes that deviate from those estimated by the ECM cause changes in the long-term fuel trim compensation value. The long-term fuel trim is adjusted when there are persistent deviations in the short-term fuel trim values. Deviations from the ECM's estimated fuel injection volumes also affect the average fuel trim learning value, which is a combination of the average short-term fuel trim (fuel feedback compensation value) and the average long-term fuel trim (learning value of the air fuel ratio). If the average fuel trim learning value exceeds the malfunction threshold, the ECM interprets this as a malfunction in the fuel system and sets a DTC.

MONITOR STRATEGY

Related DTCs	P2096: Post Catalyst Fuel Trim System Too Lean (Bank 1) P2097: Post Catalyst Fuel Trim System Too Rich (Bank 1)
Required Sensors/Components (Main)	Fuel system Heated oxygen sensor
Required Sensors/Components (Related)	Air fuel ratio sensor Mass air flow meter Crankshaft position sensor
Frequency of Operation	Continuous
Duration	1 second (1 time)
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not present	P0037, P0038 (Heated oxygen sensor - heater) P0122, P0123, P0222, P0223 (Throttle position sensor) P0137, P0138 (Heated oxygen sensor - a lack of circuit continuity) P0140 (Heated oxygen sensor - output voltage) P0171, P0172 (Fuel system main feedback control) P0604, P0605 (ROM in ECM) P1160 (Throttle return spring) P2102 (Throttle actuator control motor) P2109 (Throttle position sensor minimum stop) P2119 (Throttle actuator control) P2122, P2123, P2127, P2128 (Accelerator pedal position sensor (APPS) circuit) P2135 (Throttle position sensor (TPS) correlation) P2138 (Accelerator pedal position sensor (APPS) correlation)
Post catalyst long term fuel trim system control	Active

TYPICAL MALFUNCTION THRESHOLDS

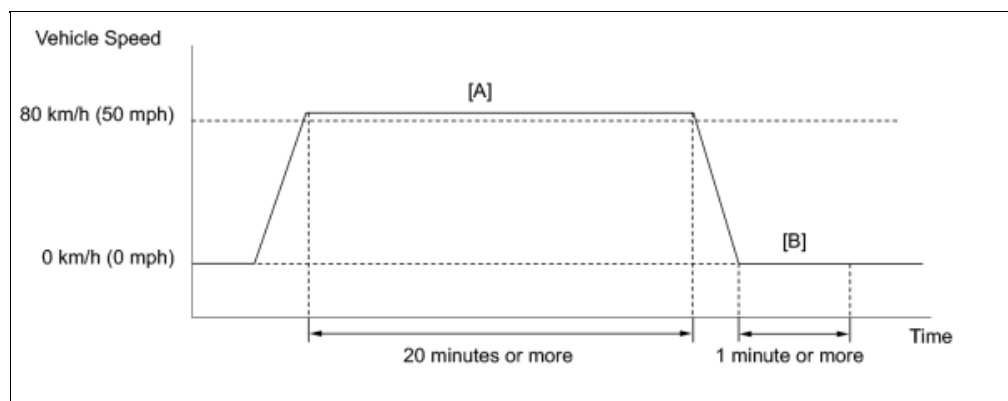
P2096

Post catalyst long term fuel trim value	Less than -0.037
---	------------------

P2097

Post catalyst long term fuel trim value	0.028 or higher
---	-----------------

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.

2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) **INFO** .
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.

HINT:

Check the engine coolant temperature is 20°C (68°F) or less at engine started.

7. Perform the following the confirmation driving pattern.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

- a. Drive the vehicle at 80 km/h (50 mph) or more for 20 minutes or more [A].
 - b. Stop the vehicle.
 - c. Idle the engine for 1 minute or more [B].
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
 9. Read pending DTCs.

HINT:

- o If a pending DTC is output, the system is malfunctioning.
 - o If a pending DTC is not output, perform the following procedure.
10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 11. Input the DTC: P2096 or P2097.
 12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System normal
ABNORMAL	<ul style="list-style-type: none"> o DTC judgment completed o System abnormal
INCOMPLETE	<ul style="list-style-type: none"> o DTC judgment not completed o Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> o Unable to perform DTC judgment o Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- o If the judgment result shows NORMAL, the system is normal.
 - o If the judgment result shows ABNORMAL, the system has a malfunction.
13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs **INFO** .

HINT:

- o If a permanent DTC is output, the system is malfunctioning.
- o If no permanent DTC is output, the system is normal.

WIRING DIAGRAM

Refer to DTC P0030 **INFO** .

INSPECTION PROCEDURE

HINT:

Malfunctioning areas can be identified by performing the Control the Injection Volume for A/F Sensor function provided in the Active Test. The Control the Injection Volume for A/F Sensor function can help to determine whether the air fuel ratio sensor, heated oxygen sensor and other potential trouble areas are malfunctioning.

The following instructions describe how to conduct the Control the Injection Volume for A/F Sensor operation using the Techstream.

1. Connect the Techstream to the DLC3.
2. Start the engine.
3. Turn the Techstream on.
4. Warm up the engine at an engine speed of 2500 rpm for approximately 90 seconds.
5. Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Volume for A/F Sensor / Gas AF Control / AFS Voltage B1S1 and O2S B1S2.
6. Perform the Active Test operation with the engine idling (press the RIGHT or LEFT button to change the fuel injection volume).
7. Monitor the output voltages of the air fuel ratio and heated oxygen sensors (AFS Voltage B1S1 and O2S B1S2) displayed on the Techstream.








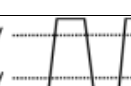


HINT:

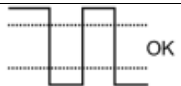

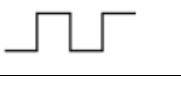
- Change the fuel injection volume within the range of -12.5% to +12.5%.
- Each sensor reacts in accordance with increases and decreases in the fuel injection volume.

TECHSTREAM DISPLAY (SENSOR)	INJECTION VOLUME	STATUS	VOLTAGE
AFS Voltage B1S1 (Air fuel ratio)	+12.5%	Rich	Below 2.0 V
	-12.5%	Lean	Higher than 2.4 V
O2S B1S2 (Heated oxygen)	+12.5%	Rich	Higher than 0.55 V
	-12.5%	Lean	Below 0.4 V

NOTICE:

The air fuel ratio sensor has an output delay of a few seconds and the heated oxygen sensor has a maximum output delay of approximately 20 seconds.

CASE	AIR FUEL RATIO SENSOR (SENSOR 1) OUTPUT VOLTAGE	HEATED OXYGEN SENSOR (SENSOR 2) OUTPUT VOLTAGE	MAIN SUSPECTED TROUBLE AREA
1	<p>Injection Volume +12.5% </p> <p> -12.5%</p> <p>Output Voltage Higher than 2.4 V  OK</p> <p> Below 2.0 V</p>	<p>Injection Volume +12.5% </p> <p> -12.5%</p> <p>Output Voltage Higher than 0.55 V  OK</p> <p> Below 0.4 V</p>	-
2	<p>Injection Volume +12.5% </p> <p> -12.5%</p> <p>Output Voltage Almost no reaction  NG</p>	<p>Injection Volume +12.5% </p> <p> -12.5%</p> <p>Output Voltage Higher than 0.55 V  OK</p> <p> Below 0.4 V</p>	<ul style="list-style-type: none"> • Air fuel ratio sensor • Air fuel ratio sensor heater • Air fuel ratio sensor circuit
	<p>Injection Volume +12.5% </p> <p> -12.5%</p>	<p>Injection Volume +12.5% </p> <p> -12.5%</p>	<ul style="list-style-type: none"> • Heated oxygen sensor • Heated

3	<p>Output Voltage</p> <p>Higher than 2.4 V</p> <p>Below 2.0 V</p> 	<p>Output Voltage</p> <p>Almost no reaction</p> <p>NG</p>	<p>oxygen sensor heater</p> <ul style="list-style-type: none"> • Heated oxygen sensor circuit
4	<p>Injection Volume</p> <p>+12.5%</p> <p>-12.5%</p>  <p>Output Voltage</p> <p>Almost no reaction</p> <p>NG</p>	<p>Injection Volume</p> <p>+12.5%</p> <p>-12.5%</p>  <p>Output Voltage</p> <p>Almost no reaction</p> <p>NG</p>	<ul style="list-style-type: none"> • Fuel injector assembly • Fuel pressure • Gas leak from exhaust system (Air fuel ratio extremely rich or lean)

- Following the Control the Injection Volume for A/F Sensor procedure enables technicians to check and graph the voltage outputs of both the air fuel ratio and heated oxygen sensors.
- To display the graph, enter the following menus: Powertrain / Engine / Active Test / Control the Injection Volume for A/F Sensor / Gas AF Control / AFS Voltage B1S1 and O2S B1S2; and then press the graph button on the Data List view.

HINT:

- Bank 1 refers to the bank that includes the No. 1 cylinder*.
- *: The No. 1 cylinder is the cylinder which is farthest from transmission.
- Bank 2 refers to the bank that does not include the No. 1 cylinder.
- Sensor 1 refers to the sensor closest to the engine assembly.
- Sensor 2 refers to the sensor farthest away from the engine assembly.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was moving or stationary, whether the engine was warmed up or not, whether the air fuel ratio was lean or rich, as well as other data recorded at the time of a malfunction.
- A low air fuel ratio sensor voltage could be caused by a rich air fuel mixture. Check for conditions that would cause the engine to run rich.
- A high air fuel ratio sensor voltage could be caused by a lean air fuel mixture. Check for conditions that would cause the engine to run lean.

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P2096 AND/OR P2097)
----	--

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Trouble Codes.
- Read the DTCs.

Result:

RESULT	PROCEED TO
P2096 or P2097	A

HINT:

If any DTCs other than P2096 or P2097 are output, troubleshoot those DTCs first.

B ► **GO TO DTC CHART**

A



2. PERFORM SYSTEM CHECK (CONTROL THE INJECTION WAY)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Start the engine.
- (e) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Way / Port.
- (f) Read the value Short #1 and Long FT #1.
- OK:
Short FT #1 + Long FT #1 = Between -19% and +19%
- (g) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Way / Direct.
- (h) Read the value Short FT #1 and Long FT #1.
- OK:
Short FT #1 + Long FT #1 = Between -19% and +19%
- Result:

ITEM		PROCEED TO
PORT	DIRECT	
OK	OK	A
OK	NG	B
NG	OK	C
NG	NG	D

B ► **CHECK FUEL PRESSURE SENSOR**

C ► **CHECK FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)**

D ► **CHECK PCV HOSE CONNECTIONS**

A



3. CHECK IF VEHICLE HAS RUN OUT OF FUEL IN PAST

- (a) Has the vehicle run out of fuel in the past?

NO ► CHECK FOR INTERMITTENT PROBLEMS

YES ► DTC CAUSED BY RUNNING OUT OF FUEL

4. CHECK PCV HOSE CONNECTIONS

(a) Check the PCV hose connections **INFO** .

OK:

PCV valve and hose are connected correctly and are not damaged.

NG ► REPAIR OR REPLACE PCV HOSE

OK



5. CHECK INTAKE SYSTEM

(a) Check the intake system for vacuum leaks **INFO** .

OK:

No leaks in intake system.

NG ► REPAIR OR REPLACE INTAKE SYSTEM

OK



6. PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE INJECTION VOLUME FOR A/F SENSOR)

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn Techstream on.

(d) Warm up the engine and run the engine at an engine speed of 2500 rpm for approximately 90 seconds.

(e) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Volume for A/F Sensor / AFS Voltage B1S1 and O2S B1S2.

(f) Perform the Control the Injection Volume for A/F Sensor operation with the engine in an idling.

(g) Monitor the output voltages of the A/F and HO2 sensors (AFS Voltage B1S1 and O2S B1S2) displayed on the Techstream.

HINT:

- Change the fuel injection volume within the range of -12.5% to 12.5%.
- The air fuel ratio sensor has an output delay of a few seconds and the heated oxygen sensor has a maximum output delay of approximately 20 seconds.
- If the sensor output voltage does not change (almost no reaction) while performing the Active Test, the sensor may be malfunctioning.

TECHSTREAM DISPLAY (SENSOR)	INJECTION VOLUME	STATUS	VOLTAGE
AFS Voltage B1S1 (A/F)	12.5%	Rich	Less than 2.0 V
	-12.5%	Lean	More than 2.4 V
O2S B1S2 (HO2)	12.5%	Rich	More than 0.55 V
	-12.5%	Lean	Less than 0.4 V

Result:

STATUS AFS VOLTAGE B1S1	STATUS O2S B1S2	A/F CONDITION AND A/F SENSOR CONDITION	SUSPECTED TROUBLE AREA	PROCEED TO
Lean/Rich	Lean/Rich	Normal	-	A
Lean	Lean	Actual air-fuel ratio lean	<ul style="list-style-type: none"> • Ventilation valve and hose • Ventilation hose connections • Injector for port injection • Gas leakage from exhaust system • Air induction system • Fuel pressure • Mass Air Flow (MAF) meter • Engine Coolant Temperature (ECT) sensor 	A
Rich	Rich	Actual air-fuel ratio rich	<ul style="list-style-type: none"> • Gas leakage from exhaust system • Ignition system • Fuel pressure • Mass air flow meter • ECT sensor 	A
Lean	Lean/Rich	A/F sensor malfunction	<ul style="list-style-type: none"> • Air fuel ratio sensor 	B
Rich	Lean/Rich	A/F sensor malfunction	<ul style="list-style-type: none"> • Air fuel ratio sensor 	B

Lean: During the Control the Injection Volume for A/F Sensor Active Test, the air fuel ratio sensor output voltage (AFS Voltage) is consistently higher than 2.4 V, and the heated oxygen sensor output voltage (O2S) is consistently below 0.4 V.

Rich: During the Control the Injection Volume for A/F Sensor Active Test, the AFS Voltage is consistently below 2.0 V, and the O2S is consistently higher than 0.55 V.

Lean/Rich: During the Control the Injection Volume for A/F Sensor Active Test, the output voltage of the heated oxygen sensor alternates correctly.

HINT:

Refer to "Data List / Active Test" [AFS Voltage B1S1 and O2S B1S2]  .

B  **INSPECT AIR FUEL RATIO SENSOR (HEATER RESISTANCE)**

A



7.	READ VALUE USING TECHSTREAM (COOLANT TEMP)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.

- (d) Enter the following menus: Powertrain / Engine / Data List / Coolant Temp.
(e) Read the Coolant Temp twice, when the engine is both cold and warmed up.

Standard:

With cold engine

Same as ambient air temperature.

With warm engine

Between 75 and 100°C (167 and 212°F)

NG ► REPLACE ENGINE COOLANT TEMPERATURE SENSOR

OK



8.	READ VALUE USING TECHSTREAM (MAF)
-----------	--

- (a) Connect the Techstream to the DLC3.
(b) Turn the ignition switch to ON.
(c) Turn the Techstream on.
(d) Start the engine.
(e) Enter the following menus: Powertrain / Engine / Data List / MAF, Coolant Temp and Engine Speed.
(f) Allow the engine to idle until Coolant Temp reaches 75°C (167°F) or higher.
(g) Read MAF with the engine speed at 3000 rpm.

Standard:

Between 13.0 gm/sec and 14.0 gm/sec (shift lever: N, A/C: Off).

NG ► CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER CONNECTOR CONNECTION)

OK



9.	CHECK FOR EXHAUST GAS LEAK
-----------	-----------------------------------

- (a) Check for exhaust gas leaks.

OK:

No gas leaks.

OK ► PERFORM CONFIRMATION DRIVING PATTERN

NG ► REPAIR OR REPLACE EXHAUST SYSTEM

10.	INSPECT AIR FUEL RATIO SENSOR (HEATER RESISTANCE)
------------	--

- (a) Inspect the air fuel ratio sensor  .

NG ► REPLACE AIR FUEL RATIO SENSOR

OK



11.	CHECK HARNESS AND CONNECTOR (AIR FUEL RATIO SENSOR - ECM)
------------	--

- (a) Disconnect the air fuel ratio sensor connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-19 (A1A+) - C14-3 (A1A+)	Always	Below 1 Ω
A34-18 (A1A-) - C14-4 (A1A-)	Always	Below 1 Ω
A34-5 (HA1A) - C14-1 (HA1A)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A34-19 (A1A+) or C14-3 (A1A+) - Body ground	Always	10 k Ω or higher
A34-18 (A1A-) or C14-4 (A1A-) - Body ground	Always	10 k Ω or higher
A34-5 (HA1A) or C14-1 (HA1A) - Body ground	Always	10 k Ω or higher

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



12.	REPLACE AIR FUEL RATIO SENSOR
------------	--------------------------------------

- (a) Replace the air fuel ratio sensor .

NEXT



13.	PERFORM CONFIRMATION DRIVING PATTERN
------------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and turn the Techstream on.
- (c) Clear the DTCs .
- (d) Turn the ignition switch off and wait for at least 30 seconds.
- (e) Turn the ignition switch to ON and turn the Techstream on.
- (f) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.

NEXT



14.	CHECK WHETHER DTC OUTPUT RECURS (DTC P2096 AND/OR P2097)
------------	---

(a) Enter the following menus: Powertrain / Engine / Trouble Codes.

(b) Read the pending DTCs.

Result:

RESULT	PROCEED TO
P2096 and/or P2097	A
DTC is not output	B

B ▶ **END**

A



15.	CHECK FUEL PRESSURE (LOW PRESSURE SIDE)
------------	--

(a) Check the fuel pressure (low pressure side) **INFO** .

Result:

RESULT	PROCEED TO
NG	A
OK	B

B ▶ **CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER CONNECTOR CONNECTION)**

A



16.	CHECK FUEL PUMP OPERATION (LOW PRESSURE SIDE)
------------	--

(a) Check the fuel pump operation **INFO** .

NG ▶ **REPLACE FUEL PUMP ASSEMBLY**

OK



17. CHECK FUEL LEAK (LOW PRESSURE SIDE)

(a) Check for fuel leaks (low pressure side).

OK:

No leaks.

NG ▶ REPAIR OR REPLACE FUEL SYSTEM (LOW PRESSURE SIDE)

OK ▶ CHECK AND REPLACE FUEL PUMP, PRESSURE REGULATOR, FUEL LINE AND FILTER

18. CHECK FUEL PRESSURE SENSOR

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Start the engine.

(e) Enter the following menus: Powertrain / Engine / Data List / Fuel Press.

(f) While revving the engine, check that the fuel pressure fluctuates.

Standard:

Idling

3000 to 5000 kPa (30.6 to 50.9 kgf/cm², 436 to 725 psi).

HINT:

The A/C switch and all accessory switches should be off, and the shift lever should be in the N, P or neutral position, and the engine should be fully warmed up.

NG ▶ CHECK MISFIRE COUNT

OK



19. READ VALUE USING TECHSTREAM

(a) Connect the Techstream to the DLC3.

(b) Start the engine.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Way / Direct.

HINT:

The A/C switch and all accessory switches should be off, and the shift lever should be in the N, P or neutral position, and the engine should be fully warmed up.

(e) Read the value Short FT #1, Long FT #1 and Fuel Pump Duty.

Result:

ITEM

PROCEED TO

FUEL PUMP DUTY	SHORT FT #1 + LONG FT #1	
10% to 40%	-	A
40% or more	-20% or less	B
10% or less	+20% or more	B
40% or more	+20% or more	C
10% or less	-20% or less	D

B ▶ REPLACE FUEL PRESSURE SENSOR

C ▶ INSPECT INJECTOR DRIVER (EDU)

D ▶ REPLACE ECM

A
▼

20.	READ VALUE USING TECHSTREAM
------------	------------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Start the engine.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Way / Direct.

HINT:

The A/C switch and all accessory switches should be off, and the shift lever should be in the N, P or neutral position, and the engine should be fully warmed up.

- (e) Read the value Short FT #1, Long FT #1 and Fuel Pump Duty.

Result:

ITEM		PROCEED TO
FUEL PUMP DUTY	SHORT FT #1 + LONG FT #1	
10% to 40%	-25% or less	A
10% to 40%	-25% to +25%	B
10% to 40%	+25% or more	A

B ▶ CHECK FOR INTERMITTENT PROBLEMS

A ▶ REPLACE FUEL INJECTOR ASSEMBLY (FOR DIRECT INJECTION)

21.	CHECK MISFIRE COUNT
------------	----------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Start the engine.

- (e) Enter the following menus: Powertrain / Engine / Active test / Control the Injection Way / Direct.
- (f) Allow the engine to idle.
- (g) Monitor all of the misfire count values that are displayed on the Techstream: Powertrain / Engine / Data List / Cylinder #1 Misfire Count to Cylinder #4 Misfire Count.

If no misfire counts occur for any of the cylinders, perform the following procedure:

- (1) Move the shift lever to D.
- (2) Monitor all of the misfire rate values that are displayed on the Techstream.

Result:

MISFIRE COUNT	PROCEED TO
No misfire counts, or misfire counts occur randomly in all cylinders	A
Misfire counts occur in particular cylinder	B

B ▶ REPLACE FUEL INJECTOR ASSEMBLY (FOR DIRECT INJECTION)

A
▼

22. INSPECT INJECTOR DRIVER (EDU)

- (a) Replace the injector driver (EDU) with known good ones from another vehicle.

NOTICE:

Do not disconnect and reconnect the connectors with the ignition switch to ON, as the injector driver (EDU) may be damaged.

- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Clear the DTCs **INFO**.
- (f) Turn the ignition switch off and wait for at least 30 seconds.
- (g) Turn the ignition switch to ON and turn the Techstream on.
- (h) Start the engine and warm it up.
- (i) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (j) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (k) Read the pending DTCs.

Result:

RESULT	PROCEED TO
P2096 and/or P2097	A
DTC is not output	B

B ▶ END (INJECTOR DRIVER (EDU) IS DEFECTIVE)

A ▶ REPLACE FUEL PUMP ASSEMBLY (FOR HIGH PRESSURE)

23. CHECK FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)

(a) Check the injection volume (whether fuel volume is high or low, and whether injection pattern is poor).

NG ► REPLACE FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)

OK ► REPLACE ECM

24. CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER CONNECTOR CONNECTION)

(a) Check the connection and terminal contact pressure of connectors and wire harness between the mass air flow meter and ECM **INFO** .

HINT:

Repair any problems.

NEXT



25. PERFORM CONFIRMATION DRIVING PATTERN

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and turn the Techstream on.
- (c) Clear the DTCs **INFO** .
- (d) Turn the ignition switch off and wait for at least 30 seconds.
- (e) Turn the ignition switch to ON and turn the Techstream on.
- (f) Start the engine and warm it up.
- (g) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.

NEXT



26. CHECK WHETHER DTC OUTPUT RECURS (DTC P2096 AND/OR P2097)

- (a) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (b) Read the pending DTCs.

Result:

RESULT	PROCEED TO
P2096 and/or P2097	A
DTC is not output	B

B ► END

A



27.	CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER - ECM)
------------	--

- (a) Disconnect the mass air flow meter connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C33-22 (VG) - C16-5 (VG)	Always	Below 1 Ω
C33-29 (E2G) - C16-4 (E2G)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C33-22 (VG) or C16-5 (VG) - Body ground	Always	10 k Ω or higher

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



28.	REPLACE MASS AIR FLOW METER
------------	------------------------------------

- (a) Replace the mass air flow meter .

HINT:

If the result of the inspection performed in step 8 indicated no problem, proceed to the next step without replacing the mass air flow meter.

NEXT



29.	PERFORM CONFIRMATION DRIVING PATTERN
------------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON and turn the Techstream on.
- (c) Clear the DTCs .
- (d) Turn the ignition switch off and wait for at least 30 seconds.
- (e) Turn the ignition switch to ON and turn the Techstream on.

(f) Start the engine and warm it up.

(g) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.

NEXT



30.	CHECK WHETHER DTC OUTPUT RECURS (DTC P2096 AND/OR P2097)
------------	---

(a) Enter the following menus: Powertrain / Engine / Trouble Codes.

(b) Read the pending DTCs.

Result:

RESULT	PROCEED TO
P2096 and/or P2097	A
DTC is not output	B

B ▶ END

A ▶ REPLACE ECM

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PFU0P5X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P2101-P2103: Throttle Actuator Control Motor Circuit Range/Performance (2013 FR-S)		

DTC	P2101	Throttle Actuator Control Motor Circuit Range/Performance
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DTC	P2102	Throttle Actuator Control Motor Circuit Low
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DTC	P2103	Throttle Actuator Control Motor Circuit High
------------	--------------	---

DESCRIPTION

The throttle actuator is operated by the ECM and opens and closes the throttle valve using gears.

The opening angle of the throttle valve is detected by the throttle position sensor, which is mounted on the throttle with motor body assembly. The throttle position sensor provides feedback to the ECM. This feedback allows the ECM to appropriately control the throttle actuator and monitor the throttle opening angle as the ECM responds to driver inputs.

HINT:

This Electronic Throttle Control System (ETCS) does not use a throttle cable.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2101	One of the following conditions is met (1 trip detection logic): <ul style="list-style-type: none"> • Throttle actuator current is 8 A or more. • Internal temperature of throttle actuator driving circuit is 175°C (347°F) or higher. 	<ul style="list-style-type: none"> • Throttle with motor body assembly • ECM
P2102	ECM is turning ETCS relay on but throttle actuator power supply voltage is 5 V or less. (1 trip detection logic)	<ul style="list-style-type: none"> • Open in throttle actuator circuit • Throttle with motor body assembly • ETCS relay • ECM
P2103	ECM is turning ETCS relay off but throttle actuator power supply voltage is 5 V or more. (1 trip detection logic)	<ul style="list-style-type: none"> • Short in throttle actuator circuit • Throttle with motor body assembly • ETCS relay • ECM

MONITOR DESCRIPTION

The ECM monitors the electrical current through the electronic actuator, and detects malfunctions and open circuits in the throttle actuator based on this value. If the current is outside the standard range, the ECM determines that there is a malfunction in the throttle actuator. In addition, if the throttle valve does not function properly (for example, stuck on), the ECM determines that there is a malfunction. The ECM then illuminates the MIL and stores a DTC.

MONITOR STRATEGY

Related DTCs	P2101: Throttle actuator control motor circuit continuity P2102: Throttle actuator control motor circuit continuity P2103: Throttle actuator control motor circuit continuity
Required Sensors/Components (Main)	Throttle actuator (throttle with motor body assembly)
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	0.512 seconds: P2101 0.353 seconds: P2102 0.6 seconds: P2103
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs not stored	None
---	------

P2101

ETCS relay	On
CPU communication	No failure
Previous diagnosis result	No failure
Battery voltage	6.2 V or more

P2102

ETCS relay	On
Battery voltage	11 V or more

P2103

ETCS relay	Off
Battery voltage	6 V or more

TYPICAL MALFUNCTION THRESHOLDS

P2101

Malfunction flag from throttle actuator operation IC
--

Set

P2102

Throttle actuator supply voltage

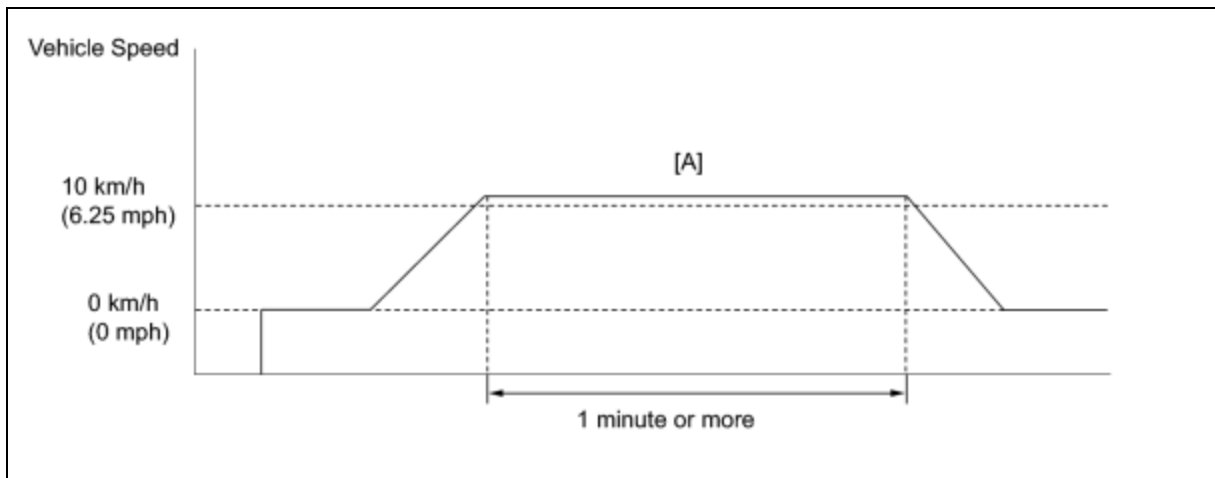
Less than 5 V

P2103

Throttle actuator supply voltage

More than 5 V

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. Depress the accelerator pedal fully and release the accelerator pedal.
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [A].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.
10. Read pending DTCs.

HINT:


- If a pending DTC is output, the system is malfunctioning.
 - If a pending DTC is not output, perform the following procedure.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 12. Input the DTC: P2101, P2102 or P2103.
 13. Check the DTC judgment result.



TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ○ DTC judgment completed ○ System normal
ABNORMAL	<ul style="list-style-type: none"> ○ DTC judgment completed ○ System abnormal
INCOMPLETE	<ul style="list-style-type: none"> ○ DTC judgment not completed ○ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> ○ Unable to perform DTC judgment ○ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs  .

HINT:

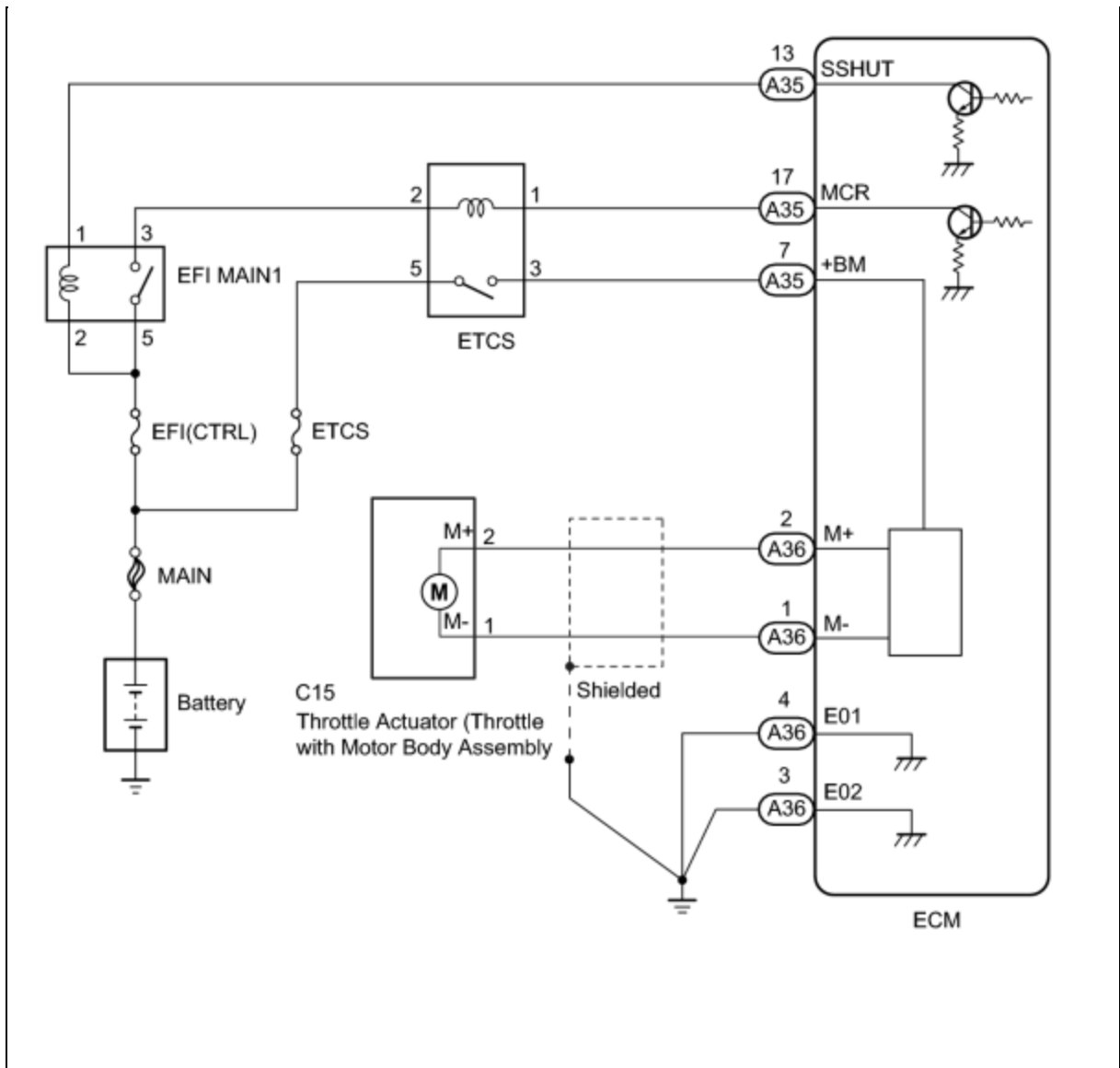
- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

FAIL-SAFE

When either of these DTCs or other DTCs relating to ETCS (Electronic Throttle Control System) malfunctions are stored, the ECM enters fail-safe mode. During fail-safe mode, the ECM cuts the current to the throttle actuator, and the throttle valve is returned to a fully closed throttle angle by the return spring. The ECM then adjusts the engine output by controlling the fuel injection (intermittent fuel-cut) and ignition timing, in accordance with the accelerator pedal opening angle, to allow the vehicle to continue running at a minimal speed. If the accelerator pedal is depressed firmly and gently, the vehicle can be driven slowly.

Fail-safe mode continues until a pass condition is detected, and the ignition switch is then turned off.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

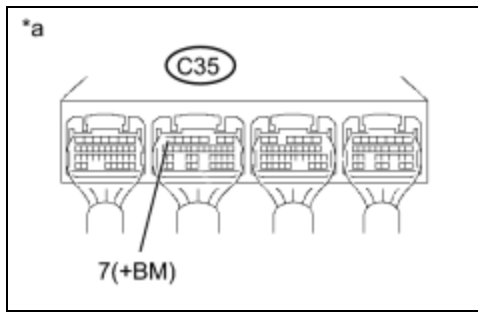
Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- The throttle actuator current (Throttle Motor Current) and the throttle actuator duty ratio (Throttle Motor Duty (Open) / Throttle Motor Duty (Close)) can be read using the Techstream. However, the ECM shuts off the throttle actuator current when the electronic throttle control system malfunctions.

PROCEDURE

1.	INSPECT TERMINAL VOLTAGE (POWER SOURCE OF THROTTLE WITH MOTOR BODY ASSEMBLY)
----	---



(a) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C35-7 (+BM) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration


*a	Component with harness connected (ECM)
----	--

NG ▶ **INSPECT RELAY (ETCS)**

OK



2.	INSPECT THROTTLE WITH MOTOR BODY ASSEMBLY (RESISTANCE OF THROTTLE ACTUATOR)
-----------	--

(a) Inspect the throttle with motor body assembly  .

NG ▶ **REPLACE THROTTLE WITH MOTOR BODY ASSEMBLY**

OK



3.	CHECK HARNESS AND CONNECTOR (THROTTLE WITH MOTOR BODY ASSEMBLY - ECM)
-----------	--

(a) Disconnect the throttle with motor body assembly connector.

(b) Disconnect the ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
-------------------	-----------	---------------------

A36-2 (M+) - C15-2 (M+)	Always	Below 1 Ω
A36-1 (M-) - C15-1 (M-)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-2 (M+) or C15-2 (M+) - Body ground	Always	10 k Ω or higher
A36-1 (M-) or C15-1 (M-) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK


4.	INSPECT THROTTLE WITH MOTOR BODY ASSEMBLY (VISUALLY CHECK THROTTLE VALVE)
-----------	--

(a) Check for foreign objects between the throttle valve and the housing.

OK:

No foreign objects between the throttle valve and housing.

NG  **REMOVE FOREIGN OBJECT**

OK


5.	INSPECT THROTTLE WITH MOTOR BODY ASSEMBLY (THROTTLE VALVE)
-----------	---

(a) Check if the throttle valve opens and closes smoothly.

OK:

Throttle valve opens and closes smoothly.

NG  **REPLACE THROTTLE WITH MOTOR BODY ASSEMBLY**

OK  **REPLACE ECM**

--	--

6. INSPECT RELAY (ETCS)

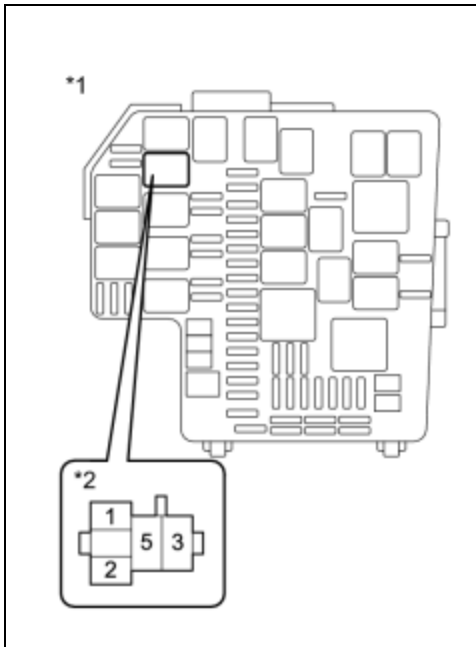
(a) Inspect the ETCS relay INFO.

NG ▶ REPLACE RELAY (ETCS)

OK



7. CHECK HARNESS AND CONNECTOR (ETCS RELAY - EFI MAIN1 RELAY - BATTERY)



(a) Remove the ETCS relay from the engine room relay block assembly.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
5 (ETCS relay holder) - Body ground	Always	11 to 14 V
2 (ETCS relay holder) - Body ground	Ignition switch ON	11 to 14 V

Result:

RESULT	PROCEED TO
Normal	A
ETCS relay terminal 5 is abnormal.	B

ETCS relay terminal 2 is abnormal.

C

Text in Illustration

*1	Engine room relay block assembly
*2	ETCS relay terminal

B ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

C ▶ INSPECT RELAY (EFI MAIN1)

A

8. CHECK HARNESS AND CONNECTOR (ECM - ETCS RELAY)

- Remove the ETCS relay from the engine room relay block assembly.
- Disconnect the ECM connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-17 (MCR) - ETCS relay terminal 1	Always	Below 1 Ω
A35-7 (+BM) - ETCS relay terminal 3	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-17 (MCR) or ETCS relay terminal 1 - Body ground	Always	10 k Ω or higher
A35-7 (+BM) or ETCS relay terminal 3 - Body ground	Always	10 k Ω or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

9. INSPECT RELAY (EFI MAIN1)

(a) Inspect EFI MAIN1 relay  .

NG  **REPLACE RELAY (EFI MAIN1)**

OK

**10. CHECK HARNESS AND CONNECTOR (ETCS RELAY - EFI MAIN1 RELAY)**

- (a) Remove the ETCS relay from the engine room relay block assembly.
- (b) Remove the EFI MAIN1 relay from the engine room relay block assembly.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN1 relay terminal 3 - ETCS relay terminal 2	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EFI MAIN1 relay terminal 3 or ETCS relay terminal 2 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **CHECK ECM POWER SOURCE CIRCUIT**



Last Modified: 4-14-2014	6.6 C	Doc ID: RM000000PFZ0PHX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 - 05/2013]
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P2122,P2123,P2127,P2128,P2138; Throttle / Pedal Position Sensor / Switch "D" Circuit Low Input; 2013 MY FR-S [03/2012 - 05/2013]		

DTC	P2122	Throttle / Pedal Position Sensor / Switch "D" Circuit Low Input
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DTC	P2123	Throttle / Pedal Position Sensor / Switch "D" Circuit High Input
------------	--------------	---

DTC	P2127	Throttle / Pedal Position Sensor / Switch "E" Circuit Low Input
------------	--------------	--

DTC	P2128	Throttle / Pedal Position Sensor / Switch "E" Circuit High Input
------------	--------------	---

DTC	P2138	Throttle / Pedal Position Sensor / Switch "D" / "E" Voltage Correlation
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DESCRIPTION

HINT:

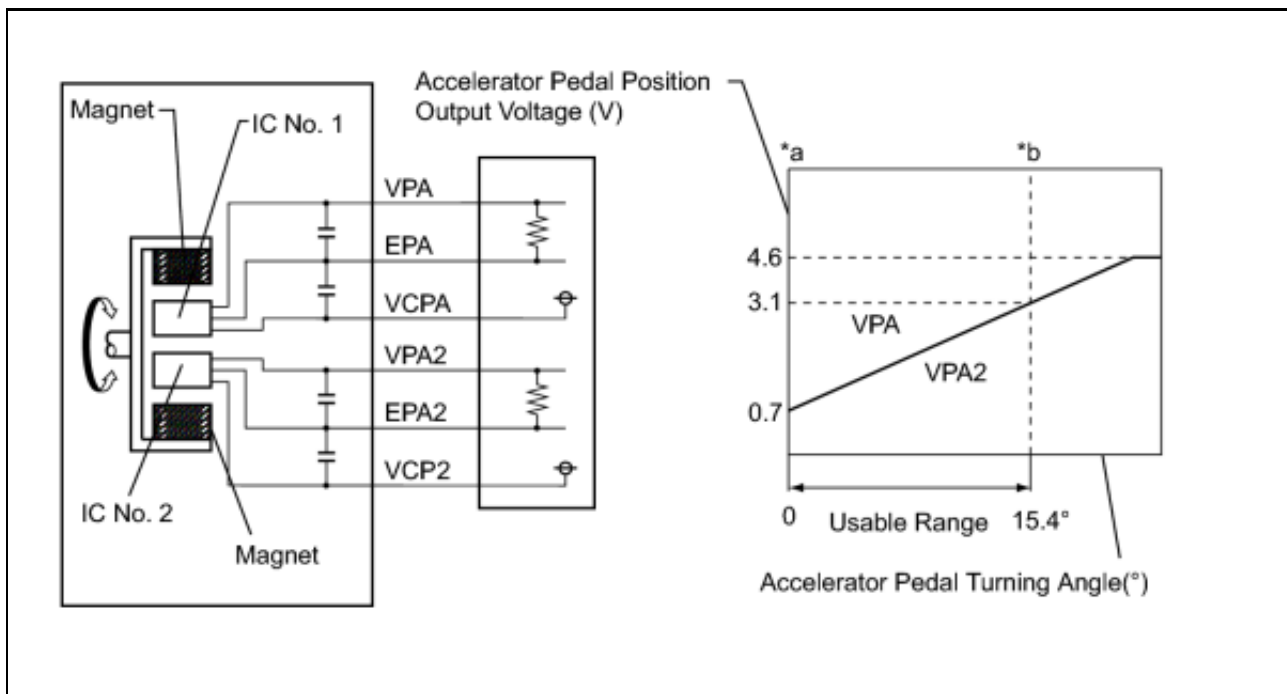
- These DTCs relate to the accelerator pedal sensor assembly.
- This electronic throttle control system does not use a throttle cable.

The accelerator pedal sensor assembly is mounted on the accelerator pedal bracket and has 2 sensor circuits: VPA (main) and VPA2 (sub). This sensor is a non-contact type. It uses Hall-effect elements in order to yield accurate signals, even in extreme conditions. The voltage, which is applied to terminals VPA and VPA2 of the ECM, varies between 0 V and 5 V in proportion to the operating angle of the accelerator pedal (throttle valve).

The ECM monitors the actual accelerator pedal operating angle (throttle valve opening angle) through the signals from VPA and VPA2, and controls the throttle actuator according to these signals.

HINT:

The accelerator pedal position output voltages of VPA and VPA2 are almost the same.



Text in Illustration

*a	Accelerator pedal fully released	*b	Accelerator pedal fully depressed
-	-	-	-

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2122	VPA voltage is less than 0.303 V. (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in accelerator pedal sensor circuit • Accelerator pedal sensor assembly • ECM
P2123	VPA voltage is 4.737 V or more. (1 trip detection logic)	
P2127	VPA2 voltage is less than 0.303 V. (1 trip detection logic)	
P2128	VPA2 voltage is 4.737 V or more. (1 trip detection logic)	
P2138	Difference in the signals from VPA and VPA2 exceeds the threshold. (1 trip detection logic)	

MONITOR DESCRIPTION

The accelerator pedal position sensor is mounted on the accelerator pedal bracket. The accelerator pedal position sensor has 2 sensor elements and 2 signal outputs: VPA and VPA2. VPA is used to detect the actual accelerator pedal angle (used for engine control) and VPA2 is used to detect malfunctions in VPA. When the difference between the output voltages of VPA and VPA2 deviates from the standard, the ECM determines that the accelerator pedal position sensor is malfunctioning. The ECM turns on the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P2122: Accelerator pedal position sensor circuit continuity (Low voltage) (Sensor 1) P2123: Accelerator pedal position sensor circuit continuity (High voltage) (Sensor 1) P2127: Accelerator pedal position sensor circuit continuity (Low voltage) (Sensor 2) P2128: Accelerator pedal position sensor circuit continuity (High voltage) (Sensor 2) P2138: Accelerator pedal position sensor correlation rationality check
Required Sensors/Components (Main)	Accelerator pedal sensor assembly
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	0.1 seconds: P2122, P2127, P2128 0.032 seconds: P2123 0.116 seconds: P2138
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

P2122, P2123, P2127, P2128

Monitor runs whenever following DTCs not stored	None
Battery voltage	6 V or more

P2138

Monitor runs whenever following DTCs not stored	P2122, P2123, P2127, P2128 (Accelerator pedal position sensor (APPS) circuit)
Battery voltage	6 V or more

TYPICAL MALFUNCTION THRESHOLDS

P2122

VPA voltage (Accelerator pedal position)	Less than 0.303 V (1.6%)
--	--------------------------

P2123

--	--

VPA voltage (Accelerator pedal position)	4.737 V (25.02%) or more
--	--------------------------

P2127

VPA2 voltage (Accelerator pedal position)	Less than 0.303 V (1.6%)
---	--------------------------

P2128

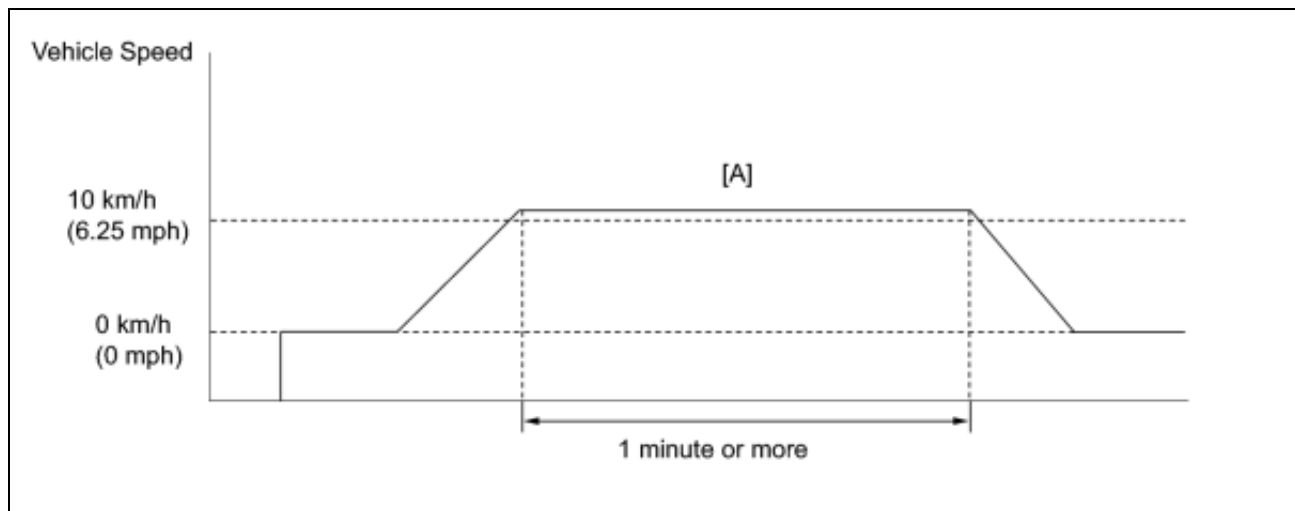
VPA2 voltage (Accelerator pedal position)	4.737 V (25.02%) or more
---	--------------------------

P2138

VPA - VPA2	4.44% (varies with VPA2) or more
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COMPONENT OPERATING RANGE

VPA voltage (Accelerator pedal position)	0.394 to 4.729 V (2.08 to 24.97%)
VPA2 voltage (Accelerator pedal position)	0.394 to 4.729 V (2.08 to 24.97%)

CONFIRMATION DRIVING PATTERN

1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
7. Depress the accelerator pedal fully and release the accelerator pedal.
8. Drive the vehicle at 10 km/h (6.25 mph) or more for 1 minute or more [A].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

9. Enter the following menus: Powertrain / Engine / Trouble Codes.

10. Read pending DTCs.

HINT:

- If a pending DTC is output, the system is malfunctioning.
- If a pending DTC is not output, perform the following procedure.

11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.


12. Input the DTC: P2122, P2123, P2127, P2128 or P2138.

13. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System normal
ABNORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System abnormal
INCOMPLETE	<ul style="list-style-type: none"> ◦ DTC judgment not completed ◦ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> ◦ Unable to perform DTC judgment ◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.

14. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs .**HINT:**

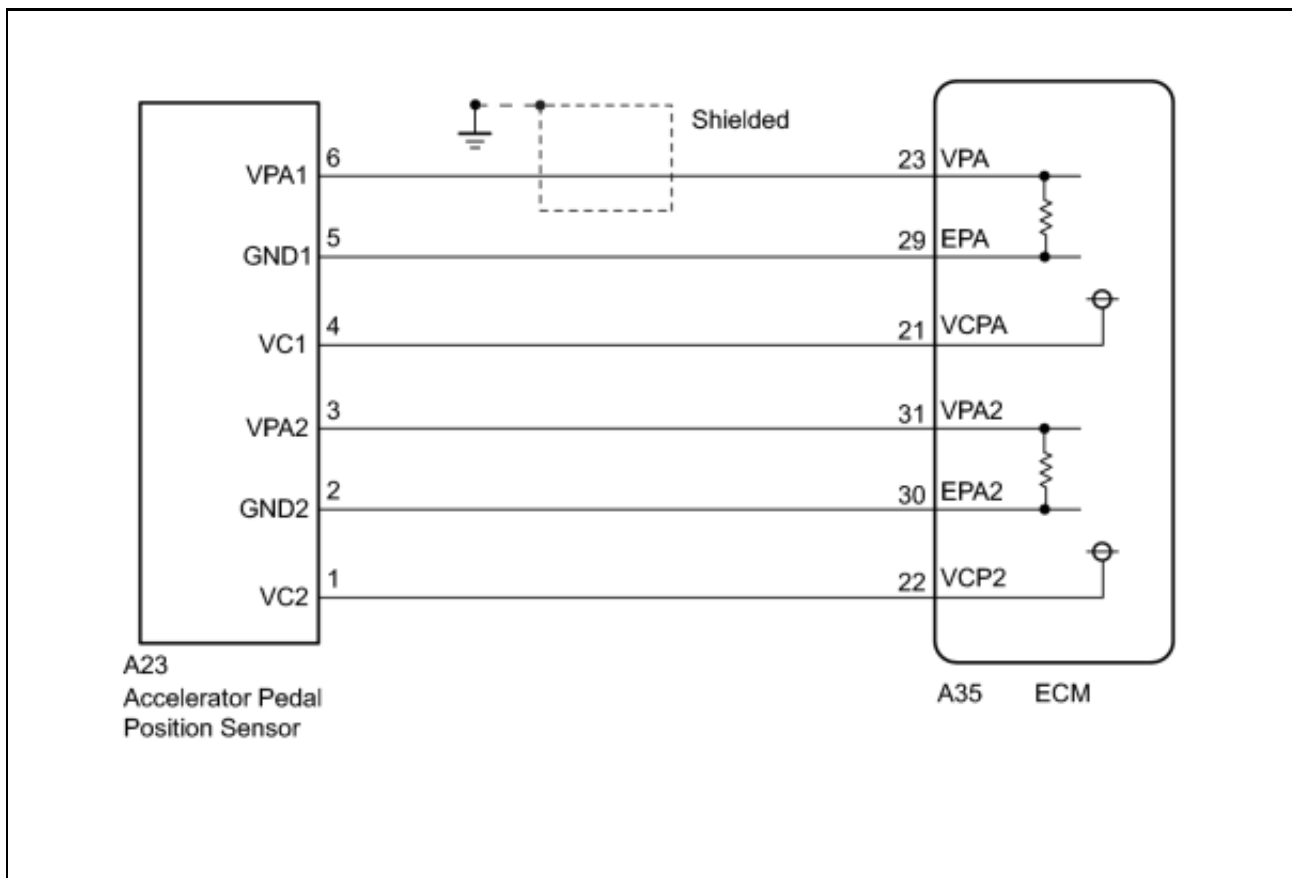
- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

FAIL-SAFE

The accelerator pedal position sensor has 2 (main and sub) sensor circuits. If a malfunction occurs in either of the sensor circuits, the ECM detects the abnormal signal voltage difference between the 2 sensor circuits and switches to fail-safe mode. In fail-safe mode, the functioning circuit is used to calculate the accelerator pedal opening angle to allow the vehicle to continue driving. If both circuits malfunction, the ECM regards the opening angle of the accelerator pedal as being fully closed. In this case, the throttle valve remains closed as if the engine is idling.

If a pass condition is detected and then the ignition switch is turned off, the fail-safe operation stops and the system returns to normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- This DTC relates to the accelerator pedal position sensor.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1. READ VALUE USING TECHSTREAM (ACCELERATOR PEDAL POSITION SENSOR)

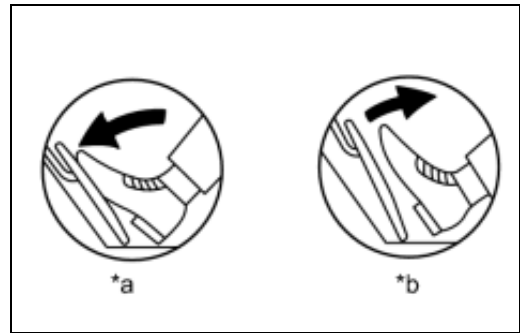
- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Data List / Accel Sensor Out No. 1 and Accel Sensor Out No. 2.
- Read the values displayed on the Techstream.

Text in Illustration

*a	Depressed
*b	Released

Standard Voltage:

ACCELERATOR PEDAL OPERATION	ACCEL SENSOR OUT NO. 1	ACCEL SENSOR OUT NO. 2	DIFFERENCE BETWEEN ACCEL SENSOR OUT NO. 1 AND ACCEL SENSOR OUT NO. 2
Released	0.5 to 0.8 V	0.5 to 0.8 V	Less than 10%
Depressed	2.4 to 3.5 V	2.4 to 3.5 V	



Result

RESULT	PROCEED TO
NG	A
OK	B

B CHECK FOR INTERMITTENT PROBLEMS

A

2. CHECK HARNESS AND CONNECTOR (ECM - ACCELERATOR PEDAL SENSOR)

- (a) Disconnect the ECM connector.
- (b) Disconnect the accelerator pedal sensor connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-23 (VPA) - A23-6 (VPA1)	Always	Below 1 Ω
A35-29 (EPA) - A23-5 (GND)	Always	Below 1 Ω
A35-21 (VCPA) - A23-4 (VC1)	Always	Below 1 Ω
A35-31 (VPA2) - A23-3 (VPA2)	Always	Below 1 Ω

A35-30 (EPA2) - A23-2 (GND2)	Always	Below 1 Ω
A35-22 (VCP2) - A23-1 (VC2)	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-23 (VPA) or A23-6 (VPA1) - Body ground	Always	10 k Ω or higher
A35-29 (EPA) or A23-5 (GND) - Body ground	Always	10 k Ω or higher
A35-21 (VCPA) or A23-4 (VC1) - Body ground	Always	10 k Ω or higher
A35-31 (VPA2) or A23-3 (VPA2) - Body ground	Always	10 k Ω or higher
A35-30 (EPA2) or A23-2 (GND2) - Body ground	Always	10 k Ω or higher
A35-22 (VCP2) or A23-1 (VC2) - Body ground	Always	10 k Ω or higher

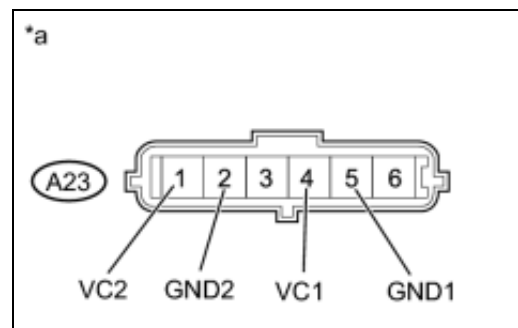
NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



3. INSPECT ECM (VC VOLTAGE)

(a) Disconnect the accelerator pedal sensor connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A23-4 (VC1) - A23-5 (GND)	Ignition Switch ON	4.5 to 5.5 V
A23-1 (VC2) - A23-2 (GND2)	Ignition Switch ON	4.5 to 5.5 V

Text in Illustration

*a


Front view of wire harness connector
(to Accelerator Pedal Sensor)

NG  **REPLACE ECM**

OK




4. REPLACE ACCELERATOR PEDAL SENSOR ASSEMBLY

(a) Replace the accelerator pedal sensor assembly  .

NEXT



5. CHECK WHETHER DTC OUTPUT RECURS (DTC P2122, P2123, P2127, P2128 OR P2138)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON and turn the Techstream on.
- (g) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (h) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (i) Read DTCs.

Result

RESULT	PROCEED TO
DTC is not output	A
DTC P2122, P2123, P2127, P2128, and/or P2138 is output	B



B REPLACE ECM

A ▶ END



Last Modified: 4-14-2014	6.6 C	Doc ID: RM000000WC400FX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 - 05/2013]
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P2195,P2196; Oxygen (A/F) Sensor Signal Stuck Lean (Bank 1 Sensor 1); 2013 MY FR-S [03/2012 - 05/2013]		

DTC	P2195	Oxygen (A/F) Sensor Signal Stuck Lean (Bank 1 Sensor 1)
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DTC	P2196	Oxygen (A/F) Sensor Signal Stuck Rich (Bank 1 Sensor 1)
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DESCRIPTION

HINT:

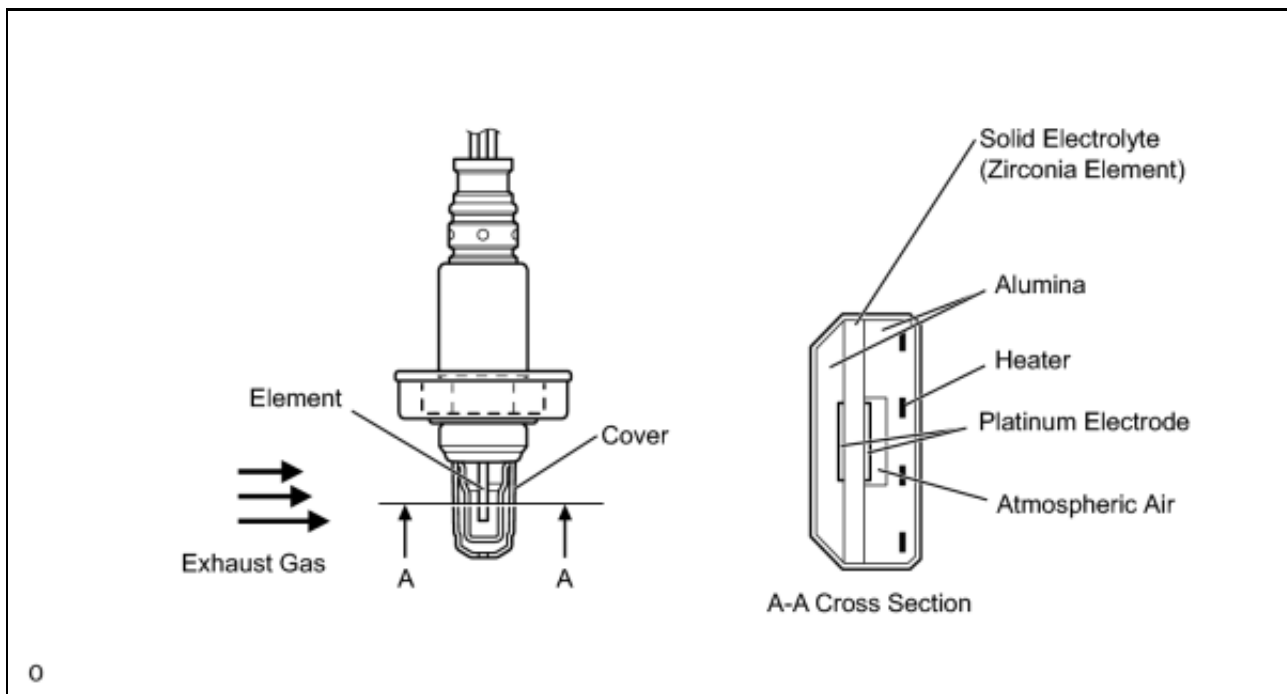
- Although the DTC titles say oxygen sensor, these DTCs relate to the air fuel ratio sensor.
- Sensor 1 refers to the sensor mounted in front of the three-way catalytic converter and located near the engine assembly.

The air fuel ratio sensor generates a voltage* that corresponds to the actual air fuel ratio. This sensor voltage is used to provide the ECM with feedback so that it can control the air fuel ratio. The ECM determines the deviation from the stoichiometric air fuel ratio level, and regulates the fuel injection time. If the air fuel ratio sensor malfunctions, the ECM is unable to control the air fuel ratio accurately.

The air fuel ratio sensor is the planar type and is integrated with the heater, which heats the solid electrolyte (zirconia element). This heater is controlled by the ECM. When the intake air volume is low (the exhaust gas temperature is low), a current flows into the heater to heat the sensor, in order to facilitate accurate oxygen concentration detection. In addition, the sensor and heater portions are the narrow type. The heat generated by the heater is conducted to the solid electrolyte through the alumina, and therefore the sensor activation is accelerated.

In order to obtain a high purification rate of the carbon monoxide (CO), hydrocarbon (HC) and nitrogen oxide (NOx) components in the exhaust gas, a three-way catalytic converter is used. For the most efficient use of the three-way catalytic converter, the air fuel ratio must be precisely controlled so that it is always close to the stoichiometric level.

*: Value changes inside the ECM. Since the air fuel ratio sensor is a current output element, the current is converted into a voltage inside the ECM. Any measurements taken at the air fuel ratio sensor or ECM connectors will show a constant voltage.



DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2195	Lambda is less than 0.85 for 10 seconds in air fuel ratio feed back control (2 trip detection logic)	<ul style="list-style-type: none"> • Open or short in air fuel ratio sensor circuit • Air fuel ratio sensor • Intake system • Fuel pressure • Fuel injector assembly (for port injection) • Fuel injector assembly (for direct injection) • ECM
P2196	Lambda is more than 1.15 for 10 seconds in air fuel ratio feed back control (2 trip detection logic)	

HINT:

- When any of these DTCs is stored, check the air fuel ratio sensor voltage output by entering the following menus on the Techstream: Powertrain / Engine / Data List / AFS Voltage B1S1.
- Short-term fuel trim values can also be read using the Techstream.
- The ECM regulates the voltages at the A1A+ and A1A- terminals of the ECM to a constant level. Therefore, the air fuel ratio sensor voltage output cannot be confirmed without using the Techstream.
- If an air fuel ratio sensor malfunction is detected, the ECM stores a DTC.

MONITOR DESCRIPTION

ECM calculates lambda based on air fuel ratio sensor output voltage. If lambda is out of the thresholds for 10 seconds or more, ECM judges the air fuel ratio sensor is stuck and stores a DTC.

MONITOR STRATEGY

	P2195: Primary oxygen sensor - Output voltage out of range
--	--

Related DTCs	P2196: Primary oxygen sensor - Output voltage out of range
Required Sensors/Components (Main)	Air fuel ratio sensor
Required Sensors/Components (Related)	Heated oxygen sensor
Frequency of Operation	Continuous
Duration	10 seconds
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	<p>P0030 (Air fuel ratio sensor - heater) P0037, P0038 (Heated oxygen sensor - heater) P0068, P0107, P0108 (Manifold absolute pressure (MAP) sensor) P0101, P0102, P0103 (Mass air flow (MAF) sensor) P0111, P0112, P0113 (Intake air temperature (IAT) sensor) P0117, P0118 (Engine coolant temperature (ECT) sensor) P0122, P0123, P0222, P0223 (Throttle position sensor) P0137, P0138 (Heated oxygen sensor - a lack of circuit continuity) P0140 (Heated oxygen sensor - output voltage) P0171, P0172 (Fuel system main feedback control) P0300, P0301, P0302, P0303, P0304 (Misfire) P0458, P0459 (Solenoid valve for purge control) P0461, P0462, P0463 (Fuel level sensor (FL)) P0500 (Vehicle speed sensor (VSS)) P0604 (RAM in ECM) P0605 (ROM in ECM) P1160 (Throttle return spring) P2101, P2102 (Throttle actuator control motor) P2109 (Throttle position sensor minimum stop) P2119 (Throttle actuator control) P2122, P2123, P2127, P2128 (Accelerator pedal position sensor (APPS) circuit) P2135 (Throttle position sensor (TPS) correlation) P2138 (Accelerator pedal position sensor (APPS) correlation)</p>
Engine coolant temperature	60°C (140°F) or higher
Atmospheric pressure	Higher than 75.06 kPa(abs) [563 mmHg(abs)]
Battery voltage	10.9 V or more
Fuel system status	Closed loop

Change of intake air mass during 1/2 engine	Less than 0.02 g/rev
Impedance of primary oxygen sensor	0 to 65 Ω
Elapsed time after engine start	60 seconds or more
Vehicle speed	20 km/h (12.4 mph) or more
Intake air mass per second	6 g/sec or more
Integrated time of canister purge after engine start	19.9 seconds or more
Learning value of EVAP density during purge	Less than 0.2
Target lambda load correction coefficient	-0.05 to 0.05
Either of following condition is met	A, B or C
A. Heated oxygen sensor output voltage feedback target	Less than 0.1 V and Higher than -0.2 V
B. Heated oxygen sensor feedback adjust	On minimum limit
C. Heated oxygen sensor feedback adjust	On maximum limit

TYPICAL MALFUNCTION THRESHOLDS

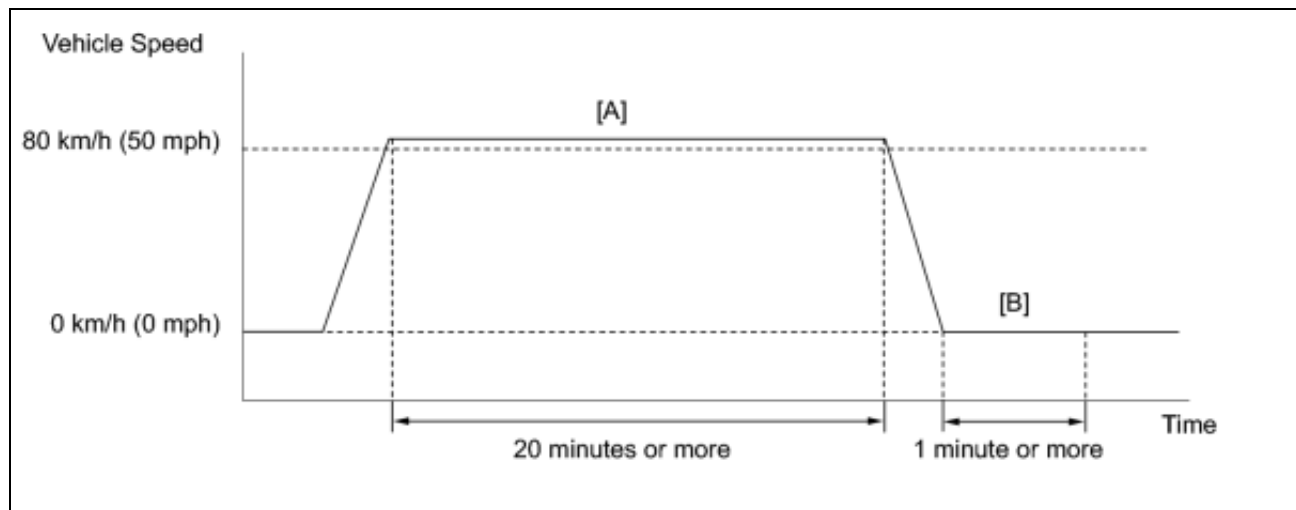
P2195

Output lambda	0.85 or less
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P2196

Output lambda	1.15 or more
---------------	--------------

CONFIRMATION DRIVING PATTERN



1. Connect the Techstream to the DLC3.

2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO .
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.

HINT:

Check the engine coolant temperature is 20°C (68°F) or less at engine started.

7. Perform the following the confirmation driving pattern.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

- a. Drive the vehicle at 80 km/h (50 mph) or more for 20 minutes or more [A].
 - b. Stop the vehicle.
 - c. Idle the engine for 1 minute or more [B].
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
 9. Read pending DTCs.

HINT:

- If a pending DTC is output, the system is malfunctioning.
- If a pending DTC is not output, perform the following procedure.

10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
11. Input the DTC: P2195 or P2196.
12. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System normal
ABNORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System abnormal
INCOMPLETE	<ul style="list-style-type: none"> ◦ DTC judgment not completed ◦ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> ◦ Unable to perform DTC judgment ◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.

13. If the test result is INCOMPLETE or N/A and no DTC is output, perform a universal trip and check for permanent DTCs INFO .

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

WIRING DIAGRAM

Refer to DTC P0030  .

INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

- Sensor 1 refers to the sensor closest to the engine assembly.
- Sensor 2 refers to the sensor farthest away from the engine assembly.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- A low air fuel ratio sensor voltage could be caused by a rich air fuel mixture. Check for conditions that would cause the engine to run rich.
- A high air fuel ratio sensor voltage could be caused by a lean air fuel mixture. Check for conditions that would cause the engine to run lean.

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO P2195 OR P2196)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Read DTCs.

Result

RESULT	PROCEED TO
DTC P2195 or P2196 is output	A
DTC P2195 or P2196 and other DTCs are output	B

HINT:

If any DTCs relating to the air fuel ratio sensor (DTCs for the air fuel ratio sensor heater or air fuel ratio sensor admittance) are output, troubleshoot those DTCs first.

B  **GO TO DTC CHART**

A**2. CONFIRM IF VEHICLE HAS RUN OUT OF FUEL IN PAST**

(a) Has the vehicle run out of fuel in the past?

NO **GO TO STEP 4**


YES**3. CHECK WHETHER DTC OUTPUT RECURS (DTC P2195 OR P2196)**

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine and warm it up.
- (i) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (j) Enter the following menus: Powertrain / Engine / Utility / All Readiness.
- (k) Input the DTC: P2195 or P2196.
- (l) Check the DTC judgment.

Result

RESULT	PROCEED TO
ABNORMAL (DTC P2195 or P2196 is output)	A
NORMAL (DTC is not output)	B

B ▶ DTC CAUSED BY RUNNING OUT OF FUEL**A****4. READ VALUE USING TECHSTREAM (TEST VALUE OF AIR FUEL RATIO SENSOR)**

- (a) Connect the Techstream to the DLC3.
 - (b) Turn the ignition switch to ON.
 - (c) Turn the Techstream on.
 - (d) Clear the DTCs  .
 - (e) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
 - (f) Enter the following menus: Powertrain / Engine / Monitor Status / O2S(A/FS) Monitor CMPL.
 - (g) Check that the status of O2S(A/FS) Monitor CMPL is Complete.
- If the status is still Incomplete, drive the vehicle according to the driving pattern again.
- (h) Enter the following menus: Powertrain / Engine / Data List / AFS Current B1S1.
 - (i) Check the test value of the air fuel ratio sensor output current during fuel-cut.

Result

RESULT	PROCEED TO
Within normal range (0.7 mA or higher, and lower than 2.2 mA)	A
Outside normal range (lower than 0.7 mA, or 2.2 mA or higher)	B

B ▶ GO TO STEP 16**A****5. READ VALUE USING TECHSTREAM (OUTPUT VOLTAGE OF AIR FUEL RATIO SENSOR)**

- (a) Connect the Techstream to the DLC3.

- (b) Start the engine.
- (c) Turn the Techstream on.
- (d) Warm up the air fuel ratio sensor at an engine speed of 2500 rpm for 90 seconds.
- (e) Enter the following menus: Powertrain / Engine / Active Test / Control the Injection Volume.
- (f) Perform the Control the Injection Volume operation with the engine idling.
- (g) Monitor the output voltages of the air fuel ratio and heated oxygen sensors (AFS Voltage B1S1 and O2S B1S2) displayed on the Techstream.

HINT:

- Change the fuel injection volume within the range of -12% to +12%. The injection volume can be changed in fine gradations.
- The air fuel ratio sensor has an output delay of a few seconds and the heated oxygen sensor has a maximum output delay of approximately 20 seconds.
- If the sensor output voltage does not change (almost no reaction) while performing the Active Test, the sensor may be malfunctioning.

TECHSTREAM DISPLAY (SENSOR)	INJECTION VOLUME	STATUS	VOLTAGE
AFS Voltage B1S1 (Air fuel ratio)	+12%	Rich	Below 2.0 V
AFS Voltage B1S1 (Air fuel ratio)	-12%	Lean	Higher than 2.4 V
O2S B1S2 (Heated oxygen)	+12%	Rich	Higher than 0.55 V
O2S B1S2 (Heated oxygen)	-12%	Lean	Below 0.4 V

Result

STATUS OF AFS VOLTAGE B1S1	STATUS OF O2S B1S2	AIR FUEL RATIO CONDITION AND AIR FUEL RATIO SENSOR CONDITION	PROCEED TO
Lean	Lean	Actual air fuel ratio lean	A
Rich	Rich	Actual air fuel ratio rich	A
Lean	Lean/Rich	Air fuel ratio sensor malfunction	B
Rich	Lean/Rich	Air fuel ratio sensor malfunction	B
Lean/Rich	Lean/Rich	Normal	B

Lean: During the Control the Injection Volume Active Test, the air fuel ratio sensor output voltage (AFS Voltage) is consistently higher than 2.4 V, and the heated oxygen sensor output voltage (O2S) is consistently below 0.4 V.

Rich: During the Control the Injection Volume Active Test, the AFS Voltage is consistently below 2.0 V, and the O2S is consistently higher than 0.55 V.

Lean/Rich: During the Control the Injection Volume Active Test, the output voltage of the heated oxygen sensor alternates correctly.

HINT:

Refer to "Data List / Active Test" [AFS Voltage B1S1 and O2S B1S2]  .

B  **GO TO STEP 16**

A



6. CHECK INTAKE SYSTEM

(a) Check the intake system for vacuum leaks  .

OK:

No leaks in the intake system.

NG  **REPAIR OR REPLACE INTAKE SYSTEM**

OK



7. CHECK FOR EXHAUST GAS LEAK

(a) Check for exhaust gas leaks.

OK:


No gas leaks.

NG  **REPAIR OR REPLACE EXHAUST SYSTEM**

OK





8. CHECK FUEL PRESSURE (LOW PRESSURE SIDE)

(a) Check the fuel pressure (low pressure side)  .


NG  **GO TO STEP 18**

OK**9. INSPECT FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)**

(a) Check the fuel injector assembly (whether fuel volume is high or low, and whether injection pattern is poor)  .

NG  **REPLACE FUEL INJECTOR ASSEMBLY (FOR PORT INJECTION)**

OK**10. CHECK FUEL PRESSURE (HIGH PRESSURE SIDE)**

(a) Check the fuel pressure (high pressure side)  .


NG  **REPAIR OR REPLACE FUEL SYSTEM (HIGH PRESSURE SIDE)**

OK**11. INSPECT FUEL INJECTOR ASSEMBLY (FOR DIRECT INJECTION)**

(a) Check the fuel injector assembly (for direct injection)  .

NG  **REPLACE FUEL INJECTOR ASSEMBLY (FOR DIRECT INJECTION)**


OK**12. REPLACE AIR FUEL RATIO SENSOR**

(a) Replace the air fuel ratio sensor  .

NEXT



13. CHECK WHETHER DTC OUTPUT RECURS (DTC P2195 OR P2196)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine and warm it up.
- (i) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (j) Enter the following menus: Powertrain / Engine / Utility / All Readiness.
- (k) Input the DTC: P2195 or P2196.
- (l) Check the DTC judgment.

Result

RESULT	PROCEED TO
ABNORMAL (DTC P2195 or P2196 is output)	A
NORMAL (DTC is not output)	B

B  END

A




14. REPLACE ECM

(a) Replace the ECM  .

NEXT




15. CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED


- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine and warm it up.
- (i) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (j) Enter the following menus: Powertrain / Engine / Utility / All Readiness.
- (k) Input the DTC: P2195 or P2196.
- (l) Check the DTC judgment.

Result

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> • DTC judgment completed • System normal
ABNORMAL	<ul style="list-style-type: none"> • DTC judgment completed • System abnormal
INCOMPLETE	<ul style="list-style-type: none"> • DTC judgment not completed • Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> • Unable to perform DTC judgment • Number of DTCs which do not fulfill DTC preconditions has reached ECU

memory limit

NEXT  **END****16. REPLACE AIR FUEL RATIO SENSOR**(a) Replace the air fuel ratio sensor  .**NEXT****17. CHECK WHETHER DTC OUTPUT RECURS (DTC P2195 OR P2196)**

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine and warm it up.
- (i) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.
- (j) Enter the following menus: Powertrain / Engine / Utility / All Readiness.
- (k) Input the DTC: P2195 or P2196.
- (l) Check the DTC judgment.

Result

RESULT	PROCEED TO
NORMAL (DTC is not output)	A
ABNORMAL (DTC P2195 or P2196 is output)	B

B  **REPLACE ECM**

A ▶ END

18. CHECK FUEL LINE

(a) Check the fuel lines for leaks or blockage.

NG ▶ REPAIR OR REPLACE FUEL LINE

OK ▶ REPLACE FUEL PUMP ASSEMBLY



Last Modified: 4-14-2014	6.6 C	Doc ID: RM000002BHB05SX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 - 05/2013]
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P2401,P2402,P2419,P2420; Evaporative Emission System Leak Detection Pump Control Circuit Low; 2013 MY FR-S [03/2012 - 05/2013]		

DTC	P2401	Evaporative Emission System Leak Detection Pump Control Circuit Low
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DTC	P2402	Evaporative Emission Leak Detection Pump Stuck ON
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DTC	P2419	Evaporative Emission System Switching Valve Control Circuit Low
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DTC	P2420	Evaporative Emission Pressure Switching Valve Stuck OFF
------------	--------------	--

DTC SUMMARY

DTC NO.	MONITORING ITEM	MALFUNCTION DETECTION CONDITION	TROUBLE AREA	DETECTION TIMING	DETECTION LOGIC
P2401	Leak detection pump stuck OFF	P2401, P2402, P2419 and P2420 stored when one of following conditions met during EVAP monitor: <ul style="list-style-type: none"> Leak detection pump OFF malfunction Leak detection pump ON malfunction Vent valve ON (closed) malfunction Vent valve OFF (opened) malfunction 	<ul style="list-style-type: none"> Canister pump module Connector/wire harness (Canister pump module - ECM) ECM 	While EVAP monitor	1 trip
P2402	Leak detection pump stuck ON				
P2419	Vent valve circuit low				
P2420	Vent valve circuit high				

DESCRIPTION

The description can be found in EVAP (Evaporative Emission) System  .

MONITOR DESCRIPTION

While the ECM monitors the EVAP system, it also monitors the status of the leak detection pump and the vent valve within the canister pump module. If the ECM detects an abnormality in the leak detection pump or vent valve operational statuses, the ECM stores the DTC, and illuminates the MIL.

MONITOR STRATEGY

Related DTC	P2401: Evaporative emission system leak detection pump circuit continuity P2402: Evaporative emission system leak detection pump circuit continuity P2419: Evaporative emission system switching valve circuit continuity P2420: Evaporative emission system switching valve circuit continuity
Required Sensors/Components (Main)	Canister pump module
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	2.5 seconds
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	None
Battery voltage	10.9 V or more
Either of the following conditions is met:	A or B
A. Ignition switch	On
B. Activated by soak timer	Satisfied

TYPICAL MALFUNCTION THRESHOLDS

P2401

Drain voltage of FET for leak detection pump	Battery voltage X 0.38 V or less
Command signal from ECM	Off

P2402

Current of FET for leak detection pump	3.5 A or more
Command signal from ECM	On

P2419


Drain voltage of FET for vent valve	Battery voltage X 0.38 V or less
Command signal from ECM	Off

P2402

Current of FET for vent valve	3.5 A or more
Command signal from ECM	On

CONFIRMATION DRIVING PATTERN**NOTICE:**

- The Evaporative System Check (Automatic Mode) consists of 5 steps performed automatically by the Techstream. It takes a maximum of approximately 24 minutes.
- Do not perform the Evaporative System Check when the fuel tank is more than 90% full because the cut-off valve may be closed, making the fuel tank leak check unavailable.
- Do not run the engine during this operation.
- When the temperature of the fuel is 35°C (95°F) or more, a large amount of vapor forms and any check results become inaccurate. When performing the Evaporative System Check, keep the fuel temperature below 35°C (95°F) and the coolant temperature below 45°C (113°F).

1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC procedure)  .
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Enter the following menus: Powertrain / Engine / Utility / Evaporative System Check / Automatic Mode.
7. After the "Evaporative System Check" is completed, check for All Readiness by entering the following menus: Powertrain / Engine / Utility / All readiness.
8. Input the DTC: P2401, P2402, P2419 or P2420.
9. Check the DTC judgment result.

TECHSTREAM DISPLAY	DESCRIPTION
NORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System normal
ABNORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System abnormal
INCOMPLETE	<ul style="list-style-type: none"> ◦ DTC judgment not completed ◦ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> ◦ Unable to perform DTC judgment ◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.

10. If the judgment result is INCOMPLETE or N/A and no pending DTC is output, perform a universal trip and check for permanent DTCs **INFO** .

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

WIRING DIAGRAM

Refer to DTC P0451 **INFO** .

INSPECTION PROCEDURE

NOTICE:

- Do not disassemble the canister pump module.
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

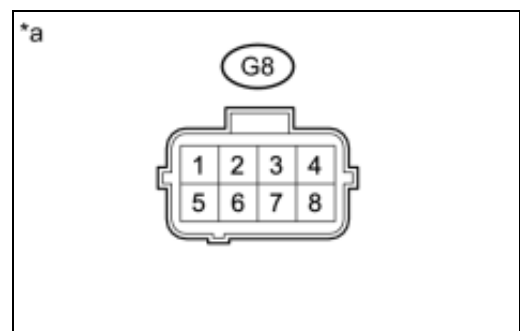
PROCEDURE

1. INSPECT CANISTER PUMP MODULE (POWER SOURCE)

- (a) Turn the ignition switch off.
- (b) Disconnect the canister pump module connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
G8-3 - Body ground	Ignition switch ON	11 to 14 V
G8-5 - Body ground	Ignition switch ON	11 to 14 V

**Text in Illustration**

*a	Component without harness connected (Canister Pump Module)
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NG GO TO STEP 4**OK****2. CHECK HARNESS AND CONNECTOR (CANISTER PUMP MODULE - ECM)**

- (a) Turn the ignition switch off.
- (b) Disconnect the canister pump module connector.
- (c) Disconnect the ECM connector.
- (d) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-8 (MPMP) - G8-4	Always	Below 1 Ω
A35-1 (VPMP) - G8-1	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-8 (MPMP) or G8-4 - Body ground	Always	10 k Ω or higher
A35-1 (VPMP) or G8-1 - Body ground	Always	10 k Ω or higher

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****3. INSPECT CANISTER PUMP MODULE**

- (a) Inspect the canister pump module .

NG **REPLACE CANISTER PUMP MODULE**

OK ▶ CHECK INTERMITTENT PROBLEMS

4. INSPECT RELAY (EFI MAIN1)

(a) Inspect the EFI MAIN1 relay **INFO** .

NG ▶ REPLACE RELAY (EFI MAIN1)

OK

5. CHECK HARNESS AND CONNECTOR (CANISTER PUMP MODULE - EFI MAIN1 RELAY)

- (a) Turn the ignition switch off.
 (b) Remove EFI MAIN1 relay from the engine room relay block assembly.
 (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G8-3 - EFI MAIN1 relay terminal 3	Always	Below 1 Ω
G8-5 - EFI MAIN1 relay terminal 3	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G8-3 or EFI MAIN1 relay terminal 3 - Body ground	Always	10 k Ω or higher
G8-5 or EFI MAIN1 relay terminal 3 - Body ground	Always	10 k Ω or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ GO TO ECM POWER SOURCE CIRCUIT



Last Modified: 4-14-2014	6.6 C	Doc ID: RM000000T6X0B4X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 - 05/2013]
Title: FA20 ENGINE CONTROL: SFI SYSTEM: P2610; ECM / PCM Internal Engine Off Timer Performance; 2013 MY FR-S [03/2012 - 05/2013]		

DTC	P2610	ECM / PCM Internal Engine Off Timer Performance
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DTC SUMMARY

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2610	<p>One of the following conditions is met (2 trip detection logic):</p> <p>Timer diagnosis</p> <ul style="list-style-type: none"> • [(Engine ECU counter - soak timer IC counter) / Engine ECU counter] is 0.24 or more. <p>Full count diagnosis</p> <ul style="list-style-type: none"> • Soak timer IC counter is not 1023. <p>Timer diagnosis</p> <ul style="list-style-type: none"> • The setting time written to the soak timer IC is different to the value read. Full count diagnosis during wake-up. • When the engine ECU counter is 1.636 seconds or less, the soak timer IC counter is 1023. 	ECM

DESCRIPTION

The soak timer operates after the ignition switch is turned off. When a certain amount of time has elapsed after turning the ignition switch off, the soak timer activates the ECM to perform malfunction checks which can only be performed after the engine is stopped. The soak timer is built into the ECM.

MONITOR DESCRIPTION

1. While the engine is running, the ECM monitors the synchronization of the soak timer and the CPU clock. If these two are not synchronized, the ECM interprets this as a malfunction, illuminates the MIL and stores the DTC.
2. If the soak timer activates the ECM even though only a short amount of time has elapsed since the ignition switch was turned off, or if the soak timer does not activate the ECM even though a considerable amount of time has elapsed since the ignition switch was turned off, the ECM determines that the soak timer is malfunctioning, illuminates the MIL and stores a DTC the next time the ignition switch is turned ON.

MONITOR STRATEGY

Related DTCs	
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	P2610: ECM engine off timer performance (soak timer IC)
Required Sensors/Components	ECM
Required Sensors/Components	-
Frequency of Operation	Once per driving cycle
Duration	0.128 seconds: Timer Diagnosis, Full Count Diagnosis and Timer Diagnosis (Case 1) Immediately: Timer Diagnosis (Case 2) and Wake-up Diagnosis
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever following DTCs are not present	None
--	------

Timer Diagnosis

Ignition switch	Off
Battery voltage	10.9 V or more
Elapsed time after engine start	10 minutes to 17.05 hours

Full Count Diagnosis

Ignition switch	Off
Battery voltage	10.9 V or more
ECM timer	4 seconds or more

Timer Diagnosis (Case 1)

Ignition switch	Off
Battery voltage	10.9 V or more

Timer Diagnosis (Case 2)

Ignition switch	Off
Battery voltage	10.9 V or more

Wake-up Diagnosis

--	--

Ignition switch	On
Soak time	1 hour or more

TYPICAL MALFUNCTION THRESHOLDS

Timer Diagnosis

$[(\text{ECM counter}) - (\text{Soak timer IC counter})] / \text{ECM counter}$	More than 0.24
--	----------------

Full Count Diagnosis

Soak timer IC counter	Not 1023 counts
-----------------------	-----------------

Timer Diagnosis (Case 1)

Value commanded by ECM = Value received by soak timer IC	Yes
--	-----

Timer Diagnosis (Case 2)

Either of the following conditions is met:	A or B
A. Soak timer IC counter when ECM timer is less than 1.636 seconds	1023 counts
B. Soak timer IC counter when ECM timer is more than 2.456 seconds	Not 1023 counts

Wake-up Diagnosis

Number of record wake-up counts is less than Number of record wake-up commands	Yes
--	-----

CONFIRMATION DRIVING PATTERN

1. Connect the Techstream to the DLC3.
2. Turn the ignition switch to ON and turn the Techstream on.
3. Clear DTCs (even if no DTCs are stored, perform the clear DTC operation) INFO.
4. Turn the ignition switch off and wait for at least 30 seconds.
5. Turn the ignition switch to ON and turn the Techstream on.
6. Start the engine.
7. Idle the engine for 10 minutes or more.
8. Enter the following menus: Powertrain / Engine / Trouble Codes.
9. Read pending DTCs.

HINT:

- If a pending DTC is output, the system is malfunctioning.
 - If a pending DTC is not output, perform the following procedure.
10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
 11. Input the DTC: P2610.
 12. Check the DTC judgment result.

TECHSTREAM	DESCRIPTION
------------	-------------

DISPLAY	
NORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System normal
ABNORMAL	<ul style="list-style-type: none"> ◦ DTC judgment completed ◦ System abnormal
INCOMPLETE	<ul style="list-style-type: none"> ◦ DTC judgment not completed ◦ Perform driving pattern after confirming DTC enabling conditions
N/A	<ul style="list-style-type: none"> ◦ Unable to perform DTC judgment ◦ Number of DTCs which do not fulfill DTC preconditions has reached ECU memory limit

HINT:

If the judgment result shows **ABNORMAL**, the system has a malfunction.

13. If the test result is **INCOMPLETE** or **N/A** and no pending DTC is output, perform a universal trip and check for permanent DTCs **INFO** .

HINT:

- If a permanent DTC is output, the system is malfunctioning.
- If no permanent DTC is output, the system is normal.

INSPECTION PROCEDURE

HINT:

- DTC P2610 is stored if an internal ECM problem is detected. Diagnostic procedures are not required. ECM replacement is required.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.


PROCEDURE

1.	REPLACE ECM
-----------	--------------------

- (a) Replace the ECM **INFO** .

NEXT

2.	CHECK WHETHER DTC OUTPUT RECURS (IN ADDITION TO DTC P2610)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Clear the DTCs  .
- (e) Turn the ignition switch off and wait for at least 30 seconds.
- (f) Turn the ignition switch to ON.
- (g) Turn the Techstream on.
- (h) Start the engine and wait for 10 minutes or more.
- (i) Enter the following menus: Powertrain / Engine / Trouble Codes / Pending.
- (j) If no pending DTC is output, the repair has been successfully completed.

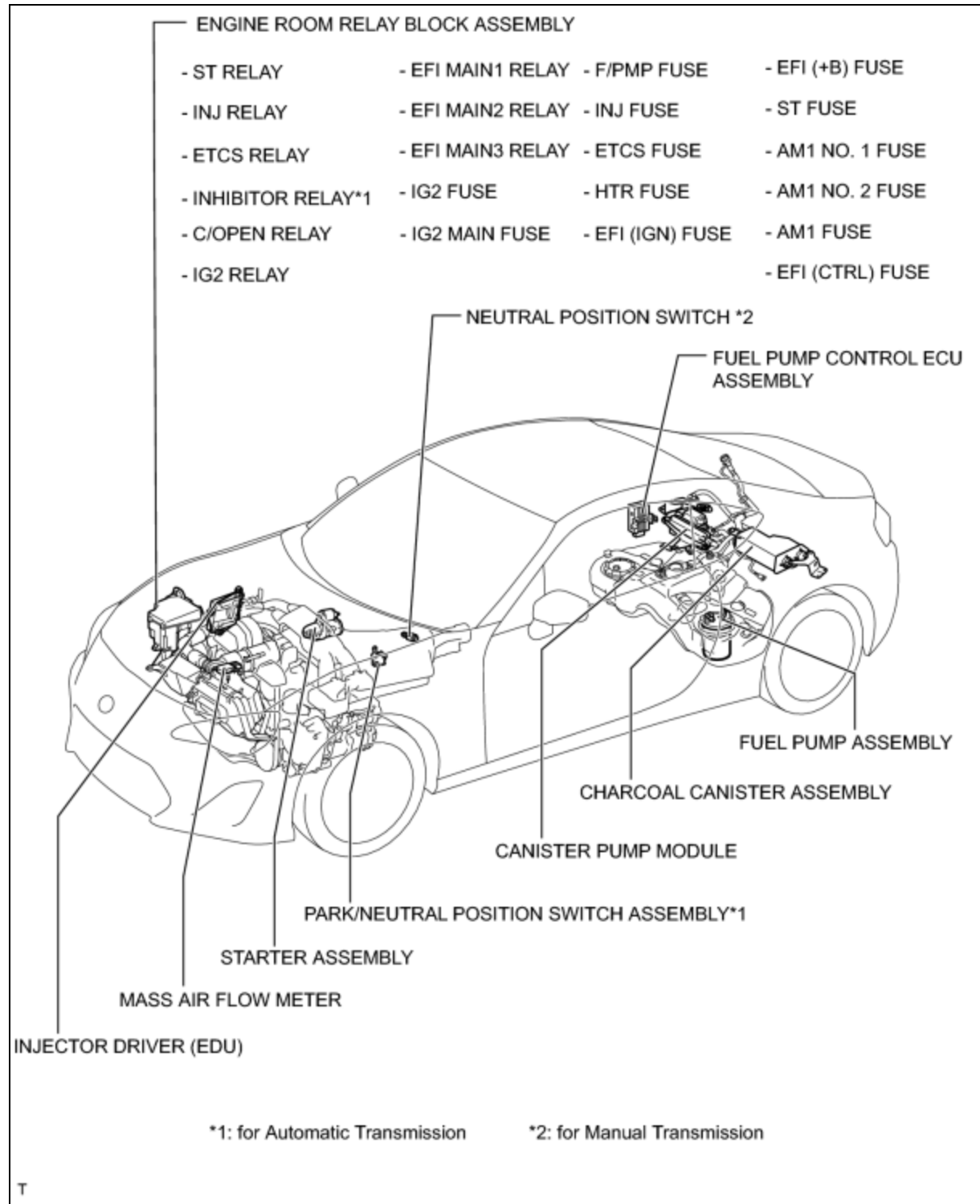
NEXT  **END**



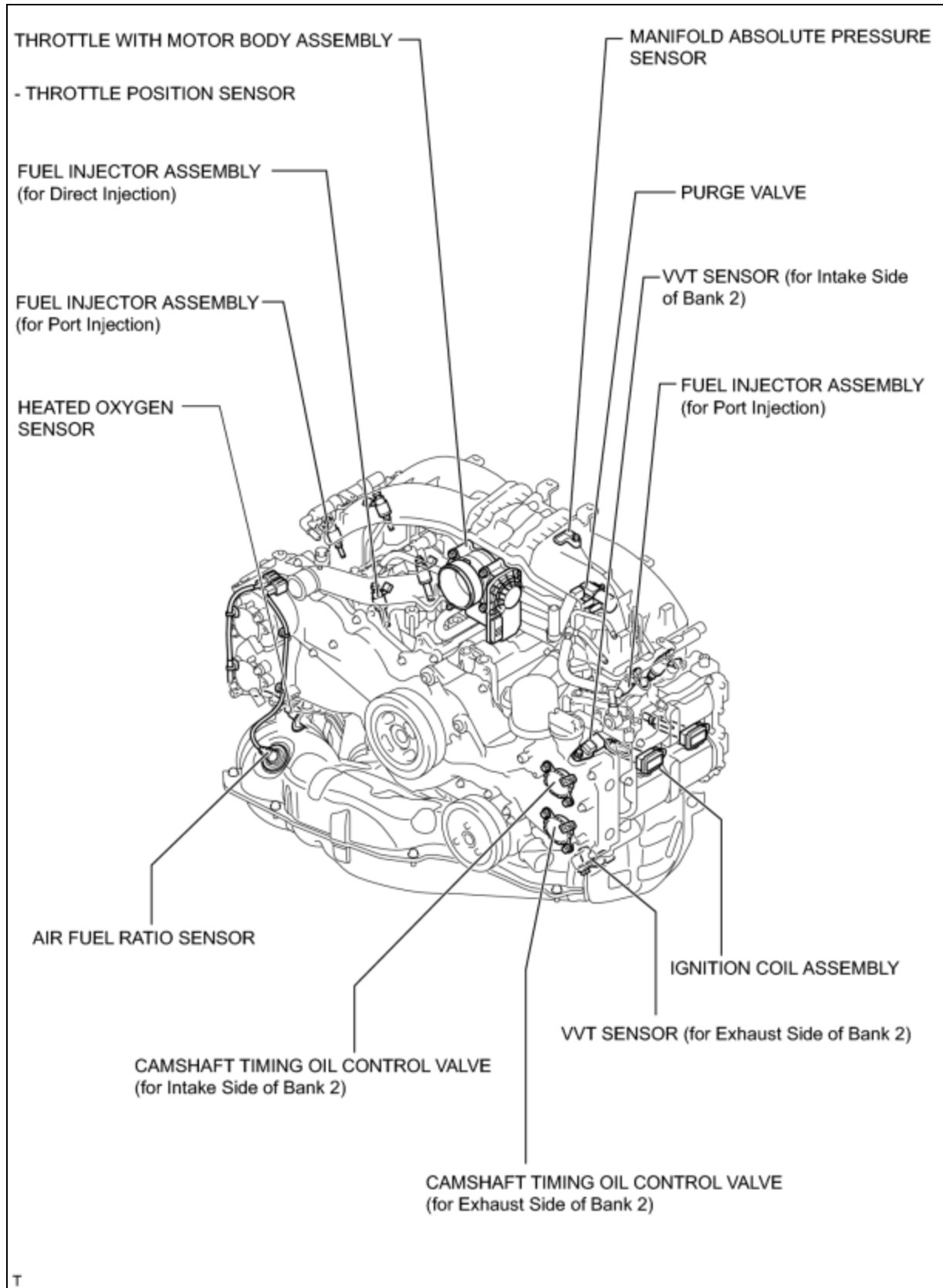
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004G5U006X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

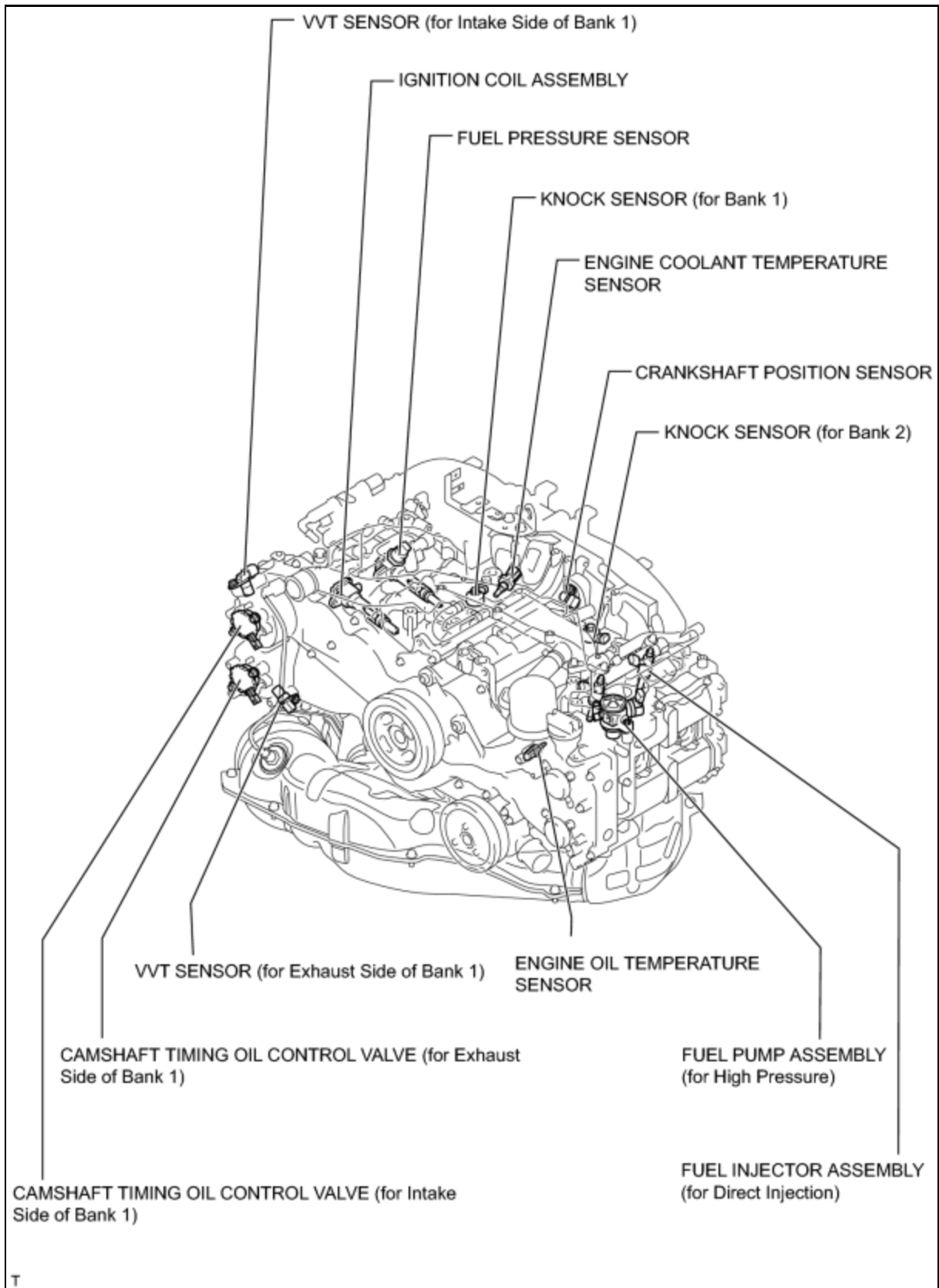
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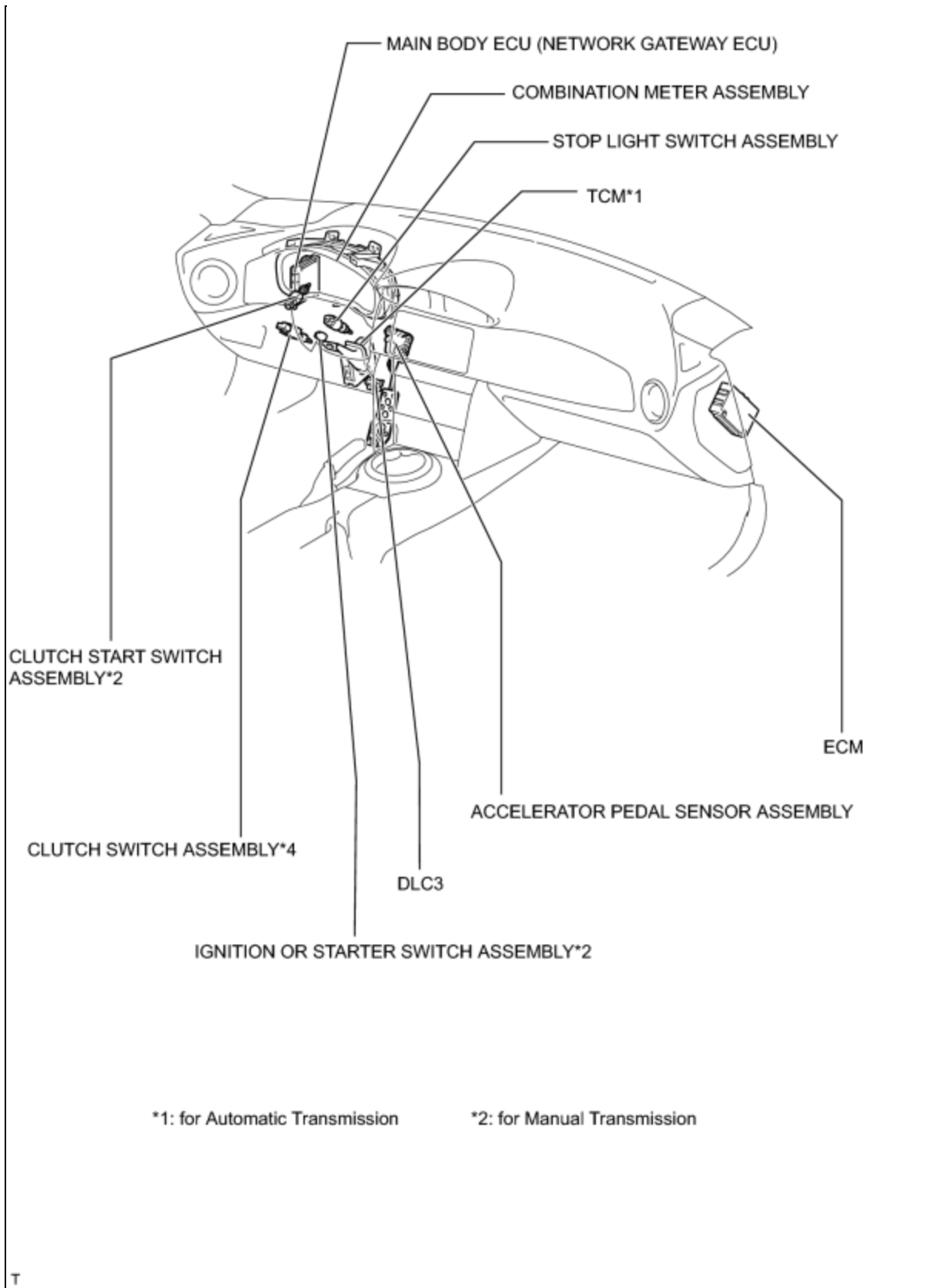
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Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PD80E1X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

1. INITIALIZATION

NOTICE:

- If the ECM is replaced, register the ECU communication ID for Immobiliser System  .
- Perform Registration (VIN registration) when replacing the ECM  .

2. WHEN USING TECHSTREAM

CAUTION:

Observe the following items for safety reasons:

- Before using the Techstream, read the instruction manual.
- Prevent the Techstream cable from being caught on the pedals, shift lever or steering wheel when driving with the Techstream connected to the vehicle.
- When driving the vehicle for testing purposes using the Techstream, 2 persons are required. One is for driving the vehicle, and the other operates the Techstream.





Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PD80E1X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

1. INITIALIZATION

NOTICE:

- If the ECM is replaced, register the ECU communication ID for Immobiliser System  .
- Perform Registration (VIN registration) when replacing the ECM  .

2. WHEN USING TECHSTREAM

CAUTION:

Observe the following items for safety reasons:

- Before using the Techstream, read the instruction manual.
- Prevent the Techstream cable from being caught on the pedals, shift lever or steering wheel when driving with the Techstream connected to the vehicle.
- When driving the vehicle for testing purposes using the Techstream, 2 persons are required. One is for driving the vehicle, and the other operates the Techstream.



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDG004X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

SFI System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Engine does not crank (Does not start)	Battery	INFO
	Starter	INFO
	Park/neutral position switch assembly*1	INFO
	Clutch start switch assembly*2	INFO
	Starter signal circuit	INFO
No initial combustion (Does not start)	ECM power source circuit	INFO
	Crankshaft position sensor	INFO
	Ignition system	INFO
	Fuel pump control circuit	INFO
	Fuel pump	INFO
	Fuel injector circuit	INFO
	Valve timing	INFO
	VC output circuit (ECM 5 V output)	INFO
	VVT sensor (for intake side)	INFO
	VVT sensor (for exhaust side)	INFO
	Starter signal circuit	INFO
	Engine immobiliser system	INFO
	ECM	INFO
	Fuel pump control circuit	INFO
	Fuel pump (for high pressure)	INFO
	Fuel injector circuit	INFO
	Fuel injector assembly (for port injection)	INFO

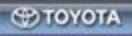
Engine cranks normally but difficult to start	Fuel injector assembly (for direct injection)	INFO
	ECM power source circuit	INFO
	Starter signal circuit	INFO
	Engine coolant temperature sensor	INFO
	Intake system	INFO
	Ignition system	INFO
	Spark plug	INFO
	Throttle with motor body assembly	INFO
	Compression	INFO
Incomplete intermittent combustion occurs (Does not start)	Fuel pump control circuit	INFO
	Fuel line	INFO
	Ignition circuit	INFO
	Ignition system	INFO
	Fuel injector circuit	INFO
	Fuel injector assembly (for port injection)	INFO
	Fuel injector assembly (for direct injection)	INFO
	ECM power source circuit	INFO
	Starter signal circuit	INFO
	Crankshaft position sensor	INFO
	VVT sensor (for intake side)	INFO
	VVT sensor (for exhaust side)	INFO
	Engine immobiliser system	INFO
	Valve timing	INFO
High engine idle speed	Throttle with motor body assembly	INFO
	Intake system	INFO
	A/C signal circuit	INFO
	ECM power source circuit	INFO
	Engine coolant temperature sensor	INFO
	PCV valve and hose	INFO
Low engine idle speed (Poor idling)	Throttle with motor body assembly	INFO
	A/C signal circuit	INFO
	Fuel pump control circuit	INFO
	Fuel pump	INFO
	Intake system	INFO
	PCV valve and hose	INFO

Rough idling	Compression	INFO
	Ignition system	INFO
	Spark plug	INFO
	Fuel injector circuit	INFO
	ECM power source circuit	INFO
	Fuel pump control circuit	INFO
	Fuel injector assembly (for port injection)	INFO
	Fuel injector assembly (for direct injection)	INFO
	Fuel pump (for high pressure)	INFO
	Fuel line	INFO
	Throttle with motor body assembly	INFO
	Intake system	INFO
	Purge valve	INFO
	PCV valve and hose	INFO
	Air fuel ratio sensor	INFO
	Heated oxygen sensor	INFO
	Mass air flow meter	INFO
	Knock sensor	INFO
	Hunting (Poor idling)	Throttle with motor body assembly
Intake system		INFO
PCV valve and hose		INFO
Air fuel ratio sensor		INFO
Mass air flow meter		INFO
Hesitation/poor acceleration	Fuel pump control circuit	INFO
	Fuel pump (for high pressure)	INFO
	Fuel line	INFO
	Spark plug	INFO
	Ignition system	INFO
	Fuel injector circuit	INFO
	Fuel injector assembly (for port injection)	INFO
	Fuel injector assembly (for direct injection)	INFO
	ECM power source circuit	INFO
	Knock sensor	INFO
	Mass air flow meter	INFO

	Throttle with motor body assembly	INFO
	Intake system	INFO
	Valve timing	INFO
	Compression	INFO
	Brake override system	INFO
Surging (Poor driveability)	Spark plug	INFO
	Fuel pump control circuit	INFO
	Fuel pump (for high pressure)	INFO
	Ignition system	INFO
	Fuel injector circuit	INFO
	Fuel injector assembly (for port injection)	INFO
	Fuel injector assembly (for direct injection)	INFO
	ECM power source circuit	INFO
	Mass air flow meter	INFO
	Variable Valve Timing (VVT) system	INFO
	Compression	INFO
	Engine stalls soon after starting	Fuel pump control circuit
Fuel pump (for high pressure)		INFO
Spark plug		INFO
Ignition system		INFO
Fuel injector circuit		INFO
Fuel injector assembly (for port injection)		INFO
Fuel injector assembly (for direct injection)		INFO
ECM power source circuit		INFO
Mass air flow meter		INFO
Variable Valve Timing (VVT) system		INFO
Throttle with motor body assembly		INFO
Intake system		INFO
PCV valve and hose		INFO
Compression		INFO
Engine stalls only during A/C operation	A/C signal circuit	INFO
	ECM	INFO
Unable/difficult to refuel	Fuel system (canister, refueling valve, roll over valve, fuel tank, etc.)	-

*1: for Automatic Transmission

*2: for Manual Transmission



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000SXQ07MX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: READINESS MONITOR DRIVE PATTERN (2013 FR-S)		

READINESS MONITOR DRIVE PATTERN

1. PURPOSE OF READINESS TESTS

- The On-Board Diagnostic (OBD II) system is designed to monitor the performance of emission related components, and indicate any detected abnormalities using DTCs (Diagnostic Trouble Codes). Since various components need to be monitored during different driving conditions, the OBD II system is designed to run separate monitoring programs called Readiness Monitors.
- To view the status, enter the following menus: Powertrain / Engine / Monitor / Current Monitor / Current.
- When the status of a Readiness Monitor reads Complete, the necessary conditions have been met for running the performance tests for that Readiness Monitor.
- A generic OBD II scan tool can also be used to view the Readiness Monitor status.

HINT:

Many state Inspection and Maintenance (I/M) programs require the status of vehicle Readiness Monitor to show Complete before beginning emission tests.

The Readiness Monitor is reset to Incomplete if:

- The ECM has lost battery power or blown a fuse.
- DTCs have been cleared.
- The conditions for running the Readiness Monitor have not been met.

If the Readiness Monitor status shows Incomplete, follow the appropriate Readiness Monitor Drive Pattern to change the status to Complete.

CAUTION:

Strictly observe posted speed limits, traffic laws, and road conditions when performing these drive patterns.

NOTICE:

These drive patterns represent the fastest method of satisfying all conditions necessary to achieve complete status for each specific Readiness Monitor.

In the event of a drive pattern being interrupted (possibly due to factors such as traffic conditions), the drive pattern can be resumed. In most cases, the Readiness Monitor will still achieve complete status upon completion of the drive pattern.

To ensure completion of the Readiness Monitors, avoid sudden changes in vehicle load and speed (driving up and down hills and/or sudden acceleration).

2. VVT SYSTEM MONITOR


(a) Refer to Confirmation Driving Pattern [P0011]  .

(b) Refer to Confirmation Driving Pattern [P0014]  .

3. CATALYST MONITOR (ACTIVE AIR FUEL RATIO CONTROL TYPE)

(a) Refer to Confirmation Driving Pattern [P0420]  .

4. EVAP SYSTEM MONITOR (KEY OFF TYPE)

(a) Refer to Confirmation Driving Pattern [EVAP System]  .

5. AIR FUEL RATIO (A/F) AND HEATED OXYGEN (HO2) SENSOR MONITORS (ACTIVE AIR FUEL RATIO CONTROL TYPE)

(a) Refer to Confirmation Driving Pattern [P0176]  .

(b) Refer to Confirmation Driving Pattern [P2195]  .

6. AIR FUEL RATIO (A/F) AND HEATED OXYGEN (HO₂) SENSOR HEATER MONITORS (FRONT A/F AND REAR HO₂ SENSOR TYPE)

(a) Refer to Confirmation Driving Pattern [P0031]  .

(b) Refer to Confirmation Driving Pattern [P0037]  .



Last Modified: 3-27-2012	6.4 M	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDTOACX
Title: FA20 ENGINE CONTROL: SFI SYSTEM: REGISTRATION (2013 FR-S)		

REGISTRATION

NOTICE:

The Vehicle Identification Number (VIN) must be input into a replacement ECM.

HINT:

The VIN is a 17-digit alphanumeric vehicle identification number. The Techstream is required to register the VIN.

1. DESCRIPTION (Using the Techstream)

HINT:

This registration section consists of 2 parts: **Read VIN and Write VIN.**

- (a) Read VIN: This process allows the VIN stored in the ECM to be read in order to confirm that the 2 VINs, provided with the vehicle and stored in the vehicle ECM, are the same.
- (b) Write VIN: This process allows the VIN to be input into the ECM. If the ECM is replaced, or the ECM VIN and vehicle VIN do not match, the VIN can be registered, or overwritten in the ECM by following this procedure.

2. READ VIN

- (a) Confirm the vehicle VIN.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Powertrain / Engine / Utility / VIN / VIN Read.

3. WRITE VIN

- (a) Confirm the vehicle VIN.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Powertrain / Engine / Utility / VIN / VIN Write.

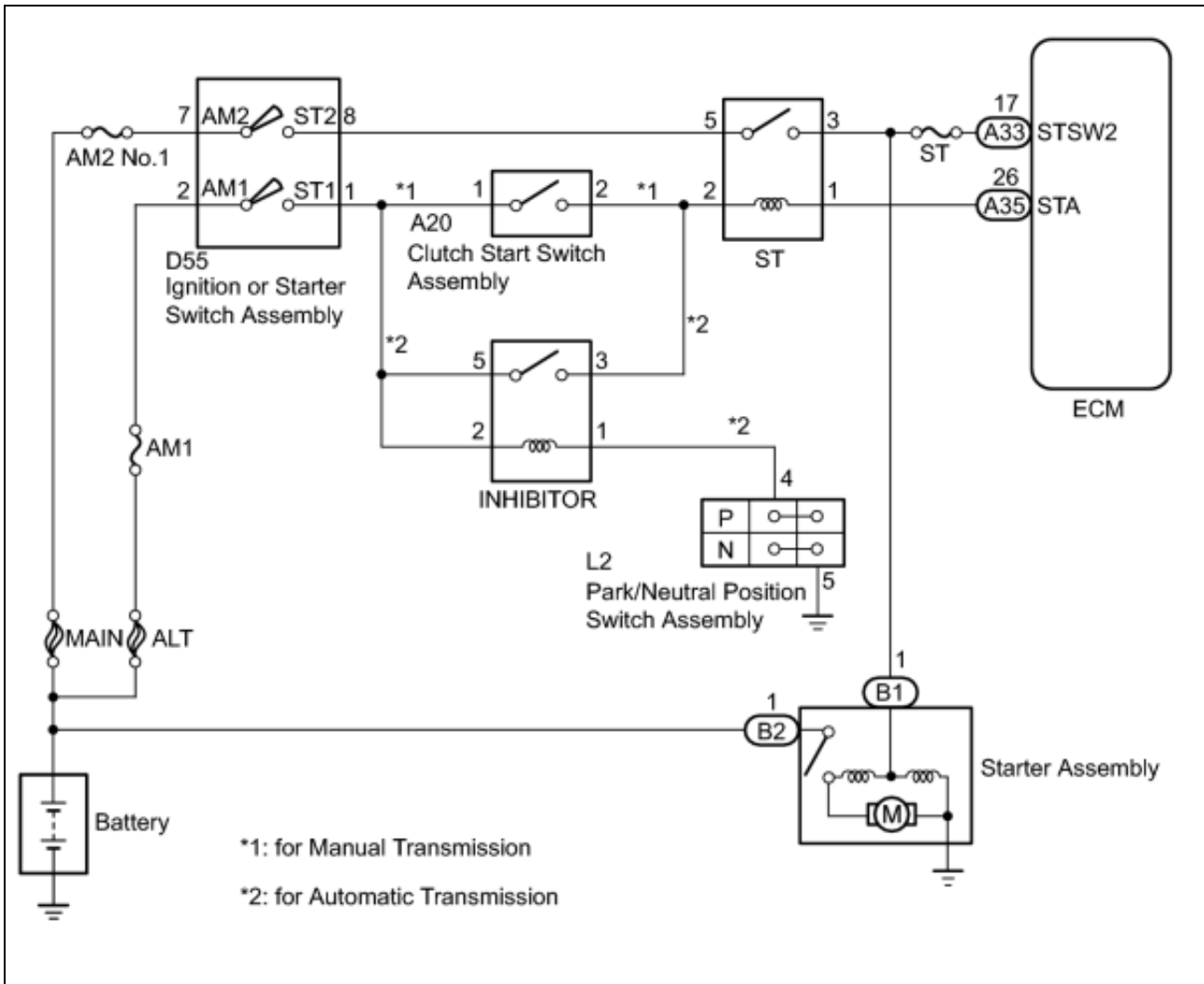
Last Modified: 4-14-2014	6.6 J	Doc ID: RM000002XN20D5X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 - 05/2013]
Title: FA20 ENGINE CONTROL: SFI SYSTEM: Starter Signal Circuit; 2013 MY FR-S [03/2012 - 05/2013]		

Starter Signal Circuit

DESCRIPTION

While the engine is being cranked, the current from the ST relay flows to the ECM STSW2 terminal. The starter start signal flowing to the STSW2 terminal is mainly used to increase the fuel injection quantity while the engine is starting.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. CHECK WHETHER ENGINE CAN BE CRANKED

(a) Check if the engine can be cranked.

Result

RESULT	PROCEED TO
Engine cannot be cranked	A
Engine can be cranked	B

B  **GO TO STEP 16**

A



2. READ VALUE USING TECHSTREAM (STARTER SIGNAL)

(a) Connect the Techstream to DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine / Data List / Starter Signal.

(e) Check the value displayed on the Techstream when the ignition switch is turned to the ON and START positions.

OK

IGNITION SWITCH POSITION	STARTER SIGNAL
ON	Close (OFF)
START	Open (ON)

NG  **GO TO STEP 4**

OK



3. CHECK HARNESS AND CONNECTOR (ECM - ST RELAY - STARTER ASSEMBLY)

- (a) Disconnect the ECM connector.
- (b) Disconnect the starter assembly connector.
- (c) Remove the ST relay from the engine room relay block assembly.
- (d) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
B1-1 - A33-17 (STSW2)	Always	Below 1 Ω
B1-1 - ST relay terminal 3	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-17 (STSW2), ST relay terminal 3 or B1-1 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



4. INSPECT IGNITION OR STARTER SWITCH ASSEMBLY

- (a) Inspect the ignition or starter switch assembly  .

NG  **REPLACE IGNITION OR STARTER SWITCH ASSEMBLY**

OK



5. CHECK HARNESS AND CONNECTOR (IGNITION OR STARTER SWITCH ASSEMBLY - ST RELAY)

- (a) Disconnect the ignition or starter switch assembly connector.
- (b) Remove the ST relay from the engine room relay block assembly.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D55-8 (ST2) - ST relay terminal 5	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D55-8 (ST2) or ST relay terminal 5 - Body ground	Always	10 k Ω or higher

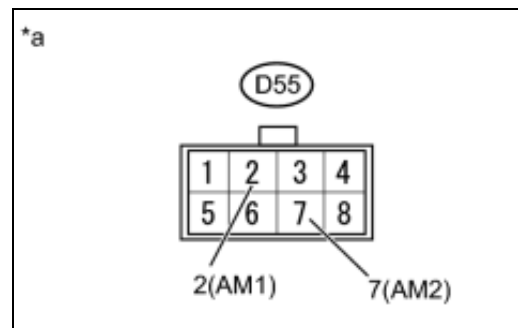
NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



6. INSPECT TERMINAL VOLTAGE (+B OF IGNITION OR STARTER SWITCH ASSEMBLY)

- (a) Disconnect the ignition or starter switch assembly connector.



- (b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D55-2 (AM1) - Body ground	Always	11 to 14 V
D55-7 (AM2) - Body ground	Always	11 to 14 V

Text in Illustration

*a

Front view of wire harness connector
(to Ignition or Starter Switch Assembly)

Result

RESULT	PROCEED TO
NG	A
OK (for automatic transmission models)	B
OK (for manual transmission models)	C

B ► **GO TO STEP 7**

C ► **GO TO STEP 12**

A ► **REPAIR OR REPLACE HARNESS OR CONNECTOR**

7. INSPECT PARK/NEUTRAL POSITION SWITCH ASSEMBLY

(a) Inspect the park/neutral position switch assembly  .

NG ► **REPLACE PARK/NEUTRAL POSITION SWITCH ASSEMBLY**

OK



8. CHECK HARNESS AND CONNECTOR (PARK/NEUTRAL POSITION SWITCH ASSEMBLY - INHIBITOR RELAY)

(a) Disconnect the park/neutral position switch assembly connector.

(b) Remove the INHIBITOR relay from the engine room relay block assembly.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
L2-4 - INHIBITOR relay terminal 1	Always	Below 1 Ω
L2-5 - Body ground	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
L2-4 or INHIBITOR relay terminal 1 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



9. CHECK HARNESS AND CONNECTOR (IGNITION OR STARTER SWITCH ASSEMBLY - INHIBITOR RELAY)

- (a) Disconnect the ignition or starter switch assembly connector.
- (b) Remove the INHIBITOR relay from the engine room relay block assembly.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D55-1 (ST1) - INHIBITOR relay terminal 5	Always	Below 1 Ω
D55-1 (ST1) - INHIBITOR relay terminal 2	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D55-1 (ST1), INHIBITOR relay terminal 2 or INHIBITOR relay terminal 5 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



10. CHECK HARNESS AND CONNECTOR (INHIBITOR RELAY - ST RELAY)

- (a) Remove the INHIBITOR relay and ST relay from the engine room relay block assembly.
- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
INHIBITOR relay terminal 3 - ST relay terminal 2	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
INHIBITOR relay terminal 3 or ST relay terminal 2 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



11. CHECK HARNESS AND CONNECTOR (ECM - ST RELAY)

- (a) Disconnect the ECM connector.
- (b) Remove the ST relay from the engine room relay block assembly.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-26 (STA) - ST relay terminal 1	Always	Below 1 Ω
A33-17 (STSW2) - ST relay terminal 3	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-26 (STA), A33-17 (STSW2), ST relay terminal 1 or ST relay terminal 3 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR**

CONNECTOR

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN
IN PROBLEM SYMPTOMS TABLE**

12. INSPECT CLUTCH START SWITCH ASSEMBLY

(a) Inspect the clutch start switch assembly **INFO** .

NG ▶ **REPLACE CLUTCH START SWITCH ASSEMBLY**

OK

**13. CHECK HARNESS AND CONNECTOR (IGNITION OR STARTER SWITCH ASSEMBLY -
CLUTCH START SWITCH)**

- (a) Disconnect the ignition or starter switch assembly connector.
 (b) Disconnect the clutch start switch assembly connector.
 (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D55-1 (ST1) - A20-1	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D55-1 (ST1) or A20-1 - Body ground	Always	10 k Ω or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR
CONNECTOR**

OK

14. CHECK HARNESS AND CONNECTOR (CLUTCH START SWITCH ASSEMBLY - ST RELAY)

- (a) Disconnect the clutch start switch assembly connector.
- (b) Remove the ST relay from the engine room relay block assembly.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A20-2 - ST relay terminal 2	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A20-2 or ST relay terminal 2 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

**15. CHECK HARNESS AND CONNECTOR (ECM - ST RELAY)**

- (a) Disconnect the ECM connector.
- (b) Remove the ST relay from the engine room relay block assembly.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-26 (STA) - ST relay terminal 1	Always	Below 1 Ω
A33-17 (STSW2) - ST relay terminal 3	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-26 (STA), A33-17 (STSW2), ST relay terminal 1 or ST relay terminal	Always	10 k Ω or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE

16. READ VALUE USING TECHSTREAM (ST SIGNAL)

- (a) Connect the Techstream to DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Data List / Starter Signal.
- (e) Check the value displayed on the Techstream when the ignition switch is turned to the ON and START positions.

OK

IGNITION SWITCH POSITION	STARTER SIGNAL
ON	Close (OFF)
START	Open (ON)

Result

RESULT	PROCEED TO
NG	A
OK	B

B ▶ PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE

A ▼

17. CHECK HARNESS AND CONNECTOR (ECM - ST RELAY)

- (a) Disconnect the ECM connector.
- (b) Remove the ST relay from the engine room relay block assembly.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-26 (STA) - ST relay terminal 1	Always	Below 1 Ω
A33-17 (STSW2) - ST relay terminal 3	Always	Below 1 Ω

Standard Resistance (Check for short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A35-26 (STA), A33-17 (STSW2), ST relay terminal 1 or ST relay terminal 3 - Body ground	Always	10 k Ω or higher

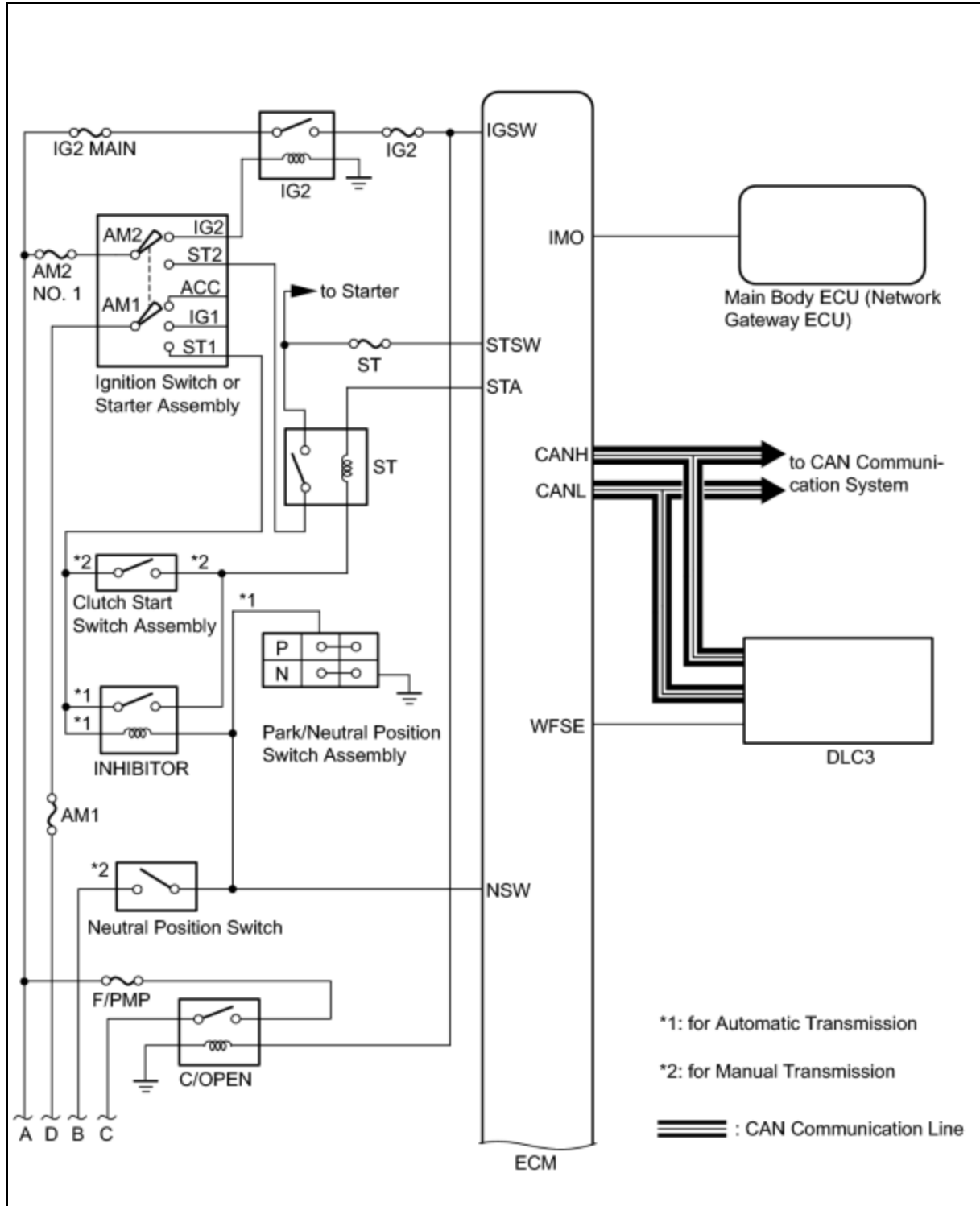
NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

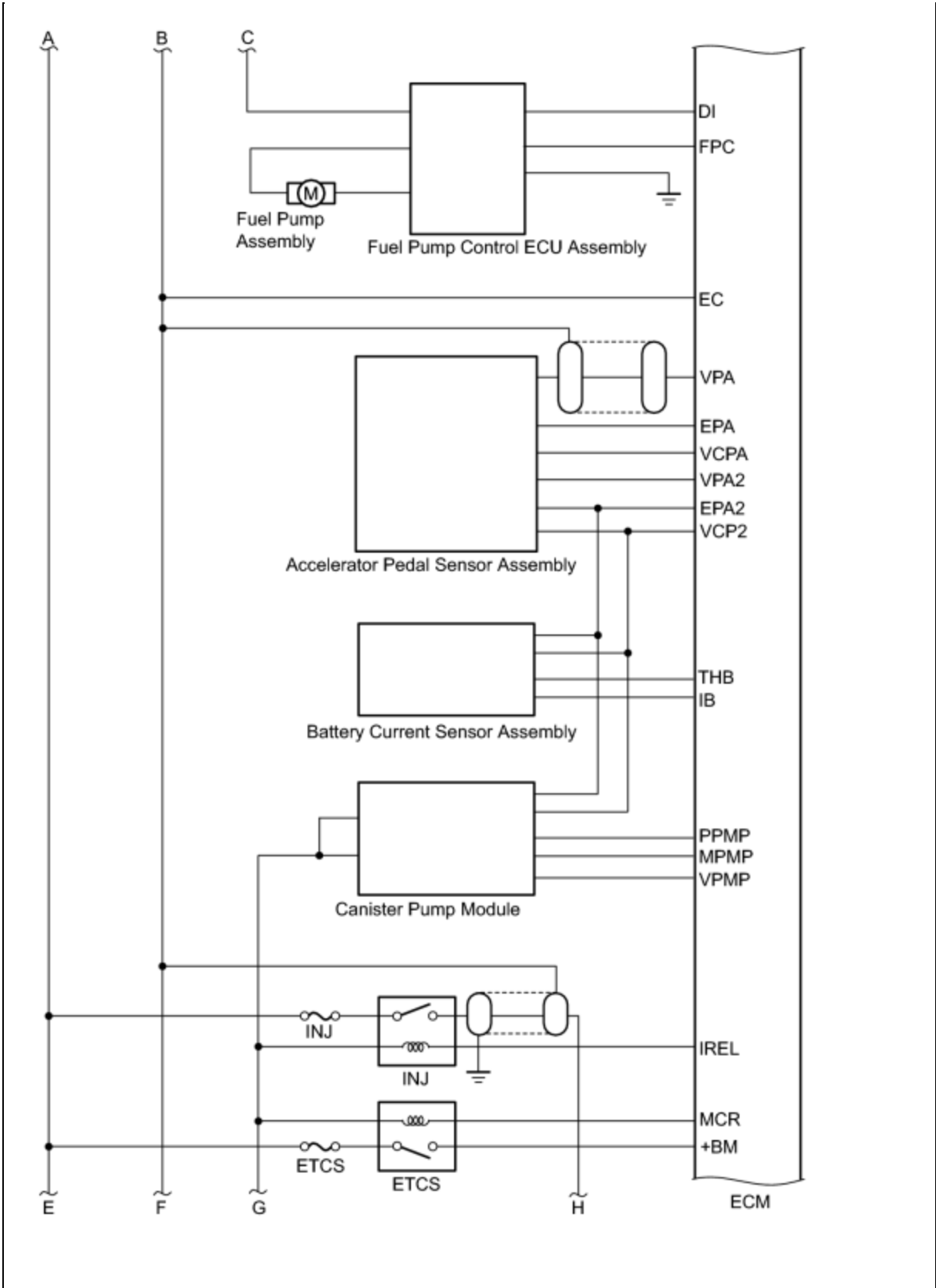
OK  **REPLACE ECM**

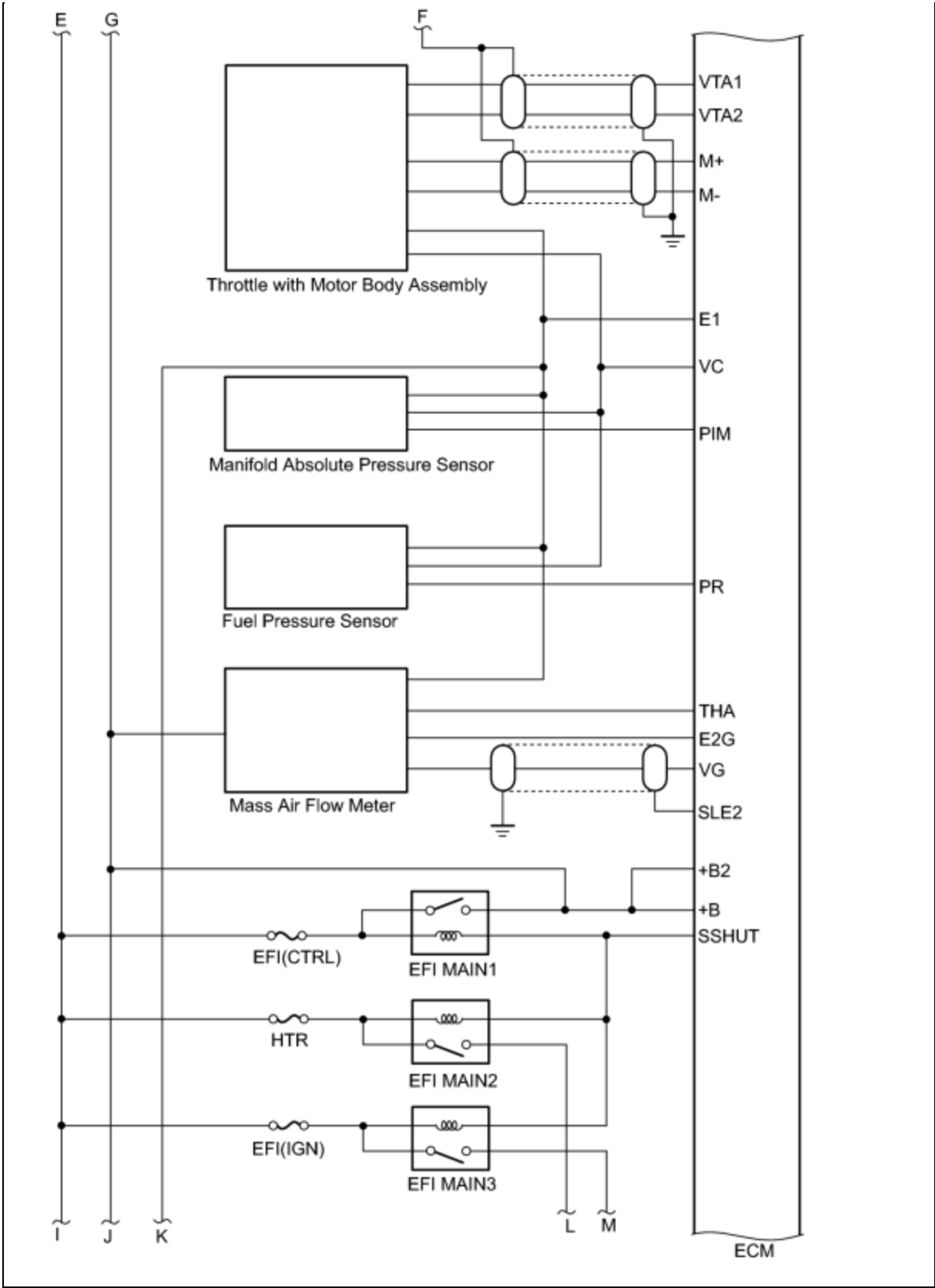


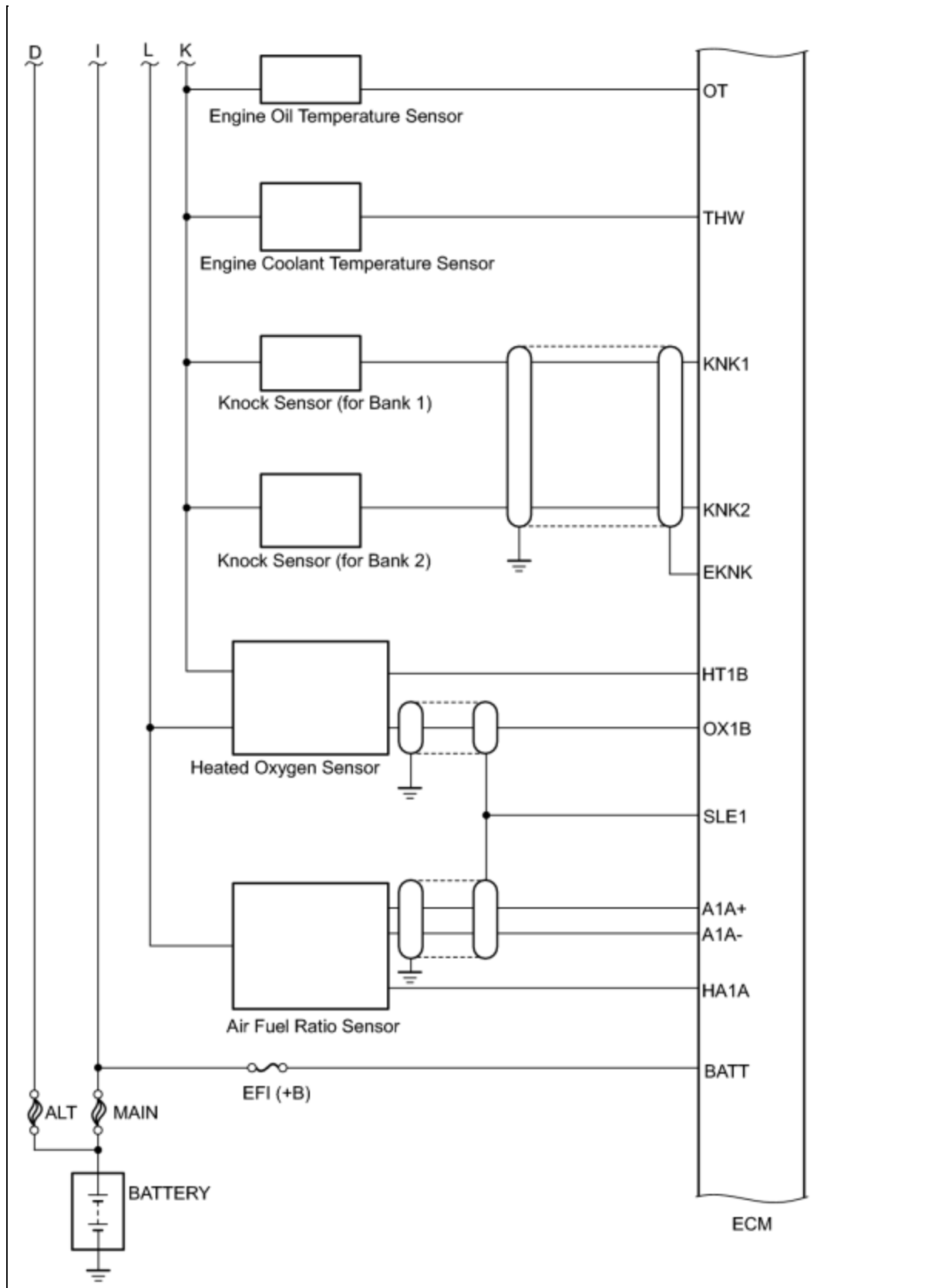
Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDB0D3X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

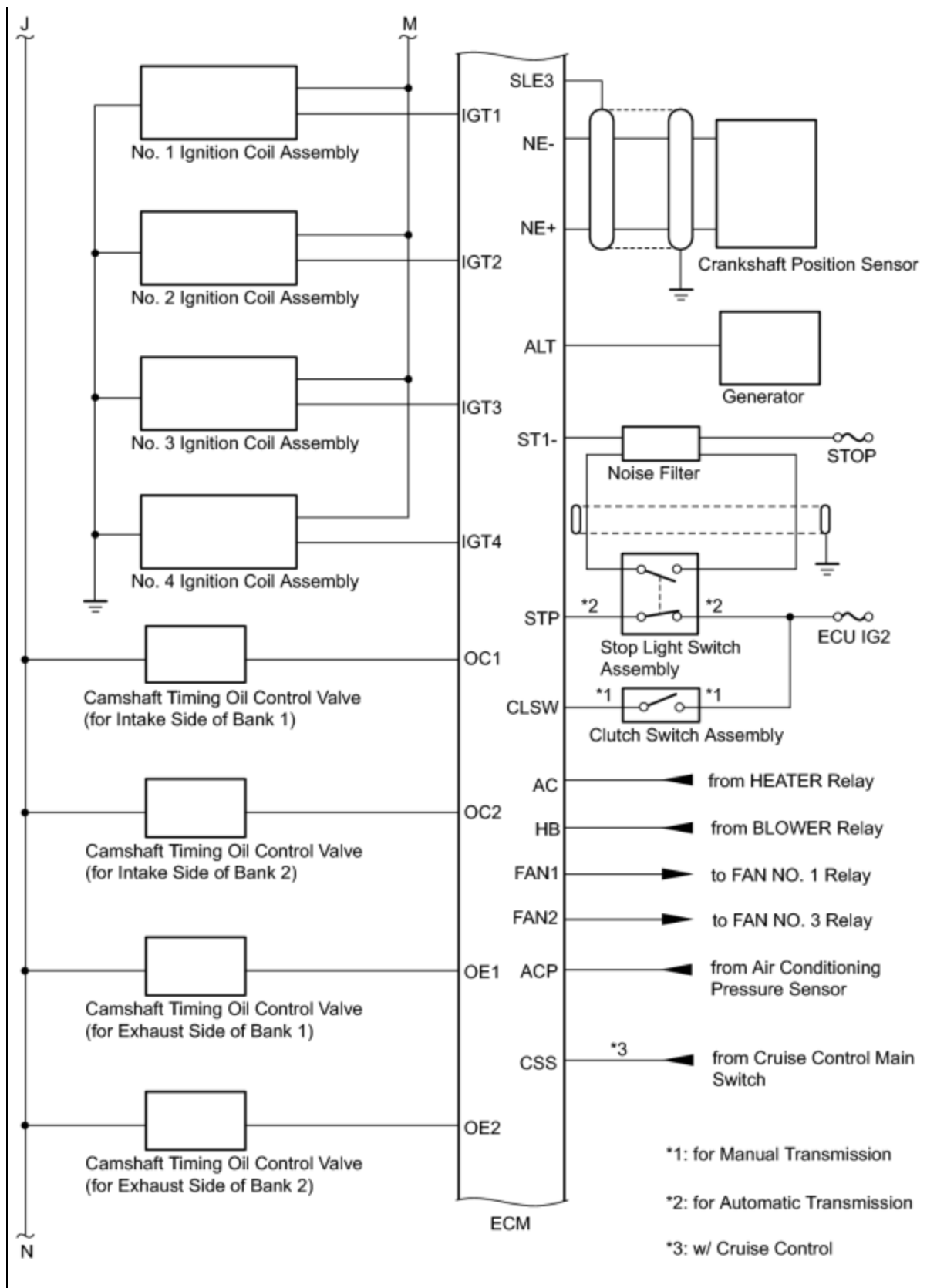
SYSTEM DIAGRAM

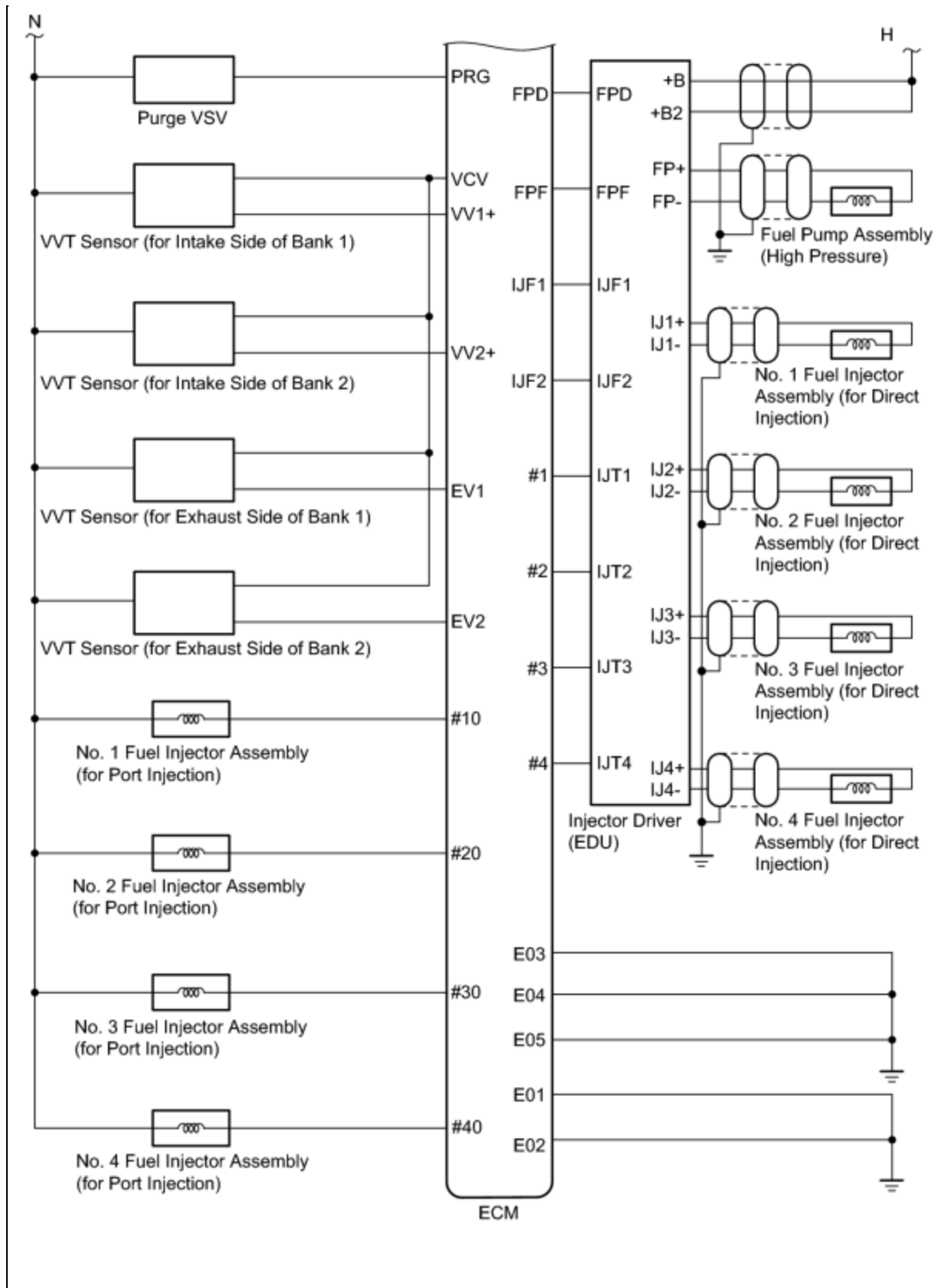






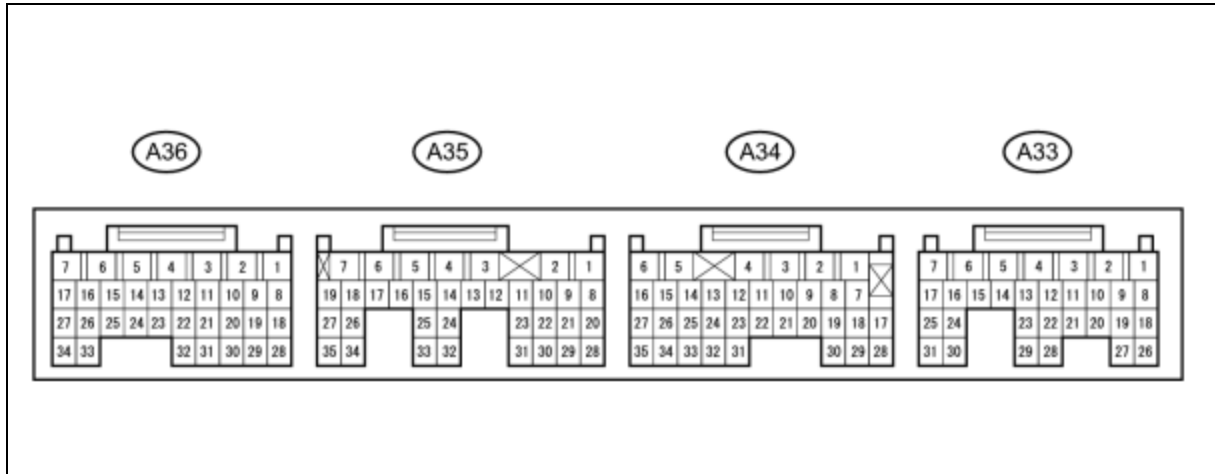






Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDHOK9X
Title: FA20 ENGINE CONTROL: SFI SYSTEM: TERMINALS OF ECM (2013 FR-S)		

TERMINALS OF ECM



HINT:

The standard voltage between each pair of the ECM terminals is shown in the table below. The appropriate conditions for checking each pair of the terminals are also indicated. The result of checks should be compared with the standard voltage for that pair of the terminals, and displayed in the "Specified Condition" column. The illustration above can be used as a reference to identify the ECM terminal locations.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A33-1 (+B2) - A36-4 (E01)	V - B-L	Power source of ECM	Ignition switch ON	12 to 14 V
A33-2 (BATT) - A36-4 (E01)	W - B-L	Battery(for measuring battery voltage and for ECM memory)	Always	10 to 13 V
A33-3 (ST1-) - A36-4 (E01)	BR-B - B-L	Stop light switch	Brake pedal depressed	11 to 14 V
			Brake pedal released	0 to 1 V
A33-7 (STP) - A36-4 (E01)*1	R - B-L	Stop light switch	Brake pedal depressed	0 to 1 V
			Brake pedal released	11 to 14 V
A33-8 (ACP) - A36-4 (E01)	G - B-L	Air conditioning pressure sensor	Ignition switch ON with A/C on	0 to 1 V
			Idling with A/C off	12 to 14 V
A33-12 (THA) - A36-29 (E1)	BR-G - Y-B	Intake air temperature sensor (built into mass air flow meter)	Ignition switch ON	0.3 to 4.6 V
A33-14 (STSW2) -	BR - B-		Ignition switch ON	0 to 1 V

A36-4 (E01)*3	L	Starter signal	Cranking	6 to 13 V
A33-15 (CLSW) - A36-4 (E01)*2	R-Y - B-L	Clutch switch	Ignition switch ON with clutch pedal depressed	0 to 1 V
			Ignition switch ON with clutch pedal released	10 to 13 V
A33-16 (NSW) - A36-4 (E01)	W-R - B-L*1 G-B - B-L*2	Neutral switch signal	Ignition switch ON, shift lever in P or N*1 Ignition switch ON, shift lever in Neutral*2	0 to 1 V
			Ignition switch ON, shift lever not in P or N*1 Ignition switch ON, shift lever not in Neutral*2	10 to 13 V
A33-17 (STSW2) - A36-4 (E01)	BR - B-L	Starter signal	Ignition switch ON	0 to 1 V
			Cranking	6 to 13 V
A33-18 (CANL) - A36-4 (E01)	B-P - B-L	CAN communication line	Ignition switch ON	Pulse generation (See waveform 1)
A33-19 (CANH) - A36-4 (E01)	O - B-L	CAN communication line	Ignition switch ON	Pulse generation (See waveform 2)
A33-20 (HB) - A36-4 (E01)	G-Y - B-L	BLOWER relay	Ignition switch ON with blower fan switch on	0 to 1 V
			Ignition switch ON with blower fan switch off	10 to 13 V
A33-22 (VG) - A33-29 (E2G)	Y - B-G	Mass air flow meter	Idling with warm engine	0.9 to 4.5 V
A33-27 (IGSW) - A36-4 (E01)	GR - B-L	IG2 relay	Ignition switch ON	10 to 13 V
A34-5 (HA1A) - A36-4 (E01)	V - B-L	Air fuel ratio sensor heater	Idling with cold engine	Pulse generation (See waveform 3)
A34-6 (+B) - A36-4 (E01)	V - B-L	Power source of ECM	Ignition switch ON	12 to 14 V
A34-9 (PR) - A36-29 (E1)	V-B - Y-B	Fuel pressure sensor	Idling with warm engine	1.0 to 1.7 V
A34-11 (IJF1) - A36-4 (E01)	R-Y - B-L	Injector for direct injection confirmation signal	Idling	Pulse generation (See waveform 4)

A34-13 (FPF) - A36-4 (E01)	R-B - B-L	High pressure side fuel pump (Spill valve)	Idling	Pulse generation (See waveform 5)
A34-14 (EV1+) - A36- 4 (E01)	Y-BR - B-L	Variable valve timing (VVT) sensor (Exhaust side (bank 1))	Idling with warm engine	Pulse generation (See waveform 6)
A34- 15(VV2+) - A36-4 (E01)	Y-V - B-L	Variable valve timing (VVT) sensor (Intake side (bank 2))	Idling with warm engine	Pulse generation (See waveform 7)
A34-16 (NE+) - A34-27 (NE-)	B - W	Crank position sensor	Idling with warm engine	Pulse generation (See waveform 6 or 7)
A34-17 (KNK2) - A36- 29 (E1)	G - Y-B	Knock sensor	Ignition switch ON	Approximately 2.5 V
A34-18 (A1A-) - A36-4 (E01)	O - B-L	Air fuel ratio sensor	Ignition switch ON	2.4 to 2.7 V
A34-19 (A1A+) - A36- 4 (E01)	W - B-L	Air fuel ratio sensor	Ignition switch ON	2.8 to 3.2 V
A34-20 (PIM) - A36-29 (E1)	BR-B - Y-B	Manifold absolute pressure sensor	Idling with warm engine	1.1 to 2.0 V
A34-21 (OX1B) - A36- 4 (E01)	L-W - B-L	Heated oxygen sensor	Idling with warm engine	0 to 0.9 V
A34-25 (EV2+) - A36- 4 (E01)	BR-Y - B-L	Variable valve timing (VVT) sensor (Exhaust side (bank 2))	Idling with warm engine	Pulse generation (See waveform 6)
A34-26 (VV1+) - A36- 4 (E01)	Y-P - B- L	Variable valve timing (VVT) sensor (Intake side (bank 1))	Idling with warm engine	Pulse generation (See waveform 7)
A34-28 (KNK1) - A36- 29 (E1)	G - Y-B	Knock sensor	Ignition switch ON	Approximately 2.5 V
A34-31 (IJF2) - A36-4 (E01)	R-G - B-L	Injector for direct injection confirmation signal	Idling	Pulse generation (See waveform 4)
A34-32 (FPD)	R-W -	High pressure side fuel pump		Pulse generation

- A36-4 (E01)	B-L	(Spill valve)	Idling	(See waveform 5)
A34-34 (VCV) - A36-4 (E01)	G-B - B-L	Power source of camshaft timing oil control valve (OCV)	Ignition switch ON	4.5 to 5.5 V
A35-1 (VPMP) - A36-4 (E01)	D-L - B-L	Vent valve (built into canister pump module)	Ignition switch ON	10 to 13 V
A35-5 (IREL) - A36-4 (E01)	D-W - B-L	INJ relay	Idling	10 to 13 V
			Ignition switch ON	0 to 1 V
A35-7 (+BM) - A36-4 (E01)	R-L - B- L	ETCS relay	Ignition switch ON	10 to 13 V
A35-8 (MPMP) - A36-4 (E01)	O-L - B-L	Leak detection pump (built into canister pump module))	Ignition switch ON	10 to 13 V
			Leak detection pump ON	0 to 1 V
A35-10 (DI) - A36-4 (E01)	W-B - B-L	Fuel pump control (for fuel pump control malfunctioning detection)	Ignition switch ON	10 to 12 V
A35-11 (FAN1) - A36- 4 (E01)	R-W - B-L	FAN NO. 3 relay	Ignition switch ON Cooling fan not operated	10 to 13 V
			Idling with A/C on or High engine coolant temperature Cooling fan operated	0 to 0.5 V
A35-12 (FAN2) - A36- 4 (E01)	B-R - B-L	FAN NO. 2 relay	Ignition switch ON	10 to 13 V
			Idling with A/C on or High engine coolant temperature Cooling fan operated	0 to 0.5 V
A35-13 (SSHUT) - A36-4 (E01)	LG - B- L	EFI MAIN1 relay	Ignition switch ON	0 to 1 V
A35-15 (TACH) - A36- 4 (E01)*3	GR-R - B-L	Engine speed	Engine speed maintained at 1500 rpm	Pulse generation (See waveform 8)
A35-17 (MCR) - A36-4 (E01)	L-R - B- L	ETCS relay	Ignition switch ON	0 to 1 V
A35-19(FPC) - A36-4 (E01)	SB - B- L	Fuel pump control	Ignition switch ON	Pulse generation (See waveform 9)
A35-20 (PPMP) - A36- 4 (E01)	O-B - B-L	Canister pressure sensor (built into canister pump module)	Ignition switch ON	1.5 to 4.0 V
A35-21 (VCPA) - A36- 4 (E01)	L-Y - B- L	Power source of accelerator pedal position sensor	Ignition switch ON	4.5 to 5.5 V
A35-22 (VCP2) - A36-	G-B -	Power source of accelerator	Ignition switch ON	4.5 to 5.5 V

4 (E01)	B-L	pedal position sensor		
A35-23(VPA) - A35-29 (EPA)	W - L	Accelerator pedal position sensor (for engine control)	Ignition switch ON, Accelerator pedal fully released	Approximately 0.7 V
			Ignition switch ON, Accelerator pedal fully depressed	Approximately 3.1 V
A35-26 (STA) - A36-4 (E01)	B-W - B-L	ST relay	Ignition switch ON	10 to 13 V
			Cranking	0 to 1 V
A35-31 (VPA2) - A35- 30 (EPA2)	O - Y-B	Accelerator pedal position sensor (for sensor malfunctioning detection)	Ignition switch ON, Accelerator pedal fully released	Approximately 0.7 V
			Ignition switch ON, Accelerator pedal fully depressed	Approximately 3.1 V
A35-35 (AC) - A36-4 (E01)	L-O - B-L	HEATER relay	Idling with A/C on	0 to 0.5 V
			Idling with A/C off	12 to 14 V
A36-1 (M-) - A36-4 (E01)	SB - B- L	Throttle actuator	Idling with warm engine	Pulse generation (See waveform 10)
A36-2 (M+) - A36-4 (E01)	G-Y - B-L	Throttle actuator	Idling with warm engine	Pulse generation (See waveform 10)
A36-5 (OE2) - A36-4 (E01)	BR-L - B-L	Camshaft timing oil control valve (OCV) (Exhaust side (bank 2))	Ignition switch ON	11 to 14 V
			Idling with warm engine	Pulse generation (See waveform 11)
A36-6 (HT1B) - A36-4 (E01)	R-B - B-L	Heated oxygen sensor heater	Ignition switch ON	11 to 14 V
			Idling with cold engine	Pulse generation (See waveform 12)
A36-7 (OE1) - A36-4 (E01)	R-W - B-L	Camshaft timing oil control valve (OCV) (Exhaust side (bank 1))	Ignition switch ON	11 to 14 V
			Idling with warm engine	Pulse generation (See waveform 11)
A36-8 (IGT4) - A36-4 (E01)	W-L - B-L	Ignition coil (ignition signal)	Idling with warm engine	Pulse generation (See waveform 13)
A36-10 (IGT2) - A36- 4 (E01)	Y-R - B-L	Ignition coil (ignition signal)	Idling with warm engine	Pulse generation (See waveform 13)

A36-11 (PRG) - A36-4 (E01)	R-G - B-L	Purge valve	One of the following conditions is met: <ul style="list-style-type: none">Ignition switch ONIdling with warm engine, under purge control	Pulse generation (See waveform 14)
A36-12 (#10) - A36-4 (E01)	P - B-L	Injector for port injection	Idling with warm engine	Pulse generation (See waveform 15)
A36-13 (#40) - A36-4 (E01)	P-G - B-L	Injector for port injection	Idling with warm engine	Pulse generation (See waveform 15)
A36-14 (#1) - A36-4 (E01)	W - B-L	Injector for direct injection	Idling with warm engine	Pulse generation (See waveform 4)
A36-16 (OC2) - A36-4 (E01)	GR - B- L	Variable valve timing (VVT) sensor (Intake side (bank 2))	Ignition switch ON	11 to 14 V
			Idling with warm engine	Pulse generation (See waveform 11)
A36-17 (OC1) - A36-4 (E01)	G-W - B-L	Variable valve timing (VVT) sensor (Intake side (bank 1))	Ignition switch ON	11 to 14 V
			Idling with warm engine	Pulse generation (See waveform 11)
A36-18 (VTA1) - A36- 29 (E1)	LG - Y- B	Throttle position sensor (for engine control)	Ignition switch ON, Accelerator pedal fully released	Approximately 0.6 V
			Ignition switch ON, Accelerator pedal fully depressed	Approximately 4.2 V
A36-19 (VC) - A36-29 (E1)	R - Y-B	Power source for sensor (specific voltage)	Ignition switch ON	4.5 to 5.5 V
A36-20 (OT) - A36-29 (E1)	BR - Y- B	Oil temperature sensor	Idling	0.5 to 1.4 V
A36-21 (IGT1) - A36- 4 (E01)	W-R - B-L	Ignition coil (ignition signal)	Idling with warm engine	Pulse generation (See waveform 13)
A36-22 (#20) - A36-4 (E01)	P-L - B- L	Injector for port injection	Idling with warm engine	Pulse generation (See waveform 15)
A36-23 (#4) -	LG-R -	Injector for direct injection	Idling with warm engine	Pulse generation

A36-4 (E01)	B-L			(See waveform 4)
A36-24 (#3) - A36-4 (E01)	LG-W - B-L	Injector for direct injection	Idling with warm engine	Pulse generation (See waveform 4)
A36-25 (#2) - A36-4 (E01)	LG-B - B-L	Injector for direct injection	Idling with warm engine	Pulse generation (See waveform 4)
A36-28 (VTA2) - A36-29 (E1)	R-Y - Y-B	Throttle position sensor (for sensor malfunction detection)	Ignition switch ON, Accelerator pedal fully released	Approximately 1.5 V
			Ignition switch ON, Accelerator pedal fully depressed	Approximately 4.3 V
A36-30 (THW) - A36-29 (E1)	BR-W - Y-B	Engine coolant temperature sensor	Idling, Engine coolant temperature 60 to 120°C (176 to 248°F)	0.8 to 1.8 V
A36-31 (IGT3) - A36-4 (E01)	W-G - B-L	Ignition coil (ignition signal)	Idling with warm engine	Pulse generation (See waveform 13)
A36-32 (#30) - A36-4 (E01)	P-B - B-L	Injector for port injection	Idling with warm engine	Pulse generation (See waveform 15)
A33-4 (EC) - Body ground	B-L - Body ground	Ground	Always	Below 1 Ω
A33-28 (SLE2) - Body ground	-	Shield	Always	Below 1 Ω
A34-1 (E03) - Body ground	B-R - Body ground	Ground	Always	Below 1 Ω
A34-2 (E04) - Body ground	B-W - Body ground	Ground	Always	Below 1 Ω
A34-3 (E05) - Body ground	B-W - Body ground	Ground	Always	Below 1 Ω
A34-29 (EKNK) - Body ground	-	Shield	Always	Below 1 Ω
A34-30 (SLE1) - Body ground	-	Shield	Always	Below 1 Ω
A34-35				

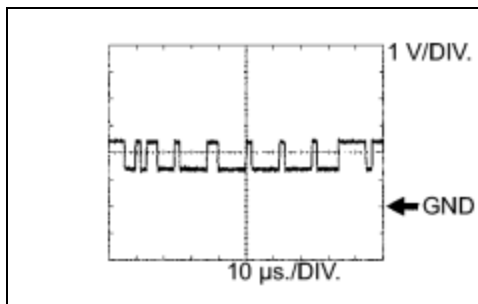
(SLE3) - Body ground	-	Shield	Always	Below 1 Ω
A35-29 (EPA) - A36-4 (E01)	L - B-L	Ground	Ignition switch ON	0 to 1 V
A35-30 (EPA2) - A36-4 (E01)	Y-B - B-L	Ground	Ignition switch ON	0 to 1 V
A36-3 (E02) - Body ground	B-Y - Body ground	Ground	Always	Below 1 Ω
A36-4 (E01) - Body ground	B-L - Body ground	Ground	Always	Below 1 Ω
A36-29 (E1) - Body ground	Y-B - Body ground	Ground	Ignition switch ON	0 to 1 V

*1: for Automatic Transmission

*2: for Manual Transmission

1. WAVEFORM 1

CAN Communication Signal



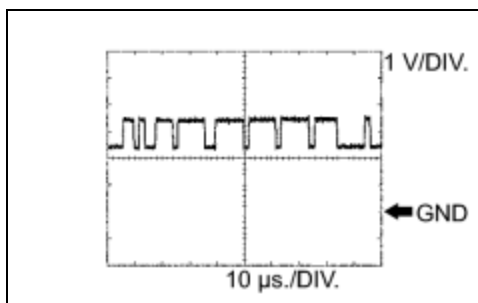
ECM Terminal Name	Between CANL and E01
Tester Range	1 V/DIV., 10 μ s./DIV.
Condition	Ignition switch ON

HINT:

The waveform varies depending on the CAN communication signal.

2. WAVEFORM 2

CAN Communication Signal

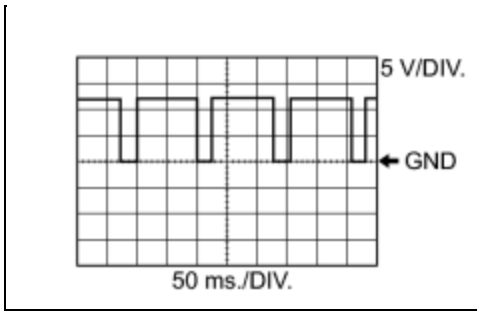


ECM Terminal Name	Between CANH and E01
Tester Range	1 V/DIV., 10 μ s./DIV.
Condition	Ignition switch ON

HINT:

The waveform varies depending on the CAN communication signal.

3. WAVEFORM 3

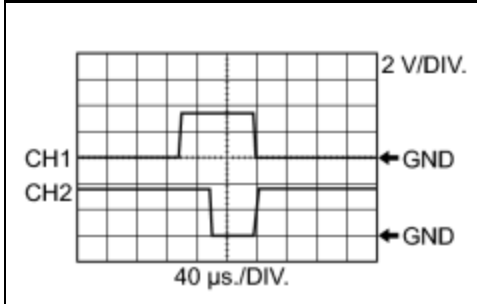


Air Fuel Ratio Sensor Heater

ECM Terminal Name	Between HA1A and E01
Tester Range	5 V/DIV., 50 ms./DIV.
Condition	Idling with cold engine

4. WAVEFORM 4

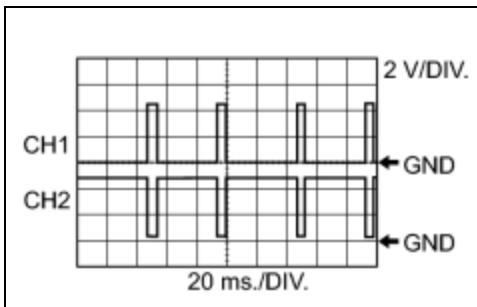
Injector for Direct Injection No. 1 (to No. 4) Injection Signal



ECM Terminal Name	CH1: Between #1 (to #4) and E01 CH2: Between IJF1or IJF2 and E01
Tester Range	2 V/DIV., 40 μs./DIV.
Condition	Idling with warm engine

HINT:

The wavelength becomes shorter as the engine speed increases.



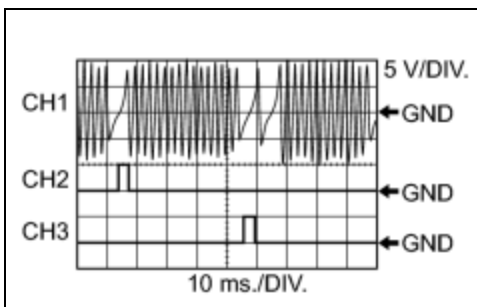
5. WAVEFORM 5

Fuel Pump for High Pressure (Spill Valve)

ECM Terminal Name	CH1: Between FPD and E01 CH2: Between FPF and E01
Tester Range	2 V/DIV., 20 ms./DIV.
Condition	Idling with warm engine

6. WAVEFORM 6

Crankshaft Position Sensor and VVT Sensor for Exhaust Camshaft



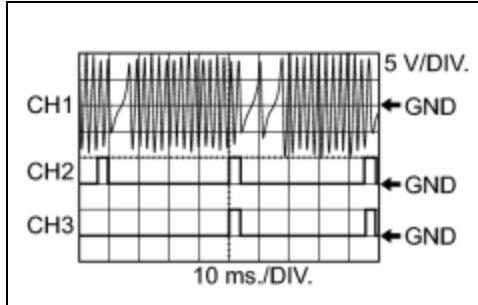
ECM Terminal Name	CH1: Between NE+ and NE- CH2: Between EV1+ and E01 CH3: Between EV2+ and E01
Tester Range	5 V/DIV., 10 ms./DIV.
Condition	Idling with warm engine

HINT:

The wavelength becomes shorter as the engine speed increases.

7. WAVEFORM 7

Crankshaft Position Sensor and VVT Sensor for Intake Camshaft



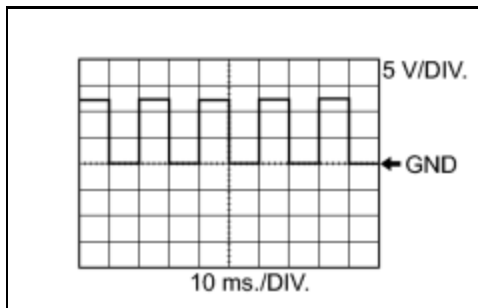
ECM Terminal Name	CH1: Between NE+ and NE- CH2: Between VV1+ and E01 CH3: Between VV2+ and E01
Tester Range	5 V/DIV., 10 ms./DIV.
Condition	Idling with warm engine

HINT:

The wavelength becomes shorter as the engine speed increases.

8. WAVEFORM 8

Engine Speed Signal



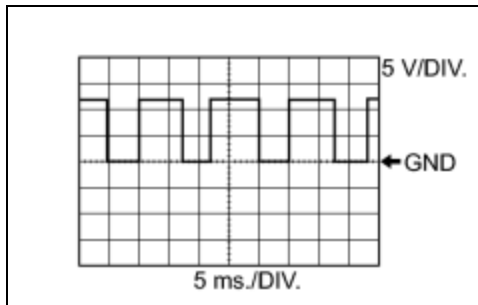
ECM Terminal Name	Between TACH and E01
Tester Range	5 V/DIV., 10 ms./DIV.
Condition	Engine speed maintained at 1500 rpm

HINT:

The wavelength becomes shorter as the vehicle speed increases.

9. WAVEFORM 9

Fuel Pump Control

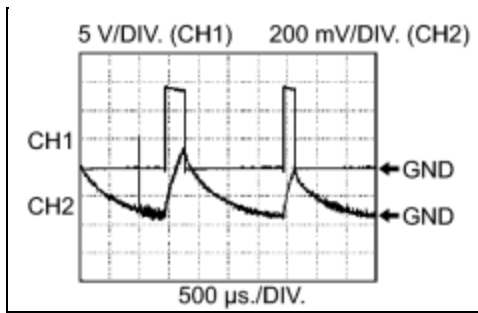


ECM Terminal Name	Between FPC and E01
Tester Range	5 V/DIV., 5 ms./DIV.
Condition	Ignition switch ON

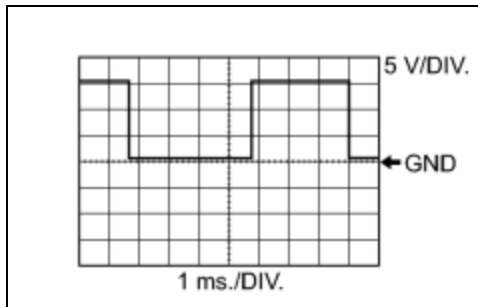
10. WAVEFORM 10

Throttle Actuator

ECM Terminal Name	CH1: Between M+ and E01 CH2: Between M- and E01
Tester Range	CH1: 5 V/DIV., 500 μ s./DIV. CH2: 200 mV/DIV., 500 μ s./DIV.



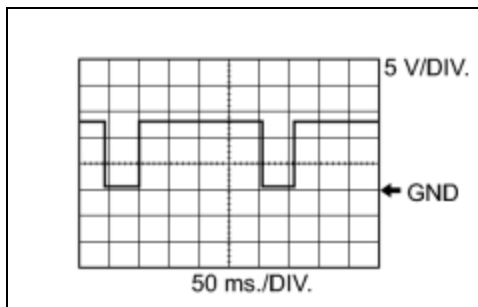
Condition	Idling with warm engine



11. WAVEFORM 11

Camshaft Timing Oil Control Valve (OCV)

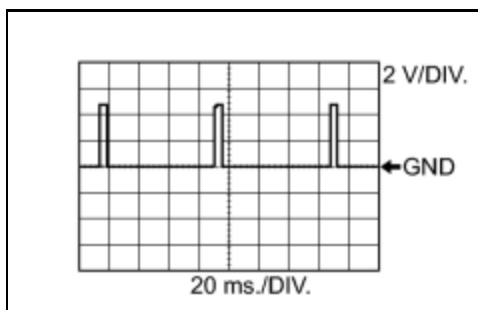
ECM Terminal Name	Between OC1, OC2, OE1 or OE2 and E01
Tester Range	5 V/DIV., 1 ms./DIV.
Condition	Idling with warm engine



12. WAVEFORM 12

Heated Oxygen Sensor

ECM Terminal Name	Between HT1B and E01
Tester Range	5 V/DIV., 50 ms./DIV.
Condition	Idling with cold engine



13. WAVEFORM 13

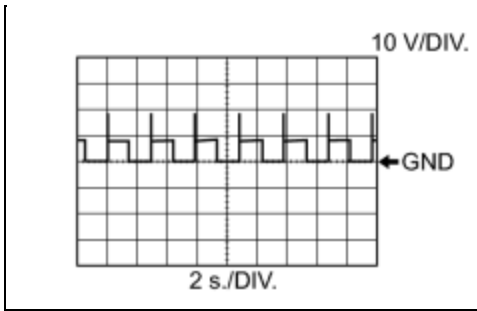
Ignition Coil (Ignition Signal)

ECM Terminal Name	Between IGT (1 to 4) and E01
Tester Range	2 V/DIV., 20 ms./DIV.
Condition	Idling with warm engine

14. WAVEFORM 14

Purge Valve

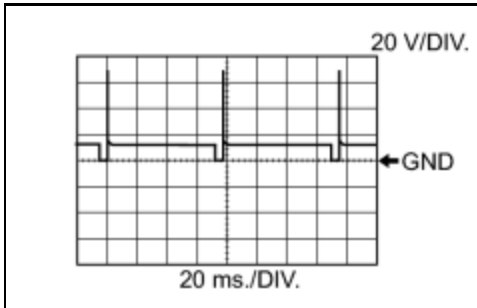
ECM Terminal Name	Between PRG and E01
Tester Range	10 V/DIV., 2 s./DIV.
	One of the following conditions is met:



Condition	<ul style="list-style-type: none"> • Ignition switch ON • Idling with warm engine, under purge control

15. WAVEFORM 15

Injector for Port Injection No. 1 (to No. 4) Injection Signal



ECM Terminal Name	Between # (10 to 40) and E01
Tester Range	20 V/DIV., 20 ms./DIV.
Condition	Idling with warm engine

HINT:

The wavelength becomes shorter as the engine speed increases.

Last Modified: 4-14-2014	6.6 C	Doc ID: RM0000020H3028X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 - 05/2013]
Title: FA20 ENGINE CONTROL: SFI SYSTEM: U0073,U0101,U0122,U0140,U0155,U0402,U0416,U0423; Control Module Communication Bus "A" Off; 2013 MY FR-S [03/2012 - 05/2013]		

DTC	U0073	Control Module Communication Bus "A" Off
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DTC	U0101	Lost Communication with TCM
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DTC	U0122	Lost Communication with Vehicle Dynamics Control Module
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DTC	U0140	Lost Communication with Body Control Module
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DTC	U0155	Lost Communication with Instrument Panel Cluster (IPC) Control Module
------------	--------------	--

DTC	U0402	Invalid Data Received from TCM
------------	--------------	---------------------------------------

DTC	U0416	Invalid Data Received from Vehicle Dynamics Control Module
------------	--------------	---

DTC	U0423	Invalid Data Received from Instrument Panel Cluster Control Module
------------	--------------	---

DESCRIPTION

Refer to CAN communication system for system description  .

DTC NO.	DTC DETECTION CONDITIONS	TROUBLE AREAS
U0073	Bus off state for 0.436 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> • Wire harness (CANL and CANH circuits) • ECM
U0101	No communication between ECM and TCM for 0.5 seconds or more	<ul style="list-style-type: none"> • Wire harness (CANL and CANH circuits) • ECM

	(1 trip detection logic)	<ul style="list-style-type: none"> • TCM
U0122	No communication between ECM and skid control ECU for 0.5 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> • Wire harness (CANL and CANH circuits) • ECM • Skid control ECU (Brake actuator assembly)
U0155	No communication between ECM and combination meter assembly for 0.5 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> • Wire harness (CANL and CANH circuits) • ECM • Combination meter assembly
U0402	Invalid data received from TCM for 2 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> • Wire harness (CANL and CANH circuits) • ECM • TCM
U0416	Invalid data received from skid control ECU for 2 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> • Wire harness (CANL and CANH circuits) • ECM • Skid control ECU (Brake actuator assembly)
U0423	Invalid data received from combination meter assembly for 2 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> • Wire harness (CANL and CANH circuits) • ECM • Combination meter assembly

MONITOR DESCRIPTION

The ECM, TCM, skid control ECU (brake actuator assembly) and combination meter assembly communicate with each other via the CAN communication line. If there is a problem in this communication, the ECM stores the DTC.

MONITOR STRATEGY

Related DTCs	<p>U0073: Control Module Communication Bus Off</p> <p>U0101: Lost Communication with TCM</p> <p>U0122: Lost Communication with Vehicle Stability Control Module</p> <p>U0155: Lost Communication with Instrument Panel Cluster Control Module (Combination Meter)</p> <p>U0402: Invalid Data Received from TCM</p> <p>U0416: Invalid Data Received from Vehicle Stability Control Module</p>
--------------	--

	U0423: Invalid Data Received from Instrument Panel Cluster Control Module
Required Sensors/Components (Main)	ECM
Required Sensors/Components (Related)	TCM Skid control ECU (Brake actuator assembly) Combination meter assembly
Frequency of Operation	Continuous
Duration	0.436 seconds: U0073 0.5 seconds: U0101, U0122 and U0155 2 seconds: U0402, U0416 and U0423
MIL Operation	1 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Battery voltage	10.9 V or more
Starter switch	Off
Engine	Running

U0073

Monitor runs whenever following DTCs are not present	U0101, U0122, U0155, U0402, U0416, U0423 (CAN system (ECM))
--	---

U0101

Monitor runs whenever following DTCs are not present	U0073, U0122, U0155, U0402, U0416, U0423 (CAN system (ECM))
--	---

U0122

Monitor runs whenever following DTCs are not present	U0073, U0101, U0155, U0402, U0416, U0423 (CAN system (ECM))
--	---

U0155

Monitor runs whenever following DTCs are not present	U0073, U0101, U0122, U0402, U0416, U0423 (CAN system (ECM))
--	---

U0402

--	--

Monitor runs whenever following DTCs are not present	U0073, U0101, U0122, U0155, U0416, U0423 (CAN system (ECM))
--	---

U0416

Monitor runs whenever following DTCs are not present	U0073, U0101, U0122, U0155, U0402, U0423 (CAN system (ECM))
--	---

U0423

Monitor runs whenever following DTCs are not present	U0073, U0101, U0122, U0155, U0402, U0416 (CAN system (ECM))
--	---

TYPICAL MALFUNCTION THRESHOLDS**U0073**

State of Control module communication bus "A" OFF	On
---	----

U0101

State of lost communication with TCM	On
--------------------------------------	----

U0122

State of lost communication with skid control ECU	On
---	----

U0155

State of lost communication with combination meter assembly	On
---	----

U0402

Communication counter between ECM and TCM	Not count up
---	--------------

U0416

Communication counter between ECM and skid control ECU	Not count up
--	--------------

U0423

Communication counter between ECM and combination meter assembly	Not count up
--	--------------

INSPECTION PROCEDURE

Go to CAN communication system for troubleshooting  .

HINT:

- When DTCs indicating a CAN communication system malfunction are output, repair the CAN communication system before repairing each corresponding sensor.
- Read freeze frame data using the Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- If the CAN communication malfunctions, there is no data output from the ECM. In this case, some of the freeze frame data are not correct and not identical with the ECM data, but the ECM data are correct.

PROCEDURE

1. CHECK ANY OTHER DTCs OUTPUT

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Trouble Codes.
- Read the DTCs.

RESULT	PROCEED TO
DTC U0073, U0101, U0122, U0155, U0402, U0416 or U0423 is output	A
DTC U0073, U0101, U0122, U0155, U0402, U0416 or U0423 and other DTCs are output	B

B ► **GO TO DTC CHART**

A ► **GO TO CAN COMMUNICATION SYSTEM**

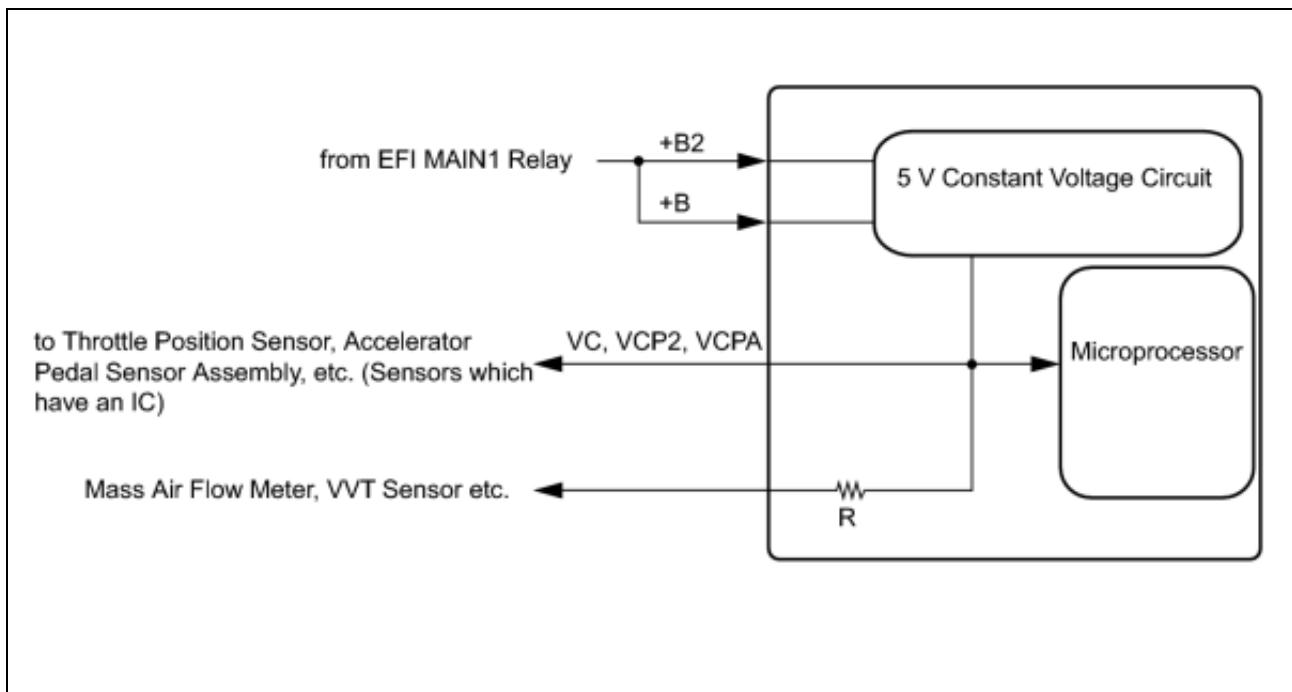


Last Modified: 4-14-2014	6.6 J	Doc ID: RM000001D6V0LTX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE CONTROL: SFI SYSTEM: VC Output Circuit; 2013 MY FR-S [03/2012 -]		

VC Output Circuit

DESCRIPTION

The ECM constantly generates 5 V power from the battery voltages supplied to the +B terminal and +B2 terminal to operate the microprocessor. The ECM also provides this power to the sensors through the VC output circuit.

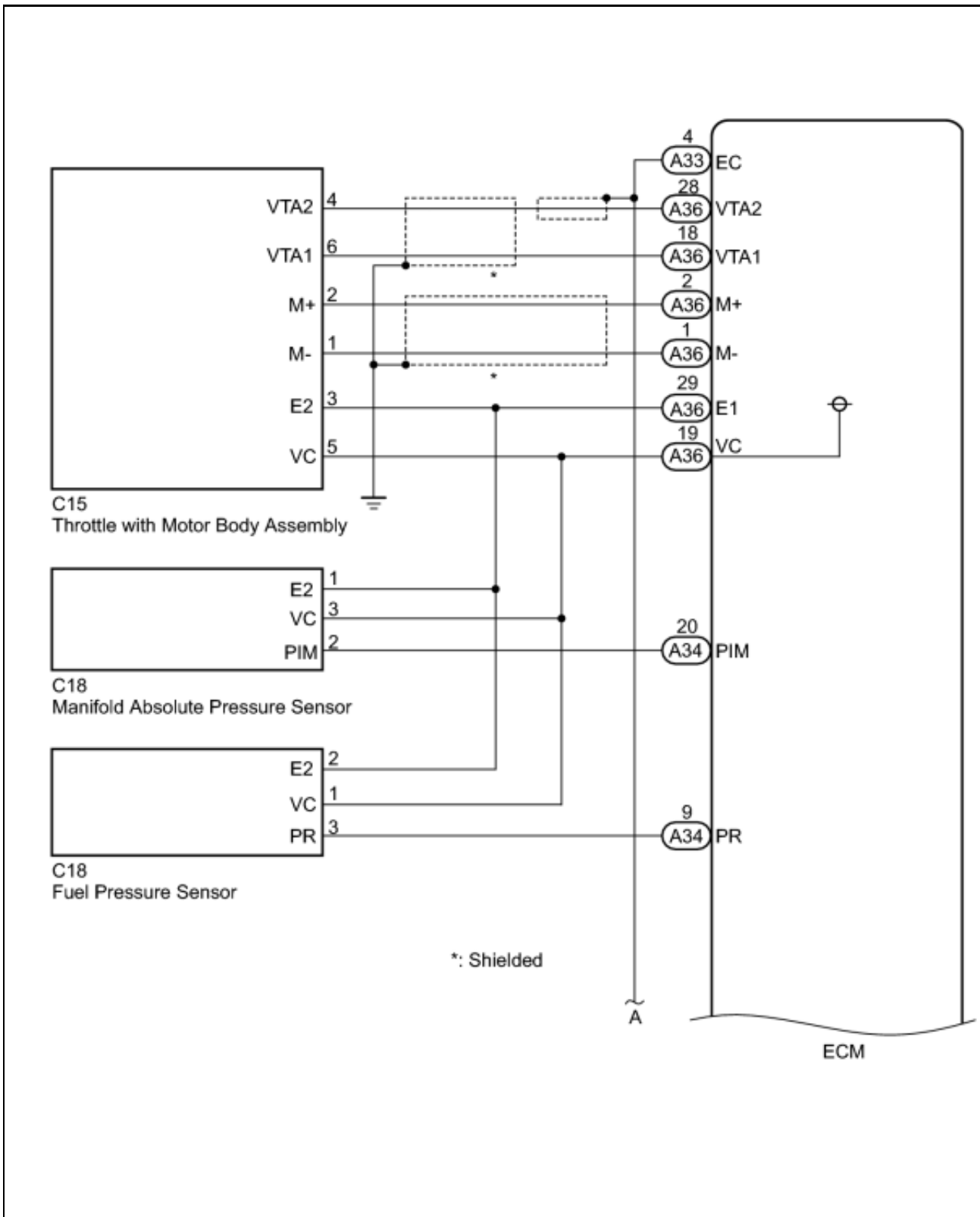


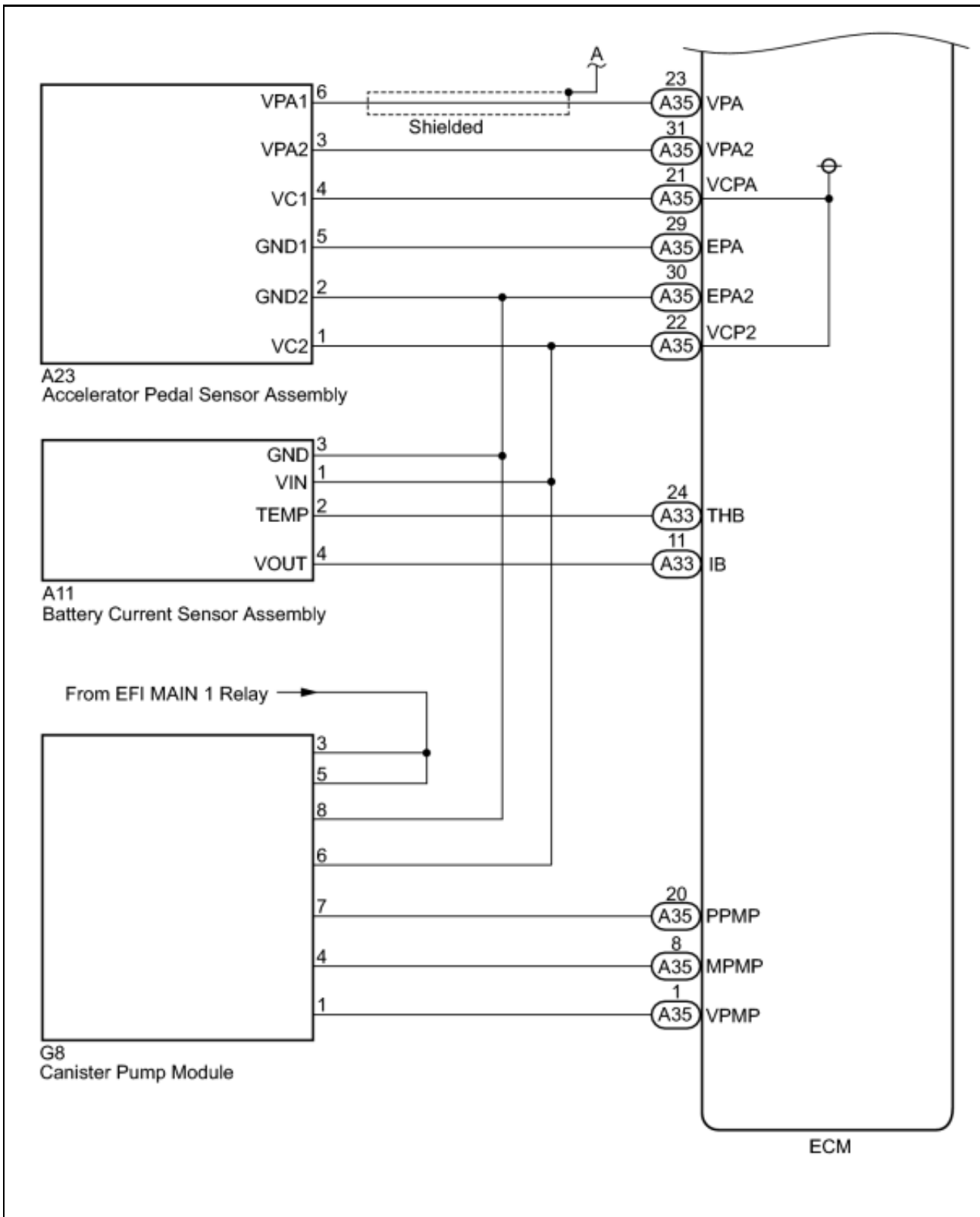
When the VC circuit is short-circuited, the microprocessor in the ECM and sensors that are supplied with power through the VC circuit are deactivated because the power is not supplied from the VC circuit. Under this condition, the system does not start up and the MIL does not illuminate even if the system malfunctions.

HINT:

Under normal conditions, the MIL is illuminated when the ignition switch is turned to ON. The MIL goes off when the engine is started.

WIRING DIAGRAM





INSPECTION PROCEDURE

PROCEDURE

- | | |
|-----------|----------------------------|
| 1. | CHECK MIL CONDITION |
|-----------|----------------------------|

(a) Check that the Malfunction Indicator Lamp (MIL) lights up when turning the ignition switch to ON.

OK:

MIL lights up.

Result

RESULT	PROCEED TO
NG	A
OK	B

B ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

A



2. CHECK CONNECTION BETWEEN TECHSTREAM AND ECM

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Check for communication between the Techstream and ECM.

Result

RESULT	PROCEED TO
Communication is not possible	A
Communication is possible	B

B ▶ **GO TO MIL CIRCUIT**

A



3. CHECK MIL (THROTTLE POSITION SENSOR)

- (a) Disconnect the throttle with motor body assembly connector.
- (b) Turn the ignition switch to ON.
- (c) Check the MIL.

Result

RESULT	PROCEED TO
MIL does not illuminate	A
MIL illuminates	B

B  **REPLACE THROTTLE WITH MOTOR BODY ASSEMBLY**

A



4. CHECK MIL (MANIFOLD ABSOLUTE PRESSURE SENSOR)

- (a) Disconnect the manifold absolute pressure sensor connector.
- (b) Turn the ignition switch to ON.
- (c) Check the MIL.

Result

RESULT	PROCEED TO
MIL does not illuminate	A
MIL illuminates	B

B  **REPLACE MANIFOLD ABSOLUTE PRESSURE SENSOR**

A



5. CHECK MIL (FUEL PRESSURE SENSOR)

- (a) Disconnect the fuel pressure sensor connector.
- (b) Turn the ignition switch to ON.
- (c) Check the MIL.

Result

RESULT	PROCEED TO
MIL does not illuminate	A
MIL illuminates	B

B  **REPLACE FUEL PRESSURE SENSOR****A****6. CHECK MIL (ACCELERATOR PEDAL SENSOR ASSEMBLY)**

- (a) Disconnect the accelerator pedal sensor assembly connector.
- (b) Turn the ignition switch to ON.
- (c) Check the MIL.

Result

RESULT	PROCEED TO
MIL does not illuminate	A
MIL illuminates	B

B  **REPLACE ACCELERATOR PEDAL SENSOR ASSEMBLY****A****7. CHECK MIL (BATTERY CURRENT SENSOR ASSEMBLY)**

- (a) Disconnect the battery current sensor assembly connector.

(b) Turn the ignition switch to ON.

(c) Check the MIL.

Result

RESULT	PROCEED TO
MIL does not illuminate	A
MIL illuminates	B

B  **REPLACE BATTERY CURRENT SENSOR ASSEMBLY**

A



8. CHECK MIL (CANISTER PUMP MODULE)

(a) Disconnect the canister pump module connector.

(b) Turn the ignition switch to ON.

(c) Check the MIL.

Result

RESULT	PROCEED TO
MIL does not illuminate	A
MIL illuminates	B

B  **REPLACE CANISTER PUMP MODULE**

A



9. CHECK HARNESS AND CONNECTOR (EACH SENSOR - ECM)

(a) Disconnect the throttle with motor body assembly connector.

(b) Disconnect the manifold absolute pressure sensor connector.

(c) Disconnect the fuel pressure sensor connector.

- (d) Disconnect the accelerator pedal sensor assembly connector.
- (e) Disconnect the battery current sensor assembly connector.
- (f) Disconnect the canister pump module connector.
- (g) Disconnect the ECM connectors.
- (h) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A36-19 (VC) - Body ground	Always	10 k Ω or higher
A35-22 (VCP2) - Body ground	Always	10 k Ω or higher
A35-21 (VCPA) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

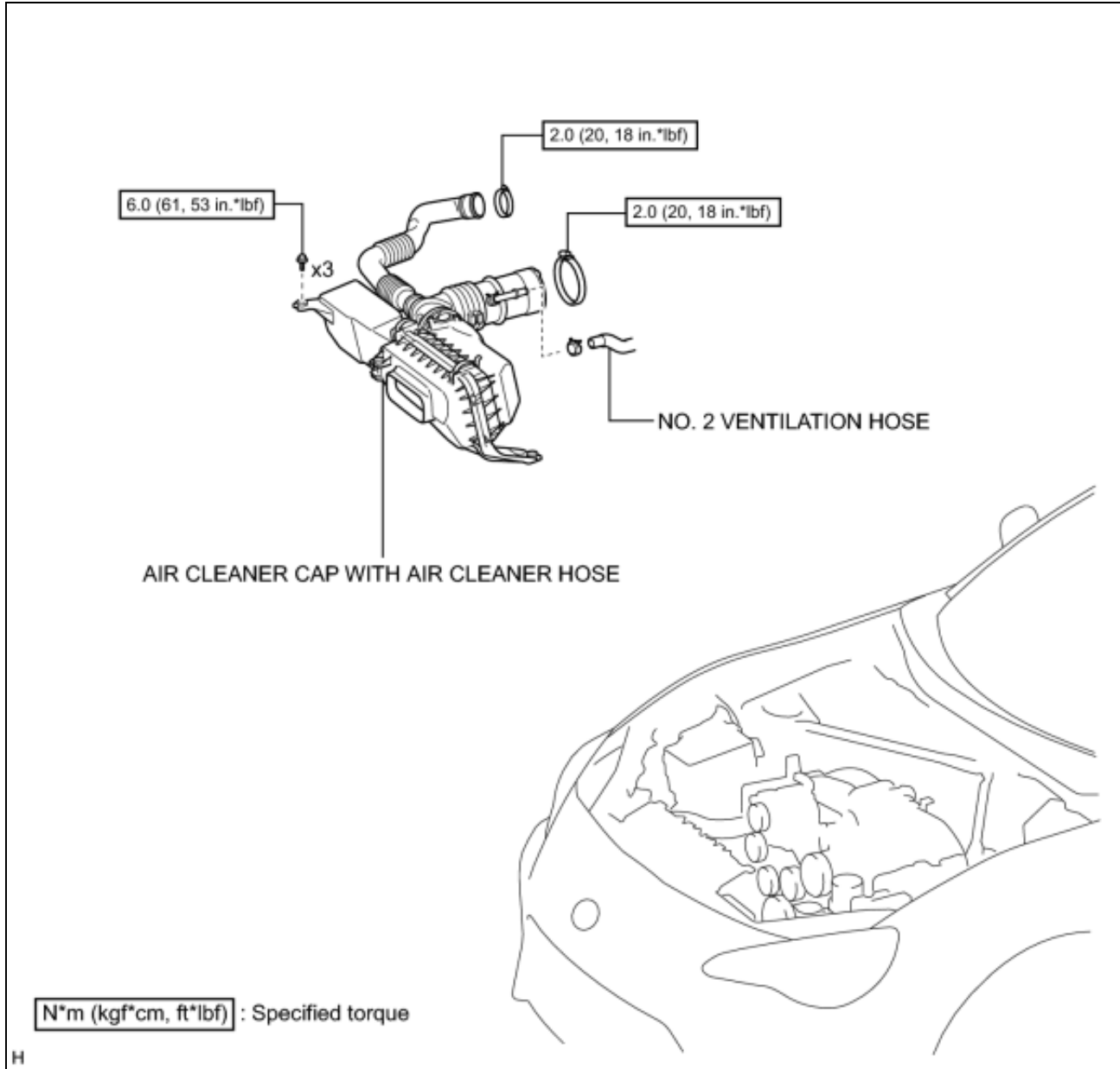
OK  **REPLACE ECM**



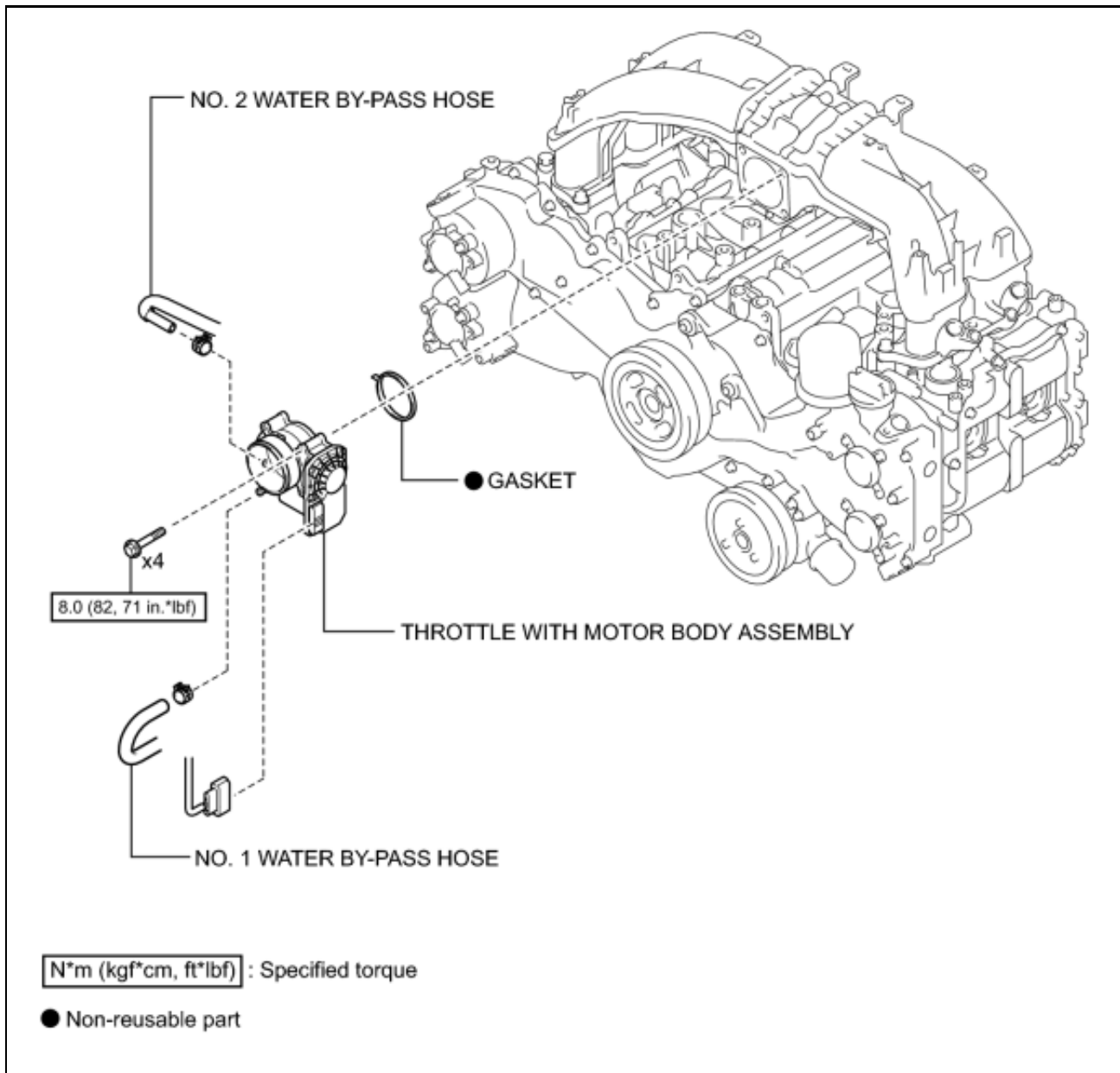
Last Modified: 4-14-2014	6.6 K	Doc ID: RM000001BQK00HX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE CONTROL: THROTTLE BODY: COMPONENTS; 2013 MY FR-S [03/2012 -]		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



Last Modified: 4-14-2014	6.6 G	Doc ID: RM000000MTB00SX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE CONTROL: THROTTLE BODY: INSPECTION; 2013 MY FR-S [03/2012 -]		

INSPECTION

1. INSPECT THROTTLE WITH MOTOR BODY ASSEMBLY

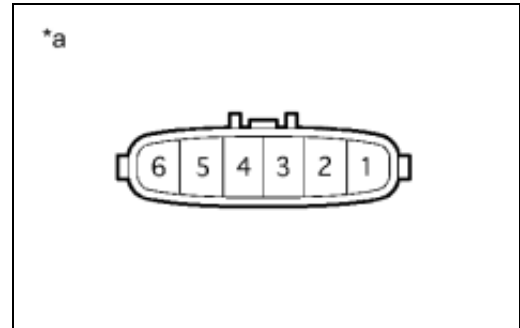
(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Throttle with Motor Body Assembly)
----	--

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	0.3 to 10 Ω



If the result is not as specified, replace the throttle with motor body assembly.



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000MTA00VX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE CONTROL: THROTTLE BODY: INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL THROTTLE WITH MOTOR BODY ASSEMBLY

- Install a new gasket to the intake manifold.
- Connect the 2 water by-pass hoses to the throttle with motor body assembly with the 2 clamps.
- Install the throttle with motor body assembly to the intake manifold with the 4 bolts.

Torque:

8.0 N·m {82 kgf·cm, 71 in·lbf}

- Connect the throttle with motor body assembly connector.

2. INSTALL AIR CLEANER CAP WITH AIR CLEANER HOSE INFO

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL INFO

4. ADD ENGINE COOLANT INFO

5. INSPECT FOR COOLANT LEAK INFO

6. INSPECT THROTTLE WITH MOTOR BODY ASSEMBLY

NOTICE:

Perform the following procedure after replacing the ECM, throttle with motor body assembly or any throttle with motor body assembly components.

- Turn the ignition switch to ON without operating the accelerator pedal.

NOTICE:

If the accelerator pedal is operated, perform the above steps again.

- Connect the Techstream to the DLC3 and clear the DTCs INFO.
- Start the engine and check that the MIL is not illuminated. After the engine is warmed up, check that the idle speed is within the specified range when the A/C is switched off.

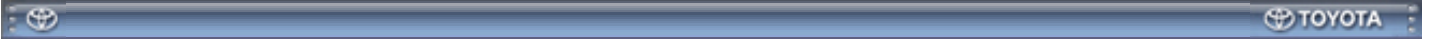
Standard:

CONDITION	ENGINE IDLE SPEED
A/C switched off	650 to 800 rpm

NOTICE:

- Be sure to perform this step with all accessories off.
- Make sure that the shift lever is in neutral (for manual transmission).
- Make sure that the shift lever is in N or P (for automatic transmission).

- Enter the following menus: Data List / Throttle Sensor Volt%. Fully depress the accelerator pedal and check that the value is 80 to 90%.
- Perform a road test and confirm that there are no abnormalities.



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000MTD00TX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE CONTROL: THROTTLE BODY: REMOVAL; 2013 MY FR-S [03/2012 -]		

REMOVAL

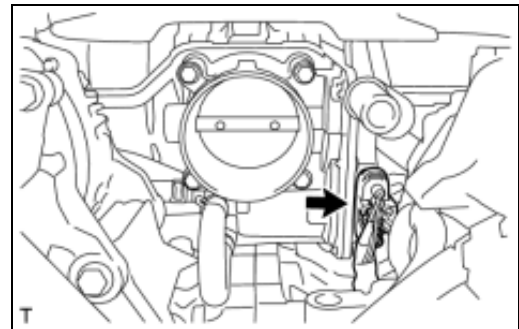
1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

2. DRAIN ENGINE COOLANT INFO

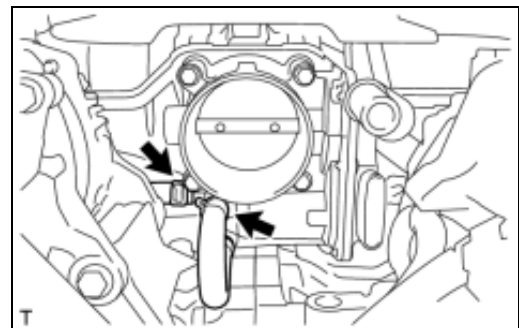
3. REMOVE AIR CLEANER CAP WITH AIR CLEANER HOSE INFO

4. REMOVE THROTTLE WITH MOTOR BODY ASSEMBLY

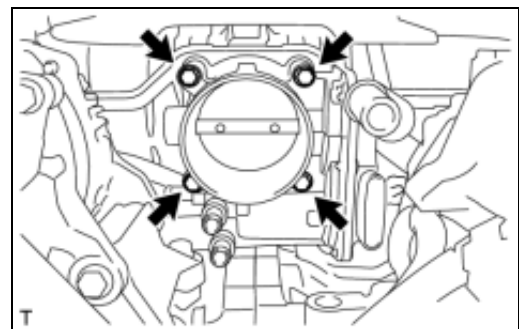
(a) Disconnect the throttle with motor body assembly connector.



(b) Disconnect the 2 water by-pass hoses from the throttle with motor body assembly.



(c) Remove the 4 bolts and the throttle with motor body assembly from the intake manifold.



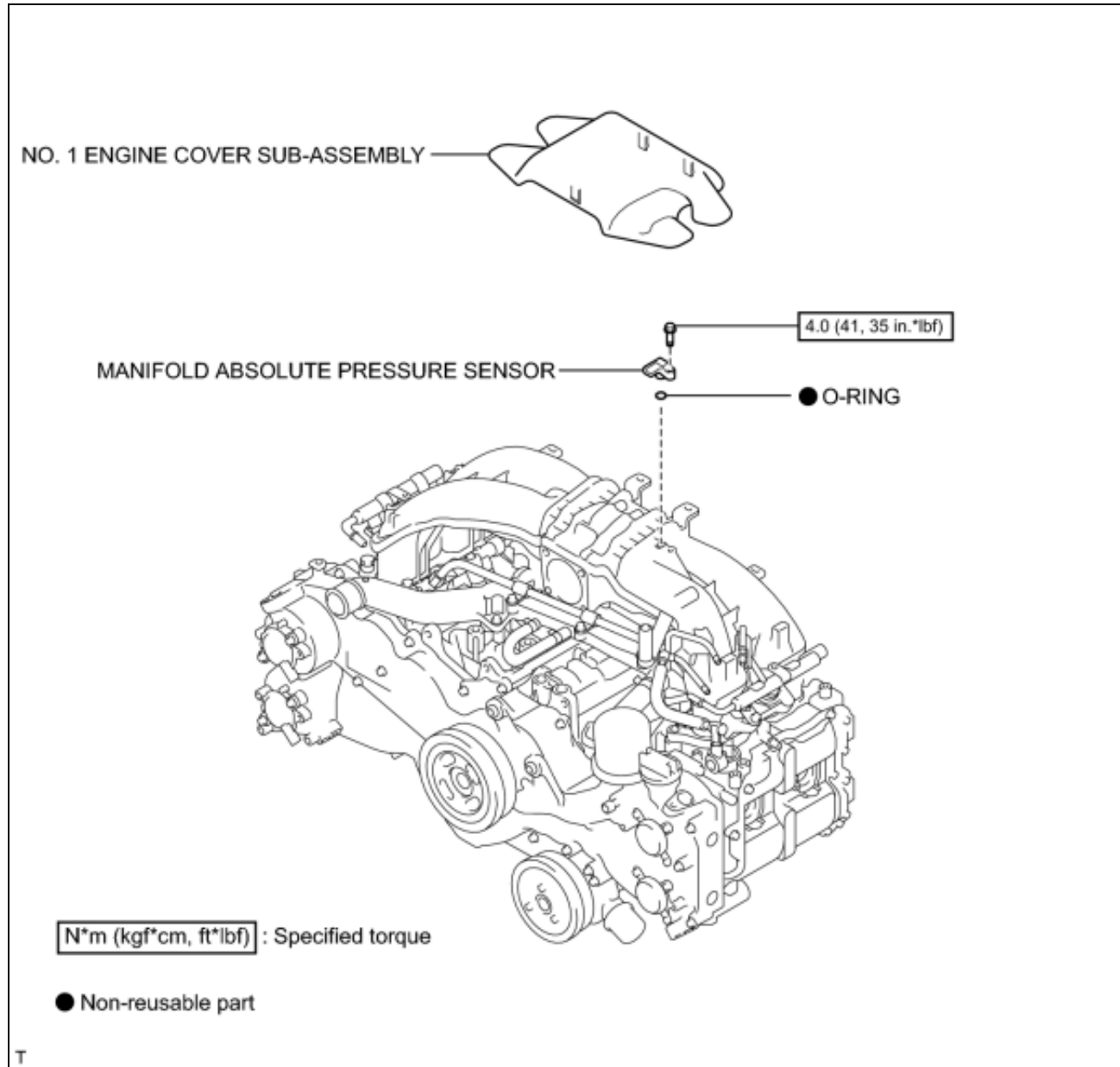
(d) Remove the gasket from the intake manifold.



Last Modified: 4-14-2014	6.6 K	Doc ID: RM000001B0600RX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE CONTROL: VACUUM SENSOR: COMPONENTS; 2013 MY FR-S [03/2012 -]		

COMPONENTS

ILLUSTRATION



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000001BO500QX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE CONTROL: VACUUM SENSOR: INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL MANIFOLD ABSOLUTE PRESSURE SENSOR

- Apply a light coat of engine oil to a new O-ring and install it to the manifold absolute pressure sensor.
- Install the manifold absolute pressure sensor with the bolt.

Torque:

4.0 N·m {41 kgf·cm, 35in·lbf}

NOTICE:

- If a component has been dropped or subjected to a strong impact, replace it.
- Make sure that the O-ring is not damaged or does not jump out of position during installation.

- Connect the manifold absolute pressure sensor connector.

2. INSTALL NO. 1 ENGINE COVER SUB-ASSEMBLY INFO

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL INFO



Last Modified: 4-14-2014	6.6 G	Doc ID: RM000003IHI00BX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE CONTROL: VACUUM SENSOR: ON-VEHICLE INSPECTION; 2013 MY FR-S [03/2012 -]		

ON-VEHICLE INSPECTION

1. INSPECT MANIFOLD ABSOLUTE PRESSURE SENSOR

- (a) Connect the Techstream to the DLC3.
 - (b) Turn the ignition switch to ON with the engine off.
 - (c) Inspect the manifold absolute pressure sensor.
 - (1) Enter the following menus: Powertrain / Engine / Data List / Atmosphere Pressure.
 - (2) Check the atmosphere pressure.
- OK:
Almost the same as ambient pressure

HINT:

- The standard atmospheric pressure is 101 kPa (1.03 kgf/cm², 14.6 psi).
- The atmospheric pressure decreases by 1 kPa (0.01 kgf/cm², 0.1 psi) as the altitude increases by 100 m.
- The atmospheric pressure varies depending on the weather.



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000001B0700RX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE CONTROL: VACUUM SENSOR: REMOVAL; 2013 MY FR-S [03/2012 -]		

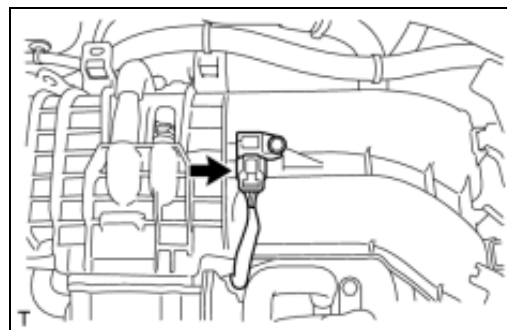
REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

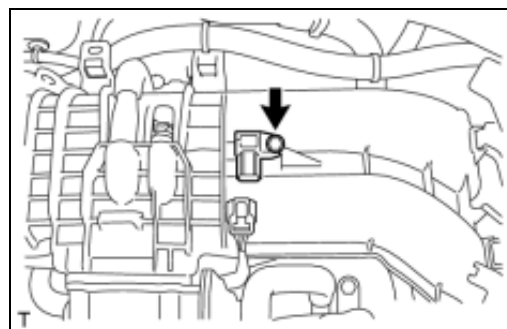
2. REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY INFO

3. REMOVE MANIFOLD ABSOLUTE PRESSURE SENSOR

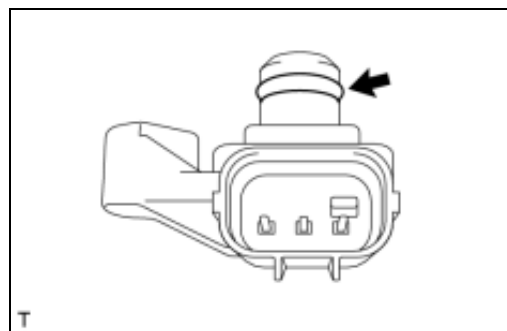
- (a) Disconnect the manifold absolute pressure sensor connector.



- (b) Remove the bolt and manifold absolute pressure sensor.



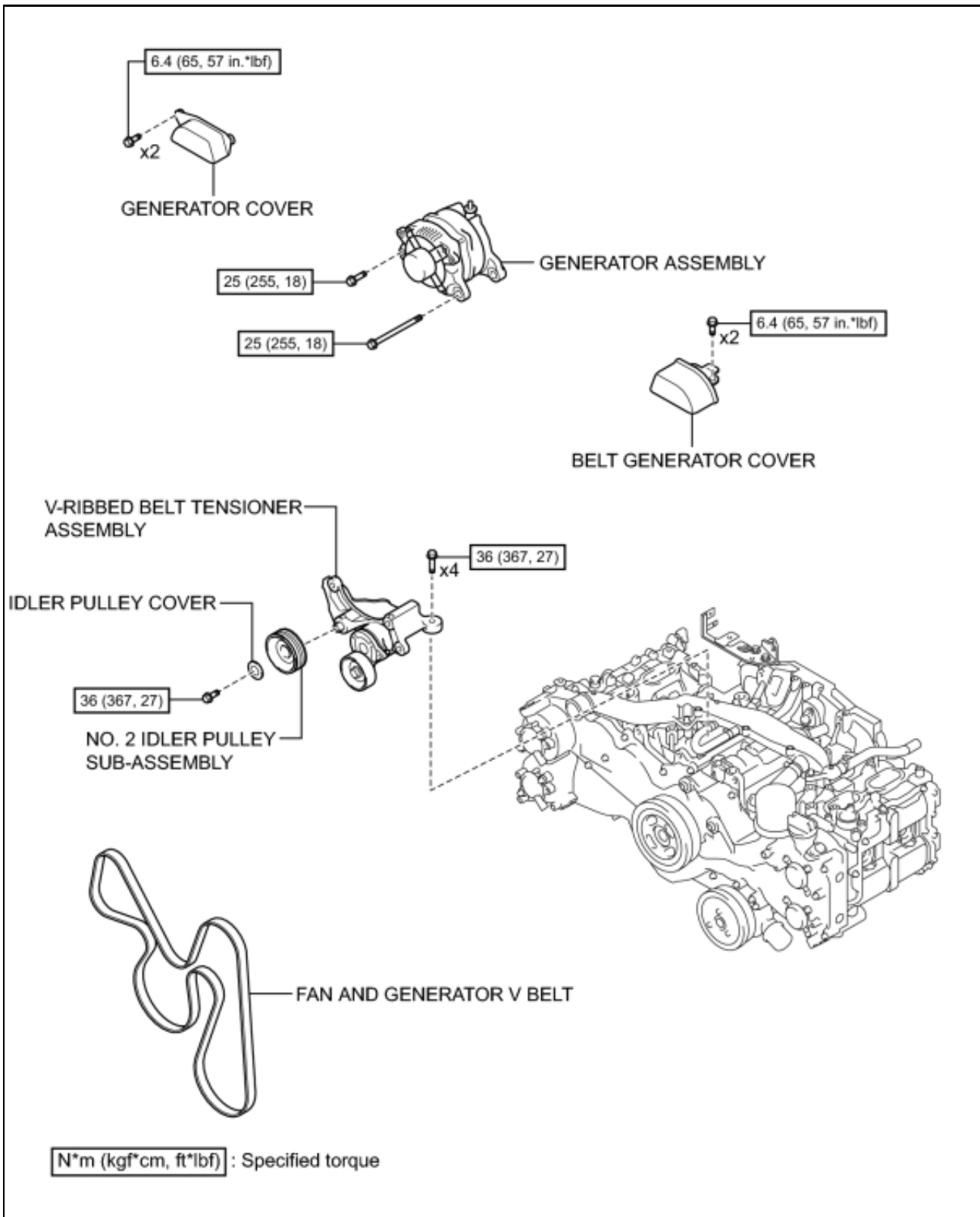
- (c) Remove the O-ring from the manifold absolute pressure sensor.



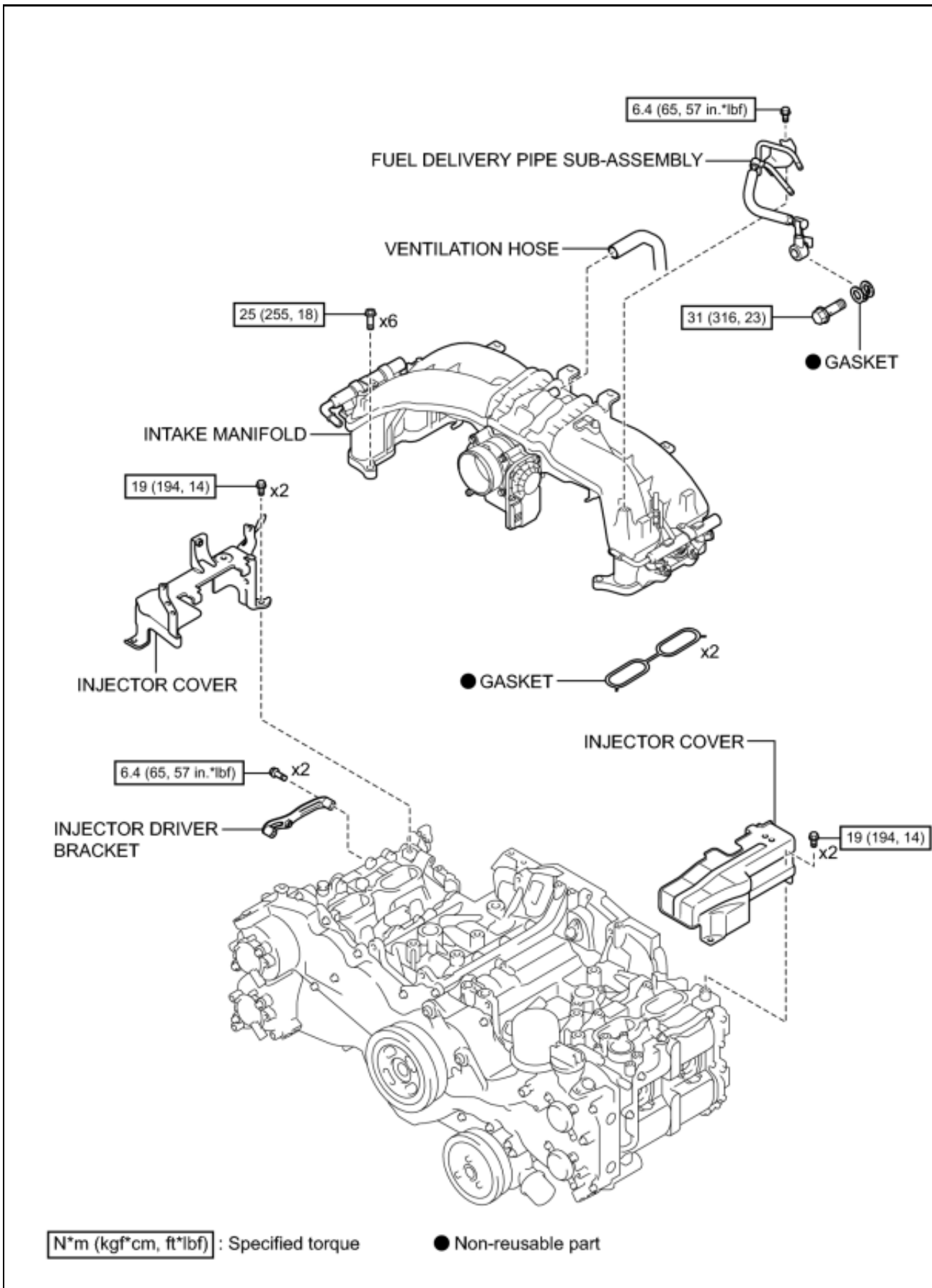
Last Modified: 4-14-2014	6.6 K	Doc ID: RM0000056U8008X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: CAMSHAFT: COMPONENTS; 2013 MY FR-S [03/2012 -]		

[COMPONENTS](#)

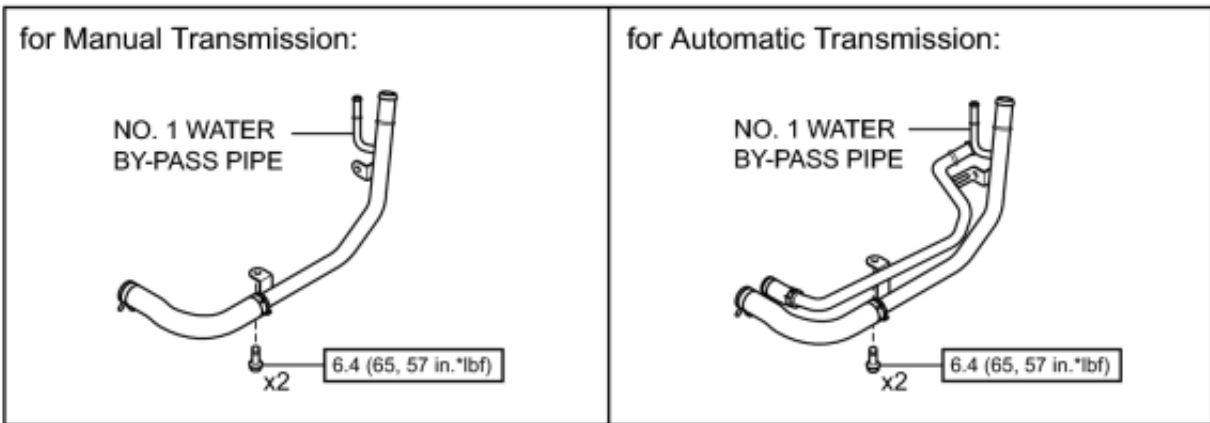
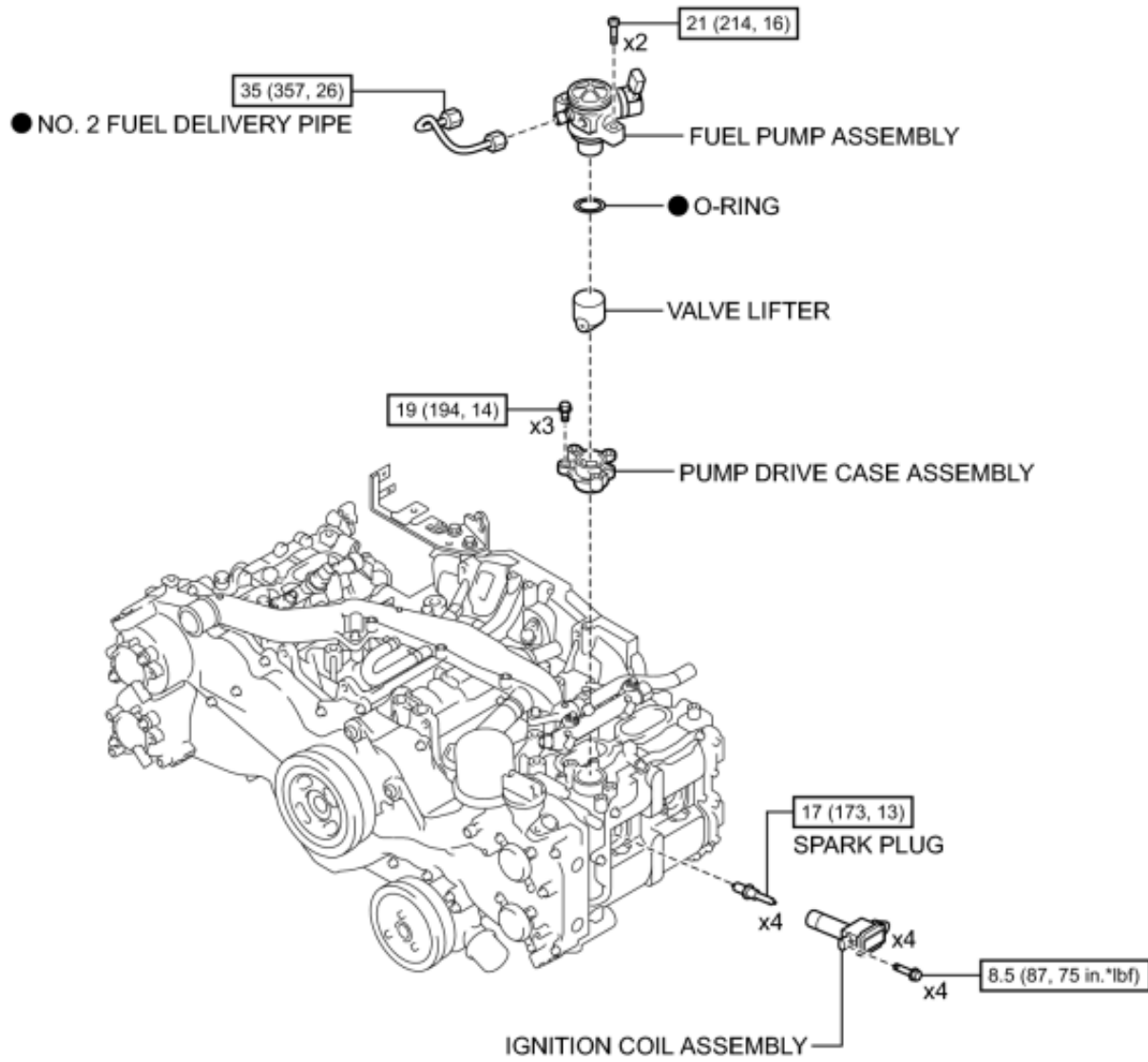
[ILLUSTRATION](#)



ILLUSTRATION

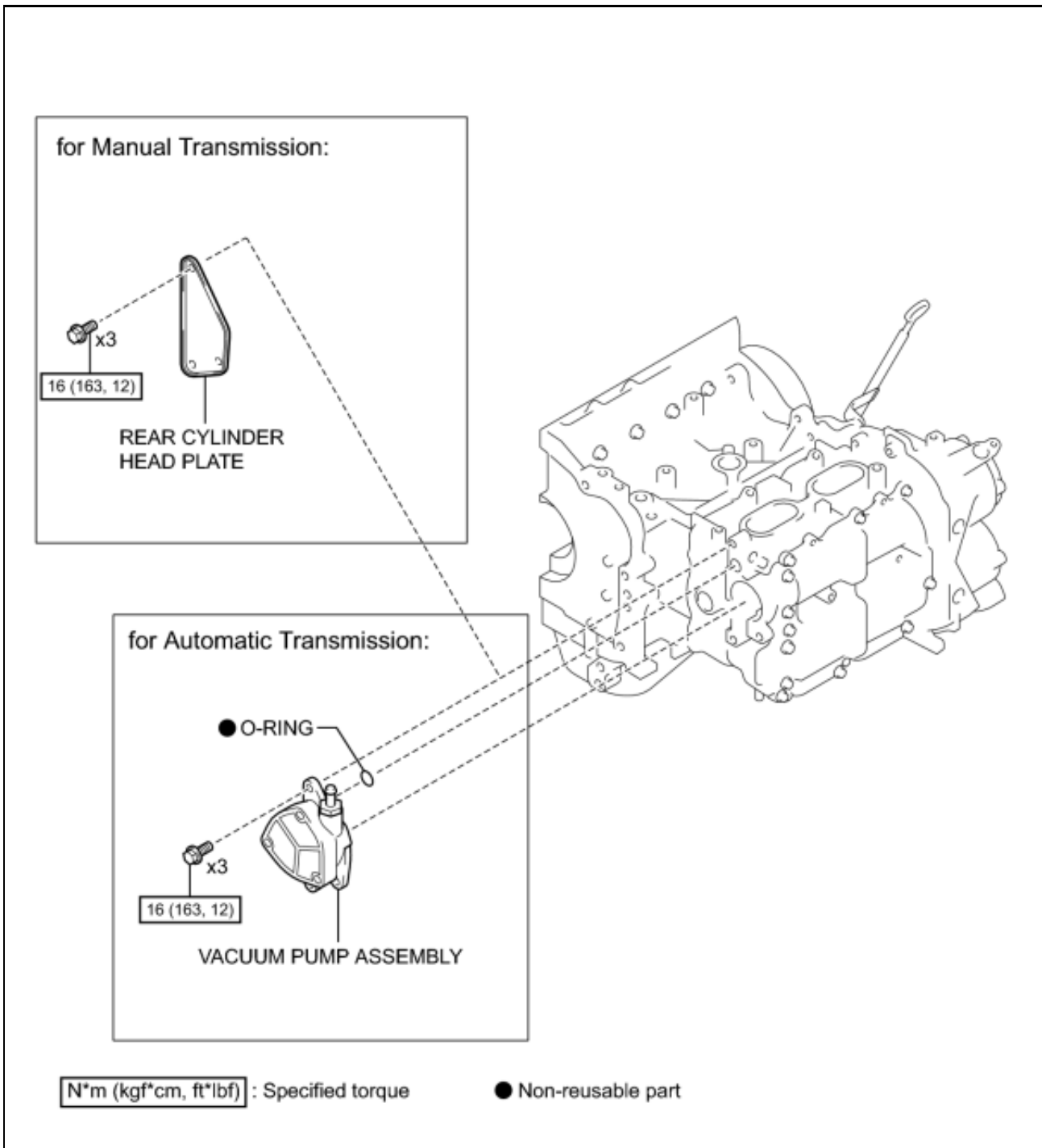


ILLUSTRATION

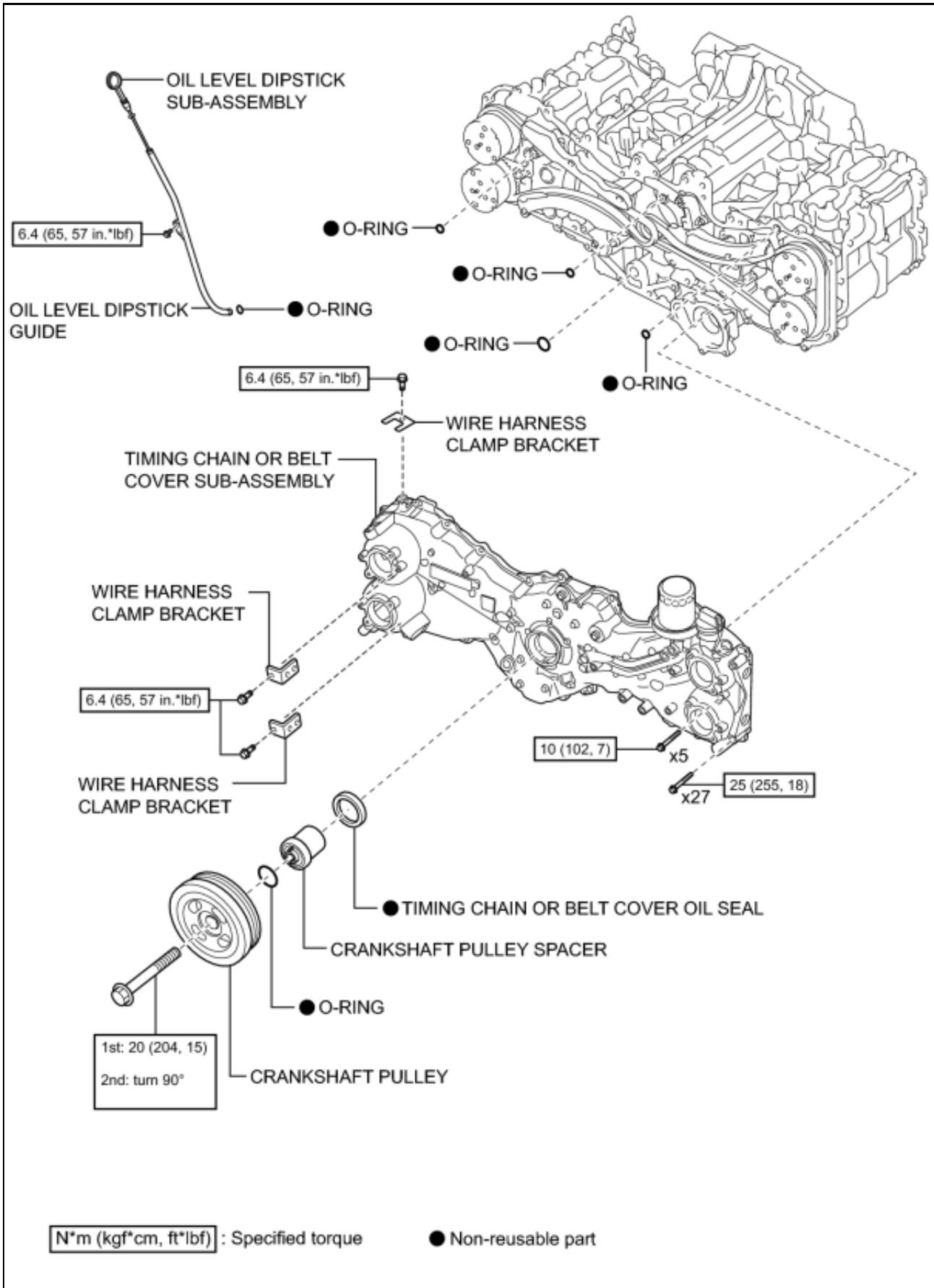


N*m (kgf*cm, ft*lbf) : Specified torque ● Non-reusable part

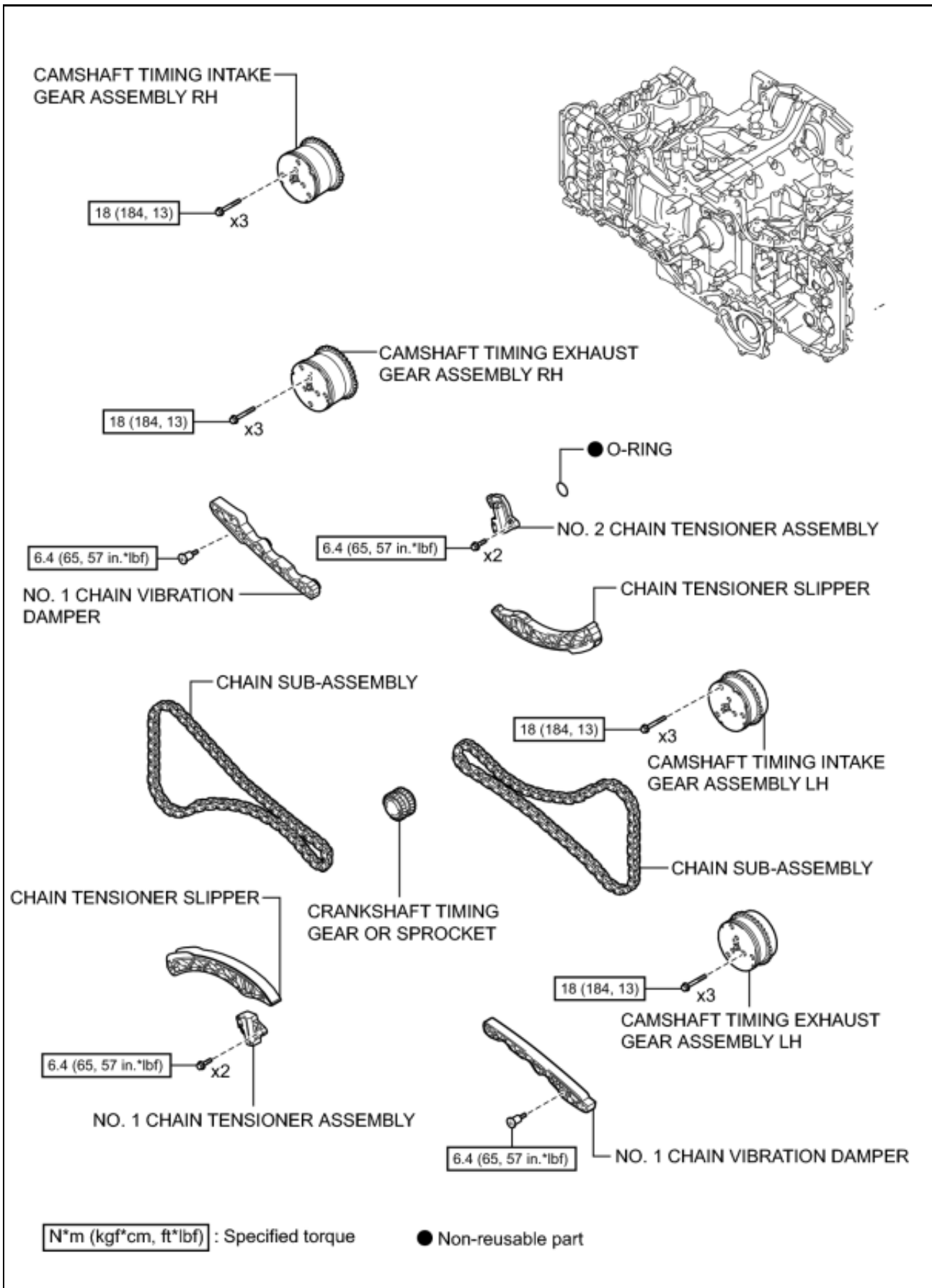
ILLUSTRATION



ILLUSTRATION

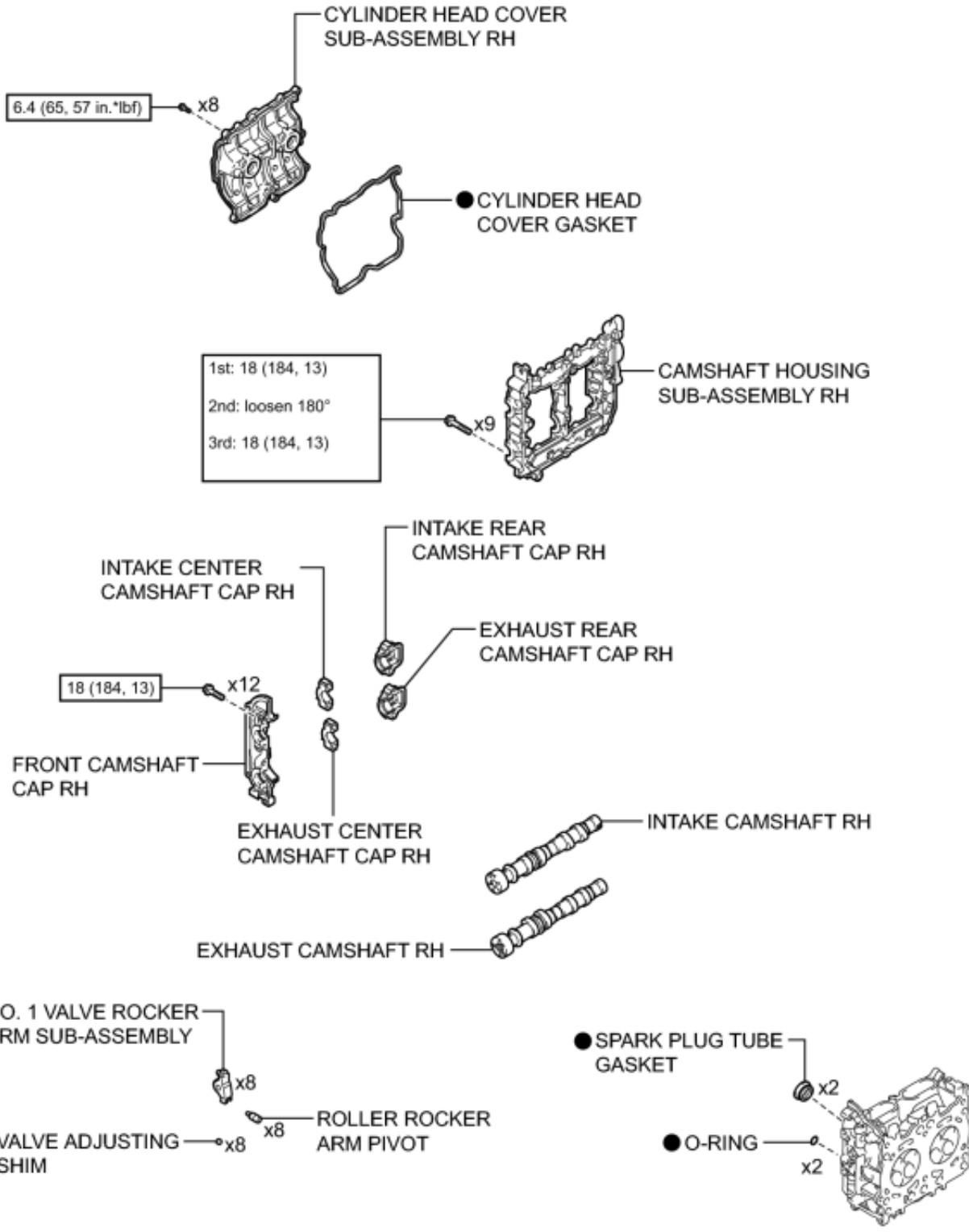


ILLUSTRATION



ILLUSTRATION

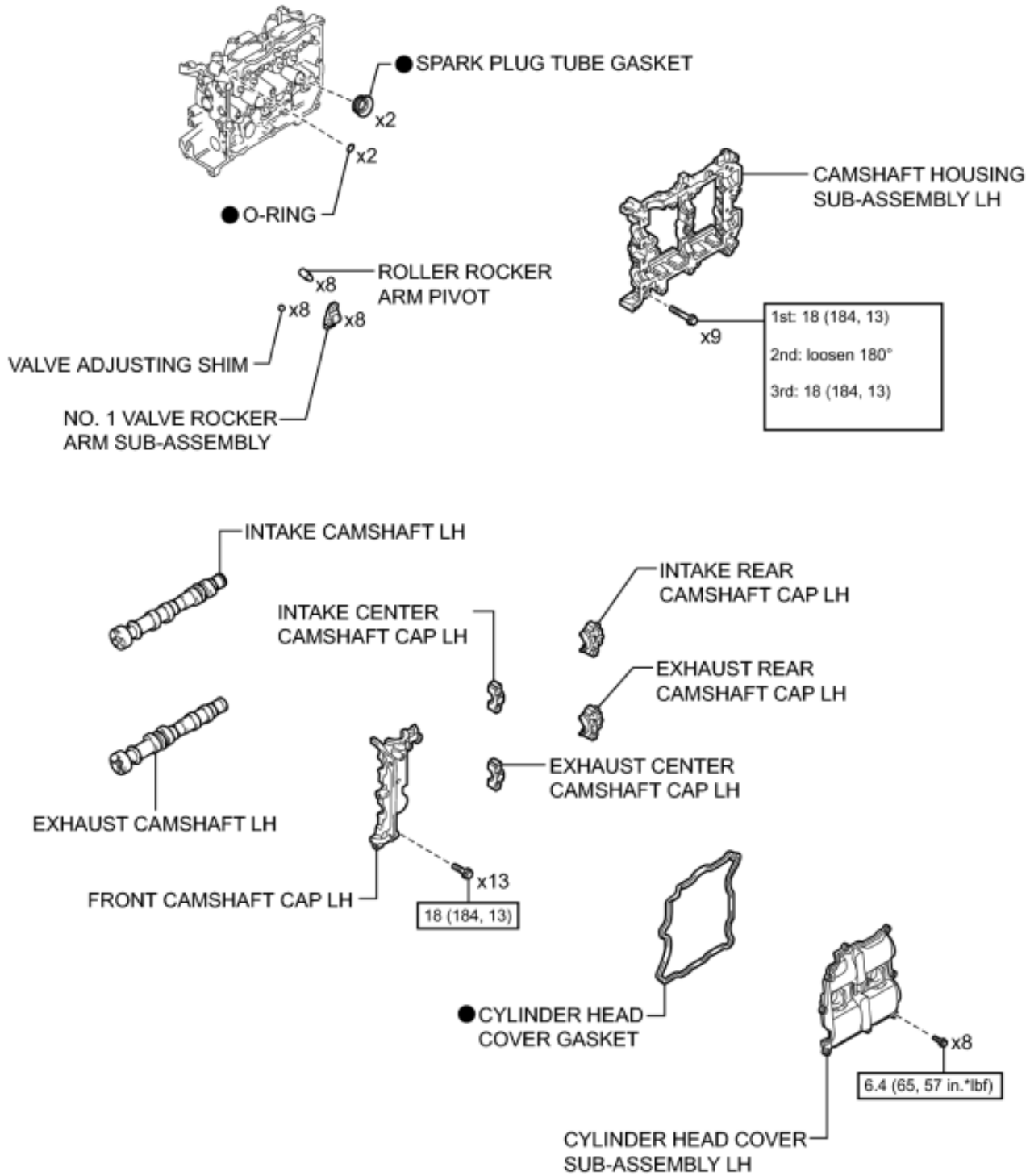
for Bank 1:



N*m (kgf*cm, ft*lbf) : Specified torque ● Non-reusable part

ILLUSTRATION

for Bank 2:



N*m (kgf*cm, ft*lbf) : Specified torque

● Non-reusable part

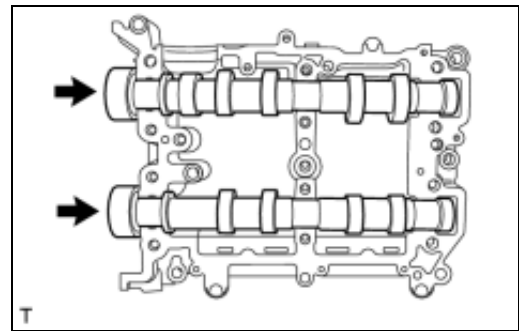
Last Modified: 4-14-2014	6.6 A	Doc ID: RM0000056U700AX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: CAMSHAFT: INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL CAMSHAFT LH (for Bank 2)

(a) Apply engine oil to the journals of the camshaft housing sub-assembly LH.

(b) Set the intake camshaft LH and the exhaust camshaft LH to the camshaft housing sub-assembly LH.

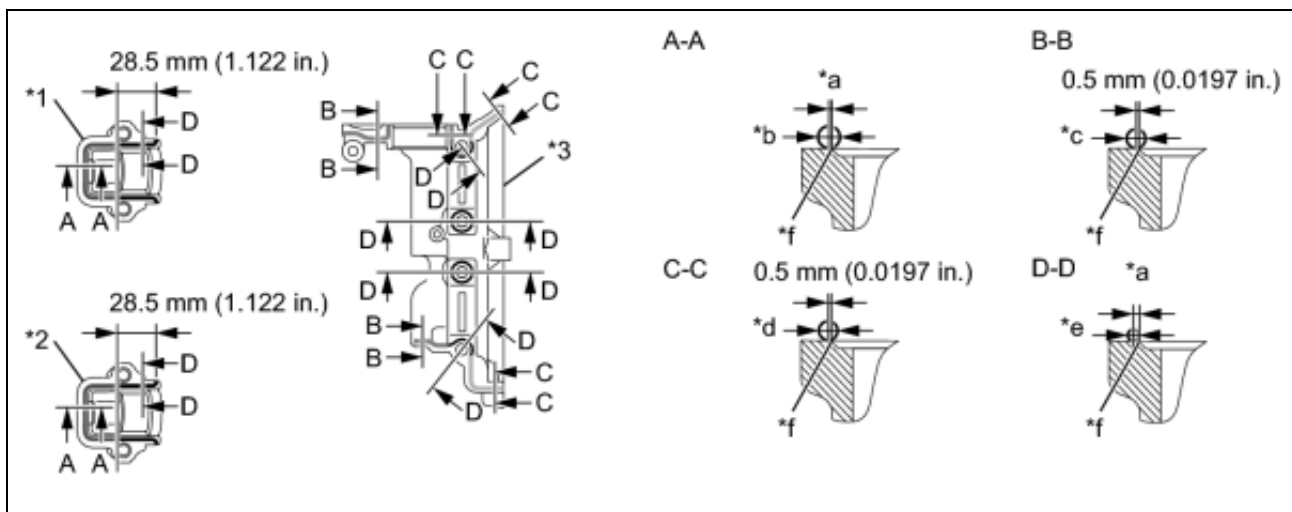


2. INSTALL CAMSHAFT CAP (for Bank 2)

(a) Apply the seal packing to the contact surface of the front camshaft cap LH, intake rear camshaft cap LH and exhaust rear camshaft cap LH as shown in the illustration.

Seal packing:

Three Bond 1217G, 1217H or equivalent



Text in Illustration

*1	Intake Rear Camshaft Cap LH	*2	Exhaust Rear Camshaft Cap LH
*3	Front Camshaft Cap LH	-	-
*a	Within 1.0 mm (0.0394 in.)	*b	φ3.0 to 4.0 mm (0.1181 to 0.1575 in.)
*c	φ2.5 to 3.5 mm (0.0984 to 0.1378 in.)	*d	φ2.5 to 4.0 mm (0.0984 to 0.1575 in.)
*e	φ1.5 to 2.5 mm (0.0591 to 0.0984 in.)	*f	Chamfer edge

NOTICE:

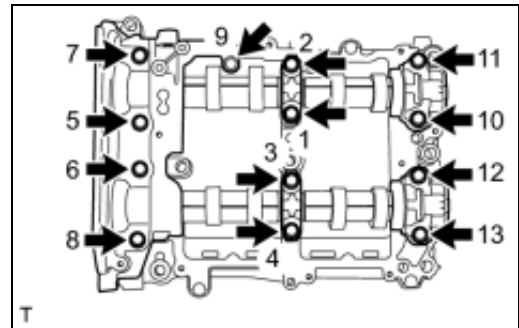
- Clean and degrease the contact surface.
- Do not apply excessively seal packing as it may cause excess seal packing to flow toward the cam journal, resulting in engine seizure.
- Do not apply seal packing to the intake center camshaft cap LH and exhaust center camshaft cap LH.
- Install the camshaft caps within 5 minutes of applying the seal packing.

(b) Apply engine oil to the journals of the camshaft caps, and place them on the camshaft housing sub-assembly LH.

(c) Tighten the 13 bolts in the order shown in the illustration to install the front camshaft cap LH, intake center camshaft cap LH, intake rear camshaft cap LH, exhaust center camshaft cap LH and exhaust rear camshaft cap LH.

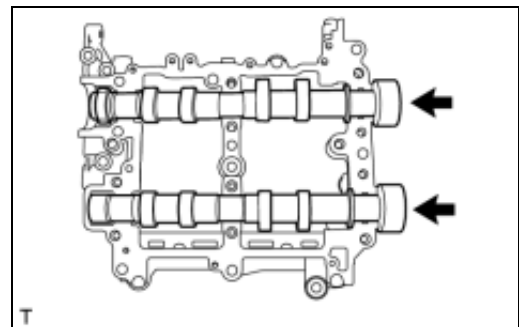
Torque:

18 N·m {184 kgf·cm, 13ft·lbf}

**3. INSTALL CAMSHAFT RH (for Bank 1)**

(a) Apply engine oil to the journals of the camshaft housing sub-assembly RH.

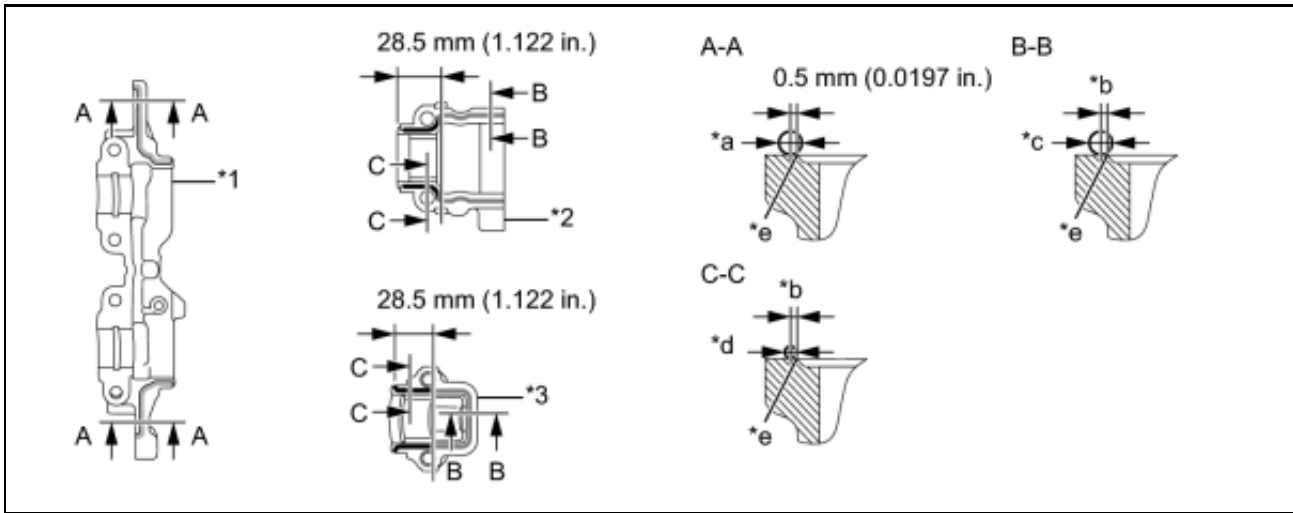
(b) Set the intake camshaft RH and the exhaust camshaft RH to the camshaft housing sub-assembly RH.

**4. INSTALL CAMSHAFT CAP (for Bank 1)**

(a) Apply the seal packing to the contact surface of the front camshaft cap RH, intake rear camshaft cap RH and exhaust rear camshaft cap RH as shown in the illustration.

Seal packing:

Three Bond 1217G, 1217H or equivalent



Text in Illustration

*1	Front Camshaft Cap RH	*2	Intake Rear Camshaft Cap RH
*3	Exhaust Rear Camshaft Cap RH	-	-
a	φ2.5 to 4.0 mm (0.0984 to 0.1575 in.)	b	Within 1.0 mm (0.0394 in.)
c	φ3.0 to 4.0 mm (0.1181 to 0.1575 in.)	d	φ1.5 to 2.5 mm (0.0591 to 0.0984 in.)
e	Chamfer edge	-	-

NOTICE:

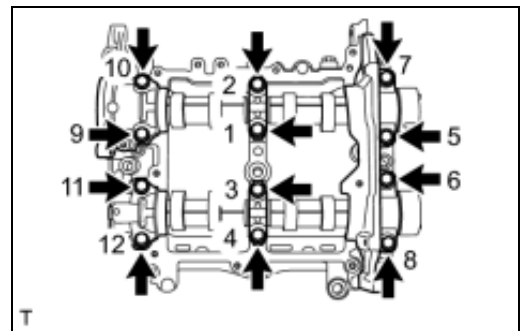
- Clean and degrease the contact surface.
- Do not apply excessively seal packing as it may cause excess seal packing to flow toward the cam journal, resulting in engine seizure.
- Do not apply seal packing to the intake center camshaft cap RH and exhaust center camshaft cap RH.
- Install the camshaft caps within 5 minutes of applying the seal packing.

(b) Apply engine oil to the journals of the camshaft caps, and place them on the camshaft housing sub-assembly RH.

(c) Tighten the 12 bolts in the order shown in the illustration to install the front camshaft cap RH, intake center camshaft cap RH, intake rear camshaft cap RH, exhaust center camshaft cap RH and exhaust rear camshaft cap RH.

Torque:

18 N·m {184 kgf·cm, 13ft·lbf}



5. INSTALL CAMSHAFT HOUSING SUB-ASSEMBLY LH

[INFO](#)

6. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY LH

[INFO](#)

7. INSTALL CAMSHAFT HOUSING SUB-ASSEMBLY RH

[INFO](#)

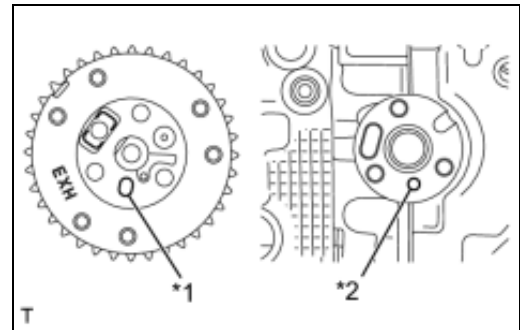
8. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY RH

[INFO](#)

9. INSTALL INJECTOR DRIVER BRACKET INFO**10. INSTALL SPARK PLUG (for Bank 1)** INFO**11. INSTALL IGNITION COIL ASSEMBLY (for Bank 1)** INFO**12. INSTALL SPARK PLUG (for Bank 2)** INFO**13. INSTALL IGNITION COIL ASSEMBLY (for Bank 2)** INFO**14. INSTALL CAMSHAFT TIMING EXHAUST GEAR ASSEMBLY LH****NOTICE:**

Before installation, check that there is no foreign matter on the camshaft timing exhaust gear assembly LH and exhaust camshaft LH.

- (a) Install the camshaft timing exhaust gear assembly LH while aligning the knock hole of the camshaft timing exhaust gear assembly LH with the knock pin of the exhaust camshaft LH.

**Text in Illustration**

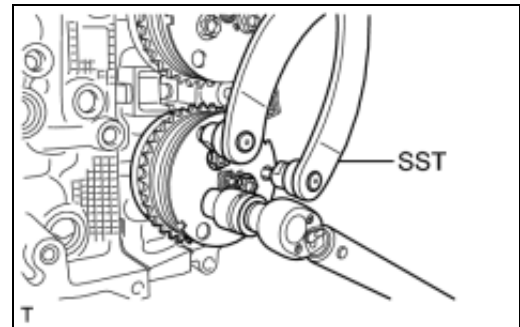
*1	Knock Hole
*2	Knock Pin

- (b) Using SST, hold the camshaft timing exhaust gear assembly LH, and tighten the 3 bolts with a socket "TORX" wrench E16.

SST: 09960-10010

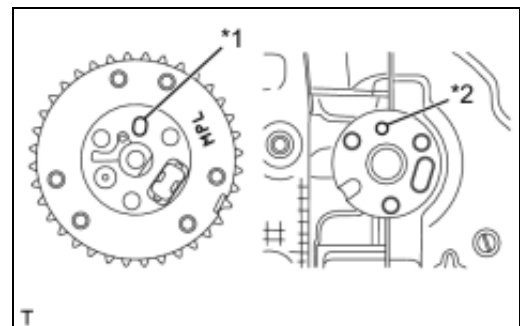
09962-01000

09963-00700

Torque:**18 N·m {184 kgf·cm, 13ft·lbf}****15. INSTALL CAMSHAFT TIMING INTAKE GEAR ASSEMBLY LH****NOTICE:**

Before installation, check that there is no foreign matter on the camshaft timing intake gear assembly LH and intake camshaft LH.

- (a) Install the camshaft timing exhaust gear assembly LH while aligning the knock hole of the camshaft timing intake gear assembly LH with the knock pin of the intake camshaft LH.

**Text in Illustration**

*1	Knock Hole
*2	Knock Pin

- (b) Using SST, hold the camshaft timing intake gear assembly LH, and tighten the 3 bolts with a socket "TORX" wrench E16.

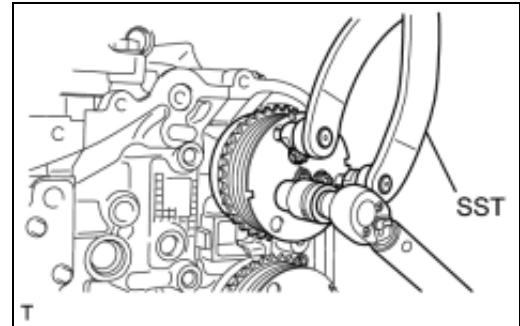
SST: 09960-10010

09962-01000

09963-00700

Torque:

18 N·m {184 kgf·cm, 13ft·lbf}



16. INSTALL CAMSHAFT TIMING EXHAUST GEAR ASSEMBLY RH

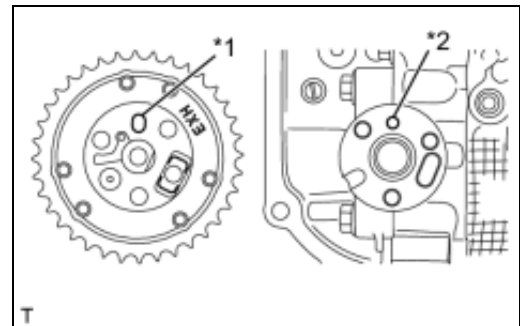
NOTICE:

Before installation, check that there is no foreign matter on the camshaft timing exhaust gear assembly RH and exhaust camshaft RH.

- (a) Install the camshaft timing intake gear assembly RH while aligning the knock hole of the camshaft timing exhaust gear assembly RH with the knock pin of the exhaust camshaft RH.

Text in Illustration

*1	Knock Hole
*2	Knock Pin



- (b) Using SST, hold the camshaft timing exhaust gear assembly RH, and tighten the 3 bolts with a socket "TORX" wrench E16.

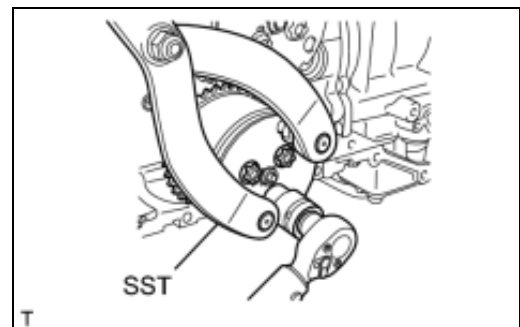
SST: 09960-10010

09962-01000

09963-00700

Torque:

18 N·m {184 kgf·cm, 13ft·lbf}



17. INSTALL CAMSHAFT TIMING INTAKE GEAR ASSEMBLY RH

NOTICE:

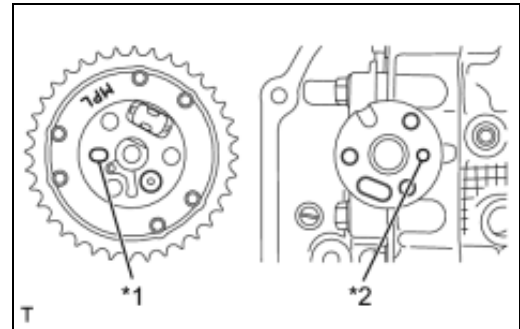
Before installation, check that there is no foreign matter on the camshaft timing intake gear

assembly RH and intake camshaft RH.

- (a) Install the camshaft timing intake gear assembly RH while aligning the knock hole of the camshaft timing intake gear assembly RH with the knock pin of the intake camshaft RH.

Text in Illustration

*1	Knock Hole
*2	Knock Pin

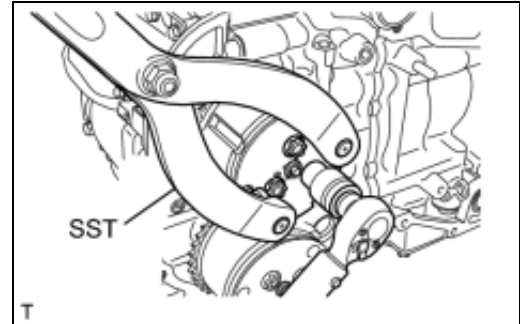


- (b) Using SST, hold the camshaft timing intake gear assembly RH, and tighten the 3 bolts with a socket "TORX" wrench E16.

SST: 09960-10010

09962-01000

09963-00700

Torque:**18 N·m {184 kgf·cm, 13ft·lbf}****18. INSTALL CRANKSHAFT TIMING GEAR OR SPROCKET** INFO**19. INSTALL CHAIN SUB-ASSEMBLY (for Bank 2)** INFO**20. INSTALL CHAIN SUB-ASSEMBLY (for Bank 1)** INFO**21. INSTALL TIMING CHAIN OR BELT COVER SUB-ASSEMBLY** INFO**22. CONNECT ENGINE WIRE** INFO**23. INSTALL TIMING CHAIN OR BELT COVER OIL SEAL** INFO**24. INSTALL CRANKSHAFT PULLEY** INFO**25. INSTALL NO. 1 WATER BY-PASS PIPE (for Manual Transmission)** INFO**26. INSTALL NO. 1 WATER BY-PASS PIPE (for Automatic Transmission)** INFO**27. INSTALL REAR CYLINDER HEAD PLATE (for Manual Transmission)** INFO**28. INSTALL VACUUM PUMP ASSEMBLY (for Automatic Transmission)** INFO**29. INSTALL PUMP DRIVE CASE ASSEMBLY** INFO**30. INSTALL VALVE LIFTER** INFO**31. INSTALL FUEL PUMP ASSEMBLY** INFO**32. INSTALL NO. 2 FUEL DELIVERY PIPE** INFO**33. INSTALL INTAKE MANIFOLD** INFO

- 34. CONNECT VENTILATION HOSE** INFO

- 35. INSTALL FUEL DELIVERY PIPE SUB-ASSEMBLY** INFO

- 36. INSTALL INJECTOR COVER (for Bank 2)** INFO

- 37. INSTALL INJECTOR COVER (for Bank 1)** INFO

- 38. INSTALL V-RIBBED BELT TENSIONER ASSEMBLY** INFO

- 39. INSTALL NO. 2 IDLER PULLEY SUB-ASSEMBLY** INFO

- 40. INSTALL OIL LEVEL DIPSTICK GUIDE** INFO

- 41. INSTALL GENERATOR ASSEMBLY** INFO

- 42. INSTALL FAN AND GENERATOR V BELT** INFO

- 43. INSTALL BELT GENERATOR COVER** INFO

- 44. INSTALL GENERATOR COVER** INFO

- 45. INSTALL ENGINE HANGER** INFO

- 46. REMOVE ENGINE STAND**

INFO

Last Modified: 4-14-2014	6.6 A	Doc ID: RM0000056U900CX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: CAMSHAFT: REMOVAL; 2013 MY FR-S [03/2012 -]		

REMOVAL

1. INSTALL ENGINE STAND

INFO

2. REMOVE ENGINE HANGER

INFO

3. REMOVE GENERATOR COVER

INFO

4. REMOVE BELT GENERATOR COVER

INFO

5. REMOVE FAN AND GENERATOR V BELT

INFO

6. REMOVE GENERATOR ASSEMBLY

INFO

7. REMOVE OIL LEVEL DIPSTICK GUIDE

INFO

8. REMOVE NO. 2 IDLER PULLEY SUB-ASSEMBLY

INFO

9. REMOVE V-RIBBED BELT TENSIONER ASSEMBLY

INFO

10. REMOVE INJECTOR COVER (for Bank 1)

INFO

11. REMOVE INJECTOR COVER (for Bank 2)

INFO

12. REMOVE FUEL DELIVERY PIPE SUB-ASSEMBLY

INFO

13. SEPARATE VENTILATION HOSE

INFO

14. REMOVE INTAKE MANIFOLD

INFO

15. REMOVE NO. 2 FUEL DELIVERY PIPE

INFO

16. REMOVE FUEL PUMP ASSEMBLY

INFO

17. REMOVE VALVE LIFTER

INFO

18. REMOVE PUMP DRIVE CASE ASSEMBLY

INFO

19. REMOVE VACUUM PUMP ASSEMBLY (for Automatic Transmission)

INFO

20. REMOVE REAR CYLINDER HEAD PLATE (for Manual Transmission)

INFO

21. REMOVE NO. 1 WATER BY-PASS PIPE (for Automatic Transmission)

INFO

22. REMOVE NO. 1 WATER BY-PASS PIPE (for Manual Transmission)

INFO

23. REMOVE CRANKSHAFT PULLEY

INFO

24. REMOVE TIMING CHAIN OR BELT COVER OIL SEAL INFO**25. DISCONNECT ENGINE WIRE** INFO**26. REMOVE TIMING CHAIN OR BELT COVER SUB-ASSEMBLY** INFO**27. REMOVE CHAIN SUB-ASSEMBLY (for Bank 1)** INFO**28. REMOVE CHAIN SUB-ASSEMBLY (for Bank 2)** INFO**29. ROTATE CRANKSHAFT AND CAMSHAFT**

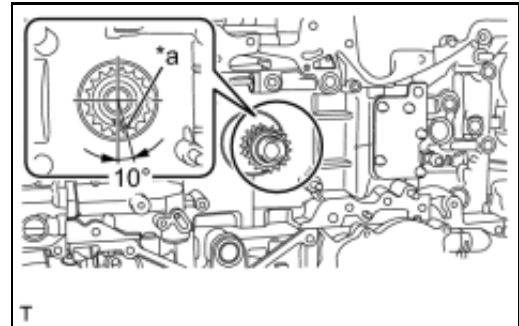
- (a) Turn the crankshaft approximately 200° clockwise, and align the alignment mark as shown in the illustration.

Text in Illustration

*a	Alignment Mark
----	----------------

NOTICE:

Do not turn the crankshaft counterclockwise except for a slight adjustment to correctly align the alignment mark. If not, the valves may come into contact with the piston.



- (b) Using SST, turn the camshaft timing intake gear assembly LH approximately 180° clockwise, and align the alignment mark on the camshaft timing intake gear assembly LH to the position (zero-lift position) shown in the illustration.

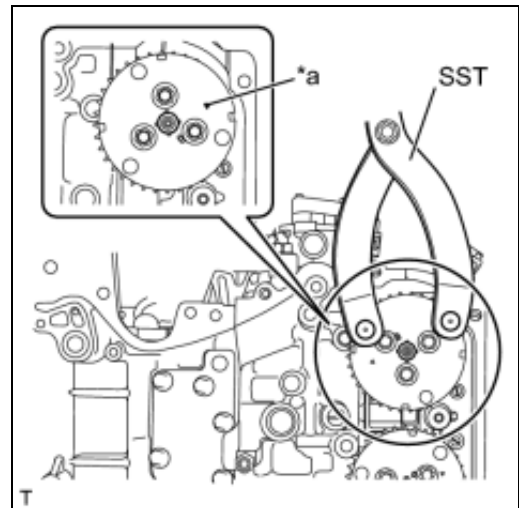
Text in Illustration

*a	Alignment Mark
----	----------------

SST: 09960-10010

09962-01000

09963-00700

**NOTICE:**

After this work, when the intake valve and exhaust valve lift at the same time, the valve heads contact each other, causing the valve stems to bend. To avoid this, do not turn the intake camshaft LH and the exhaust camshaft LH more than the zero-lift range (the range where the camshafts can be turned lightly by hand).

- (c) Remove the pulley bolt.

30. REMOVE CRANKSHAFT TIMING GEAR OR SPROCKET INFO**31. REMOVE CAMSHAFT TIMING INTAKE GEAR ASSEMBLY RH**

- (a) Using SST, hold the camshaft timing intake gear assembly RH and remove the 3 bolts with a "TORX" socket wrench E16.

SST: 09960-10010

09962-01000

09963-00700



- (b) Remove the camshaft timing intake gear assembly RH.

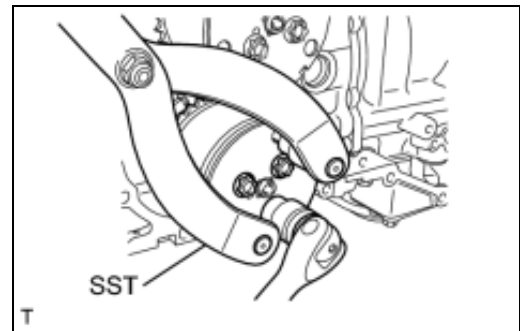
32. REMOVE CAMSHAFT TIMING EXHAUST GEAR ASSEMBLY RH

- (a) Using SST, hold the camshaft timing exhaust gear assembly RH and remove the 3 bolts with a "TORX" socket wrench E16.

SST: 09960-10010

09962-01000

09963-00700



- (b) Remove the camshaft timing exhaust gear assembly RH.

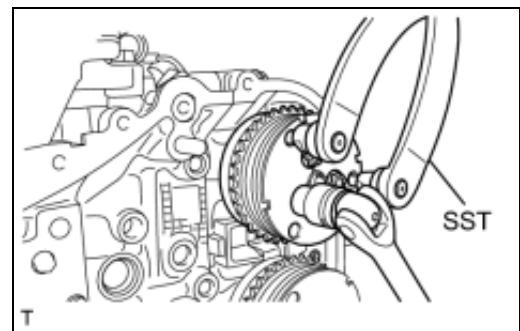
33. REMOVE CAMSHAFT TIMING INTAKE GEAR ASSEMBLY LH

- (a) Using SST, hold the camshaft timing intake gear assembly LH and remove the 3 bolts with a "TORX" socket wrench E16.

SST: 09960-10010

09962-01000

09963-00700



- (b) Remove the camshaft timing intake gear assembly LH.

34. REMOVE CAMSHAFT TIMING EXHAUST GEAR ASSEMBLY LH

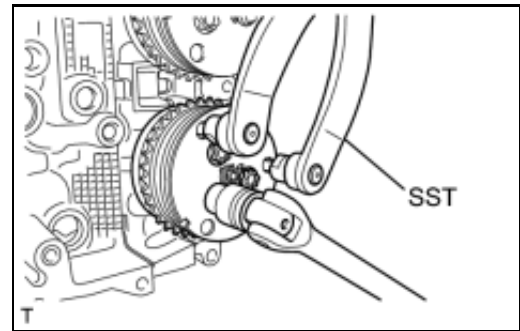
- (a) Using SST, hold the camshaft timing exhaust gear assembly LH and remove the 3 bolts with a "TORX" socket

wrench E16.

SST: 09960-10010

09962-01000

09963-00700



(b) Remove the camshaft timing exhaust gear assembly LH.

35. REMOVE IGNITION COIL ASSEMBLY (for Bank 2) INFO

36. REMOVE SPARK PLUG (for Bank 2) INFO

37. REMOVE IGNITION COIL ASSEMBLY (for Bank 1) INFO

38. REMOVE SPARK PLUG (for Bank 1) INFO

39. REMOVE INJECTOR DRIVER BRACKET INFO

40. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY RH INFO

41. REMOVE CAMSHAFT HOUSING SUB-ASSEMBLY RH INFO

42. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY LH INFO

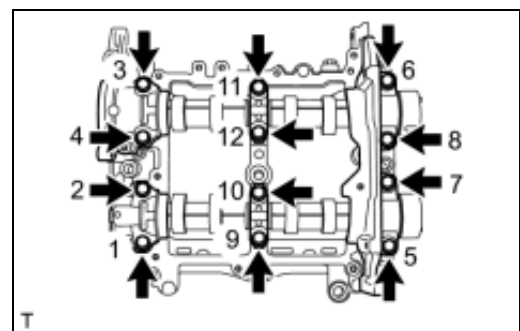
43. REMOVE CAMSHAFT HOUSING SUB-ASSEMBLY LH INFO

44. REMOVE CAMSHAFT CAP (for Bank 1)

(a) In several steps, uniformly loosen the 12 bolts in the order shown in the illustration, and remove the front camshaft cap RH, intake center camshaft cap RH, intake rear camshaft cap RH, exhaust center camshaft cap RH, and exhaust rear camshaft cap RH.

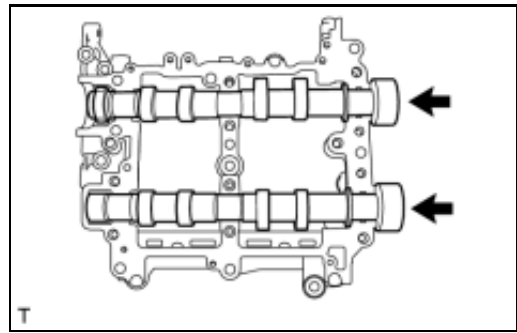
HINT:

Arrange the removed parts in the correct order.



45. REMOVE CAMSHAFT RH (for Bank 1)

- (a) Remove the intake camshaft RH and exhaust camshaft RH from the camshaft housing sub-assembly RH.

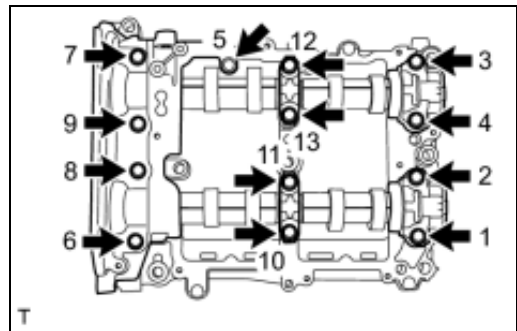


46. REMOVE CAMSHAFT CAP (for Bank 2)

- (a) In several steps, uniformly loosen the 13 bolts in the order shown in the illustration, and remove the front camshaft cap LH, intake center camshaft cap LH, intake rear camshaft cap LH, exhaust center camshaft cap LH and exhaust rear camshaft cap LH.

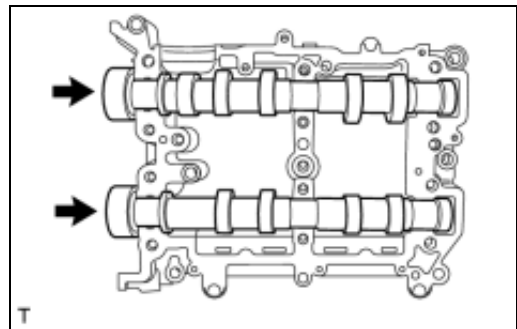
HINT:

Arrange the removed parts in the correct order.



47. REMOVE CAMSHAFT LH (for Bank 2)

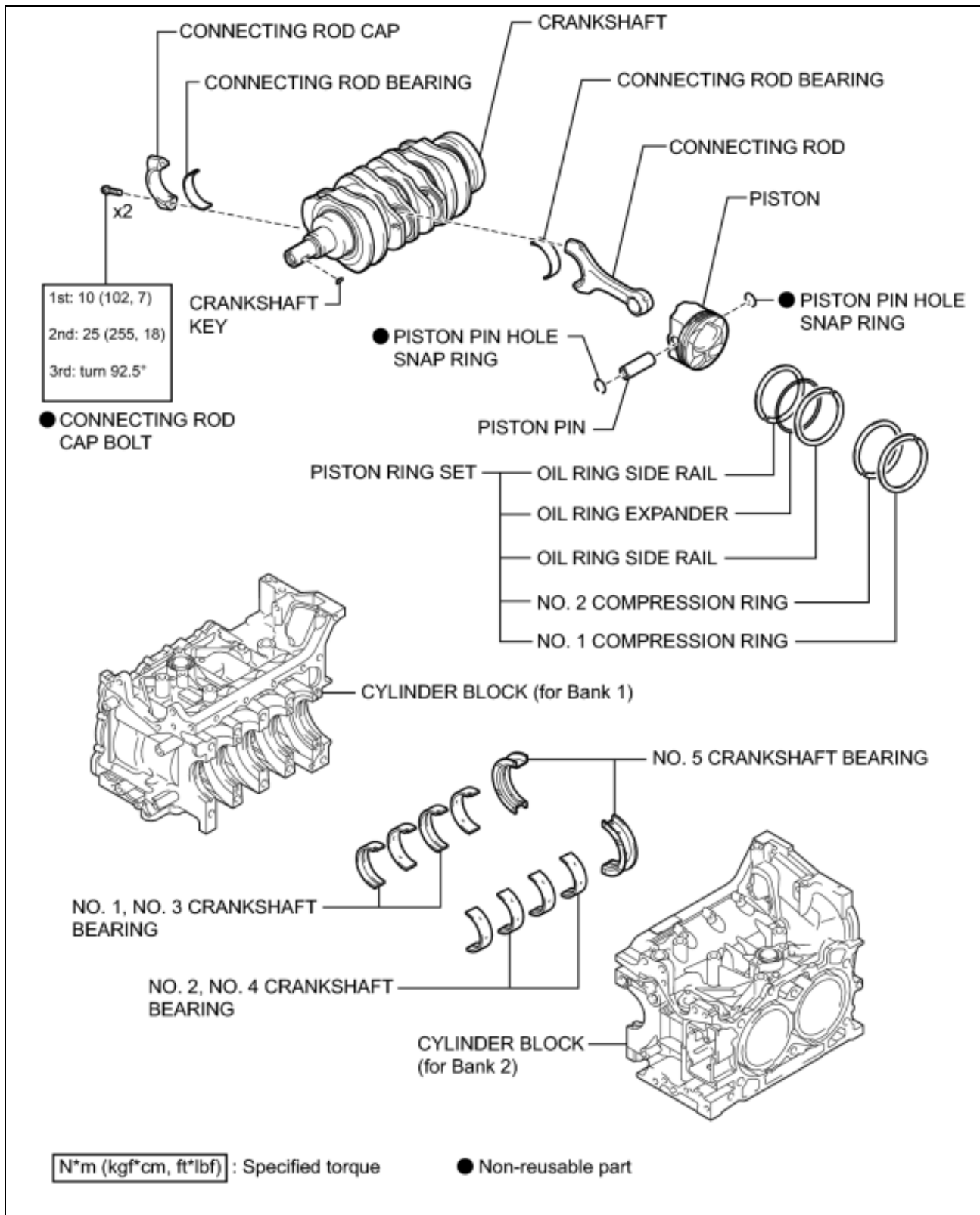
- (a) Remove the intake camshaft LH and exhaust camshaft LH from the camshaft housing sub-assembly LH.



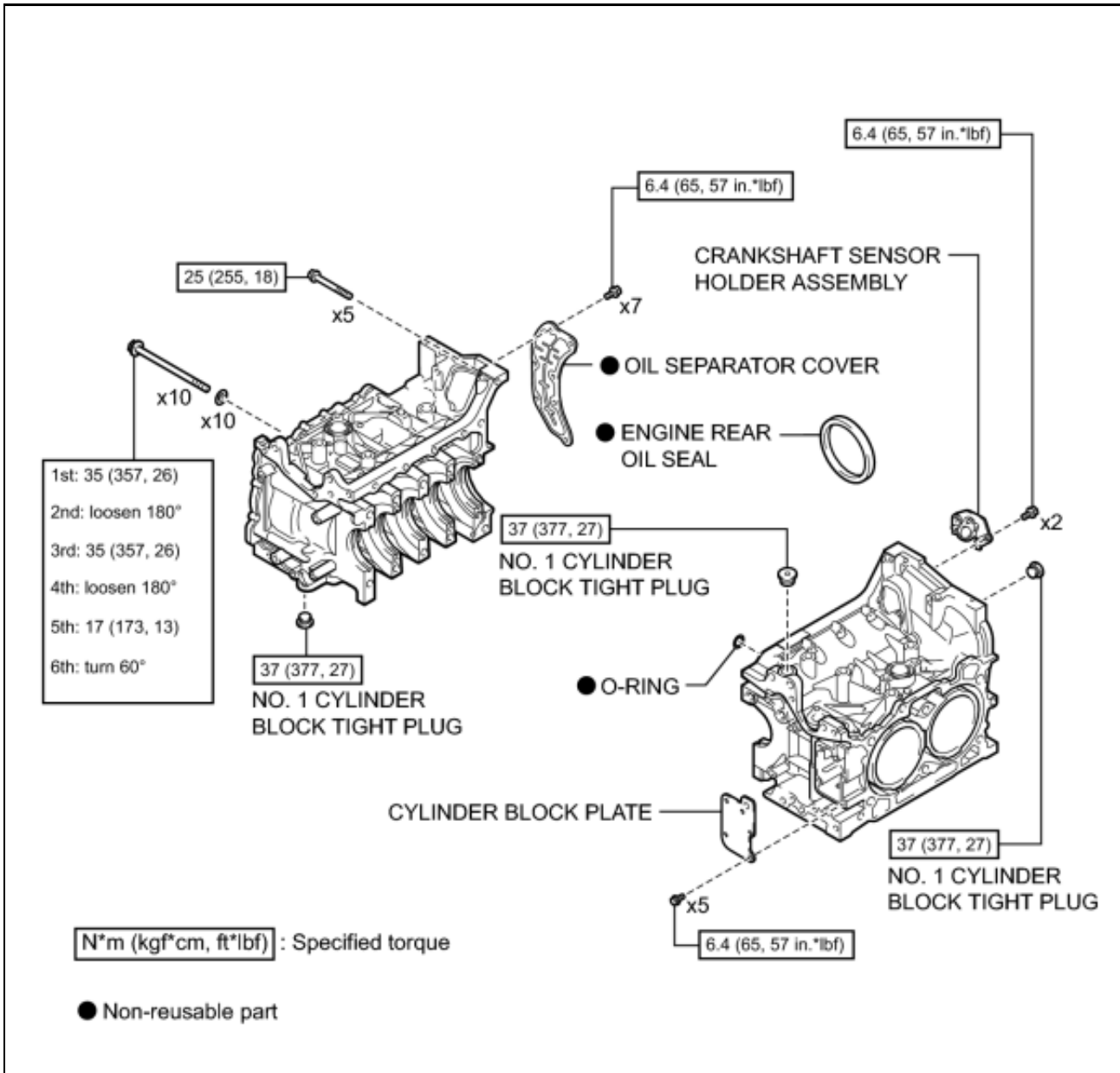
Last Modified: 4-14-2014	6.6 K	Doc ID: RM000000T4V07IX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: CYLINDER BLOCK: COMPONENTS; 2013 MY FR-S [03/2012 -]		

[COMPONENTS](#)

[ILLUSTRATION](#)



ILLUSTRATION



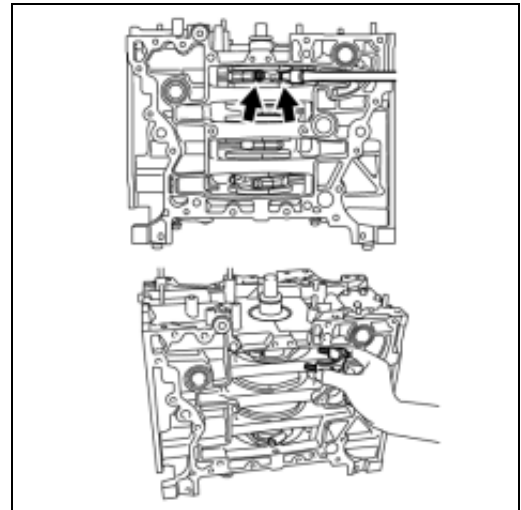
Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000T4X087X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: CYLINDER BLOCK: DISASSEMBLY; 2013 MY FR-S [03/2012 -]		

DISASSEMBLY

1. REMOVE PISTON SUB-ASSEMBLY WITH CONNECTING ROD

- (a) Mark each connecting rod cap and piston with a cylinder number.
- (b) Turn the crankshaft so that the connecting rod cap can be removed.

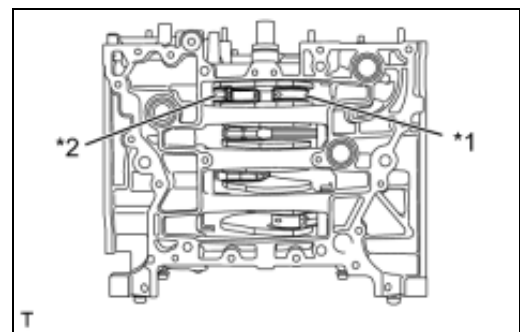
- (c) Using a "TORX" socket wrench E14, remove the 2 connecting rod cap bolts and connecting rod cap.



- (d) Turn the crankshaft and separate the crank pin from the connecting rod.

Text in Illustration

*1	Crank pin
*2	Connecting rod

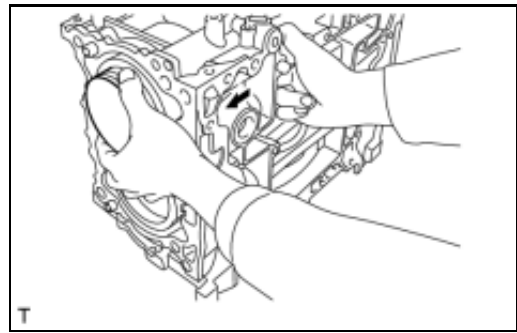


HINT:

Turn the crankshaft clockwise when removing the No. 1 or No. 3 piston with connecting rod, and turn it counterclockwise when removing the No. 2 or No. 4 piston with connecting rod.

- (e) Push the connecting rod in the direction of the arrow, and

remove the piston with connecting rod from the cylinder block.



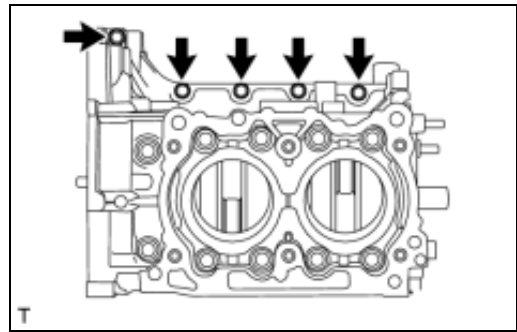
2. REMOVE CYLINDER BLOCK SUB-ASSEMBLY (for Bank 1)

NOTICE:

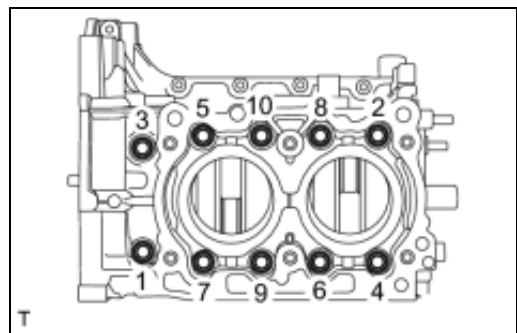
Place a cloth to avoid scratching the mating surface of the cylinder block during servicing.

(a) Operate the engine stand so that the bank 1 side faces upward.

(b) Remove the 5 bolts.



(c) Using a 12 mm socket wrench, loosen the 10 bolts in the order as shown in the illustration.



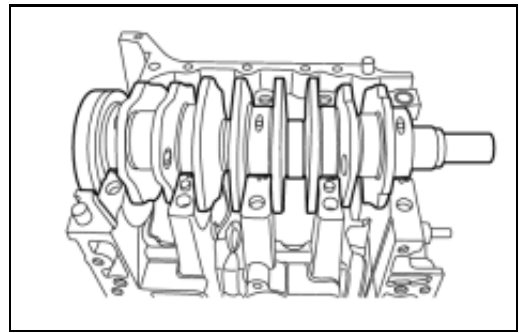
(d) Remove the 10 bolts and cylinder block (for bank 1).

NOTICE:

Lift the cylinder block (for bank 1) slightly, and confirm that the crankshaft is remaining on the cylinder block (for bank 2). If the cylinder block (for bank 1) is lifted carelessly when separating, the crankshaft possibly having stuck to cylinder block (for bank 1) may fall off.

3. REMOVE CRANKSHAFT

(a) Remove the crankshaft from the cylinder block (for bank 2).

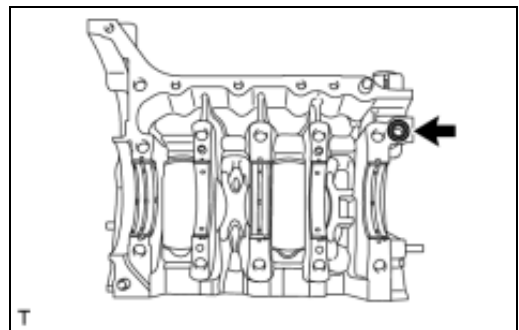


4. REMOVE REAR ENGINE OIL SEAL

(a) Remove the rear engine oil seal.

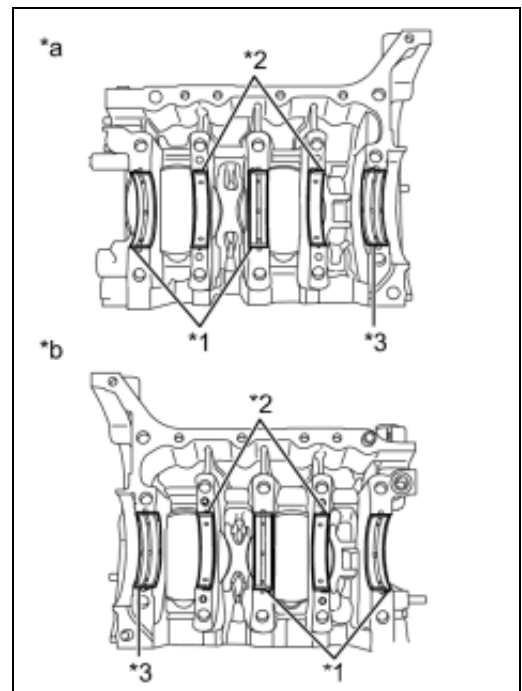
5. REMOVE O-RING

(a) Remove the O-ring from the cylinder block (for bank 2).



6. REMOVE CRANKSHAFT BEARING

(a) Remove the crankshaft bearings from the cylinder block (for bank 1) and cylinder block (for bank 2).



Text in Illustration

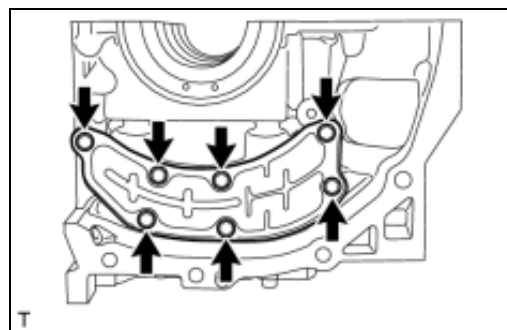
*1	No. 1 and No. 3 Crankshaft Bearing
*2	No. 2 and No. 4 Crankshaft Bearing
*3	No. 5 Crankshaft Bearing
*a	for Bank 1
*b	for Bank 2

HINT:

- Arrange the removed parts in the correct order.
- Push the bearing at the opposite end to locking lip to remove the bearing.

7. REMOVE OIL SEPARATOR COVER

- (a) Remove the 7 bolts and oil separator cover from the cylinder block (for bank 1).

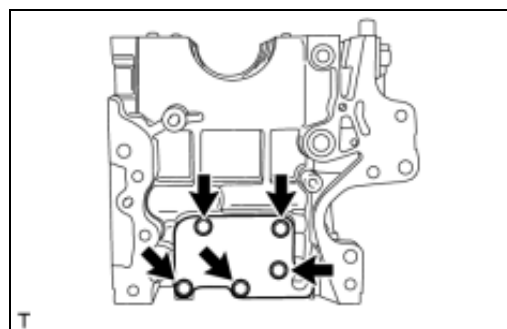


8. REMOVE CYLINDER BLOCK SUB-ASSEMBLY (for Bank 2)

- (a) Remove the cylinder block sub-assembly (for bank 2) from the engine stand.

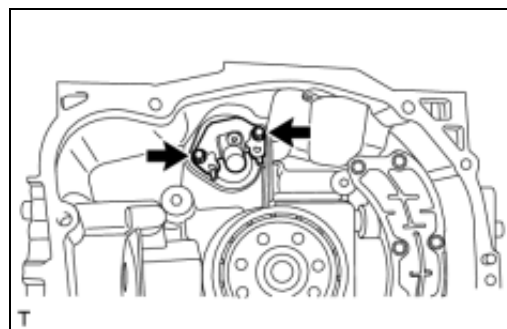
9. REMOVE CYLINDER BLOCK PLATE

- (a) Remove the 5 bolts and cylinder block plate from the cylinder block (for bank 2).



10. REMOVE CRANKSHAFT SENSOR HOLDER ASSEMBLY

- (a) Remove the 2 bolts and crankshaft sensor holder assembly from the cylinder block (for bank 2).

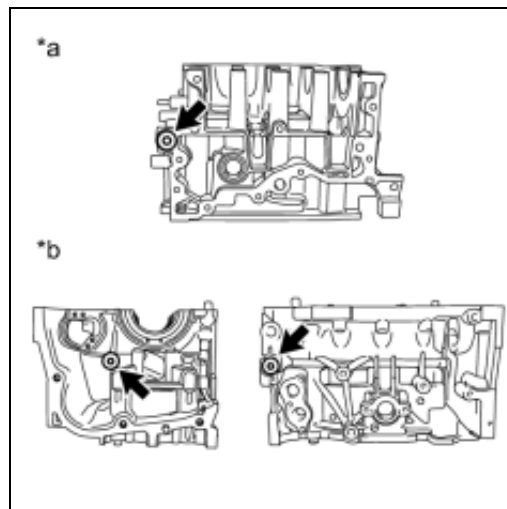


11. REMOVE NO. 1 CYLINDER BLOCK TIGHT PLUG

- (a) Remove the 3 No. 1 cylinder block tight plugs from the cylinder block (for bank 1) and cylinder block (for bank 2).

Text in Illustration

*a	for Bank 1
*b	for Bank 2



12. REMOVE CONNECTING ROD BEARING

- (a) Remove the connecting rod bearings.

HINT:

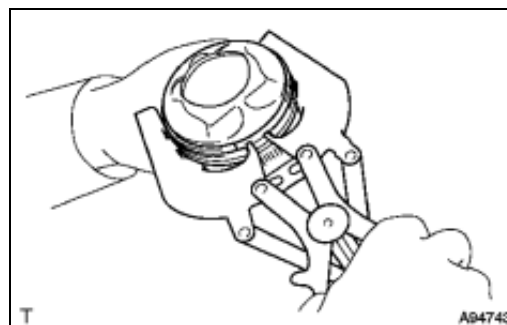
Arrange the removed parts in the correct order.

13. REMOVE PISTON RING SET

HINT:

Arrange the removed parts in the correct order.

- (a) Using a piston ring expander, remove the No. 1 compression ring and No. 2 compression ring in order.



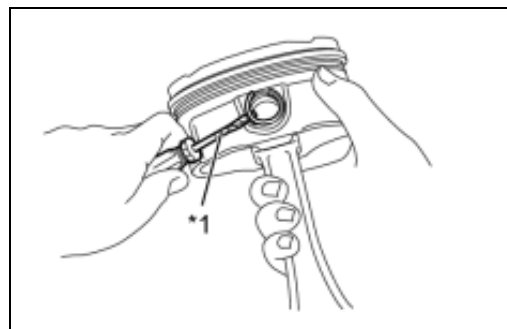
- (b) Remove the upper oil ring side rail, lower oil ring side rail and oil ring expander in order by hand.

14. REMOVE PISTON WITH PIN SUB-ASSEMBLY

- (a) Using a screwdriver with its tip wrapped in protective tape, remove the piston pin hole snap ring on one end from the piston.

Text in Illustration

*1	Protective Tape
----	-----------------



HINT:

Be careful not to damage the piston and piston pin by wrapping the tip of the screwdriver with protective tape.

- (b) Remove the piston pin from the piston.
- (c) Using a screwdriver with its tip wrapped in protective tape, remove the piston pin hole snap ring on other end from the piston.

HINT:

Be careful not to damage the piston and piston pin by wrapping the tip of the screwdriver with protective tape.



Last Modified: 4-14-2014	6.6 G	Doc ID: RM000000XCV08HX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: CYLINDER BLOCK: INSPECTION; 2013 MY FR-S [03/2012 -]		

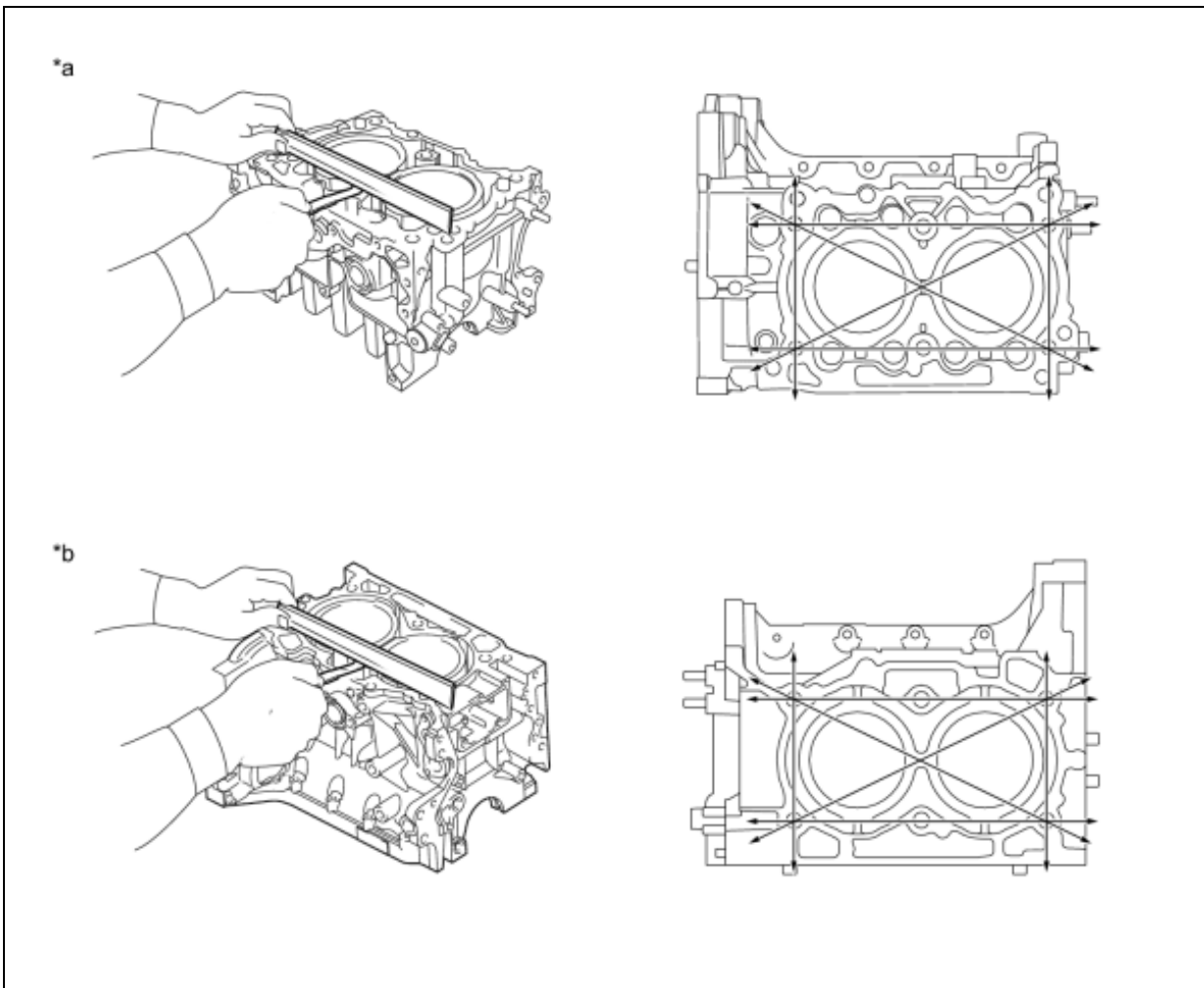
INSPECTION

1. INSPECT CYLINDER BLOCK SUB-ASSEMBLY

- (a) Visually check that there are no cracks, scratches or other damage.
- (b) Using a dye penetrant, check the important sections for fissures.
- (c) Check that there are no signs of gas leak or water leak on gasket attachment surfaces.
- (d) Check the oil passages for clogging.

2. INSPECT CYLINDER BLOCK FOR WARPAGE

- (a) Using a precision straightedge and a feeler gauge, measure the surfaces that contact the cylinder head for warpage.



Text in Illustration

*a	for Bank 1	*b	for Bank 2
----	------------	----	------------

Maximum warpage:
0.025 mm (0.00098 in.)

If the warpage is greater than the maximum, correct the surface by grinding it or replace the cylinder block.

HINT:

Measurement should be performed at a temperature of 20°C (68°F).

Allowable minimum cylinder block height:

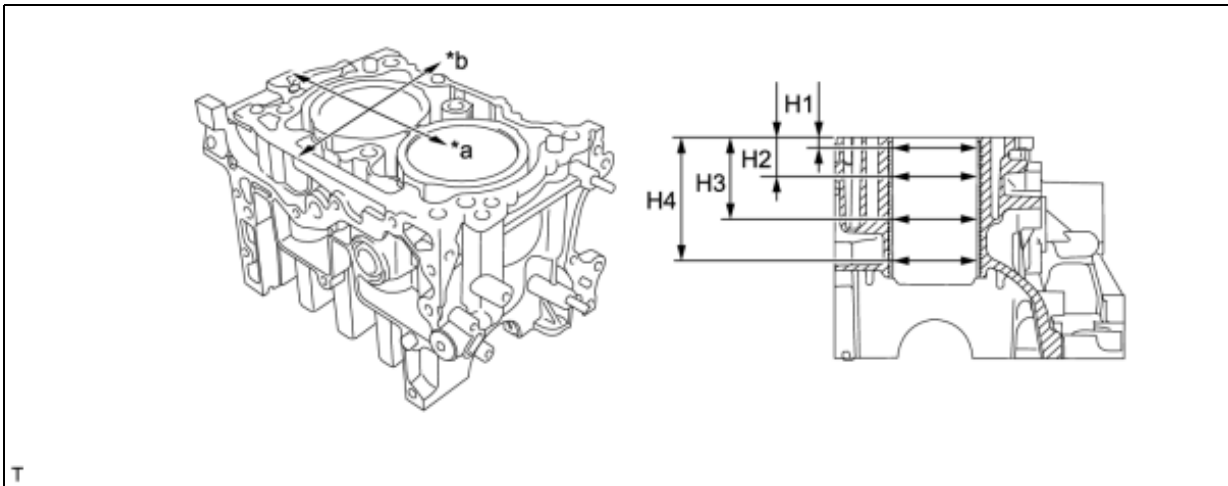
204.9 mm (8.067 in.)

Standard cylinder block height:

205.0 mm (8.071 in.)

3. INSPECT CYLINDER BORE

- (a) Using a cylinder gauge, measure the cylinder bore diameter at positions shown in the illustration and check for taper and out-of-round.

**Text in Illustration**

*a	Piston pin direction	*b	Thrust direction
----	----------------------	----	------------------

Standard

Cylinder bore size A	86.005 to 86.015 mm (3.38602 to 3.38641 in.)
Cylinder bore size B	85.995 to 86.005 mm (3.38562 to 3.38602 in.)

Maximum

Taper	0.030 mm (0.00118 in.)
Out-of-runout	0.010 mm (0.00039 in.)

Location

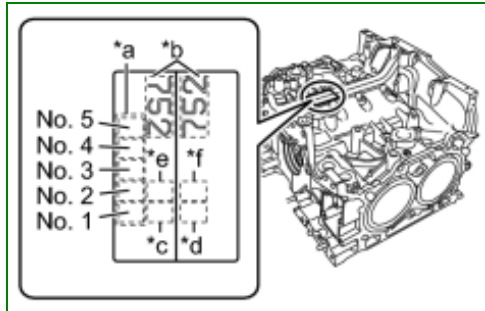
H1	10.0 mm (0.394 in.)
H2	45.0 mm (1.772 in.)
H3	80.0 mm (3.150 in.)
H4	115.0 mm (4.528 in.)

If the result is not as specified, perform boring and honing, or replace the cylinder block and piston as a

set.

HINT:

- Measurement should be performed at a temperature of 20°C (68°F).
- Measure the inside diameter of each cylinder bore in both the thrust and piston pin directions at the height shown in the illustration.
- The cylinder bore size is stamped on the upper face of the cylinder block.

**Text in Illustration**

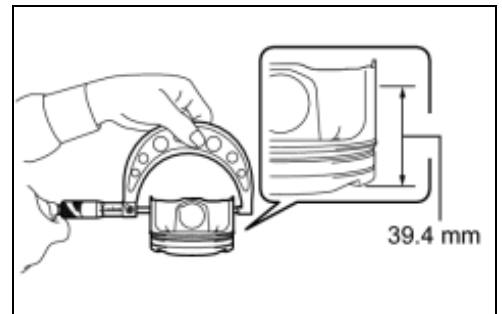
*a	Main journal size mark
*b	Cylinder block (for bank 1 / for bank 2) combination mark
*c	No. 1 cylinder bore size mark
*d	No. 2 cylinder bore size mark
*e	No. 3 cylinder bore size mark
*f	No. 4 cylinder bore size mark

4. INSPECT PISTON DIAMETER

- (a) Using a micrometer, measure the piston diameter at right angles to the piston pin hole, and at a point 39.4 mm (1.551 in.) from the top of the piston head.

Standard

A grade	85.985 to 85.995 mm (3.38523 to 3.38562 in.)
B grade	85.975 to 85.985 mm (3.38484 to 3.38523 in.)
0.25 mm (0.0098 in.) over size	86.225 to 86.245 mm (3.39468 to 3.39547 in.)
0.50 mm (0.0197 in.) over size	86.475 to 86.495 mm (3.40452 to 3.40531 in.)



If the result is not as specified, replace the piston.

HINT:

- Measurement should be performed at a temperature of 20°C (68°F).
- Measure the outer diameter of each piston in thrust direction at the height shown in the illustration.
- Standard sized pistons are classified into 2 grades, "A" and "B".
These grades should be used as guide lines in selecting a

These grades should be used as guide lines in selecting a standard piston diameter.

- If the piston is replaced, check the piston oil clearance, and select a suitable sized piston diameter.

5. INSPECT PISTON OIL CLEARANCE

- (a) Subtract the piston diameter measurement from the cylinder bore diameter measurement.

Standard oil clearance:

0.010 to 0.030 mm (0.00039 to 0.00118 in.)

HINT:

- Oil clearance = maximum cylinder bore diameter - piston diameter
- If the result is not as specified, perform boring and honing, or replace the cylinder block and piston as a set.

6. REPAIR CYLINDER LINER

- (a) If any of the inside diameter, taper, out-of-round or piston oil clearance is out of standard, or if there is any damage on the cylinder liner, rebore it to replace with an oversized piston.

Allowable maximum cylinder liner diameter:

86.505 mm (3.40570 in.)

If the inside diameter of cylinder liner is more than the maximum after boring and honing, replace the cylinder block and piston as a set.

HINT:

- When any of the cylinder liner needs to be rebored, all other cylinder bores must be rebored at the same time, and replaced with oversized pistons.
- Immediately after reboring, the inside diameter of the cylinder liner may differ from its actual diameter due to high temperature. Thus, when measuring the inside diameter of the cylinder liner, wait until it has cooled to the normal temperature of 20°C (68°F).

7. INSPECT PISTON WITH PIN

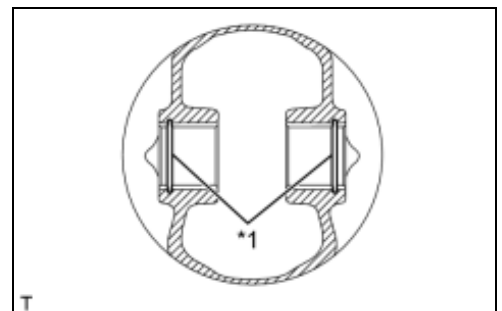
- (a) Check the piston and piston pin for wear or cracks.
 (b) Check the piston pin hole snap ring for distortion or wear.
 (c) Check the piston ring groove for damage.

- (d) Check the piston pin hole snap ring groove for burr.

Text in Illustration

*1	Piston Pin Hole Snap Ring Groove
----	----------------------------------

If any burr is found, remove the burr from the groove.



(e) Check if the piston pin can be pushed into the piston pin hole with your thumb.

HINT:

Measurement should be performed at a temperature of 20°C (68°F).

8. INSPECT CONNECTING ROD SMALL END BUSH

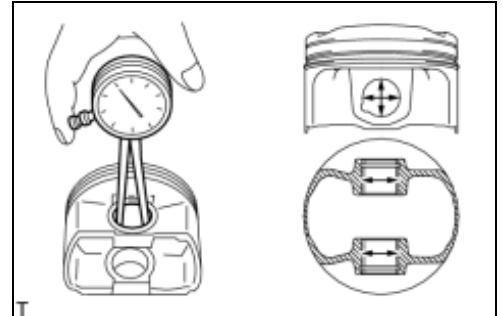
(a) Check the bushing at connecting rod small end bush for damage.

9. INSPECT PISTON PIN OIL CLEARANCE

(a) Using a caliper gauge, measure the inside diameter of the piston pin hole.

HINT:

- Measurement should be performed at a temperature of 20°C (68°F).
- Measure the inside diameter of the piston pin hole at the 4 locations shown in the illustration, and take the maximum value.
- Record the measured value.



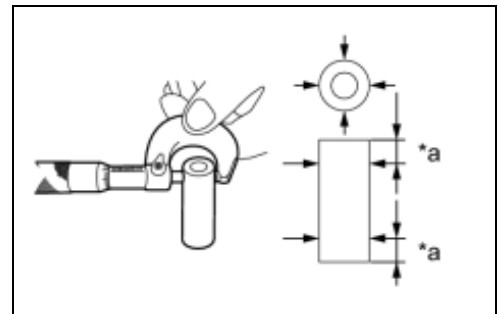
(b) Using a micrometer, measure the outer diameter of the piston pin.

Text in Illustration

*a	10.0 mm (0.394 in.)
----	---------------------

HINT:

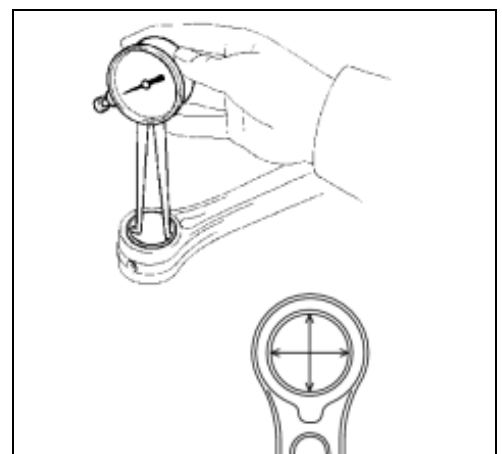
- Measurement should be performed at a temperature of 20°C (68°F).
- Measure the outer diameter of the piston pin at the 4 locations shown in the illustration, and take the minimum value.
- Record the measured value.



(c) Using a caliper gauge, measure the inside diameter of bushing at connecting rod small end.

HINT:

- Measurement should be performed at a temperature of 20°C (68°F).
- Measure the inside diameter of the bushing at the 4 locations shown in the illustration, and take the minimum value.
- Record the measured value.



(d) Calculate the clearance between the piston pin hole and piston pin.

Standard oil clearance:

0.004 to 0.008 mm (0.00016 to 0.00031 in.)

If the clearance between the piston pin and piston pin hole is more than the maximum, replace the piston and piston pin as a set.

HINT:

Oil clearance = piston pin hole inside diameter - piston pin outer diameter

(e) Calculate the clearance between piston pin and bushing at connecting rod small end.

Standard oil clearance:

0.006 to 0.026 mm (0.00024 to 0.00102 in.)

If the clearance between the piston pin and bushing at connecting rod small end is more than the maximum, replace the connecting rod and piston pin as a set.

HINT:

Oil clearance = connecting rod small end inside diameter - piston pin outer diameter

10. INSPECT PISTON RING

(a) Make sure that the piston ring is not broken or damaged.

If the piston ring is broken or damaged, replace it with a new one.

HINT:

Use a piston ring of the same size as the piston to be used.

11. INSPECT PISTON RING END GAP

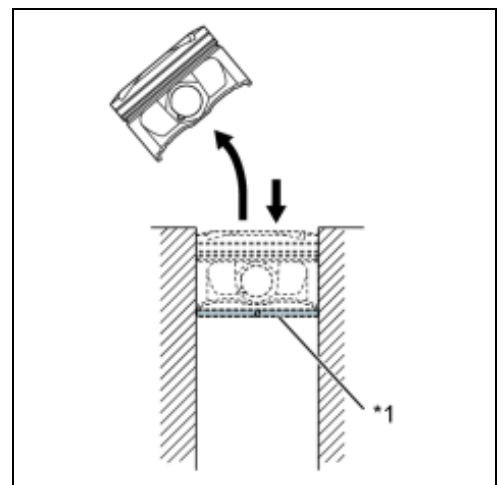
(a) Using a piston, push the piston ring into the cylinder.

HINT:

Push the piston ring into the cylinder until the entire piston is inserted into the cylinder.

Text in Illustration

*1	Piston ring
----	-------------



(b) Using a feeler gauge, measure the end gap.

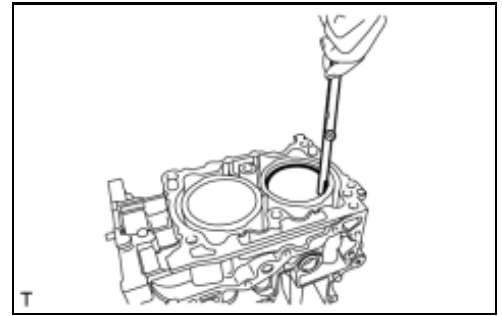
Maximum end gap

No. 1	0.20 to 0.25 mm (0.00787 to 0.00984 in.)
No. 2	0.60 to 0.70 mm (0.02362 to 0.02756 in.)
Oil ring	0.10 to 0.35 mm (0.00394 to 0.01378 in.)

If the end gap is more than the maximum, replace the piston ring with a new one.

HINT:

- Measurement should be performed at a temperature of 20°C (68°F).
- Use a piston ring of the same size as the piston to be used.



12. INSPECT RING GROOVE CLEARANCE

(a) Using a feeler gauge, measure the clearance between the piston ring and the wall of the ring groove.

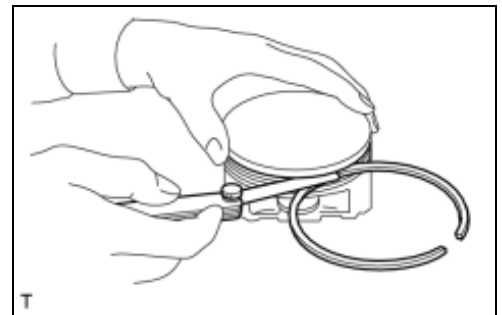
Maximum clearance

No. 1	0.030 to 0.080 mm (0.00118 to 0.00315 in.)
No. 2	0.030 to 0.070 mm (0.00118 to 0.00276 in.)

If the clearance is more than the maximum, replace the piston ring with a new one.

HINT:

- Measurement should be performed at a temperature of 20°C (68°F).
- Before measuring the clearance, clean the piston ring groove and piston ring.
- Use a same sized piston ring with the piston when replacing it.



13. INSPECT CONNECTING ROD SUB-ASSEMBLY

(a) Check that the large or small end thrust surface is not damaged.

(b) Check the connecting rod assembly bearing for scar, peeling, seizure, melting or wear, etc.

(c) Using a rod aligner and feeler gauge, check the connecting rod sub-assembly for bend.

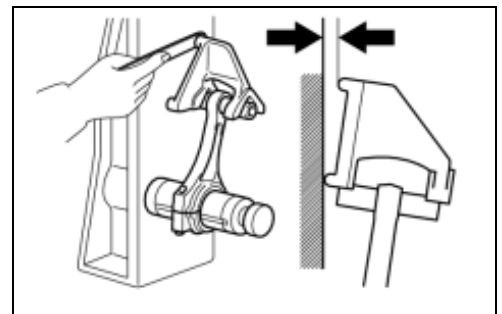
Maximum bend:

0.10 mm (0.0039 in.) per 100 mm (3.937 in.) in length

If the bend is more than the maximum, replace the connecting rod sub-assembly with a new one.

HINT:

Measurement should be performed at a temperature of 20°C (68°F).



(d) Using a rod aligner and feeler gauge, check the connecting rod sub-assembly for twist.

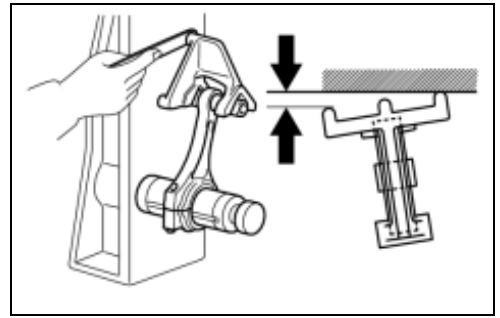
Maximum twist:

0.10 mm (0.0039 in.) per 100 mm (3.937 in.) in length

If the twist is more than the maximum, replace the connecting rod sub-assembly with a new one.

HINT:

Measurement should be performed at a temperature of 20°C (68°F).



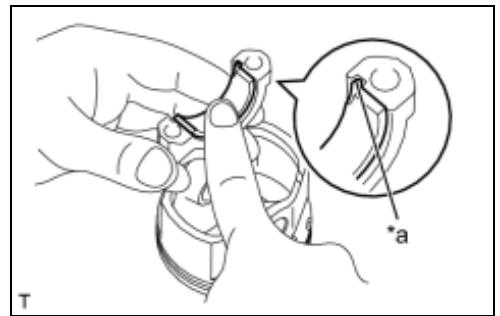
14. INSPECT CONNECTING ROD THRUST CLEARANCE

(a) Clean the connecting rod bearings and crank pins, and apply engine oil to the crank pins. <*1>

(b) Align the claw and attach the connecting rod bearing to the connecting rod.

Text in Illustration

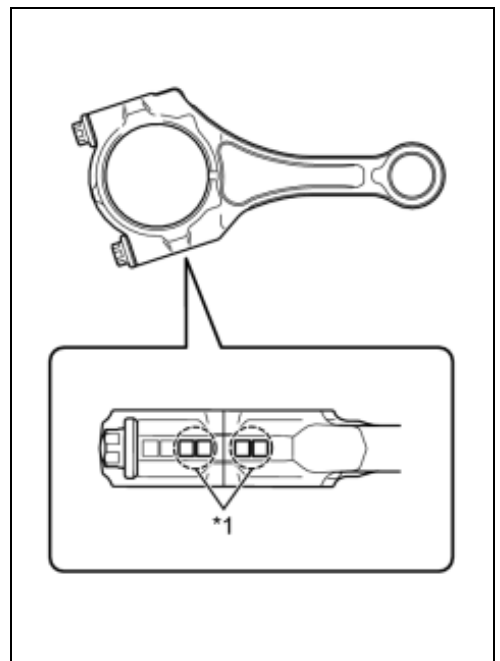
*a	Claw
----	------



(c) Check the matching symbols and set the connecting rod, connecting rod cap and connecting rod cap bolts.

Text in Illustration

*1	Matching Symbol
----	-----------------



HINT:

- Measurement should be performed at a temperature of 20°C (68°F).
- Each connecting rod has its own mating cap. Make sure that they are assembled correctly by checking their matching symbol.

(e) Apply engine oil to the threads of the connecting rod cap bolts.

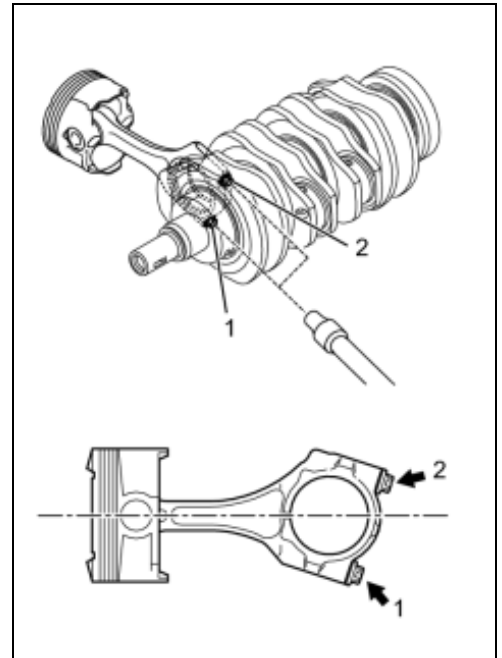
(f) Using a "TORX" socket wrench E14, tighten the 2 connecting rod cup bolts in the order shown in the illustration.

Torque:

10 N·m {102 kgf·cm, 7ft·lbf}

NOTICE:

- Securely hold the crankshaft during the operation.
- Be sure not to damage the crankshaft when securing it.



(g) Retighten the 2 connecting rod cup bolts in the same order as above. <*2>

Torque:

25 N·m {255 kgf·cm, 18ft·lbf}

NOTICE:

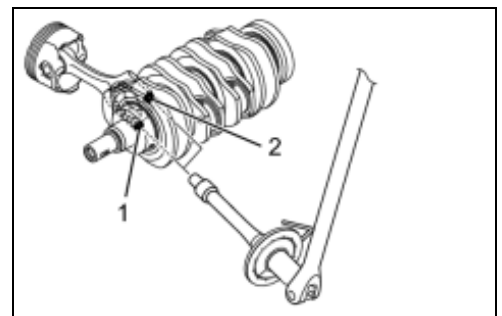
- Securely hold the crankshaft during the operation.
- Be sure not to damage the crankshaft when securing it.

(h) In the same procedures from <*1> to <*2>, install the No. 2, No. 3 and No. 4 piston with connecting rods.

(i) Using a "TORX" socket wrench E14 and an angle gauge, tighten the connecting rod cup bolts for the No. 1 to No. 4 piston with connecting rods by additional 92.5°.

NOTICE:

- Securely hold the crankshaft during the operation.
- Be sure not to damage the crankshaft when securing it.

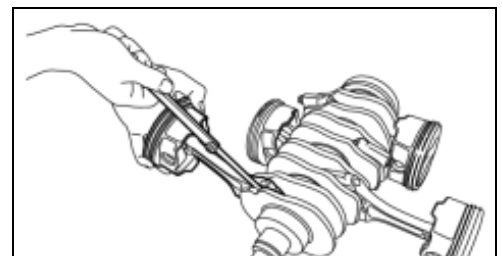


(j) Using a feeler gauge, measure the thrust clearance for each connecting rod.

Standard thrust clearance:

0.070 to 0.330 mm (0.00276 to 0.01299 in.)

If the clearance is not within the standard, replace the connecting rod.



HINT:

Measure the thrust clearance for each connecting rod at several points, and replace the connecting rod if there is uneven wear.

**15. INSPECT CONNECTING ROD OIL CLEARANCE**

- (a) Clean the connecting rod bearings and crank pins, and apply engine oil to the crank pins. <*1>
 (b) Attach the connecting rod bearings to the connecting rod and connecting rod cap.

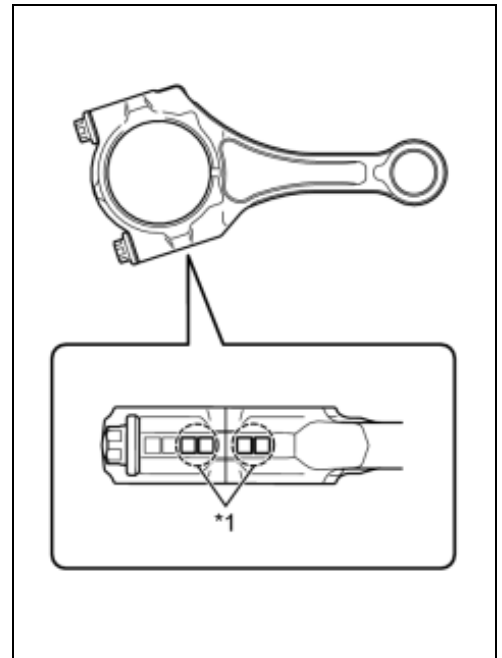
- (c) Lay a strip of Plastigage across the crank pin, and set the connecting rod and the connecting rod cap with the 2 connecting rod cap bolts after checking the matching symbols.

Text in Illustration

*1	Matching Symbol
----	-----------------

HINT:

- Measurement should be performed at a temperature of 20°C (68°F).
- Each connecting rod has its own mating cap. Make sure that they are assembled correctly by checking their matching symbol.



- (d) Apply engine oil to the threads of the connecting rod cap bolts.

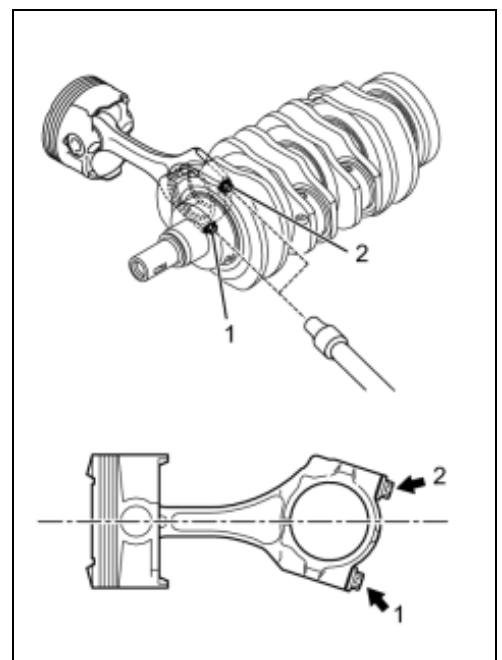
- (e) Using a "TORX" socket wrench E14, tighten the 2 connecting rod cup bolts in the order shown in the illustration.

Torque:

10 N·m {102 kgf·cm, 7ft·lbf}

NOTICE:

- Do not turn the crankshaft.
- Securely hold the crankshaft during the operation.
- Be sure not to damage the crankshaft when securing it.



- (f) Retighten the 2 connecting rod cup bolts in the same order as above. <*2>

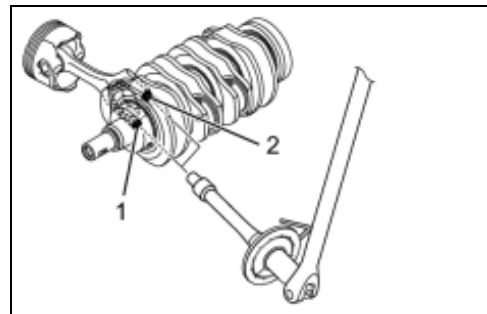
Torque:

25 N·m {255 kgf·cm, 18ft·lbf}

NOTICE:

- Do not turn the crankshaft.
- Securely hold the crankshaft during the operation.
- Be sure not to damage the crankshaft when securing it.

(g) In the same procedures from <*1> to <*2>, install the No. 2, No. 3 and No. 4 piston with connecting rods.



(h) Using a "TORX" socket wrench E14 and an angle gauge, tighten the connecting rod cup bolts for the No. 1 to No. 4 piston with connecting rods by additional 92.5°.

(i) Remove the connecting rod cup and measure the Plastigage at its widest point.

Standard oil clearance:

0.025 to 0.055 mm (0.00098 to 0.00217 in.)

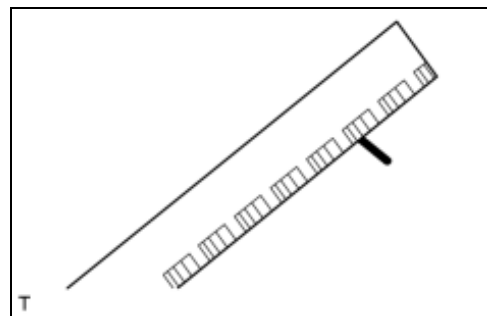
NOTICE:

Completely remove the Plastigage after the inspection.

If the oil clearance is more than the maximum, replace the bearings.

HINT:

Measure the outer diameter of the crank pin using a micrometer, and select a suitable size connecting rod bearing when replacing the connecting rod bearing.

**Standard**

BEARING	BEARING SIZE (THICKNESS AT CENTER)	OUTER DIAMETER OF CRANK PIN
Standard	1.492 to 1.508 mm (0.05874 to 0.05937 in.)	49.976 to 50.000 mm (1.96756 to 1.96850 in.)
0.03 mm (0.0012 in.) Undersize	1.511 to 1.515 mm (0.05949 to 0.05965 in.)	49.946 to 49.970 mm (1.96637 to 1.96732 in.)
0.05 mm (0.0020 in.) Undersize	1.521 to 1.525 mm (0.05988 to 0.06004 in.)	49.926 to 49.950 mm (1.96559 to 1.96653 in.)
0.25 mm (0.0098 in.) Undersize	1.621 to 1.625 mm (0.06382 to 0.06398 in.)	49.726 to 49.750 mm (1.95771 to 1.95866 in.)

16. INSPECT CRANKSHAFT

(a) Using a dye penetrant, check the important sections for fissures.

(b) Using a dial indicator, measure the circle runout at the center

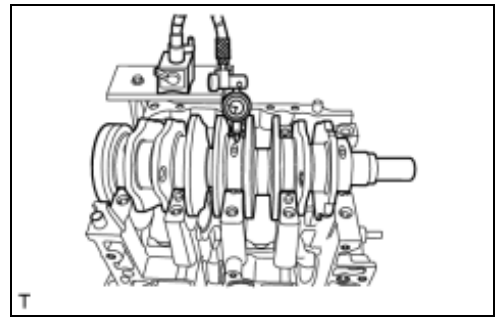
(b) Using a dial indicator, measure the circle runout at the center journal.

Maximum circle runout:
0.035 mm (0.00138 in.)

If the circle runout is more than the maximum, grind to correct or replace the crankshaft.

HINT:

- Measurement should be performed at a temperature of 20°C (68°F).
- If a suitable V-block is not available, using just the No. 1 and No. 5 crankshaft bearings on the cylinder block, position the crankshaft on the cylinder block. Then, measure the crankshaft runout using a dial indicator.



(c) Using a micrometer, check the outer diameter of the crankshaft journal and crank pin for taper and out-of-round.

Maximum (Pin)

Taper	0.006 mm (0.00024 in.)
Out-of-runout	0.005 mm (0.00020 in.)

Maximum (Journal)

Taper	0.006 mm (0.00024 in.)
Out-of-runout	0.005 mm (0.00020 in.)

Allowable minimum diameter

Pin	47.726 mm (1.87897 in.)
Journal	67.735 mm (2.66673 in.)

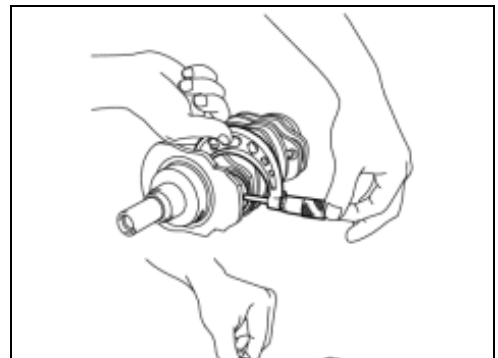
If taper or out-of-round is more than the maximum, replace the connecting rod bearing or crankshaft bearing, and grind to correct or replace the crankshaft as required.

HINT:

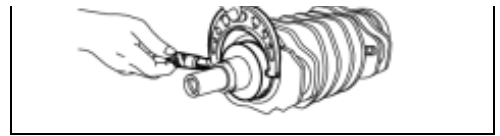
- Measurement should be performed at a temperature of 20°C (68°F).
- Select a suitable size connecting rod bearing or crankshaft bearing when replacing the connecting rod bearing or crankshaft bearing.
- When grinding to correct the crank journal or crank pin, finish them to the suitable dimensions as shown in the table below according to the undersize bearing to be used.

Standard

BEARING	CONNECTING ROD BEARING THICKNESS (AT CENTER)	CRANK PIN OUTER DIAMETER	CRANKSHAFT BEARING THICKNESS (AT CENTER)		CRANKSHAFT JOURNAL DIAMETER
			NO. 1 TO	NO. 5	



			NO. 4		
Standard	1.492 to 1.508 mm (0.05874 to 0.05937 in.)	49.976 to 50.000 mm (1.96756 to 1.96850 in.)	2.495 to 2.513 mm (0.09823 to 0.09894 in.)	2.493 to 2.511 mm (0.09815 to 0.09886 in.)	67.985 to 68.009 mm (2.67657 to 2.67751 in.)
0.03 mm (0.0012 in.) Undersize	1.511 to 1.515 mm (0.05949 to 0.05965 in.)	49.946 to 49.970 mm (1.96637 to 1.96734 in.)	2.519 to 2.522 mm (0.09917 to 0.09929 in.)	2.517 to 2.520 mm (0.09909 to 0.09921 in.)	67.955 to 67.979 mm (2.67539 to 2.67633 in.)
0.05 mm (0.0020 in.) Undersize	1.521 to 1.525 mm (0.05988 to 0.06004 in.)	49.926 to 49.950 mm (1.96559 to 1.96653 in.)	2.529 to 2.532 mm (0.09957 to 0.09968 in.)	2.527 to 2.530 mm (0.09949 to 0.09961 in.)	67.935 to 67.959 mm (2.67460 to 2.67555 in.)
0.25 mm (0.0098 in.) Undersize	1.621 to 1.625 mm (0.06382 to 0.06398 in.)	49.726 to 49.750 mm (1.95771 to 1.95866 in.)	2.629 to 2.632 mm (0.10350 to 0.10362 in.)	2.627 to 2.630 mm (0.10342 to 0.10354 in.)	67.735 to 67.759 mm (2.66673 to 2.66767 in.)



17. INSPECT CRANKSHAFT BEARING

- (a) Inspect the crankshaft bearing for scar, peeling, seizure, melting or wear, etc.

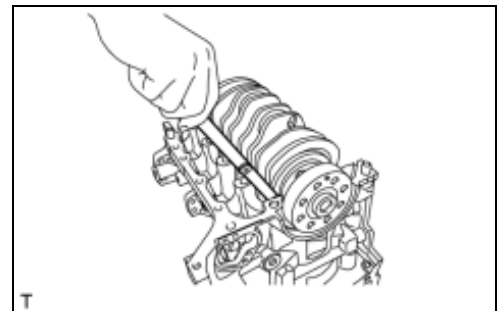
18. INSPECT CRANKSHAFT THRUST CLEARANCE

- (a) Using a feeler gauge, check the thrust clearance of the crankshaft at No. 5 crankshaft bearing.

Standard clearance:

0.130 to 0.308 mm (0.00512 to 0.01213 in.)

If the thrust clearance is not within the standard, replace the No. 5 crankshaft bearing.



19. INSPECT CRANKSHAFT OIL CLEARANCE

- (a) Remove the seal packing left on the cylinder block.
- (b) Clean the crankshaft bearings and crankshaft journals.

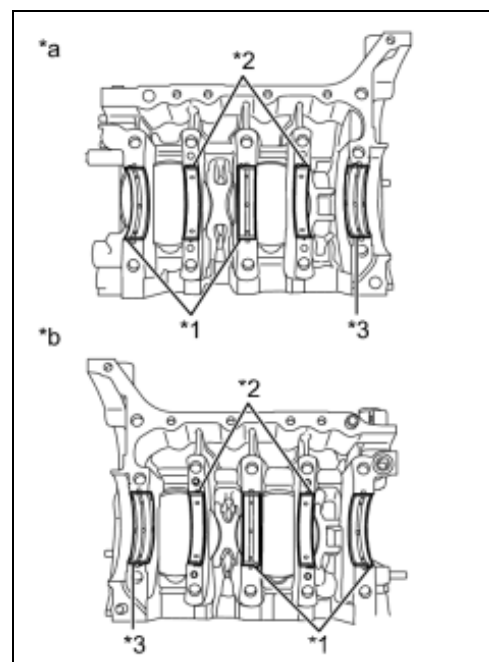
(c) Attach the crankshaft bearings to the cylinder block.

NOTICE:

- Be careful not to damage the matching surface of the cylinder block.
- The shapes of the No. 1 and No. 3 bearings are different from those of the No. 2 and No. 4 bearings. Be sure to attach them correctly.

Text in Illustration

*1	No. 1 and No. 3 crankshaft bearings (with grooves)
*2	No. 2 and No. 4 crankshaft bearings (without grooves)
*3	No. 5 crankshaft bearings
*a	for Bank 1
*b	for Bank 2



(d) Place the crankshaft on the cylinder block.

(e) Lay a strip of Plastigage across each camshaft journal.

(f) Place the cylinder block (for bank 1) on the cylinder block (for bank 2).

(g) Apply engine oil to the washers and cylinder block bolt threads.

NOTICE:

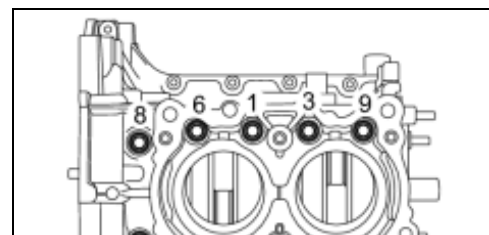
To prevent engine oil from entering into the water jacket, do not apply a large amount.

(h) Using a 12 mm socket wrench, tighten the 10 bolts in the order shown in the illustration.

Torque:

35 N·m {357 kgf·cm, 26ft·lbf}

NOTICE:



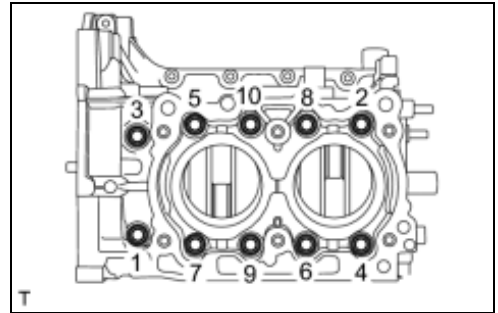
When tightening the bolts, hold the cylinder block (for bank 2) while not holding the cylinder block (for bank 1) to ensure the joint accuracy of the cylinder blocks.



- (i) Using a 12 mm socket wrench, loosen the 10 bolts by 180 ° in the order shown in the illustration.

NOTICE:

When loosening the bolts, hold the cylinder block (for bank 2) while not holding the cylinder block (for bank 1) to ensure the joint accuracy of the cylinder blocks.



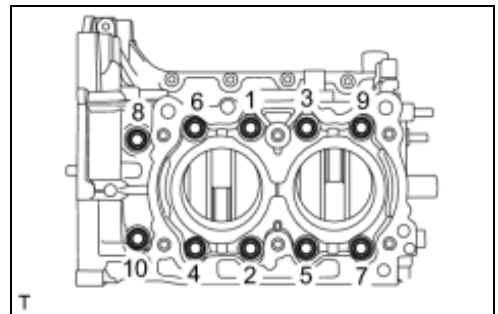
- (j) Using a 12 mm socket wrench, tighten the 10 bolts in the order shown in the illustration.

Torque:

35 N·m {357 kgf·cm, 26ft·lbf}

NOTICE:

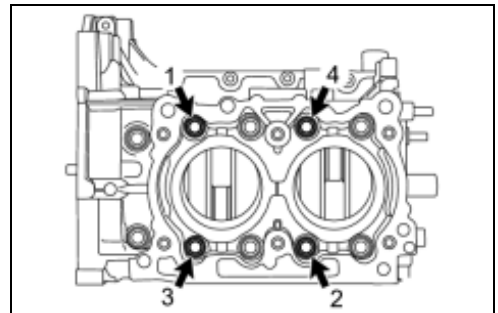
When tightening the bolts, hold the cylinder block (for bank 2) while not holding the cylinder block (for bank 1) to ensure the joint accuracy of the cylinder blocks.



- (k) Using a 12 mm socket wrench, loosen the 4 bolts by 180 ° in the order shown in the illustration.

NOTICE:

When loosening the bolts, hold the cylinder block (for bank 2) while not holding the cylinder block (for bank 1) to ensure the joint accuracy of the cylinder blocks.



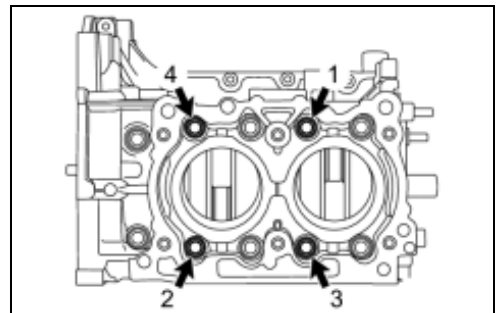
- (l) Using a 12 mm socket wrench, tighten the 4 bolts in the order shown in the illustration.

Torque:

17 N·m {173 kgf·cm, 13ft·lbf}

NOTICE:

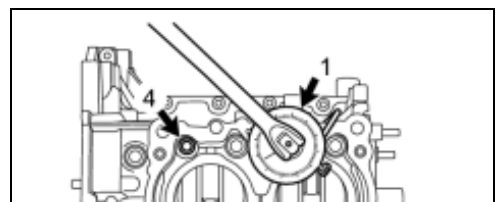
When tightening the bolts, hold the cylinder block (for bank 2) while not holding the cylinder block (for bank 1) to ensure the joint accuracy of the cylinder blocks.



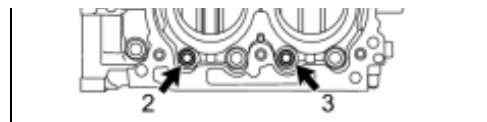
- (m) Using a 12 mm socket wrench and an angle gauge, tighten the 4 bolts by additional 60° in the order shown in the illustration.

NOTICE:

When tightening the bolts, hold the cylinder block (for bank 2)



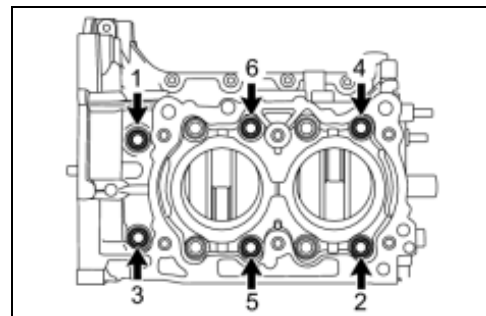
When tightening the bolts, hold the cylinder block (for bank 2) while not holding the cylinder block (for bank 1) to ensure the joint accuracy of the cylinder blocks.



- (n) Using a 12 mm socket wrench, loosen the 6 bolts by 180 ° in the order shown in the illustration.

NOTICE:

When loosening the bolts, hold the cylinder block (for bank 2) while not holding the cylinder block (for bank 1) to ensure the joint accuracy of the cylinder blocks.



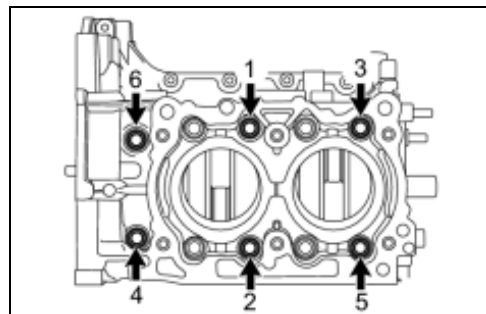
- (o) Using a 12 mm socket wrench, tighten the 6 bolts in the order shown in the illustration.

Torque:

17 N·m {173 kgf·cm, 13ft·lbf}

NOTICE:

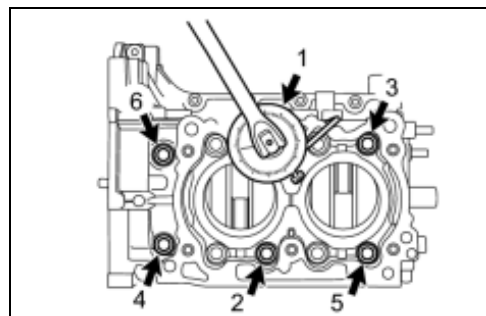
When tightening the bolts, hold the cylinder block (for bank 2) while not holding the cylinder block (for bank 1) to ensure the joint accuracy of the cylinder blocks.



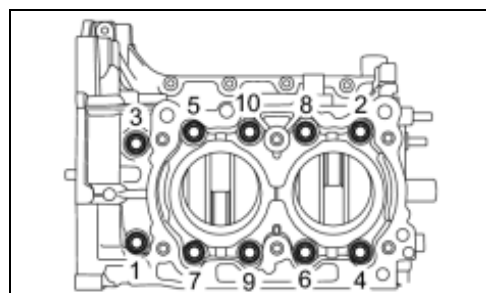
- (p) Using a 12 mm socket wrench and an angle gauge, tighten the 6 bolts by additional 60° in the order shown in the illustration.

NOTICE:

When tightening the bolts, hold the cylinder block (for bank 2) while not holding the cylinder block (for bank 1) to ensure the joint accuracy of the cylinder blocks.



- (q) Using a 12 mm socket wrench, loosen the 10 bolts in the order shown in the illustration.



(r) Remove the 10 bolts and cylinder block (for bank 1).

NOTICE:

Lift the cylinder block (for bank 1) slightly, and confirm that the crankshaft remains on the cylinder block (for bank 2). If the cylinder block (for bank 1) is lifted carelessly when separating, the crankshaft may fall off as it may have stuck to the cylinder block (for bank 1).

(s) Measure the Plastigage at its widest point.

Standard clearance:

0.013 to 0.031 mm (0.00051 to 0.00122 in.)

If the clearance is not within the standard, replace the crankshaft bearing, and grind to correct or replace the crankshaft as required.

NOTICE:

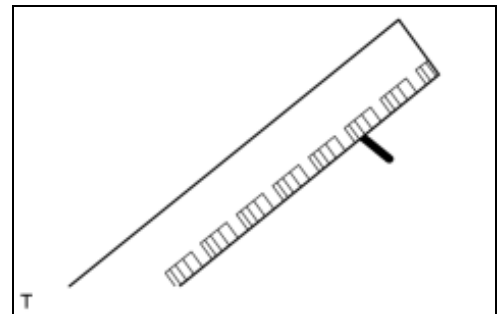
Completely remove the Plastigage after the inspection.

HINT:

- Select the suitable size connecting rod bearing or crankshaft bearing when replacing the connecting rod bearing or crankshaft bearing.
- When grinding to correct the crank journal or crank pin, finish them to the suitable dimensions as shown in the table below according to the undersize bearing to be used.

Standard

BEARING	CONNECTING ROD BEARING THICKNESS (AT CENTER)	CRANK PIN OUTER DIAMETER	CRANKSHAFT BEARING THICKNESS (AT CENTER)		CRANKSHAFT JOURNAL DIAMETER
			NO. 1 TO NO. 4	NO. 5	
Standard	1.492 to 1.508 mm (0.05874 to 0.05937 in.)	49.976 to 50.000 mm (1.96756 to 1.96850 in.)	2.495 to 2.513 mm (0.09823 to 0.09894 in.)	2.493 to 2.511 mm (0.09815 to 0.09886 in.)	67.985 to 68.009 mm (2.67657 to 2.67751 in.)
0.03 mm (0.0012 in.) Undersize	1.511 to 1.515 mm (0.05949 to 0.05965 in.)	49.946 to 49.970 mm (1.96637 to 1.96734 in.)	2.519 to 2.522 mm (0.09917 to 0.09929 in.)	2.517 to 2.520 mm (0.09909 to 0.09921 in.)	67.955 to 67.979 mm (2.67539 to 2.67633 in.)
0.05 mm (0.0020 in.)	1.521 to 1.525 mm (0.05988 to 0.06024 in.)	49.926 to 49.950 mm (1.96559 to 1.96700 in.)	2.529 to 2.532 mm (0.09957 to 0.09984 in.)	2.527 to 2.530 mm (0.09949 to 0.09984 in.)	67.935 to 67.959 mm (2.67460 to 2.67554 in.)



in.) Undersize	(0.05988 to 0.06004 in.)	to 1.96653 in.)	to 0.09968 in.)	to 0.09961 in.)	(2.67460 to 2.67555 in.)
0.25 mm (0.0098 in.) Undersize	1.621 to 1.625 mm (0.06382 to 0.06398 in.)	49.726 to 49.750 mm (1.95771 to 1.95866 in.)	2.629 to 2.632 mm (0.10350 to 0.10362 in.)	2.627 to 2.630 mm (0.10342 to 0.10354 in.)	67.735 to 67.759 mm (2.66673 to 2.66767 in.)



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000T4Y0BEX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: CYLINDER BLOCK: REASSEMBLY; 2013 MY FR-S [03/2012 -]		

REASSEMBLY

1. INSTALL NO. 1 CYLINDER BLOCK TIGHT PLUG

NOTICE:

- Place wooden blocks wrapped in a cloth under the cylinder block and stabilize the cylinder block during servicing.
- Place a cloth to avoid scratching the mating surface of the cylinder block during servicing.

Text in Illustration

*a	for Bank 1
*b	for Bank 2

- (a) Apply seal packing to the threaded portion of the No. 1 cylinder block tight plugs and install them to the cylinder block (for bank 1) and cylinder block (for bank 2).

Seal packing:

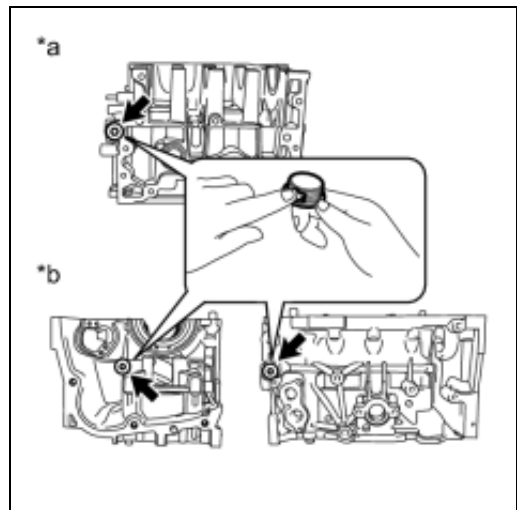
Three Bond 1105 or equivalent

Torque:

37 N·m {377 kgf·cm, 27ft·lbf}

NOTICE:

Before applying seal packing, degrease the No. 1 cylinder block tight plugs and thread holes of the cylinder block (for bank 1) and cylinder block (for bank 2).

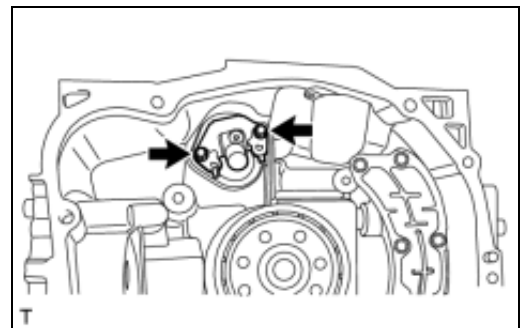


2. INSTALL CRANKSHAFT SENSOR HOLDER ASSEMBLY

- (a) Install the crankshaft sensor holder assembly to the cylinder block (for bank 2) with the 2 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}

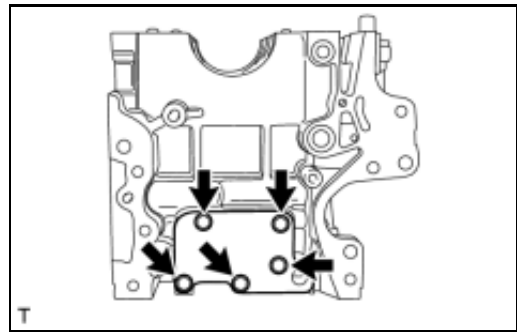


3. INSTALL CYLINDER BLOCK PLATE

- (a) Install the cylinder block plate to the cylinder block (for bank 2) with the 5 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}



4. INSTALL OIL SEPARATOR COVER

- (a) Apply seal packing in a continuous line as shown in the illustration.

Seal packing:

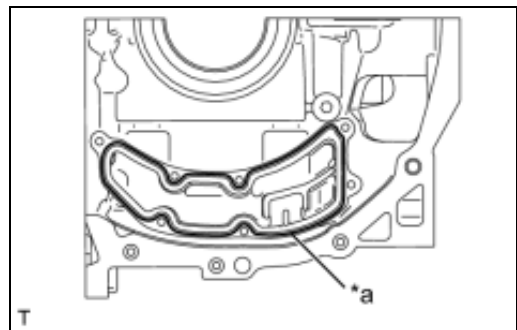
Three Bond 1217G, 1217H or equivalent

Text in Illustration

*a	φ3.0 to 5.0 mm (0.118 to 0.197 in.)
----	-------------------------------------

NOTICE:

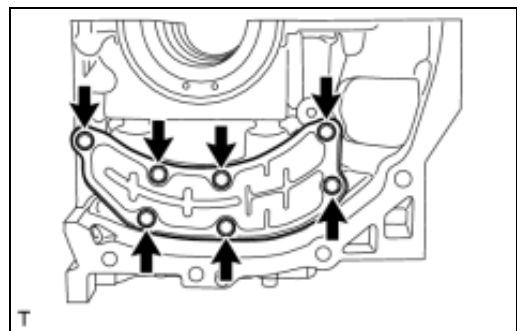
- Clean and degrease the contact surface.
- Install the oil separator cover within 5 minutes of applying seal packing.



- (b) Tight the 7 bolts in the order shown in the illustration to install the oil separator cover to the cylinder block (for bank 1).

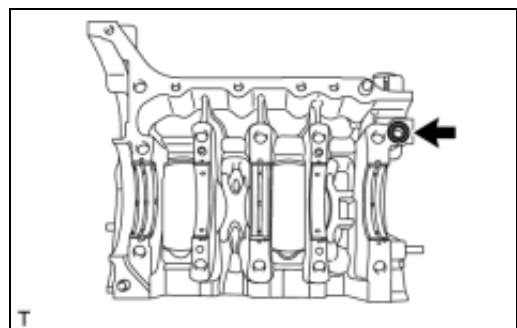
Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}



5. INSTALL O-RING

- (a) Attach a new O-ring to the cylinder block (for bank 2).



6. INSTALL CRANKSHAFT BEARING

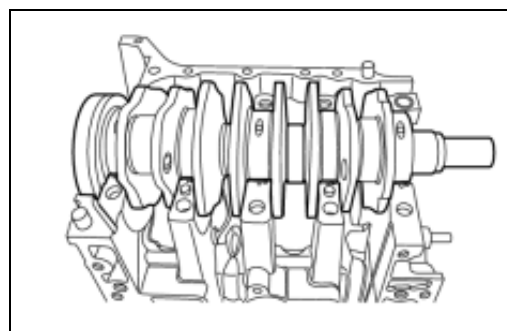
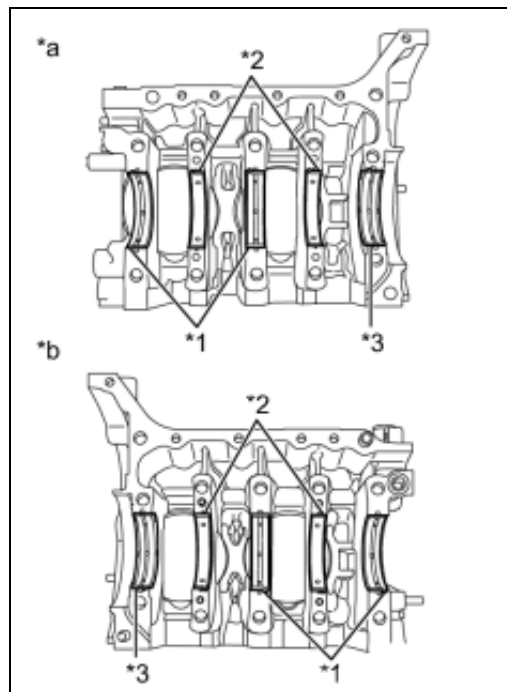
- (a) Apply engine oil to the crankshaft bearing, and install them to the cylinder block (for bank 1) and cylinder block (for bank 2).

Text in Illustration

*1	No. 1 and No. 3 Bearings (with groove)
*2	No. 2 and No. 4 Bearings (without groove)
*3	No. 5 Bearing
*a	for Bank 1
*b	for Bank 2

NOTICE:

- Place a cloth to avoid scratching the mating surface of the cylinder block during servicing.
- The shapes of the No. 1 and No. 3 bearings are different from those of the No. 2 and No. 4 bearings. Be sure to install them in the right locations.



7. INSTALL CRANKSHAFT

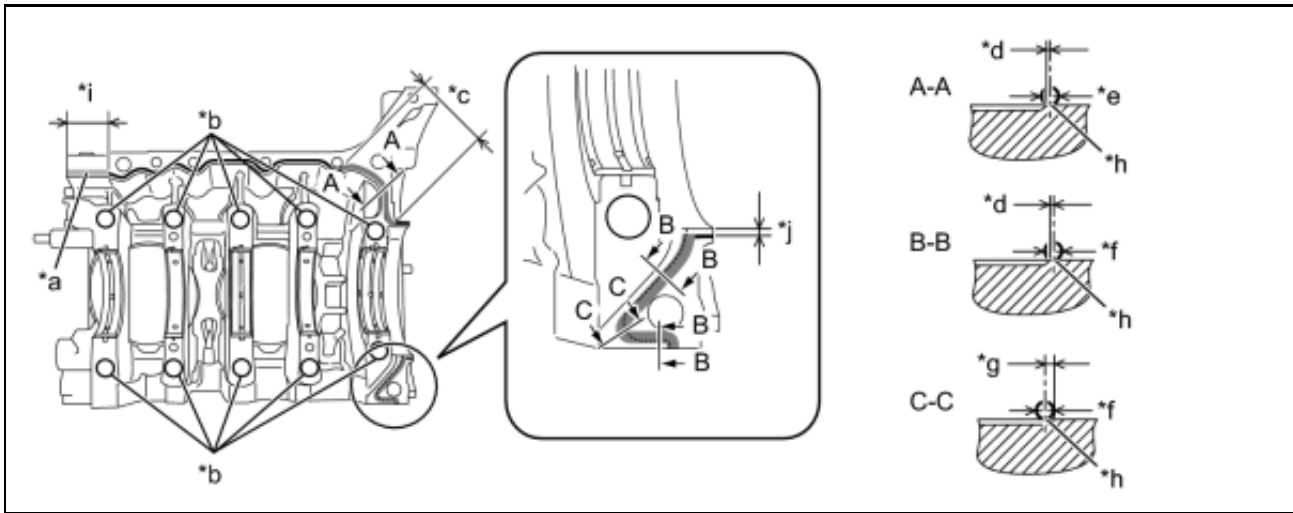
- (a) Apply engine oil to the crankshaft journals and place the crankshaft on the cylinder block (for bank 2).

8. INSTALL CYLINDER BLOCK SUB-ASSEMBLY (for Bank 1)

- (a) Apply seal packing to the mating surface of the cylinder block sub-assembly (for bank 1) as shown in the illustration.

Seal packing:

Three Bond 1217G, 1217H or equivalent



Text in Illustration

*a	φ3.5 to 4.5 mm (0.138 to 0.177 in.)	*b	φ0.5 to 1.5 mm (0.0197 to 0.0591 in.)
*c	Range of A-A	*d	Within 1.0 mm (0.039 in.)
*e	φ2.7 to 3.7 mm (0.106 to 0.146 in.)	*f	φ3.5 to 4.5 mm (0.138 to 0.177 in.)
*g	2.0 mm (0.079 in.)	*h	Chamfer edge
*i	36.0 mm (1.417 in.)	*j	2.5 mm (0.098 in.)

NOTICE:

- Do not let the seal packing overflow to the oil passage or crankshaft bearing because engine seizure may result.
- Clean and degrease the contact surface.
- Install the cylinder block sub-assembly (for bank 1) within 5 minutes of applying seal packing.

(b) Place the cylinder block sub-assembly (for bank 1) to the cylinder block sub-assembly (for bank 2).

(c) Apply engine oil to the washers and cylinder block bolt threads.

NOTICE:

To prevent engine oil from entering into the water jacket, do not apply a large amount.

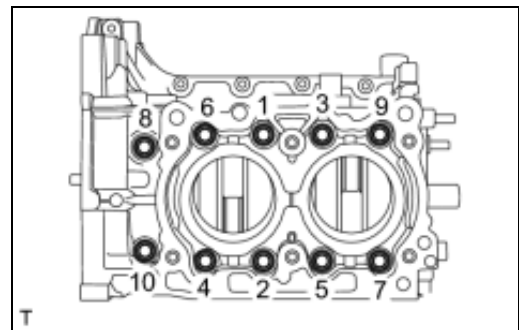
(d) Using a 12 mm socket wrench, tighten the 10 bolts in the order shown in the illustration.

Torque:

35 N·m {357 kgf·cm, 26ft·lbf}

NOTICE:

When tightening the bolts, hold the cylinder block sub-assembly (for bank 2) while not holding the cylinder block sub-assembly (for bank 1) to ensure the joint accuracy of the cylinder blocks.

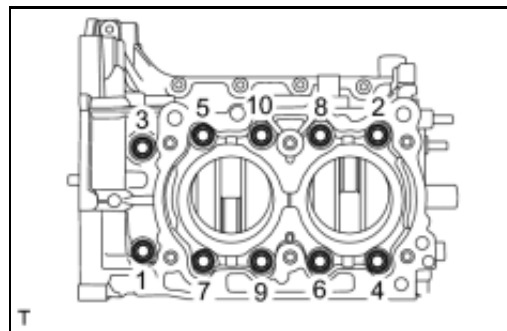


(e) Using a 12 mm socket wrench, loosen the 10 bolts by 180

° in the order shown in the illustration.

NOTICE:

When loosening the bolts, hold the cylinder block sub-assembly (for bank 2) while not holding the cylinder block sub-assembly (for bank 1) to ensure the joint accuracy of the cylinder blocks.



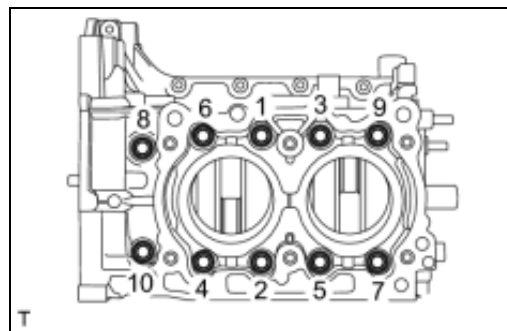
(f) Using a 12 mm socket wrench, tighten the 10 bolts in the order shown in the illustration.

Torque:

35 N·m {357 kgf·cm, 26ft·lbf}

NOTICE:

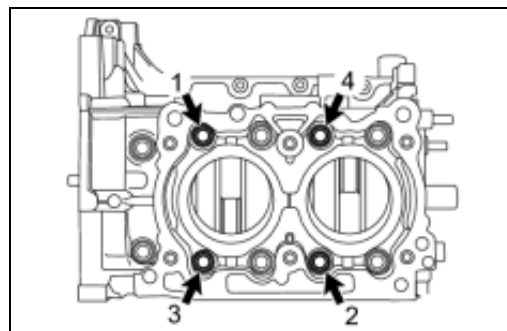
When tightening the bolts, hold the cylinder block sub-assembly (for bank 2) while not holding the cylinder block sub-assembly (for bank 1) to ensure the joint accuracy of the cylinder blocks.



(g) Using a 12 mm socket wrench, loosen the 4 bolts by 180° in the order shown in the illustration.

NOTICE:

When loosening the bolts, hold the cylinder block sub-assembly (for bank 2) while not holding the cylinder block sub-assembly (for bank 1) to ensure the joint accuracy of the cylinder blocks.



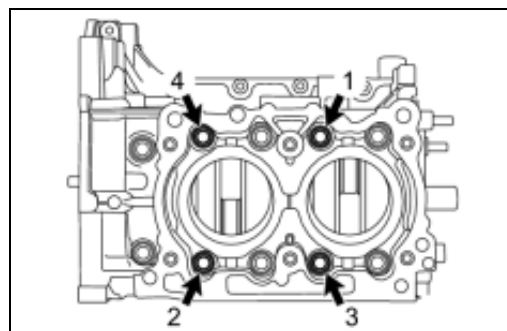
(h) Using a 12 mm socket wrench, tighten the 4 bolts in the order shown in the illustration.

Torque:

17 N·m {173 kgf·cm, 13ft·lbf}

NOTICE:

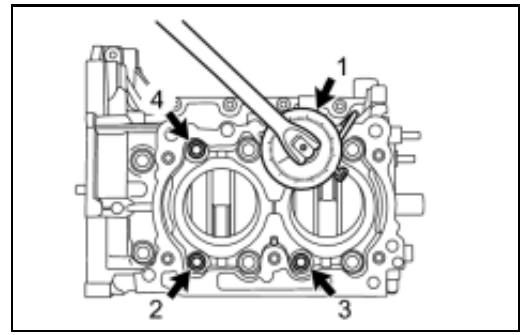
When tightening the bolts, hold the cylinder block sub-assembly (for bank 2) while not holding the cylinder block sub-assembly (for bank 1) to ensure the joint accuracy of the cylinder blocks.



(i) Using a 12 mm socket wrench and an angle gauge, tighten the 4 bolts by additional 60° in the order shown in the illustration.

NOTICE:

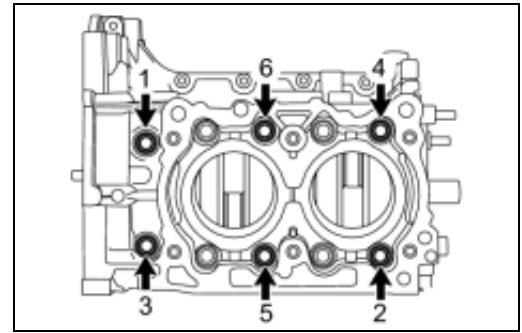
When tightening the bolts, hold the cylinder block sub-assembly (for bank 2) while not holding the cylinder block sub-assembly (for bank 1) to ensure the joint accuracy of the cylinder blocks.



- (j) Using a 12 mm socket wrench, loosen the 6 bolts by 180 ° in the order shown in the illustration.

NOTICE:

When loosening the bolts, hold the cylinder block sub-assembly (for bank 2) while not holding the cylinder block sub-assembly (for bank 1) to ensure the joint accuracy of the cylinder blocks.



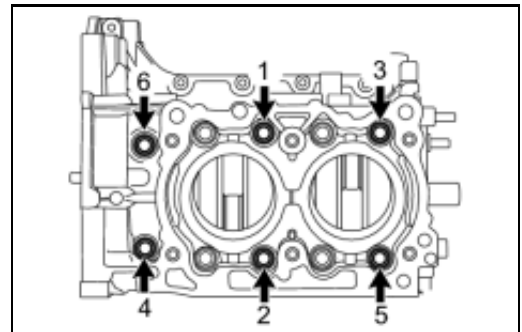
- (k) Using a 12 mm socket wrench, tighten the 6 bolts in the order shown in the illustration.

Torque:

17 N·m {173 kgf·cm, 13ft·lbf}

NOTICE:

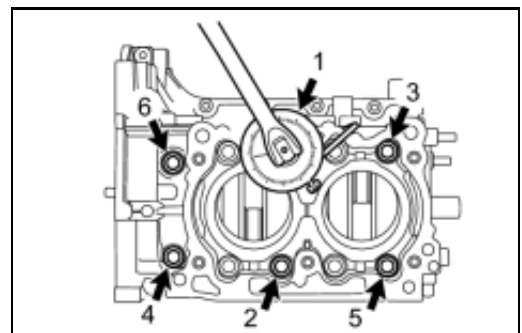
When tightening the bolts, hold the cylinder block sub-assembly (for bank 2) while not holding the cylinder block sub-assembly (for bank 1) to ensure the joint accuracy of the cylinder blocks.



- (l) Using a 12 mm socket wrench and an angle gauge, tighten the 6 bolts by additional 60° in the order shown in the illustration.

NOTICE:

When tightening the bolts, hold the cylinder block sub-assembly (for bank 2) while not holding the cylinder block sub-assembly (for bank 1) to ensure the joint accuracy of the cylinder blocks.



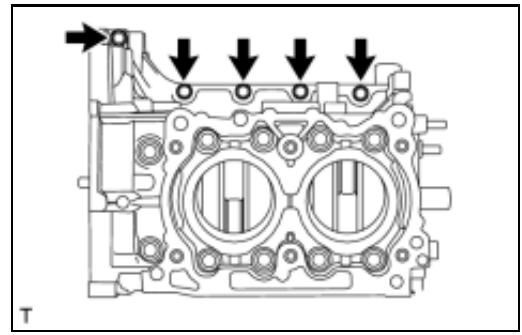
- (m) Tighten the 5 bolts.

Torque:

25 N·m {255 kgf·cm, 18ft·lbf}

HINT:

After tightening, if the seal packing is squeezed out in the seal surface area of the chain cover and oil pan sub-assembly, completely remove it. Seal packing on the chamfer area, however, should not be removed.



(n) Check that the crankshaft turns smoothly.

9. INSTALL REAR ENGINE OIL SEAL

(a) Apply a light coat of engine oil to a new rear engine oil seal inner periphery and outer periphery.

(b) Using SST and a hammer, tap in the rear engine oil seal uniformly to the position shown in the illustration.

SST: 09223-15030

SST: 09950-70010

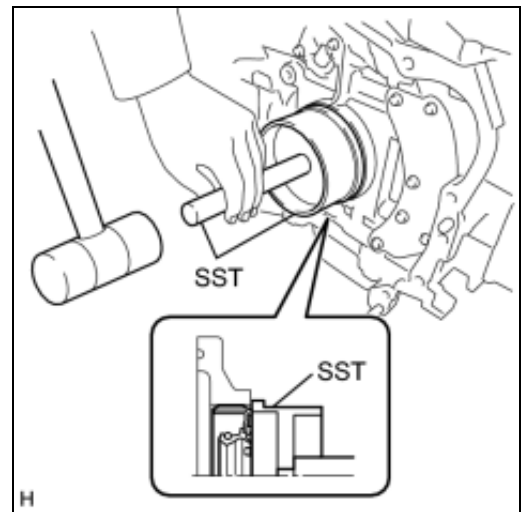
09951-07150

Oil seal tap-in depth:

0 to 1.0 mm (0 to 0.039 in.) from the cylinder block surface

NOTICE:

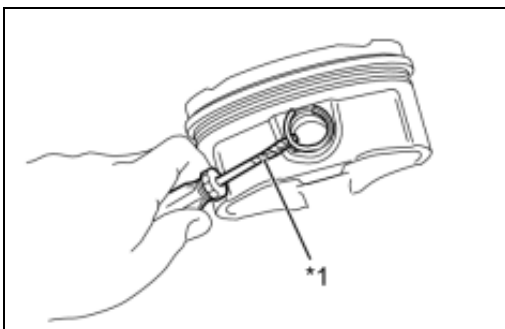
- Do not tap in the rear engine oil seal at an angle.
- Remove the engine oil from the crankshaft.
- Do not tap in the rear engine oil seal more than necessary.

**10. INSTALL CYLINDER BLOCK SUB-ASSEMBLY**

(a) Mount the cylinder block sub-assembly onto an engine stand.

11. INSTALL PISTON WITH PIN SUB-ASSEMBLY

(a) Using a screwdriver with its tip wrapped in protective tape, install the piston pin hole snap ring on one end of the piston.

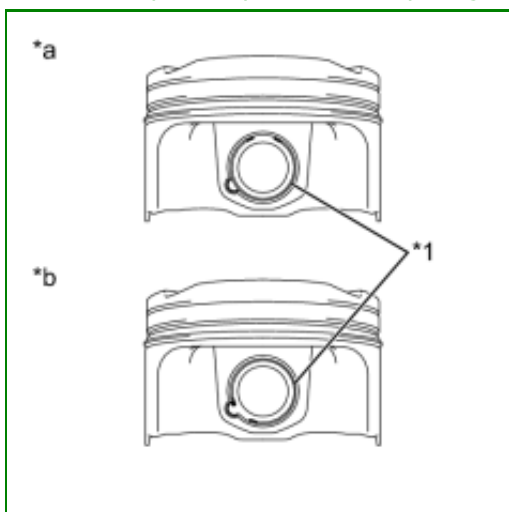
**Text in Illustration**

*1

Protective Tape

HINT:

- Make sure that the piston pin hole snap ring is firmly attached into the piston pin hole snap ring groove.



groove.

- After installing the piston pin hole snap ring, rotate the piston pin hole snap ring so that its end part and the cutout portion of the piston pin hole snap ring groove do not match.

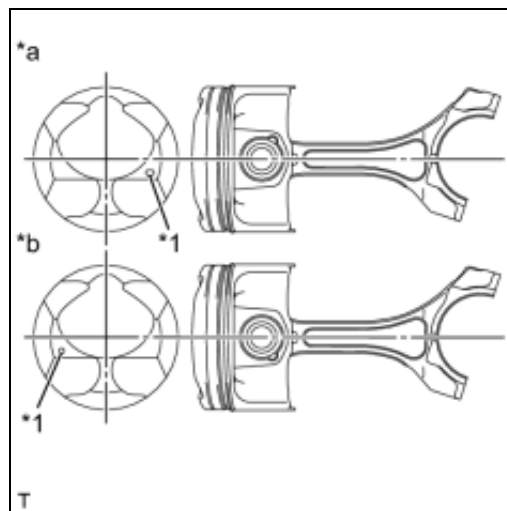
Text in Illustration

*1	Piston Pin Hole Snap Ring
*a	Correct
*b	Incorrect

(b) Make sure the directions of the piston front mark and connecting rod, and then set the piston to the connecting rod.

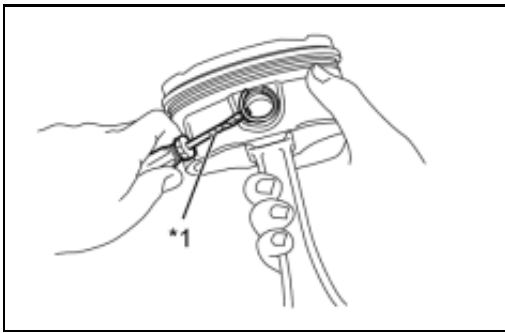
Text in Illustration

*1	Front Mark
*a	for Bank 1
*b	for Bank 2



(c) Apply engine oil to the piston pin and install it to the piston.

(d) Using a screwdriver with its tip wrapped in protective tape, install the piston pin hole snap ring to the piston.

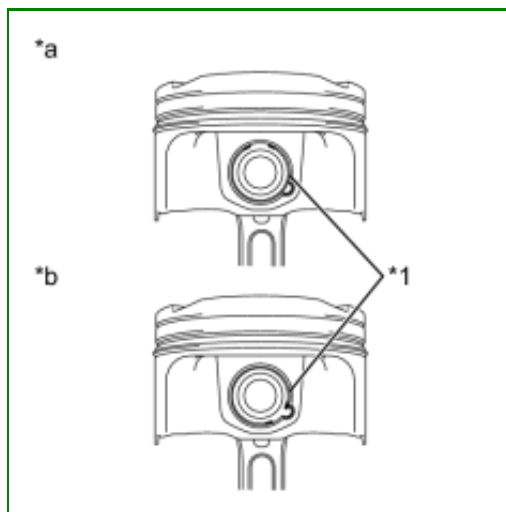


Text in Illustration

*1	Protective Tape
----	-----------------

HINT:

- Make sure the piston pin hole snap ring is firmly attached into the piston pin hole snap ring groove.



groove.

- After installing the piston pin hole snap ring, rotate the piston pin hole snap ring so that its end part and the cutout portion of the piston pin hole snap ring groove do not match.

Text in Illustration

*1	Piston Pin Hole Snap Ring
*a	Correct
*b	Incorrect

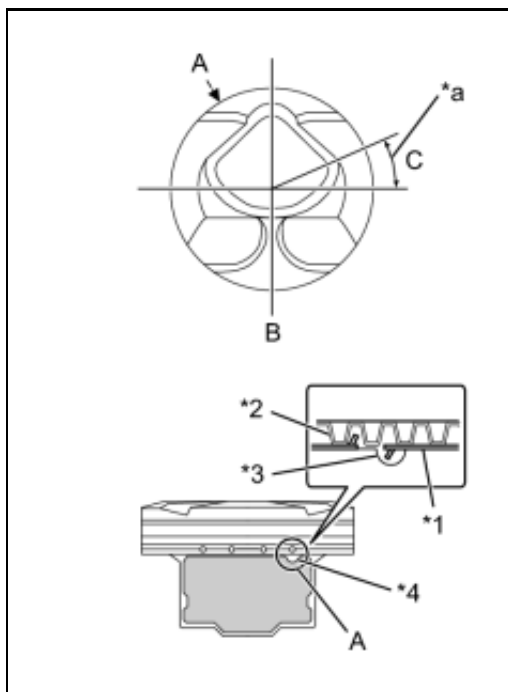
12. INSTALL PISTON RING SET

- Install the oil ring expander, lower oil ring side rail and upper oil ring side rail in order by hand.


HINT:

The oil ring consists of the 2 oil ring side rails and oil ring expander.

- Set the oil ring expander ends at the location B in the illustration.
- Hook the stoppers at the both ends of the lower oil ring side rail into the oil return hole at the coating cutout portion A and the oil ring expander as shown in the illustration.



Text in Illustration

*1	Lower Oil Ring Side Rail
*2	Oil Ring Expander
*3	Oil Return Hole
*4	Coating Cutout
*a	0 to 20°
	Coating part

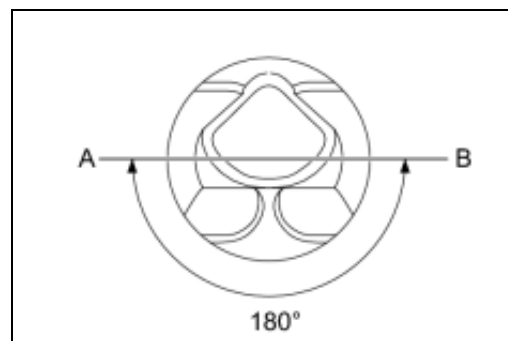
(d) Align the rail ends of the upper oil ring side rail within the range C and hook the stopper into the oil ring expander.

(e) Using a piston ring expander, install the No. 2 compression ring and No. 1 compression ring in order.

(f) Set the No. 1 compression ring ends at the location A or B in the illustration.

HINT:

The No. 1 compression ring ends can be set either at A or B.



(g) Set the No. 2 compression ring ends at the location A or B, that is 180° opposite of those of the No. 1 compression ring.

(h) Check that the piston rings and oil rings are correctly set.

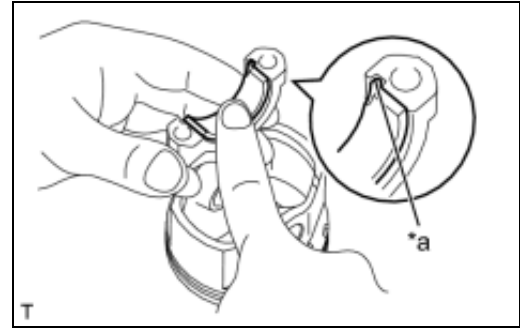
13. INSTALL PISTON SUB-ASSEMBLY WITH CONNECTING ROD

(a) Operate the engine stand so that the oil pan side faces upward.

(b) Install the connecting rod bearings to the connecting rod and connecting rod cap. <*1>

Text in Illustration

*a	Claw
----	------



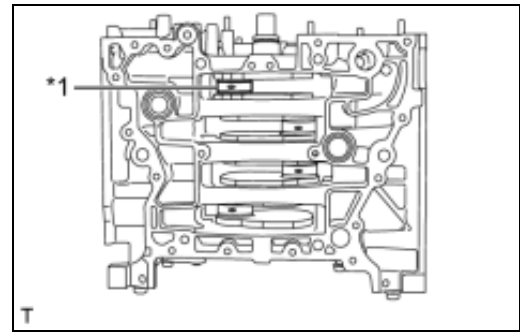
(c) Check that the piston rings and oil rings are correctly set.

(d) Apply engine oil to the piston and inside the cylinder bore.

(e) Turn the crankshaft so that the crank pin is positioned at TDC.

Text in Illustration

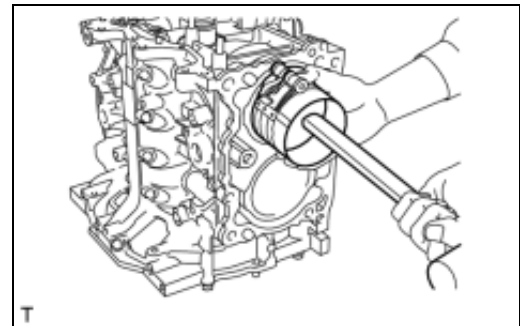
*1	Crank Pin
----	-----------



(f) Squeeze the piston rings with a piston ring compressor, face the piston front mark toward the engine front side, and insert the piston with connecting rod into the cylinder block by lightly tapping on the piston top with a hammer handle, etc.

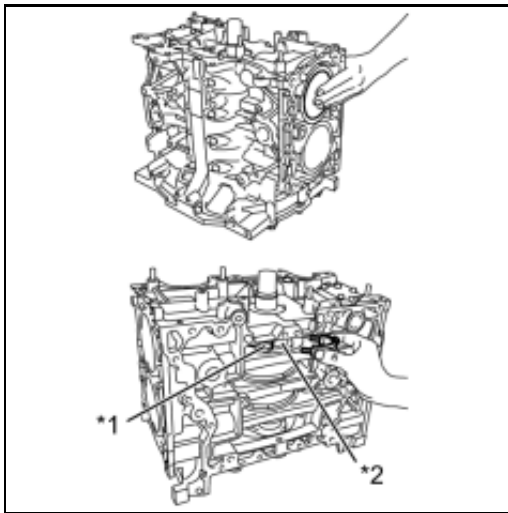
NOTICE:

- When inserting the piston with connecting rod, be careful not to scratch the cylinder bore or crank pin by connecting the rod edge.
- Be careful not to apply too much impact when inserting to prevent the connecting rod bearing from falling off.



(g) Apply engine oil to the seating face of the connecting rod cap and threads of the connecting rod cap bolts.

(h) While pushing the piston top, turn the crankshaft to position the crankshaft pin and connecting rod large end as shown in the illustration, and then attach the connecting rod cup with 2 new connecting rod cap bolts.

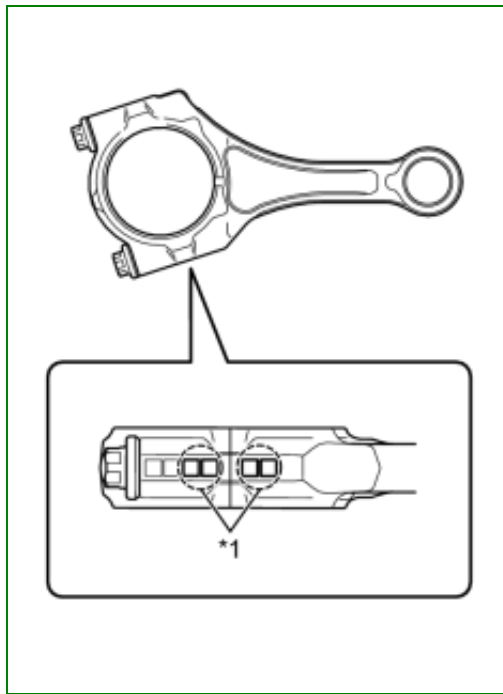


Text in Illustration

*1	Connecting Rod
*2	Crankshaft Pin

HINT:

- Each connecting rod has its own mating cap. Make sure that they are assembled correctly by



checking their matching symbols.

- Use new connecting rod cap bolts.
- Turn the crankshaft counterclockwise when installing the No. 1 or No. 3 piston with connecting rod, and turn the crankshaft clockwise when installing the No. 2 or No. 4 piston with connecting rod.

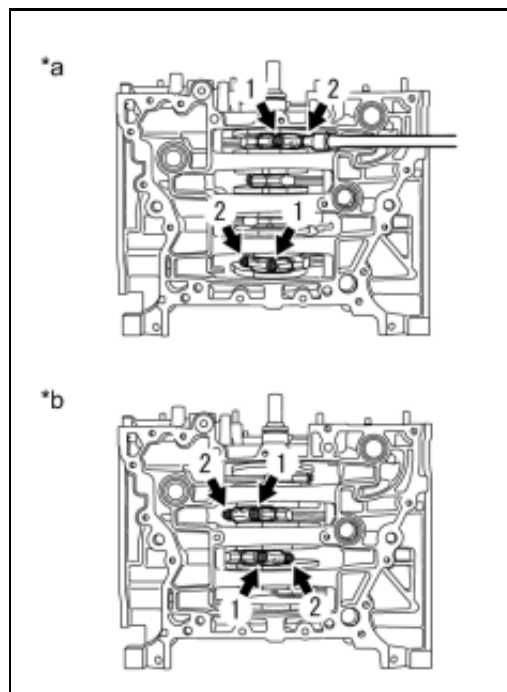
Text in Illustration

*1	Matching Symbol
----	-----------------

- (i) Using a "TORX" socket wrench E14, tighten the 2 connecting rod cup bolts in the order shown in the illustration.

Torque:**10 N·m {102 kgf·cm, 7ft·lbf}****Text in Illustration**

*a	No. 1 and No. 4
*b	No. 2 and No. 3



- (j) Retighten the 2 connecting rod cup bolts in the same order as above. <*2>

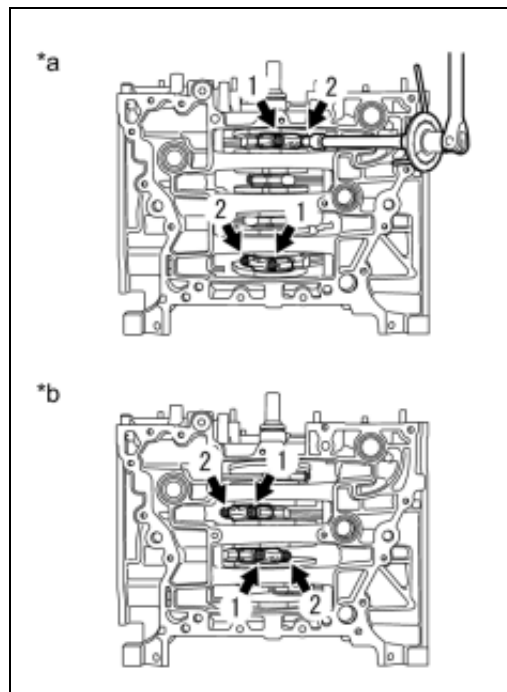
Torque:**25 N·m {255 kgf·cm, 18ft·lbf}**

- (k) In the same procedures from <*1> to <*2>, install the No. 2, No. 3 and No. 4 piston with connecting rods.

- (l) Using a "TORX" socket wrench E14 and an angle gauge, tighten the connecting rod cup bolts for the No. 1 to No. 4 piston with connecting rods by additional 92.5°.

Text in Illustration

*a	No. 1 and No. 4
*b	No. 2 and No. 3

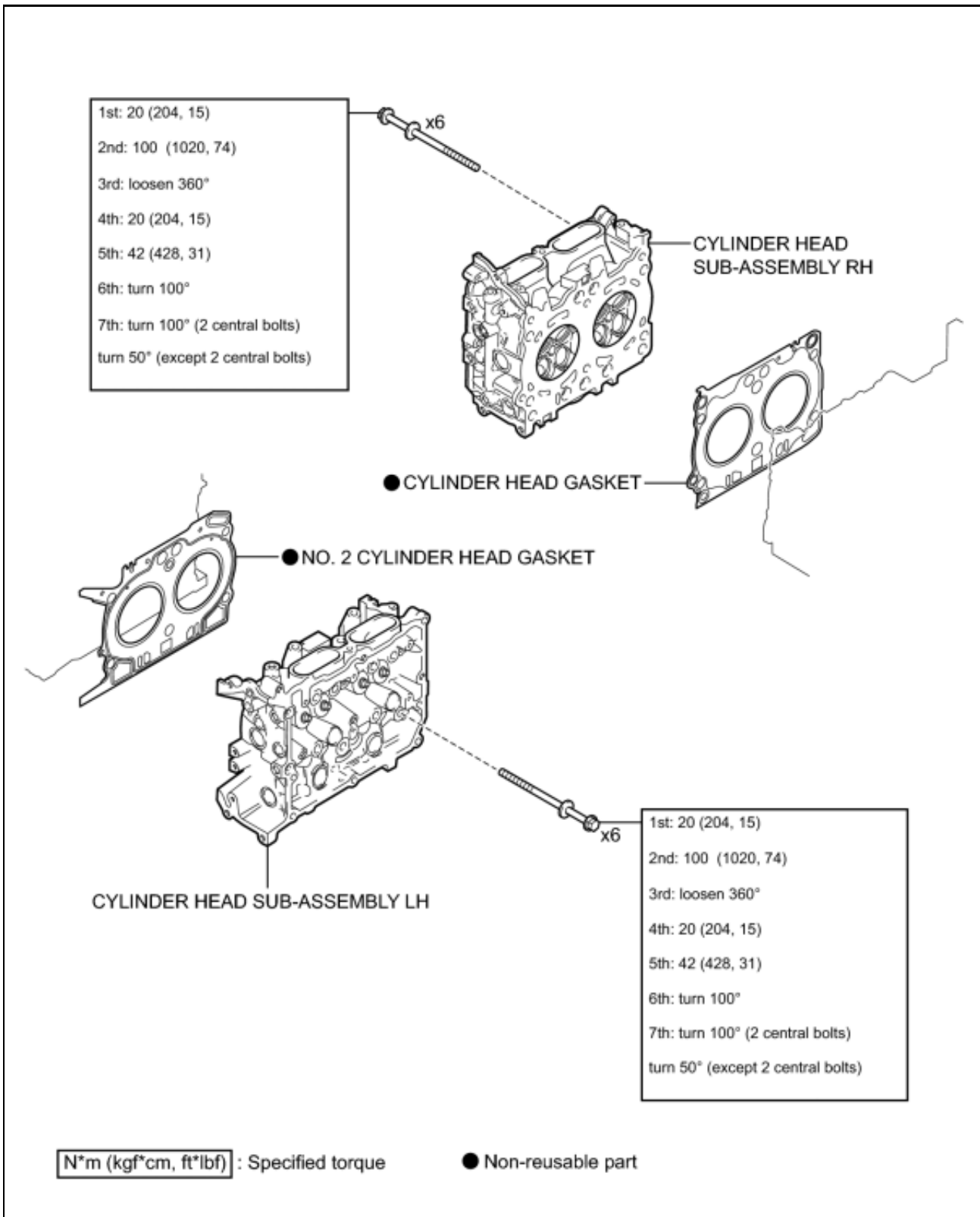


- (m) Check that the crankshaft can be turned smoothly.

Last Modified: 4-14-2014	6.6 K	Doc ID: RM00000591R000X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: CYLINDER HEAD GASKET: COMPONENTS; 2013 MY FR-S [03/2012 -]		

[COMPONENTS](#)

[ILLUSTRATION](#)



Last Modified: 4-14-2014	6.6 A	Doc ID: RM0000056U7008X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: CYLINDER HEAD GASKET: INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL NO. 2 CYLINDER HEAD GASKET

- (a) Operate the engine stand so that the bank 2 side faces upward.
- (b) Clean the bolt holes in the cylinder block (bank 2).

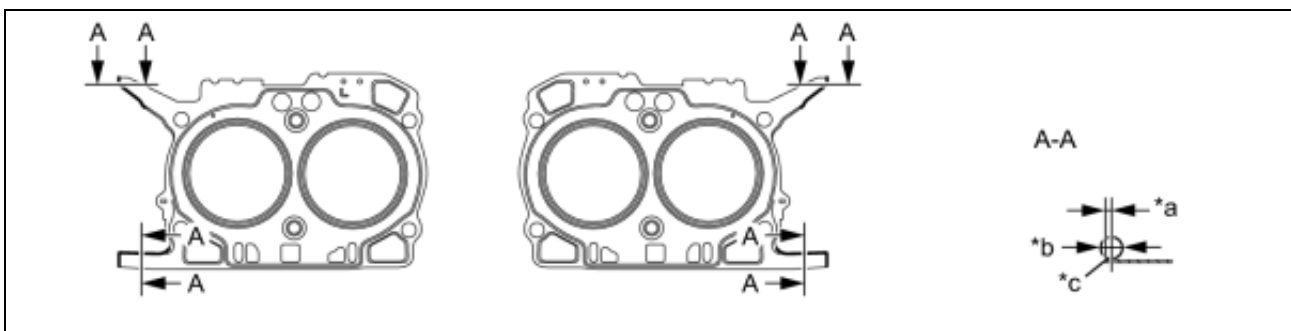
NOTICE:

To avoid erroneous tightening of the bolts, clean out the bolt holes sufficiently by blowing with compressed air to eliminate engine coolant, etc.

- (c) Apply the seal packing to both sides of the No. 2 cylinder head gasket as shown in the illustration.

Seal packing:

Three Bond 1217G, 1217H or equivalent



Text in Illustration

*a	0 to 1.0 mm (0 to 0.039in.)	*b	φ2,0 to 4.0 mm (0.079 to 0.158 in.)
*c	Edge of the gasket	-	-

NOTICE:

- Clean and degrease the contact surface.
- Install the cylinder head sub-assembly LH within 5 minutes of applying the seal packing.

- (d) Place the No. 2 cylinder head gasket on the cylinder block (bank 2).

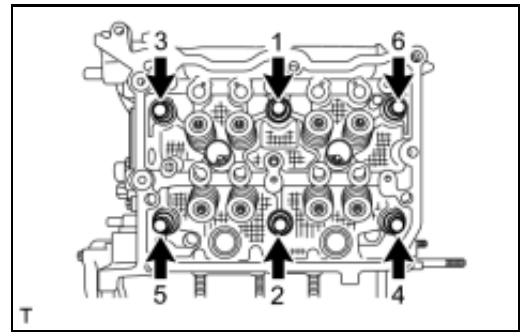
2. INSTALL CYLINDER HEAD SUB-ASSEMBLY LH

- (a) Clean the threads of the cylinder head bolts and apply sufficient engine oil to the washers and threads of the bolts.
- (b) Mount the cylinder head sub-assembly LH on the cylinder block (bank 2).

(c) Tighten the 6 cylinder head bolts in the order shown in the illustration.

Torque:

20 N·m {204 kgf·cm, 15ft·lbf}



(d) Tighten the 6 cylinder head bolts further in the same order above.

Torque:

100 N·m {1020 kgf·cm, 74ft·lbf}

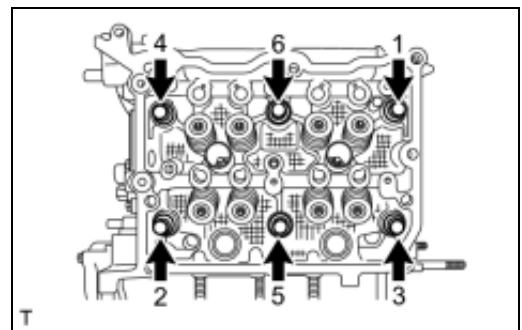
NOTICE:

If the bolt makes a stick-slip sound during tightening, repeat the procedure from the cylinder head gasket installation after cleaning and completely drying the bolt holes and contact surfaces.

HINT:

In that case, the No. 2 cylinder head gasket can be reused.

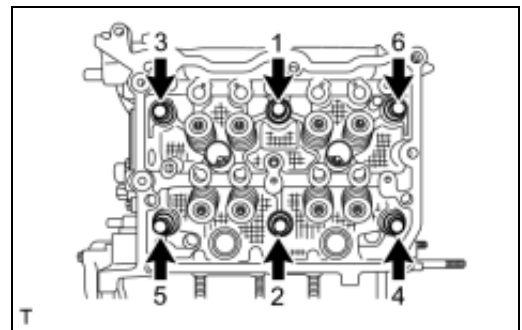
(e) Loosen the 6 cylinder head bolts by 360 ° in the order shown in the illustration.



(f) Tighten the 6 cylinder head bolts in the order shown in the illustration.

Torque:

20 N·m {204 kgf·cm, 15ft·lbf}



(g) Tighten the 6 cylinder head bolts further in the same order above.

Torque:

42 N·m {428 kgf·cm, 31ft·lbf}

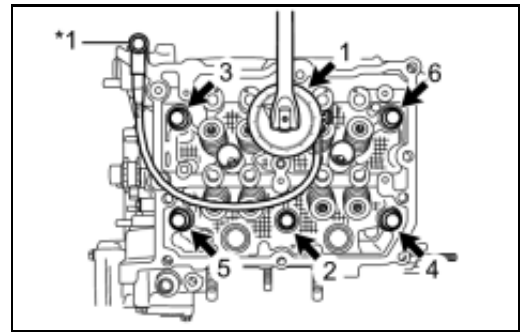
(h) Using an angle gauge, tighten the 6 cylinder head bolts another 100 ° in the order shown in the illustration.

HINT:

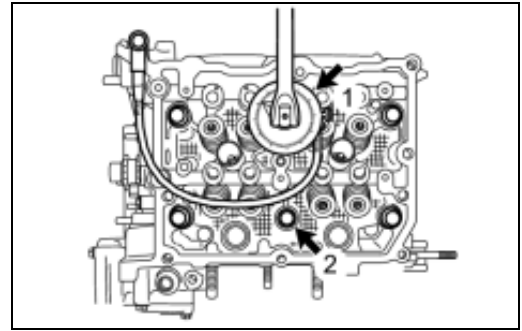
Temporarily install the appropriate bolt for angle gauge if necessary.

Text in Illustration

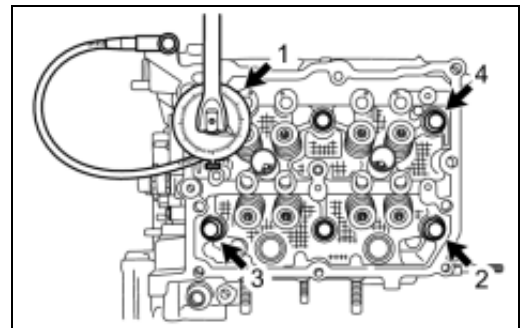
*1	Temporary Bolt
----	----------------



- (i) Using an angle gauge, tighten the 2 cylinder head bolts another 100 ° in the order shown in the illustration.



- (j) Using an angle gauge, tighten the 4 cylinder head bolts another 50 ° in the order shown in the illustration.



3. INSTALL CAMSHAFT HOUSING SUB-ASSEMBLY LH

INFO

4. INSTALL CYLINDER HEAD GASKET

- (a) Operate the engine stand so that the bank 1 side faces upward.
 (b) Clean the bolt holes in the cylinder block (bank 1).

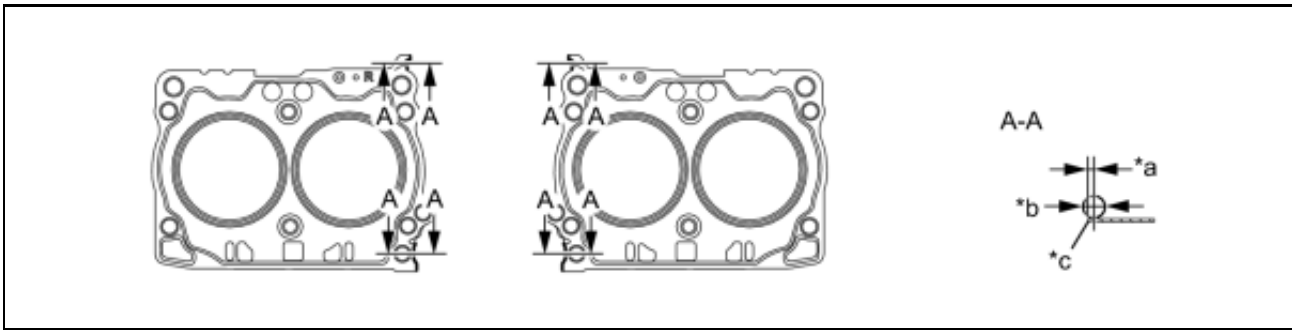
NOTICE:

To avoid erroneous tightening of the bolts, clean out the bolt holes sufficiently by blowing with compressed air to eliminate engine coolant, etc.

- (c) Apply the seal packing to both sides of the cylinder head gasket as shown in the illustration.

Seal packing:

Three Bond 1217G, 1217H or equivalent



Text in Illustration

*a	0 to 1.0 mm (0 to 0.039in.)	*b	φ2,0 to 4.0 mm (0.079 to 0.158 in.)
*c	Edge of the gasket	-	-

NOTICE:

- Clean and degrease the contact surface.
- Install the cylinder head sub-assembly RH within 5 minutes of applying the seal packing.

(d) Place the cylinder head gasket on the cylinder block (bank 1).

5. INSTALL CYLINDER HEAD SUB-ASSEMBLY RH

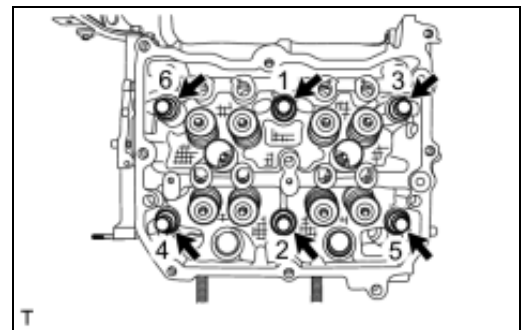
(a) Clean the threads of the cylinder head bolts and apply sufficient engine oil to the washers and threads of the bolts.

(b) Mount the cylinder head sub-assembly RH on the cylinder block (bank 1).

(c) Tighten the 6 cylinder head bolts in the order shown in the illustration.

Torque:

20 N·m {204 kgf·cm, 15ft·lbf}



(d) Tighten the 6 cylinder head bolts further in the same order as above.

Torque:

100 N·m {1020 kgf·cm, 74ft·lbf}

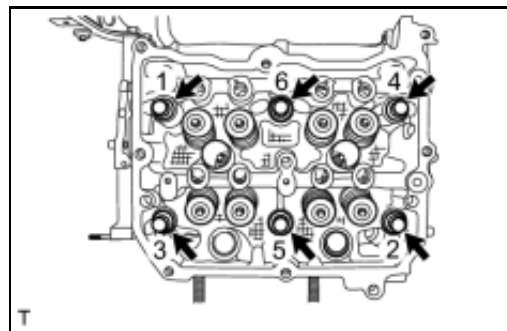
NOTICE:

If the bolt makes a stick-slip sound during tightening, repeat the procedure from the cylinder head gasket installation after cleaning and completely drying the bolt holes and contact surfaces.

HINT:

In that case, the cylinder head gasket can be reused.

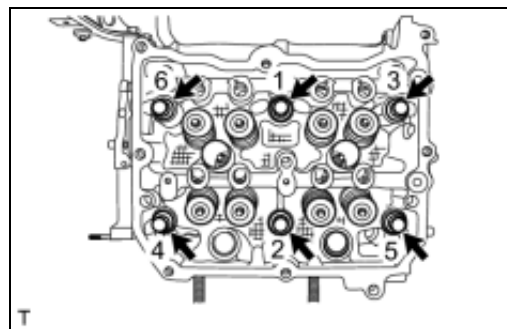
- (e) Loosen the 6 cylinder head bolts by 360 ° in the order shown in the illustration.



- (f) Tighten the 6 cylinder head bolts in the order shown in the illustration.

Torque:

20 N·m {204 kgf·cm, 15ft·lbf}



- (g) Tighten the 6 cylinder head bolts further in the same order above.

Torque:

42 N·m {428 kgf·cm, 31ft·lbf}

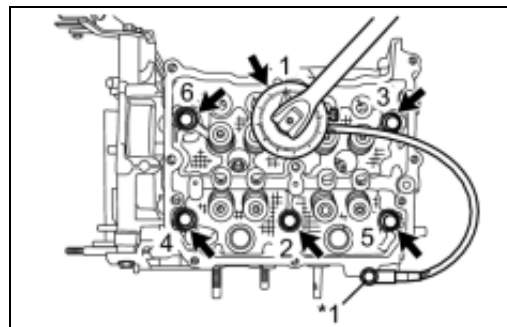
- (h) Using an angle gauge, tighten the 6 cylinder head bolts another 100 ° in the order shown in the illustration.

HINT:

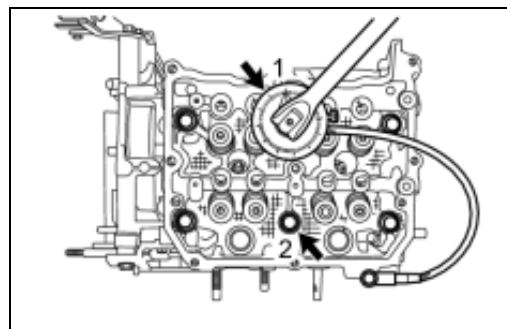
Temporarily install the appropriate bolt for angle gauge if necessary.

Text in Illustration

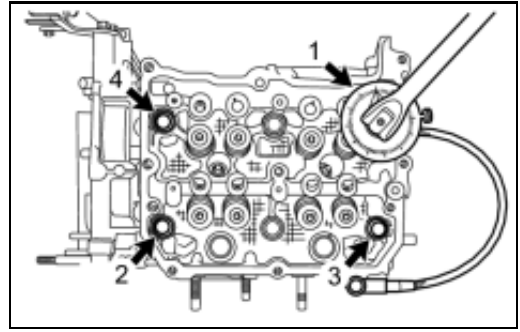
*1	Temporary Bolt
----	----------------



- (i) Using an angle gauge, tighten the 2 cylinder head bolts another 100 ° in the order shown in the illustration.



- (j) Using an angle gauge, tighten the 4 cylinder head bolts another 50 ° in the order shown in the illustration.



6. INSTALL CAMSHAFT HOUSING SUB-ASSEMBLY RH

INFO



TOYOTA

Last Modified: 4-14-2014	6.6 A	Doc ID: RM0000056U900AX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: CYLINDER HEAD GASKET: REMOVAL; 2013 MY FR-S [03/2012 -]		

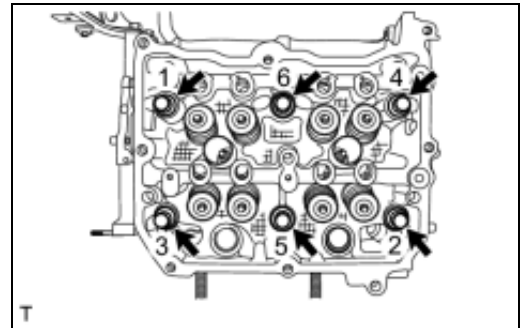
REMOVAL

1. REMOVE CAMSHAFT HOUSING SUB-ASSEMBLY RH

INFO

2. REMOVE CYLINDER HEAD SUB-ASSEMBLY RH

(a) Loosen the 6 bolts in the order shown in the illustration.



(b) Lightly tap the cylinder head sub-assembly RH to separate it from the cylinder block (bank 1).

(c) Remove the cylinder head sub-assembly RH.

NOTICE:

Be careful not to scratch the mating surface of the cylinder head and cylinder block.

3. REMOVE CYLINDER HEAD GASKET

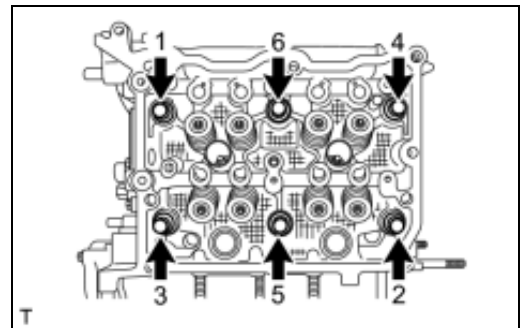
(a) Remove the cylinder head gasket.

4. REMOVE CAMSHAFT HOUSING SUB-ASSEMBLY LH

INFO

5. REMOVE CYLINDER HEAD SUB-ASSEMBLY LH

(a) Loosen the 6 bolts in the order shown in the illustration.



(b) Lightly tap the cylinder head sub-assembly LH to separate it from the cylinder block (bank 2).

(c) Remove the cylinder head sub-assembly LH.

NOTICE:

Be careful not to scratch the mating surface of the cylinder head and cylinder block.

6. REMOVE NO. 2 CYLINDER HEAD GASKET

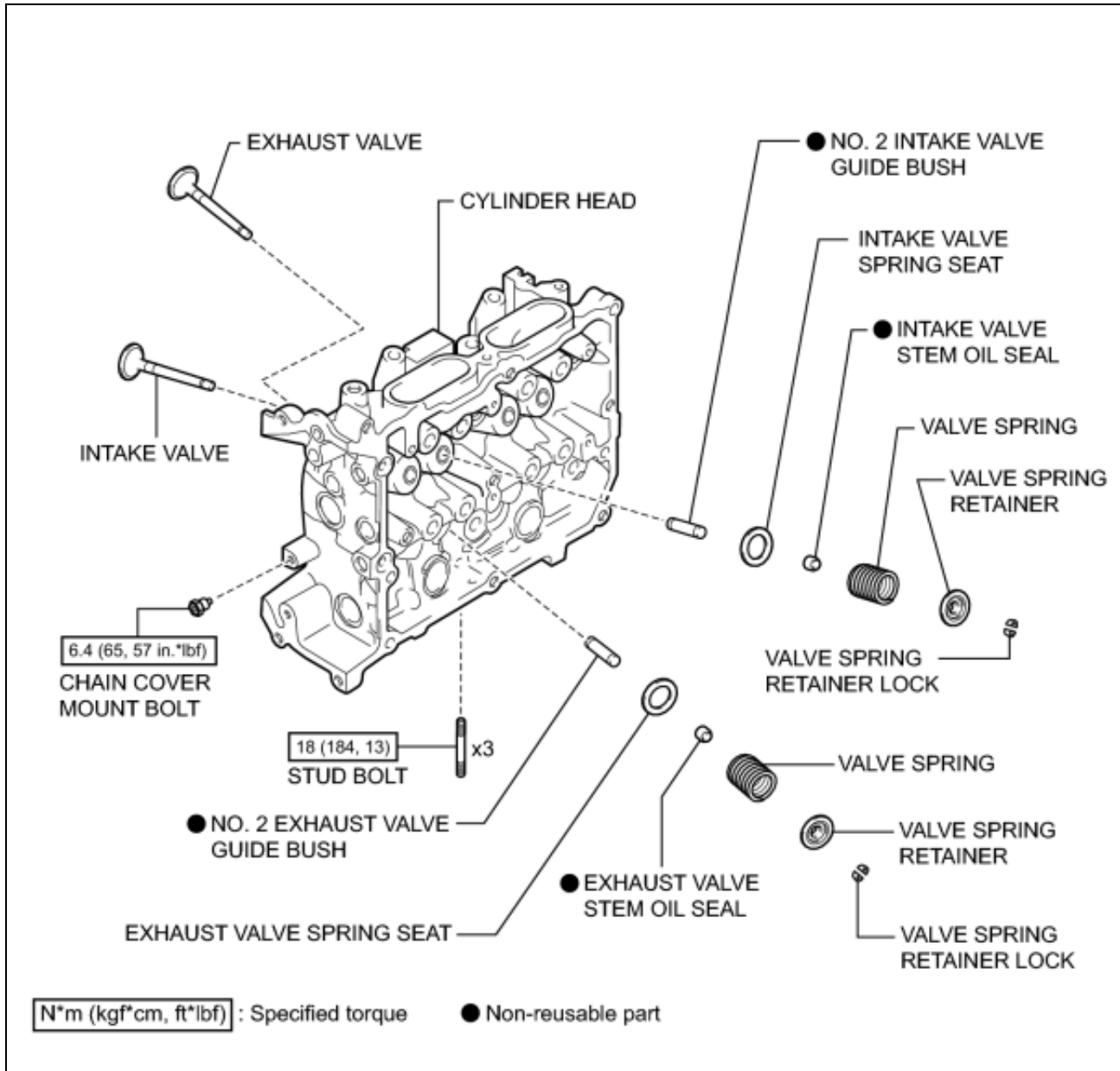
- (a) Remove the No. 2 cylinder head gasket.



Last Modified: 4-14-2014	6.6 K	Doc ID: RM000000T4V07HX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: CYLINDER HEAD: COMPONENTS; 2013 MY FR-S [03/2012 -]		

COMPONENTS

ILLUSTRATION

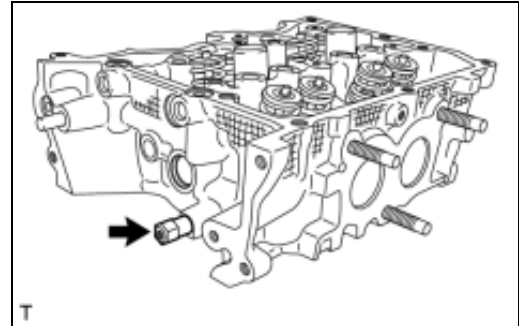


Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000T4X086X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: CYLINDER HEAD: DISASSEMBLY; 2013 MY FR-S [03/2012 -]		

DISASSEMBLY

1. REMOVE CHAIN COVER MOUNT BOLT

- (a) Remove the chain cover mount bolt.



2. REMOVE STUD BOLT

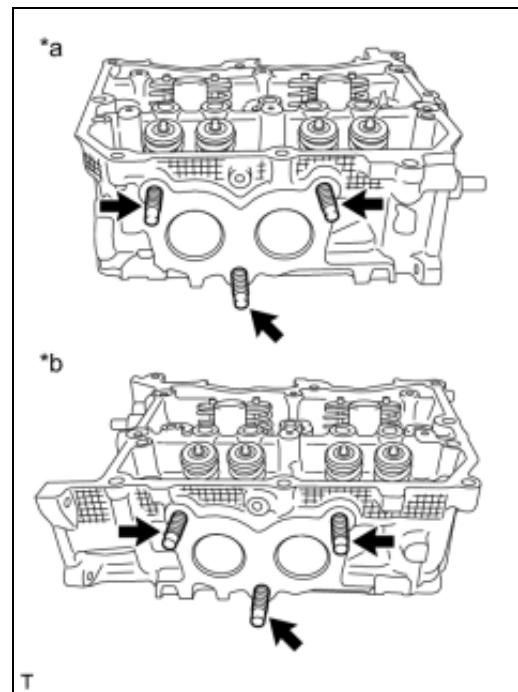
HINT:

If any of the stud bolts is deformed or the threads are damaged, replace it.

- (a) Remove the 6 stud bolts from the cylinder heads.

Text in Illustration

*a	for Bank 1
*b	for Bank 2



3. REMOVE INTAKE VALVE

NOTICE:

Place a cloth, etc. to avoid scratching the mating surface of the cylinder head during servicing.

HINT:

- Mark each part to prevent confusion.
- Arrange the removed parts in the correct order.

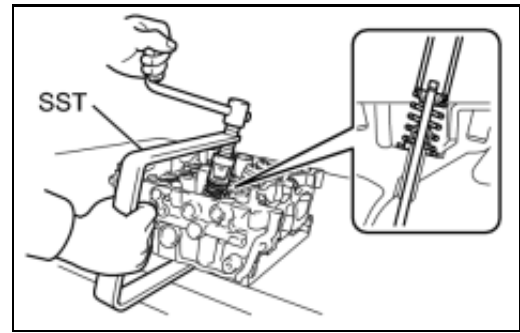
- (a) Using SST, compress the spring and remove the valve spring retainer locks.

SST: 09202-70020

09202-00010

09202-01010

09202-01020



(b) Remove the valve, valve spring retainer, valve spring and valve spring seat.

4. REMOVE EXHAUST VALVE**CAUTION:**

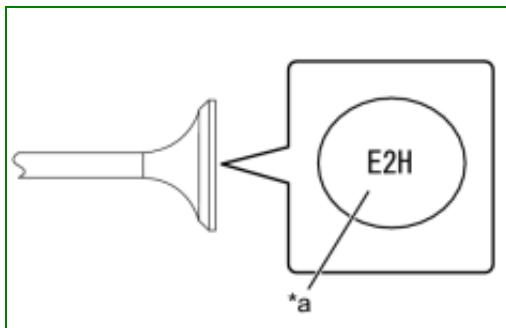
- The exhaust valve is encapsulated with metallic sodium. The metallic sodium is a strong alkaline and prone to cause a serious chemical reaction. Therefore, extra caution is required when handling or disposing the exhaust valve.
- Never disassemble the exhaust valve. The metallic sodium may cause blindness if it gets into your eyes, or cause burn injuries or chemical reactions resulting in fire if it comes into contact with your skin or any heat source.
- If the exhaust valve is damaged, after removing the valve, carry out processing of "Preparation for disposal" and "Disposal".
- Make sure to wear safety glasses and protective gloves when removing a damaged exhaust valve.
- Do not intentionally damage the exhaust valve to remove the metallic sodium.

NOTICE:

When it is determined that disposal procedure is dissolving, this may be performed.

HINT:

- The exhaust valve is encapsulated with metallic sodium. This is safe as long as it does not come into contact with air.
- The exhaust valve in which metallic sodium is encapsulated can be identified with the embossed



mark.

Text in Illustration

*a	Embossed mark (E2H is for FA20 Engine)
----	--

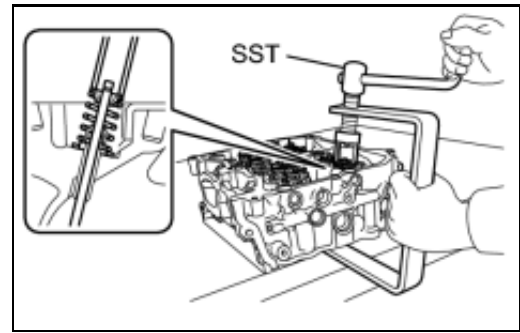
(a) Using SST, compress the spring and remove the valve spring retainer locks.

SST: 09202-70020

09202-00010

09202-01010

09202-01020



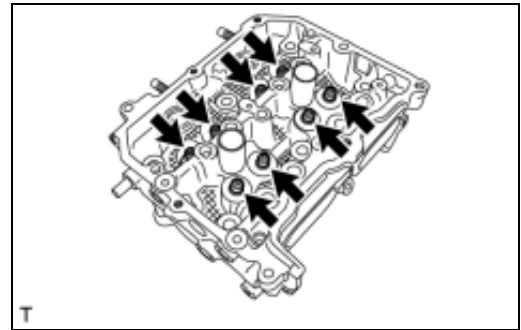
(b) Remove the valve, valve spring retainer, valve spring and valve spring seat.

5. REMOVE VALVE STEM OIL SEAL

(a) Remove the 8 valve stem oil seals.

NOTICE:

- Place a cloth, etc. to avoid scratching the mating surface of the cylinder head during servicing.
- Be careful not to damage the valve guide bushes and cylinder head.



6. DISPOSE OF EXHAUST VALVE

CAUTION:

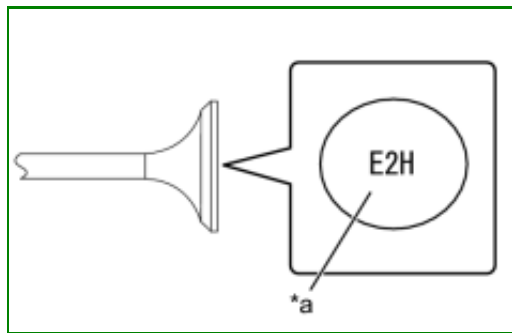
- The exhaust valve is encapsulated with metallic sodium. The metallic sodium is a strong alkaline and prone to cause a serious chemical reaction. Therefore, extra caution is required when handling or disposing the exhaust valve.
- Never disassemble the exhaust valve. The metallic sodium may cause blindness if it gets into your eyes, or cause burn injuries or chemical reactions resulting in fire if it comes into contact with your skin or any heat source.
- If the exhaust valve is damaged, after removing the valve, carry out processing of "Preparation for disposal" and "Disposal".
- Make sure to wear safety glasses and protective gloves when removing a damaged exhaust valve.
- Do not intentionally damage the exhaust valve to remove the metallic sodium.

NOTICE:

When it is determined that disposal procedure is dissolving, this may be performed.

HINT:

- The exhaust valve is encapsulated with metallic sodium. This is safe as long as it does not come into contact with air.
- The metallic sodium within the exhaust valve can be identified using the embossed mark.



Text in Illustration

*a	Embossed mark (E2H is for FA20 Engine)
----	--

(a) Preparation for disposal

CAUTION:

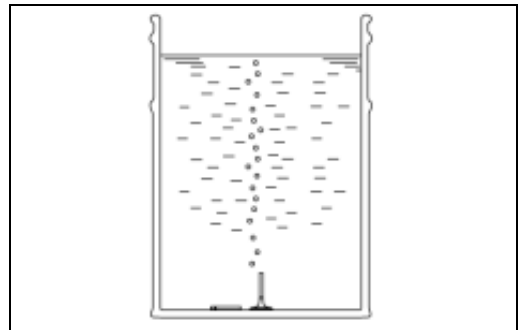
- Ensure a fire extinguisher is at hand.
- Wear safety glasses.
- Wear protective gloves.

(b) Disposal

- (1) Wear protective gloves and then remove the damaged valve from the cylinder head.
- (2) Place a large container (bucket or other container) in a well-ventilated area and fill it with water (at least 10 liters).
- (3) Place the damaged exhaust valve inside the container in an upright position using large pliers or similar tool to submerge it under water.

CAUTION:

- Ensure the damaged exhaust valve is fully submerged in water.
- Keep any fire sparks or fire sources away from this container because hydrogen gas will be emitted from the chemical reaction.
- Because of serious chemical reaction, step back at least 2 to 3 m from the container.



- (4) After the chemical reaction has completed (approximately 4 to 5 hours), using large pliers or similar tool, carefully remove the valve from the container, and then dispose of it according to the same procedures that are provided for other parts.

CAUTION:

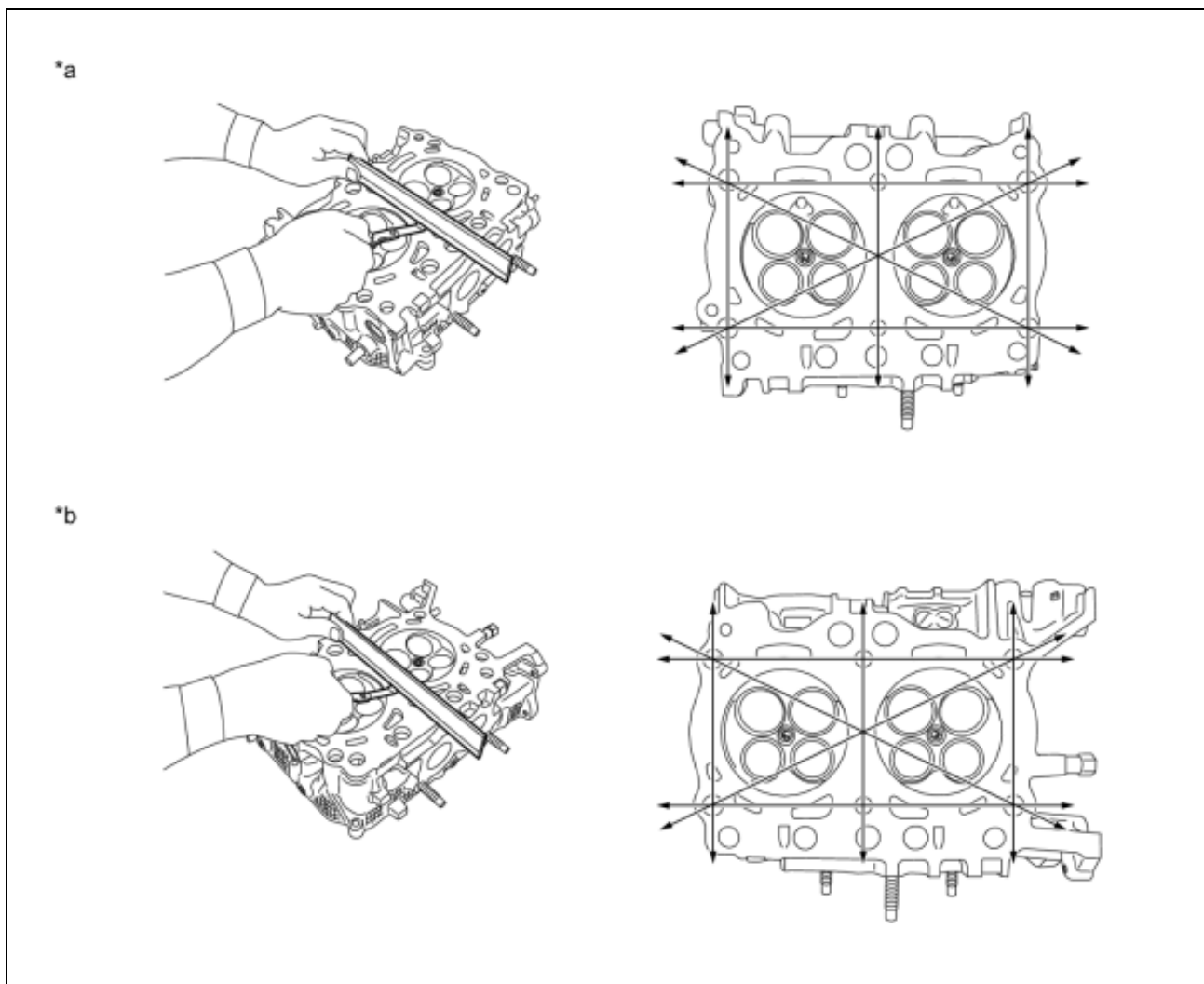
- After the chemical reaction, be careful not to let used liquid (sodium hydrate) contact your skin. Should it contact your skin, immediately rinse it with plenty of water.
- After the chemical reaction, dispose of used liquid (sodium hydrate) according to all applicable government and local regulations.

Last Modified: 4-14-2014	6.6 G	Doc ID: RM000000XCV08GX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: CYLINDER HEAD: INSPECTION; 2013 MY FR-S [03/2012 -]		

INSPECTION

1. INSPECT CYLINDER HEAD SUB-ASSEMBLY

- Visually check that there are no cracks, scratches or other damage.
- Using a dye penetrant, check the important sections for fissures.
- Check that there are no signs of gas leak or water leak on gasket attachment surfaces.
- Using a precision straightedge and a feeler gauge, measure the surfaces that contact the cylinder block for warpage.



Text in Illustration

*a	for Bank 1	*b	for Bank 2
----	------------	----	------------

Maximum warpage:

0.035 mm (0.00138 in.)

Allowable minimum cylinder head height:

98.4 mm (3.874 in.)

Standard cylinder head height:

98.5 mm (3.878 in.)

If the warpage is more than the maximum, correct the surface by grinding it or replace the cylinder head sub-assembly.

HINT:

- Measurement should be performed at a temperature of 20°C (68°F).
- If the cylinder head sub-assembly bolt tightening torques and tightening angles are uneven, cylinder head sub-assembly warpage may occur. During installation, make sure that tightening torques and tightening angles are correctly obtained.
- If the cylinder head sub-assembly is replaced, hand-lap the valve and valve seat with an abrasive compound.

2. INSPECT INTAKE VALVE

(a) Check the valve flange and valve stem for damage, wear or deformation.

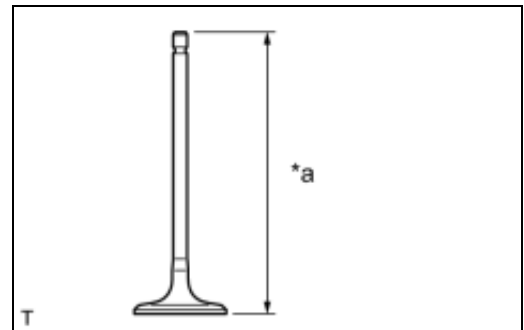
(b) Using a vernier caliper, measure the overall length of the valve.

Standard overall length:

103.3 mm (4.067 in.)

Text in Illustration

*a	Overall Length
----	----------------



(c) Using a vernier caliper, measure the valve head margin thickness.

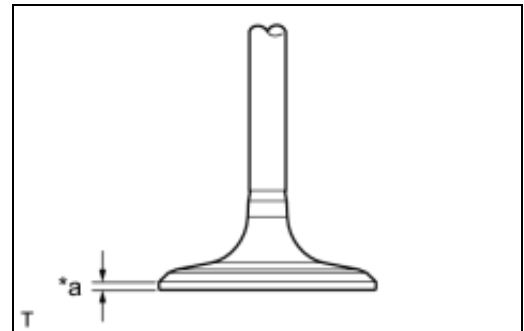
Standard margin thickness:

0.8 to 1.2 mm (0.0315 to 0.0472 in.)

Text in Illustration

*a	Margin thickness
----	------------------

If the margin thickness is not as specified, replace the valve.



HINT:

- It is possible to differentiate between the intake valve and the exhaust valve by their overall length.
- If the valve is replaced, hand-lap the valve and valve seat with an abrasive compound.

(d) Using a micrometer, measure the diameter of the valve stem.

Standard valve stem diameter:

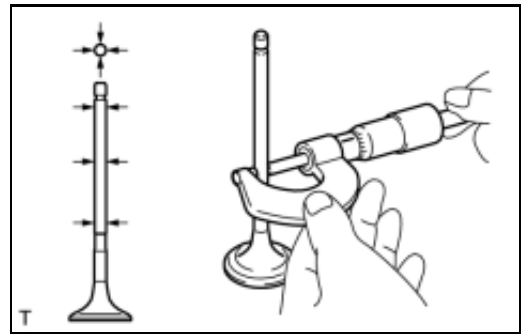
5.455 to 5.470 mm (0.2148 to 0.2154 in.)

If the valve stem diameter is not as specified, replace the

valve.

HINT:

- Measurement should be performed at a temperature of 20°C (68°F).
- Measure the valve stem diameter at the 6 locations as shown in the illustration, and take the minimum value.
- If the valve is replaced, hand-lap the valve and valve seat with an abrasive compound.



3. INSPECT EXHAUST VALVE

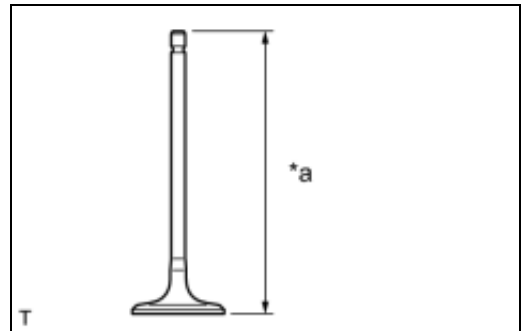
(a) Check the valve flange and valve stem for damage, wear or deformation.

(b) Using a vernier caliper, measure the overall length of the valve.

Standard overall length:
95.1 mm (3.744 in.)

Text in Illustration

*a	Overall Length
----	----------------



(c) Using a vernier caliper, measure the valve head margin thickness.

Standard margin thickness:
1.0 to 1.4 mm (0.039 to 0.055 in.)

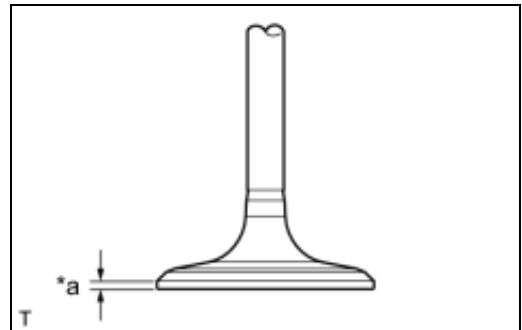
Text in Illustration

*a	Margin thickness
----	------------------

If the margin thickness is not as specified, replace the valve.

HINT:

- It is possible to differentiate between the intake valve and the exhaust valve by their overall length.
- If the valve is replaced, hand-lap the valve and valve seat with an abrasive compound.



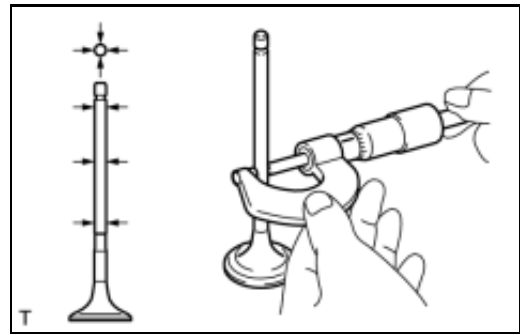
(d) Using a micrometer, measure the diameter of the valve stem.

Standard valve stem diameter:
5.445 to 5.460 mm (0.21437 to 0.21496 in.)

If the valve stem diameter is not as specified, replace the valve.

HINT:

- Measurement should be performed at a temperature of 20°C (68°F).
- Measure the valve stem diameter at the 6 locations as shown in the illustration, and take the minimum value.
- If the valve is replaced, hand-lap the valve and valve seat with an abrasive compound.

**4. INSPECT VALVE GUIDE BUSH OIL CLEARANCE**

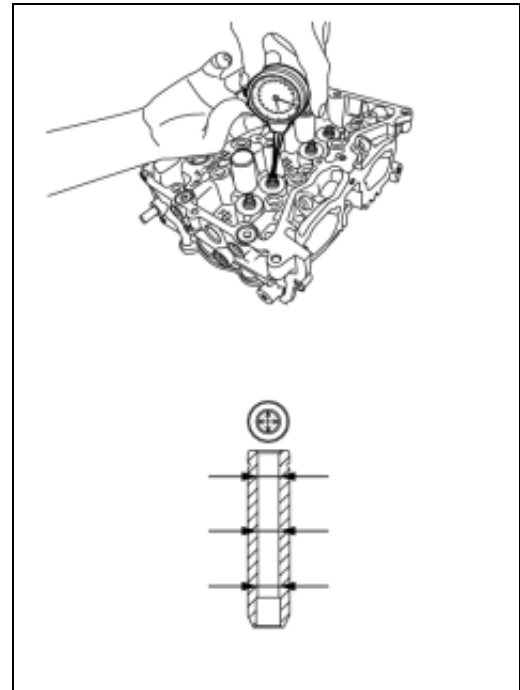
- (a) Using a caliper gauge, measure the inside diameter of the valve guide bush.

Standard valve guide bush inside diameter:
5.500 to 5.512 mm (0.21654 to 0.21701 in.)

If the inside diameter is not as specified, replace the valve guide bush.

HINT:

- Measurement should be performed at a temperature of 20°C (68°F).
- Measure the inside diameter of the valve guide bush at the 6 locations as shown in the illustration, and take the maximum value.



- (b) Calculate the clearance between the valve guide bush and valve stem.

Standard Oil Clearance:

ITEM	SPECIFIED CONDITION
Intake	0.030 to 0.057 mm (0.00118 to 0.00224 in.)
Exhaust	0.040 to 0.067 mm (0.00157 to 0.00264 in.)

If the clearance between valve guide bush and valve stem is more the standard, replace the valve guide bush or valve, whichever shows the greater amount of wear or damage.

HINT:

- Subtract the valve stem diameter measurement from the inside diameter measurement of the valve guide bush.
- If the valve is replaced, hand-lap the valve and valve seat with an abrasive compound.

5. INSPECT VALVE ADJUSTING SHIM CLEARANCE

- (a) Visually check the valve adjusting shim for damage.

- (b) Using a micrometer, measure the valve stem end diameter.

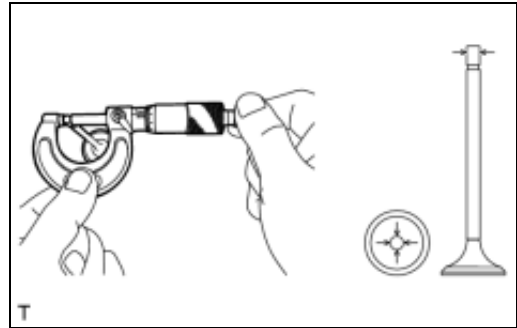
Standard valve stem end diameter:

ITEM	SPECIFIED CONDITION
Intake	5.455 to 5.470 mm (0.21476 to 0.21535 in.)
Exhaust	5.445 to 5.460 mm (0.21437 to 0.21496 in.)

If the valve stem end diameter is not as specified, replace the valve.

HINT:

- Measurement should be performed at a temperature of 20°C (68°F).
- Measure the valve stem end diameter at the 2 locations as shown in the illustration, and take the minimum value.
- If the valve is replaced, hand-lap the valve and valve seat with an abrasive compound.



- (c) Using a caliper gauge, measure the inside diameter of the valve adjusting shim.

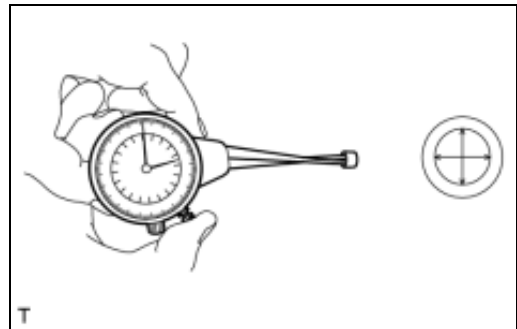
Standard valve adjusting shim inside diameter:

5.500 to 5.560 mm (0.21654 to 0.21890 in.)

If the inside diameter is not as specified, replace the valve adjusting shim.

HINT:

- Measurement should be performed at a temperature of 20°C (68°F).
- Measure the inside diameter of the valve adjusting shim at the 2 locations as shown in the illustration, and take the maximum value.
- If the valve adjusting shim needs to be replaced, check the valve clearance and select a suitable one.



- (d) Calculate the clearance between the valve adjusting shim and valve stem end.

Standard Oil Clearance:

0.030 to 0.115 mm (0.00118 to 0.00453 in.)

If the clearance between valve adjusting shim and valve stem end exceeds the standard, replace the valve adjusting shim or valve, whichever shows the greater amount of wear or damage.

HINT:

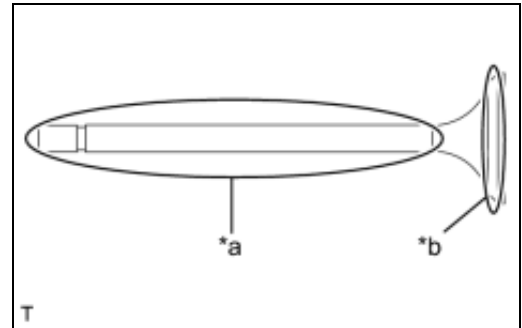
- Subtract the valve stem end diameter measurement from the inside diameter measurement of the valve adjusting shim.
- If the valve is replaced, hand-lap the valve and valve seat with an abrasive compound.
- If the valve adjusting shim needs to be replaced, check the valve clearance and select a suitable one.

6. INSPECT INTAKE VALVE SEATS

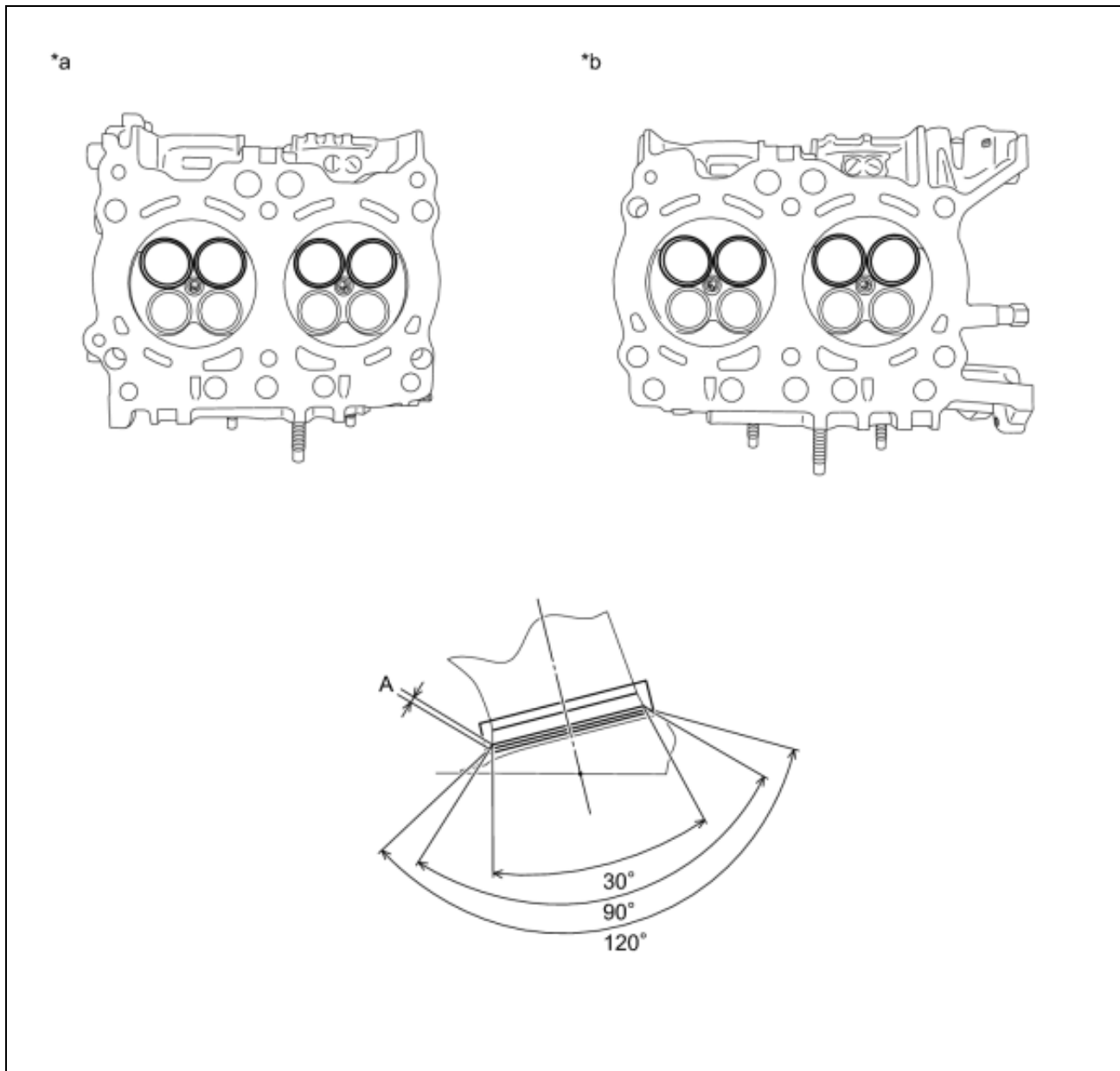
- (a) Visually check the valve seat for damage or deformation.
- (b) Clean the valve and valve seat.
- (c) Apply a light coat of engine oil to the valve stem, and a light coat of Prussian blue uniformly to the valve face.

Text in Illustration

*a	Valve stem
*b	Valve face



- (d) Insert the valve, and without rotating the valve, lightly press the valve face against the valve seat, and then pull it out.
- (e) Using a vernier caliper, measure the width of the contact face shown in the illustration.



Text in Illustration

*a	for Bank 1	*b	for Bank 2
----	------------	----	------------

Standard width (A):

0.8 to 1.6 mm (0.032 to 0.063 in.)

If the width is not as specified, repair the valve seat with a cutter.

HINT:

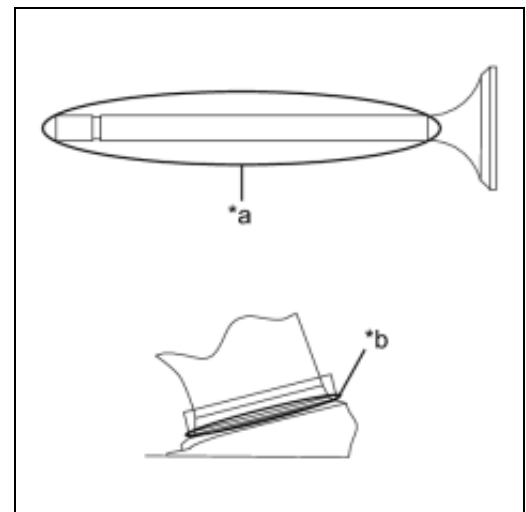
- Measure the width of the Prussian blue adhering to the valve seat.
- If the Prussian blue is not continually adhered on the valve seat, hand-lap the valve and valve seat with an abrasive compound.
- If the Prussian blue is still not continually adhered on the valve seat after lapping, repair the valve seat with a cutter.

(f) Completely remove the Prussian blue from the valve and valve seat.

(g) Apply a light coat of engine oil to the valve stem, and a light coat of Prussian blue uniformly to the valve seat face.

Text in Illustration

*a	Valve stem
*b	Contact face



(h) Insert the valve, and without rotating the valve, lightly press the valve face against the valve seat, and then pull it out.

(i) Check the location of the contact face shown in the illustration.

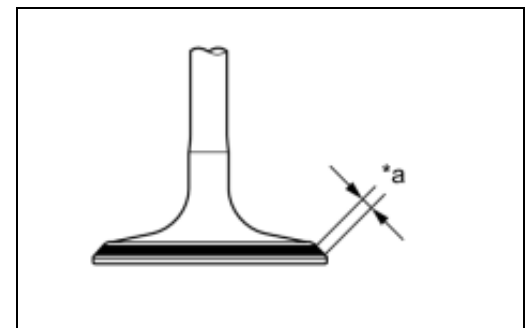
Standard contact face location:

Middle of the valve face at all circumference

Text in Illustration

*a	Contact face location
----	-----------------------

If the seat contact is not in the middle of the valve face, repair the valve seat with a cutter.

**HINT:**

Check the location of the Prussian blue adhering to the valve face.

(j) Completely remove the Prussian blue from the valve and valve seat.

7. INSPECT EXHAUST VALVE SEATS

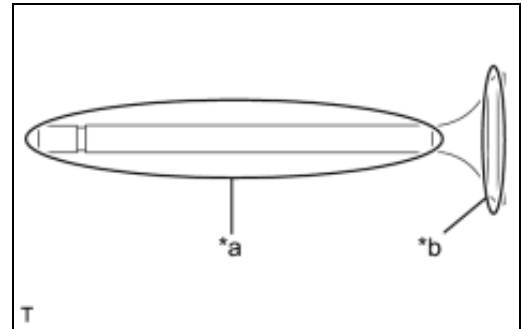
(a) Visually check the valve seat for damage or deformation.

(b) Clean the valve and valve seat.

(c) Apply a light coat of engine oil to the valve stem, and a light coat of Prussian blue uniformly to the valve face.

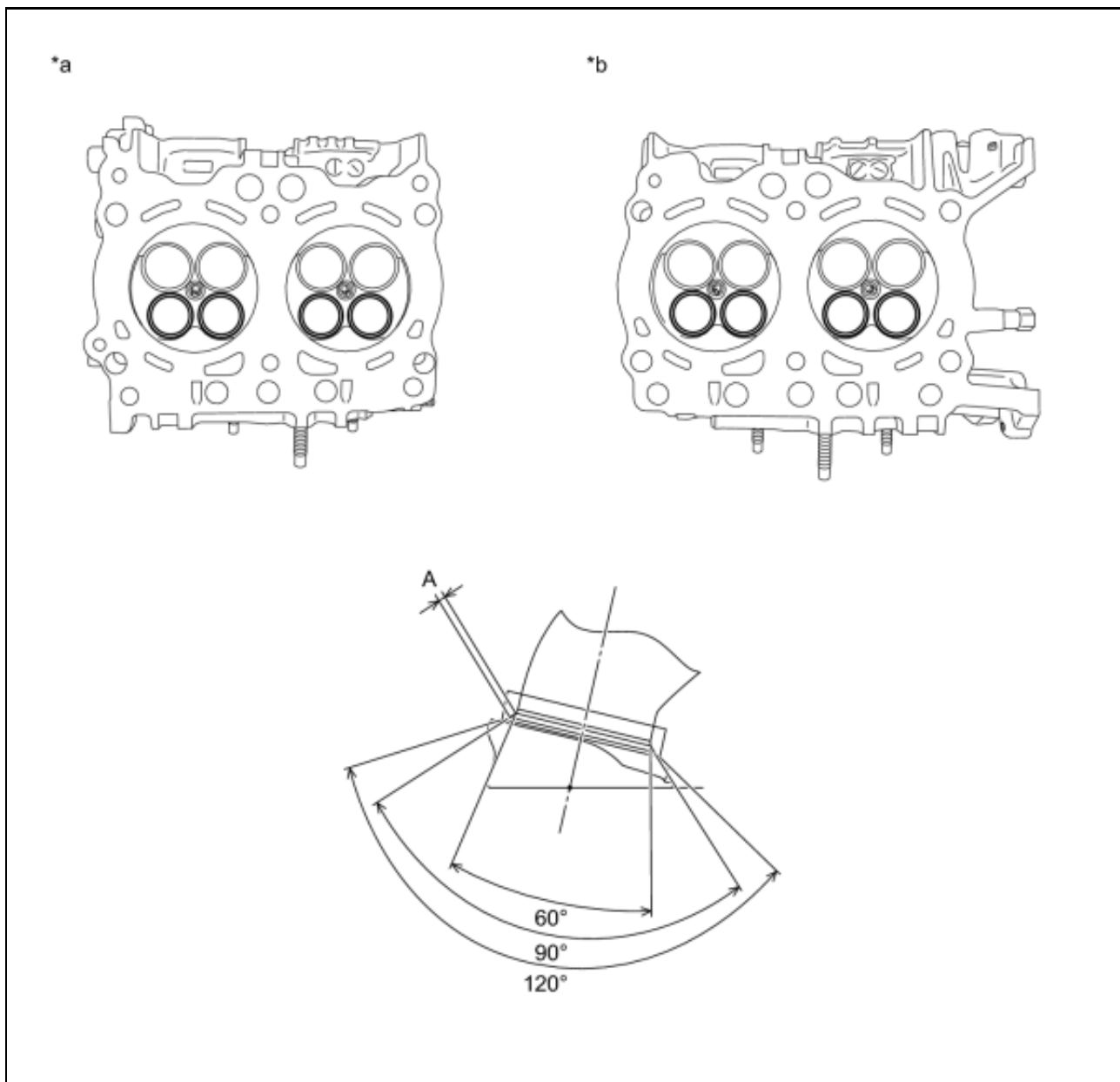
Text in Illustration

*a	Valve stem
*b	Valve face



(d) Insert the valve, and without rotating the valve, lightly press the valve face against the valve seat, and then pull it out.

(e) Using a vernier caliper, measure the width of the contact face shown in the illustration.



Text in Illustration

*a	for Bank 1	*b	for Bank 2
----	------------	----	------------

Standard width (A):

1.1 to 1.7 mm (0.043 to 0.067 in.)

If the width is not as specified, repair the valve seat with a cutter.

HINT:

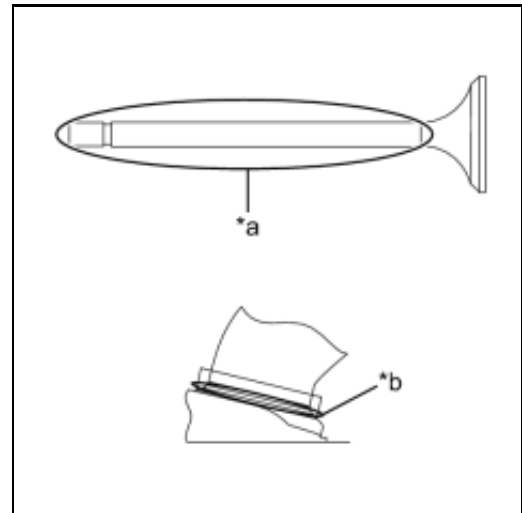
- Measure the width of the Prussian blue adhering to the valve seat.
- If the Prussian blue is not continually adhered on the valve seat, hand-lap the valve and valve seat with an abrasive compound.
- If the Prussian blue is still not continually adhered on the valve seat after lapping, repair the valve seat with a cutter.

(f) Completely remove the Prussian blue from the valve and valve seat.

- (g) Apply a light coat of engine oil to the valve stem, and a light coat of Prussian blue uniformly to the valve seat face.

Text in Illustration

*a	Valve stem
*b	Contact face



- (h) Insert the valve, and without rotating the valve, lightly press the valve face against the valve seat, and then pull it out.

- (i) Check the location of the contact face shown in the illustration.

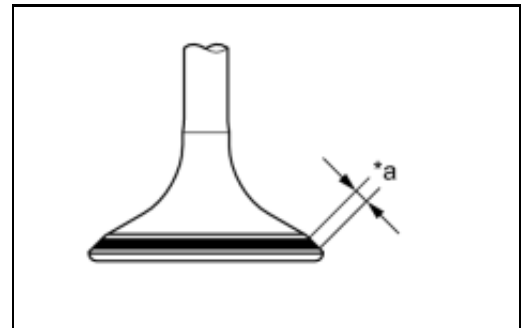
Standard contact face location:

Middle of the valve face at all circumference

Text in Illustration

*a	Contact face location
----	-----------------------

If the seat contact is not in the middle of the valve face, repair the valve seat with a cutter.



HINT:

Check the location of the Prussian blue adhering to the valve face.

- (j) Completely remove the Prussian blue from the valve and valve seat.

8. INSPECT VALVE SPRING

- (a) Visually check the valve spring for damage or deformation.

- (b) Using a vernier caliper, measure the free length of the valve spring.

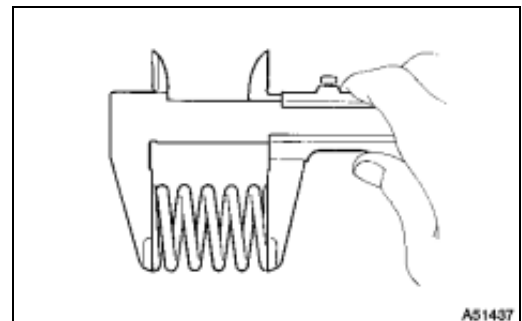
Standard free length:

41.06 mm (1.617 in.)

If the free length is not as specified, replace the spring.

HINT:

Measurement should be performed at a temperature of 20°C (68°F).



A51437

(c) Using a steel square, measure the deviation of the valve spring.

Maximum deviation:

Less than 1.8 mm (0.0710 in.)

Maximum angle:

2.5°

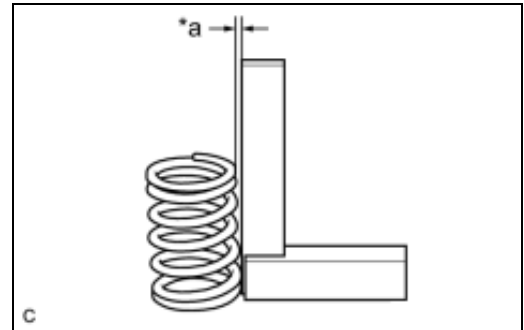
Text in Illustration

*a	Deviation
----	-----------

If the result is not as specified, replace the valve spring.

HINT:

- Measurement should be performed at a temperature of 20°C (68°F).
- To measure deviation of the valve spring, stand the valve spring on a level surface and measure its deviation at the top of the valve spring using a steel square.



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000T4Y0BDX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: CYLINDER HEAD: REASSEMBLY; 2013 MY FR-S [03/2012 -]		

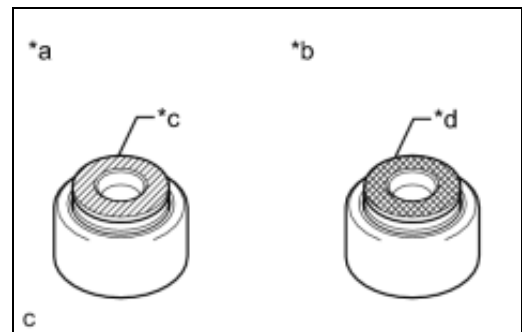
REASSEMBLY

1. INSTALL INTAKE VALVE STEM OIL SEAL

(a) Apply engine oil to new valve stem oil seals.

Text in Illustration

*a	for Intake
*b	for Exhaust
*c	Gray
*d	Light green



NOTICE:

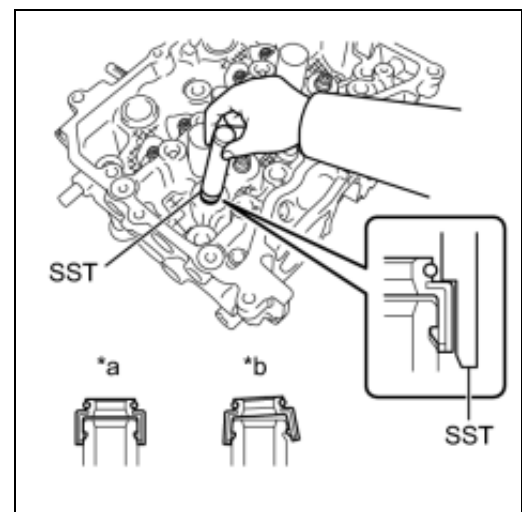
- Pay close attention to the colors when installing the oil seals.
- Installing the intake oil seal into the exhaust side or installing the exhaust oil seal to the intake side may cause installation problems later.

(b) Using SST, push in the oil seals by hand.

SST: 09201-41020

Text in Illustration

*a	Correct
*b	Incorrect



NOTICE:

- Place a cloth, etc. to avoid scratching the mating surface of the cylinder head during servicing.
- Do not tap SST with a plastic hammer to install the oil seals as it may damage the oil seals. Push in the oil seals by hand with SST.
- Do not install the oil seals at an angle.

2. INSTALL EXHAUST VALVE STEM OIL SEAL

- (a) Using SST, push in the oil seals by hand.

SST: 09201-41020

HINT:

Use the same procedure as for the intake oil seals.

3. INSTALL INTAKE VALVE

NOTICE:

Place a cloth to avoid scratching the mating surface of the cylinder head during servicing.

- (a) Set the valve spring seat, valve spring and retainer onto the cylinder head.

HINT:

Install the valve spring to the cylinder head with the narrow pitch end facing the valve spring seat.

- (b) Apply engine oil to the valve stem and insert the valve into the valve guide bush.

NOTICE:

When inserting the valve into the valve guide bush, use special care not to damage the oil seal lip.

- (c) Apply engine oil to the valve spring retainer locks.

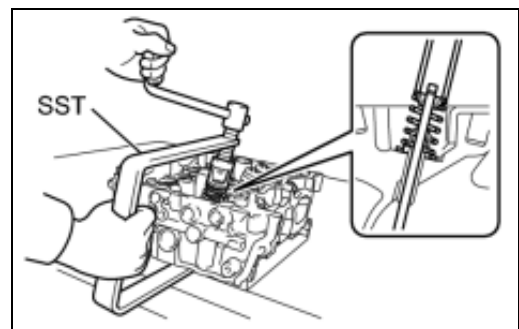
- (d) Using SST, compress the valve spring and install the valve spring retainer locks.

SST: 09202-70020

09202-00010

09202-01010

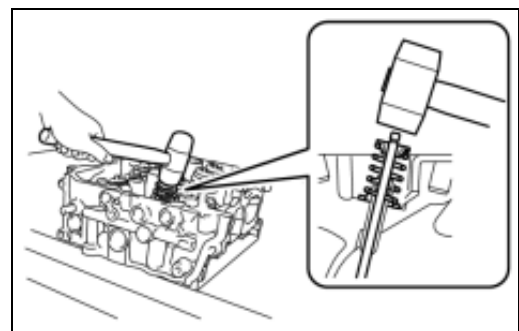
09202-01020



- (e) Using a plastic hammer, lightly tap the valve stem tip to ensure a proper fit.

NOTICE:

Be careful not to tap the retainer.



4. INSTALL EXHAUST VALVE

NOTICE:

Place a cloth to avoid scratching the mating surface of the cylinder head during servicing.

- (a) Set the valve spring seat, valve spring and retainer onto the cylinder head.

HINT:

Install the valve spring to the cylinder head with the narrow pitch end facing the valve spring seat.

(b) Apply engine oil to the valve stem and insert the valve into the valve guide bush.

NOTICE:

When inserting the valve into the valve guide bush, use special care not to damage the oil seal lip.

(c) Apply engine oil to the valve spring retainer locks.

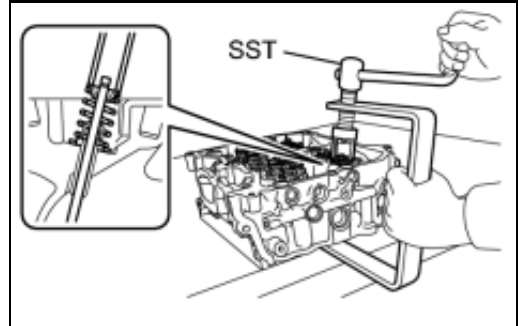
(d) Using SST, compress the valve spring and install the valve spring retainer locks.

SST: 09202-70020

09202-00010

09202-01010

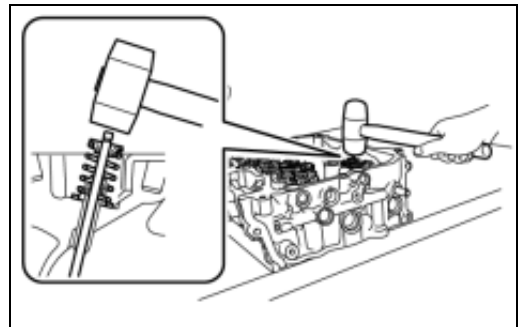
09202-01020



(e) Using a plastic hammer, lightly tap the valve stem tip to ensure a proper fit.

NOTICE:

Be careful not to tap the retainer.



5. INSTALL STUD BOLT

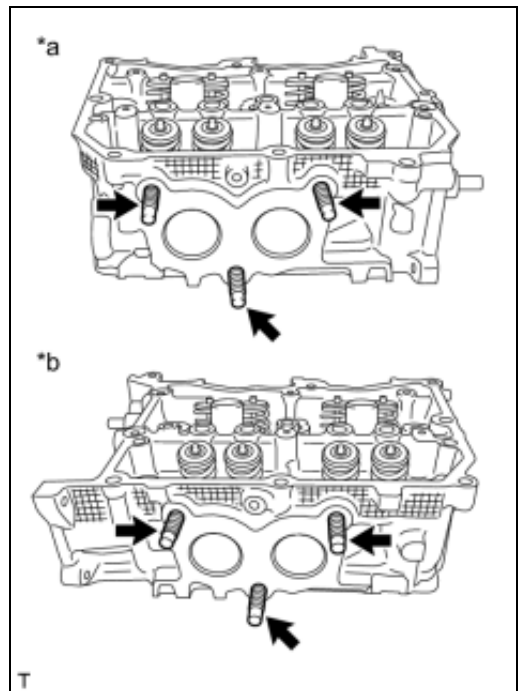
(a) Install the 6 stud bolts to the cylinder heads.

Torque:

18 N·m {184 kgf·cm, 13ft·lbf}

Text in Illustration

*a	for Bank 1
*b	for Bank 2

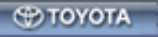
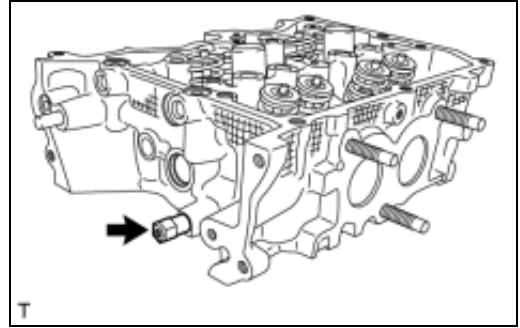


6. INSTALL CHAIN COVER MOUNT BOLT

- (a) Install the chain cover mount bolt to the cylinder head sub-assembly LH.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}



Last Modified: 4-14-2014	6.6 A	Doc ID: RM0000035AU028X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: CYLINDER HEAD: REPAIR; 2013 MY FR-S [03/2012 -]		

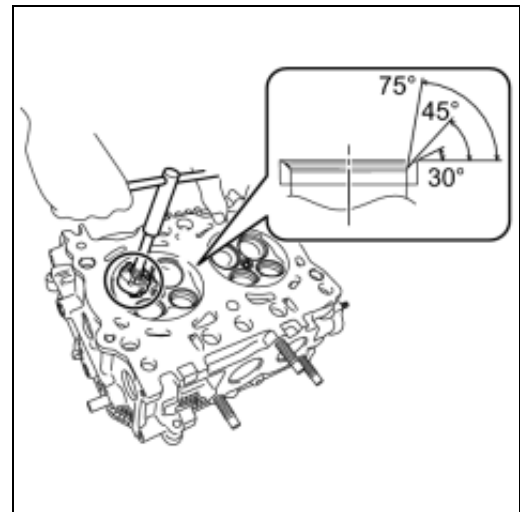
REPAIR

1. REPAIR INTAKE VALVE SEATS

NOTICE:

- Repair the seat while checking the seating position.
- Releasing the seat cutter pressure gradually helps to make the intake valve seat faces smoother.

- (a) Using a 45° cutter, resurface the valve seat so that the valve seat width is more than the specification.

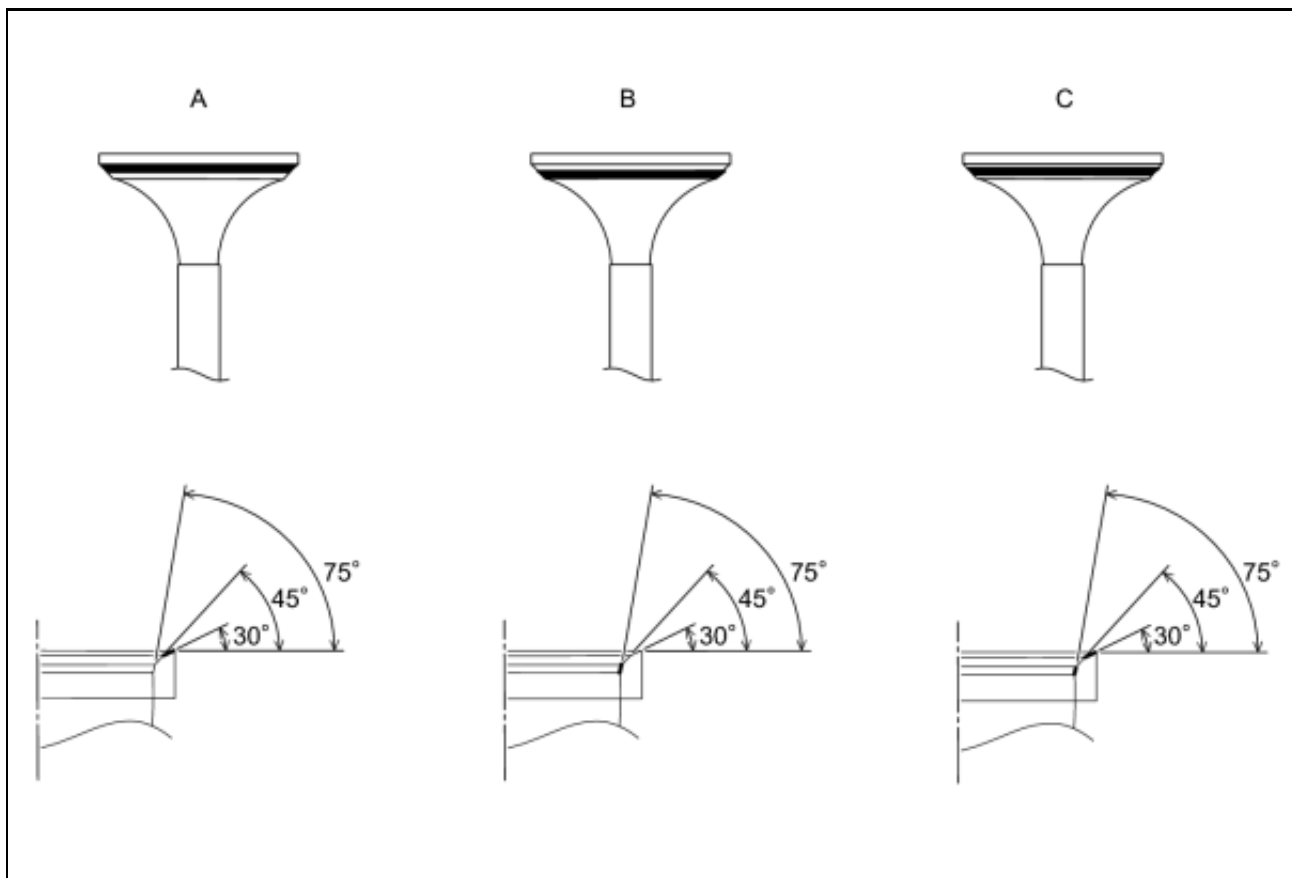


- (b) Hand-lap the valve and valve seat with an abrasive compound.
(c) Check the valve seating position.

HINT:

This procedure is necessary to select a cutter to be used in the following steps.

- (d) Using 30° or 75° cutters, correct the valve seat so that the contact condition between the valve and valve seat is within the standard.

**NOTICE:**

- Repair the seat while checking the seating position.
- Releasing the seat cutter pressure gradually helps to make the intake valve seat faces smoother.

HINT:

Select an appropriate cutter by referring to the following chart.

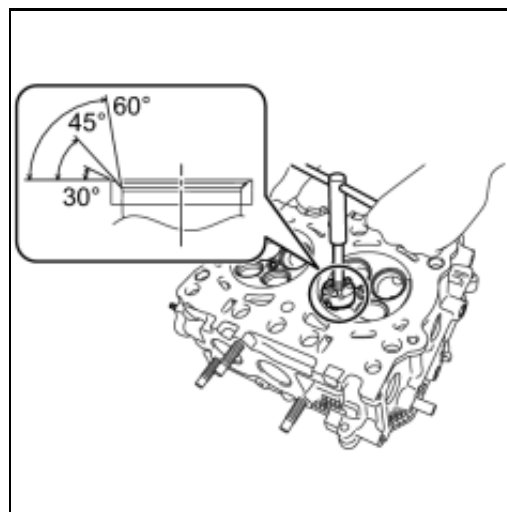
CONTACT POSITION	CUTTER TO BE SELECTED
A in the illustration	If the valve face position is high, use a 30° valve seat cutter in order to grind the surface so that the contact surface between the valve and the valve seat is at a standard value.
B in the illustration	If the valve face position is low, use a 75° valve seat cutter in order to grind the surface so that the contact surface between the valve and the valve seat is at a standard value.
C in the illustration	If the valve face position is centered, use a 30° and 75° valve seat cutter in order to grind the surface so that the contact surface between the valve and the valve seat is at a standard value.

(e) Hand-lap the valve and valve seat with an abrasive compound.

2. REPAIR EXHAUST VALVE SEATS**NOTICE:**

- Repair the seat while checking the seating position.
- Releasing the seat cutter pressure gradually helps to make the intake valve seat faces smoother.

- (a) Using a 45° cutter, resurface the valve seat so that the valve seat width is more than the specification.

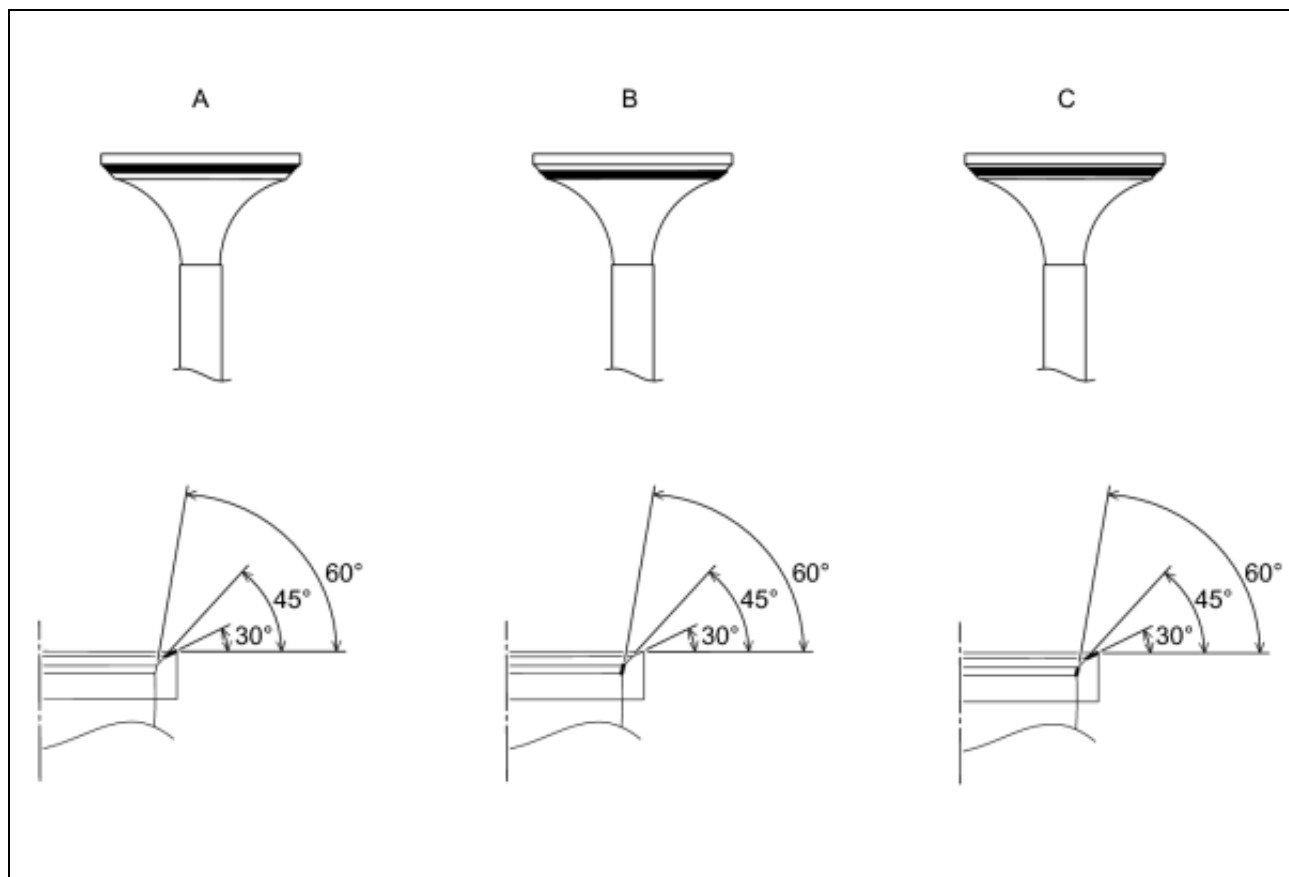


- (b) Hand-lap the valve and valve seat with an abrasive compound.
 (c) Check the valve seating position.

HINT:

This procedure is necessary to select a cutter to be used in the following steps.

- (d) Using 30° or 60° cutters, correct the valve seat so that the contact condition between the valve and valve seat is within the standard.



NOTICE:

- Repair the seat while checking the seating position.
- Releasing the seat cutter pressure gradually helps to make the intake valve seat faces smoother.

HINT:

Select an appropriate cutter by referring to the following chart.

CONTACT POSITION	CUTTER TO BE SELECTED
A in the illustration	If the valve face position is high, use a 30° valve seat cutter in order to grind the surface so that the contact surface between the valve and the valve seat is at a standard value.
B in the illustration	If the valve face position is low, use a 60° valve seat cutter in order to grind the surface so that the contact surface between the valve and the valve seat is at a standard value.
C in the illustration	If the valve face position is centered, use a 30° and 60° valve seat cutter in order to grind the surface so that the contact surface between the valve and the valve seat is at a standard value.

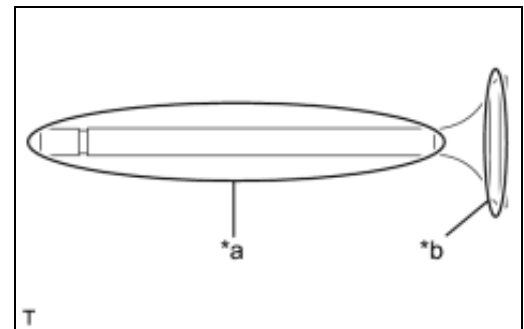
(e) Hand-lap the valve and valve seat with an abrasive compound.

3. REPAIR VALVE

(a) Apply a light layer of engine oil to the valve stem, and a small amount of an abrasive compound uniformly to the valve face.

Text in Illustration

*a	Valve stem
*b	Valve face

**HINT:**

- Do not apply the abrasive compound more than necessary.
- Do not apply the abrasive compound to the valve stem as the valve stem may be affected.

(b) Slowly insert the valve stem into the valve guide bush and lap the valve and valve seat.

HINT:

- Lift the valve and strike the valve on the valve seat 2 times, and slightly rotate the valve. Repeat this set.
- The contact surface between the valve and the valve seat may become larger than the standard value, therefore, ensure that the valve is not continuously lapped by rotating while seated in the valve seat.
- While lapping, ensure that the valve is not removed from the valve guide bush by lifting too much.

(c) After lapping, completely remove the abrasive compound.

NOTICE:

Be sure to completely remove the abrasive compound as the remained compound could cause engine troubles.

(d) Check the valve seating position and width.



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000T4Y0BCX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: CYLINDER HEAD: REPLACEMENT; 2013 MY FR-S [03/2012 -]		

REPLACEMENT

1. REPLACE NO. 2 INTAKE VALVE GUIDE BUSH

(a) Place the cylinder block on wooden blocks with the combustion chamber side facing upward.

(b) Using SST and a hammer, tap out the No. 2 intake valve guide bush.

SST: 09201-10000

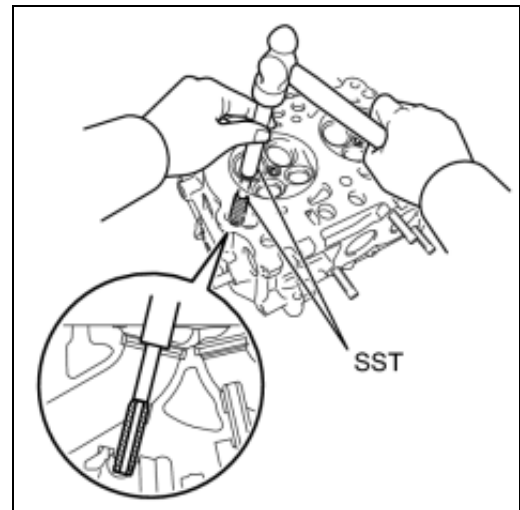
09201-01050

SST: 09950-70010

09951-07100

NOTICE:

- Place wooden blocks wrapped in a cloth under the cylinder head and stabilize the cylinder head during servicing.
- Use special care not to damage the cylinder head.

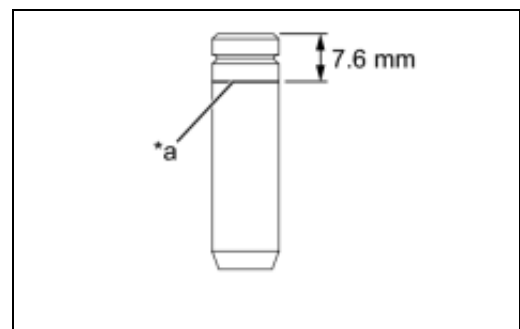


(c) Before installing the No. 2 intake valve guide bush, make sure that neither scratches nor damages exist on the inner surface of cylinder head valve guide bush holes.

(d) Draw a reference line 7.6 mm (0.299 in.) below from the top face on a new No. 2 intake valve guide bush using a marker.

Text in Illustration

*a	Reference line
----	----------------



HINT:

Reference line is used as a guide when tapping-in the No. 2 intake valve guide bush.

(e) Place the cylinder block on wooden blocks with the combustion chamber side facing downward.

(f) Apply enough engine oil to the No. 2 intake valve guide bush, and set it on the cylinder head.

(g) Using SST and a hammer, tap in the No. 2 intake valve guide bush to the reference line.

SST: 09201-10000

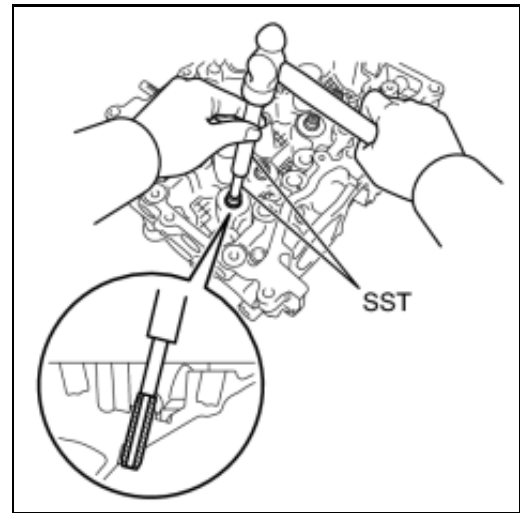
09201-01050

SST: 09950-70010

09951-07100

NOTICE:

- Place wooden blocks wrapped in a cloth under the cylinder head and stabilize the cylinder head during servicing.
- Use special care not to damage the cylinder head.



- (h) While measuring the No. 2 intake valve guide bush protrusion amount using a vernier caliper, tap in the No. 2 intake valve guide bush so that its height is within the standard.

Standard protrusion height:

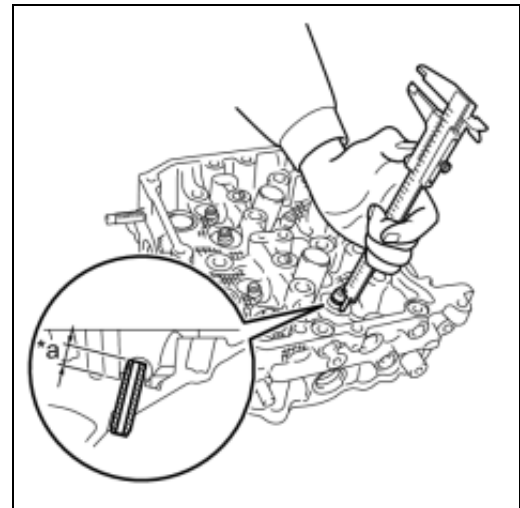
11.4 to 11.8 mm (0.449 to 0.466 in.)

NOTICE:

- Place wooden blocks wrapped in a cloth under the cylinder head and stabilize the cylinder head during servicing.
- Use special care not to damage the cylinder head.

HINT:

Use multiple small repetitions of tap-in and measurement in order not to excessively tap in the No. 2 intake valve guide bush.

**Text in Illustration**

*a	Protrusion height
----	-------------------

- (i) Place the cylinder block on wooden blocks with the combustion chamber side facing upward.

NOTICE:

- Place wooden blocks wrapped in a cloth under the cylinder head and stabilize the cylinder head during servicing.
- Use special care not to damage the cylinder head.

- (j) Using a reamer, ream the No. 2 intake valve guide bush to obtain the standard clearance between the No. 2 intake valve guide bush and valve stem.

Standard inside diameter:

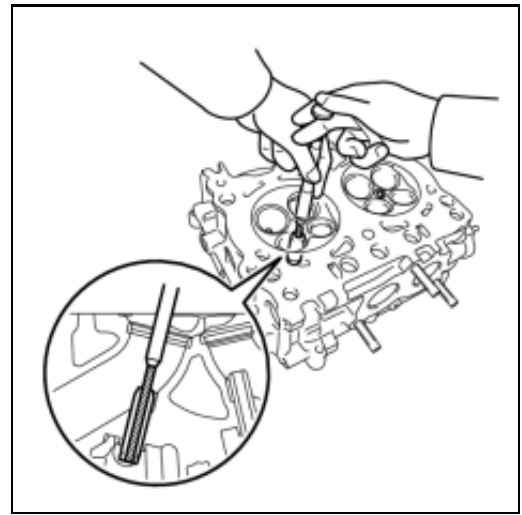
5.500 to 5.512 mm (0.21654 to 0.21701 in.) at 20°C
(68°F)

NOTICE:

While gradually widening the reamer diameter, ream the No. 2 intake valve guide bush uniformly so that the oil clearance is within the standard.

HINT:

- Apply engine oil to the reamer when reaming.
- If the inner surface of No. 2 intake valve guide bush is damaged, slightly grind the edge of the reamer with 400-grit sandpaper.
- If the inner surface of No. 2 intake valve guide bush becomes lustrous and the reamer does not chip, use a new reamer or correct the reamer.



(k) After reaming, remove chips and clean the No. 2 intake valve guide bush.

(l) Measure the inside diameter of the No. 2 intake valve guide bush and confirm the oil clearance.

(m) Check the contact condition between the valve and valve seat.

2. REPLACE NO. 2 EXHAUST VALVE GUIDE BUSH

(a) Place the cylinder block on wooden blocks with the combustion chamber side facing upward.

(b) Using SST and a hammer, tap out the No. 2 exhaust valve guide bush.

SST: 09201-10000

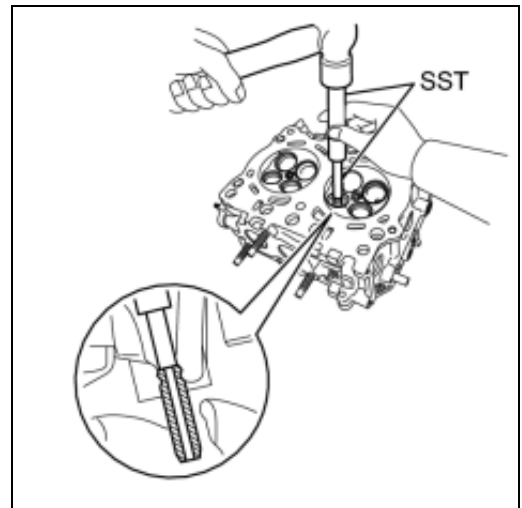
09201-01050

SST: 09950-70010

09951-07100

NOTICE:

- Place wooden blocks wrapped in a cloth under the cylinder head and stabilize the cylinder head during servicing.
- Use special care not to damage the cylinder head.



(c) Before installing the No. 2 exhaust valve guide bush, make sure that neither scratches nor damages exist on the inner surface of cylinder head valve guide bush holes.

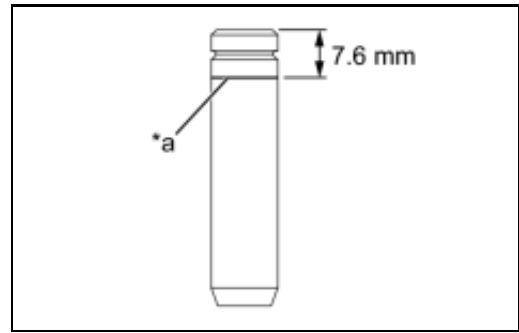
(d) Draw a reference line 7.6 mm (0.299 in.) below from the top face on a new No. 2 exhaust valve guide bush using a marker.

Text in Illustration

*a	Reference line
----	----------------

HINT:

Reference line is used as a guide when tapping-in the No. 2 exhaust valve guide bush.



- (e) Place the cylinder block on wooden blocks with the combustion chamber side facing downward.
 (f) Apply enough engine oil to the No. 2 exhaust valve guide bush, and set it on the cylinder head.

- (g) Using SST and a hammer, tap in the No. 2 exhaust valve guide bush to the reference line.

SST: 09201-10000

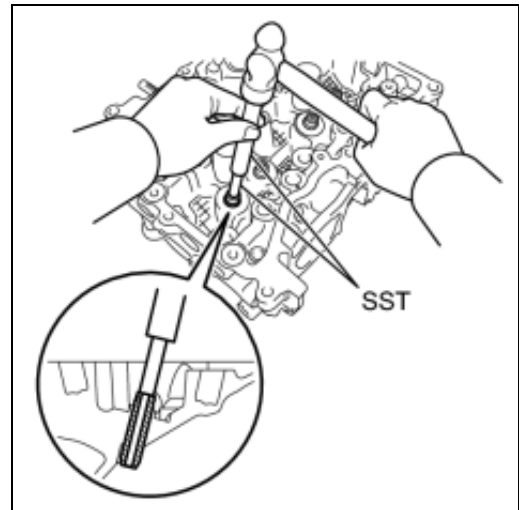
09201-01050

SST: 09950-70010

09951-07100

NOTICE:

- Place wooden blocks wrapped in a cloth under the cylinder head and stabilize the cylinder head during servicing.
- Use special care not to damage the cylinder head.



- (h) While measuring the No. 2 exhaust valve guide bush protrusion amount using a vernier caliper, tap in the No. 2 exhaust valve guide bush so that its height is within the standard.

Standard protrusion height:

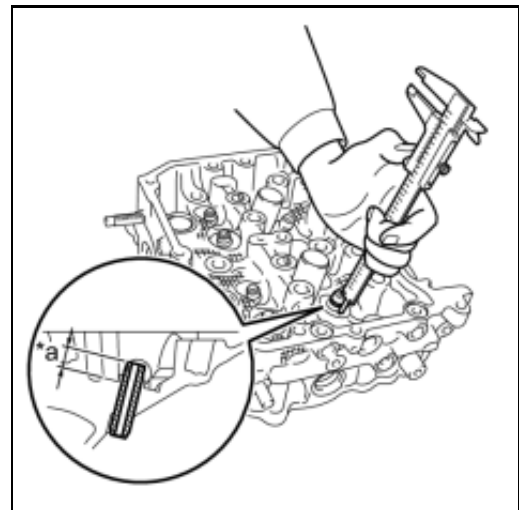
11.4 to 11.8 mm (0.449 to 0.466 in.)

NOTICE:

- Place wooden blocks wrapped in a cloth under the cylinder head and stabilize the cylinder head during servicing.
- Use special care not to damage the cylinder head.

HINT:

Use multiple small repetitions of tap-in and measurement in order not to excessively tap in the No. 2 exhaust valve guide bush.

**Text in Illustration**

*a	Protrusion height
----	-------------------

(i) Place the cylinder block on wooden blocks with the combustion chamber side facing upward.

NOTICE:

- Place wooden blocks wrapped in a cloth under the cylinder head and stabilize the cylinder head during servicing.
- Use special care not to damage the cylinder head.

(j) Using a reamer, ream the No. 2 exhaust valve guide bush to obtain the standard clearance between the No. 2 exhaust valve guide bush and valve stem.

Standard inside diameter:

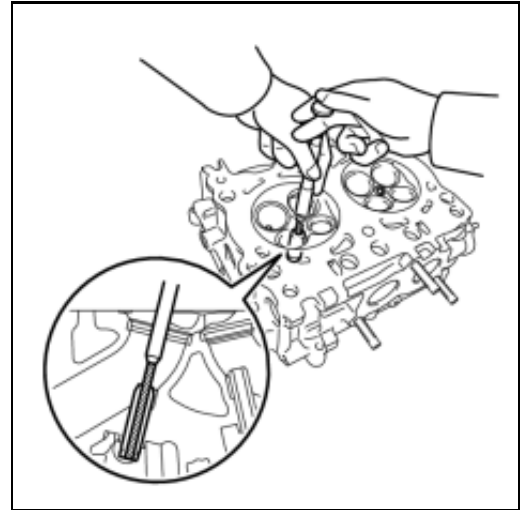
5.500 to 5.512 mm (0.21654 to 0.21701 in.) at 20°C (68°F)

NOTICE:

While gradually widening the reamer diameter, ream the No. 2 exhaust valve guide bush uniformly so that the oil clearance is within the standard.

HINT:

- Apply engine oil to the reamer when reaming.
- If the inner surface of No. 2 exhaust valve guide bush is damaged, slightly grind the edge of the reamer with 400-grit sandpaper.
- If the inner surface of No. 2 exhaust valve guide bush becomes lustrous and the reamer does not chip, use a new reamer or correct the reamer.



(k) After reaming, remove chips and clean the No. 2 exhaust valve guide bush.

(l) Measure the inside diameter of the No. 2 exhaust valve guide bush and confirm the oil clearance.

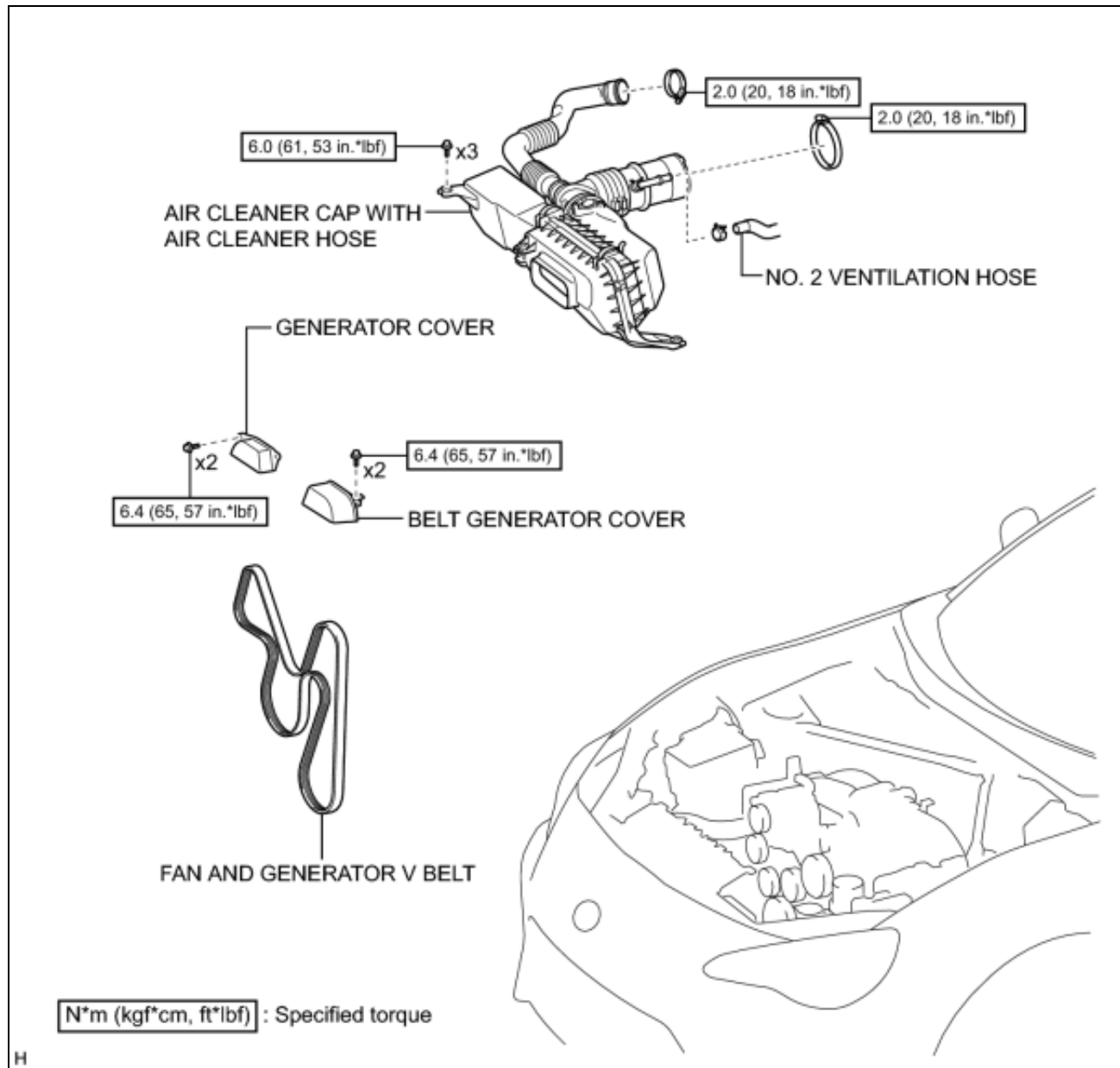
(m) Check the contact condition between the valve and valve seat.



Last Modified: 4-14-2014	6.6 K	Doc ID: RM000000T3R03YX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: DRIVE BELT: COMPONENTS; 2013 MY FR-S [03/2012 -]		

COMPONENTS

ILLUSTRATION



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000TXU067X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: DRIVE BELT: INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL FAN AND GENERATOR V BELT

- (a) Set the fan and generator V belt onto every part.

Text in Illustration

*1	Idler
*2	Generator
*3	Tensioner
*4	Water Pump
*5	Crankshaft
*6	A/C Compressor

- (b) While turning the belt tensioner clockwise, remove the 3 mm (0.118 in.) hexagon wrench.

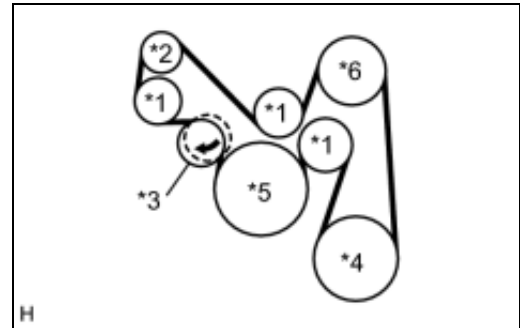
NOTICE:

Make sure that the fan and generator V belt is properly installed to each pulley.

- (c) Check that the fan and generator V belt fits properly in the ribbed grooves.

HINT:

Make sure to check by hand that the fan and generator V belt have not slipped out of the grooves on the bottom of the pulley.



2. INSTALL BELT GENERATOR COVER

- (a) Install the belt generator cover with the 2 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}

- (b) Engage the 2 wire harness clamps and install the wire harness to the belt generator cover.

3. INSTALL GENERATOR COVER

- (a) Install the generator cover with the 2 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}

4. INSTALL AIR CLEANER CAP WITH AIR CLEANER HOSE

(a) Install the air cleaner cap with air cleaner hose with the 3 bolts.

Torque:

6.0 N·m { 61 kgf·cm, 53in·lbf }

(b) Install the air cleaner cap with air cleaner hose with the 2 hose clamps.

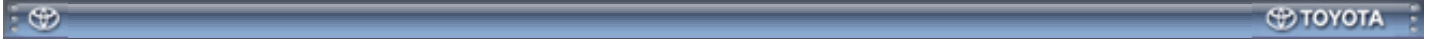
Torque:

2.0 N·m { 20 kgf·cm, 18in·lbf }

(c) Connect the No. 2 ventilation hose.

(d) Connect the mass air flow meter connector.

(e) Engage the wire harness clamp and install the wire harness to the air cleaner cap.



Last Modified: 4-14-2014	6.6 G	Doc ID: RM0000041LH006X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: DRIVE BELT: ON-VEHICLE INSPECTION; 2013 MY FR-S [03/2012 -]		

ON-VEHICLE INSPECTION

1. INSPECT FAN AND GENERATOR V BELT

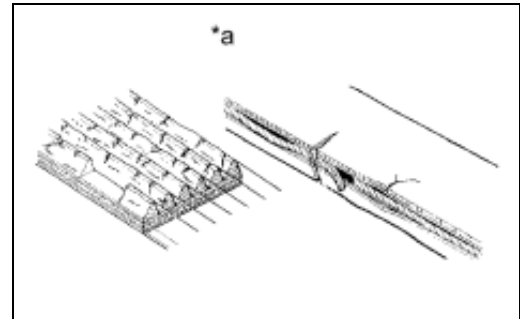
(a) Check the belt for wear, cracks or other signs of damage.

Text in Illustration

*a	INCORRECT
----	-----------

If any of the following defects is found, replace the fan and generator V belt.

- The belt is cracked.
- The belt is worn out to the extent that the cords are exposed.
- The belt has chunks missing from the ribs.



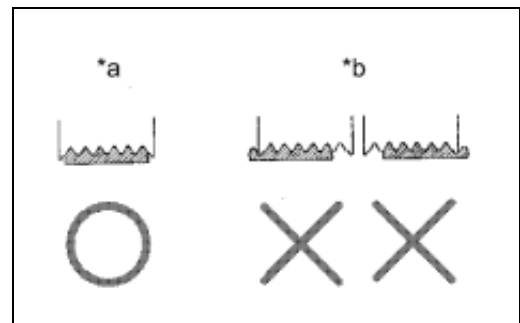
(b) Check that the belt fits properly in the ribbed grooves.

Text in Illustration

*a	CORRECT
*b	INCORRECT

HINT:

Check with your hand to confirm that the belt has not slipped out of the grooves on the bottom of the pulley. If it has slipped out, replace the fan and generator V belt. Install the new fan and generator V belt.

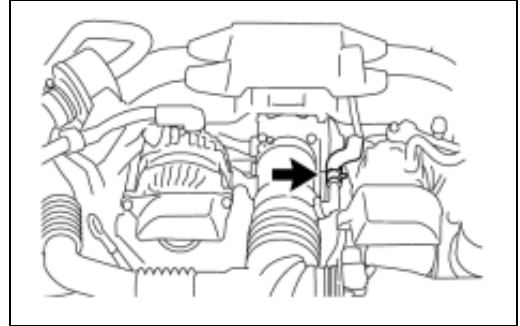


Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000TXV06BX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: DRIVE BELT: REMOVAL; 2013 MY FR-S [03/2012 -]		

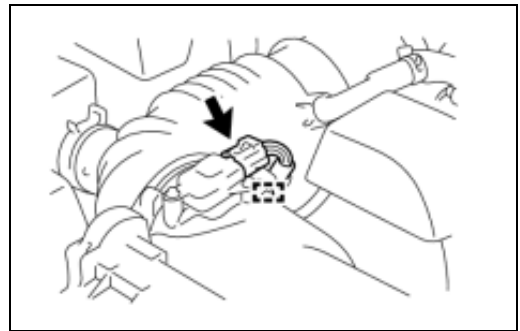
REMOVAL

1. REMOVE AIR CLEANER CAP WITH AIR CLEANER HOSE

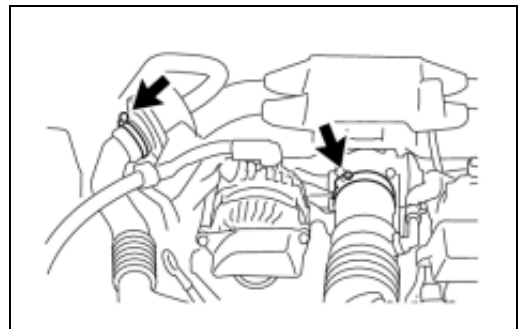
- (a) Loosen the hose clamp and disconnect the No. 2 ventilation hose.



- (b) Disconnect the mass air flow meter connector.

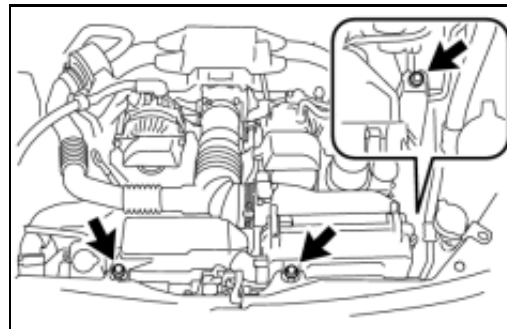


- (c) Disengage the clamp and separate the wire harness from the air cleaner cap.



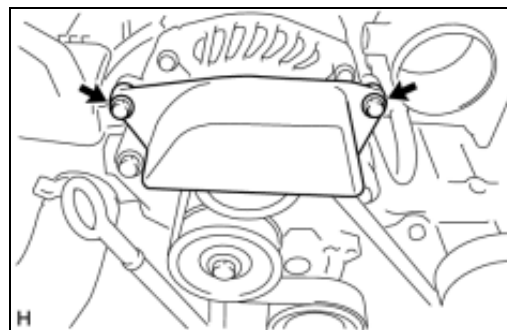
- (d) Loosen the 2 hose clamps.

- (e) Remove the 3 bolts and the air cleaner cap with air cleaner hose.



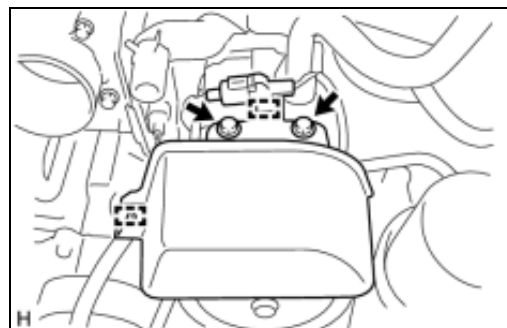
2. REMOVE GENERATOR COVER

- (a) Remove the 2 bolts and generator cover.



3. REMOVE BELT GENERATOR COVER

- (a) Disengage the 2 clamps and separate the wire harness from the belt generator cover.
 (b) Remove the 2 bolts and belt generator cover.



4. REMOVE FAN AND GENERATOR V BELT

- (a) While turning the belt tensioner clockwise, align the holes and insert a 3 mm (0.118 in.) hexagon wrench into the holes to hold the belt tensioner.

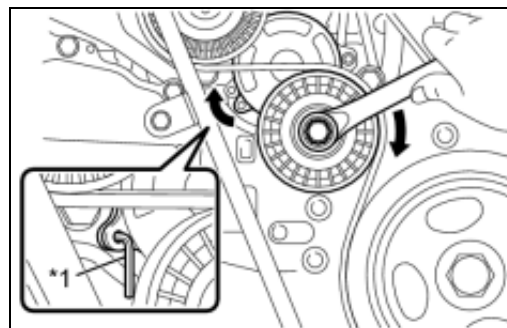
Text in Illustration

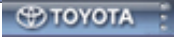
*1	Hexagon Wrench
----	----------------

HINT:

The pulley bolt for the belt tensioner has a left-hand thread.

- (b) Remove the fan and generator V belt from the belt tensioner.

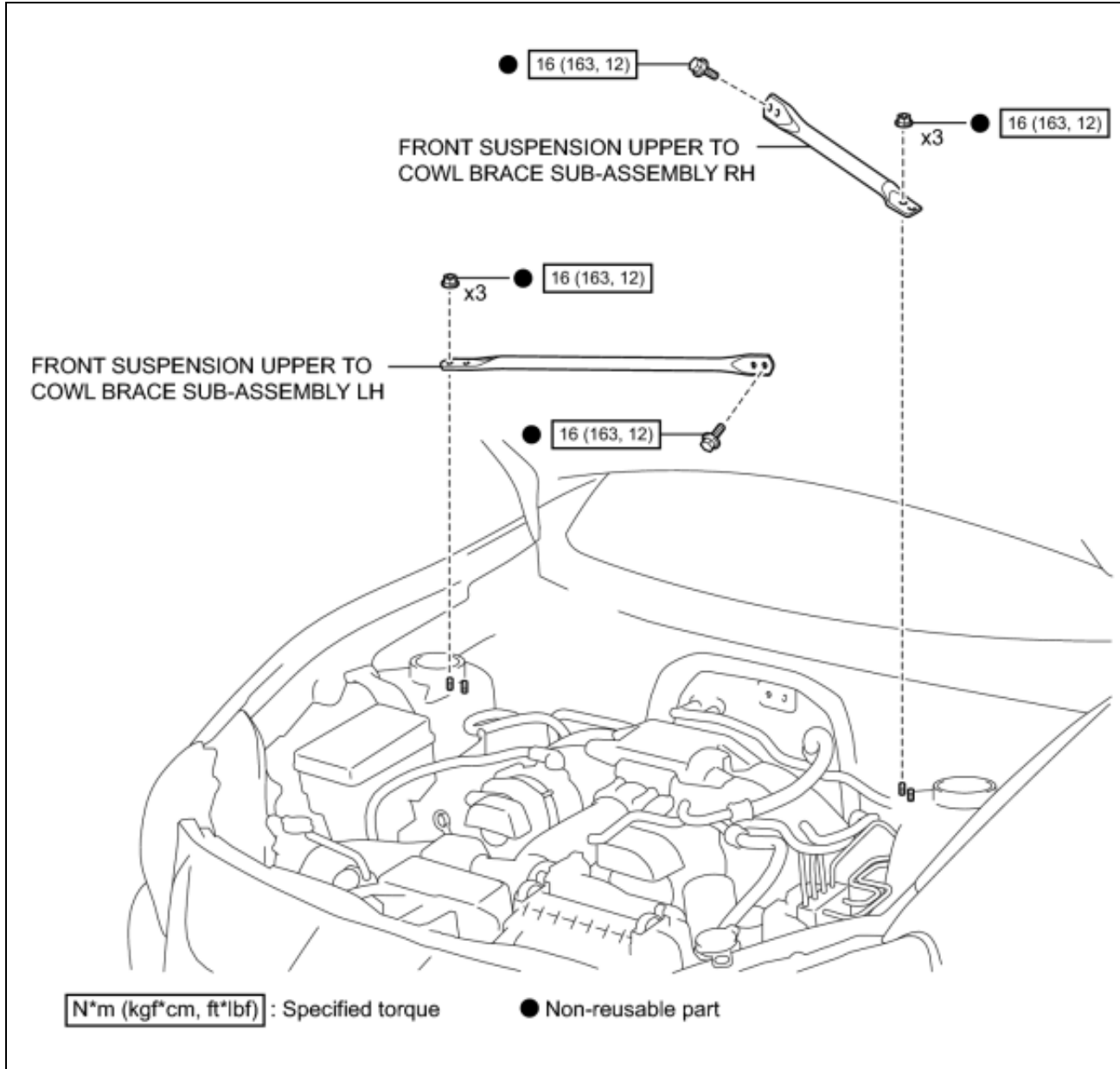




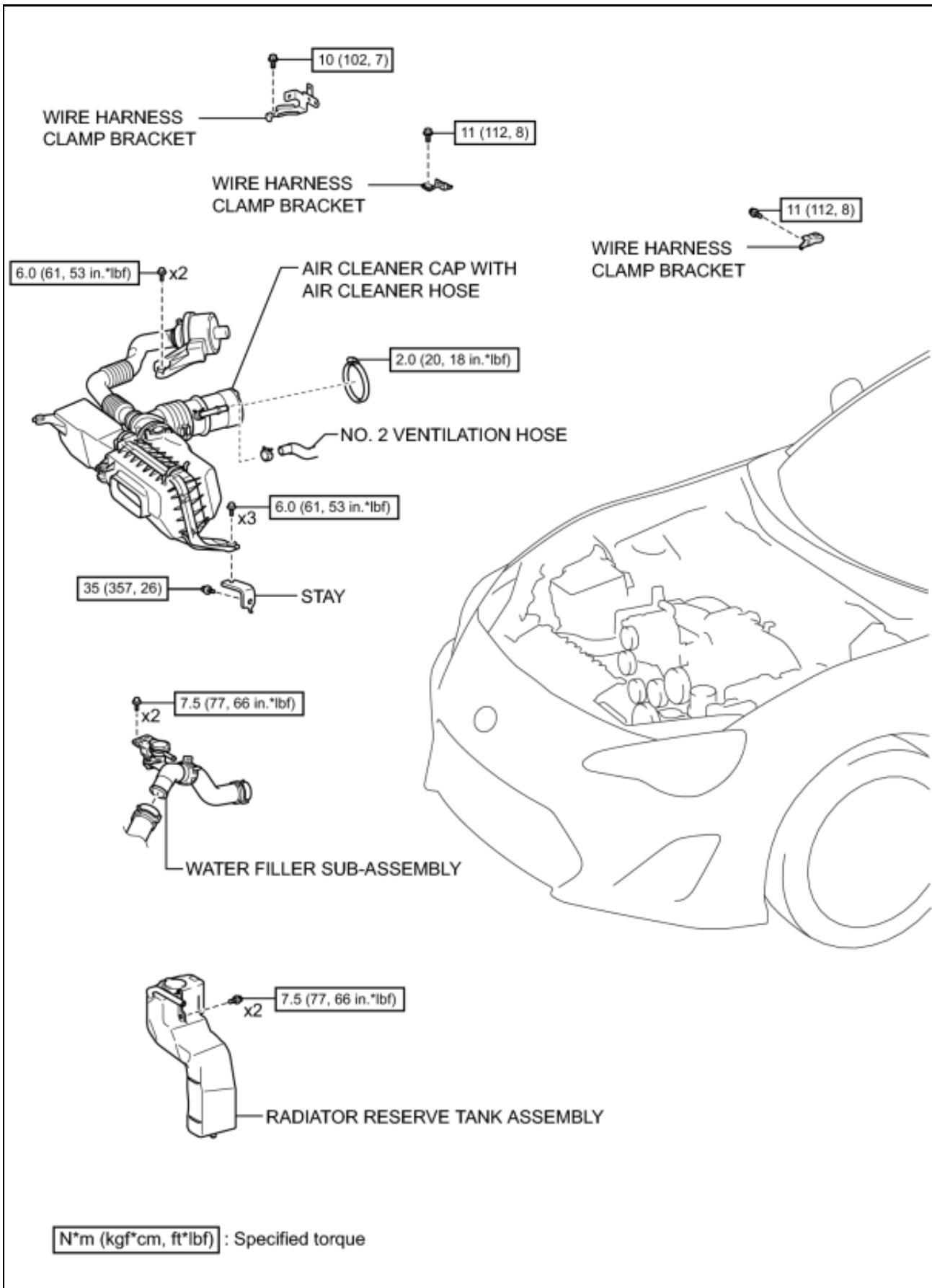
Last Modified: 4-14-2014	6.6 K	Doc ID: RM000003IC9006X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: ENGINE ASSEMBLY: COMPONENTS; 2013 MY FR-S [03/2012 -]		

COMPONENTS

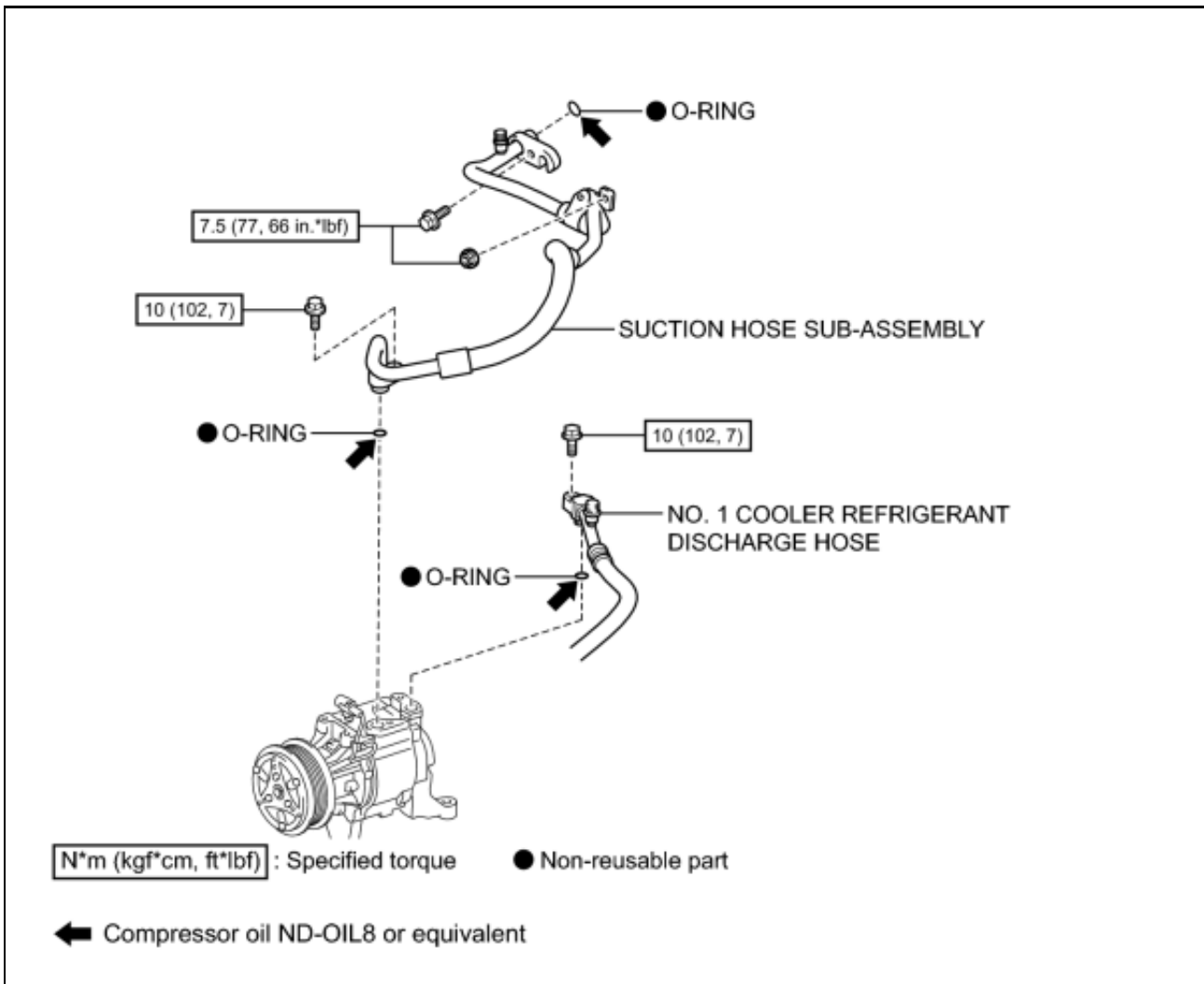
ILLUSTRATION



ILLUSTRATION

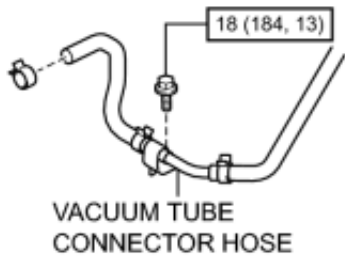


ILLUSTRATION

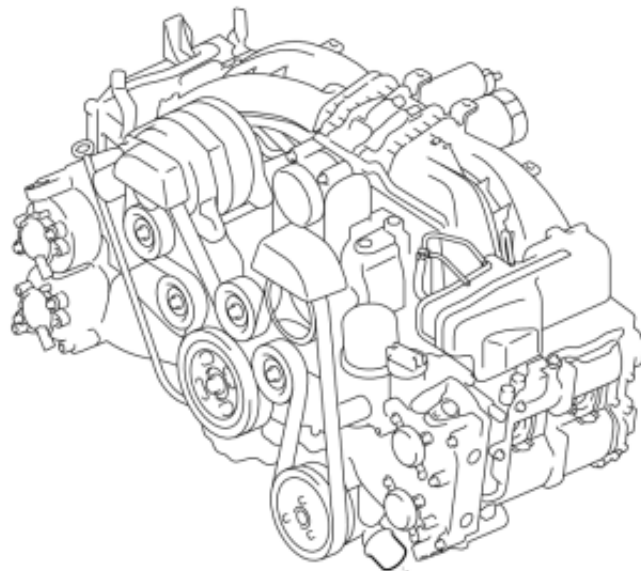
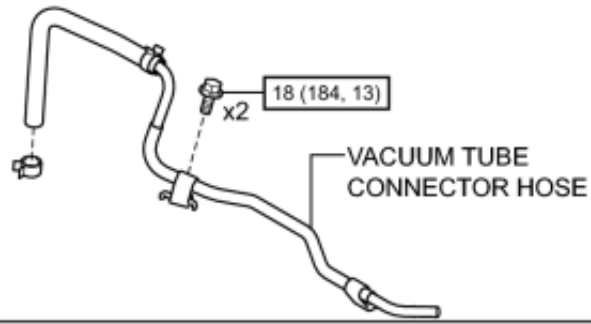


ILLUSTRATION

for Manual Transmission:

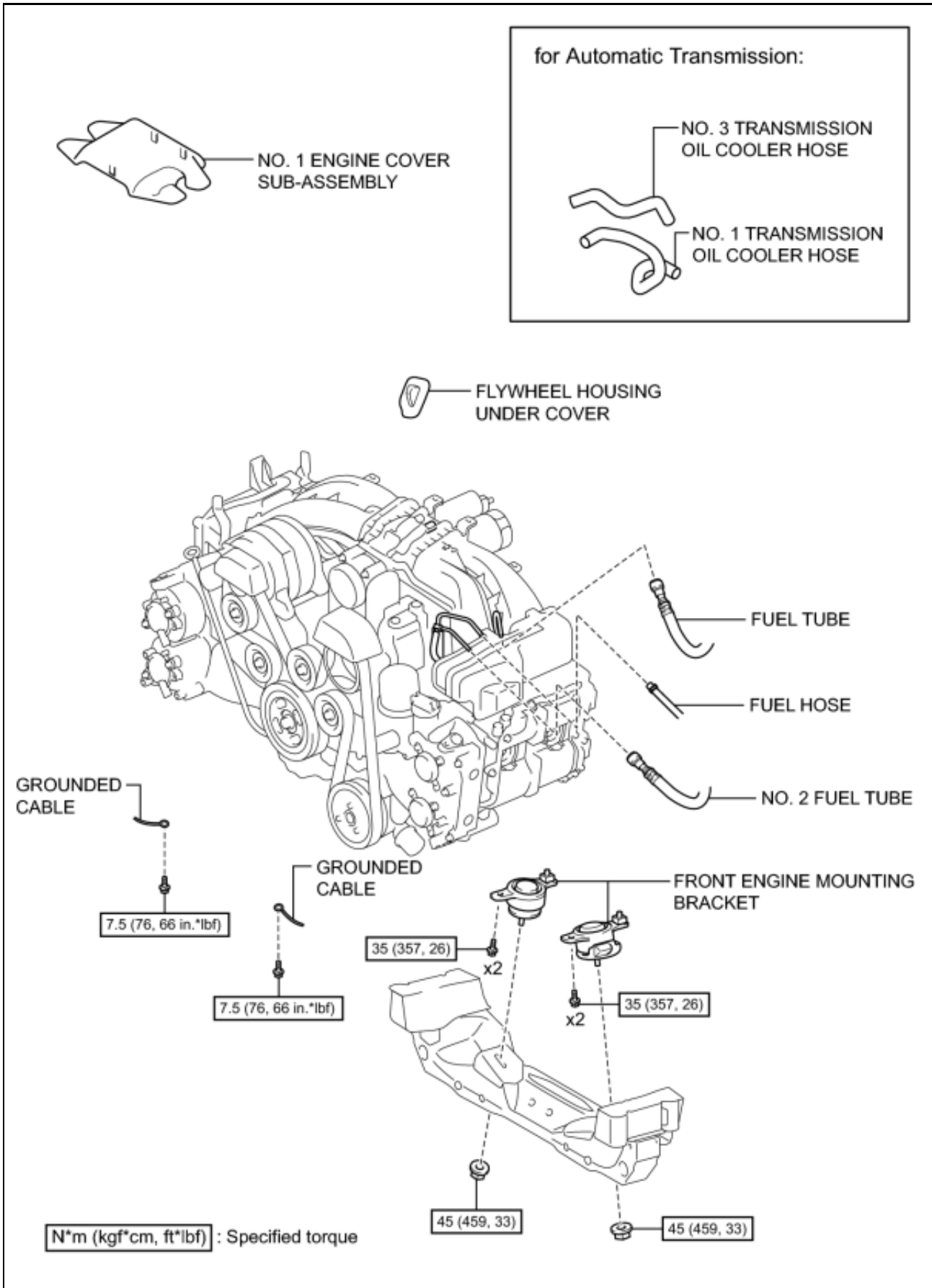


for Automatic Transmission:



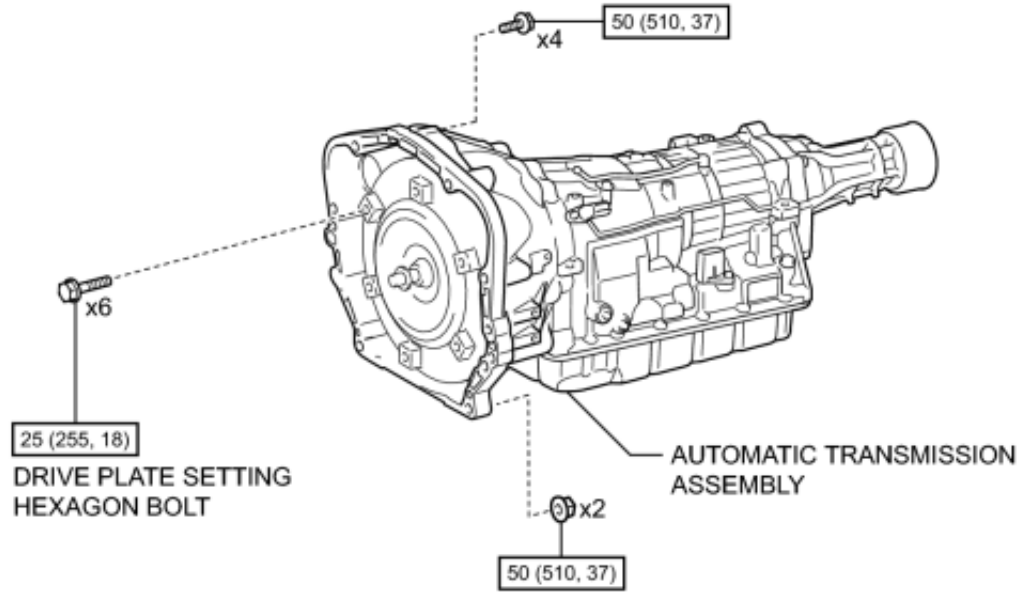
18 (184, 13) : Specified torque

ILLUSTRATION

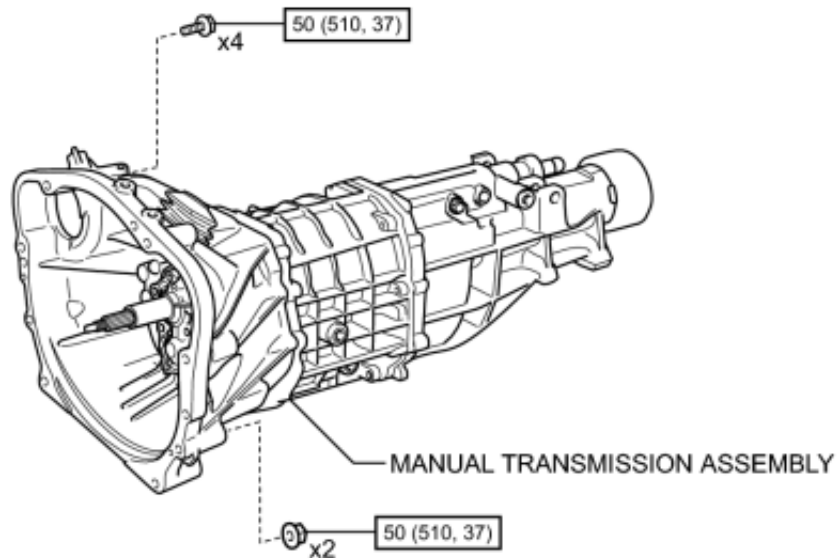


ILLUSTRATION

for Automatic Transmission:

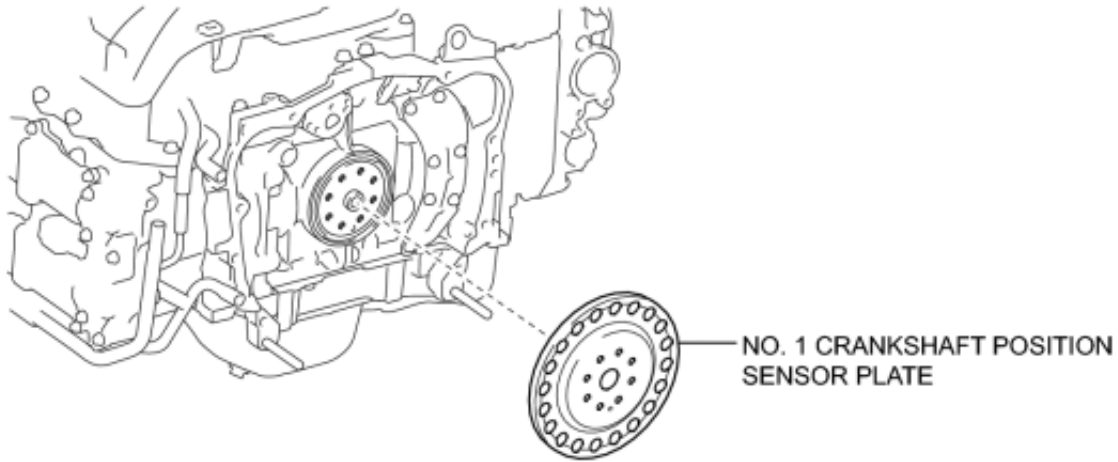


for Manual Transmission:

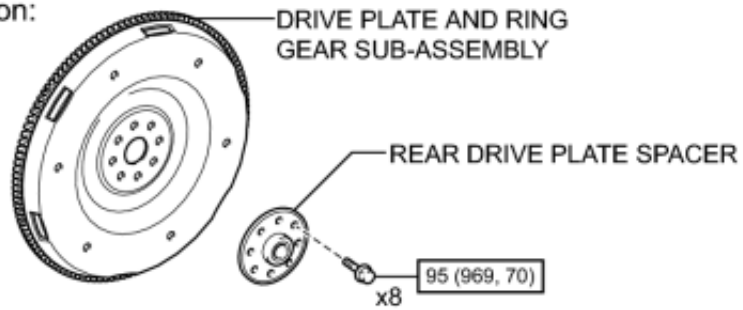


N*m (kgf*cm, ft*lb) : Specified torque

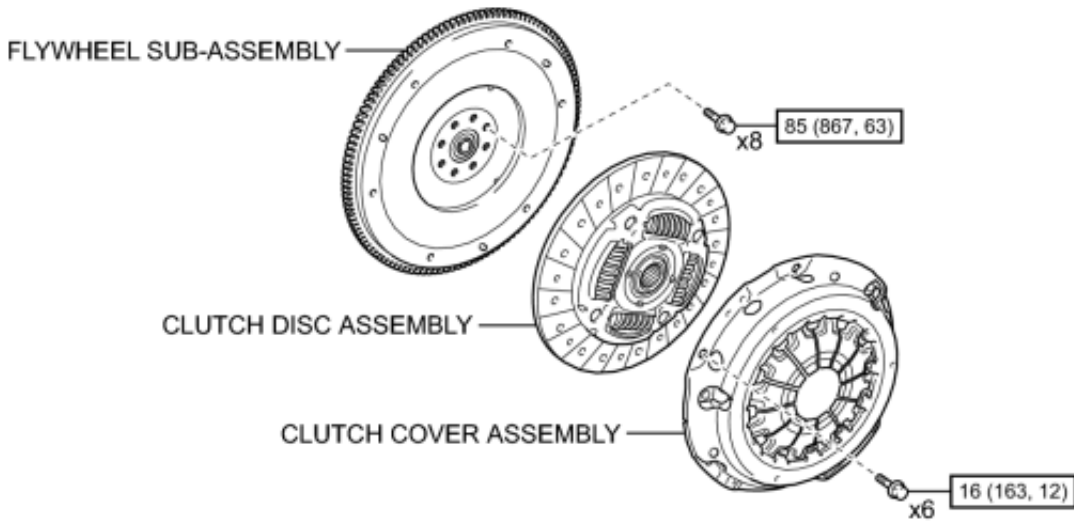
ILLUSTRATION



for Automatic Transmission:



for Manual Transmission:



N*m (kgf*cm, ft*lb) : Specified torque

Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000N8101BX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: ENGINE ASSEMBLY: INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL FRONT ENGINE MOUNTING BRACKET

(a) Install the 2 front engine mounting brackets with the 4 bolts.

Torque:

45 N·m {459 kgf·cm, 33ft·lbf}

2. REMOVE ENGINE STAND

(a) Attach an engine sling device and hang the engine with a chain block.

NOTICE:

With the exception of installing the engine assembly to an engine stand or removing the engine assembly from an engine stand, do not perform any work on the engine while it is suspended, as doing so is dangerous.

(b) Remove the engine stand from the engine.

3. INSTALL NO. 1 CRANKSHAFT POSITION SENSOR PLATE INFO

4. INSTALL FLYWHEEL SUB-ASSEMBLY (for Manual Transmission) INFO

5. INSTALL CLUTCH DISC ASSEMBLY (for Manual Transmission) INFO

6. INSTALL CLUTCH COVER ASSEMBLY (for Manual Transmission) INFO

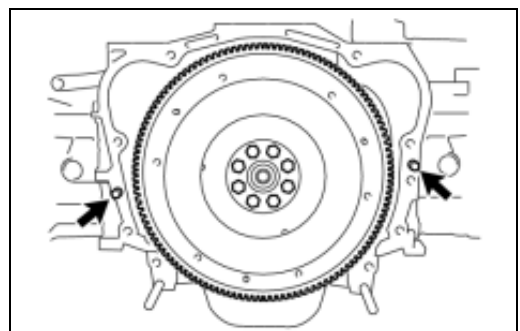
7. INSTALL DRIVE PLATE AND RING GEAR SUB-ASSEMBLY (for Automatic Transmission)

INFO

8. INSTALL ENGINE ASSEMBLY

(a) Confirm that 2 knock pins are on the transmission contact surface of the engine block before transmission installation.

(b) Keeping the engine assembly and the transmission assembly in a horizontal position, align the knock pins with each hole on the transmission assembly and install the bolt.



Torque:

50 N·m {510 kgf·cm, 37ft·lbf}

9. REMOVE ENGINE HANGER INFO

10. CONNECT FUEL HOSE

(a) Connect the fuel tube and No. 2 fuel tube to the fuel pipe INFO.

(b) Connect the No. 2 fuel vapor feed hose to the fuel pipe.

11. INSTALL DRIVE PLATE SETTING HEXAGON BOLT (for Automatic Transmission) INFO**12. INSTALL FLYWHEEL HOUSING UNDER COVER** INFO**13. INSTALL FRONT CROSS MEMBER SUB-ASSEMBLY**

- (a) Install the front suspension crossmember sub-assembly with the 2 nuts.

Torque:

45 N·m {459 kgf·cm, 33ft·lbf}

14. INSTALL MANUAL TRANSMISSION ASSEMBLY (for Manual Transmission)

- (a) Install the 3 bolts and 2nuts.

Torque:

50 N·m {510 kgf·cm, 37ft·lbf}

15. INSTALL AUTOMATIC TRANSMISSION ASSEMBLY (for Automatic Transmission)

- (a) Install the 3 bolts and 2nuts.

Torque:

50 N·m {510 kgf·cm, 37ft·lbf}

16. INSTALL FRONT STABILIZER BAR (for Automatic Transmission)INFO**17. INSTALL EARTH CABLE**

- (a) Install the 2 grounded cables with the 2 bolts.

Torque:

7.5 N·m {77 kgf·cm, 66in·lbf}

18. CONNECT RADIATOR OUTLET HOSE

- (a) Install the clamp and connect the radiator outlet hose.

19. CONNECT NO. 3 TRANSMISSION OIL COOLER HOSE (for Automatic Transmission)

- (a) Connect the No. 3 transmission oil cooler hose.

20. INSTALL STARTER ASSEMBLYINFO**21. CONNECT NO. 1 COOLER REFRIGERANT DISCHARGE HOSE** INFO**22. INSTALL SUCTION HOSE SUB-ASSEMBLY**

- (a) Remove the attached vinyl tape from the hose.
- (b) Apply sufficient compressor oil to a new O-ring and the fitting surface of the compressor assembly with pulley.

Compressor oil:

ND-OIL 8 or equivalent

- (c) Install the O-ring onto the suction hose sub-assembly.
- (d) Install the suction hose sub-assembly onto the compressor assembly with pulley with the bolt.

Torque:**10 N·m {102 kgf·cm, 7ft·lbf}**

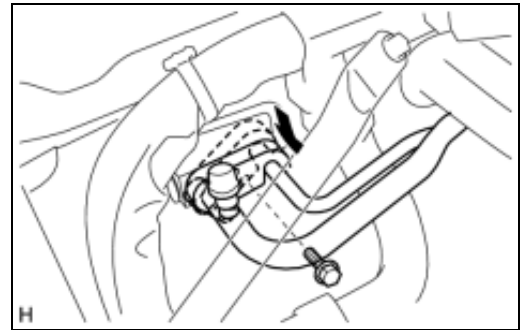
- (e) Remove the vinyl tape from the pipe.
- (f) Sufficiently apply compressor oil to a new O-ring and the fitting surface of the suction pipe sub-assembly.

Compressor oil:

ND-OIL 8 or equivalent

- (g) Connect the O-ring to the suction pipe sub-assembly.
- (h) Connect the suction pipe sub-assembly.
- (i) Rotate the hook connector in the direction indicated by the arrow in the illustration.

- (j) Insert the pipe joint into the cooler expansion valve securely and tighten the bolt.

Torque:**7.5 N·m {77 kgf·cm, 66in·lbf}**

- (k) Install the suction pipe sub-assembly with the nut.

Torque:**10 N·m {102 kgf·cm, 7ft·lbf}****23. INSTALL NO. 1 TRANSMISSION OIL COOLER HOSE (for Automatic Transmission)**

- (a) Connect the No. 1 transmission oil cooler hose.

24. CONNECT HEATER WATER HOSE

- (a) Install the 2 hose clamps and connect 2 heater water hoses.

25. INSTALL EXHAUST MANIFOLD**INFO****26. CONNECT VACUUM TUBE CONNECTOR HOSE (for Manual Transmission)**

- (a) Connect the vacuum tube connector hose with the bolt.

Torque:**18 N·m {184 kgf·cm, 13ft·lbf}**

- (b) Connect the vacuum tube connector hose.

27. CONNECT VACUUM TUBE CONNECTOR HOSE (for Automatic Transmission)

- (a) Connect the vacuum tube connector hose with the 2 bolts.

Torque:**18 N·m {184 kgf·cm, 13ft·lbf}**

- (b) Connect the vacuum tube connector hose.

28. INSTALL NO. 1 ENGINE COVER SUB-ASSEMBLY INFO**29. CONNECT ENGINE WIRE**

- (a) Connect the generator connector and connect the clamp.
- (b) Connect the generator wire with the nut.

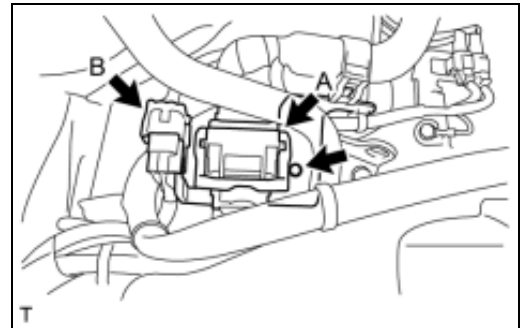
Torque:**16 N·m {163 kgf·cm, 12ft·lbf}**

- (c) Install the terminal cap.
- (d) Connect the 5 wire harness clamps.
- (e) Install the 2 wire harness clamp brackets with the 2 bolts.

Torque:**11 N·m {112 kgf·cm, 8ft·lbf}**

- (f) Connect the 2 wire harness clamps to the 2 wire harness clamp brackets.
- (g) Connect the wire harness clamp to the No. 2 engine hanger.

- (h) Connect the connector (B).

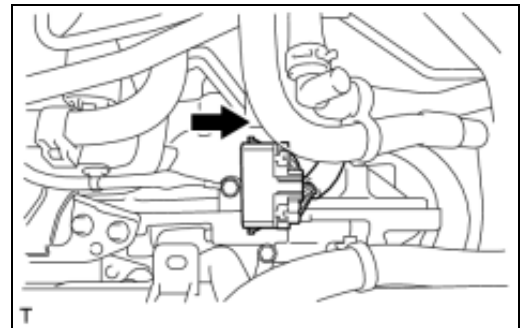


- (i) Connect the wire harness connector (A) and securely lock the connector.
- (j) Install the wire harness clamp bracket to the No. 2 engine hanger with the bolt.

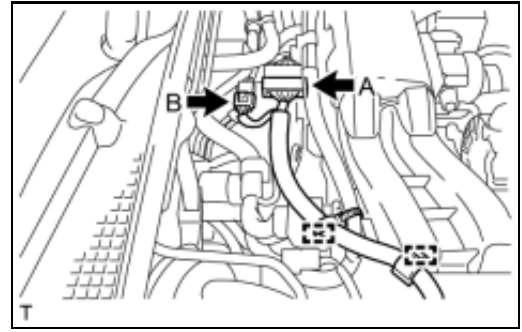
Torque:**10 N·m {102 kgf·cm, 7ft·lbf}**

- (k) for Automatic Transmission:

- (1) Slide the connector in the direction shown in the diagram, and connect the wire harness.



(2) Connect the 2 wire harness clamps.



(3) Connect the wire harness connector (A) and securely lock the connector.

(4) Connect the connector (B).

30. INSTALL INJECTOR DRIVER INFO

31. INSTALL WATER FILLER SUB-ASSEMBLY

(a) Install the 2 clamps and connect the water filler sub-assembly.

(b) Install the water filler sub-assembly with 2 bolts.

Torque:

7.5 N·m {77 kgf·cm, 66in·lbf}

32. INSTALL RADIATOR RESERVE TANK ASSEMBLY INFO

33. INSTALL AIR CLEANER CAP WITH AIR CLEANER HOSE

(a) Install the stay with bolt to the body.

Torque:

35 N·m {357 kgf·cm, 26ft·lbf}

(b) Install the air cleaner assembly with hose with the 3 bolts.

Torque:

6.0 N·m {61 kgf·cm, 53in·lbf}

(c) Install the hose clamp.

Torque:

2.0 N·m {20 kgf·cm, 18in·lbf}

(d) Connect the clamp and wire harness to the air cleaner cap.

(e) Connect the mass air flow meter connector.

(f) Connect the No. 2 ventilation hose.

(g) Install the 2 bolts and the chamber duct with chamber.

Torque:

6.0 N·m {61 kgf·cm, 53in·lbf}

(h) Connect the hose.

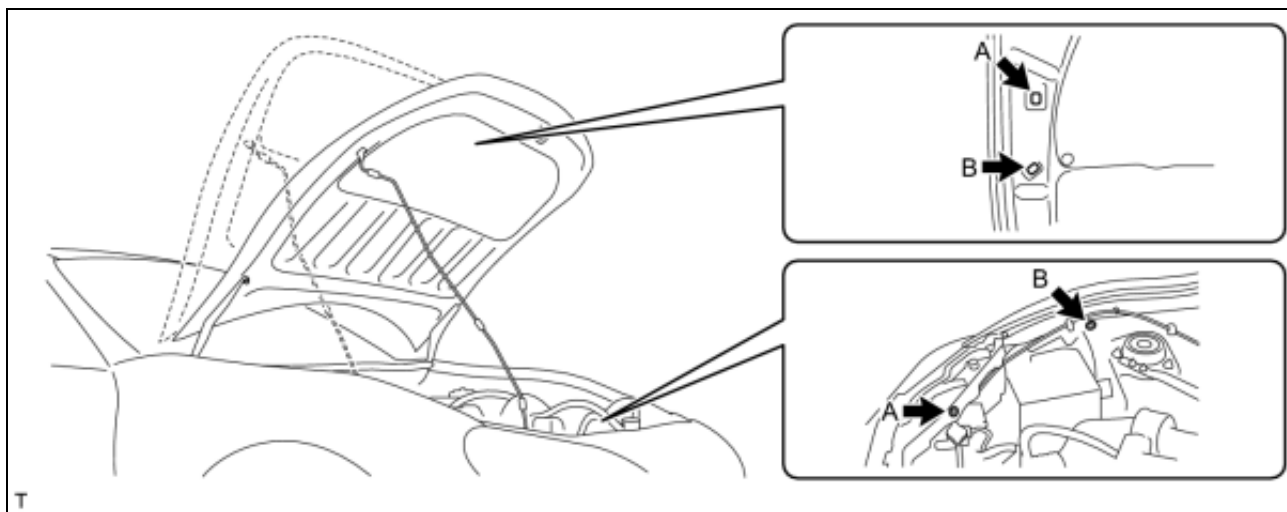
34. INSTALL FRONT SUSPENSION UPPER TO COWL BRACE SUB-ASSEMBLY LH INFO

35. INSTALL FRONT SUSPENSION UPPER TO COWL BRACE SUB-ASSEMBLY RH INFO

36. ADD ENGINE OIL INFO

37. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL INFO**38. ADD ENGINE COOLANT** INFO**39. CHARGE WITH REFRIGERANT**INFO**40. CHECK FOR ENGINE COOLANT LEAK** INFO**41. CHECK FOR ENGINE OIL LEAK** INFO**42. CHECK FOR FUEL LEAK** INFO**43. CHECK FOR EXHAUST GAS LEAK** INFO**44. INSPECT FOR REFRIGERANT LEAK**INFO**45. INSPECT THROTTLE WITH MOTOR BODY ASSEMBLY** INFO**46. INSPECT IGNITION TIMING** INFO**47. INSPECT ENGINE IDLE SPEED** INFO**48. INSPECT CO/HC** INFO**49. INSPECT ENGINE COOLANT LEVEL** INFO**50. INSPECT ENGINE OIL LEVEL** INFO**51. SET HOOD SUB-ASSEMBLY**

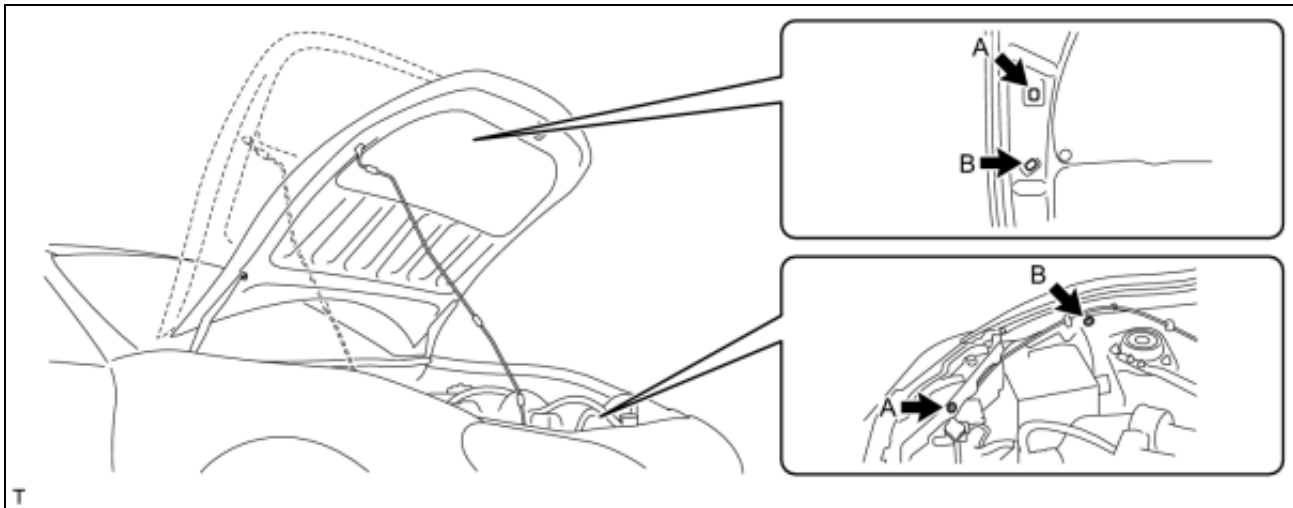
(a) Change the front hood stay position from B to A, and store the front hood stay.



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000N82013X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: ENGINE ASSEMBLY: REMOVAL; 2013 MY FR-S [03/2012 -]		

REMOVAL

1. SET HOOD SUB-ASSEMBLY



- (a) Change the front hood stay position from A to B, and support the hood sub-assembly at position B.

2. RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM

INFO

3. DISCHARGE FUEL SYSTEM PRESSURE

INFO

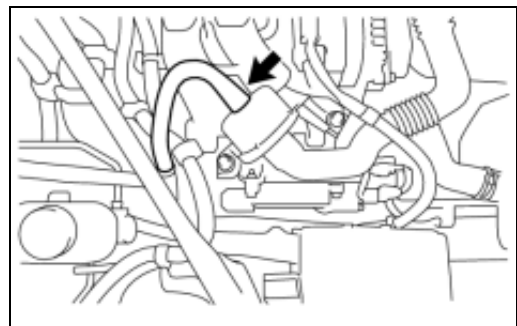
4. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

5. REMOVE FRONT SUSPENSION UPPER TO COWL BRACE SUB-ASSEMBLY LH INFO

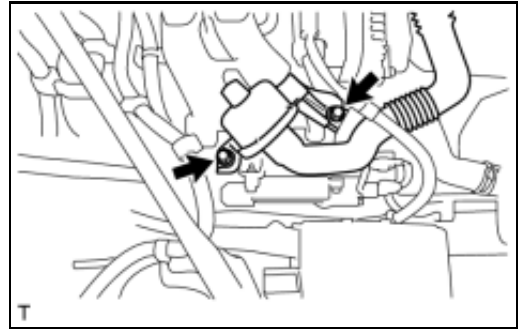
6. REMOVE FRONT SUSPENSION UPPER TO COWL BRACE SUB-ASSEMBLY RH INFO

7. REMOVE AIR CLEANER CAP WITH AIR CLEANER HOSE

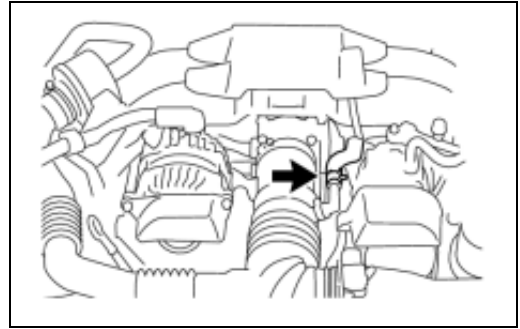
- (a) Disconnect the hose.



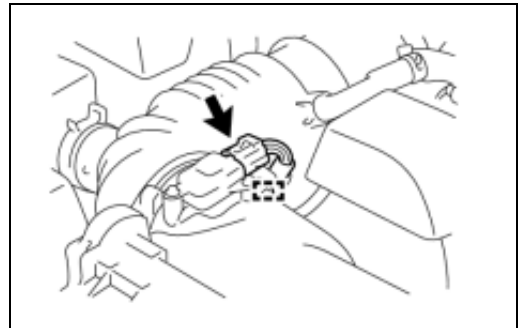
(b) Remove the 2 bolts and disconnect the chamber.



(c) Loosen the hose clamp and disconnect the No. 2 ventilation hose.

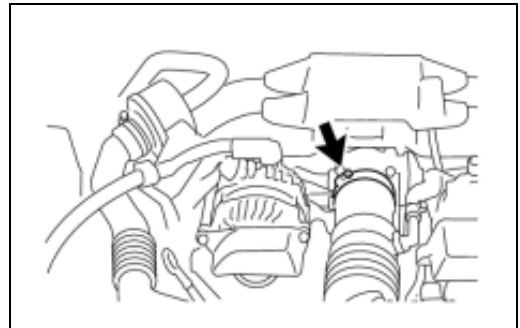


(d) Disconnect the mass air flow meter connector.

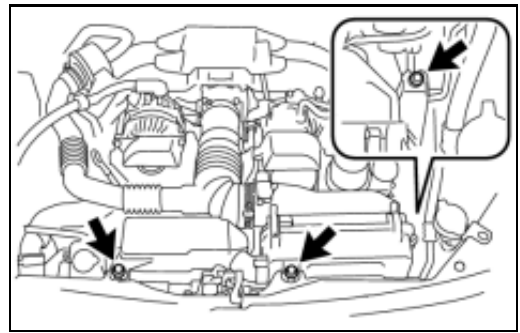


(e) Disengage the clamp and separate the wire harness from the air cleaner cap.

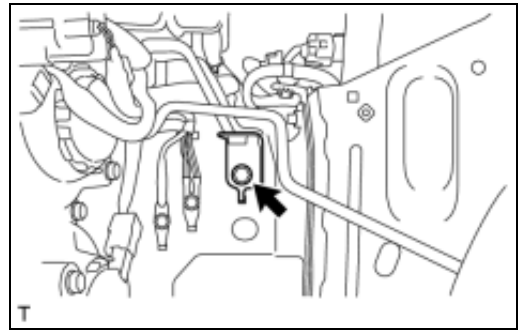
(f) Loosen the hose clamp.



- (g) Remove the 3 bolts and air cleaner cap with air cleaner hose.



- (h) Remove the bolt and stay from the body.



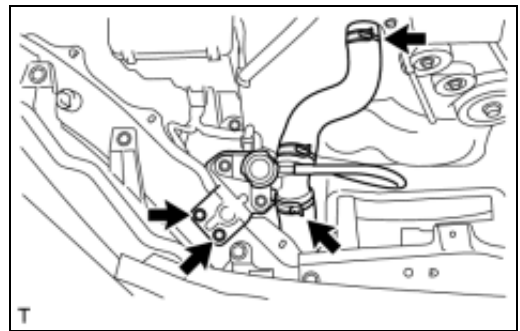
8. DRAIN ENGINE OIL INFO

9. DRAIN ENGINE COOLANT INFO

10. REMOVE RADIATOR RESERVE TANK ASSEMBLY INFO

11. REMOVE WATER FILLER SUB-ASSEMBLY

- (a) Remove the 2 bolts and disconnect the water filler sub-assembly.
- (b) Remove the 2 clamps and water filler sub-assembly.



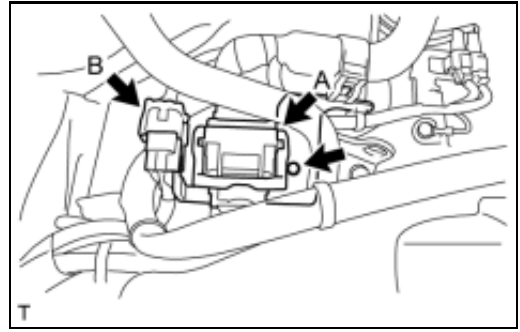
12. REMOVE INJECTOR DRIVER INFO

13. DISCONNECT ENGINE WIRE

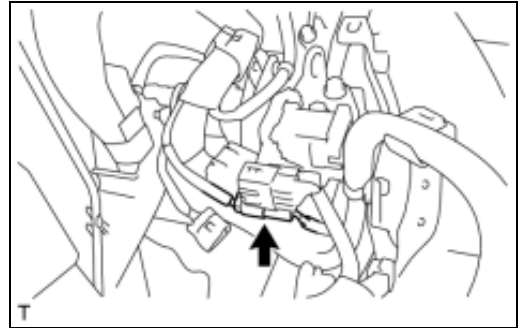
HINT:

Fix the disconnected harness components with tape to keep them out of the way.

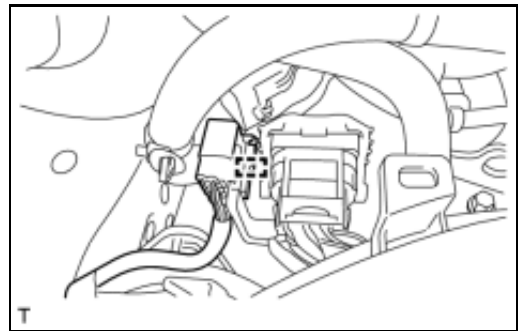
- (a) Remove the bolt and wire harness clamp bracket from the No. 2 engine hanger.



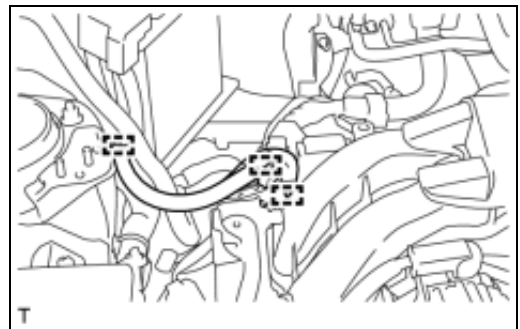
- (b) Release the lock of connector (A) and disconnect the connector.
 (c) Disconnect the connector (B).



- (d) Disconnect the connector.



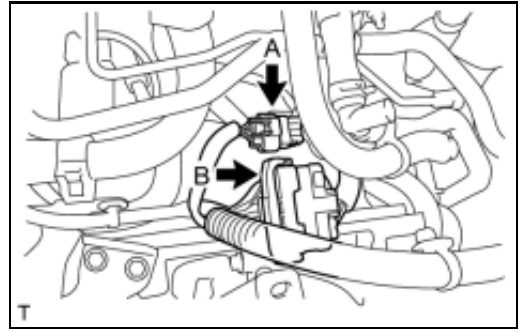
- (e) Disconnect the wire harness clamp and wire harness from the No. 2 engine hanger.



- (f) Disconnect the 3 wire harness clamps.

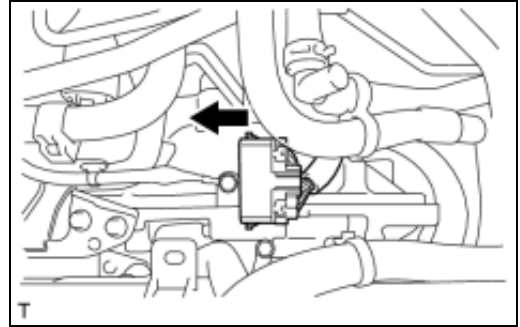
- (g) for Automatic Transmission:

- (1) Release the lock of connector (A) and disconnect the connector.

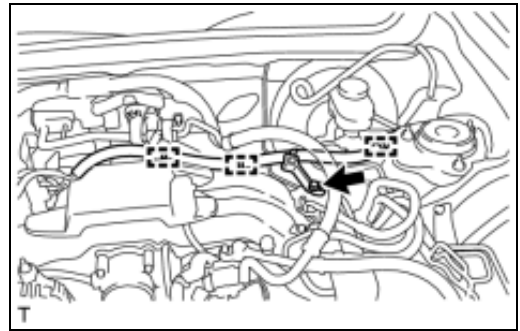


- (2) Disconnect the connector (B).

- (3) Slide the connector in the direction shown in the illustration, and disconnect the wire harness.

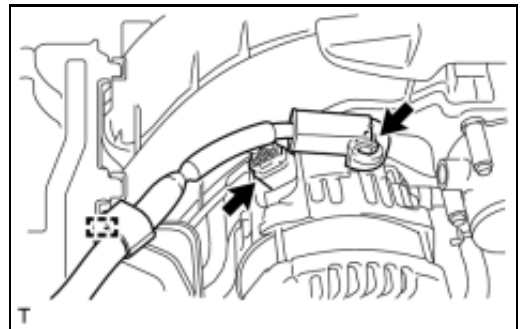


- (4) Disconnect the 3 wire harness clamps.



- (5) Remove the bolt and wire harness clamp bracket.

- (h) Disconnect the terminal cap.

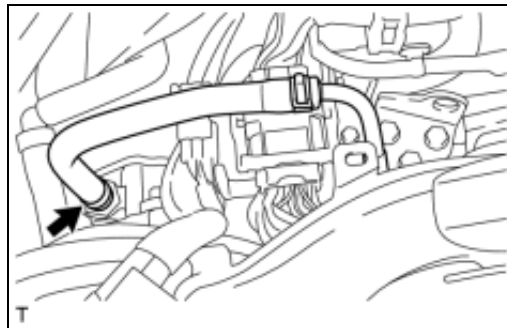


- (i) Remove the nut and disconnect the wire harness from terminal B.
 (j) Disconnect the generator connector and disengage the clamp.

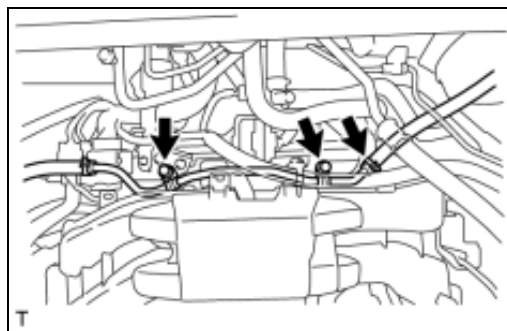
14. REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY INFO

15. DISCONNECT VACUUM TUBE CONNECTOR HOSE (for Automatic Transmission)

- (a) Loosen the hose clamp and disconnect the vacuum tube connector hose.



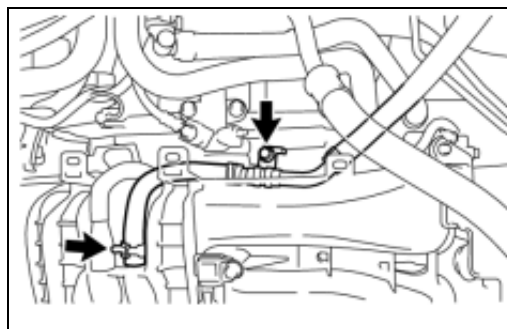
- (b) Remove the 2 bolts and disconnect the vacuum tube connector hose.



- (c) Loosen the hose clamp and remove the vacuum tube connector hose.

16. DISCONNECT VACUUM TUBE CONNECTOR HOSE (for Manual Transmission)

- (a) Loosen the hose clamp and disconnect the vacuum tube connector hose from the intake manifold.



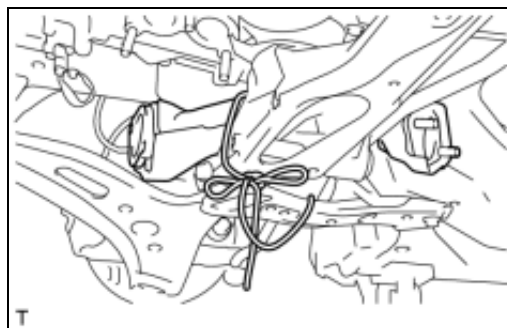
- (b) Remove the bolt and disconnect the vacuum tube connector hose.

17. REMOVE EXHAUST MANIFOLD

INFO

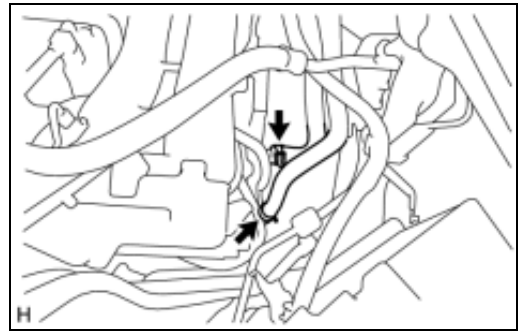
18. FIX FRONT EXHAUST PIPE SUB-ASSEMBLY (for Manual Transmission)

- (a) Tie the front exhaust pipe sub-assembly to the front cross member sub-assembly with rope.



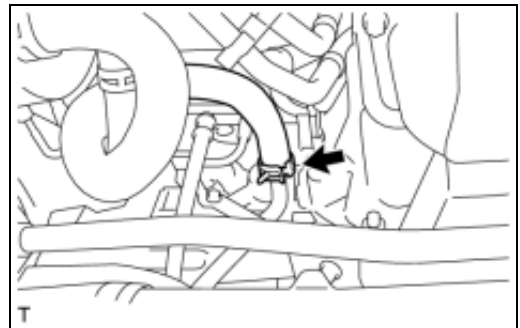
19. DISCONNECT HEATER WATER HOSE

- (a) Loosen the 2 hose clamps and disconnect the 2 heater water hoses.



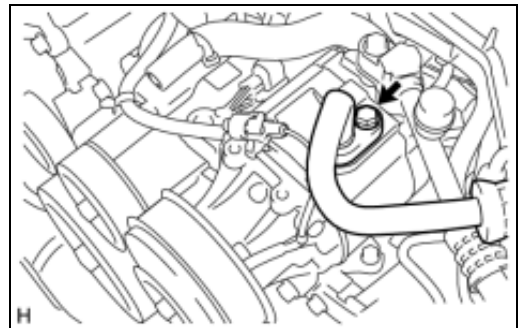
20. DISCONNECT NO. 1 TRANSMISSION OIL COOLER HOSE (for Automatic Transmission)

- (a) Loosen the clip and disconnect the No. 1 transmission oil cooler hose.



21. REMOVE SUCTION HOSE SUB-ASSEMBLY

- (a) Remove the bolt and disconnect the suction hose sub-assembly from the compressor assembly with pulley.

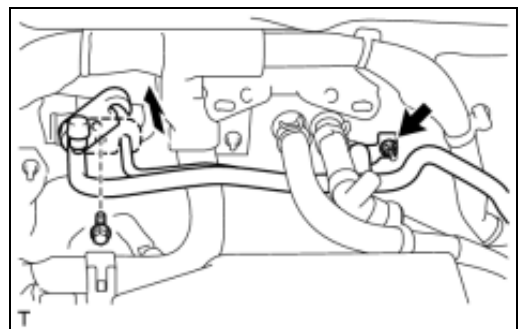


- (b) Remove the O-ring from the discharge hose sub-assembly.

NOTICE:

Seal the openings of the disconnected parts using vinyl tape to prevent entry of moisture and foreign matter.

- (c) Remove the bolt and slide the hook connector.



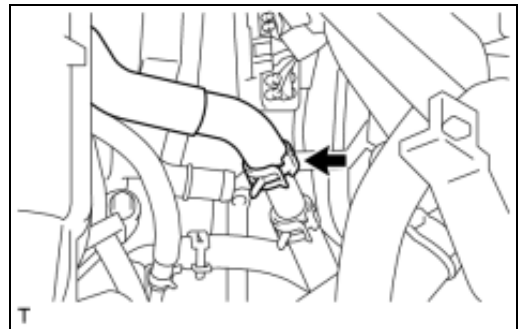
- (d) Remove the nut and suction pipe sub-assembly.
- (e) Remove the O-ring from the suction pipe sub-assembly.

NOTICE:

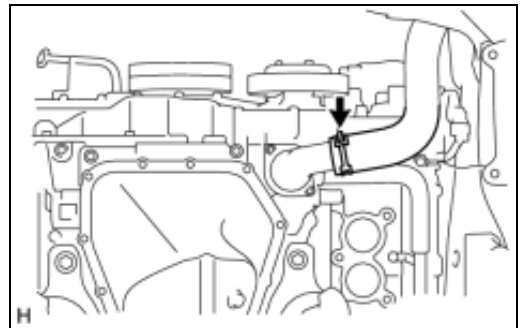
Seal the openings of the disconnected parts using vinyl tape to prevent entry of moisture and foreign matter.

22. DISCONNECT NO. 1 COOLER REFRIGERANT DISCHARGE HOSE INFO**23. REMOVE STARTER ASSEMBLY**INFO**24. DISCONNECT NO. 3 TRANSMISSION OIL COOLER HOSE (for Automatic Transmission)**

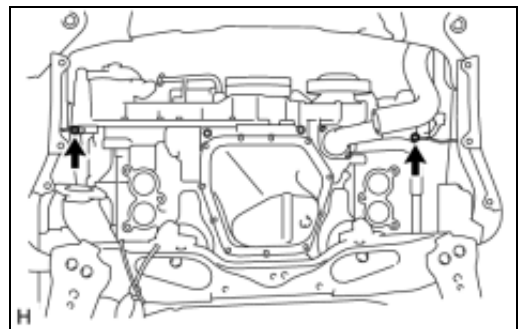
- (a) Loosen the clip and disconnect the No. 3 transmission oil cooler hose.

**25. DISCONNECT RADIATOR OUTLET HOSE**

- (a) Loosen the clip and disconnect the radiator outlet hose.

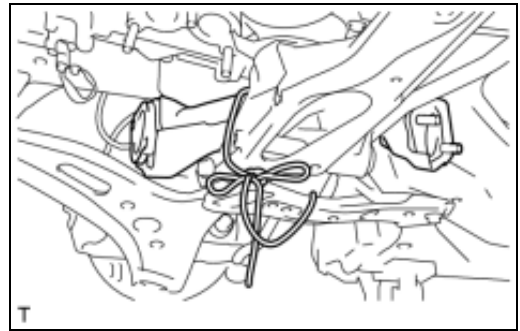
**26. DISCONNECT GROUNDED CABLE**

- (a) Remove the 2 bolts and disconnect the 2 grounded cables.

**27. REMOVE FRONT STABILIZER BAR (for Automatic Transmission)**INFO

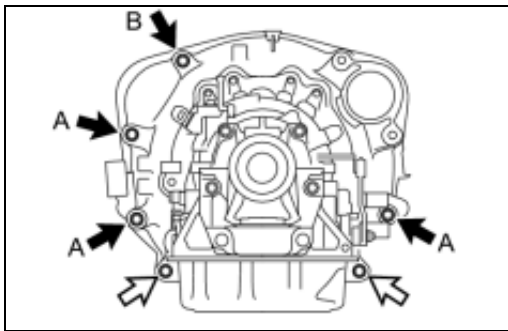
28. FIX FRONT EXHAUST PIPE ASSEMBLY (for Automatic Transmission)

- (a) Tie the front exhaust pipe assembly to the front cross member sub-assembly with rope.



29. SEPARATE AUTOMATIC TRANSMISSION ASSEMBLY (for Automatic Transmission)

- (a) Remove the 3 bolts and 2 nuts.



Text in Illustration

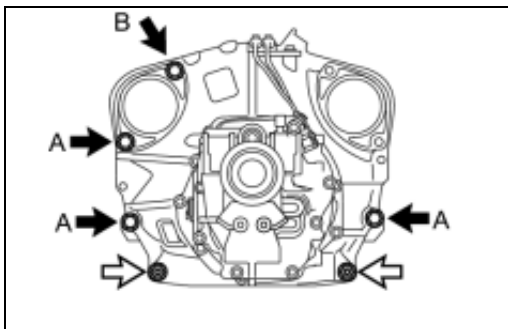
	Bolt
	Nut

NOTICE:

In order to prevent dropping, do not remove bolt B.

30. REMOVE MANUAL TRANSMISSION ASSEMBLY (for Manual Transmission)

- (a) Remove the 3 bolts and 2 nuts.



Text in Illustration

	Bolt
--	------



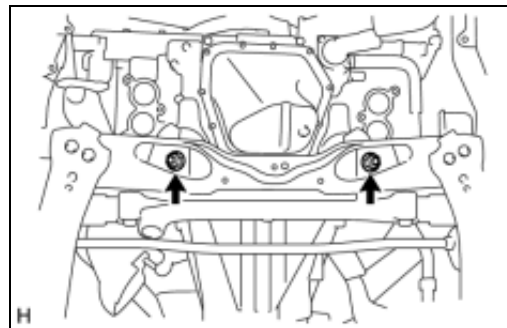
Nut

NOTICE:

In order to prevent dropping, do not remove bolt B.

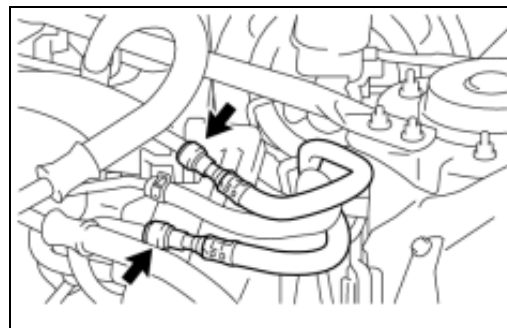
31. SEPARATE FRONT CROSS MEMBER SUB-ASSEMBLY

- (a) Remove the 2 nuts from the front cross member sub-assembly.

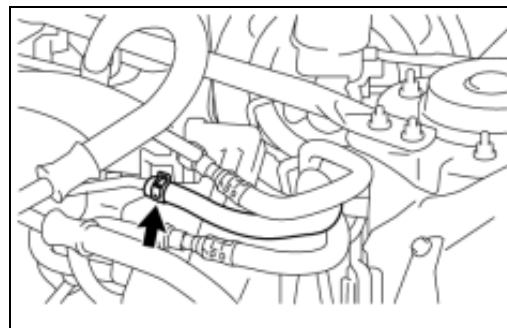
**32. REMOVE FLYWHEEL HOUSING UNDER COVER** INFO**33. REMOVE DRIVE PLATE SETTING HEXAGON BOLT (for Automatic Transmission)** INFO**34. SEPARATE FUEL HOSE**

- (a) Using SST, disconnect the fuel tube and No. 2 fuel tube from the fuel pipe INFO.

SST: SU003-03936



- (b) Remove the clamp and disconnect the No. 2 fuel vapor feed hose from the fuel pipe.

**35. INSTALL ENGINE HANGER**

- (a) Install the engine hanger with the bolt, as shown in the illustration.

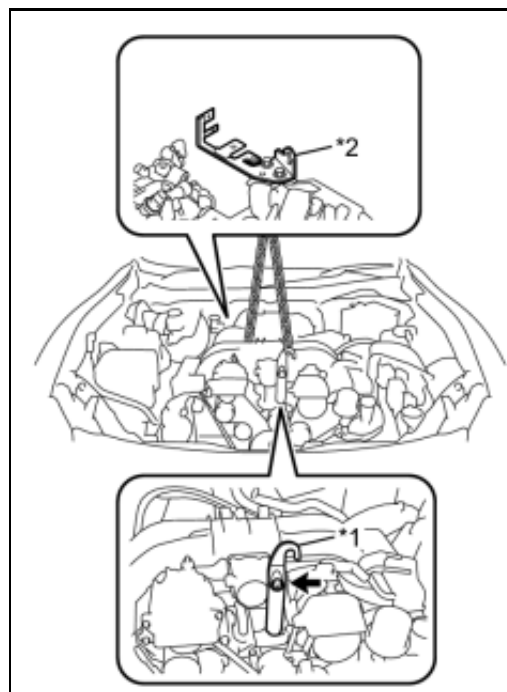
Text in Illustration

*1	No. 1 Engine Hanger
*2	No. 2 Engine Hanger

Torque:

43 N·m {439 kgf·cm, 32ft·lbf}

No. 1 Engine Hanger	12281-38030
Bolt	90119-14120



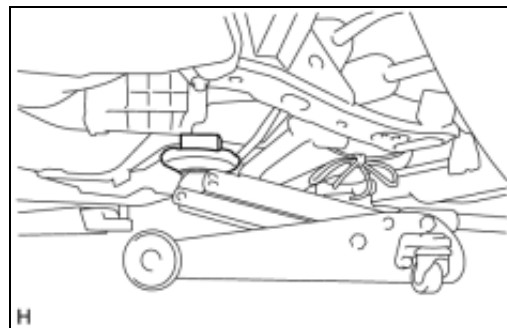
- (b) Use an engine sling device and a mini crane to hold the engine.

36. SUPPORT TRANSMISSION ASSEMBLY

- (a) Support the transmission assembly clutch housing with a jack.

NOTICE:

Support the transmission assembly until the installation of the engine assembly is completed.

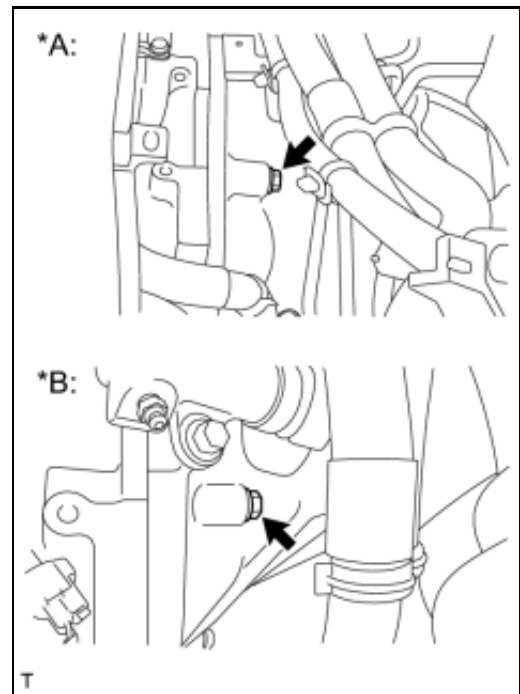


37. REMOVE ENGINE ASSEMBLY

- (a) Remove the bolt from the transmission assembly.

Text in Illustration

*A	for Automatic Transmission
*B	for Manual Transmission



(b) Hoist the engine assembly up with an engine sling device and a mini crane.

38. REMOVE DRIVE PLATE AND RING GEAR SUB-ASSEMBLY (for Automatic Transmission)

INFO

39. REMOVE CLUTCH COVER ASSEMBLY (for Manual Transmission)

INFO

40. REMOVE CLUTCH DISC ASSEMBLY (for Manual Transmission)

INFO

41. REMOVE FLYWHEEL SUB-ASSEMBLY (for Manual Transmission)

INFO

42. REMOVE NO. 1 CRANKSHAFT POSITION SENSOR PLATE

INFO

43. INSTALL ENGINE STAND

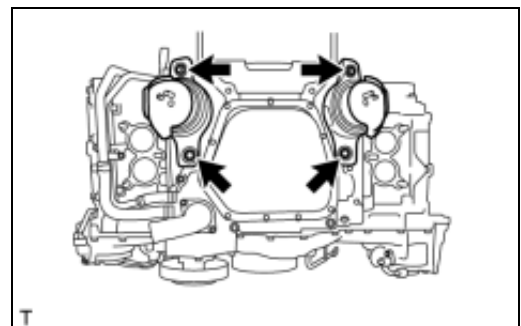
(a) Set the engine on an engine stand.

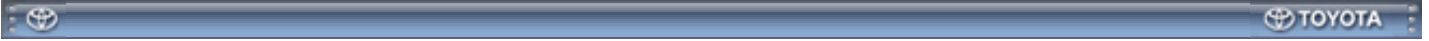
NOTICE:

With the exception of installing the engine assembly to an engine stand or removing the engine assembly from an engine stand, do not perform any work on the engine while it is suspended, as doing so is dangerous.

44. REMOVE FRONT ENGINE MOUNTING BRACKET

(a) Remove the 4 bolts and 2 front engine mounting brackets.

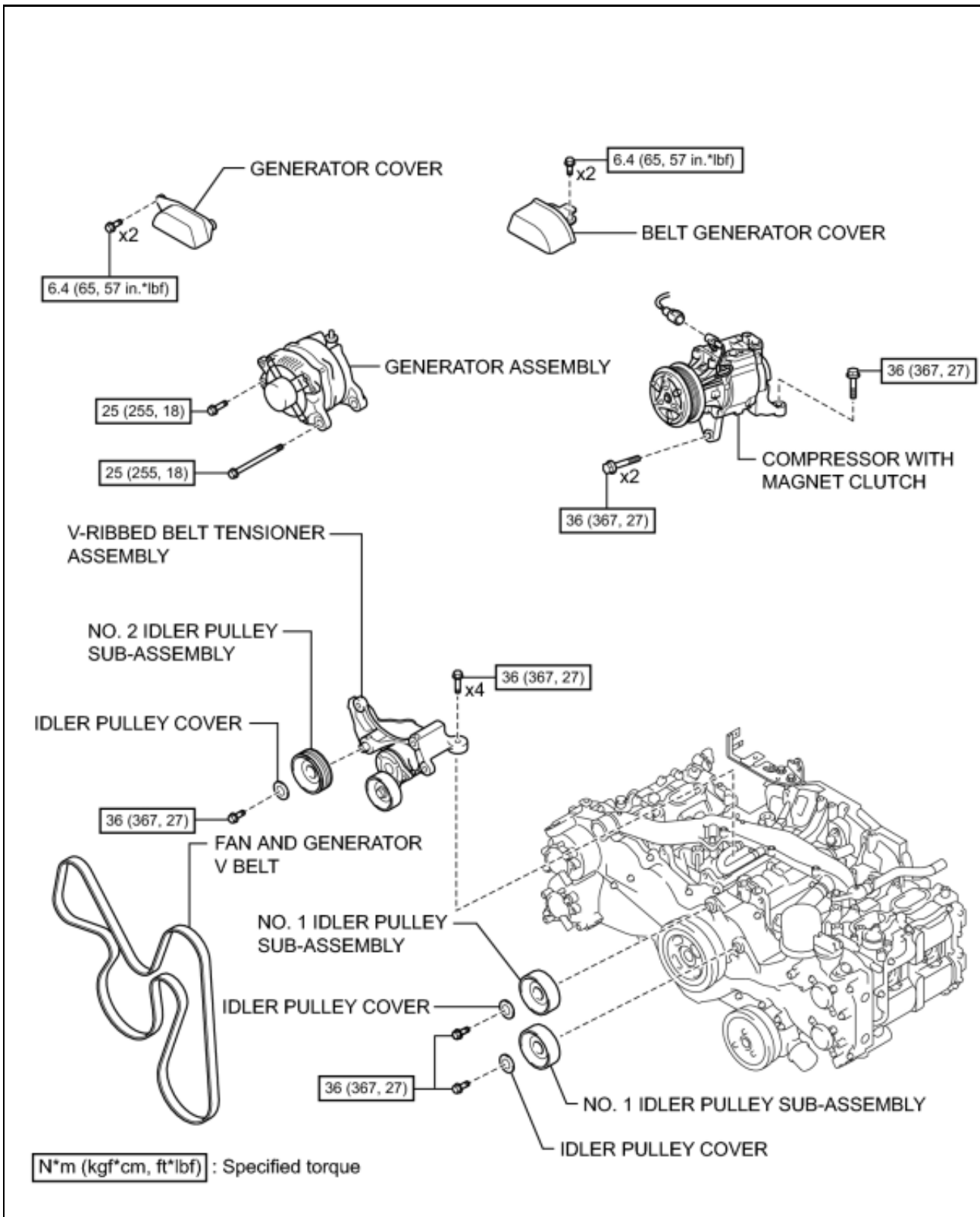




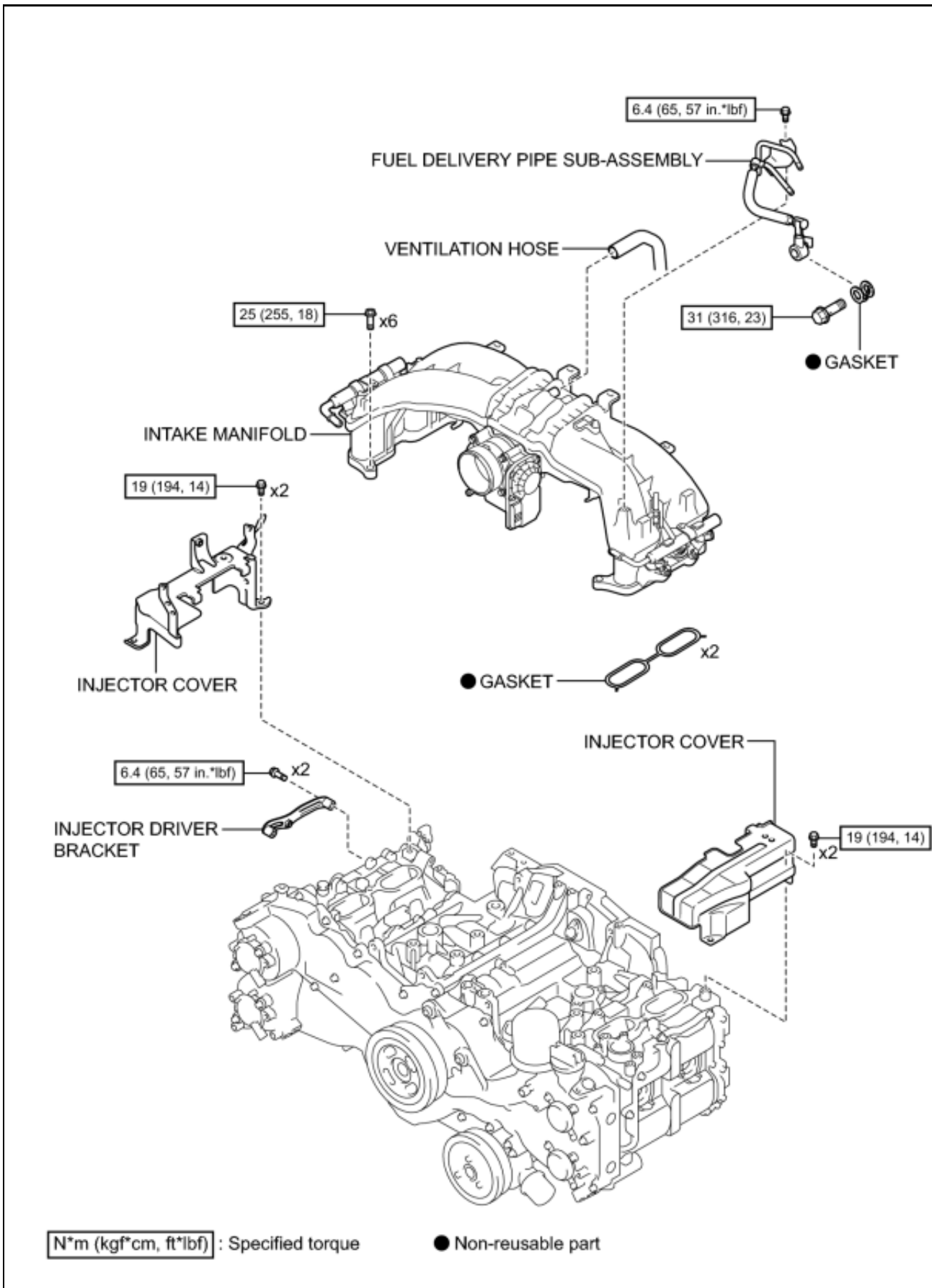
Last Modified: 4-14-2014	6.6 K	Doc ID: RM000000T4V07GX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: ENGINE UNIT: COMPONENTS; 2013 MY FR-S [03/2012 -]		

[COMPONENTS](#)

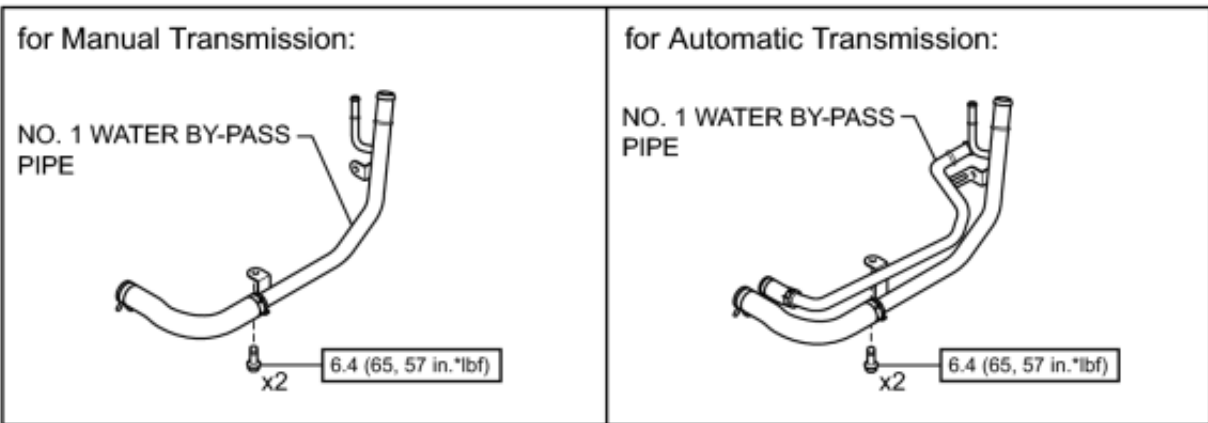
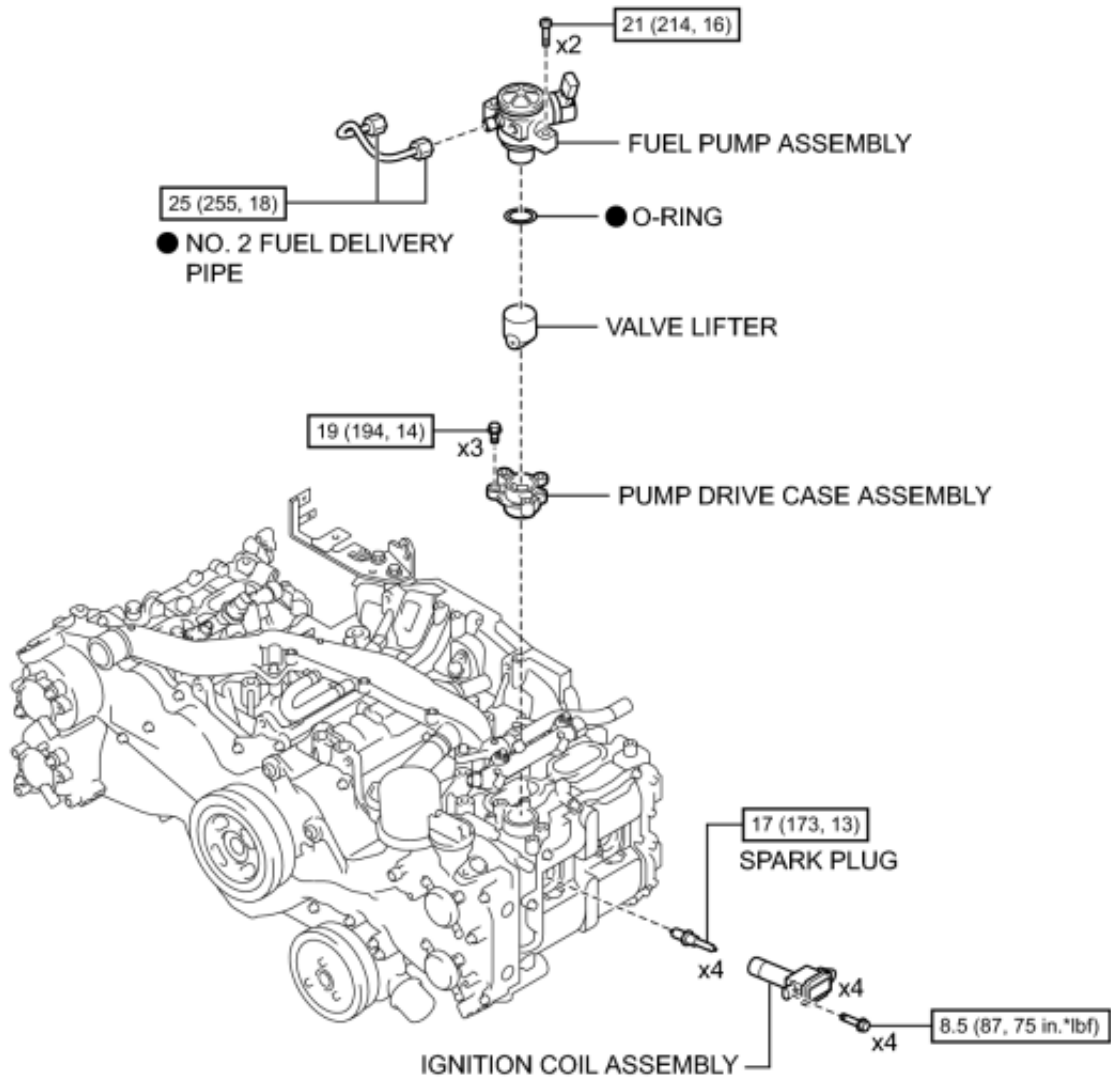
[ILLUSTRATION](#)



ILLUSTRATION

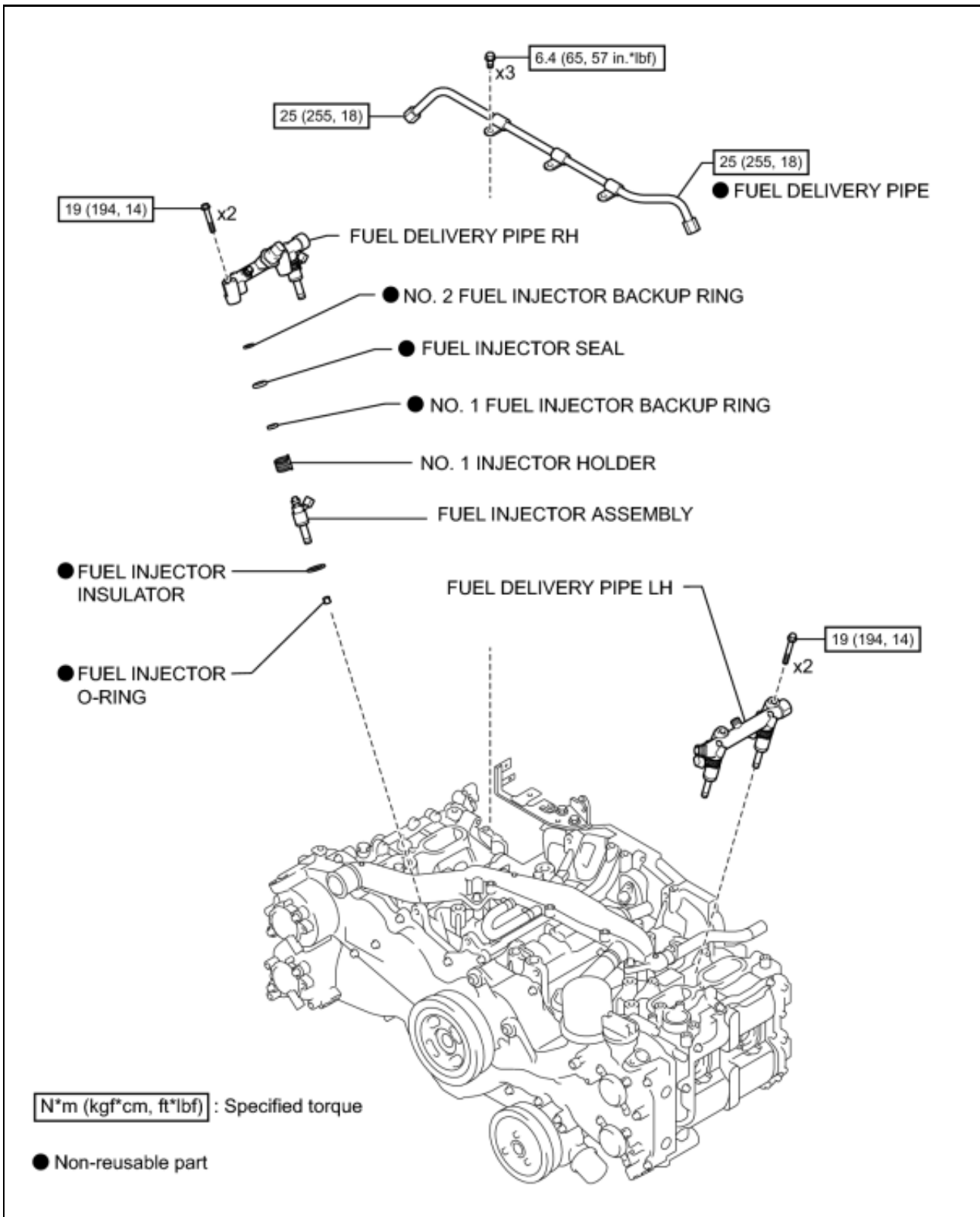


ILLUSTRATION

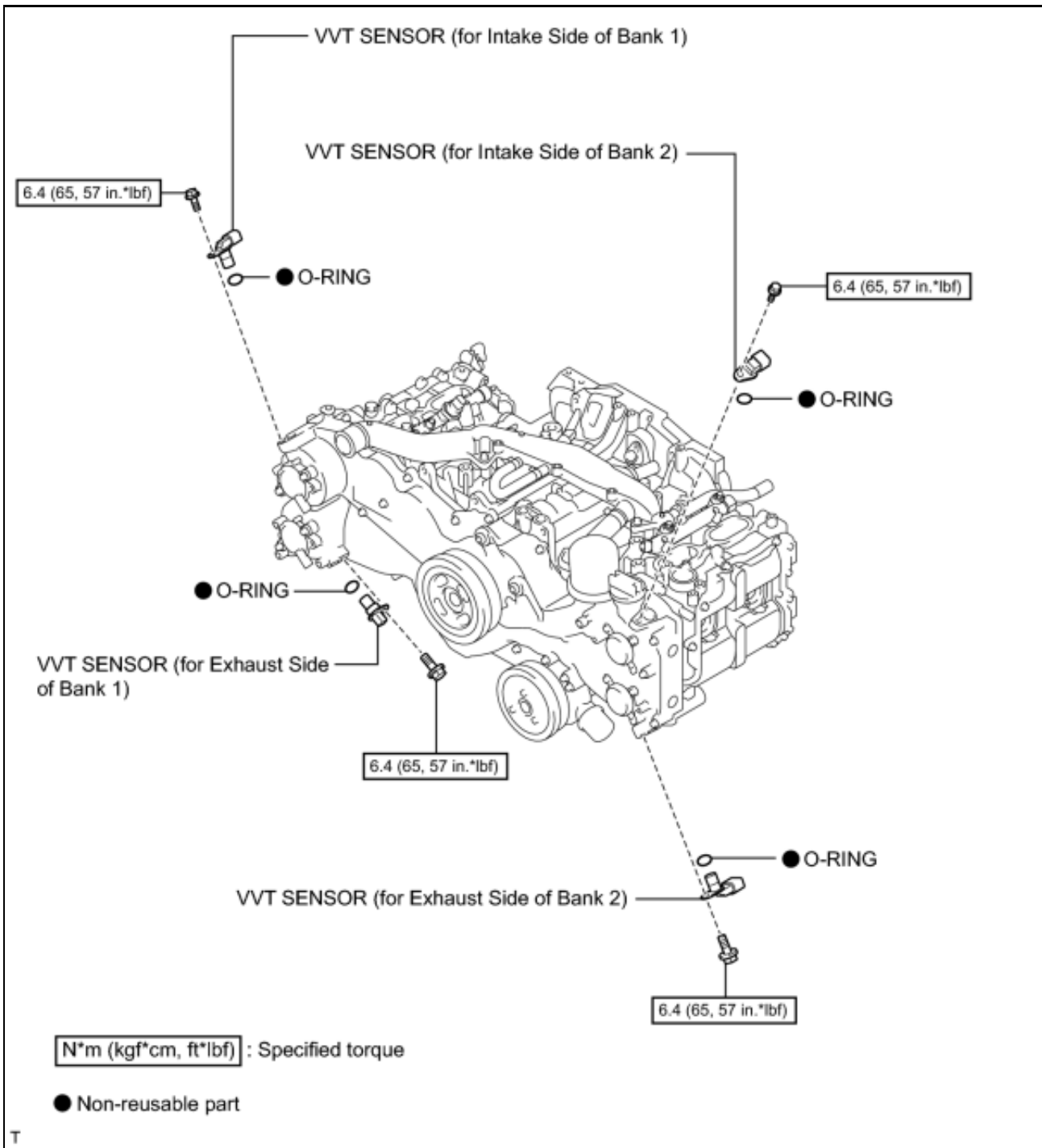


N*m (kgf*cm, ft*lbf) : Specified torque ● Non-reusable part

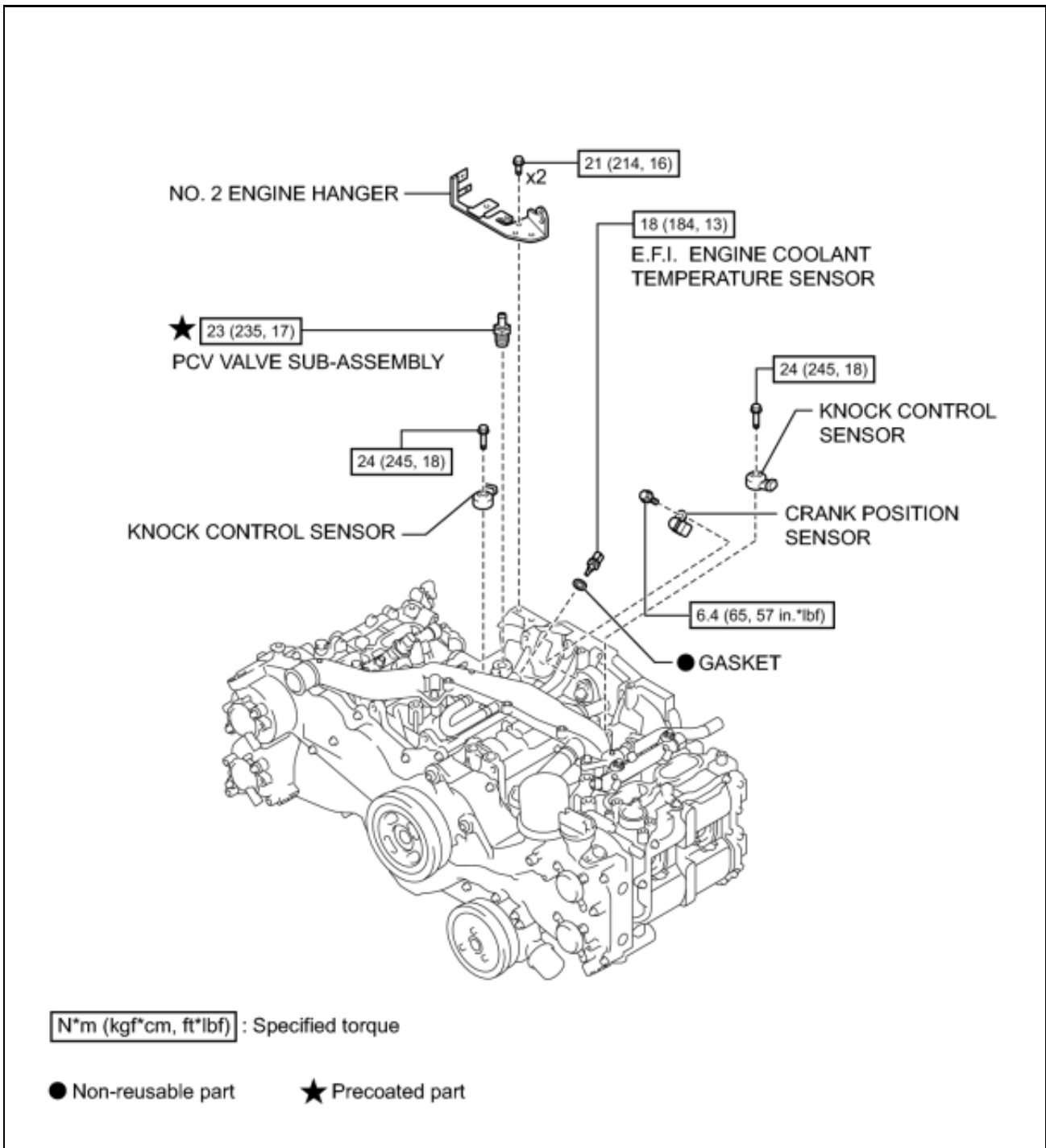
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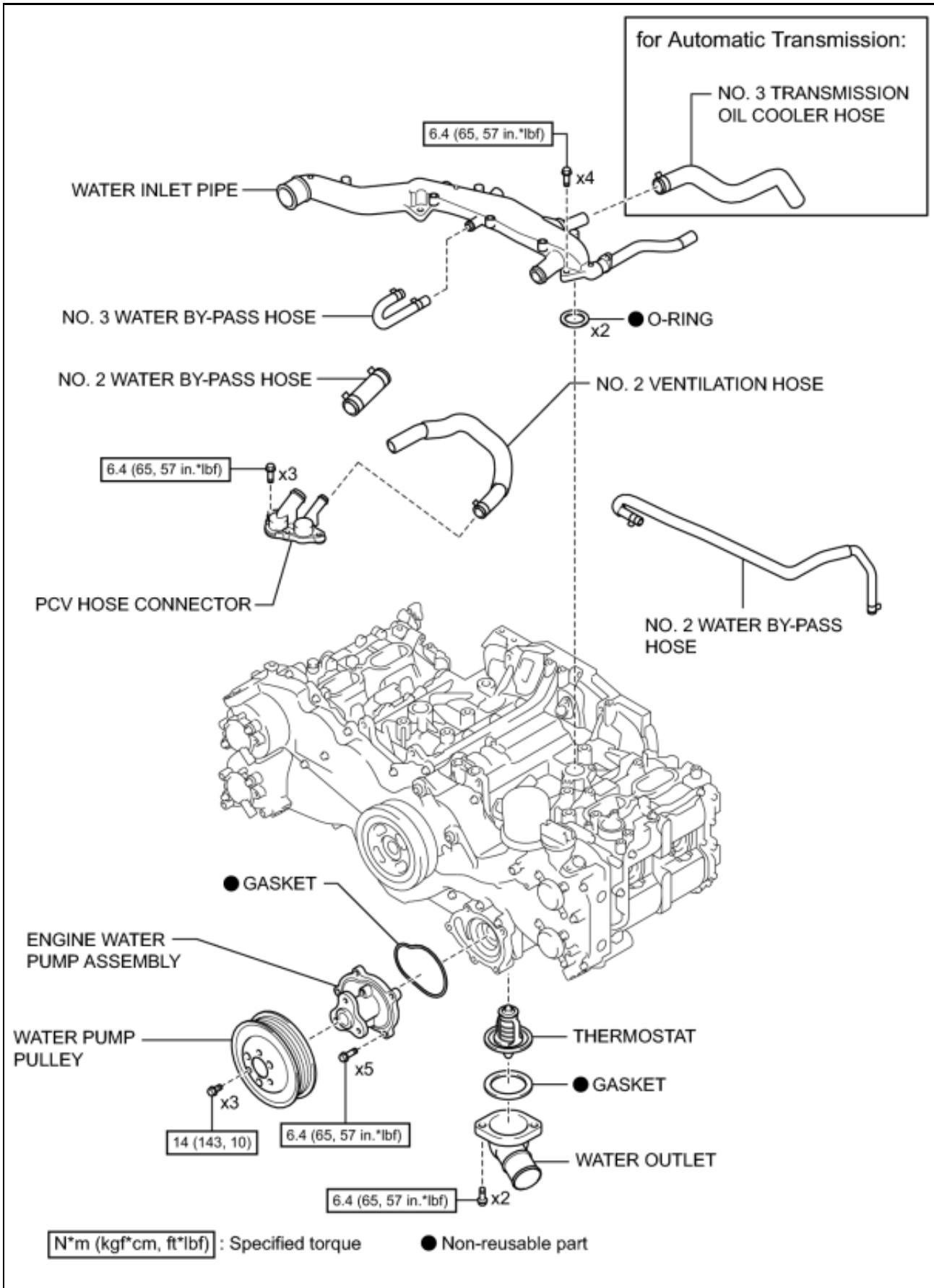
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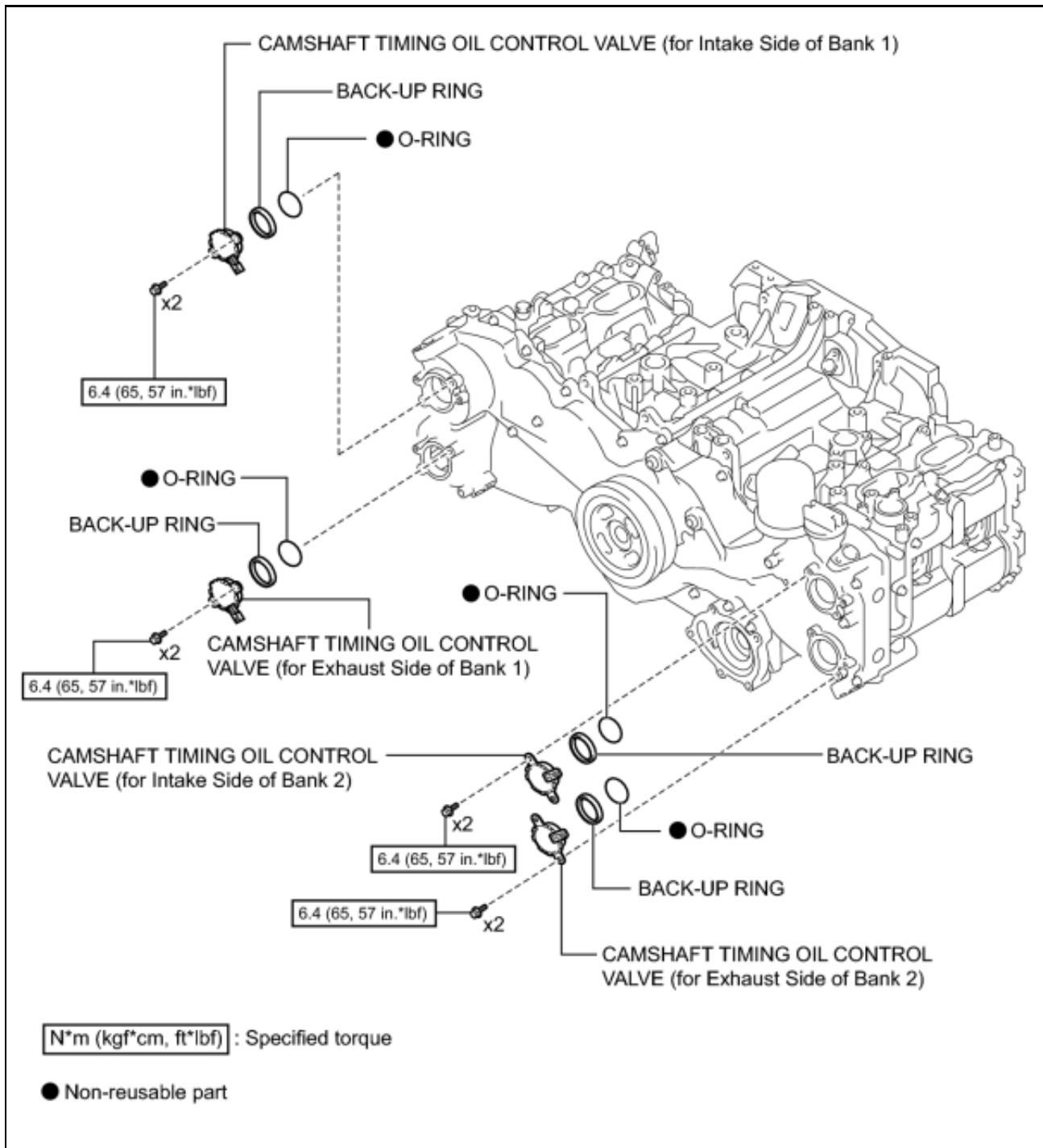
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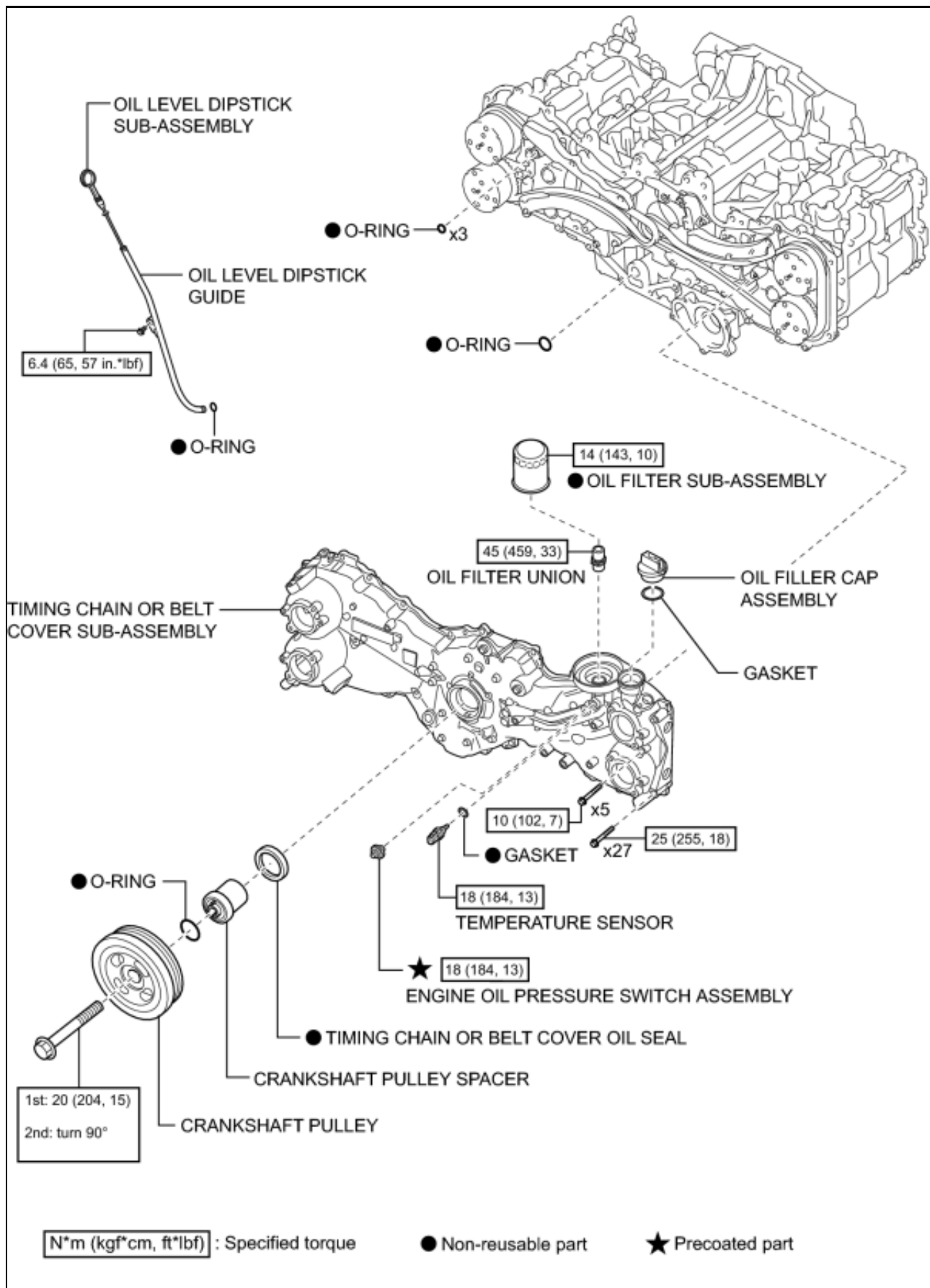
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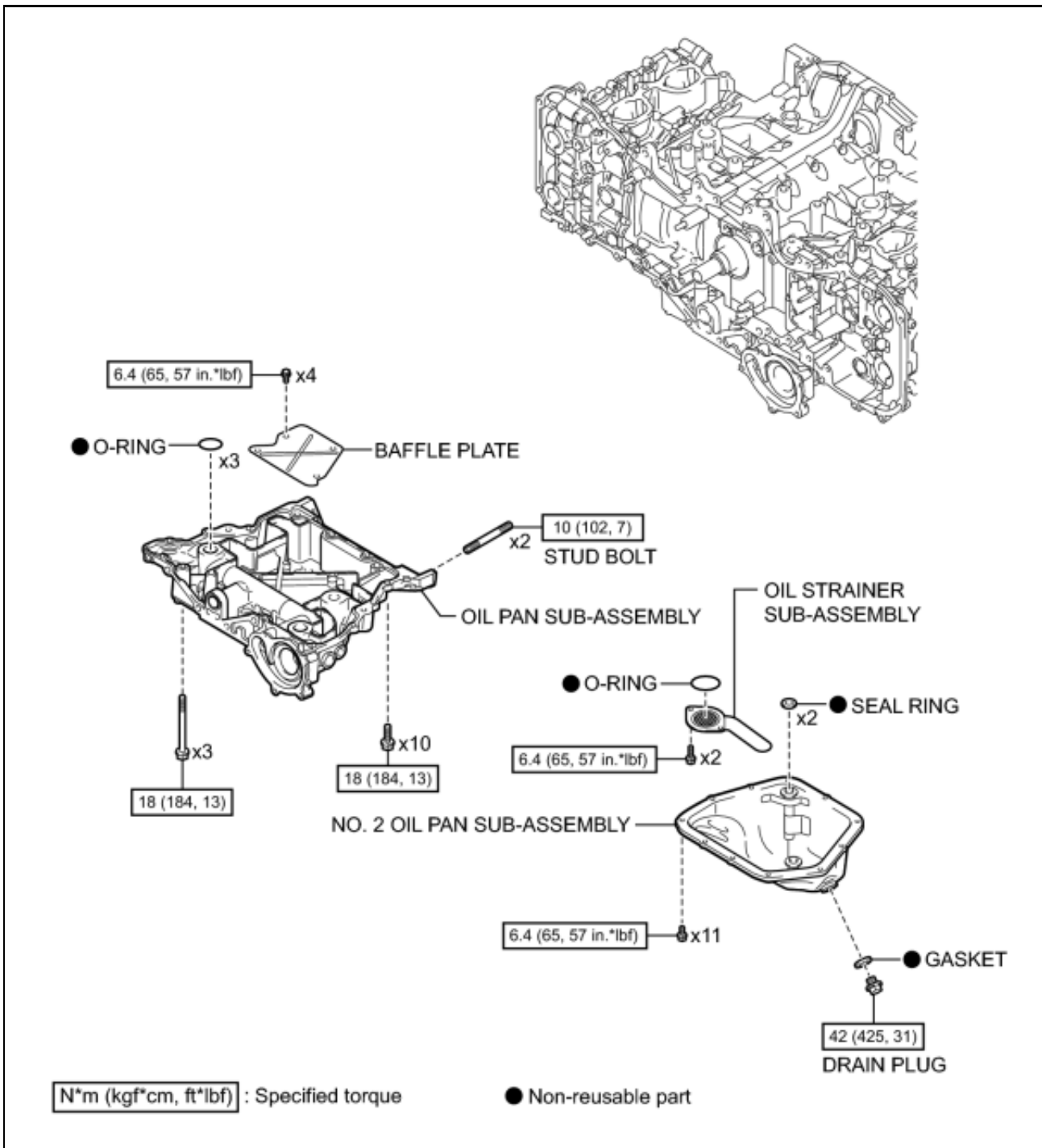
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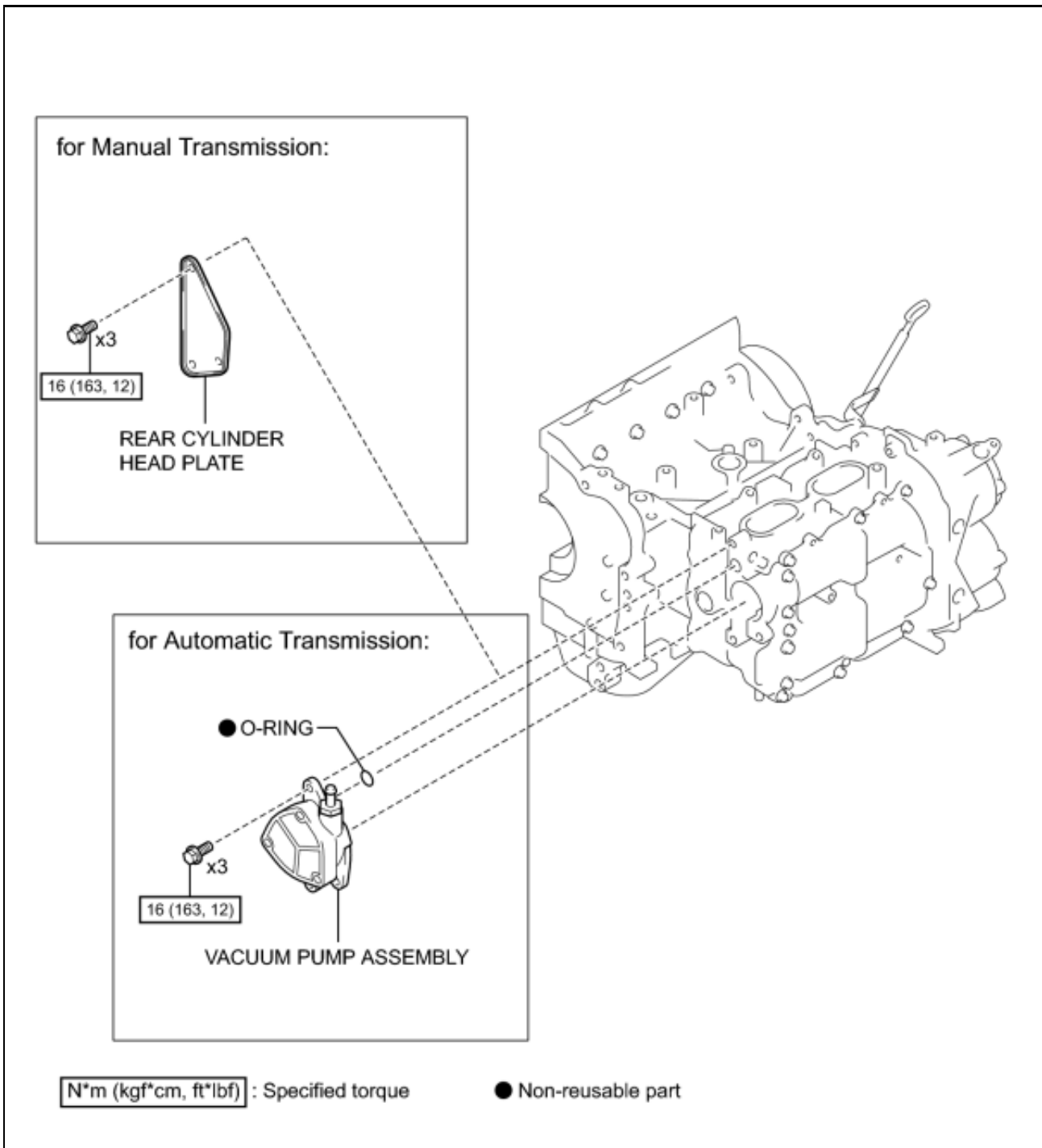
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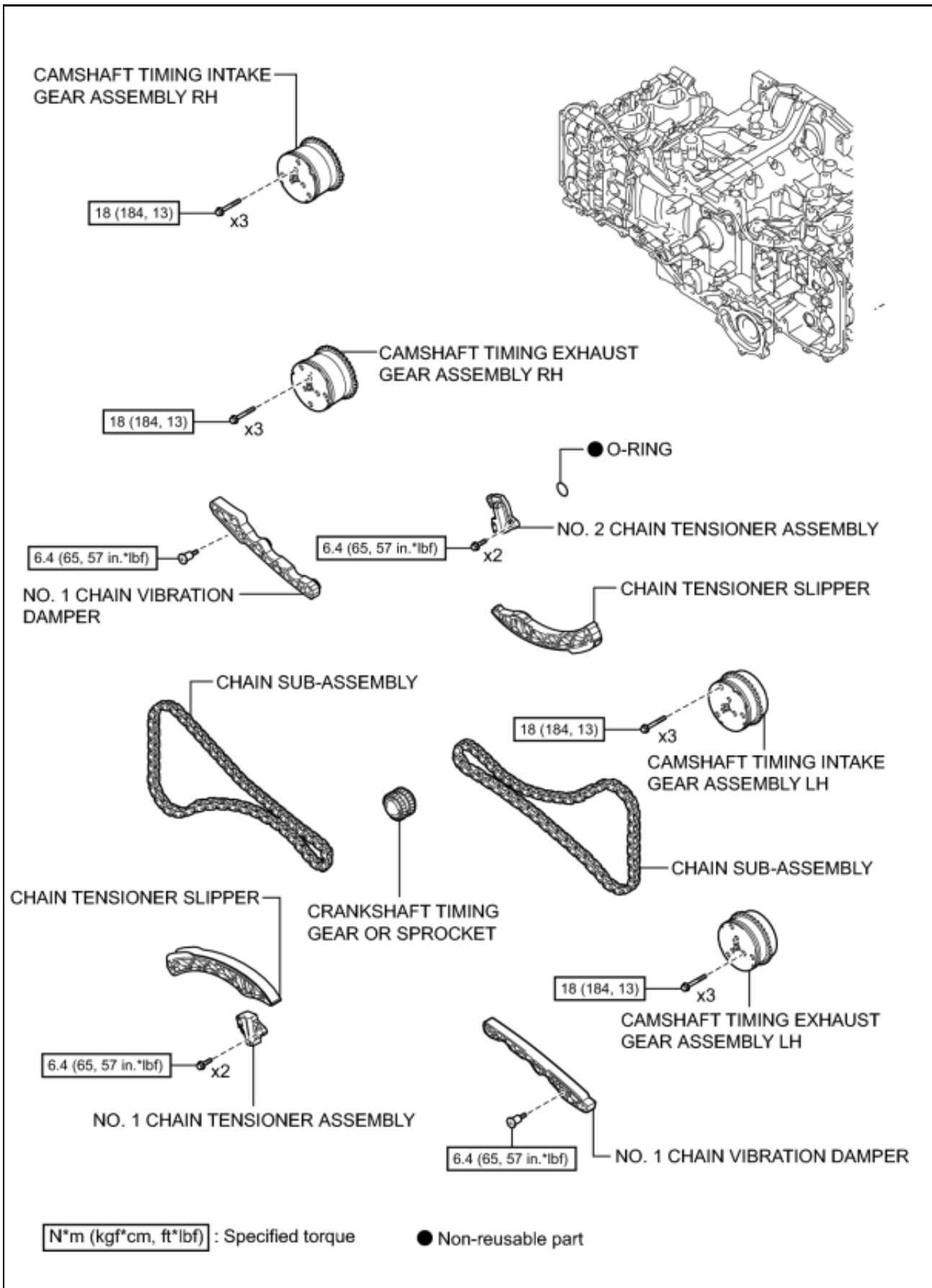
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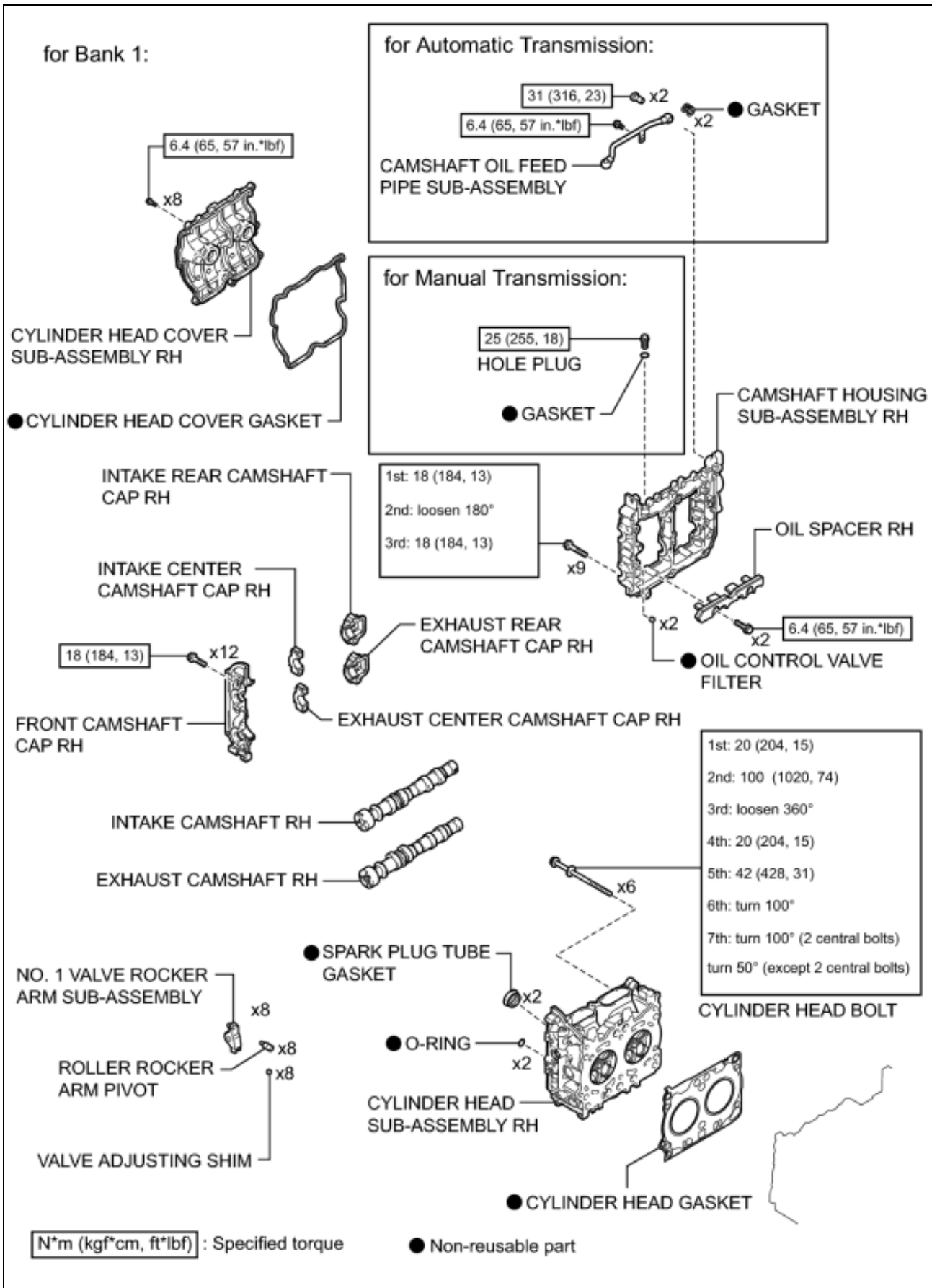
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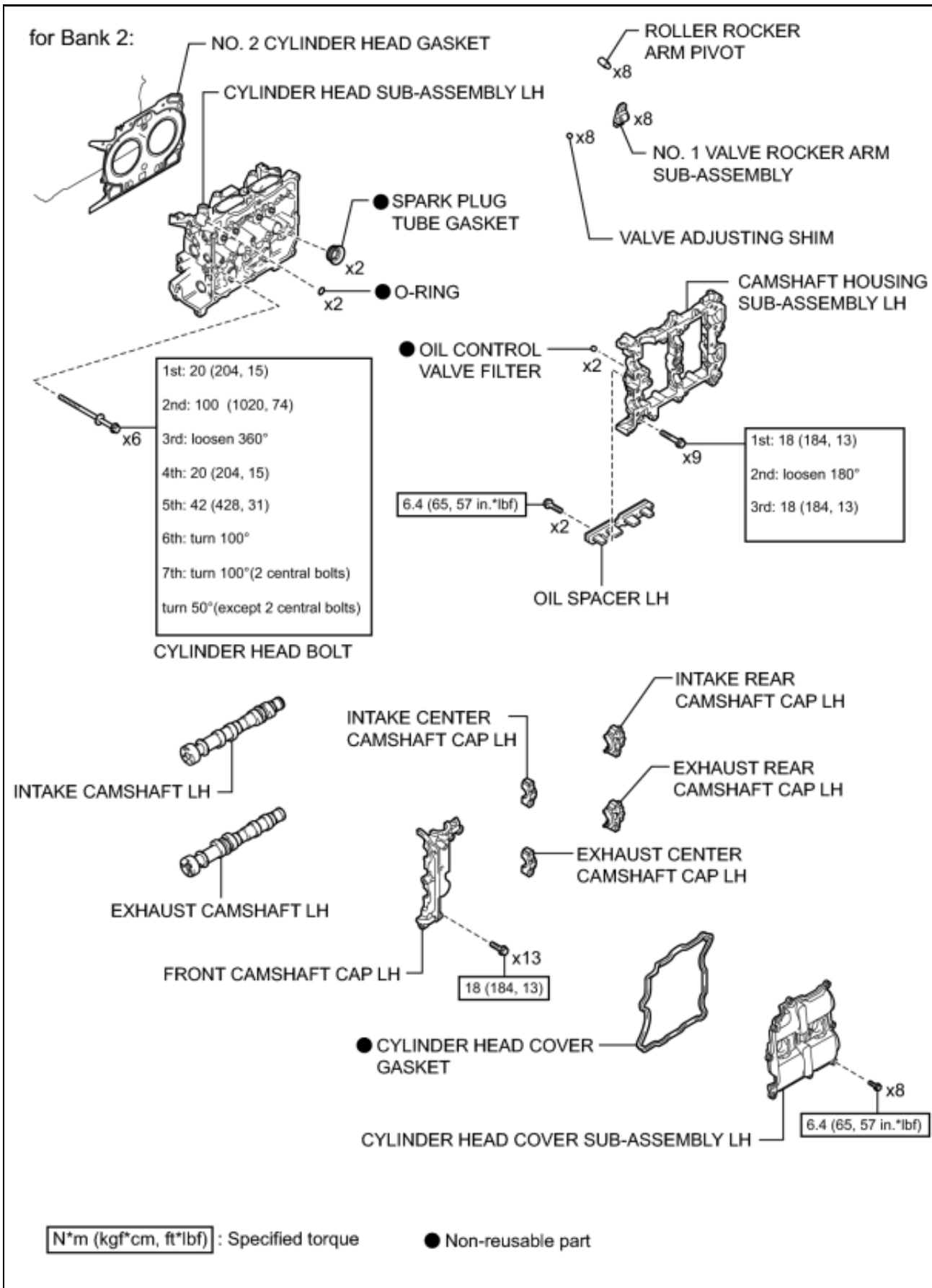
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION



Last Modified: 4-14-2014	6.6 A	Doc ID: RM0000021ZT040X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: ENGINE UNIT: DISASSEMBLY; 2013 MY FR-S [03/2012 -]		

DISASSEMBLY

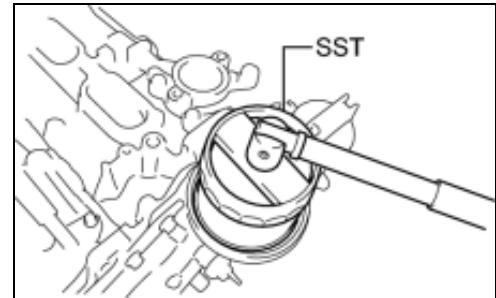
1. REMOVE OIL FILLER CAP ASSEMBLY

(a) Remove the oil filler cap assembly.

2. REMOVE OIL FILTER SUB-ASSEMBLY

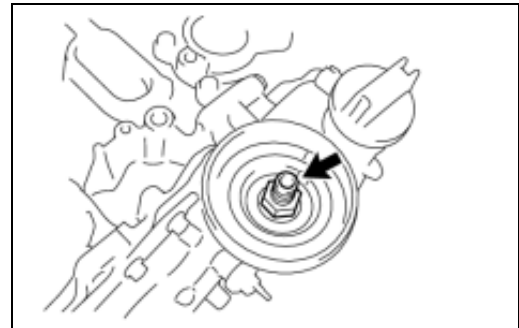
(a) Using SST, remove the oil filter sub-assembly.

SST: 09228-22020



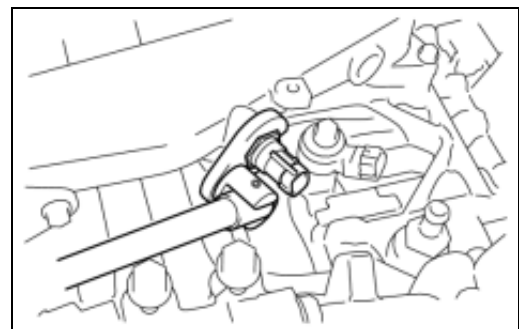
3. REMOVE OIL FILTER UNION

(a) Using a 24 mm deep socket wrench, remove the oil filter union.



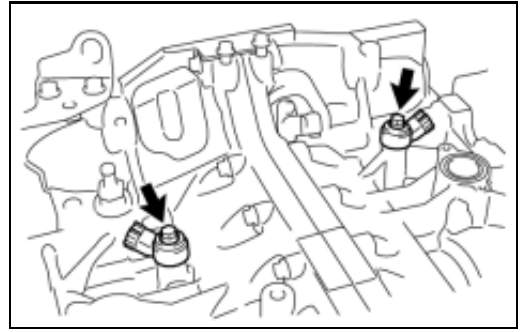
4. REMOVE E.F.I. ENGINE COOLANT TEMPERATURE SENSOR

(a) Using a 19 mm union nut wrench, remove the E.F.I. engine coolant temperature sensor.



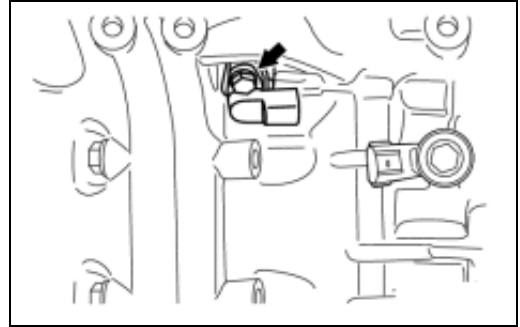
5. REMOVE KNOCK CONTROL SENSOR

(a) Remove the 2 bolts and 2 knock control sensors.



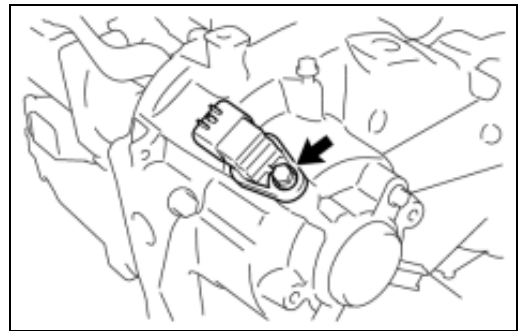
6. REMOVE CRANK POSITION SENSOR

(a) Remove the bolt and crank position sensor.



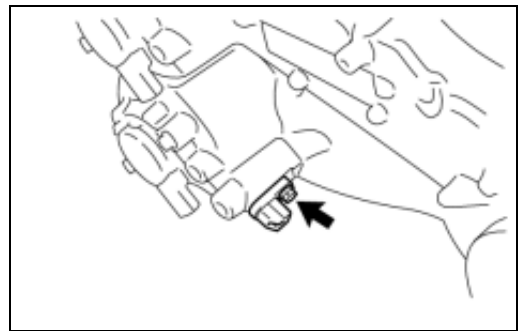
7. REMOVE VVT SENSOR

(a) Remove the bolt and VVT sensor (for intake side of bank 1).



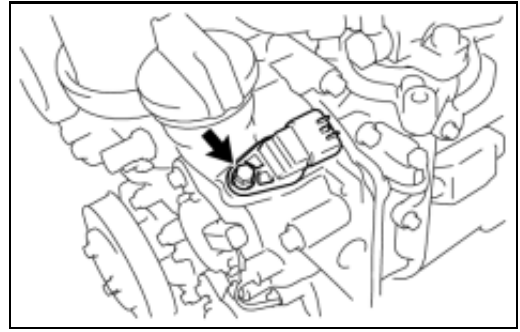
(b) Remove the O-ring from the VVT sensor.

(c) Remove the bolt and VVT sensor (for exhaust side of bank 1).



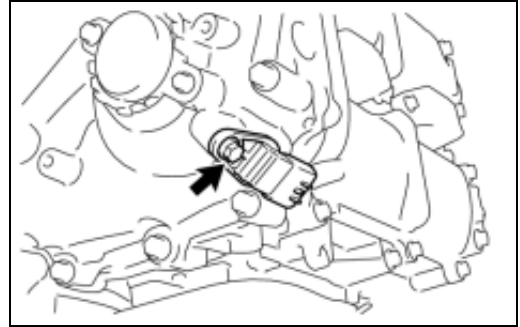
(d) Remove the O-ring from the VVT sensor.

- (e) Remove the bolt and VVT sensor (for intake side of bank 2).



- (f) Remove the O-ring from the VVT sensor.

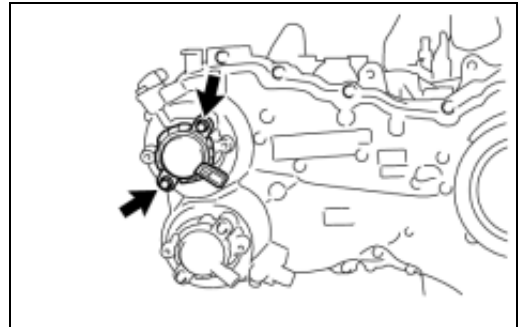
- (g) Remove the bolt and VVT sensor (for exhaust side of bank 2).



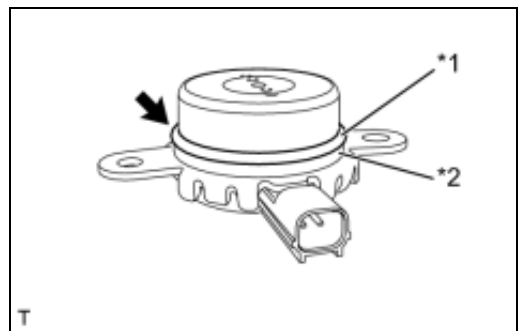
- (h) Remove the O-ring from the VVT sensor.

8. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE

- (a) Remove the 2 bolts and camshaft timing oil control valve (for intake side of bank 1).



- (b) Remove the O-ring from the camshaft timing oil control valve.



- (c) Remove the back-up ring from the camshaft timing oil control valve.

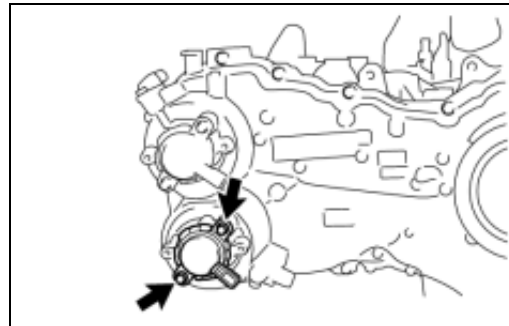
Text in Illustration

*1	O-ring
----	--------

*2

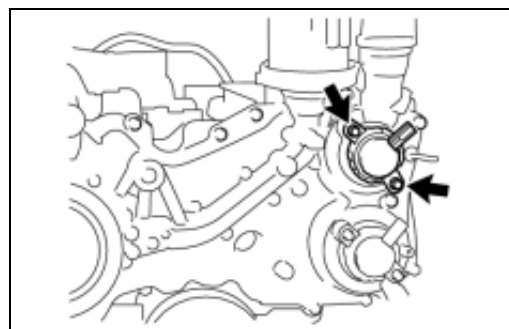
Back-up Ring

- (d) Remove the 2 bolts and camshaft timing oil control valve (for exhaust side of bank 1).



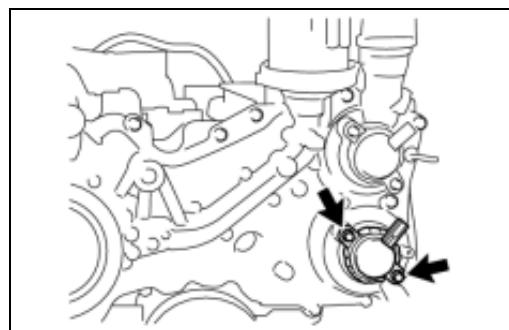
- (e) Remove the O-ring from the camshaft timing oil control valve.
 (f) Remove the back-up ring from the camshaft timing oil control valve.

- (g) Remove the 2 bolts and camshaft timing oil control valve (for intake side of bank 2).



- (h) Remove the O-ring from the camshaft timing oil control valve.
 (i) Remove the back-up ring from the camshaft timing oil control valve.

- (j) Remove the 2 bolts and camshaft timing oil control valve (for exhaust side of bank 2).



- (k) Remove the O-ring from the camshaft timing oil control valve.
 (l) Remove the back-up ring from the camshaft timing oil control valve.

9. REMOVE TEMPERATURE SENSOR

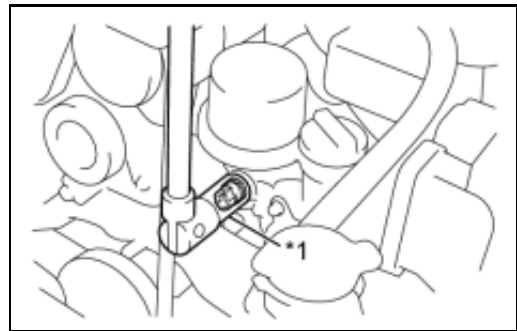
- (a) Using a 19 mm deep socket wrench, remove the temperature sensor.

NOTICE:

Use a cloth or the like to prevent engine oil from splashing.

Text in Illustration

*1	19 mm Deep Socket Wrench
----	--------------------------



10. REMOVE ENGINE OIL PRESSURE SWITCH ASSEMBLY

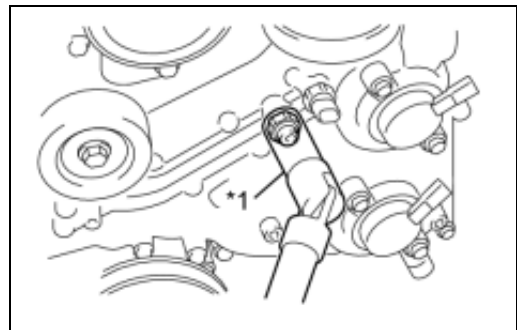
- (a) Using a 24 mm deep socket wrench, remove the engine oil pressure switch assembly.

NOTICE:

Use a cloth or the like to prevent engine oil from splashing.

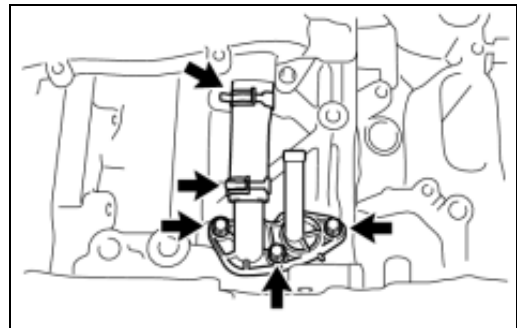
Text in Illustration

*1	24 mm deep socket wrench
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11. REMOVE PCV HOSE CONNECTOR

- (a) Remove the 3 bolts and PCV hose connector.

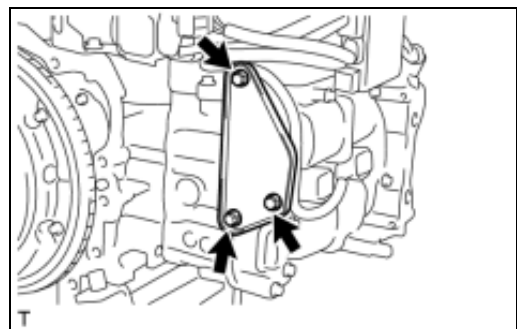


- (b) Loosen the 2 clips and remove the No. 2 water by-pass hose from the PCV hose connector.

12. REMOVE VACUUM PUMP ASSEMBLY (for Automatic Transmission) INFO

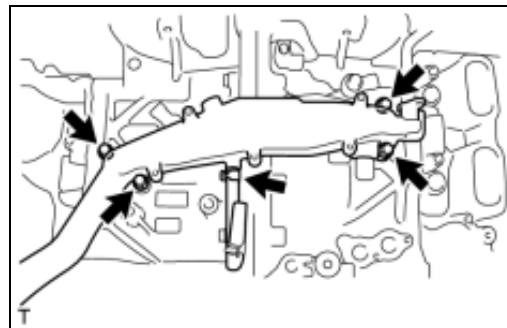
13. REMOVE REAR CYLINDER HEAD PLATE (for Manual Transmission)

- (a) Remove the 3 bolts and rear cylinder head plate.



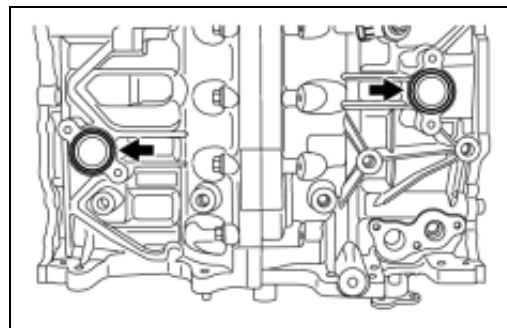
14. REMOVE WATER INLET PIPE

(a) Disconnect the No. 3 water by-pass hose.



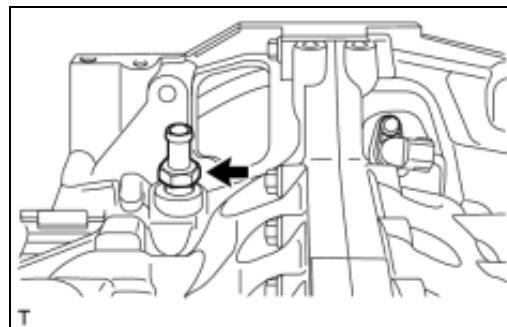
(b) Remove the 4 bolts and water inlet pipe.

(c) Remove the 2 O-rings from the cylinder block.



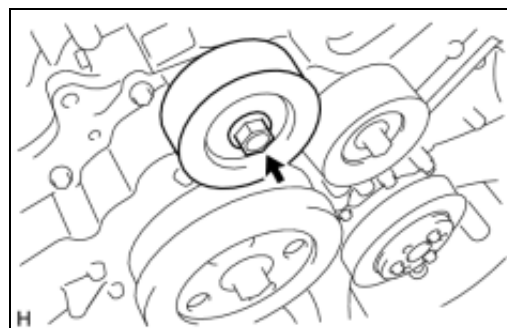
15. REMOVE PCV VALVE SUB-ASSEMBLY

(a) Using a 19 mm deep socket wrench, remove the PCV valve sub-assembly.



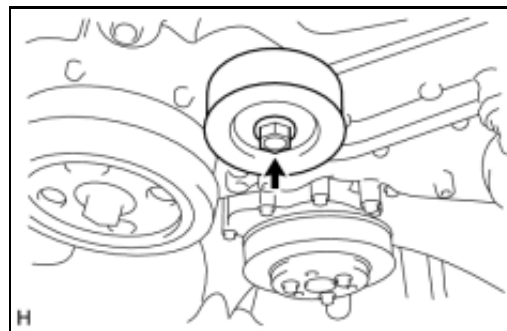
16. REMOVE NO. 1 IDLER PULLEY SUB-ASSEMBLY

(a) Remove the bolt, No. 1 idler pulley sub-assembly and idler pulley cover.



17. REMOVE NO. 1 IDLER PULLEY SUB-ASSEMBLY

- (a) Remove the bolt, No. 1 idler pulley sub-assembly and idler pulley cover.



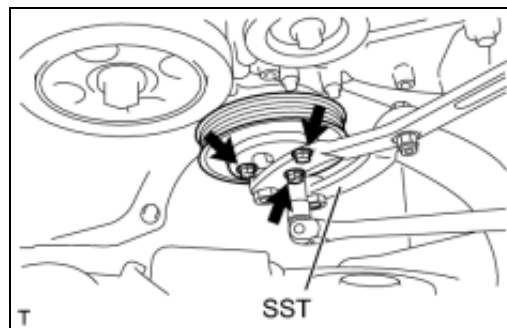
18. REMOVE WATER PUMP PULLEY

- (a) Using SST, hold the water pump pulley.

SST: 09960-10010

09962-01000

09963-00700



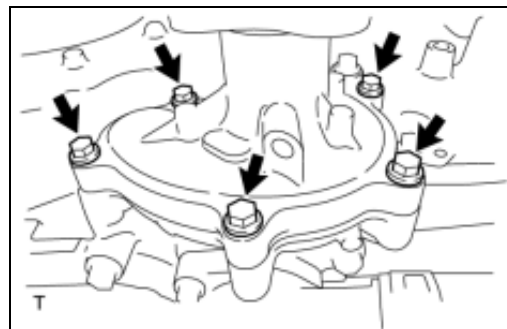
- (b) Remove the 3 bolts and water pump pulley.

NOTICE:

Be careful not to let SST slip during the work.

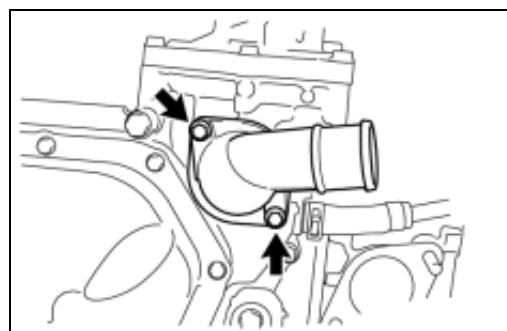
19. REMOVE ENGINE WATER PUMP ASSEMBLY

- (a) Remove the 5 bolts, engine water pump assembly and gasket.



20. REMOVE WATER OUTLET

- (a) Remove the 2 bolts and water outlet.



21. REMOVE THERMOSTAT

- (a) Remove the thermostat.
- (b) Remove the gasket from the thermostat.

NOTICE:

Be careful not to let SST slip during the work.

22. REMOVE CRANKSHAFT PULLEY

- (a) Install SST to the crankshaft pulley.

SST: 09213-80010

90179-10016

09213-08010

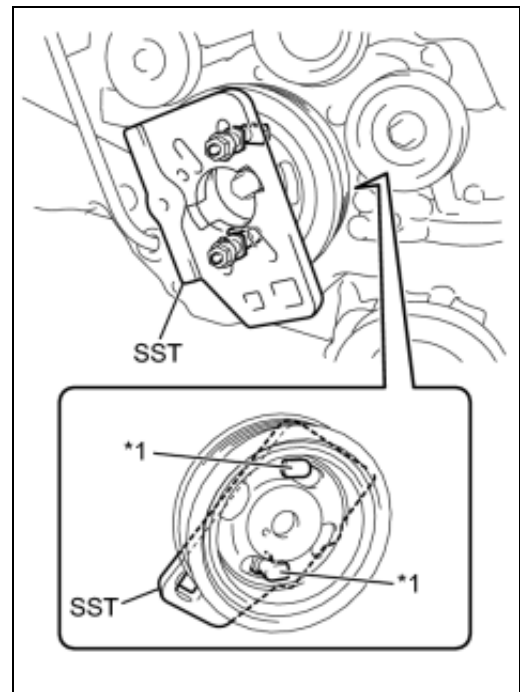
09213-08110

HINT:

Position the projections on SST in the direction as shown in the illustration to prevent SST from separating from the crankshaft pulley.

Text in Illustration

*1	Claw
----	------



- (b) Using SST, hold the crankshaft pulley and loosen the crankshaft pulley set bolt.

SST: 09213-80010

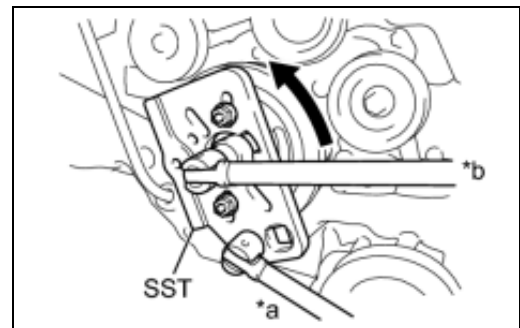
90179-10016

09213-08010

09213-08110

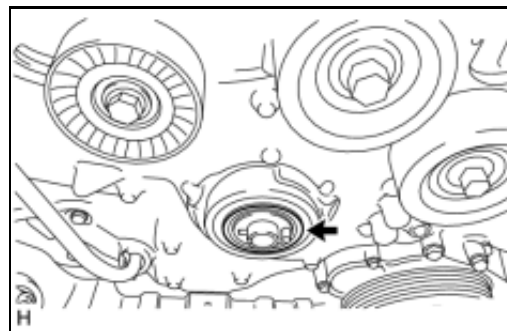
Text in Illustration

*a	Hold
*b	Turn



- (c) Remove the crankshaft pulley.

(d) Remove the O-ring and crankshaft pulley spacer.



23. REMOVE TIMING CHAIN OR BELT COVER OIL SEAL

(a) Using a screwdriver with its tip wrapped in protective tape, pry out the timing chain or belt cover oil seal.

Text in Illustration

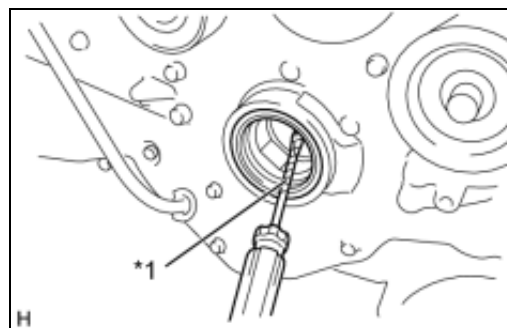
*1	Protective Tape
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NOTICE:

After the removal, check the crankshaft for damage. If it is damaged, smooth the surface with 400-grit sandpaper.

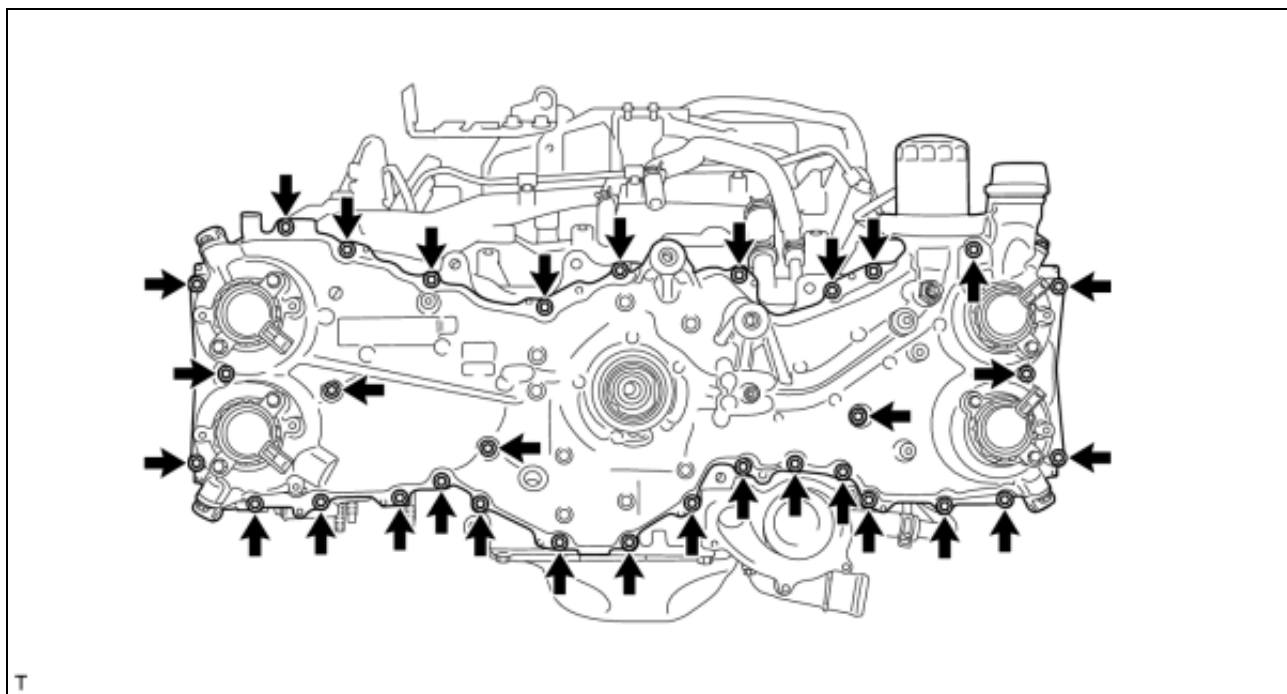
HINT:

Tape the screwdriver tip before use.

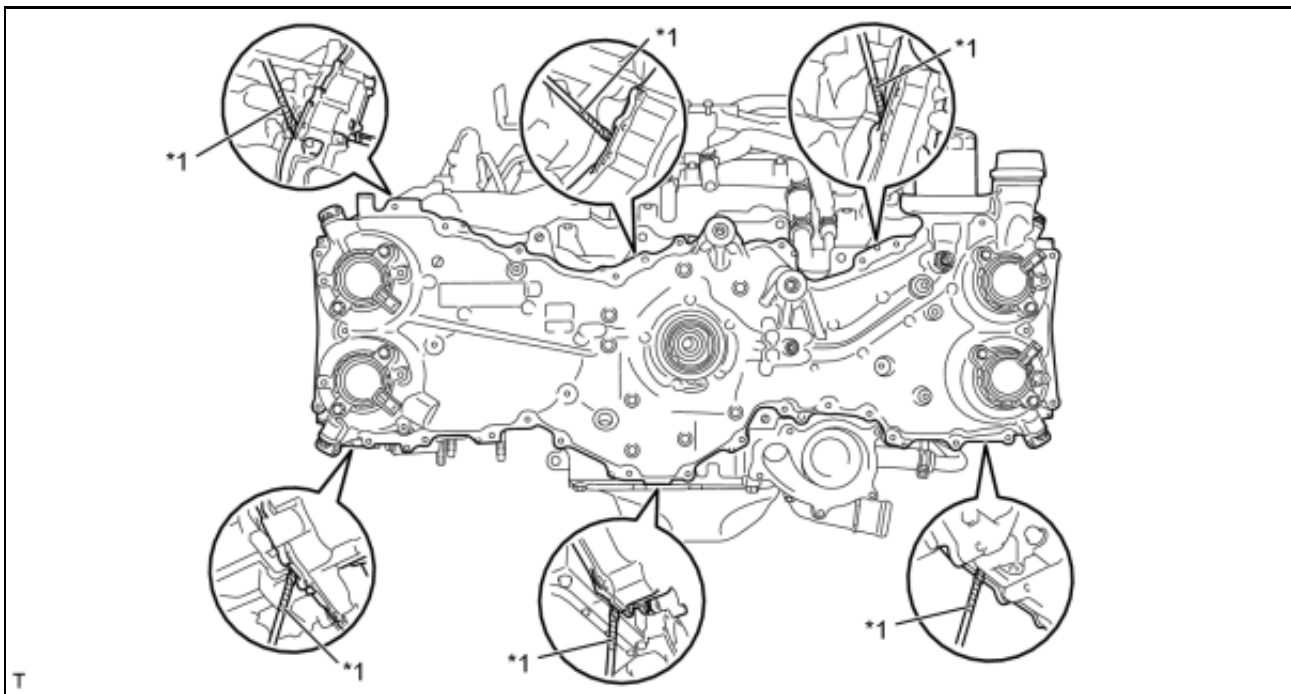


24. REMOVE TIMING CHAIN OR BELT COVER SUB-ASSEMBLY

(a) Remove the 32 bolts.



(b) Using a screwdriver with its tip wrapped in protective tape, remove the timing chain or belt cover sub-assembly by prying between the timing chain or belt cover sub-assembly and cylinder head or cylinder block.



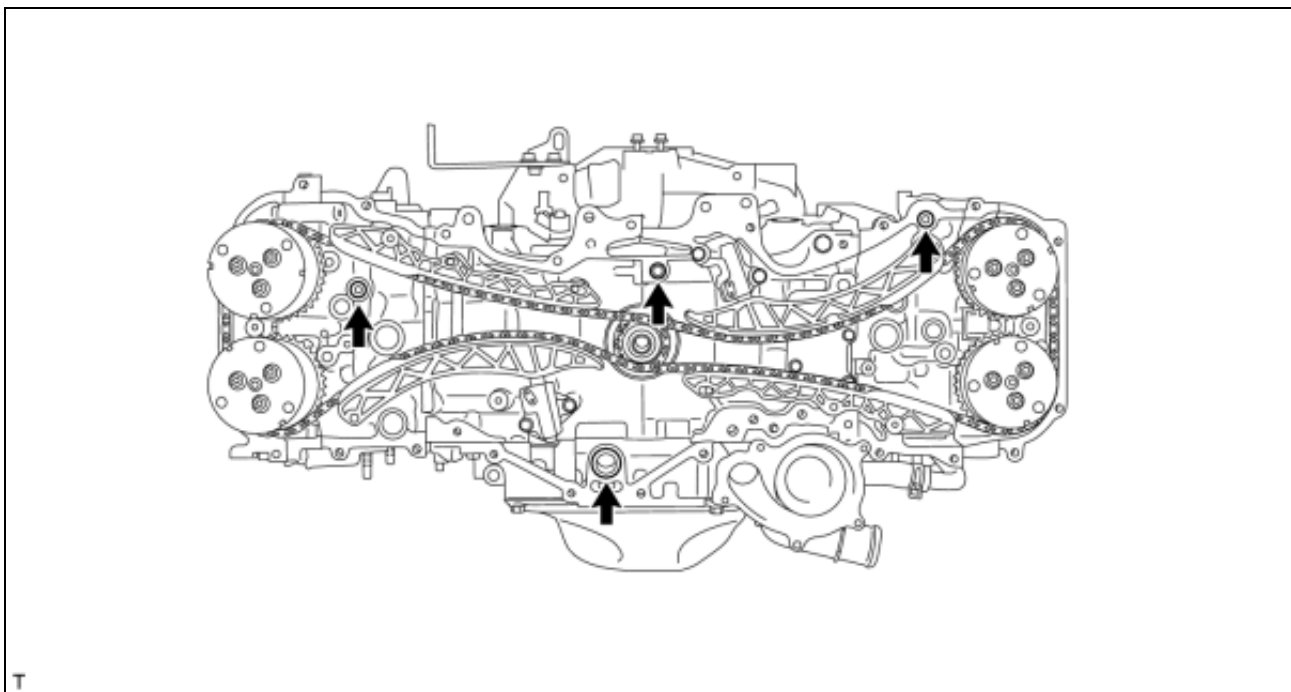
Text in Illustration

*1	Protective Tape	-	-
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NOTICE:

Be careful not to damage the contact surfaces of the cylinder head, cylinder block or chain cover.

(c) Remove the 4 O-rings.



25. REMOVE CHAIN SUB-ASSEMBLY (for Bank 1)

(a) Temporarily install the crank pulley bolt to the crankshaft.

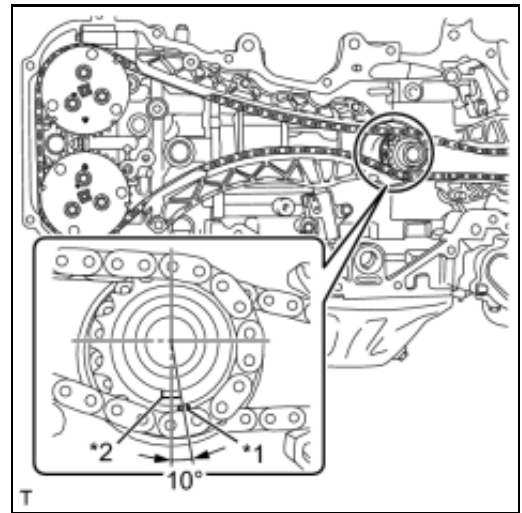
- (b) Turn the crankshaft and align the alignment marks of the crankshaft timing gear or sprocket, camshaft timing intake gear assembly RH and camshaft timing exhaust gear assembly RH.

HINT:

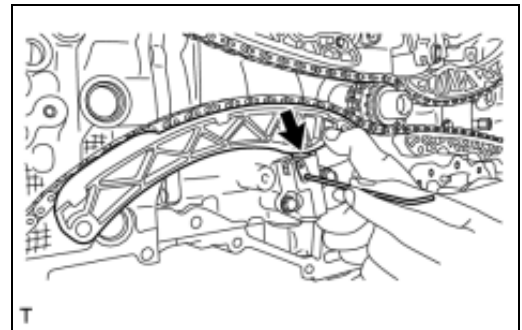
The crankshaft key faces downward at this time.

Text in Illustration

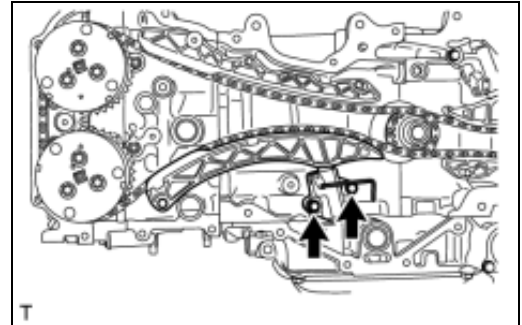
*1	Alignment Mark
*2	Key



- (c) Push down the chain tensioner slipper and retain the plunger by inserting a 2.5 mm (0.098 in.) diameter hexagonal wrench into the No. 1 chain tensioner assembly through the stopper plate.

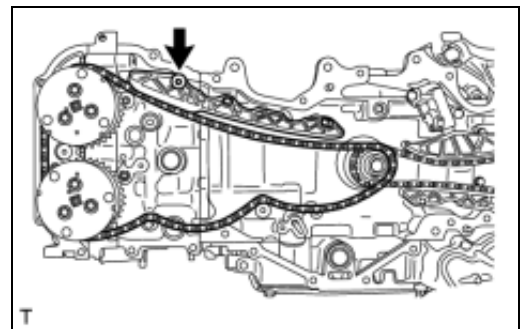


- (d) Remove the 2 bolts and No. 1 chain tensioner assembly.



- (e) Remove the chain tensioner slipper.

- (f) Using a 5 mm hexagonal wrench, remove the bolt and No. 1 chain vibration damper.



- (g) Remove the chain sub-assembly (for bank 1).

NOTICE:

- With the chain sub-assembly (for bank 1) removed, the valve heads may contact each other if the camshafts are turned, causing the valve stems to bend.
- To avoid this, do not turn the intake camshaft RH and the exhaust camshaft RH more than zero-lift range (The range where camshafts can be turned lightly by hand).

HINT:

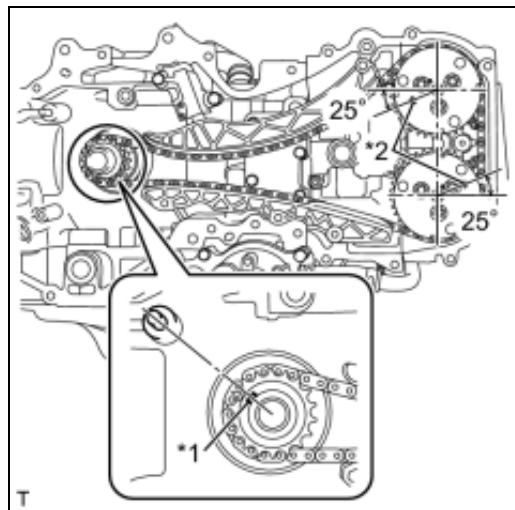
Arrange the removed parts in the correct order.

26. REMOVE CHAIN SUB-ASSEMBLY (for Bank 2)

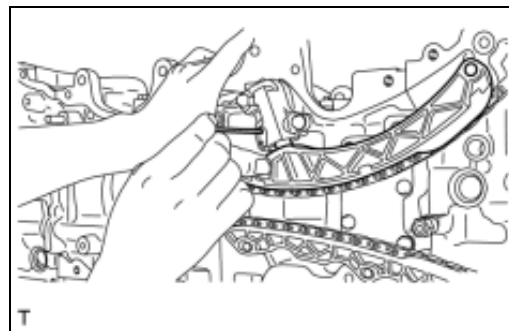
- (a) Turn the crankshaft and position each alignment mark on the crankshaft timing gear or sprocket, camshaft timing intake gear assembly LH and camshaft timing exhaust gear assembly LH as shown in the illustration.

Text in Illustration

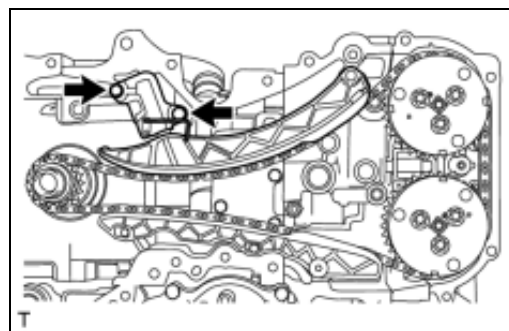
*1	Key
*2	Alignment Mark



- (b) Push the chain tensioner slipper and retain the plunger by inserting an approximately 1 mm (0.039 in.) diameter wire into the No. 2 chain tensioner assembly through the stopper plate .

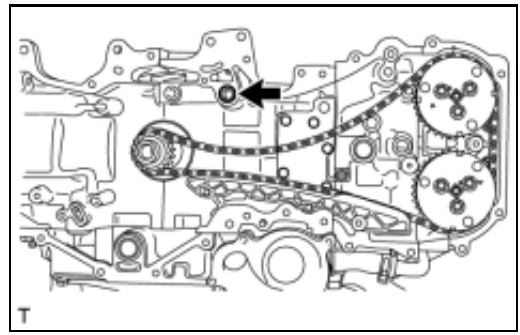


- (c) Remove the 2 bolts and No. 2 chain tensioner assembly.

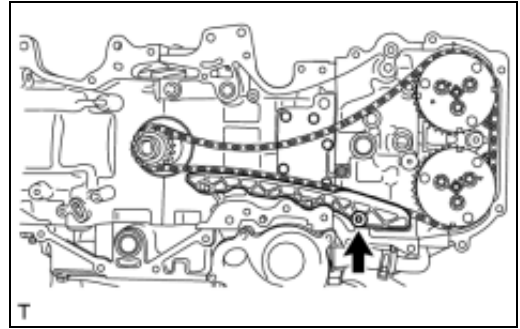


- (d) Remove the chain tensioner slipper.

(e) Remove the O-ring from the cylinder block.



(f) Using a 5 mm socket hexagon wrench, remove the bolt and No. 1 chain vibration damper.



(g) Remove the chain sub-assembly (for bank 2).

NOTICE:

- With the chain sub-assembly (for bank 2) removed, the valve heads may contact each other if the camshafts are turned, causing the valve stems to bend. To avoid this, do not turn the exhaust camshaft LH more than zero-lift range (The range where the camshaft can be turned lightly by hand).
- At this time, No. 1 and No. 4 pistons are located near TDC. If the intake camshaft is turned, the valves may come into contact with the piston, causing the valve stems to bend. To avoid this, do not turn the intake camshaft LH.

HINT:

Arrange the removed parts in the correct order.

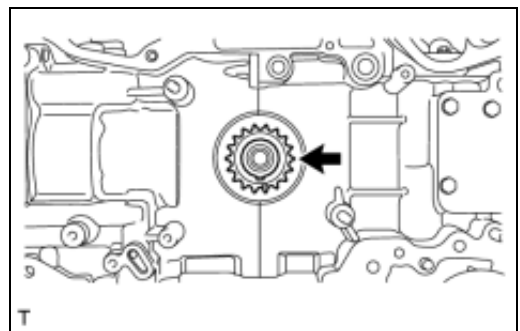
27. ROTATE CRANK SHAFT AND CAMSHAFT INFO

28. REMOVE CRANKSHAFT TIMING GEAR OR SPROCKET

(a) Remove the crankshaft timing gear or sprocket.

HINT:

Make sure the front-back direction and make a mark for installation if necessary.



29. REMOVE CAMSHAFT TIMING INTAKE GEAR ASSEMBLY RH INFO

30. REMOVE CAMSHAFT TIMING EXHAUST GEAR ASSEMBLY RH INFO

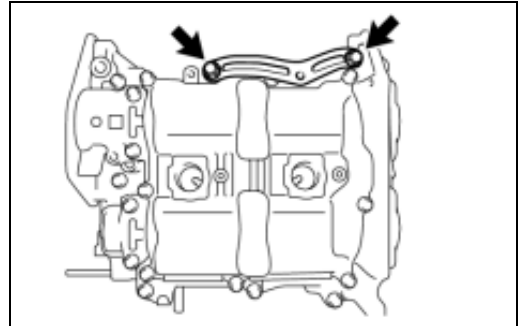
31. REMOVE CAMSHAFT TIMING INTAKE GEAR ASSEMBLY LH INFO

32. REMOVE CAMSHAFT TIMING EXHAUST GEAR ASSEMBLY LH INFO**33. REMOVE SPARK PLUG**

(a) Using a 14 mm spark plug wrench, remove the 4 spark plugs.

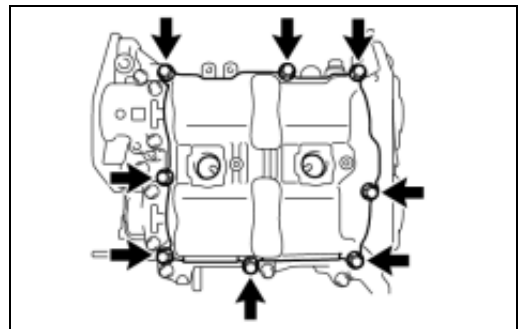
34. REMOVE INJECTOR DRIVER BRACKET

(a) Remove the 2 bolts and injector driver bracket.

**35. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY RH**

(a) Operate the engine stand so that the bank 1 side faces upward.

(b) Remove the 8 bolts.



(c) Using a screwdriver with its tip wrapped in protective tape, remove the cylinder head cover sub-assembly RH.

NOTICE:

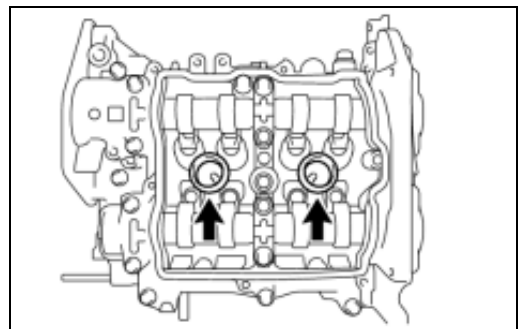
Do not damage the camshaft housing sub-assembly RH, cam caps and cylinder head cover sub-assembly RH.

(d) Remove the cylinder head cover gasket.

(e) Remove the 2 spark plug tube gaskets.

NOTICE:

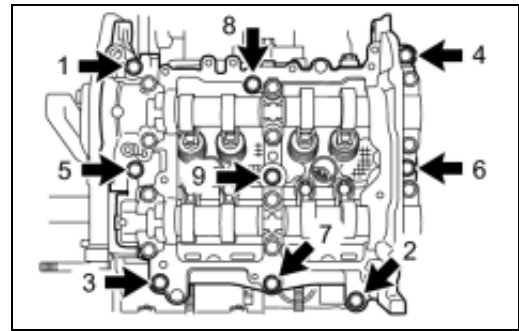
When removing the seal packing left on the camshaft housing sub-assembly RH using a scraper, use special care not to damage the camshafts.

**36. REMOVE CAMSHAFT HOUSING SUB-ASSEMBLY RH**

NOTICE:

Do not remove the intake and exhaust camshafts first as it may cause a deformation of the cylinder head sub-assembly.

- (a) Loosen the 9 bolts in the order shown in the illustration and remove them.



- (b) Using a screwdriver with its tip wrapped in protective tape, remove the camshaft housing sub-assembly RH.

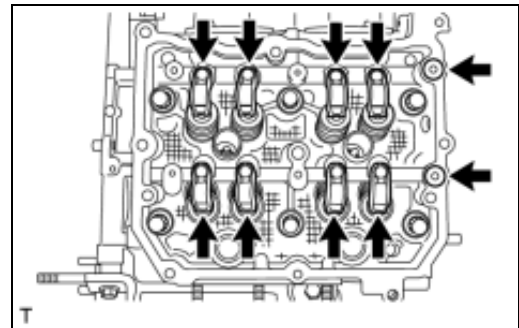
NOTICE:

Do not damage the cylinder head sub-assembly RH and camshaft housing sub-assembly RH.

- (c) Remove the 2 O-rings and 8 No. 1 valve rocker arm sub-assemblies from the cylinder head sub-assembly.

HINT:

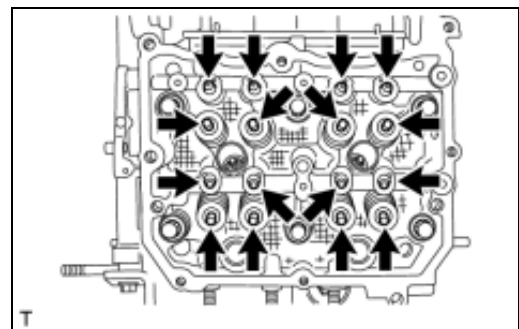
Arrange the removed parts in the correct order.



- (d) Remove the 8 valve adjusting shims and 8 roller rocker arm pivots from the cylinder head sub-assembly.

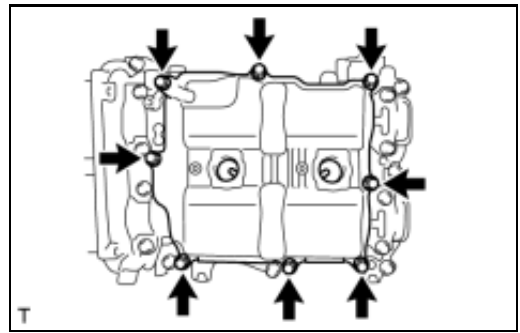
HINT:

Arrange the removed parts in the correct order.

**37. REMOVE CYLINDER HEAD SUB-ASSEMBLY RH** INFO**38. REMOVE CYLINDER HEAD GASKET** INFO**39. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY LH**

- (a) Operate the engine stand so that the bank 2 side faces upward.

(b) Remove the 8 bolts.



(c) Using a screwdriver with its tip wrapped in protective tape, remove the cylinder head cover sub-assembly LH.

NOTICE:

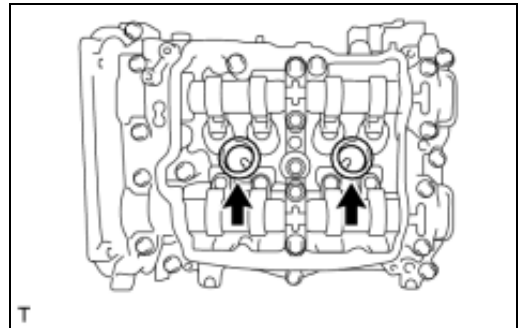
Do not damage the camshaft housing sub-assembly LH, cam caps and cylinder head cover sub-assembly LH.

(d) Remove the cylinder head cover gasket.

(e) Remove the 2 spark plug tube gaskets.

NOTICE:

When removing the seal packing left on the camshaft housing sub-assembly LH using a scraper, use special care not to damage the camshafts.

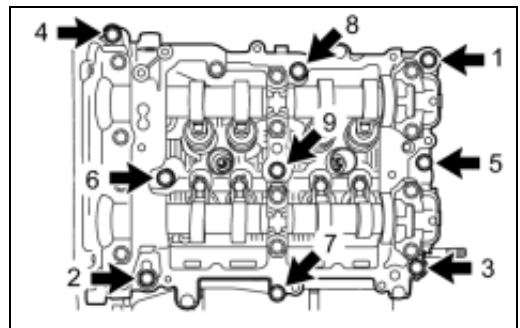


40. REMOVE CAMSHAFT HOUSING SUB-ASSEMBLY LH

NOTICE:

Do not remove the intake and exhaust camshafts first as it may cause a deformation of the camshaft housing sub-assembly LH.

(a) Loosen the 9 bolts in the order shown in the illustration and remove them.



(b) Using a screwdriver with its tip wrapped in protective tape, remove the camshaft housing sub-assembly LH.

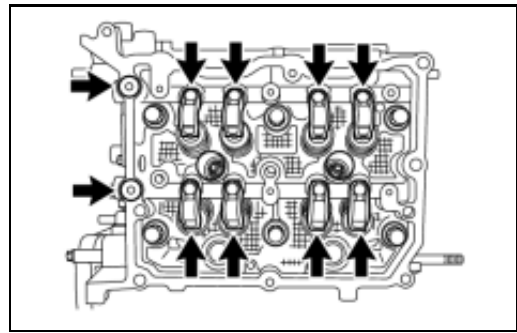
NOTICE:

Do not damage the cylinder head sub-assembly LH and camshaft housing sub-assembly LH.

- (c) Remove the 2 O-rings and 8 No. 1 valve rocker arm sub-assemblies from the cylinder head sub-assembly LH.

HINT:

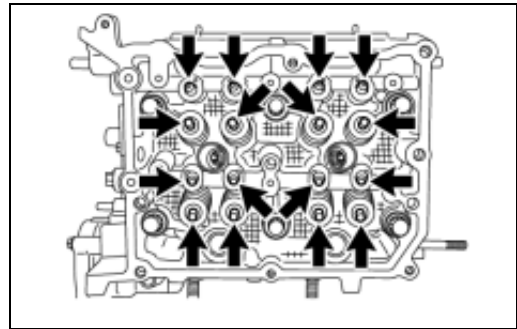
Arrange the removed parts in the correct order.



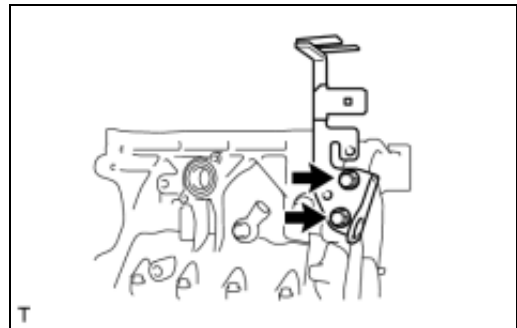
- (d) Remove the 8 valve adjusting shims and 8 roller rocker arm pivots from the cylinder head sub-assembly LH.

HINT:

Arrange the removed parts in the correct order.

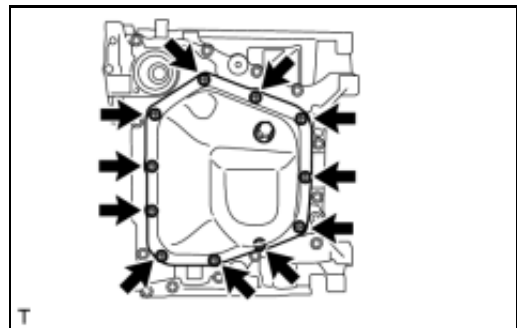
**41. REMOVE CYLINDER HEAD SUB-ASSEMBLY LH** INFO**42. REMOVE NO. 2 CYLINDER HEAD GASKET** INFO**43. REMOVE NO. 2 ENGINE HANGER**

- (a) Remove the 2 bolts and No. 2 engine hanger from the cylinder block (for bank 1).

**44. REMOVE NO. 2 OIL PAN SUB-ASSEMBLY**

- (a) Remove the drain plug and gasket.

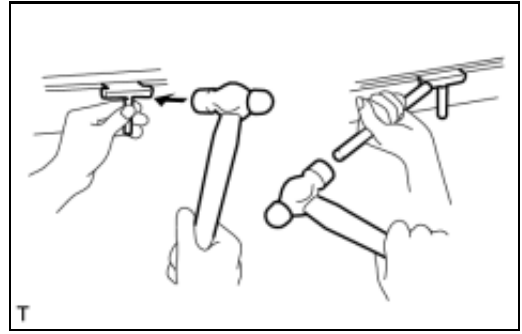
- (b) Remove the 11 bolts.



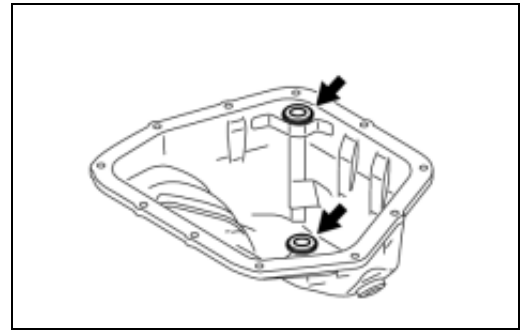
- (c) Using an oil pan seal cutter, remove the No. 2 oil pan sub-assembly.

NOTICE:

Do not damage the contact surface and flange part of the No. 2 oil pan sub-assembly.

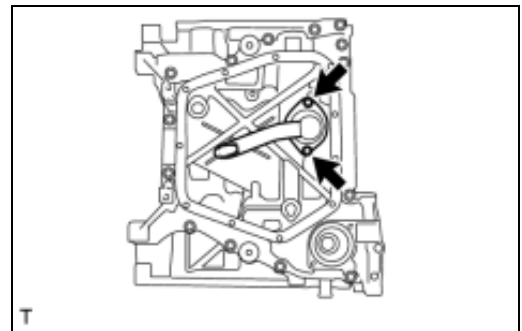


- (d) Remove the 2 seal rings from the No. 2 oil pan sub-assembly.



45. REMOVE OIL STRAINER SUB-ASSEMBLY

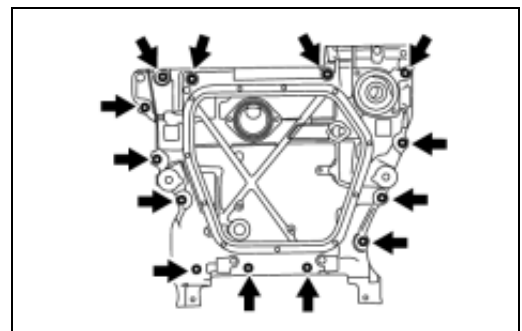
- (a) Remove the 2 bolts and oil strainer sub-assembly.



- (b) Remove the O-ring.

46. REMOVE OIL PAN SUB-ASSEMBLY

- (a) Remove the 13 bolts.

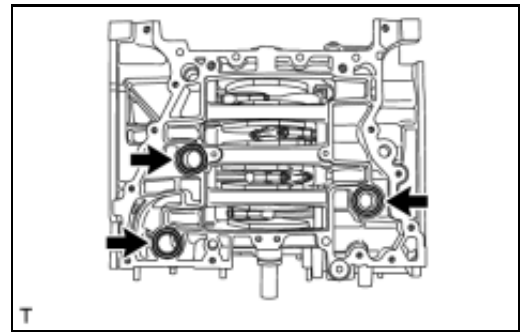


- (b) Using a screwdriver with its tip wrapped in protective tape, remove the oil pan sub-assembly.

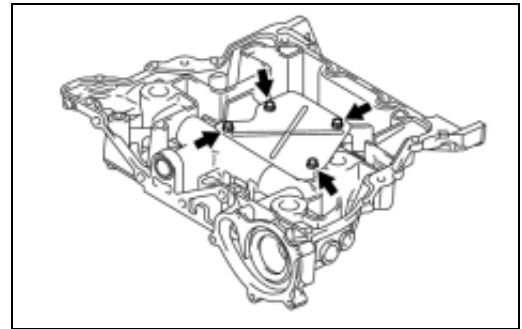
NOTICE:

Do not damage the cylinder block and oil pan sub-assembly.

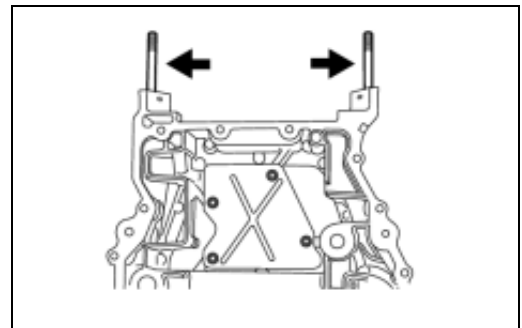
(c) Remove the 3 O-rings from the cylinder block.



(d) Remove the 4 bolts and baffle plate from the oil pan sub-assembly.



(e) Remove the 2 stud bolts from the oil pan sub-assembly.

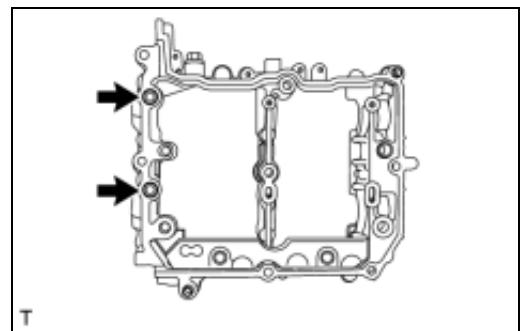


47. REMOVE CAMSHAFT BEARING CAP (for Bank 1) INFO

48. REMOVE CAMSHAFT (for Bank 1) INFO

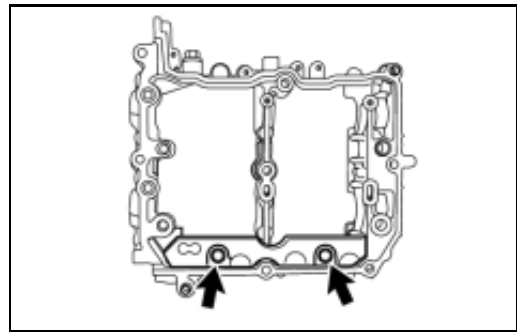
49. REMOVE OIL CONTROL VALVE FILTER (for Bank 1)

(a) Remove the 2 oil control valve filters from the camshaft housing sub-assembly RH.



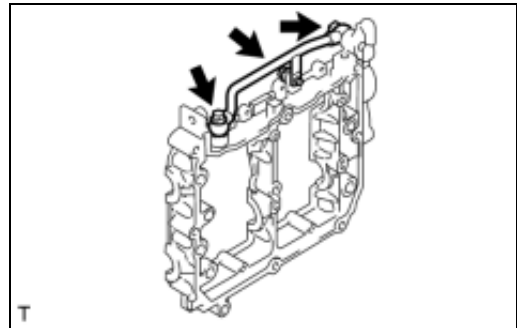
50. REMOVE OIL SPACER RH

- (a) Remove the 2 bolts and oil spacer RH.



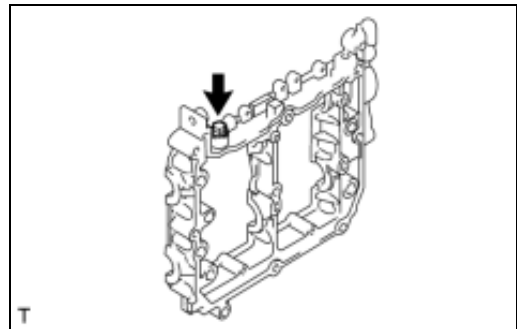
51. REMOVE CAMSHAFT OIL FEED PIPE SUB-ASSEMBLY (for Automatic Transmission)

- (a) Remove the 2 union bolts, the bolt, camshaft oil feed pipe sub-assembly and 2 gaskets from the camshaft housing sub-assembly RH.



52. REMOVE HOLE PLUG (for Manual Transmission)

- (a) Remove the hole plug and gasket from the camshaft housing sub-assembly RH.

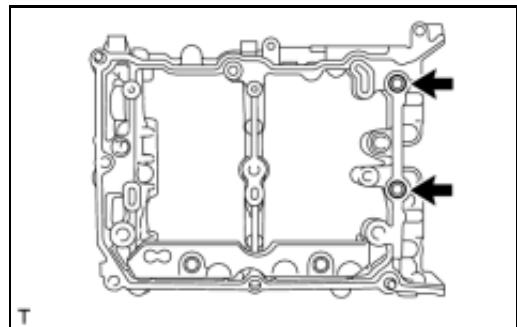


53. REMOVE CAMSHAFT BEARING CAP (for Bank 2) INFO

54. REMOVE CAMSHAFT (for Bank 2) INFO

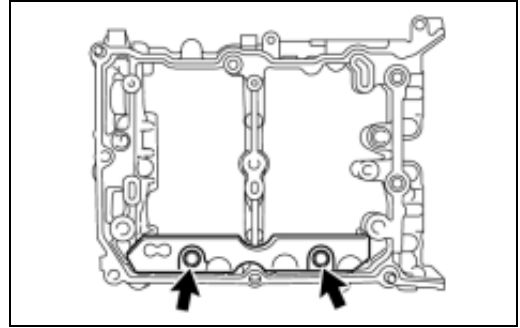
55. REMOVE OIL CONTROL VALVE FILTER (for Bank 2)

- (a) Remove the 2 oil control valve filters from the camshaft housing sub-assembly LH.



56. REMOVE OIL SPACER LH

(a) Remove the 2 bolts and oil spacer LH.



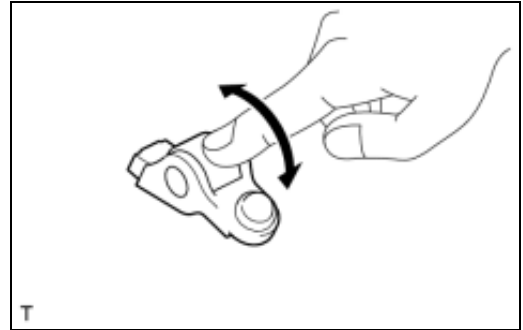
Last Modified: 4-14-2014	6.6 G	Doc ID: RM000000XCV08FX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: ENGINE UNIT: INSPECTION; 2013 MY FR-S [03/2012 -]		

INSPECTION

1. INSPECT NO. 1 VALVE ROCKER ARM SUB-ASSEMBLY

- (a) Check that the roller moves smoothly by rotating it by hand.

Replace the No. 1 valve rocker arm sub-assembly if the roller does not rotate smoothly.



2. INSPECT CHAIN SUB-ASSEMBLY

- (a) Check the chain sub-assembly for deformation, cracks or other damages.

If the chain sub-assembly has any defects, replace it.

3. INSPECT CAMSHAFT TIMING GEAR

- (a) Check the camshaft timing gear teeth for abnormal wear and scratches.

If the camshaft timing gear has any defects, replace it.

4. INSPECT CRANKSHAFT TIMING GEAR OR SPROCKET

- (a) Check the crankshaft timing gear or sprocket teeth for abnormal wear and scratches.

If necessary, replace it.

- (b) Check that there is no play between the crankshaft timing gear or sprocket and the key.

If necessary, replace the crankshaft timing gear or sprocket or the key.

5. INSPECT CHAIN TENSIONER SLIPPER

- (a) Check the chain tensioner slipper for deformation, cracks or other damages.

6. INSPECT NO. 1 CHAIN VIBRATION DAMPER

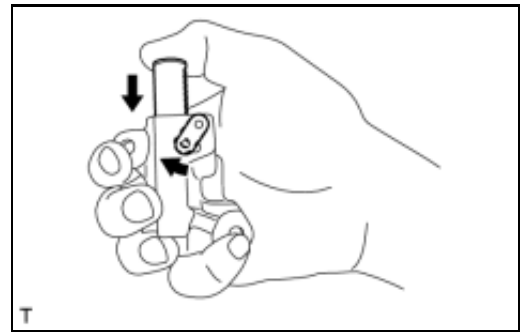
- (a) Check the No. 1 chain vibration damper for deformation, cracks or other damages.

7. INSPECT CHAIN TENSIONER ASSEMBLY

- (a) Check the chain tensioner assembly for deformation, cracks or other damages.

- (b) Check that the plunger moves smoothly when it is unlocked.

If the plunger does not move smoothly, replace the chain tensioner assembly.



- (c) Check that the plunger does not move when it is locked.

8. INSPECT CAMSHAFT HOUSING SUB-ASSEMBLY

- (a) Visually check the oil control valve filters, and if clogging is found, replace them with new ones.
- (b) Check the camshaft housing sub-assembly journals for damage and wear. Replace the camshaft housing sub-assembly if necessary.

9. INSPECT CAMSHAFT

- (a) Check the camshaft journals for damage and wear.

Replace the camshaft if necessary.

- (b) Check the cam face condition.

Replace the camshaft if uneven wear is found.

HINT:

Remove the minor faults by smoothing the surface with 400-grit sandpaper.

- (c) Inspect for runout.

- (1) Place the camshaft on V-blocks.

- (2) Using a dial indicator, measure the circle runout at the center journal.

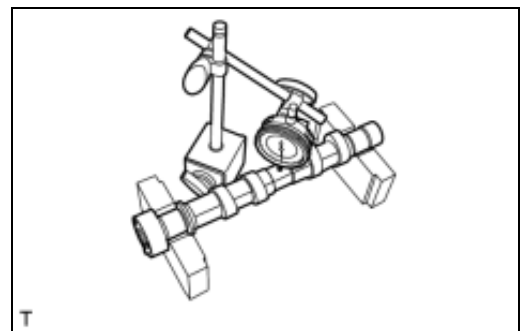
Maximum circle runout:

0.020 mm (0.00079 in.)

If the circle runout is more than the maximum, replace the camshaft.

HINT:

Measurement should be performed at a temperature of 20°C (68°F).



- (d) Inspect for cam height.

- (1) Using a micrometer, measure the cam lobe height.

Standard height (Intake):

POSITION	STANDARD

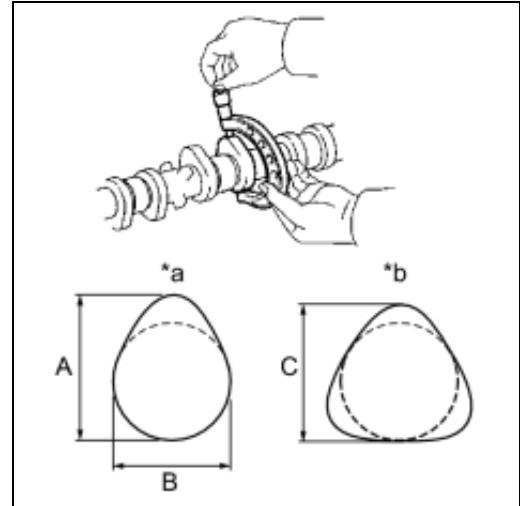
A	40.82 to 40.92 mm (1.6083 to 1.6110 in.)
B	34.0 mm (1.3386 in.)

Standard height (Exhaust):

POSITION	STANDARD
A	40.72 to 40.82 mm (1.6031 to 1.6071 in.)
B	34.0 mm (1.3386 in.)

Standard height (For fuel pump):

POSITION	STANDARD
C	40.55 to 40.65



Text in Illustration

*a	For Valve
*b	For Fuel Pump

If the result is not as specified, replace the camshaft.

HINT:

Measurement should be performed at a temperature of 20°C (68°F).

(e) Inspect for camshaft journals.

(1) Using a micrometer, measure the journal diameter.

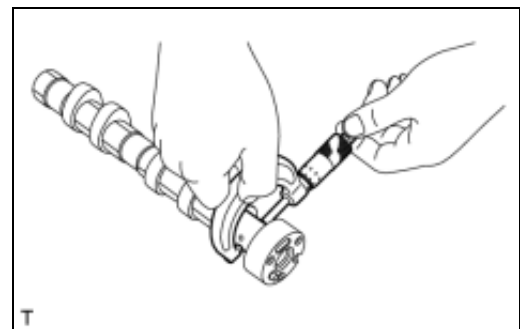
Standard journal diameter:

25.946 to 25.963 mm (1.02149 to 1.02216 in.)

If the result is not as specified, check the oil clearance.

HINT:

Measurement should be performed at a temperature of 20°C (68°F).



10. INSPECT CAMSHAFT OIL CLEARANCE

(a) Using a dial indicator, measure the thrust clearance while moving the camshaft back and forth.

Standard thrust clearance:

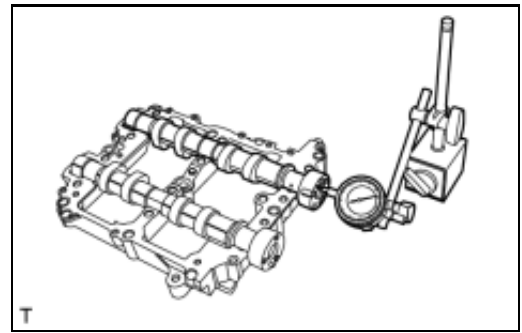
0.0068 to 0.1160 mm (0.00027 to 0.00457 in.)

If the clearance is not as specified or if uneven wear is found, replace each camshaft cap and camshaft housing

as a set. If necessary replace the camshaft.

HINT:

- Measurement should be performed at a temperature of 20°C (68°F).
- Set the dial indicator at the end surface of the camshaft.

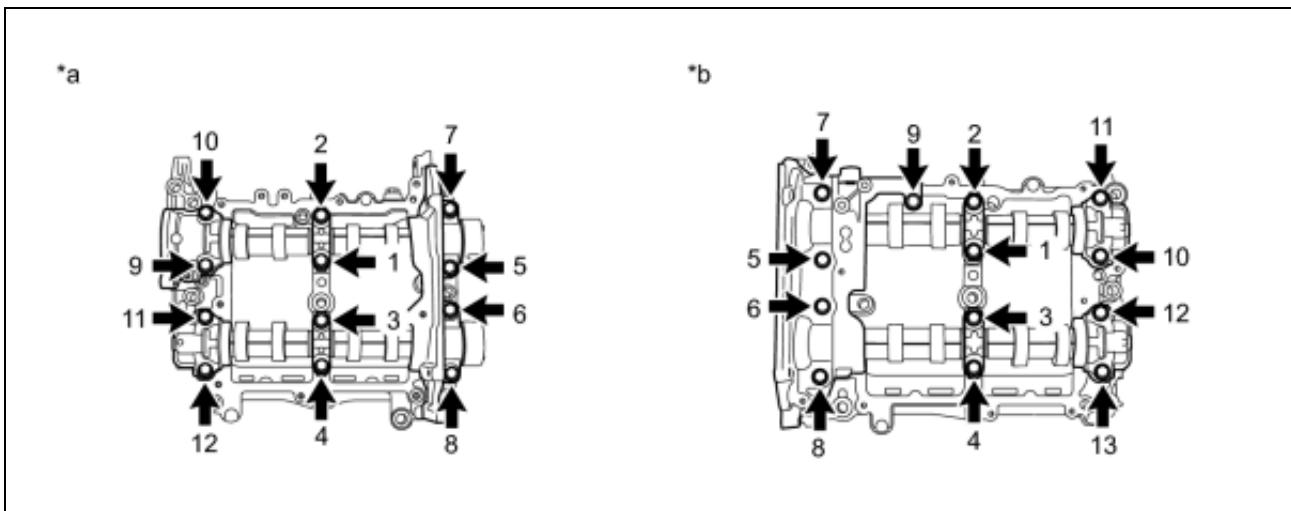


11. INSPECT CAMSHAFT OIL CLEARANCE

HINT:

Measurement should be performed at a temperature of 20°C (68°F).

- Remove the seal packing from camshaft housing and front camshaft cap, intake rear camshaft cap and exhaust rear camshaft cap.
- Clean each camshaft cap and camshaft housing journal.
- Set the camshafts on the camshaft housing.
- Place a plastigauge across the camshaft journals and set the camshaft caps.
- Tighten the bolts in the order shown in the illustration to install the front camshaft cap, intake center camshaft cap, intake rear camshaft cap, exhaust center camshaft cap and exhaust rear camshaft cap.



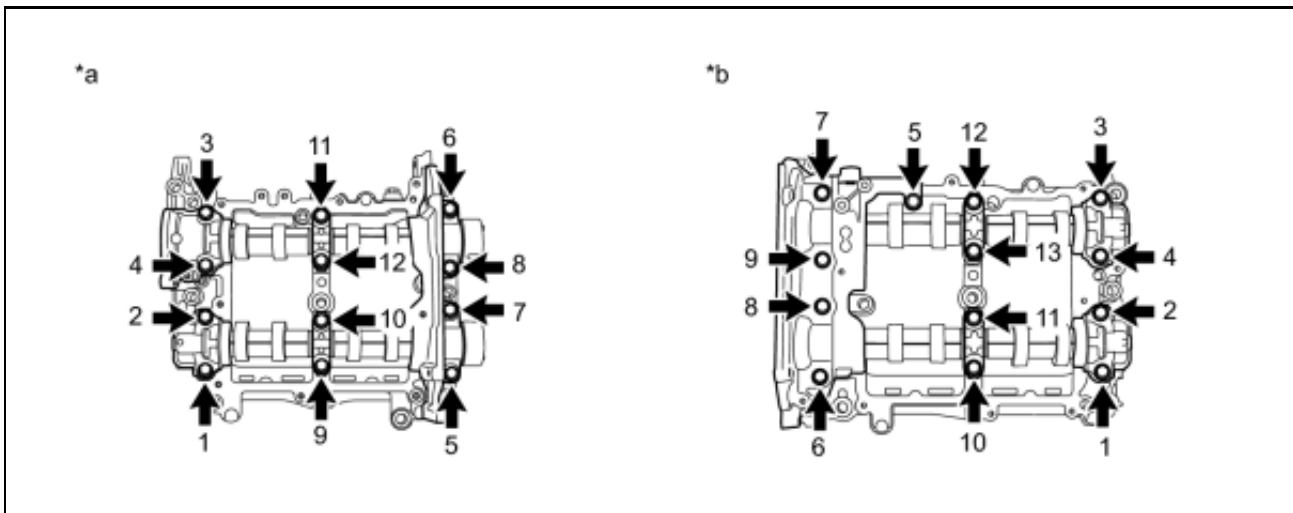
Text in Illustration

*a	for Bank 1	*b	for Bank 2
----	------------	----	------------

Torque:

18 N·m {184 kgf·cm, 13ft·lbf}

- Using several steps, uniformly loosen the bolts in the order shown in the illustration, and remove the front camshaft cap, intake center camshaft cap, intake rear camshaft cap, exhaust center camshaft cap and exhaust rear camshaft cap.



Text in Illustration

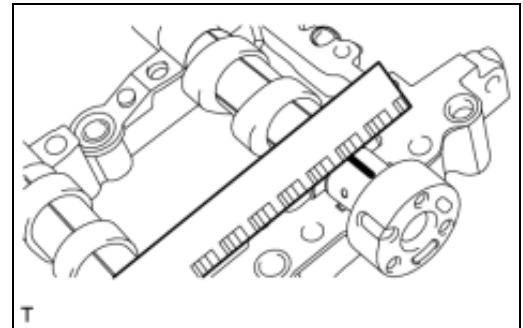
*a	for Bank 1	*b	for Bank 2
----	------------	----	------------

(g) Measure the widest point of the plastigauge on each journal.

Standard oil clearance:

0.037 to 0.072 mm (0.00146 to 0.00283 in.)

If the clearance is not as specified, replace each camshaft cap and camshaft housing as a set. If necessary, replace the camshaft.



(h) Completely remove the plastigauge.



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000N81019X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: ENGINE UNIT: INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL IGNITION COIL ASSEMBLY

(a) Install the 4 ignition coils with the 4 bolts.

Torque:

8.5 N·m {87 kgf·cm, 75in·lbf}

2. INSTALL NO. 1 WATER BY-PASS PIPE (for Manual Transmission)

(a) Install the No. 1 water by-pass pipe with the 2 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}

(b) Connect the water by-pass hose with the hose clamp.

3. INSTALL NO. 1 WATER BY-PASS PIPE (for Automatic Transmission)

(a) Install the No. 1 water by-pass pipe with the 2 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}

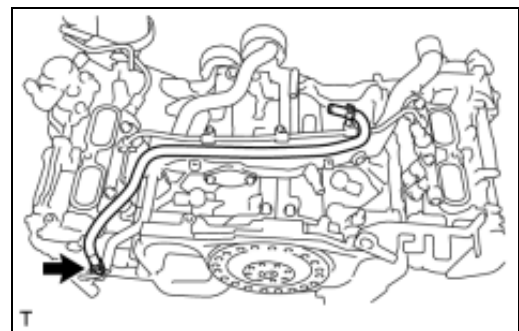
(b) Connect the 2 water by-pass hoses with the 2 hose clamps.

4. CONNECT NO. 3 TRANSMISSION OIL COOLER HOSE (for Automatic Transmission)

(a) Connect the No. 3 transmission oil cooler hose with the hose clamp.

5. INSTALL NO. 2 WATER BY-PASS HOSE

(a) Connect the No. 2 water by-pass hose with the clamp.



6. CONNECT NO. 2 VENTILATION HOSE

(a) Connect the No. 2 ventilation hose.

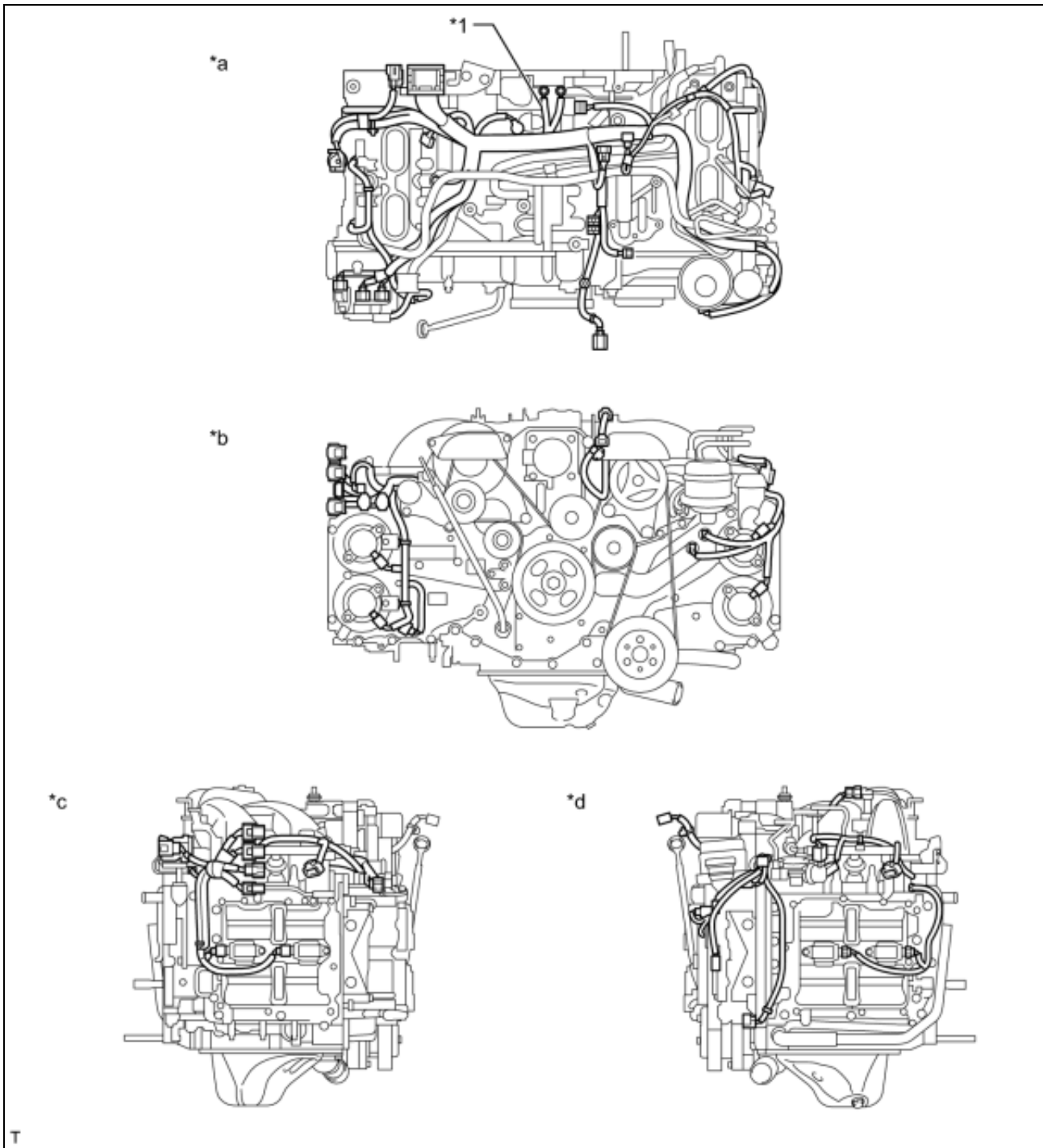
7. INSTALL ENGINE WIRE

(a) Connect the ground wire with the 2 bolts.

Torque:

19 N·m {194 kgf·cm, 14ft·lbf}

(b) Connect each connector and each clamp to fix the engine wire as shown in the illustration, and check that the engine wire is correctly installed.



Text in Illustration

*1	Ground Wire	-	-
*a	Upper side	*b	Front side
*c	Right side	*d	Left side

8. INSTALL PUMP DRIVE CASE ASSEMBLY INFO

9. INSTALL VALVE LIFTER INFO

10. INSTALL FUEL PUMP ASSEMBLY INFO**11. INSTALL FUEL INJECTOR O-RING** INFO**12. INSTALL FUEL INJECTOR ASSEMBLY** INFO**13. INSTALL FUEL DELIVERY PIPE LH** INFO**14. INSTALL FUEL DELIVERY PIPE RH** INFO**15. INSTALL FUEL DELIVERY PIPE** INFO**16. INSTALL NO. 2 FUEL DELIVERY PIPE** INFO**17. INSTALL INTAKE MANIFOLD**

- (a) Install 2 new gaskets to the intake manifold.
- (b) Install the intake manifold with the 6 bolts.

Torque:

25 N·m {255 kgf·cm, 18ft·lbf}

- (c) Engage the 2 clamps and connect the 4 connectors.
- (d) Connect the fuel pump connector.
- (e) Connect the No. 1 vacuum switching valve assembly connector.
- (f) Connect the vacuum sensor connector.
- (g) Connect the 2 water by-pass hoses to the throttle body assembly.
- (h) Connect the throttle body assembly connector.

18. CONNECT VENTILATION HOSE INFO**19. INSTALL FUEL DELIVERY PIPE SUB-ASSEMBLY**

- (a) Install the fuel delivery pipe sub-assembly to the fuel pump assembly with a new gasket and the union bolt.

Torque:

31 N·m {316 kgf·cm, 23ft·lbf}

- (b) Connect the No. 2 fuel vapor feed hose.
- (c) Install the bolt and connect the fuel delivery pipe sub-assembly.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}

20. INSTALL INJECTOR COVER (for Bank 2)

- (a) Install the injector cover to the intake manifold with the 2 bolts.

Torque:

19 N·m {194 kgf·cm, 14ft·lbf}

21. INSTALL INJECTOR COVER (for Bank 1)

- (a) Install the injector cover to the intake manifold with the 2 bolts.

Torque:

19 N·m {194 kgf·cm, 14ft·lbf}

22. INSTALL COMPRESSOR WITH MAGNET CLUTCH INFO

23. INSTALL V-RIBBED BELT TENSIONER ASSEMBLY INFO

24. INSTALL NO. 2 IDLER PULLEY SUB-ASSEMBLY INFO

25. INSTALL OIL LEVEL DIPSTICK GUIDE INFO

26. INSTALL GENERATOR ASSEMBLY

(a) Install the generator assembly with the 2 bolts.

Torque:

25 N·m {255 kgf·cm, 18ft·lbf}

27. INSTALL FAN AND GENERATOR V BELT INFO

28. INSTALL BELT GENERATOR COVER INFO

29. INSTALL GENERATOR COVER INFO



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000T4Y0BBX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: ENGINE UNIT: REASSEMBLY; 2013 MY FR-S [03/2012 -]		

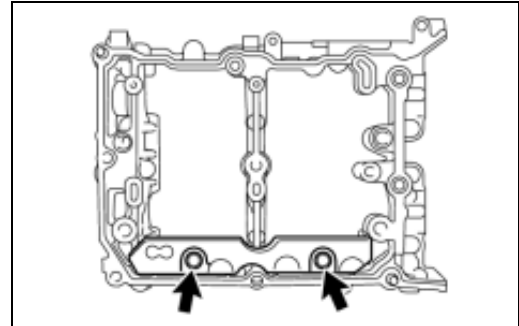
REASSEMBLY

1. INSTALL OIL SPACER LH

(a) Install the oil spacer LH with the 2 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}

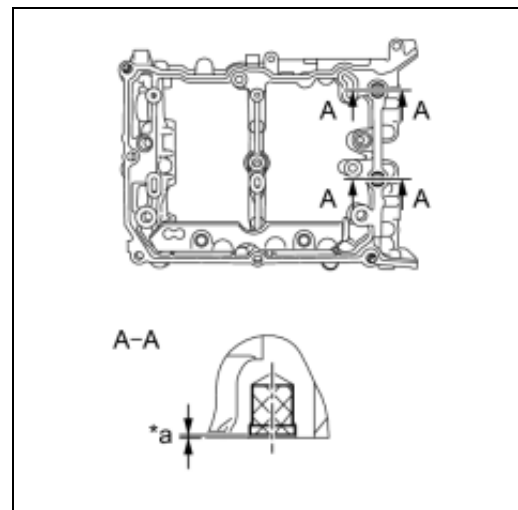


2. INSTALL OIL CONTROL VALVE FILTER (for Bank 2)

(a) Install 2 new oil control valve filters to the camshaft housing sub-assembly LH as shown in the illustration.

Text in Illustration

*a	0 to 0.5 mm (0 to 0.0197 in.) from the face of the camshaft housing sub-assembly LH
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3. INSTALL CAMSHAFT (for Bank 2) INFO

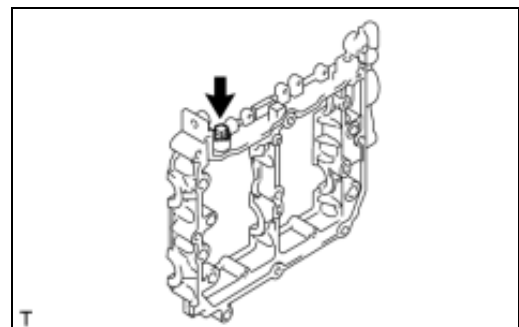
4. INSTALL CAMSHAFT CAP (for Bank 2) INFO

5. INSTALL HOLE PLUG (for Manual Transmission)

(a) Install a new gasket and the hole plug to the camshaft housing sub-assembly RH.

Torque:

25 N·m {255 kgf·cm, 18ft·lbf}



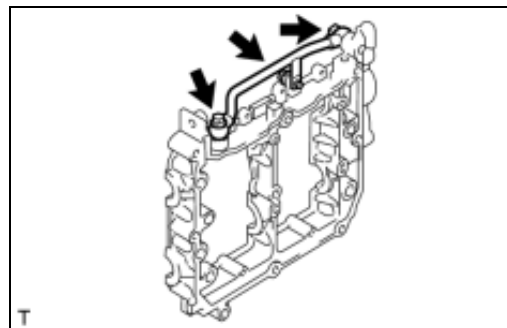
6. INSTALL CAMSHAFT OIL FEED PIPE SUB-ASSEMBLY (for Automatic Transmission)

- (a) Temporarily install 2 new gaskets and the camshaft oil feed pipe sub-assembly with the bolt and 2 union bolts.

- (b) Tighten the 2 union bolts to the specified torque.

Torque:

31 N·m {316 kgf·cm, 23ft·lbf}



- (c) Tighten the bolt to the specified torque.

Torque:

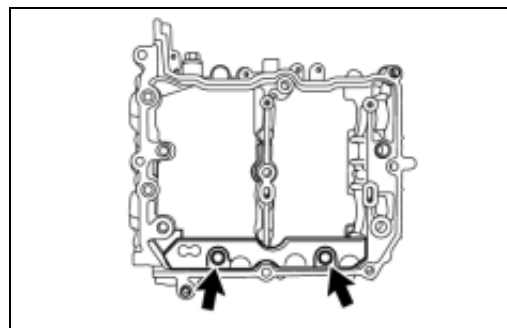
6.4 N·m {65 kgf·cm, 57in·lbf}

7. INSTALL OIL SPACER RH

- (a) Install the oil spacer RH with the 2 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}

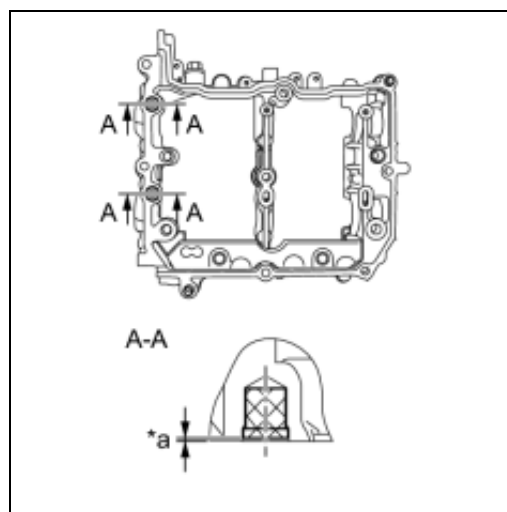


8. INSTALL OIL CONTROL VALVE FILTER (for Bank 1)

- (a) Install 2 new oil control valve filters to the camshaft housing sub-assembly RH as shown in the illustration.

Text in Illustration

*a	0 to 0.5 mm (0 to 0.0197 in.) from the face of the camshaft housing sub-assembly RH
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9. INSTALL CAMSHAFT (for Bank 1) INFO

10. INSTALL CAMSHAFT CAP (for Bank 1) INFO**11. INSTALL OIL PAN SUB-ASSEMBLY**

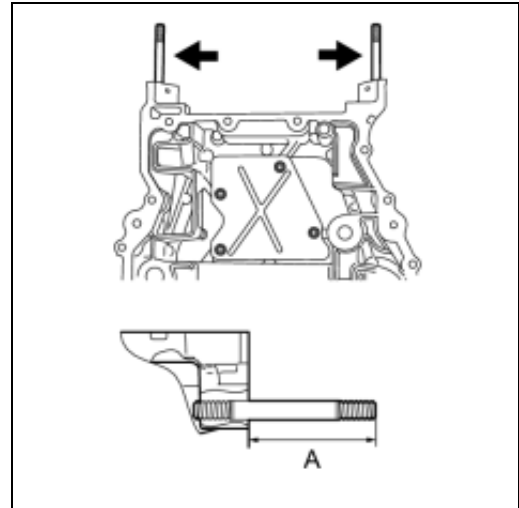
(a) Install the 2 stud bolts to the oil pan sub-assembly.

Torque:

10 N·m {102 kgf·cm, 7ft·lbf}

Standard height (A):

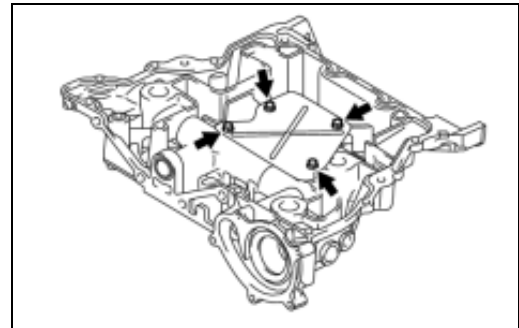
70.0 mm (2.756 in.)



(b) Install the baffle plate to the oil pan sub-assembly with the 4 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}



(c) Apply seal packing in a continuous line as shown in the illustration.

Seal packing:

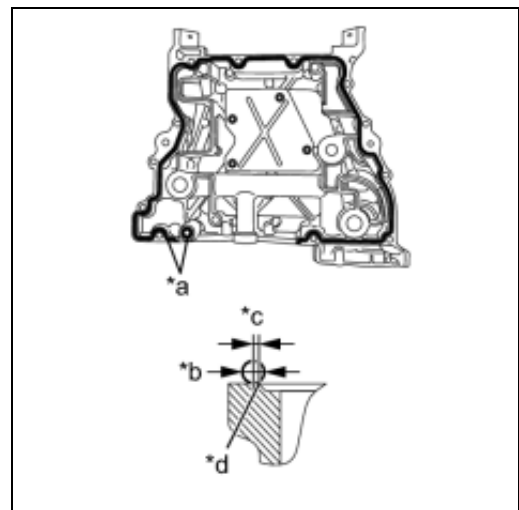
Three Bond 1217G, 1217H or equivalent

Text in Illustration

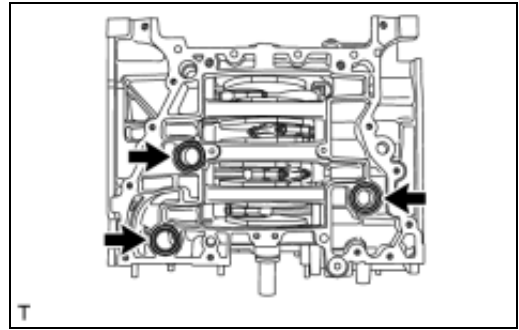
*a	Seal Packing
*b	φ4.0 to 6.0 mm (0.158 to 0.236 in.)
*c	1.5 mm (0.059 in.)
*d	Chamfer edge

NOTICE:

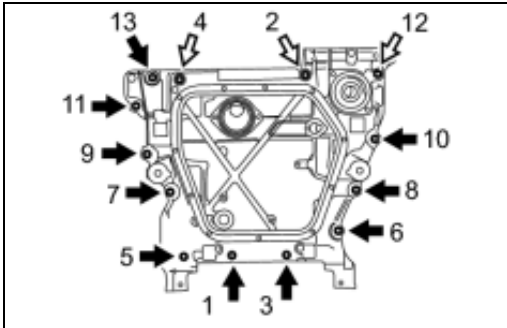
- Clean and degrease the contact surface.
- Install the oil pan sub-assembly within 5 minutes of applying seal packing.
- Apply seal packing 1.5 mm (0.0591 in.) away from the outer side of the chamfer edge. However, it is allowed to apply the seal packing on the chamfer around the bolt hole.





(d) Install 3 new O-rings to the cylinder block.



(e) Tighten the 13 bolts in the order shown in the illustration to install the oil pan sub-assembly to the cylinder block.



Text in Illustration

	Bolt A
	Bolt B

Length of bolt A:
 25.0 mm (0.984 in.)
 Length of bolt B:
 75.0 mm (2.953 in.)

HINT:

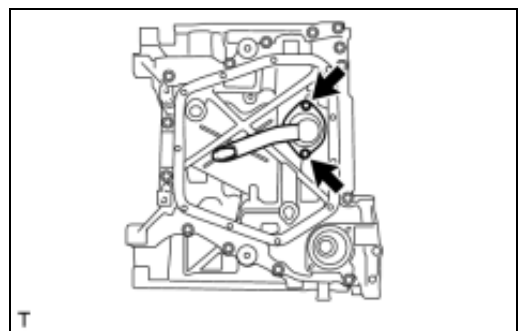
After tightening the bolts, if the seal packing is squeezed out onto the seal surface of the chain cover, completely remove it.

12. INSTALL OIL STRAINER SUB-ASSEMBLY

- (a) Install a new O-ring.
- (b) Install the oil strainer sub-assembly to the oil pan sub-assembly with the 2 bolts.

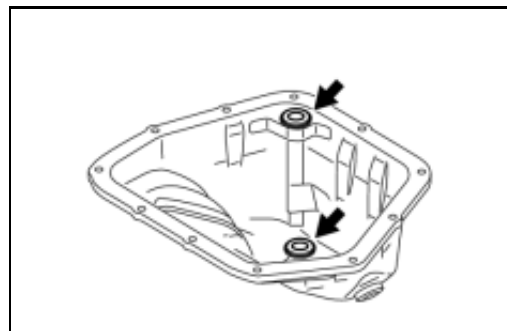
Torque:

6.4 N·m { 65 kgf·cm, 57in·lbf }



13. INSTALL NO. 2 OIL PAN SUB-ASSEMBLY

- (a) Install 2 new oil pan seal rings to the No. 2 oil pan sub-assembly.



- (b) Apply seal packing in a continuous line as shown in the illustration.

Seal packing:

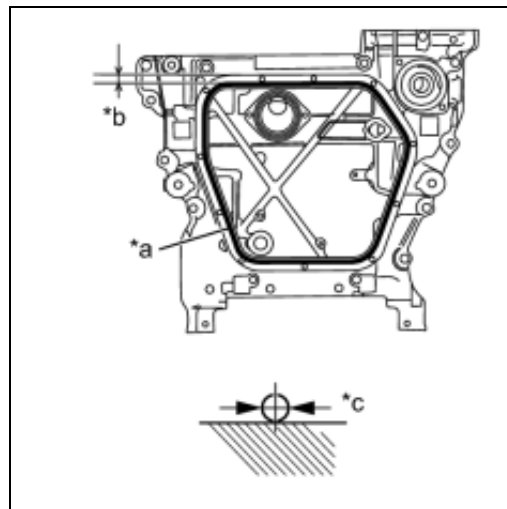
Three Bond 1217G, 1217H or equivalent

NOTICE:

- Clean and degrease the contact surface.
- Install the No. 2 oil pan sub-assembly within 5 minutes of applying seal packing.

Text in Illustration

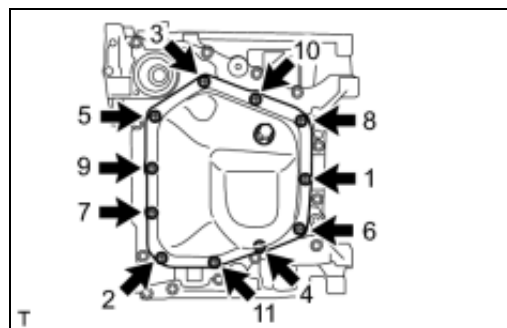
*a	Seal Packing
*b	9.5 mm (0.374 in.)
*c	φ4.0 to 6.0 mm (0.158 to 0.236 in.)



- (c) Tighten the 11 bolts in the order shown in the illustration to install the No. 2 oil pan sub-assembly.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}



- (d) Install a new gasket and the drain plug.

Torque:

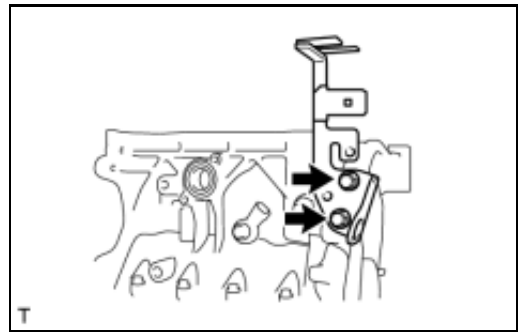
42 N·m {425 kgf·cm, 31ft·lbf}

14. INSTALL NO. 2 ENGINE HANGER

- (a) Install the No. 2 engine hanger to the cylinder block (for bank 1) with the 2 bolts.

Torque:

21 N·m {214 kgf·cm, 16ft·lbf}

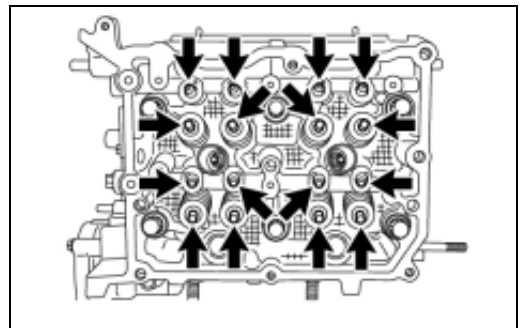


15. INSTALL NO. 2 CYLINDER HEAD GASKET INFO

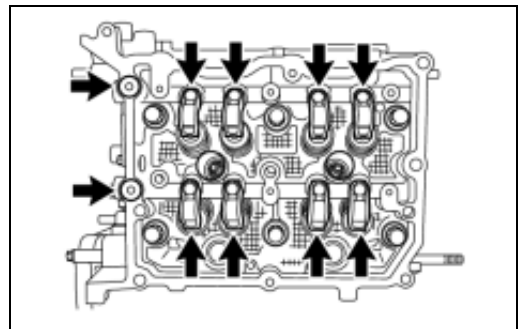
16. INSTALL CYLINDER HEAD SUB-ASSEMBLY LH INFO

17. INSTALL CAMSHAFT HOUSING SUB-ASSEMBLY LH

- (a) Apply engine oil to the 8 valve adjusting shims and 8 roller rocker arm pivots, and then install them to the cylinder head sub-assembly LH.



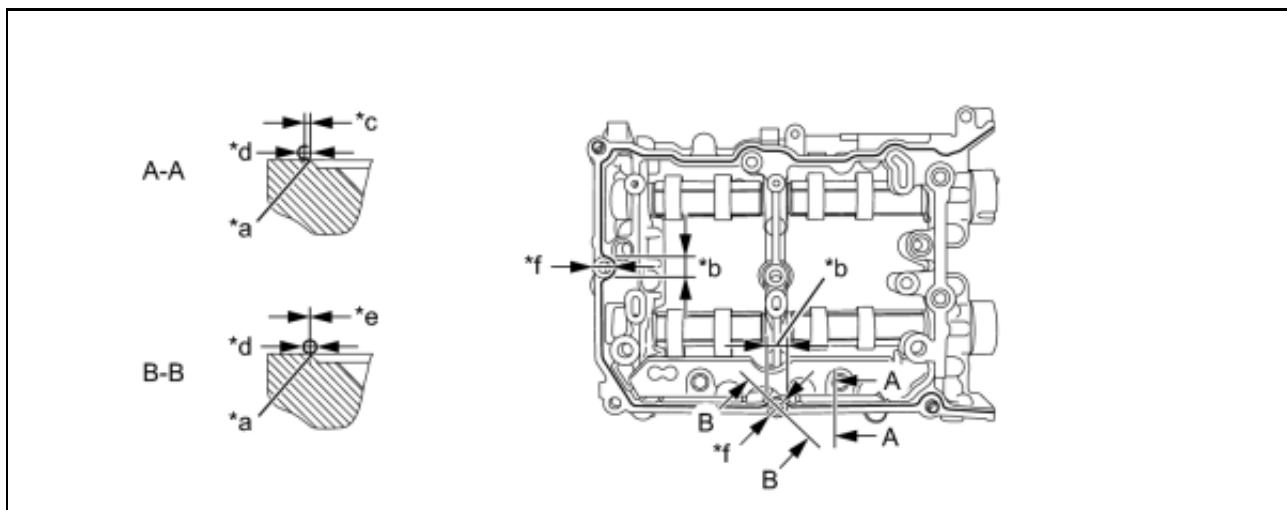
- (b) Apply engine oil to 2 new O-rings and the 8 No. 1 valve rocker arm sub-assemblies, and then install them to the cylinder head sub-assembly LH.



- (c) Apply seal packing in a continuous line as shown in the illustration.

Seal packing:

Three Bond 1217G, 1217H or equivalent



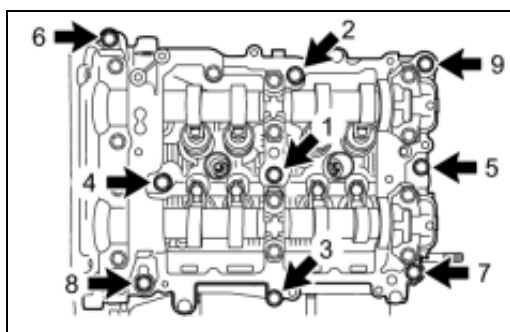
Text in Illustration

*a	Chamfer edge	*b	Range of B-B
*c	within 1.0 mm (0.0394 in.)	*d	φ2.5 to 3.5 mm (0.098 to 0.138 in.)
*e	-0.5 to 0.5 mm (-0.0197 to 0.0197 in.)	*f	18.0 mm (0.709 in.)

NOTICE:

- Clean and degrease the contact surface.
- Do not apply excessive seal packing.
- Install the camshaft housing sub-assembly LH within 5 minutes of applying seal packing.
- After tightening the bolts, if the seal packing is squeezed out onto the seal surface of the chain cover, completely remove it.

(d) Tighten the 9 bolts in the order shown in the illustration to install the camshaft housing sub-assembly LH.

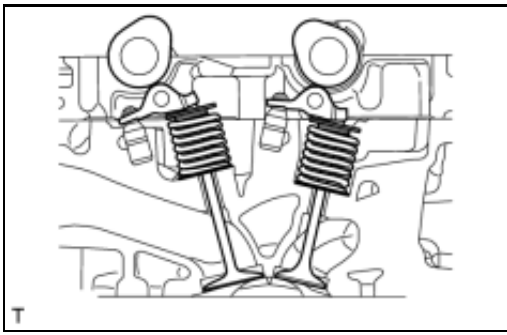


Torque:

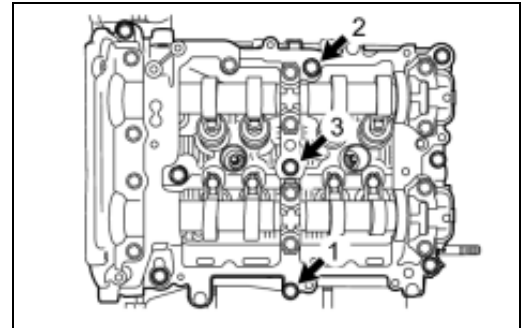
18 N·m {184 kgf·cm, 13ft·lbf}

HINT:

Set the intake camshaft LH and the exhaust camshaft LH to the zero-lift position.



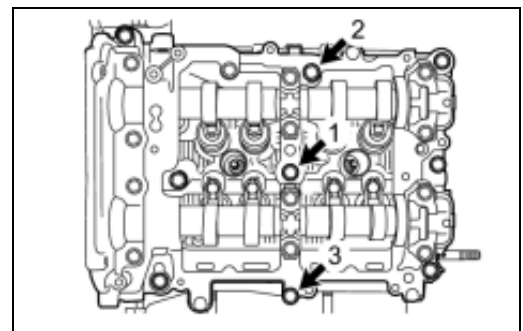
(e) Loosen the 3 bolts by 180° in the order shown in the illustration.



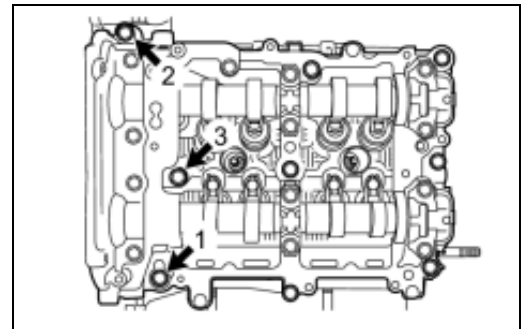
(f) Tighten the 3 bolts in the order shown in the illustration.

Torque:

18 N·m {184 kgf·cm, 13ft·lbf}



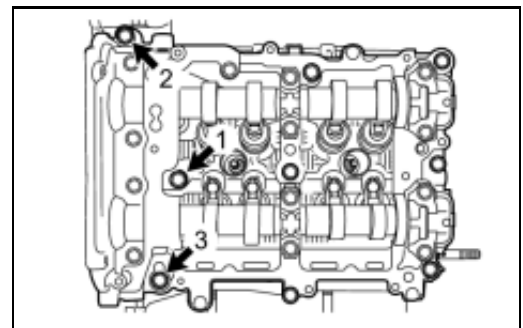
(g) Loosen the 3 bolts by 180° in the order shown in the illustration.



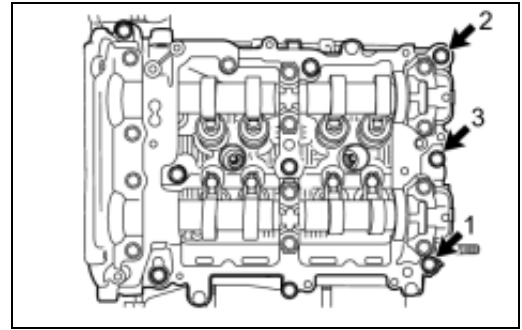
(h) Tighten the 3 bolts in the order shown in the illustration.

Torque:

18 N·m {184 kgf·cm, 13ft·lbf}



- (i) Loosen the 3 bolts by 180° in the order shown in the illustration.



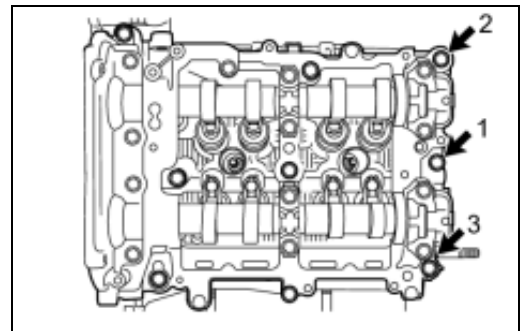
- (j) Tighten the 3 bolts in the order shown in the illustration.

Torque:

18 N·m {184 kgf·cm, 13ft·lbf}

HINT:

After tightening the bolts, if the seal packing is squeezed out onto the seal surface of the chain cover, completely remove it.

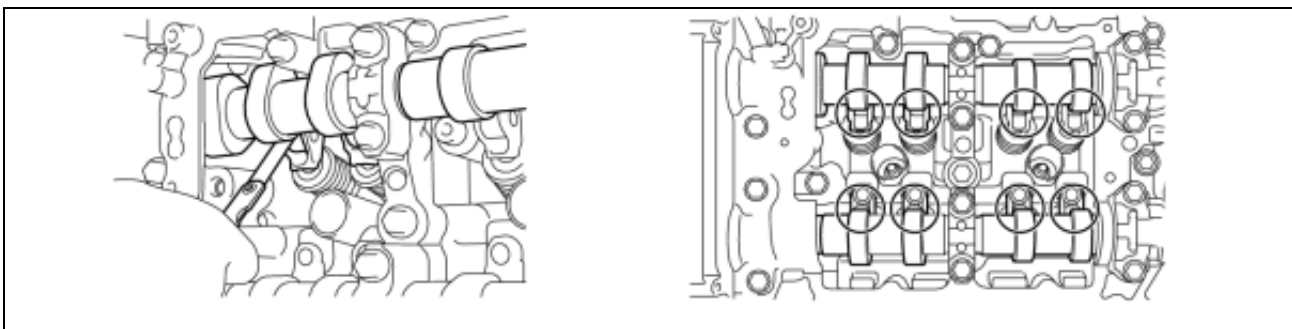


18. INSPECT VALVE CLEARANCE (for Bank 2)

NOTICE:

With the chain sub-assembly (for bank 2) removed, valve heads may contact each other if the camshafts are turned, causing the valve stems to bend. To avoid this, do not turn the intake camshaft LH and exhaust camshaft LH more than the zero-lift range (The range where the camshafts can be turned lightly by hand).

- (a) Using a feeler gauge, check the valve clearance between the cam base circle and the roller surface of the No. 1 valve rocker arm sub-assembly.



Standard valve clearance (cold):

0.10 to 0.16 mm (0.0039 to 0.0063 in.) for intake

0.21 to 0.27 mm (0.0083 to 0.0106 in.) for exhaust

HINT:

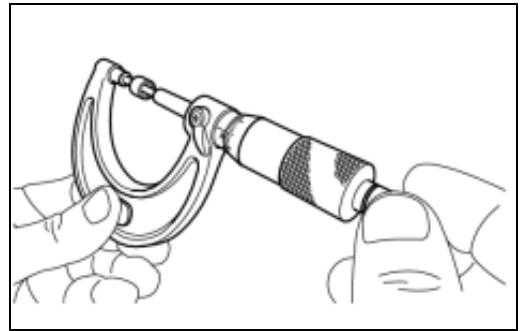
- Set the intake camshaft LH and the exhaust camshaft LH to the zero-lift position.
- If the clearance is not as specified, take notes of the value in order to adjust the valve clearance later on.

19. ADJUST VALVE CLEARANCE (for Bank 2)

- (a) Remove the camshaft housing sub-assembly LH.
- (b) Remove the No. 1 valve rocker arm sub-assemblies.

(c) Remove the valve adjusting shims.

(d) Using a micrometer, measure the thickness of the valve adjusting shims.



(e) Calculate the thickness of the valve adjusting shim so that the valve clearance comes within the specified values.

Intake side:

$$A = B + (C - 0.13 \text{ mm (0.0051 in.)}) \times 1.54$$

Exhaust side:

$$A = B + (C - 0.24 \text{ mm (0.0094 in.)}) \times 1.69$$

A:

Required valve adjusting shim thickness

B:

Removed valve adjusting shim thickness

C:

Measured valve clearance

(f) Apply engine oil to the inner face of the valve adjusting shims and install them to the valves.

NOTICE:

Check if the shims can be rotated smoothly on the valves.

(g) Install the No. 1 valve rocker arm sub-assemblies.

(h) Install the camshaft housing sub-assembly LH.

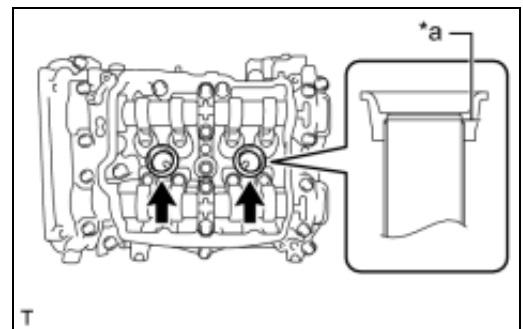
(i) Check that the No. 1 valve rocker arm sub-assemblies are correctly installed.

20. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY LH

(a) Apply a light layer of engine oil to 2 new spark plug tube gaskets and install them to the spark plug tubes as shown in the illustration.

Text in Illustration

*a	Spark plug tube edge
----	----------------------



(b) Install a new cylinder head cover gasket to the cylinder head cover sub-assembly LH.

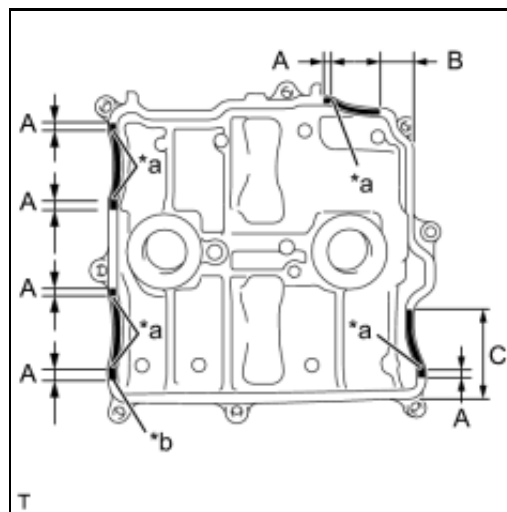
(c) Apply seal packing to the mating surface of cylinder head cover sub-assembly LH as shown in the illustration.

Seal packing:
Three Bond 1217G, 1217H or equivalent

AREA	APPLICATION LENGTH
A	10.0 mm (0.394 in.) or more
B	18.8 mm (0.740 in.) or more
C	63.0 mm (2.480 in.) or more

Text in Illustration

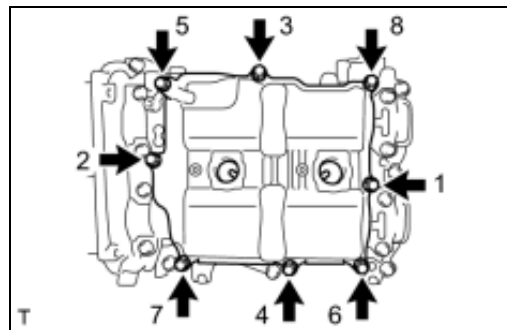
*a	Arch starting point
*b	φ2,0 to 4.0 mm (0.079 to 0.158 in.)



(d) Tighten the 8 bolts in the order shown in the illustration and install the cylinder head cover sub-assembly LH.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}

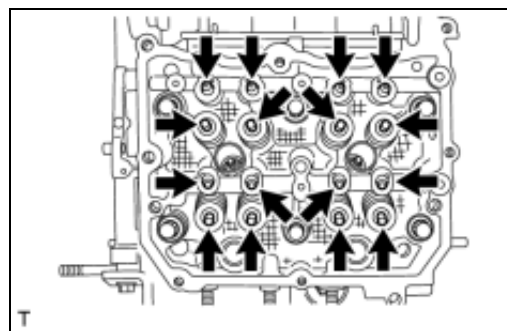


21. INSTALL CYLINDER HEAD GASKET INFO

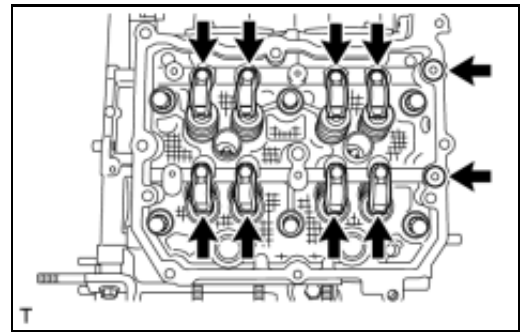
22. INSTALL CYLINDER HEAD SUB-ASSEMBLY RH INFO

23. INSTALL CAMSHAFT HOUSING SUB-ASSEMBLY RH

(a) Apply engine oil to the 8 valve adjusting shims and 8 roller rocker arm pivots, and then install them to the cylinder head sub-assembly.



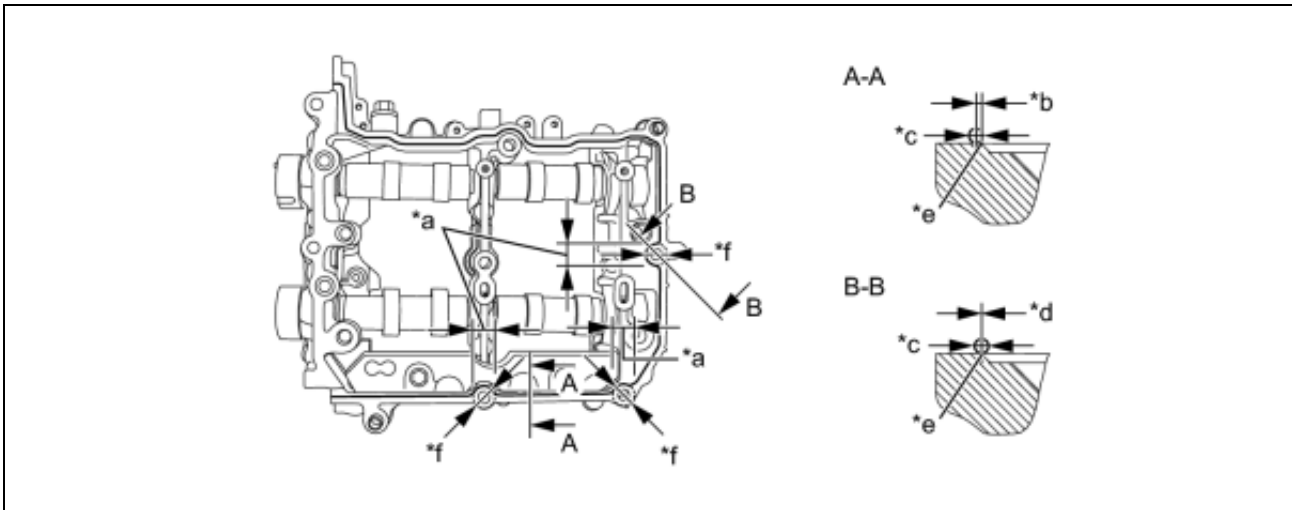
(b) Apply engine oil to 2 new O-rings and the 8 No. 1 valve rocker arm sub-assemblies, and then install them to the cylinder head sub-assembly.



(c) Apply seal packing in a continuous line as shown in the illustration.

Seal packing:

Three Bond 1217G, 1217H or equivalent



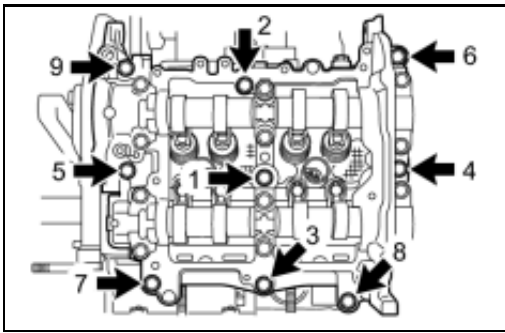
Text in Illustration

*a	Range of B-B	*b	0 to 1.0 mm (0 to 0.0394 in.)
*c	φ2.5 to 3.5 mm (0.098 to 0.138 in.)	*d	-0.5 to 0.5 mm (-0.0197 to 0.0197 in.)
*e	Chamfer edge	*f	18.0 mm (0.709 in.)

NOTICE:

- Clean and degrease the contact surface.
- Do not apply excessive seal packing.
- Install the camshaft housing sub-assembly RH within 5 minutes of applying seal packing.
- After tightening the bolts, if the seal packing is squeezed out onto the seal surface of the chain cover, completely remove it.

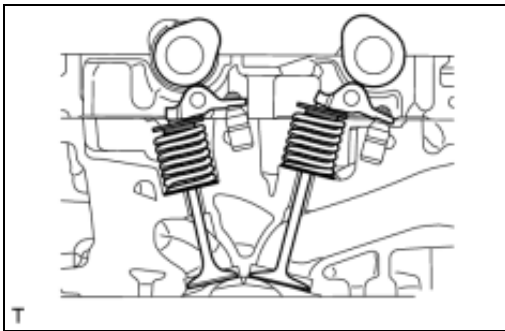
(d) Tighten the 9 bolts in the order shown in the illustration to install the camshaft housing sub-assembly RH.

**Torque:**

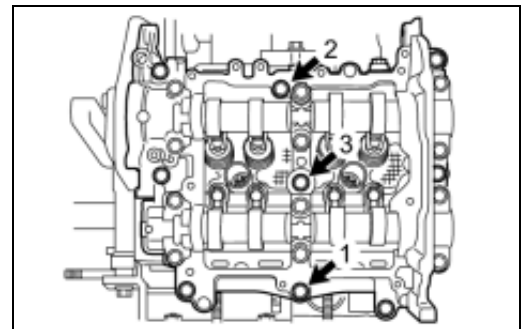
18 N·m {184 kgf·cm, 13ft·lbf}

HINT:

Set the intake camshaft RH and the exhaust camshaft RH to the zero-lift position.



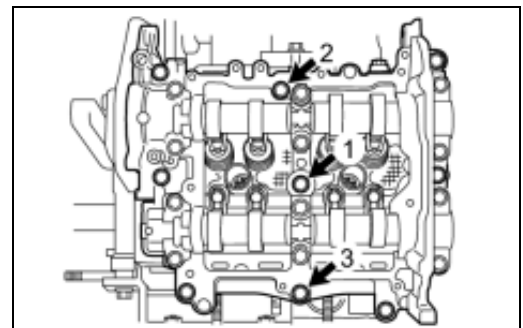
(e) Loosen the 3 bolts by 180° in the order shown in the illustration.



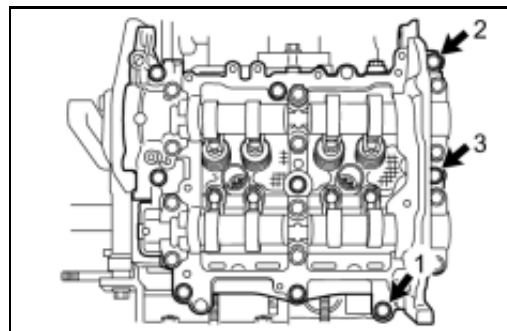
(f) Tighten the 3 bolts in the order shown in the illustration.

Torque:

18 N·m {184 kgf·cm, 13ft·lbf}



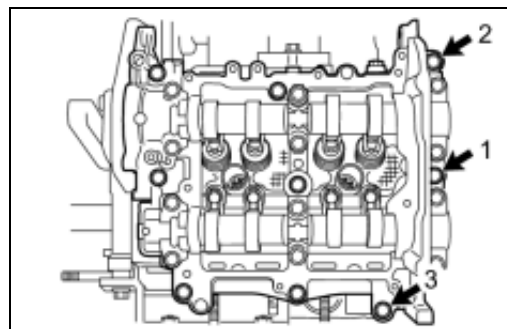
- (g) Loosen the 3 bolts by 180° in the order shown in the illustration.



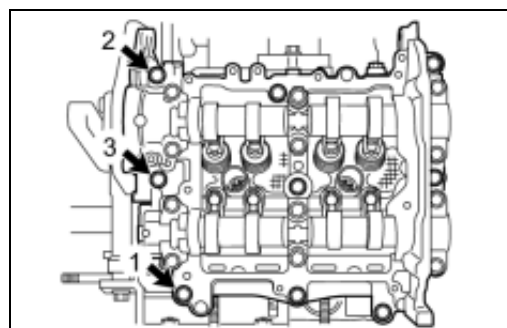
- (h) Tighten the 3 bolts in the order shown in the illustration.

Torque:

18 N·m {184 kgf·cm, 13ft·lbf}



- (i) Loosen the 3 bolts by 180° in the order shown in the illustration.



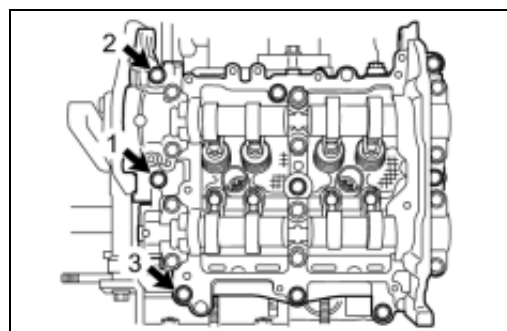
- (j) Tighten the 3 bolts in the order shown in the illustration.

Torque:

18 N·m {184 kgf·cm, 13ft·lbf}

HINT:

After tightening the bolts, if the seal packing is squeezed out onto the seal surface of the chain cover, completely remove it.

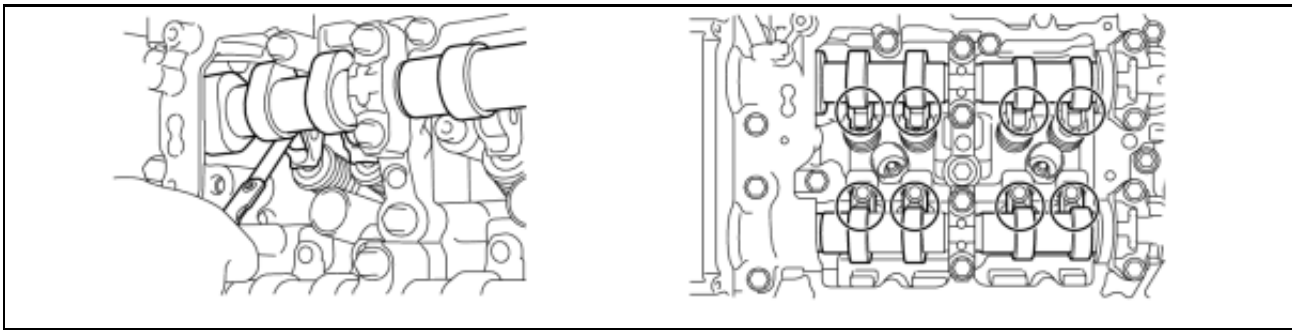


24. INSPECT VALVE CLEARANCE (for Bank 1)

NOTICE:

With the chain sub-assembly (for bank 1) removed, valve heads may contact each other if the camshafts are turned, causing the valve stems to bend. To avoid this, do not turn the intake camshaft RH and exhaust camshaft RH more than the zero-lift range (The range where the camshafts can be turned lightly by hand).

- (a) Using a feeler gauge, check the valve clearance between the cam base circle and the roller surface of the No. 1 valve rocker arm sub-assembly.



Standard valve clearance (cold):

0.10 to 0.16 mm (0.0039 to 0.0063 in.) for intake

0.21 to 0.27 mm (0.0083 to 0.0106 in.) for exhaust

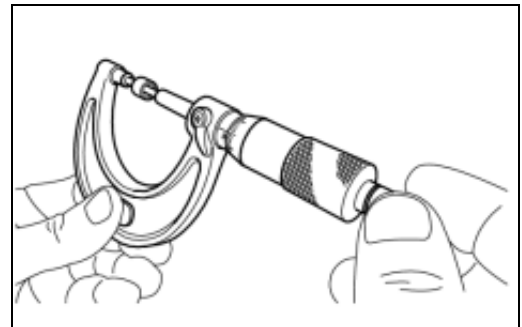
HINT:

- Set the intake camshaft RH and the exhaust camshaft RH to the zero-lift position.
- If the clearance is not as specified, take notes of the value in order to adjust the valve clearance later on.

25. ADJUST VALVE CLEARANCE (for Bank 1)

- Remove the camshaft housing sub-assembly RH.
- Remove the No. 1 valve rocker arm sub-assemblies.
- Remove the valve adjusting shims.

- Using a micrometer, measure the thickness of the valve adjusting shims.



- Calculate the thickness of the valve adjusting shim so that the valve clearance comes within the specified values.

Intake side:

$$A = B + (C - 0.13 \text{ mm (0.0051 in.)}) \times 1.54$$

Exhaust side:

$$A = B + (C - 0.24 \text{ mm (0.0094 in.)}) \times 1.69$$

A:

Required valve adjusting shim thickness

B:

Removed valve adjusting shim thickness

C:

Measured valve clearance

- Apply engine oil to the inner face of the valve adjusting shims and install them to the valves.

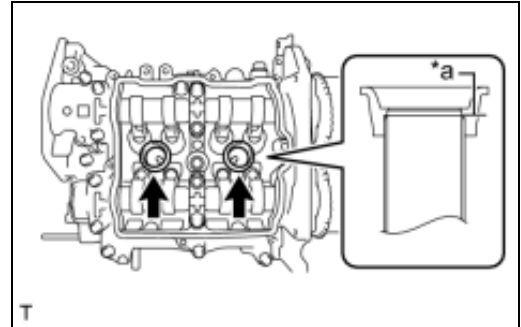
NOTICE:

Check if the shims can be rotated smoothly on the valves.

- (g) Install the No. 1 valve rocker arm sub-assemblies.
- (h) Install the camshaft housing sub-assembly RH.
- (i) Check that the No. 1 valve rocker arm sub-assemblies are correctly installed.

26. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY RH

- (a) Apply a light layer of engine oil to 2 new spark plug tube gaskets and install them to the spark plug tubes as shown in the illustration.

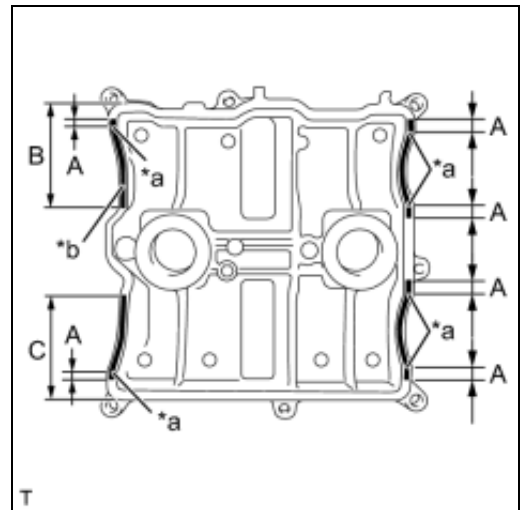


Text in Illustration

*a	Spark plug tube edge
----	----------------------

- (b) Install a new cylinder head cover gasket to the cylinder head cover sub-assembly RH.
- (c) Apply seal packing to the mating surface of cylinder head cover sub-assembly RH as shown in the illustration.

Seal packing:
Three Bond 1217G, 1217H or equivalent



AREA	APPLICATION LENGTH
A	10.0 mm (0.394 in.) or more
B	68.0 mm (2.677 in.) or more
C	70.7 mm (2.784 in.) or more

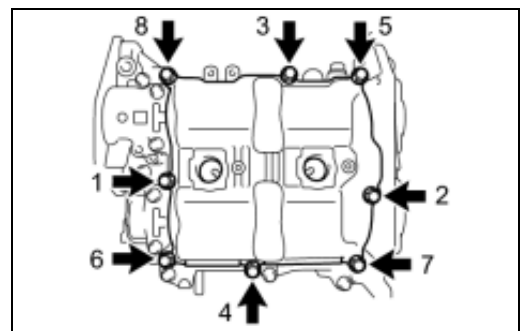
Text in Illustration

*a	Arch starting point
*b	φ2,0 to 4.0 mm (0.079 to 0.158 in.)

- (d) Tighten the 8 bolts in the order shown in the illustration and install the cylinder head cover sub-assembly RH.

Torque:

6.4 N·m { 65 kgf·cm, 57in·lbf }

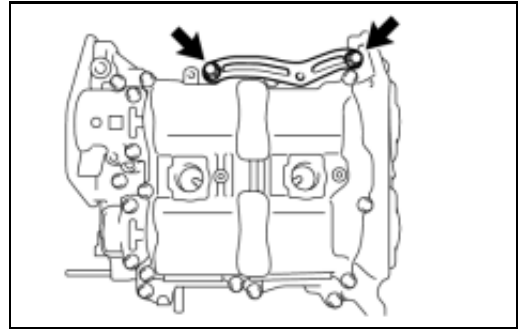


27. INSTALL INJECTOR DRIVER BRACKET

(a) Install the injector driver bracket with the 2 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}



28. INSTALL SPARK PLUG

(a) Using a 14 mm spark plug wrench, install the 4 spark plugs.

Torque:

17 N·m {173 kgf·cm, 13ft·lbf}

29. INSTALL CAMSHAFT TIMING EXHAUST GEAR ASSEMBLY LH INFO

30. INSTALL CAMSHAFT TIMING INTAKE GEAR ASSEMBLY LH INFO

31. INSTALL CAMSHAFT TIMING EXHAUST GEAR ASSEMBLY RH INFO

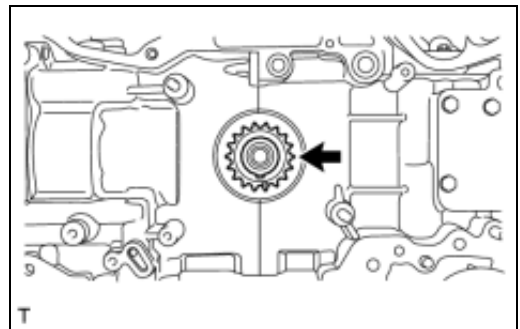
32. INSTALL CAMSHAFT TIMING INTAKE GEAR ASSEMBLY RH INFO

33. INSTALL CRANKSHAFT TIMING GEAR OR SPROCKET

(a) Install the crankshaft timing gear or sprocket.

HINT:

The crankshaft timing gear or sprocket should be installed as it was before.



34. INSTALL CHAIN SUB-ASSEMBLY (for Bank 2)

NOTICE:

Do not allow any foreign matter to adhere or to enter into the component parts during installation.

HINT:

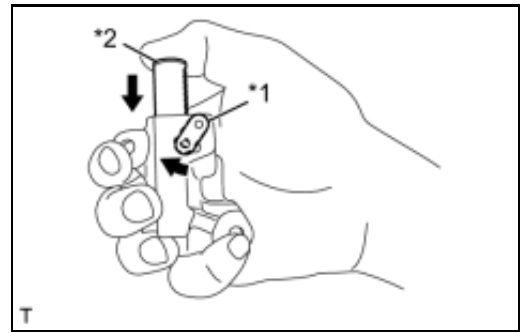
Apply engine oil to all component parts of the chain sub-assembly.

(a) Temporarily install the crank pulley bolt to the crankshaft.

(b) Move the link plate in the direction of the arrow in the illustration to press in the plunger.

Text in Illustration

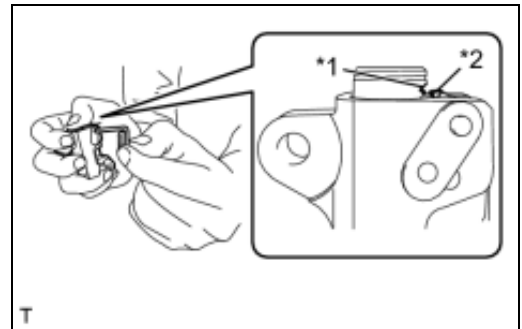
*1	Link Plate
*2	Plunger



- (c) Insert an approximately 1 mm (0.0394 in.) diameter wire or the like into the chain tensioner assembly through the stopper pin hole, and hold the plunger.

Text in Illustration

*1	First notch of the plunger rack
*2	Stopper Tooth

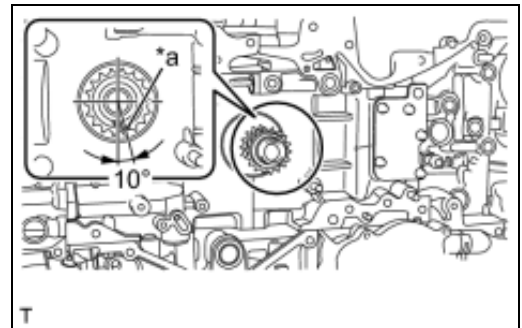
**HINT:**

If the stopper pin hole on the link plate and the stopper pin hole on the chain tensioner assembly are not aligned, check that the first notch of the plunger rack is engaged with the stopper tooth. If not engaged, retract the plunger a little so that the first notch of the plunger rack is engaged with the stopper tooth.

- (d) Check that the crankshaft timing gear or sprocket is located at the position shown in the illustration. If not, turn the crankshaft to align the crankshaft timing gear or sprocket alignment mark as shown in the illustration.

Text in Illustration

*a	Alignment Mark
----	----------------

**NOTICE:**

Make sure to perform this operation to prevent the valves and pistons from contacting each other.

- (e) Using SST, turn the camshaft timing intake gear assembly LH and align the alignment mark as shown in the illustration.

SST: 09960-10010

09962-01000

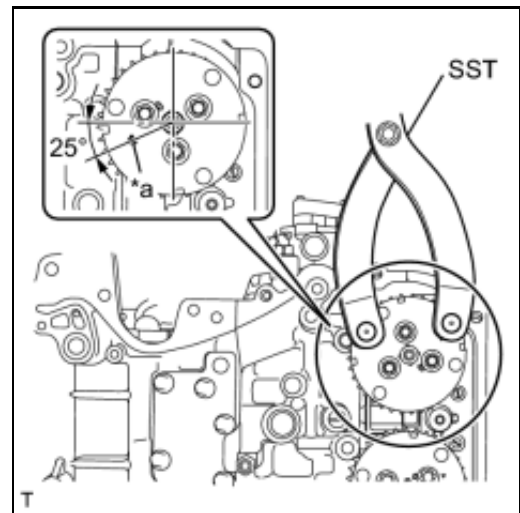
09963-00700

Text in Illustration

*a	Alignment Mark
----	----------------

NOTICE:

Do not turn the exhaust camshaft LH. If the exhaust camshaft LH is turned, valve heads may come into contact with each other, causing the valve stems to bend.



(f) Remove the crank pulley bolt from the crankshaft.

(g) Temporarily install the crankshaft pulley spacer and crankshaft pulley to the crankshaft with the crank pulley bolt.

HINT:

Put a mark on the crankshaft pulley to mark the position of the crankshaft timing gear key.

(h) Using SST, turn the crankshaft counterclockwise by 200° and align the crankshaft key as shown in the illustration.

SST: 09960-10010

09962-01000

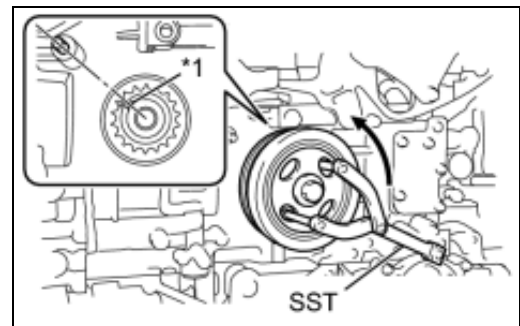
09963-01000

Text in Illustration

*1	Key
----	-----

NOTICE:

Never turn the crankshaft clockwise because the valves may come into contact with the piston. Turning the crankshaft clockwise is only allowed when adjusting the key position precisely.

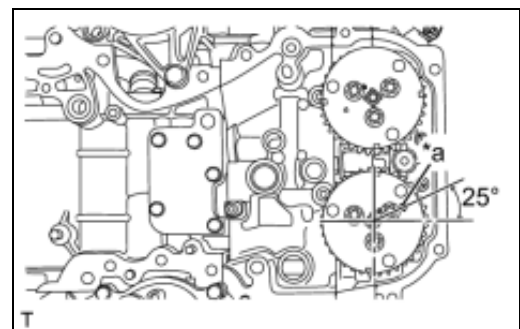


(i) Remove the crank pulley bolt, crankshaft pulley and crankshaft pulley spacer.

(j) Align the alignment mark on the camshaft timing exhaust gear assembly LH as shown in the illustration.

Text in Illustration

*a	Alignment Mark
----	----------------

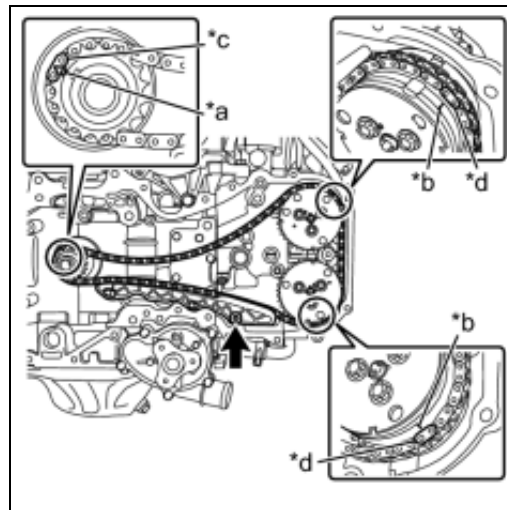
**NOTICE:**

To avoid damaging the valves, do not turn the camshaft timing exhaust gear assembly LH more than the zero-lift range (The range where camshaft timing exhaust gear assembly LH can be turned lightly by hand).

- (k) Align the chain mark plate (blue) with the alignment mark on the crankshaft timing gear or sprocket.

Text in Illustration

*a	Alignment mark
*b	Timing mark
*c	Mark plate (Blue)
*d	Mark plate (Pink)



- (l) Align the chain mark plate (pink) with the timing mark on the camshaft timing intake gear assembly LH.
- (m) Align the chain mark plate (pink) with the timing mark on the camshaft timing exhaust gear assembly LH.
- (n) Using a 5 mm hexagon socket wrench, install the No. 1 chain vibration damper with the bolt.

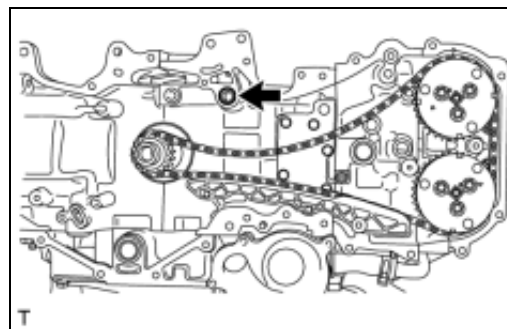
Torque:

6.4 N·m { 65 kgf·cm, 57in·lbf }

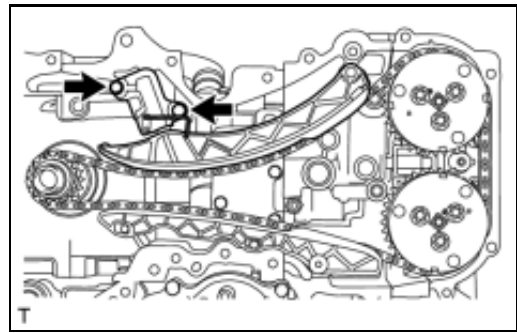
HINT:

Apply engine oil to the bolt before install it.

- (o) Install a new O-ring to the cylinder block (for bank 2).



(p) Install the chain tensioner slipper.



(q) Install the No. 2 chain tensioner assembly with the 2 bolts.

Torque:

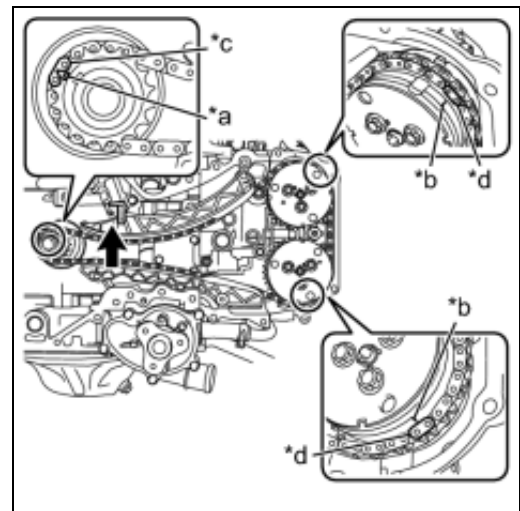
6.4 N·m {65 kgf·cm, 57in·lbf}

(r) Check that the chain is correctly installed.

Text in Illustration

*a	Alignment mark
*b	Timing mark
*c	Mark plate (Blue)
*d	Mark plate (Pink)

- (1) Chain mark plate (blue) is aligned with the alignment mark on the crankshaft timing gear or sprocket.
- (2) Chain mark plate (pink) is aligned with the timing mark on the camshaft timing intake gear assembly LH.
- (3) Chain mark plate (pink) is aligned with the timing mark on the camshaft timing exhaust gear assembly LH.



(s) Pull out the wire or the like from the No. 2 chain tensioner assembly.

(t) Temporarily install the crank pulley bolt to the crankshaft.

(u) Turn the crankshaft clockwise, and make sure that there are no abnormal conditions.

NOTICE:

Be sure to perform this confirmation.

35. INSTALL CHAIN SUB-ASSEMBLY (for Bank 1)

NOTICE:

Do not allow any foreign matter to adhere or to enter into the component parts during installation.

HINT:

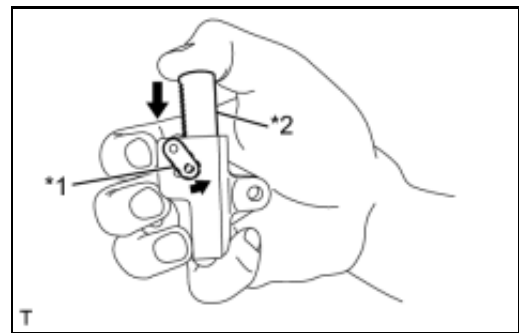
Apply engine oil to all component parts of the chain sub-assembly.

(a) Move the link plate in the direction of the arrow in the

illustration to press in the plunger.

Text in Illustration

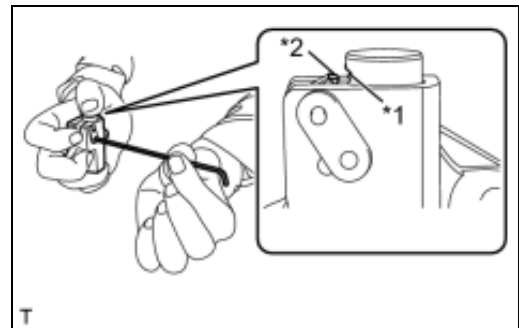
*1	Link Plate
*2	Plunger



- (b) Insert a 2.5 mm (0.098 in.) diameter hexagon wrench into the No. 1 chain tensioner assembly through the stopper pin hole, and hold the plunger.

Text in Illustration

*1	First notch of the plunger rack
*2	Stopper Tooth



HINT:

If the stopper pin hole on the link plate and the stopper pin hole on the chain tensioner assembly are not aligned, check that the first notch of the plunger rack is engaged with the stopper tooth. If not engaged, retract the plunger a little so that the first notch of the plunger rack is engaged with the stopper tooth.

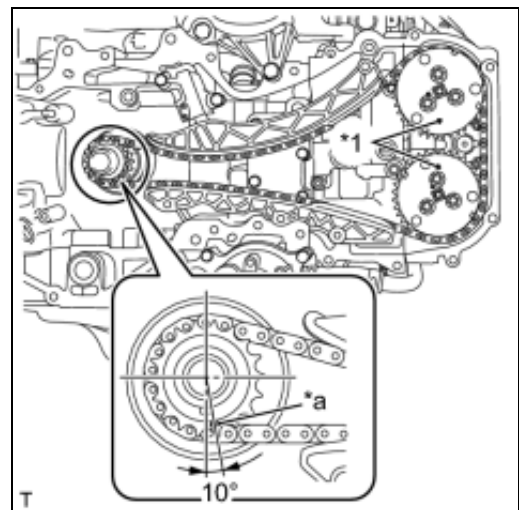
- (c) Turn the crankshaft and align the alignment marks of the crankshaft timing gear or sprocket, camshaft timing intake gear assembly LH and camshaft timing exhaust gear assembly LH as shown in the illustration.

Text in Illustration

*a	Alignment Mark
----	----------------

HINT:

When the marks are aligned as shown in the illustration, crankshaft key faces directly underneath.



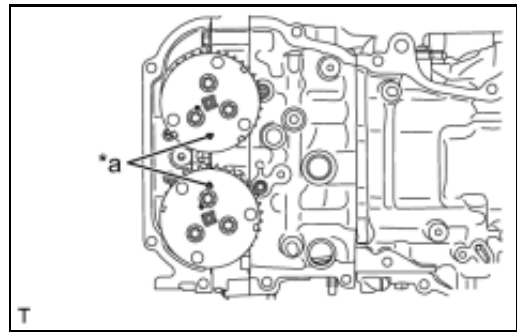
- (d) Align the alignment marks of the camshaft timing intake gear assembly RH and camshaft timing exhaust gear assembly RH as shown in the illustration.

Text in Illustration

*a	Alignment Mark
----	----------------

NOTICE:

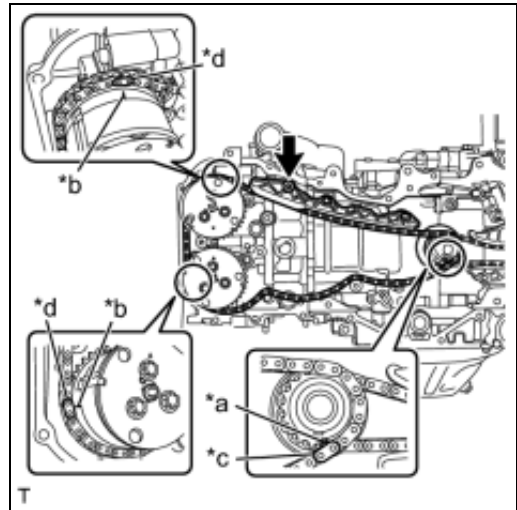
To avoid damaging the valves, do not turn the camshaft timing intake gear assembly RH and camshaft timing exhaust gear assembly RH more than the zero-lift range (The range where the camshafts can be turned lightly by hand).



- (e) Align the chain mark plate (blue) with the alignment mark on the crankshaft timing gear or sprocket.

Text in Illustration

*a	Alignment mark
*b	Timing mark
*c	Mark plate (Blue)
*d	Mark plate (Pink)



- (f) Align the chain mark plate (pink) with the timing mark on the camshaft timing intake gear assembly RH.
- (g) Align the chain mark plate (pink) with the timing mark on the camshaft timing exhaust gear assembly RH.
- (h) Using a 5 mm hexagon socket wrench, install the No. 1 chain vibration damper with the bolt.

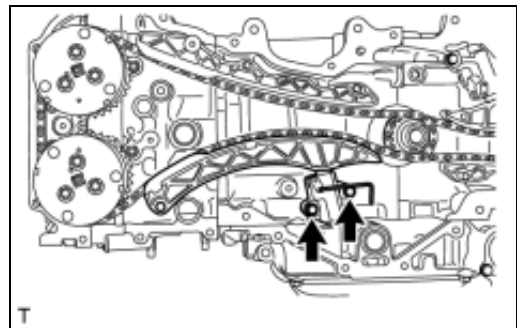
Torque:

6.4 N·m { 65 kgf·cm, 57in·lbf }

HINT:

Apply engine oil to the bolt before install it.

- (i) Install the chain tensioner slipper.



- (j) Install the No. 1 chain tensioner assembly with the 2 bolts.

Torque:

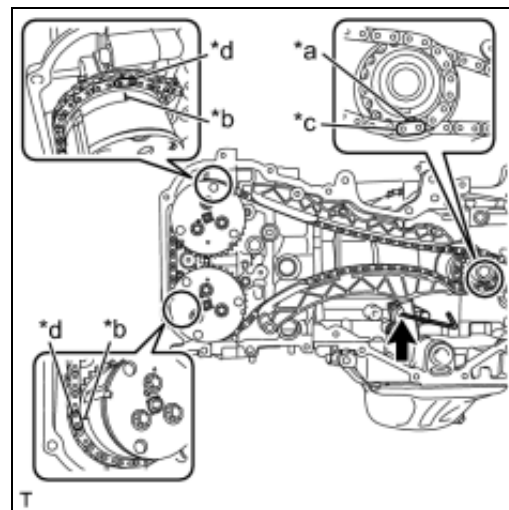
6.4 N·m { 65 kgf·cm, 57in·lbf }

(k) Check that the chain is correctly installed.

Text in Illustration

*a	Alignment mark
*b	Timing mark
*c	Mark plate (Blue)
*d	Mark plate (Pink)

- (1) Chain mark plate (blue) is aligned with the alignment mark on the crankshaft timing gear or sprocket.
- (2) Chain mark plate (pink) is aligned with the timing mark on the camshaft timing intake gear assembly RH.
- (3) Chain mark plate (pink) is aligned with the timing mark on the camshaft timing exhaust gear assembly RH.



(l) Pull out the hexagon wrench from the No. 1 chain tensioner assembly.

(m) Turn the crankshaft clockwise, and make sure that there are no abnormal conditions.

NOTICE:

Be sure to perform this confirmation.

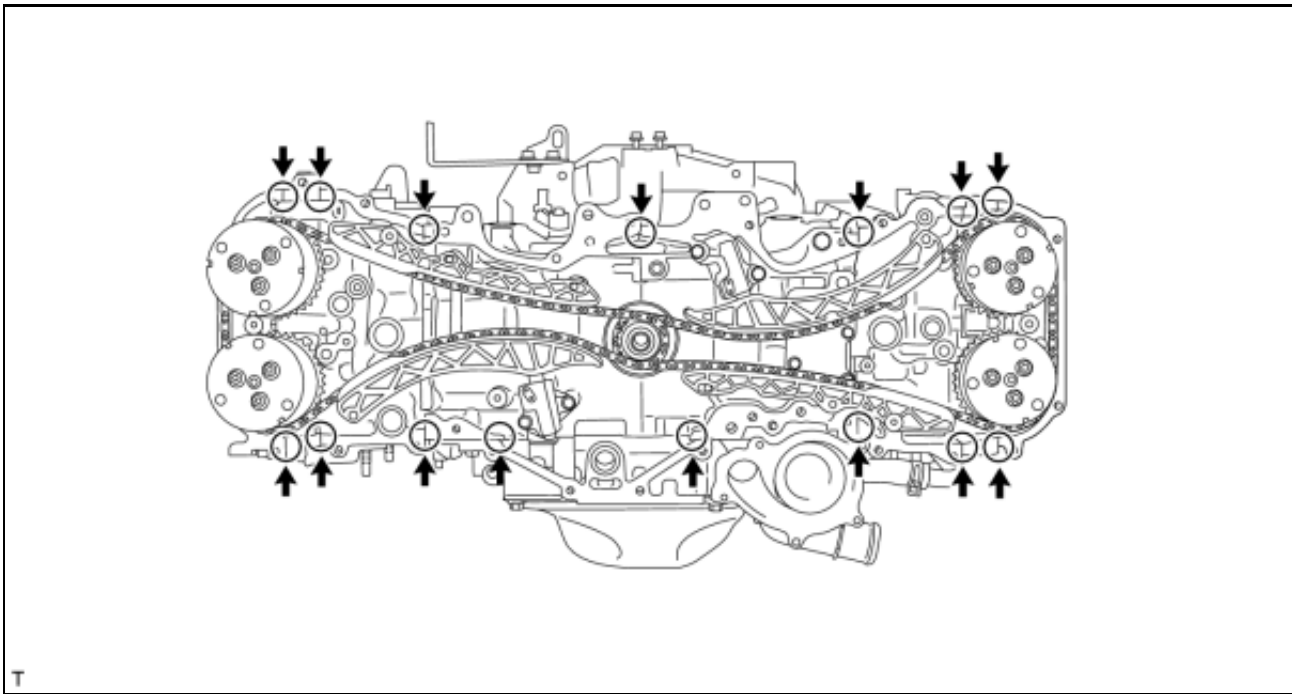
(n) Remove the crank pulley bolt.

36. INSTALL TIMING CHAIN OR BELT COVER SUB-ASSEMBLY

- (a) Apply a light layer of engine oil to 4 new O-rings and attach them to the engine.
- (b) Clean and degrease the contact surface.
- (c) If there are gaps at positions shown in the illustration, fill up with seal packing.

Seal packing:

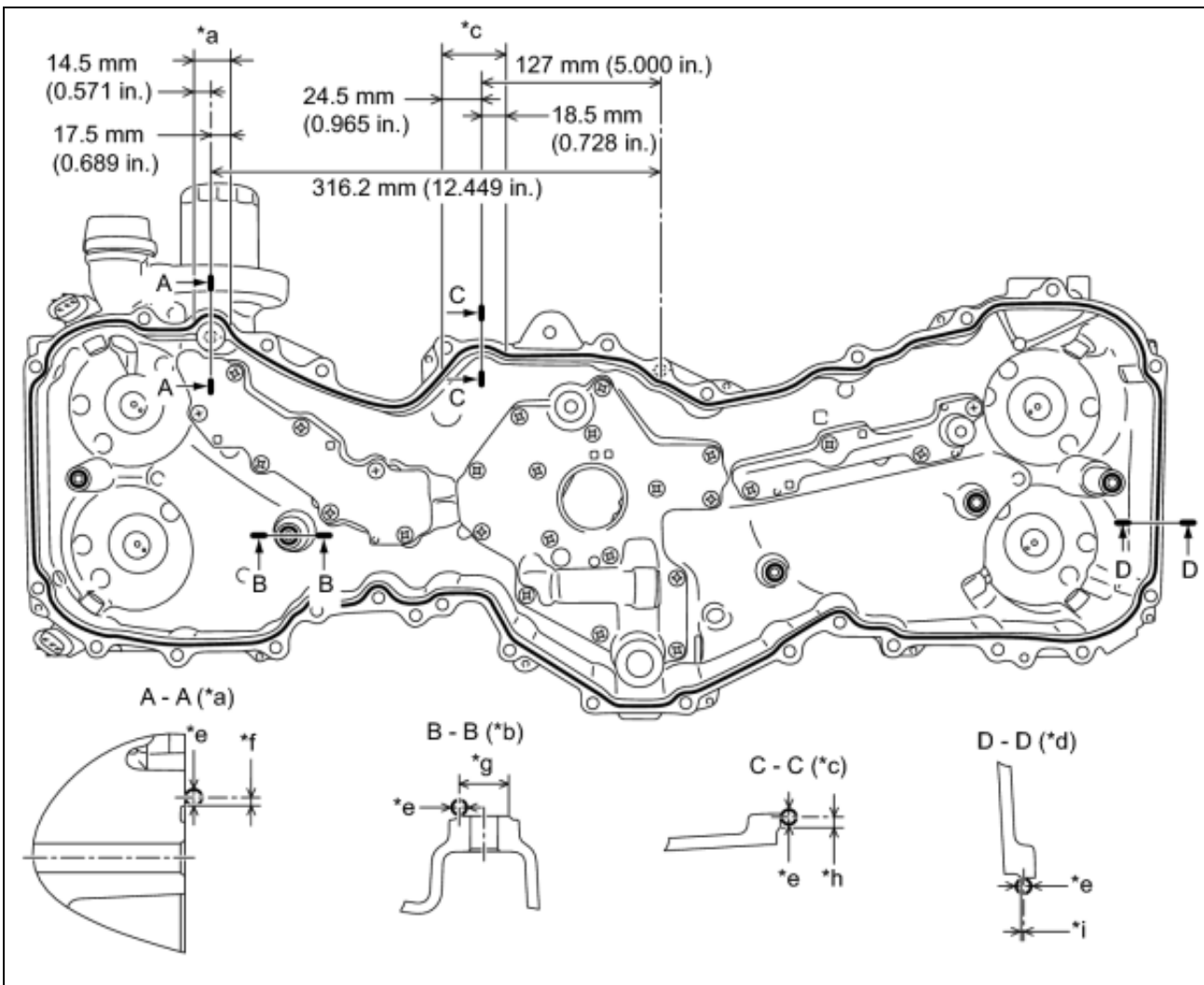
Three Bond 1217G, 1217H or equivalent



(d) Apply seal packing in a continuous line as shown in the illustration.

Seal packing:

Three Bond 1217G, 1217H or equivalent



Text in Illustration

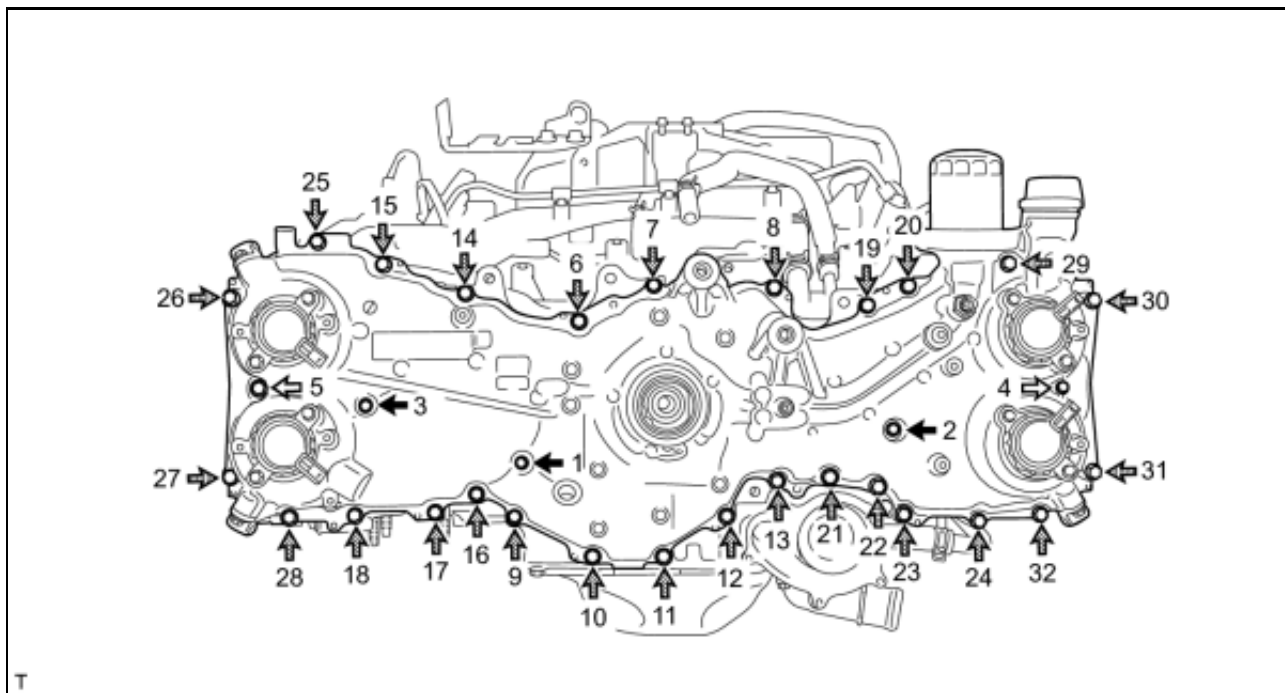
*a	Area A	*b	Boss (5 locations)
*c	Area B	*d	Other than ranges A and B
*e	φ3.5 to 4.5 mm (0.138 to 0.177 in.)	*f	2.0 mm (0.079 in.)
*g	φ12 mm (0.472 in.)	*h	2.5 mm (0.098 in.)
*i	0.5 mm (0.0197 in.)	-	-

NOTICE:

- Clean and degrease the contact surface.
- Install the chain cover within 5 minutes and tighten the bolts within 15 minutes of applying seal packing.
- Do not add engine oil within 30 minutes of installation.
- Do not start the engine within 30 minutes of installation.

(e) Temporarily install the timing chain or belt cover sub-assembly with the 32 bolts.

(f) Securely tighten the 32 bolts in the order as shown in the illustration.



Text in Illustration

	Bolt A		Bolt B
	Bolt C		Bolt D

Torque:

Bolt A and B -

10 N·m {102 kgf·cm, 7ft·lbf}

Bolt C and D -

25 N·m {255 kgf·cm, 18ft·lbf}

Bolt Length:

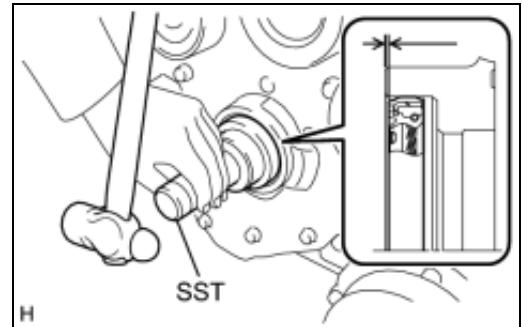
ITEM	LENGTH	ITEM	LENGTH
Bolt A	20 mm (0.787 in.)	Bolt B	50 mm (1.969 in.)
Bolt C	25 mm (0.984 in.)	Bolt D	60 mm (2.362 in.)

37. INSTALL TIMING CHAIN COVER OIL SEAL

(a) Apply engine oil to a new oil seal lip.

NOTICE:

- Keep the lip free from foreign matter.
- Do not apply engine oil to the dust seal section.



(b) Using SST and a hammer, tap in the new oil seal until its surface is flush with the timing chain or belt cover sub-assembly edge.

SST: 09223-22010

NOTICE:

- Do not tap the oil seal at an angle.
- Do not deform the oil seal.

HINT:

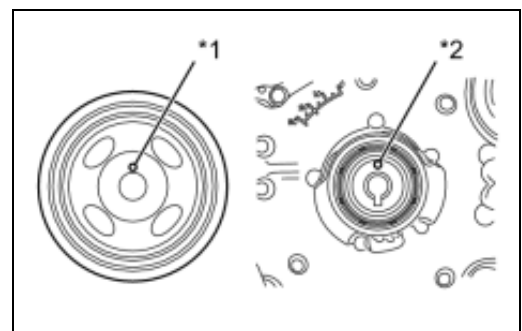
Alternatively, the tapping depth of the timing chain cover oil seal can be 0 to -1.0 mm (0 to -0.0394 in.) from the timing chain cover end surface.

38. INSTALL CRANKSHAFT PULLEY

- (a) Install the crankshaft pulley spacer.
- (b) Install a new O-ring to the crankshaft pulley spacer.
- (c) Install the crankshaft pulley while aligning the knock hole of the pulley with the knock pin on the crankshaft pulley spacer.

Text in Illustration

*1	Knock Hole
*2	Knock Pin



(d) Apply engine oil to threads and seat sections of the crankshaft pulley set bolt.

(e) Install SST to the crankshaft pulley.

SST: 09213-80010

90179-10016

09213-08010

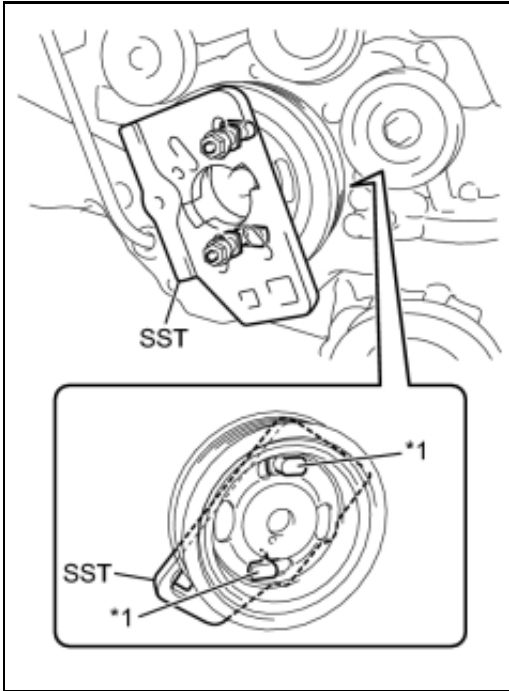
09213-08110

HINT:

Position the projections on SST in the direction as shown in the illustration to prevent SST from separating from the crankshaft pulley.

Text in Illustration

*1	Claw
----	------



(f) Using SST, hold the crankshaft pulley and tighten the crankshaft pulley set bolt.

SST: 09213-80010

90179-10016

09213-08010

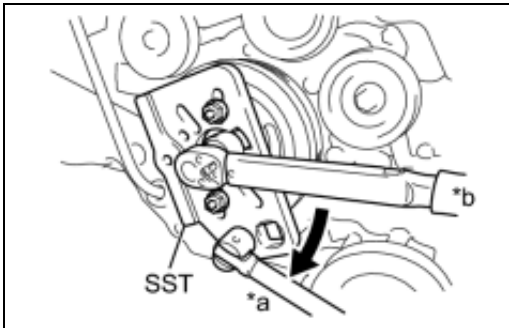
09213-08110

Torque:

20 N·m {204 kgf·cm, 15ft·lbf}

Text in Illustration

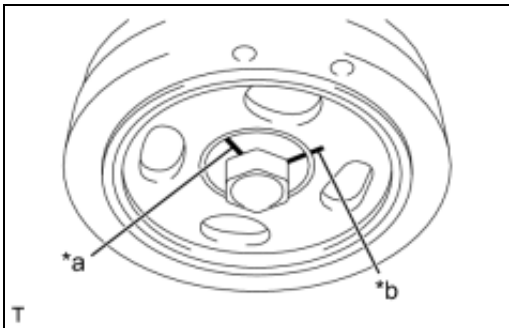
*a	Hold
*b	Turn



(g) Using a marker, draw the reference line (A) on the crankshaft pulley set bolt and also the reference line (B) on the crank pulley according to the line engraved around the crankshaft pulley set bolt head as shown in the illustration.

Text in Illustration

*a	Reference Line A
*b	Reference Line B



HINT:

There are carved lines on the crankshaft pulley set bolt head every 90°.

- (h) Using SST, hold the crankshaft pulley, and tighten the crankshaft pulley set bolt by 90° until the reference lines A and B are aligned.

SST: 09213-80010

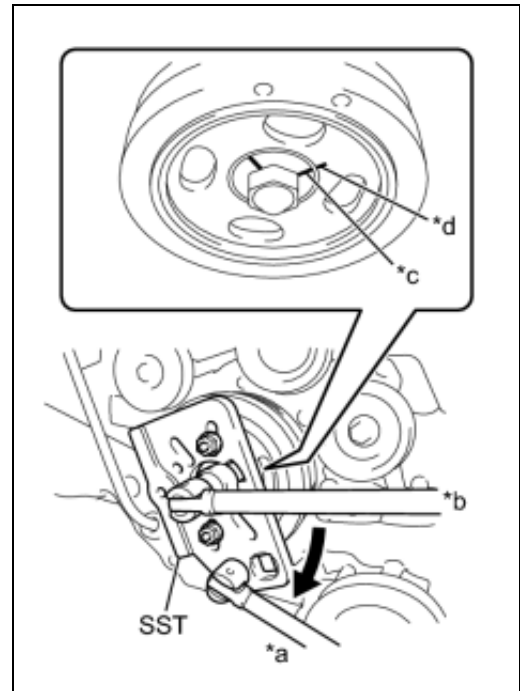
90179-10016

09213-08010

09213-08110

Text in Illustration

*a	Hold
*b	Turn
*c	Reference Line A
*d	Reference Line B



39. INSTALL THERMOSTAT

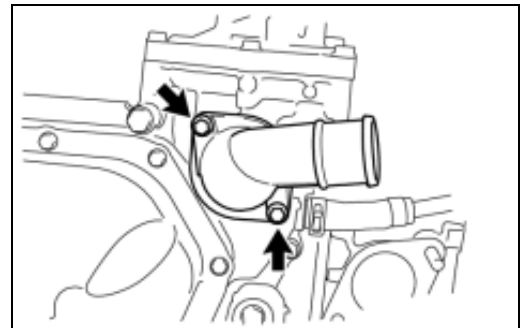
- (a) Attach a new gasket to the thermostat.

40. INSTALL WATER OUTLET

- (a) Install the thermostat and water outlet with the 2 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}

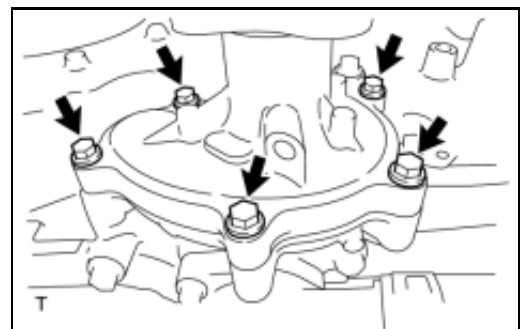


41. INSTALL ENGINE WATER PUMP ASSEMBLY

- (a) Install a new gasket and the water pump assembly with the 5 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}



42. INSTALL WATER PUMP PULLEY

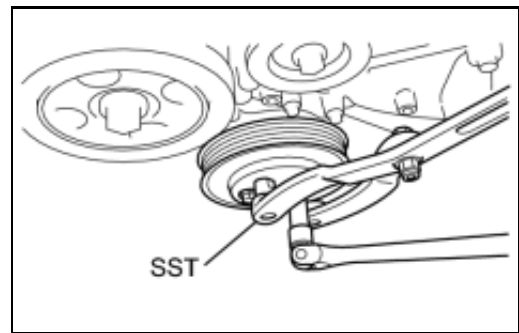
- (a) Temporarily install the water pump pulley with the 3 bolts.

(b) Using SST, hold the water pump pulley.

SST: 09960-10010

09962-01000

09963-00700



(c) Securely tighten the 3 bolts.

NOTICE:

Be careful not to let SST slip during the work.

Torque:

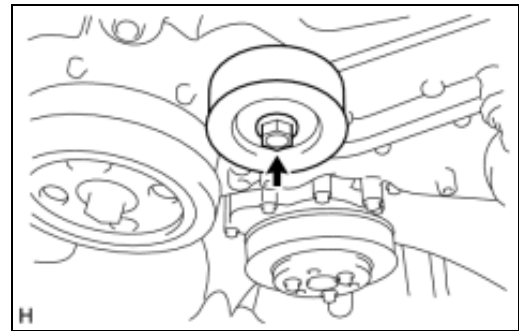
14 N·m {143 kgf·cm, 10ft·lbf}

43. INSTALL NO. 1 IDLER PULLEY SUB-ASSEMBLY

(a) Install the idler pulley cover and No. 1 idler pulley sub-assembly with the bolt.

Torque:

36 N·m {367 kgf·cm, 27ft·lbf}



44. INSTALL NO. 1 IDLER PULLEY SUB-ASSEMBLY

(a) Install the idler pulley cover and No. 1 idler pulley sub-assembly with the bolt.

Torque:

36 N·m {367 kgf·cm, 27ft·lbf}



45. INSTALL PCV VALVE SUB-ASSEMBLY

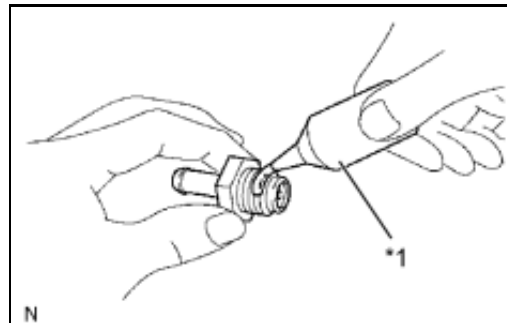
(a) Apply adhesive to 2 or 3 threads of the PCV valve sub-assembly.

Adhesive:

Three Bond 1141G or equivalent

Text in Illustration

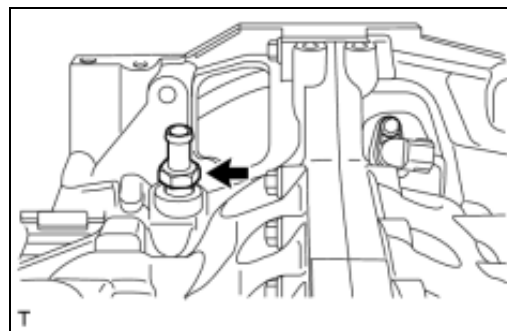
*1	Adhesive 1141G
----	----------------



(b) Using a 19 mm deep socket wrench, install the PCV valve sub-assembly.

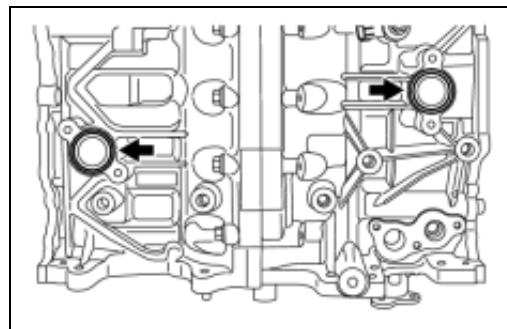
Torque:

23 N·m {235 kgf·cm, 17ft·lbf}



46. INSTALL WATER INLET PIPE

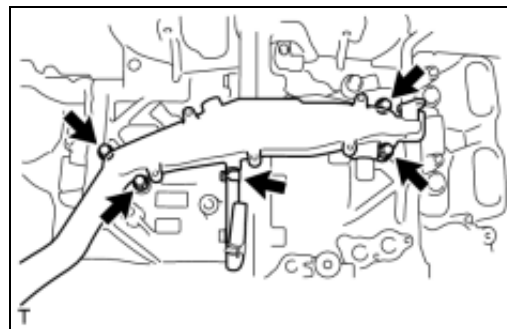
(a) Attach 2 new O-rings to the cylinder block.



(b) Install the water inlet pipe with the 4 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}



(c) Connect the No. 3 water by-pass hose with the clamp.

47. INSTALL REAR CYLINDER HEAD PLATE (for Manual Transmission)

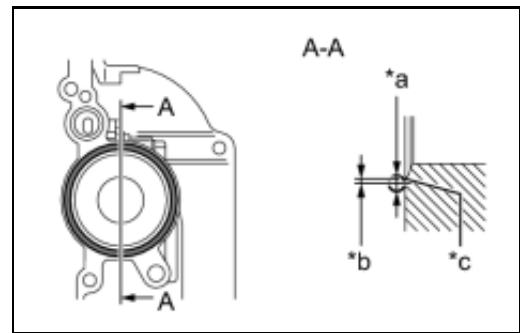
(a) Apply seal packing in a continuous line as shown in the illustration.

Seal packing:

Three Bond 1217G, 1217H or equivalent

Text in Illustration

*a	φ2,0 to 4.0 mm (0.079 to 0.158 in.)
*b	Within 1.0 mm (0.0394 in.)
*c	Chamfer edge



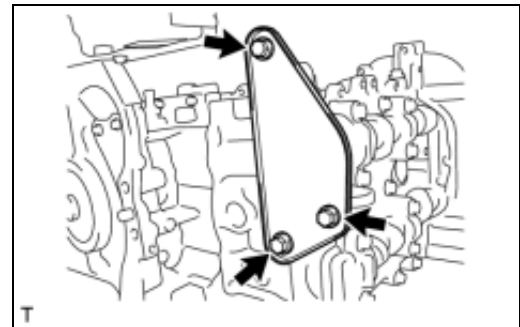
NOTICE:

- Clean and degrease the contact surface.
- Install the rear cylinder head plate within 5 minutes of applying seal packing.

(b) Install the rear cylinder head plate with the 3 bolts.

Torque:

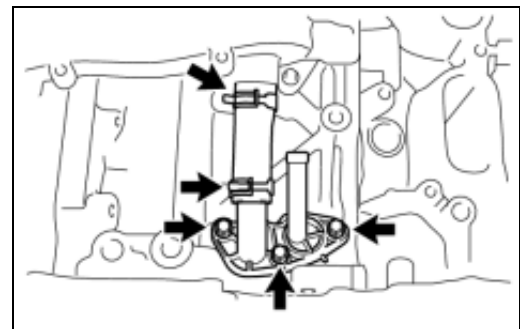
16 N·m {163 kgf·cm, 12ft·lbf}



48. INSTALL VACUUM PUMP ASSEMBLY (for Automatic Transmission) INFO

49. INSTALL PCV HOSE CONNECTOR

(a) Connect the No. 2 water by-pass hose to the PCV hose connector and water inlet pipe with the clips.



(b) Install the PCV hose connector with the 3 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}

50. INSTALL ENGINE OIL PRESSURE SWITCH ASSEMBLY

(a) Clean and degrease the threads of the engine oil pressure switch assembly.

(b) Apply adhesive 1324 to the threads of the engine oil pressure switch assembly.

Adhesive:

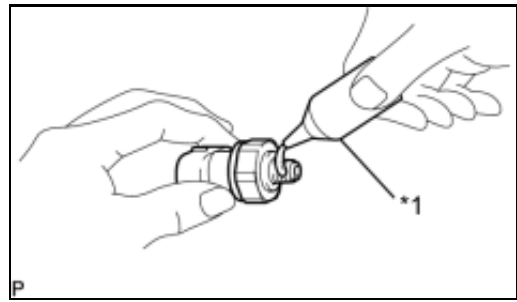
Toyota Genuine Adhesive 1324, Three Bond 1324 or equivalent

Text in Illustration

*1	Adhesive 1324
----	---------------

NOTICE:

Keep the oil hole free from adhesive.



- (c) Using a 24 mm deep socket wrench, install the engine oil pressure switch assembly.

Text in Illustration

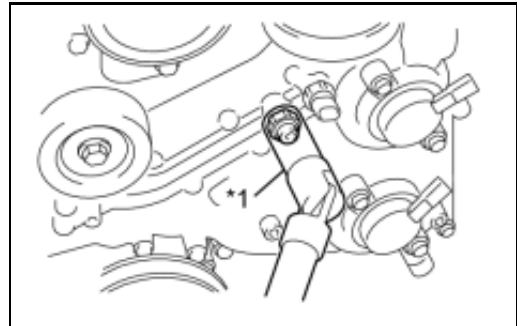
*1	24 mm Deep Socket Wrench
----	--------------------------

Torque:

18 N·m {184 kgf·cm, 13ft·lbf}

NOTICE:

Do not start the engine for at least 1 hour after installation.

**51. INSTALL TEMPERATURE SENSOR**

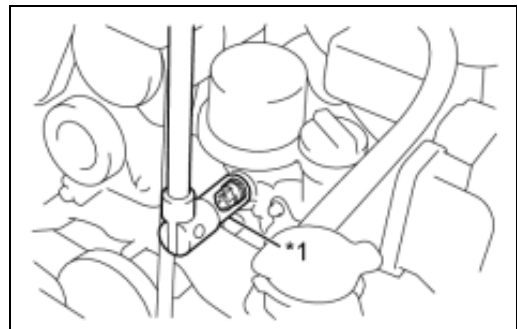
- (a) Attach a new gasket to the temperature sensor.
- (b) Using a 19 mm deep socket wrench, install the temperature sensor.

Text in Illustration

*1	19 mm Deep Socket Wrench
----	--------------------------

Torque:

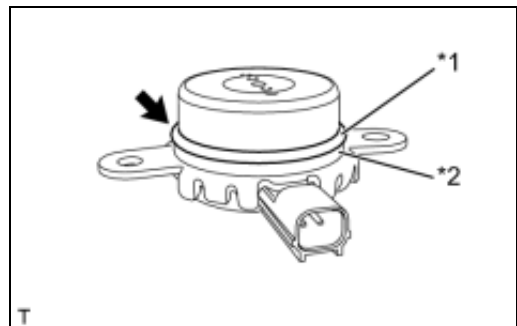
18 N·m {184 kgf·cm, 13ft·lbf}

**52. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE**

- (a) Install the back-up ring to the camshaft timing oil control valve (for exhaust side of bank 2).

Text in Illustration

*1	O-ring
*2	Back-up ring



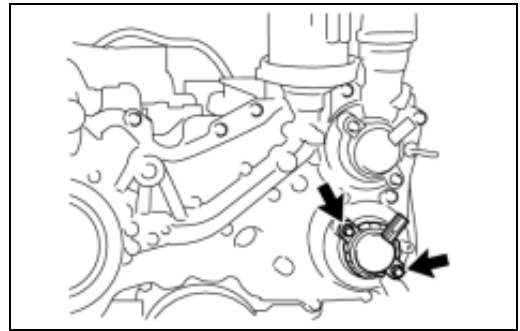
- (b) Install a new O-ring to the camshaft timing oil control valve (for exhaust side of bank 2).

(c) Apply a light coat of engine oil to the O-ring.

(d) Install the camshaft timing oil control valve (for exhaust side of bank 2) with the 2 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}



(e) Install the back-up ring to the camshaft timing oil control valve (for intake side of bank 2).

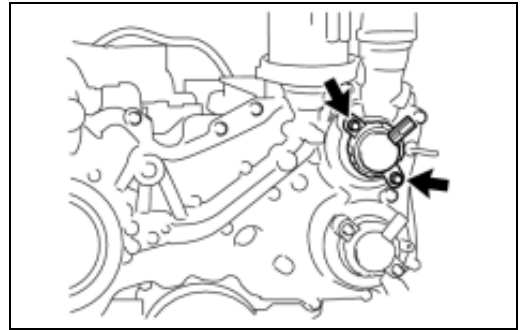
(f) Install a new O-ring to the camshaft timing oil control valve (for intake side of bank 2).

(g) Apply a light coat of engine oil to the O-ring.

(h) Install the camshaft timing oil control valve (for intake side of bank 2) with the 2 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}



(i) Install the back-up ring to the camshaft timing oil control valve (for exhaust side of bank 1).

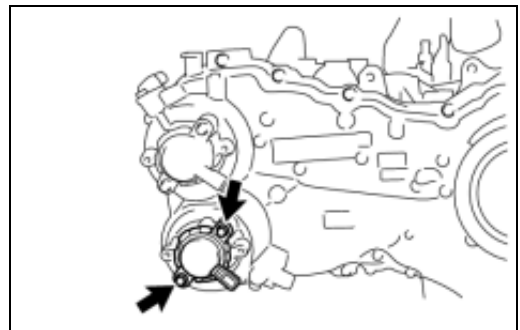
(j) Install a new O-ring to the camshaft timing oil control valve (for exhaust side of bank 1).

(k) Apply a light coat of engine oil to the O-ring.

(l) Install the camshaft timing oil control valve (for exhaust side of bank 1) with the 2 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}



(m) Install the back-up ring to the camshaft timing oil control valve (for intake side of bank 1).

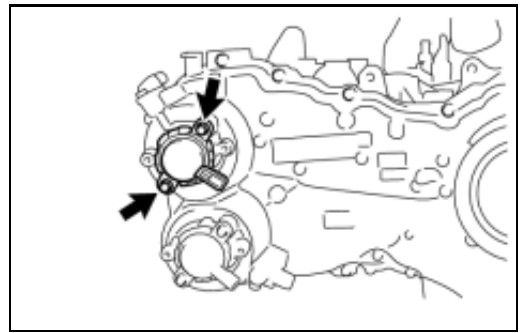
(n) Install a new O-ring to the camshaft timing oil control valve (for intake side of bank 1).

(o) Apply a light coat of engine oil to the O-ring.

- (p) Install the camshaft timing oil control valve (for intake side of bank 1) with the 2 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}



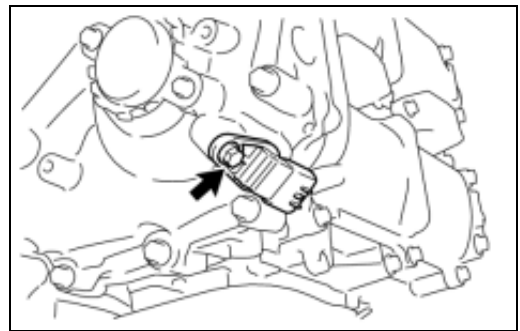
53. INSTALL VVT SENSOR

- (a) Install a new O-ring to the VVT sensor (for exhaust side of bank 2).
 (b) Apply a light coat of engine oil to the O-ring.

- (c) Install the VVT sensor (for exhaust side of bank 2) with the bolt.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}

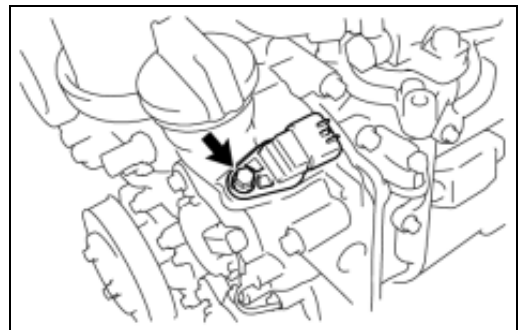


- (d) Install a new O-ring to the VVT sensor (for intake side of bank 2).
 (e) Apply a light coat of engine oil to the O-ring.

- (f) Install the VVT sensor (for intake side of bank 2) with the bolt.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}

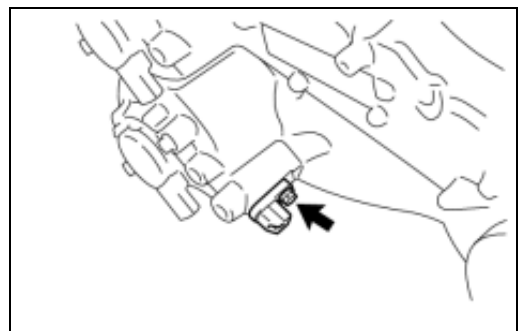


- (g) Install a new O-ring to the VVT sensor (for exhaust side of bank 1).
 (h) Apply a light coat of engine oil to the O-ring.

- (i) Install the VVT sensor (for exhaust side of bank 1) with the bolt.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}

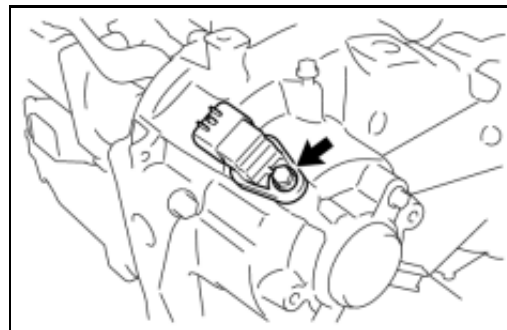


- (j) Install a new O-ring to the VVT sensor (for intake side of bank 1).
- (k) Apply a light coat of engine oil to the O-ring.

- (l) Install the VVT sensor (for intake side of bank 1) with the bolt.

Torque:

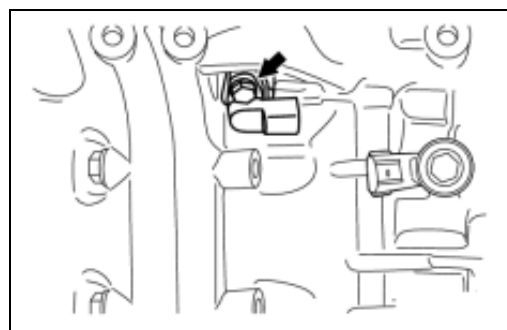
6.4 N·m {65 kgf·cm, 57in·lbf}

**54. INSTALL CRANK POSITION SENSOR**

- (a) Install the crank position sensor with the bolt.

Torque:

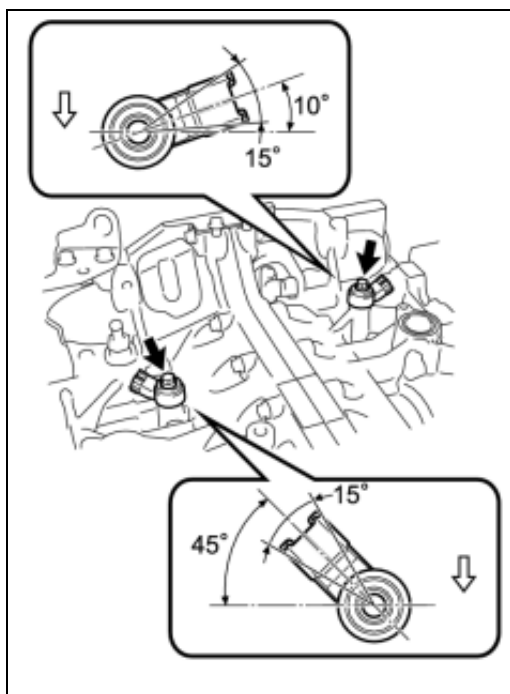
6.4 N·m {65 kgf·cm, 57in·lbf}

**55. INSTALL KNOCK CONTROL SENSOR**

- (a) Install the 2 knock control sensors onto the cylinder block with the 2 bolts as shown in the illustration.

Torque:

24 N·m {245 kgf·cm, 18ft·lbf}




Text in Illustration**56. INSTALL E.F.I. WATER TEMPERATURE SENSOR**

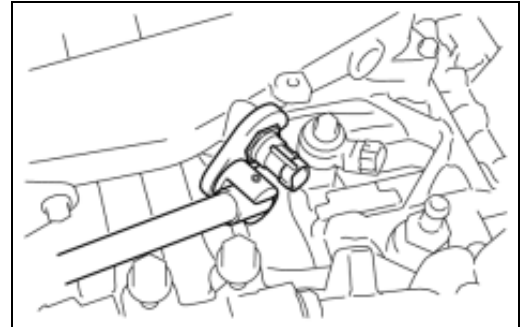
- (a) Using a 19 mm union nut wrench, install a new gasket and the E.F.I. water temperature sensor.

Torque:

18 N·m {184 kgf·cm, 13ft·lbf}

NOTICE:

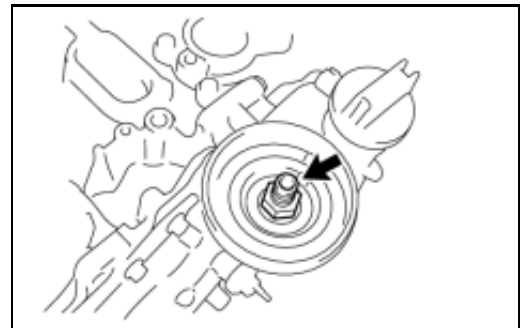
Use the formula to calculate special torque values for situations where a union nut wrench is combined with a torque wrench  .

**57. INSTALL OIL FILTER UNION**

- (a) Using a 24 mm deep socket wrench, install the oil filter union.

Torque:

45 N·m {459 kgf·cm, 33ft·lbf}

**58. INSTALL OIL FILTER SUB-ASSEMBLY**

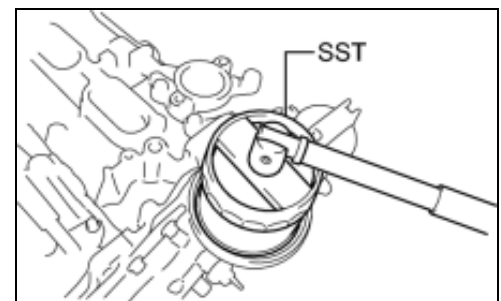
- (a) Apply engine oil to the installation surface of the oil filter sub-assembly.

- (b) Using SST, install the oil filter sub-assembly.

SST: 09228-22020

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

**59. INSTALL OIL FILLER CAP ASSEMBLY**

- (a) Install the oil filler cap assembly.



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000N82011X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: ENGINE UNIT: REMOVAL; 2013 MY FR-S [03/2012 -]		

REMOVAL

CAUTION:

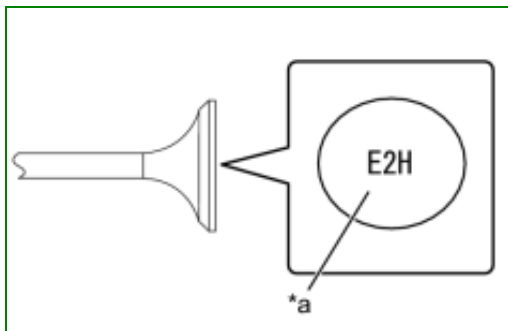
- The exhaust valve is encapsulated with metallic sodium. The metallic sodium is a strong alkaline and prone to cause a serious chemical reaction. Therefore, extra caution is required when handling or disposing the exhaust valve.
- Never disassemble the exhaust valve. The metallic sodium may cause blindness if it gets into your eyes, or cause burn injuries or chemical reactions resulting in fire if it comes into contact with your skin or any heat source.
- If the exhaust valve is damaged, after removing the valve, carry out processing of "Preparation for disposal" and "Disposal".
- Make sure to wear safety glasses and protective gloves when removing a damaged exhaust valve.
- Do not intentionally damage the exhaust valve to remove the metallic sodium.

NOTICE:

When it is determined that disposal procedure is dissolving, this may be performed.

HINT:

- The exhaust valve is encapsulated with metallic sodium. This is safe as long as it does not come into contact with air.
- The exhaust valve in which metallic sodium is encapsulated can be identified with the embossed



mark.

- For removal of the exhaust valve, [INFO](#).
- For disposal of the exhaust valve, [INFO](#).

Text in Illustration

*a	Embossed mark (E2H is for FA20 Engine)
----	--

1. REMOVE ENGINE HANGERS

(a) Remove the bolt and engine hanger.

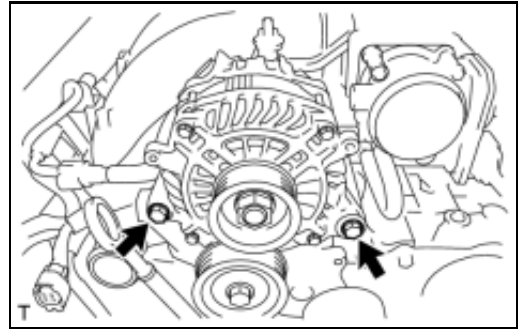
2. REMOVE GENERATOR COVER [INFO](#)

3. REMOVE BELT GENERATOR COVER [INFO](#)

4. REMOVE FAN AND GENERATOR V BELT [INFO](#)

5. REMOVE GENERATOR ASSEMBLY

(a) Remove the 2 bolts and generator assembly.



6. REMOVE OIL LEVEL DIPSTICK GUIDE INFO

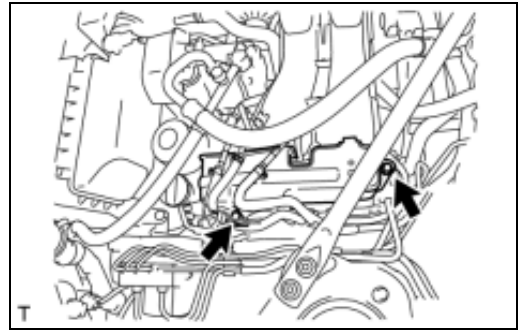
7. REMOVE NO. 2 IDLER PULLEY SUB-ASSEMBLY INFO

8. REMOVE V-RIBBED BELT TENSIONER ASSEMBLY INFO

9. REMOVE COMPRESSOR WITH MAGNET CLUTCH INFO

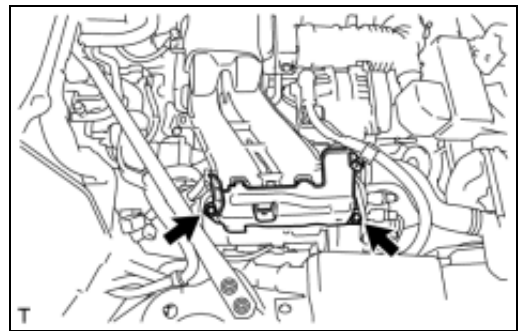
10. REMOVE INJECTOR COVER (for Bank 2)

(a) Remove the 2 bolts and injector cover.

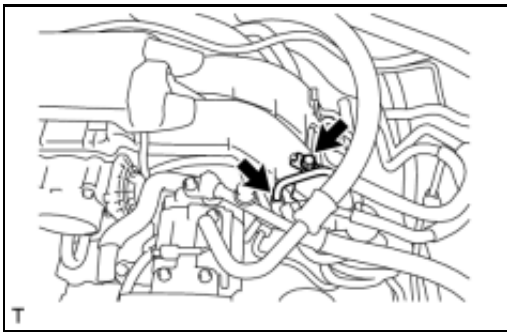


11. REMOVE INJECTOR COVER (for Bank 1)

(a) Remove the 2 bolts and injector cover.

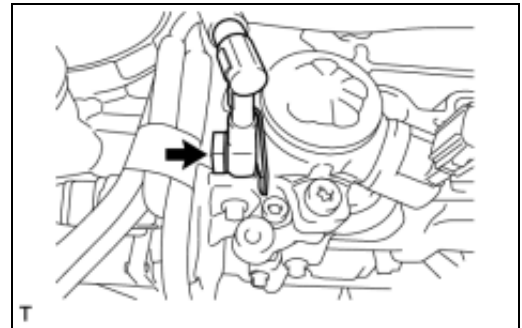


12. REMOVE FUEL DELIVERY PIPE SUB-ASSEMBLY



- (a) Remove the bolt and disconnect the fuel delivery pipe sub-assembly.
- (b) Disconnect the No. 2 fuel vapor feed hose.

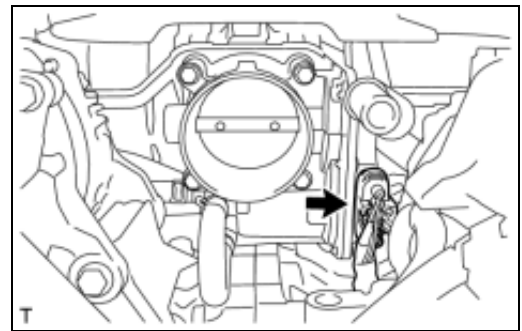
- (c) Remove the union bolt and gasket, and disconnect the fuel delivery pipe sub-assembly.



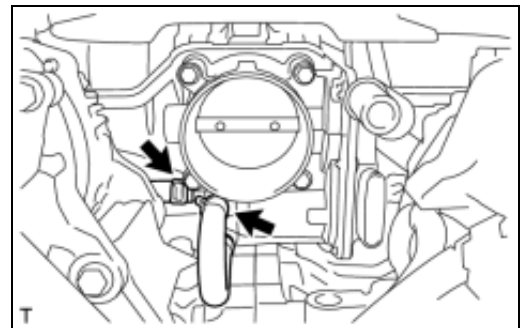
13. SEPARATE VENTILATION HOSE INFO

14. REMOVE INTAKE MANIFOLD

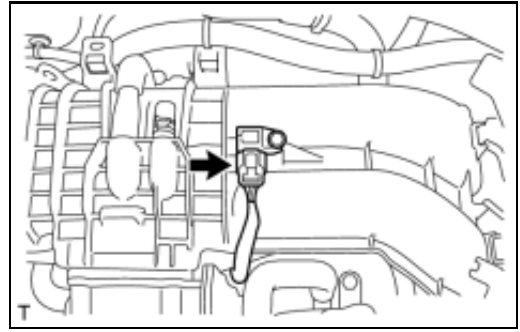
- (a) Disconnect the throttle body assembly connector.



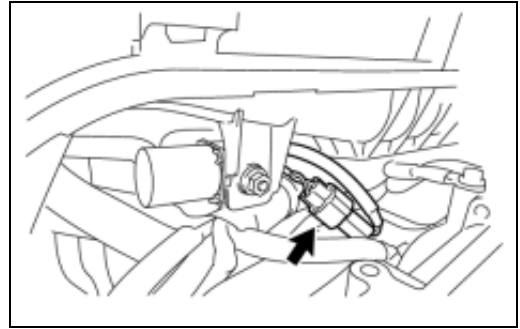
- (b) Disconnect the 2 water by-pass hoses from the throttle body assembly.



(c) Disconnect the vacuum sensor connector.



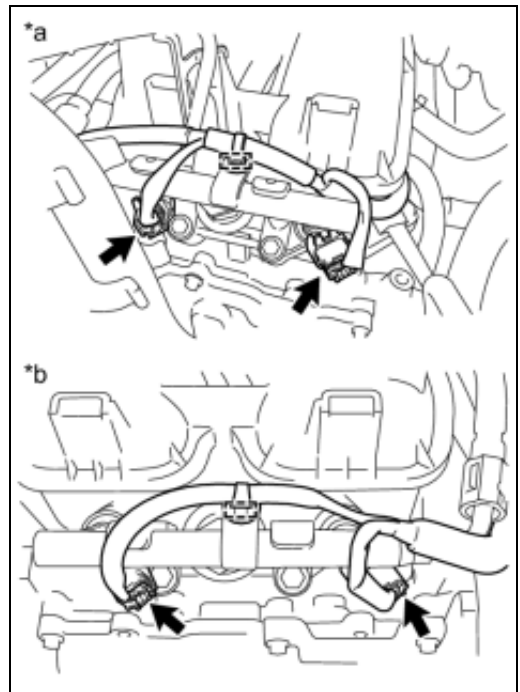
(d) Disconnect the No. 1 vacuum switching valve assembly connector.



(e) Disengage the 2 clamps and disconnect the 4 connectors.

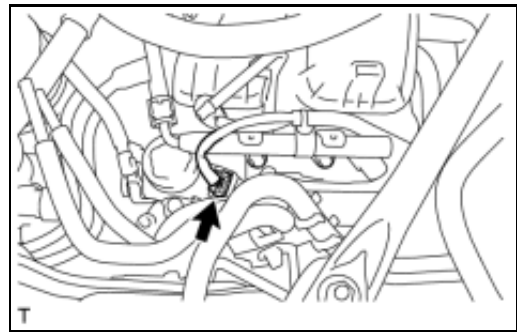
Text in Illustration

*a	for Bank 2
*b	for Bank 1



(f) Disconnect the wire harness.

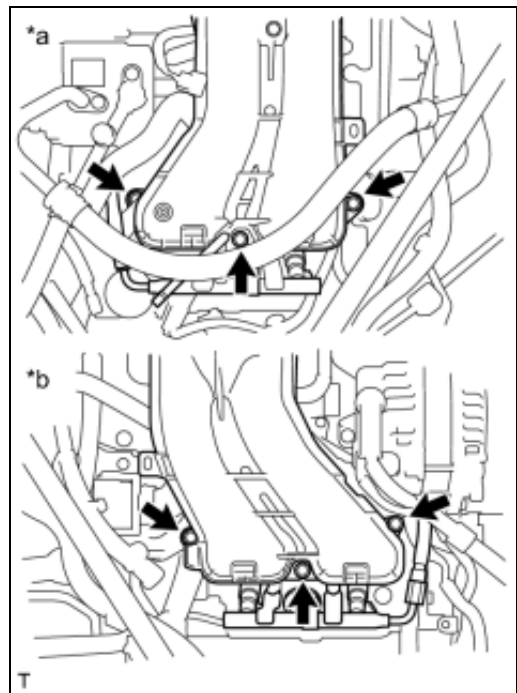
(g) Disconnect the fuel pump connector.



(h) Remove the 6 bolts, intake manifold and 2 gaskets.

Text in Illustration

*a	for Bank 2
*b	for Bank 1



15. REMOVE NO. 2 FUEL DELIVERY PIPE [INFO](#)

16. REMOVE FUEL DELIVERY PIPE [INFO](#)

17. REMOVE FUEL DELIVERY PIPE LH [INFO](#)

18. REMOVE FUEL DELIVERY PIPE RH [INFO](#)

19. REMOVE FUEL INJECTOR ASSEMBLY [INFO](#)

20. REMOVE FUEL INJECTOR O-RING [INFO](#)

21. REMOVE FUEL PUMP ASSEMBLY [INFO](#)

22. REMOVE VALVE LIFTER [INFO](#)

23. REMOVE PUMP DRIVE CASE ASSEMBLY [INFO](#)

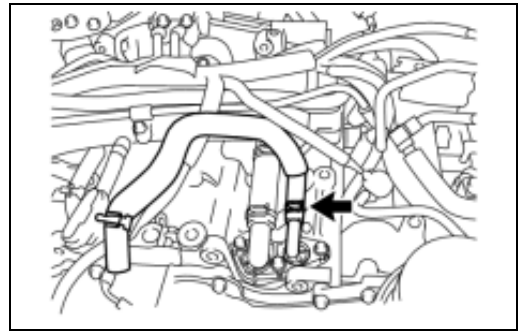
24. REMOVE ENGINE WIRE

(a) Remove the 2 bolts and separate the ground wire harness.

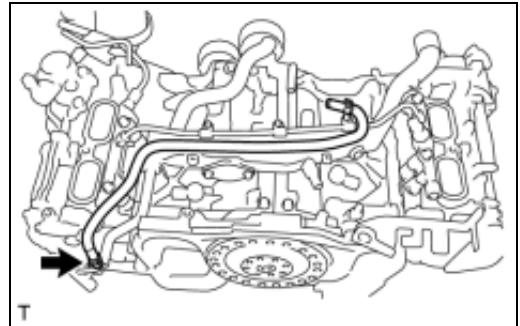
(b) Disconnect each connector and clamp, and remove the engine wire.

25. REMOVE NO. 2 VENTILATION HOSE

- (a) Disconnect the No. 2 ventilation hose.

**26. REMOVE NO. 2 WATER BY-PASS HOSE**

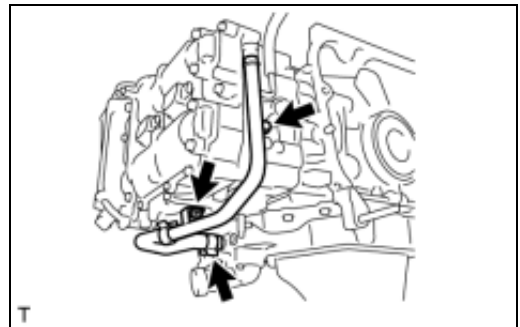
- (a) Disconnect the No. 2 water by-pass hose.

**27. REMOVE NO. 3 TRANSMISSION OIL COOLER HOSE (for Automatic Transmission)**

- (a) Disconnect the No. 3 transmission oil cooler hose.

28. REMOVE NO. 1 WATER BY-PASS PIPE (for Manual Transmission)

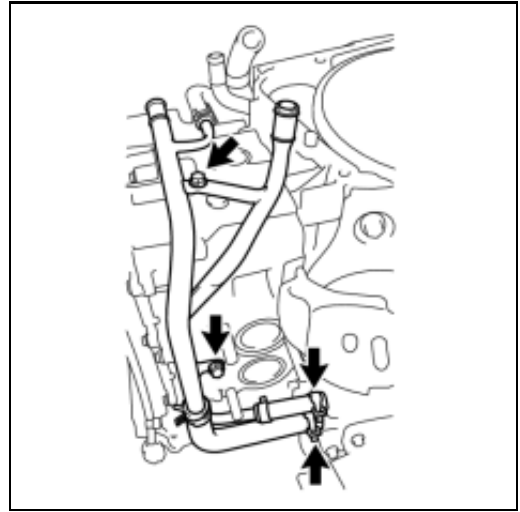
- (a) Loosen the hose clip and disconnect the water by-pass hose.
 (b) Remove the 2 bolts and the No. 1 water by-pass pipe.

**29. REMOVE NO. 1 WATER BY-PASS PIPE (for Automatic Transmission)**

- (a) Loosen the 2 hose clips and disconnect the 2 water by-

pass hoses.

(b) Remove the 2 bolts and No. 1 water by-pass pipe.



30. REMOVE IGNITION COIL ASSEMBLY

(a) Remove the 4 bolts and 4 ignition coil assemblies.



Last Modified: 4-14-2014	6.6 G	Doc ID: RM000000U3S02RX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: ENGINE: ON-VEHICLE INSPECTION; 2013 MY FR-S [03/2012 -]		

ON-VEHICLE INSPECTION

1. INSPECT ENGINE COOLANT

INFO

2. INSPECT ENGINE OIL

INFO

3. INSPECT BATTERY

INFO

4. INSPECT AIR CLEANER FILTER ELEMENT SUB-ASSEMBLY

INFO

5. INSPECT SPARK PLUG

INFO

6. INSPECT V-RIBBED BELT TENSIONER ASSEMBLY

- (a) Remove the fan and generator V belt INFO .
- (b) Check that nothing gets caught in the tensioner by turning it clockwise and counterclockwise.
If a any malfunction exists, replace the tensioner.
- (c) Install the fan and generator V belt INFO .

7. INSPECT IGNITION TIMING

- (a) Warm up and stop the engine.
- (b) When using the Techstream:
 - (1) Connect the Techstream to the DLC3.
 - (2) Start the engine and idle it.
 - (3) Turn the Techstream on.
 - (4) Enter the following menus: Powertrain / Engine and ECT / Data List / IGN Advance.

Standard ignition timing:

-5 to 10° BTDC at idle

NOTICE:

- Switch off all the accessories and the A/C before connecting the Techstream.
- When checking the idle speed, the transmission should be in neutral.

HINT:

Refer to the Techstream operator's manual for further details.

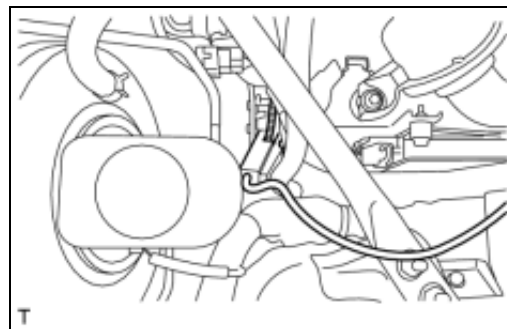
(5) Check that the ignition timing advances immediately when the engine speed is increased.

(c) When not using the Techstream:

- (1) Connect the tester probe of a timing light to the wire of the ignition connector for the No. 1 cylinder.

HINT:

Use a timing light that detects the primary current.



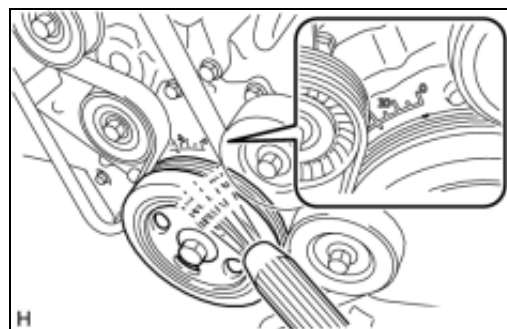
- (2) Using the timing light, check the ignition timing.

Standard ignition timing:

-5 to 10° BTDC at idle

NOTICE:

When checking the ignition timing, the transmission should be in neutral.



(3) Check that the ignition timing advances immediately when the engine speed is increased.

(4) Disconnect the timing light from the engine.

8. INSPECT ENGINE IDLE SPEED

(a) Warm up and stop the engine.

(b) When using the Techstream:

- (1) Connect the Techstream to the DLC3.

NOTICE:

Switch off all the accessories and the A/C before connecting the Techstream.

(2) Race the engine at 2500 rpm for approximately 90 seconds.

(3) Turn the Techstream on.

(4) Enter the following menus: Powertrain / Engine and ECT / Data List / Engine Speed.

Standard Idle Speed:

TRANSMISSION	IDLING SPEED
for Automatic Transmission	600 to 800 rpm
for Manual Transmission	550 to 750 rpm

NOTICE:

When checking the idle speed, the transmission should be in neutral.

HINT:

Refer to the Techstream operator's manual for further details.

If the idle speed is not as specified, check the air intake system.

(5) Disconnect the Techstream from the DLC3.

9. INSPECT COMPRESSION

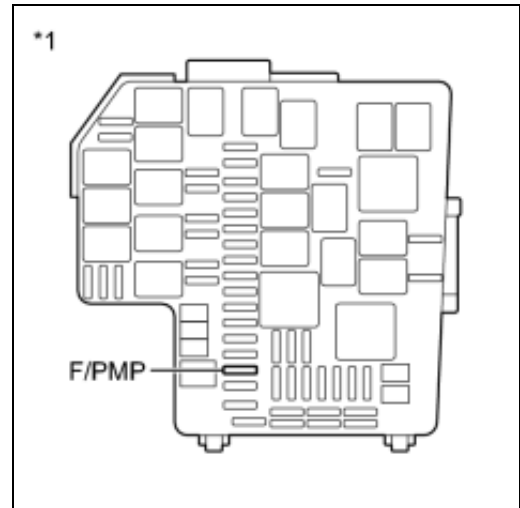
(a) Check for DTCs **INFO**.

(b) Remove the relay block cover.

(c) Remove the F/PMP fuse.

Text in Illustration

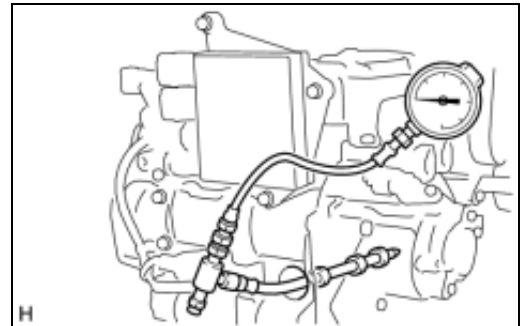
*1	Engine Room Relay Block
----	-------------------------



(d) Warm up and stop the engine.

(e) Remove the 4 spark plugs **INFO**.

(f) Insert a compression gauge into the spark plug hole.



(g) Inspect the cylinder compression pressure.

(1) While cranking the engine, measure the compression pressure.

HINT:

Always use a fully charged battery to obtain an engine speed of 250 rpm or more.

NOTICE:

The measurement must be performed as quickly as possible.

Standard compression pressure:

1750 kPa (17.8 kgf/cm², 254 psi) or higher

Minimum pressure:

1150 kPa (11.7 kgf/cm², 167 psi)

Difference between each cylinder:

200 kPa (2.0 kgf/cm² , 29 psi) or less

HINT:

If the cylinder compression is low, pour a small amount of engine oil into the cylinder through the spark plug hole and inspect the compression again. Then perform the 2 steps above for the cylinders with low compression.

- If adding oil increases the compression, the piston rings and/or cylinder bore may be worn or damaged.
- If the pressure stays low, a valve may be stuck or seated improperly, or there may be leakage from the gasket.

(h) Install the 4 spark plugs INFO.

(i) Reinstall the F/PMP fuse.

(j) Install the relay block cover.

(k) Clear the DTC INFO.

10. INSPECT CO/HC

HINT:

This check is for determining whether or not the idle CO/HC complies with regulations.

(a) Start the engine.

(b) Maintain the engine speed at 2500 rpm for approximately 180 seconds.

(c) Insert a CO/HC meter testing probe at least 40 cm (1.31 ft) into the tailpipe during idling.

(d) Immediately check the CO/HC concentration at idle and/or 2500 rpm.

HINT:

- When performing the 2 mode (2500 rpm and idle) test, follow the measurement order prescribed by the applicable local regulations.
- If the CO/HC concentration does not comply with regulations, troubleshoot in the order given below.

(1) Check the A/F sensor INFO and heated oxygen sensor INFO operation.

(2) Refer to the table below for the possible cause, and then inspect and correct the applicable causes if necessary.

CO	HC	SYMPTOM	CAUSES
Normal	High	Rough idle	1. Faulty ignition: <ul style="list-style-type: none"> ◦ Incorrect timing ◦ Plugs are contaminated or shorted, or plug gaps are incorrect 2. Incorrect valve clearance 3. Leaky intake and exhaust valves 4. Leaky cylinders
		Rough idle	1. Vacuum leaks: <ul style="list-style-type: none"> ◦ Ventilation hoses

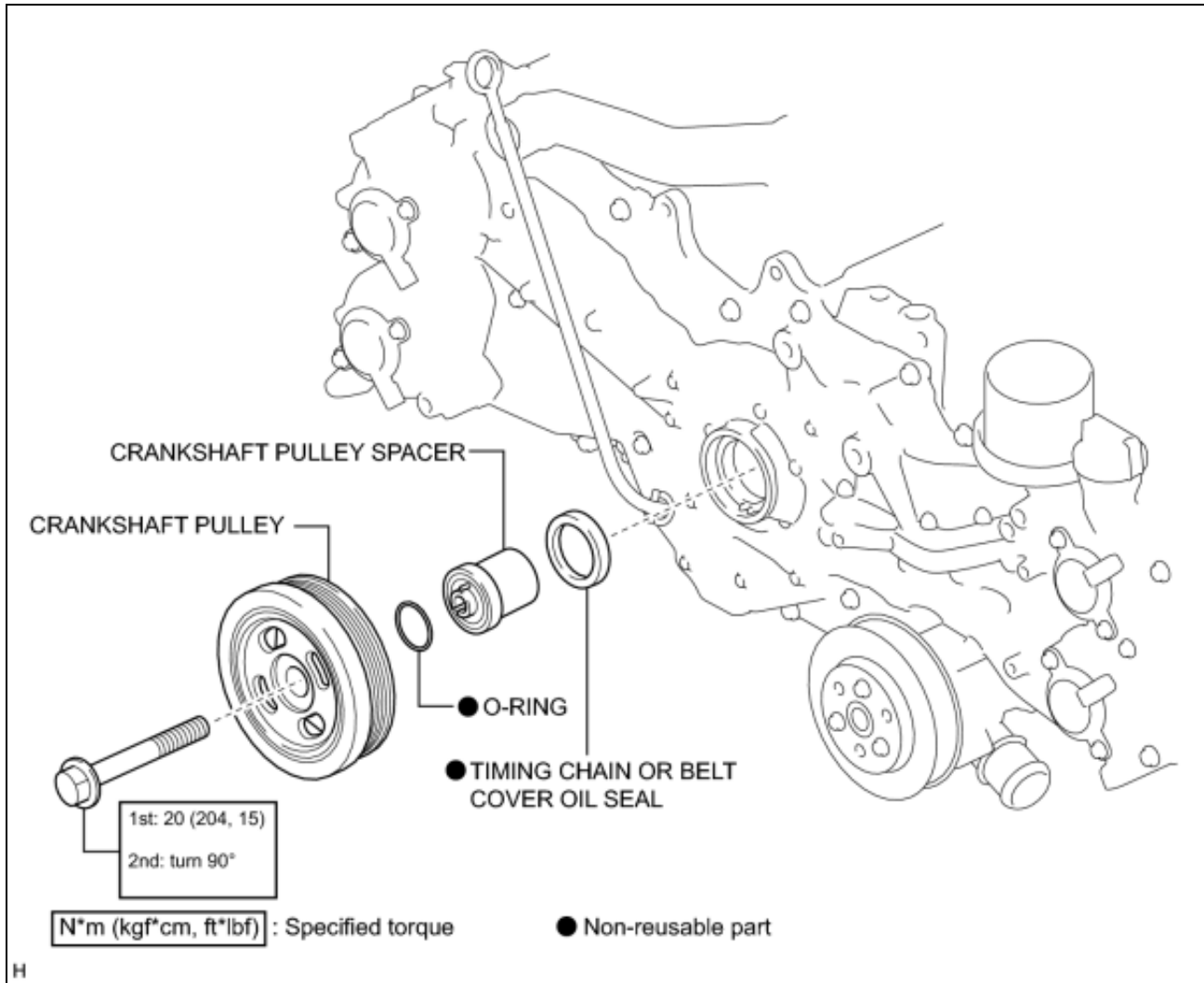
Low	High	(Fluctuating HC reading)	<ul style="list-style-type: none"> ◦ Intake manifold ◦ Throttle body <p>2. Lean mixture causing misfire</p>
High	High	Rough idle (Black smoke from exhaust)	<p>1. Restricted air filter</p> <p>2. Plugged PCV valve</p> <p>3. Faulty EFI system:</p> <ul style="list-style-type: none"> ◦ Faulty pressure regulator ◦ Defective engine coolant temperature sensor ◦ Faulty mass air flow meter ◦ Faulty ECM ◦ Faulty injectors ◦ Faulty throttle position sensor



Last Modified: 4-14-2014	6.6 K	Doc ID: RM000002S5D01AX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: FRONT CRANKSHAFT OIL SEAL: COMPONENTS; 2013 MY FR-S [03/2012 -]		

COMPONENTS

ILLUSTRATION



Last Modified: 4-14-2014	6.6 A	Doc ID: RM0000041LD007X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: FRONT CRANKSHAFT OIL SEAL: INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL TIMING CHAIN OR BELT COVER OIL SEAL

(a) Apply engine oil to the lip of a new timing chain or belt cover oil seal.

NOTICE:

- Keep the lip free of foreign matter.
- Do not apply engine oil to the dust seal section.

(b) Using SST and a hammer, tap in the timing chain or belt cover oil seal until its surface is flush with the timing chain cover edge.

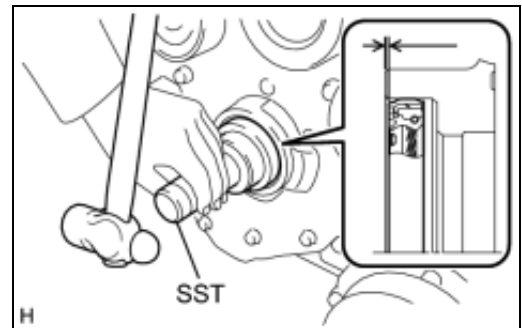
SST: 09223-22010

NOTICE:

- Keep the lip free of foreign matter.
- Do not tap the oil seal at an angle.

HINT:

Alternatively, the tapping depth of the timing chain or belt cover oil seal can be 0 to -1.0 mm (0 to -0.039 in.) from the timing chain cover end surface.



2. INSTALL CRANKSHAFT PULLEY

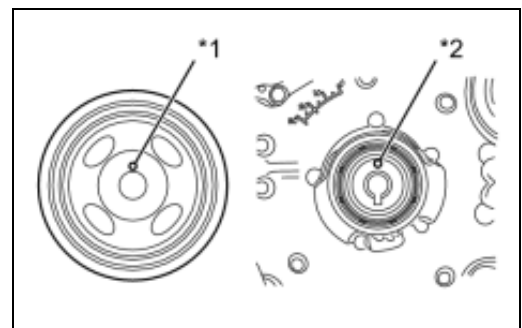
(a) Install the crankshaft pulley spacer.

(b) Install a new O-ring to the crankshaft pulley spacer.

(c) Install the crankshaft pulley while aligning the knock hole of the pulley with the knock pin on the crankshaft pulley spacer.

Text in Illustration

*1	Knock Hole
*2	Knock Pin



(d) Install SST to the crankshaft pulley.

SST: 09213-80010

90179-10016

09213-08010

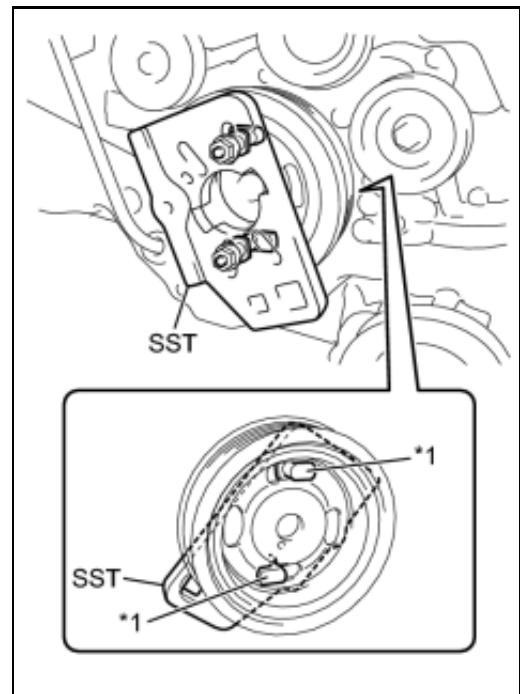
09213-08110

HINT:

Position the projections on SST in the direction as shown in the illustration to prevent SST from separating from the crankshaft pulley.

Text in Illustration

*1	Claw
----	------



(e) Apply engine oil to the crankshaft pulley set bolt.

(f) Using SST, hold the crankshaft pulley and tighten the crankshaft pulley set bolt.

SST: 09213-80010

90179-10016

09213-08010

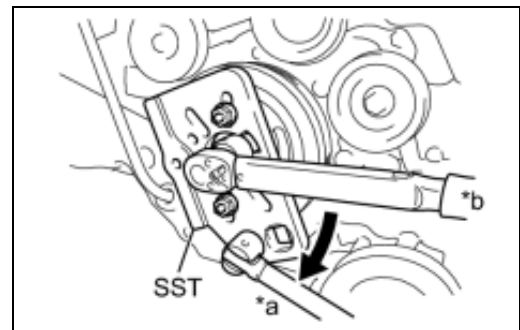
09213-08110

Torque:

20 N·m {204 kgf·cm, 15ft·lbf}

Text in Illustration

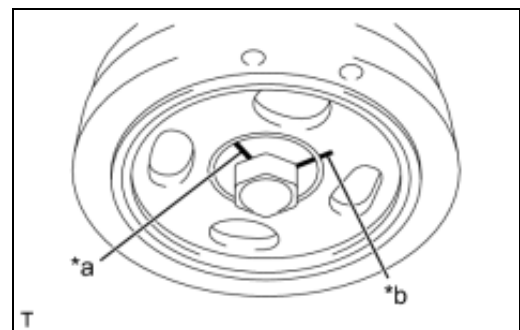
*a	Hold
*b	Turn



(g) Using a marker, draw the reference line (A) on the crankshaft pulley set bolt and also the reference line (B) on the crank pulley according to the line engraved around the crankshaft pulley set bolt head as shown in the illustration.

Text in Illustration

*a	Reference Line A
*b	Reference Line B



HINT:

There are carved lines on the crankshaft pulley set bolt head every 90°.

(h) Using SST, hold the crankshaft pulley, and tighten the crankshaft pulley set bolt by 90° until the reference lines A and B are aligned.

SST: 09213-80010

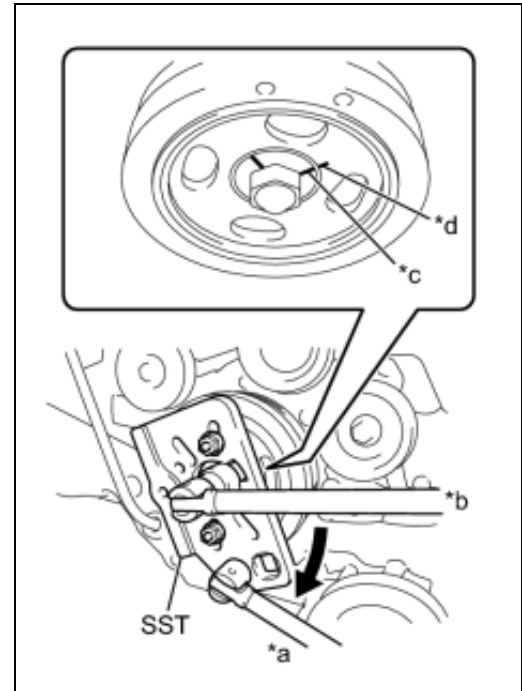
90179-10016

09213-08010

09213-08110

Text in Illustration

*a	Hold
*b	Turn
*c	Reference Line A
*d	Reference Line B



3. INSTALL FAN AND GENERATOR V BELT

INFO



Last Modified: 4-14-2014	6.6 A	Doc ID: RM0000041LE007X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: FRONT CRANKSHAFT OIL SEAL: REMOVAL; 2013 MY FR-S [03/2012 -]		

REMOVAL

1. REMOVE FAN AND GENERATOR V BELT

INFO

2. REMOVE CRANKSHAFT PULLEY

(a) Install SST to the crankshaft pulley.

SST: 09213-80010

90179-10016

09213-08010

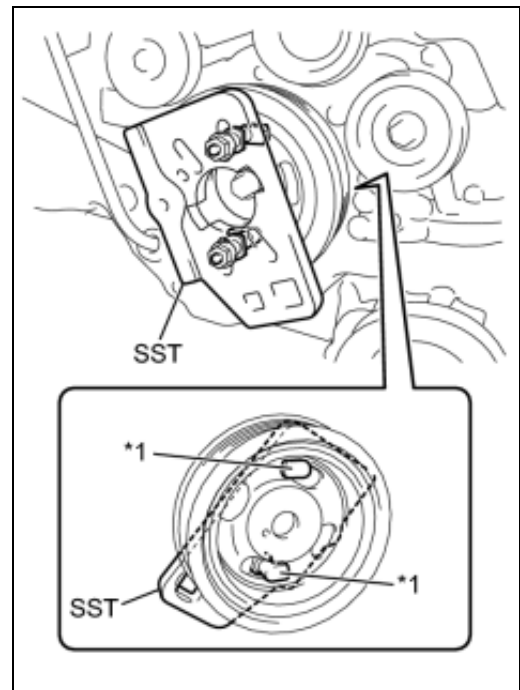
09213-08110

HINT:

Position the projections on SST in the direction as shown in the illustration to prevent SST from separating from the crankshaft pulley.

Text in Illustration

*1	Claw
----	------



(b) Using SST, hold the crankshaft pulley and loosen the crankshaft pulley set bolt.

SST: 09213-80010

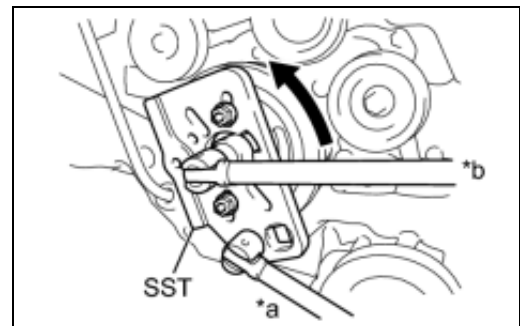
90179-10016

09213-08010

09213-08110

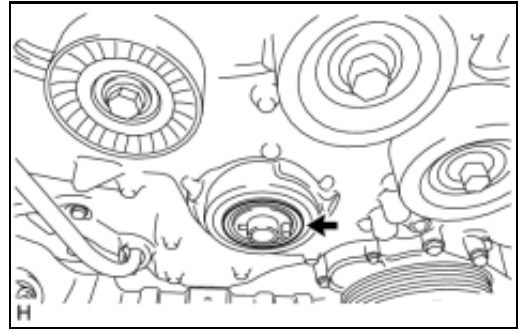
Text in Illustration

*a	Hold
*b	Turn



(c) Remove the crankshaft pulley.

(d) Remove the O-ring and crankshaft pulley spacer.



3. REMOVE TIMING CHAIN OR BELT COVER OIL SEAL

(a) Using a screwdriver with its tip wrapped in protective tape, pry out the timing chain or belt cover oil seal.

Text in Illustration

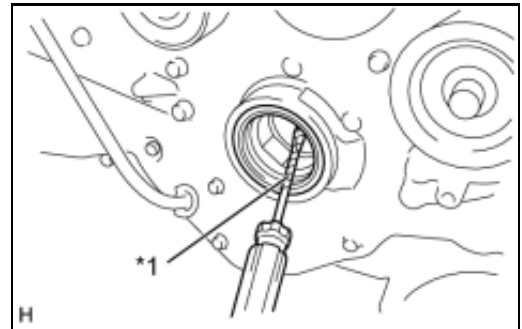
*1	Protective Tape
----	-----------------

NOTICE:

After the removal, check the crankshaft for damage. If it is damaged, smooth the surface with 400-grit sandpaper.

HINT:

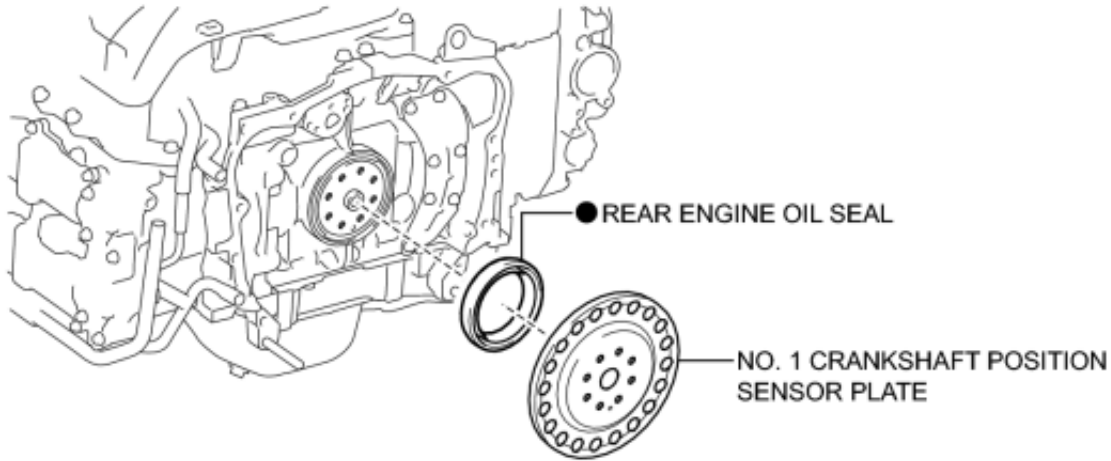
Tape the screwdriver tip before use.



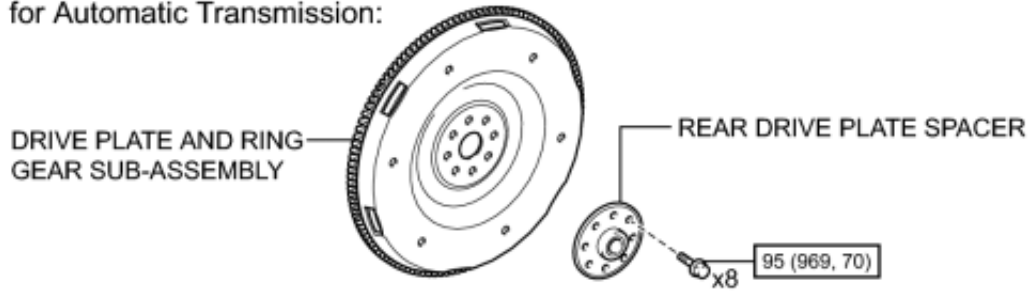
Last Modified: 4-14-2014	6.6 K	Doc ID: RM000004I0M003X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: REAR CRANKSHAFT OIL SEAL: COMPONENTS; 2013 MY FR-S [03/2012 -]		

[COMPONENTS](#)

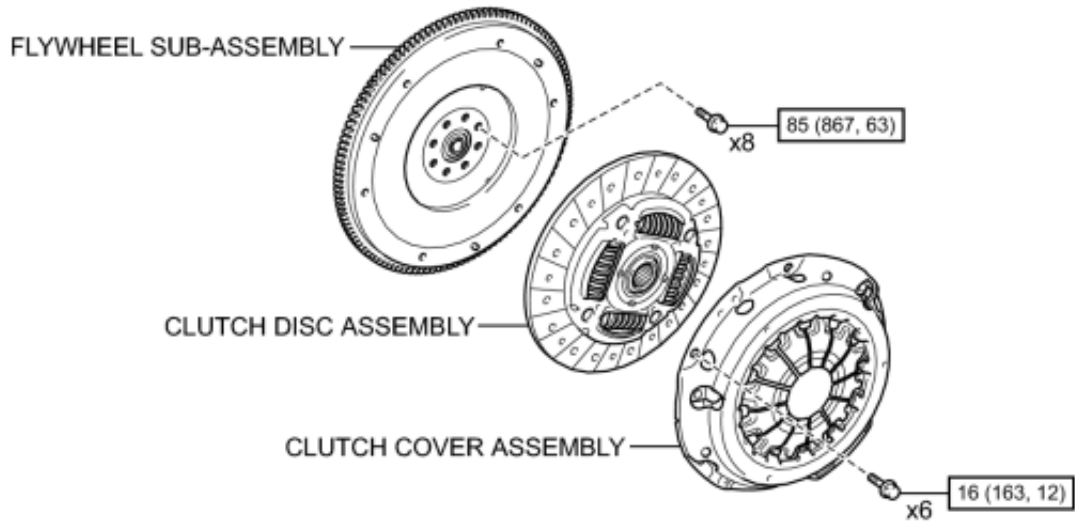
[ILLUSTRATION](#)



for Automatic Transmission:



for Manual Transmission:



N*m (kgf*cm, ft*lbf) : Specified torque

● Non-reusable part

T

Last Modified: 4-14-2014	6.6 A	Doc ID: RM0000041LF007X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: REAR CRANKSHAFT OIL SEAL: INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL REAR ENGINE OIL SEAL

(a) Apply engine oil to the lip of a new rear engine oil seal.

NOTICE:

Keep the lip free of foreign matter.

(b) Using SST and a hammer, tap in the oil seal until its surface is flush with the rear oil seal retainer edge.

SST: 09223-15030

SST: 09950-70010

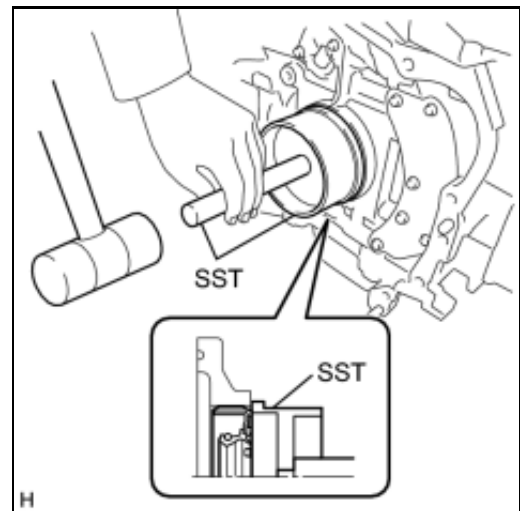
09951-07150

Oil seal tap in depth:

0 to 1.0 mm (0 to 0.0394 in.)

NOTICE:

- Wipe any extra grease off of the crankshaft.
- Keep the lip free of foreign matter.
- Do not tap on the oil seal at an angle.



2. INSTALL NO. 1 CRANKSHAFT POSITION SENSOR PLATE

(a) Clean the 8 bolts and 8 bolt holes.

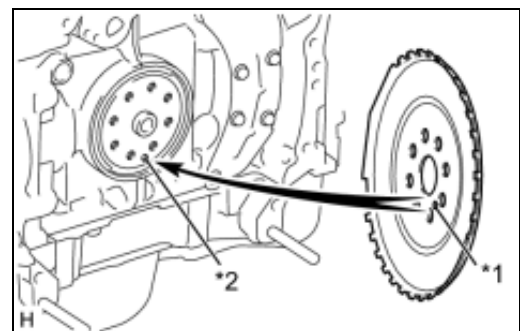
(b) Install the No. 1 crankshaft position sensor plate.

Text in Illustration

*1	Pin Hole
*2	Pin

HINT:

Align the pin of the front drive spacer with the pin hole of the crankshaft.



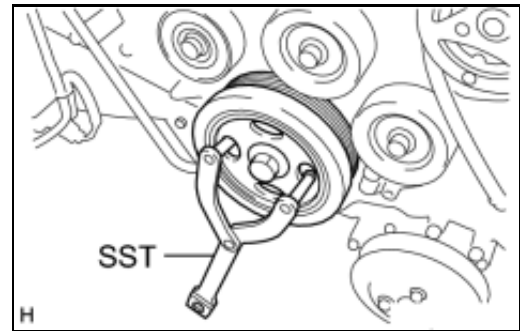
3. INSTALL FLYWHEEL SUB-ASSEMBLY (for Manual Transmission)

(a) Using SST, hold the crankshaft pulley.

SST: 09960-10010

09962-01000

09963-01000

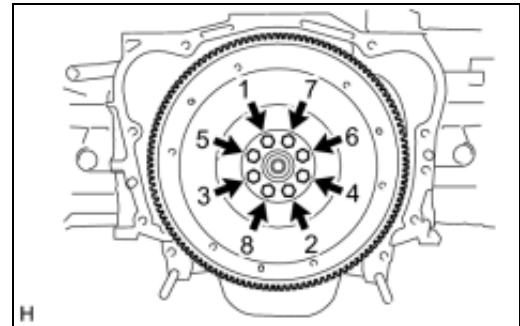


(b) Install the flywheel sub-assembly onto the crankshaft.

(c) In several steps, uniformly install and tighten the 8 bolts in the sequence shown in the illustration.

Torque:

85 N·m {867 kgf·cm, 63ft·lbf}



4. INSTALL CLUTCH DISC ASSEMBLY (for Manual Transmission)

INFO

5. INSTALL CLUTCH COVER ASSEMBLY (for Manual Transmission)

INFO

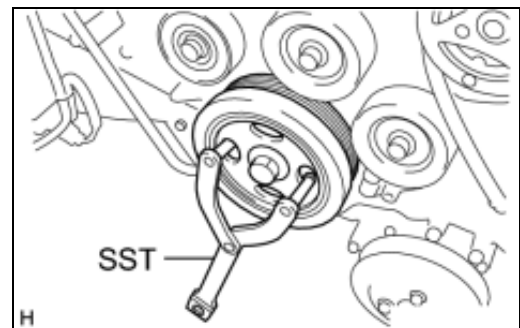
6. INSTALL DRIVE PLATE AND RING GEAR SUB-ASSEMBLY (for Automatic Transmission)

(a) Using SST, hold the crankshaft pulley.

SST: 09960-10010

09962-01000

09963-01000

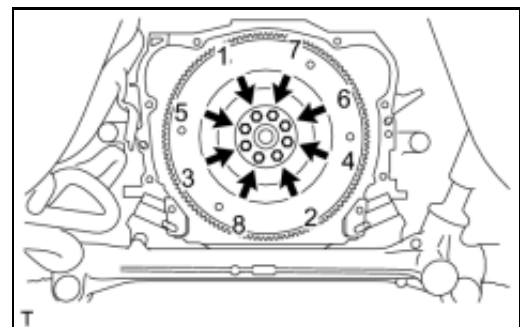


(b) Install the drive plate and ring gear sub-assembly and rear drive plate spacer onto the crankshaft.

(c) In several steps, uniformly install and tighten the 8 bolts in the sequence shown in the illustration.

Torque:

95 N·m {969 kgf·cm, 70ft·lbf}



7. REMOVE MANUAL TRANSMISSION ASSEMBLY (for Manual Transmission)

INFO

8. INSTALL AUTOMATIC TRANSMISSION ASSEMBLY (for Automatic Transmission)

INFO

9. INSPECT FOR OIL LEAK



Last Modified: 4-14-2014	6.6 A	Doc ID: RM0000041LG007X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: REAR CRANKSHAFT OIL SEAL: REMOVAL; 2013 MY FR-S [03/2012 -]		

REMOVAL

1. REMOVE AUTOMATIC TRANSMISSION ASSEMBLY (for Automatic Transmission)

INFO

2. REMOVE MANUAL TRANSMISSION ASSEMBLY (for Manual Transmission)

INFO

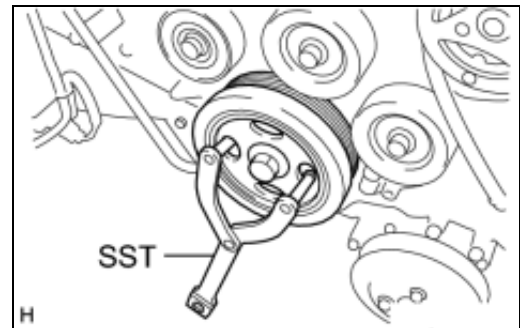
3. REMOVE DRIVE PLATE AND RING GEAR SUB-ASSEMBLY (for Automatic Transmission)

(a) Using SST, hold the crankshaft.

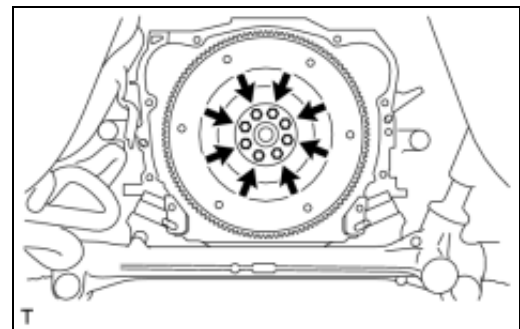
SST: 09960-10010

09962-01000

09963-01000



(b) Remove the 8 bolts, drive plate and ring gear sub-assembly and rear drive plate spacer.



4. REMOVE CLUTCH COVER ASSEMBLY (for Manual Transmission) INFO

5. REMOVE CLUTCH DISC ASSEMBLY (for Manual Transmission) INFO

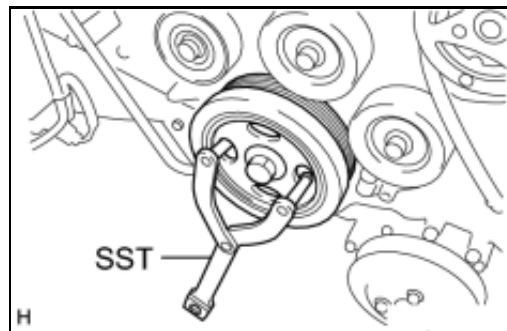
6. REMOVE FLYWHEEL SUB-ASSEMBLY (for Manual Transmission)

(a) Using SST, hold the crankshaft.

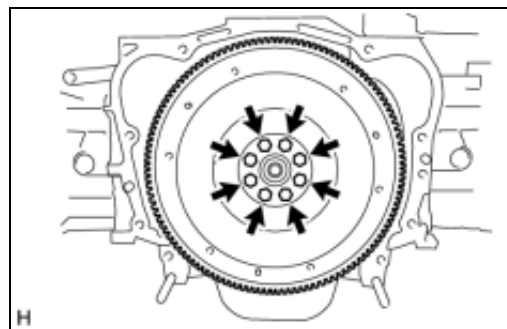
SST: 09960-10010

09962-01000

09963-01000



(b) Remove the 8 bolts and flywheel sub-assembly.

**7. REMOVE NO. 1 CRANKSHAFT POSITION SENSOR PLATE**

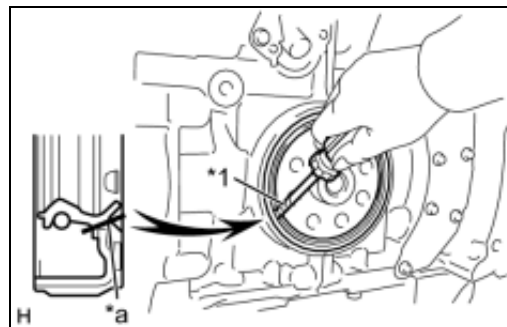
(a) Remove the No. 1 crankshaft position sensor plate.

8. REMOVE REAR ENGINE OIL SEAL

(a) Using a knife, cut through the oil seal lip.

Text in Illustration

*1	Protective Tape
*a	Cut position



(b) Using a screwdriver with its tip taped, pry out the rear engine oil seal.

NOTICE:

After removal, check the crankshaft for damage. If it is damaged, smooth the surface with 400-grit sandpaper.

HINT:

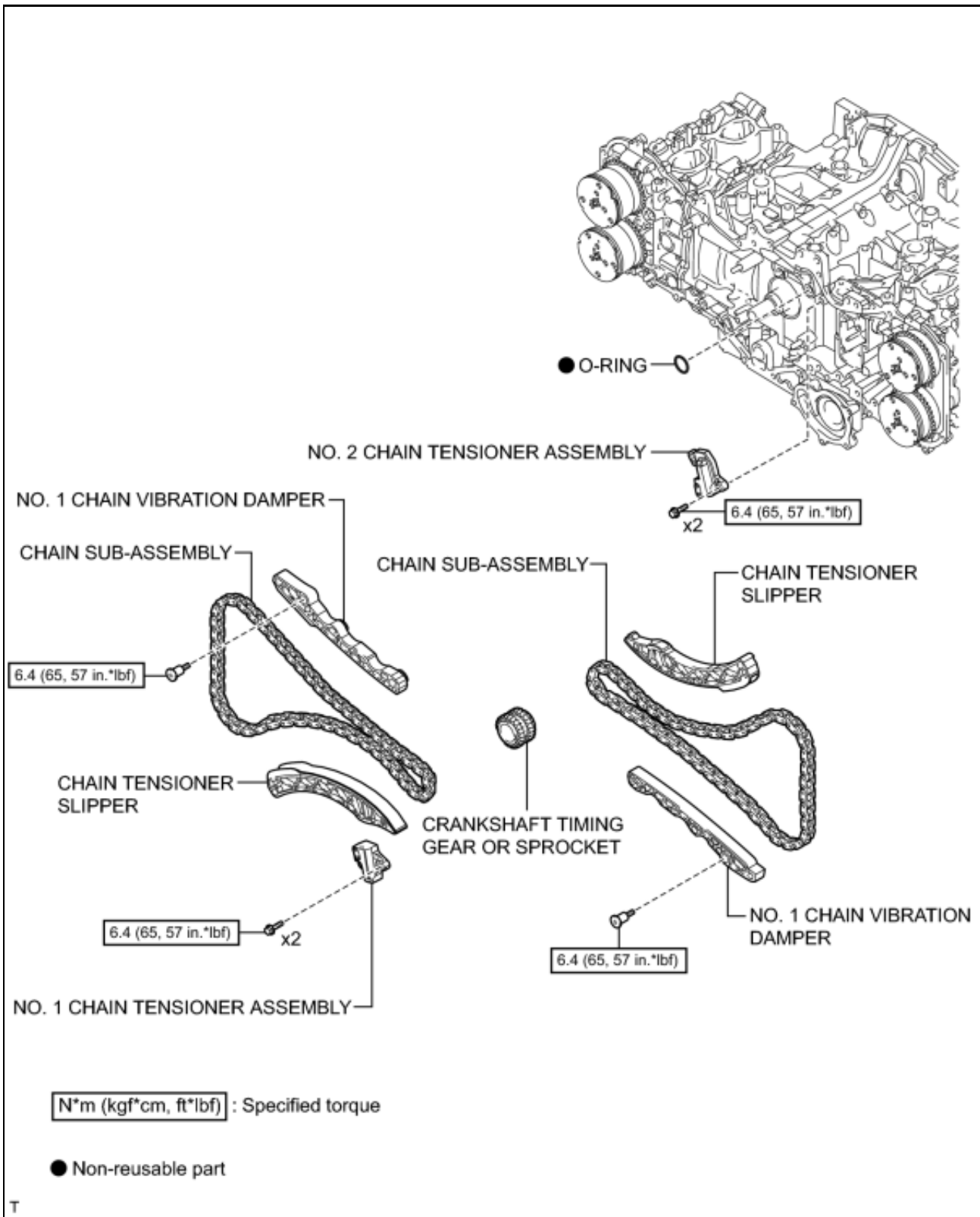
Tape the screwdriver tip before use.



Last Modified: 4-14-2014	6.6 K	Doc ID: RM00000591S000X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: TIMING CHAIN: COMPONENTS; 2013 MY FR-S [03/2012 -]		

[COMPONENTS](#)

[ILLUSTRATION](#)



Last Modified: 4-14-2014	6.6 A	Doc ID: RM0000056U7009X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: TIMING CHAIN: INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL CHAIN SUB-ASSEMBLY (for Bank 2)

NOTICE:

Do not allow any foreign matter to adhere onto or to enter into the component parts during installation.

HINT:

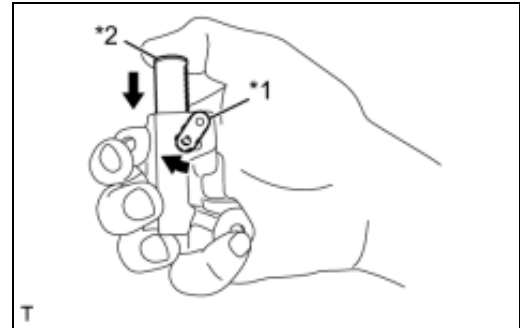
Apply engine oil to all component parts of the chain sub-assembly.

(a) Temporarily install the pulley bolt to the crankshaft.

(b) Move the link plate in the direction of the arrow in the illustration to press in the plunger.

Text in Illustration

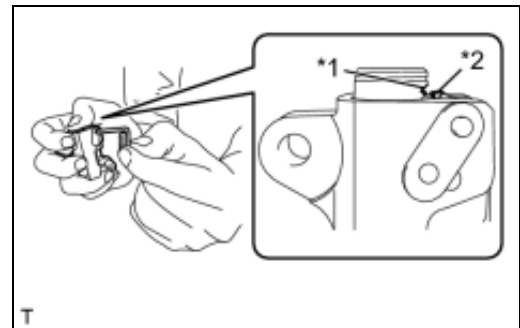
*1	Link Plate
*2	Plunger



(c) Insert an approximately 1 mm (0.039 in.) wire or the like into the chain tensioner through the stopper pin hole, and hold the plunger.

HINT:

If the stopper pin hole on the link plate and the stopper pin hole on the chain tensioner are not aligned, check that the first notch of the plunger rack is engaged with the stopper tooth. If not engaged, retract the plunger a little so that the first notch of the plunger rack is engaged with the stopper tooth.



Text in Illustration

*1	First notch of the plunger rack
*2	Stopper Tooth

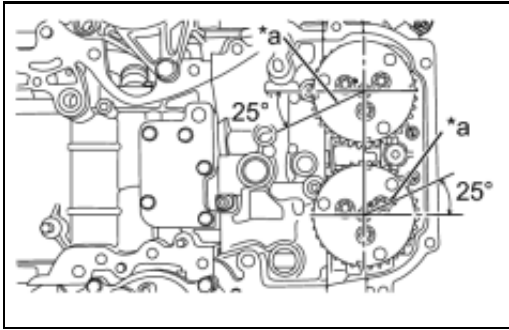
(d) Align the alignment mark on the camshaft timing intake gear assembly LH and camshaft timing exhaust gear assembly LH with the position shown in the illustration.

NOTICE:

To avoid damaging the valves, do not turn the camshaft timing intake gear assemblies more than the zero-lift range (the range where camshaft timing intake gear assemblies can be turned lightly by hand).

Text in Illustration

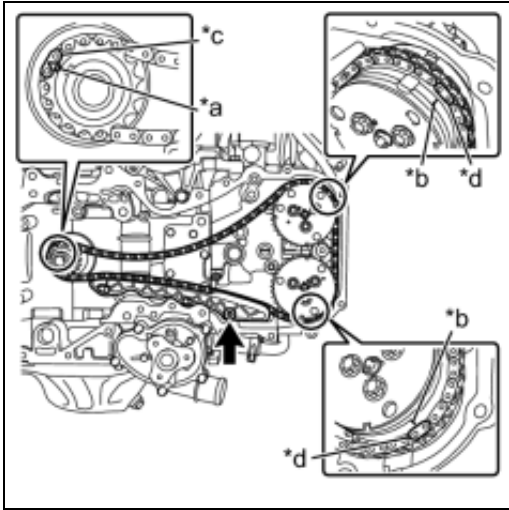
*a	Alignment Mark
----	----------------



(e) Align the timing chain mark plate (blue) with the alignment mark of the crankshaft timing gear or sprocket.

Text in Illustration

*a	Alignment Mark
*b	Timing Mark
*c	Mark plate (Blue)
*d	Mark plate (Pink)

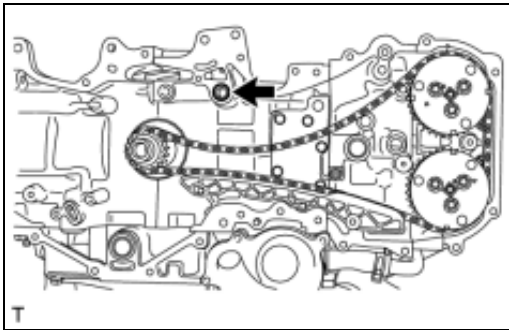


- (f) Align the timing chain mark plate (pink) with the timing mark on the camshaft timing intake gear assembly LH.
- (g) Align the timing chain mark plate (pink) with the timing mark on the camshaft timing exhaust gear assembly LH.
- (h) Apply engine oil to the bolt.
- (i) Using a 5 mm hexagon socket wrench, install the No. 1 chain vibration damper with the bolt.

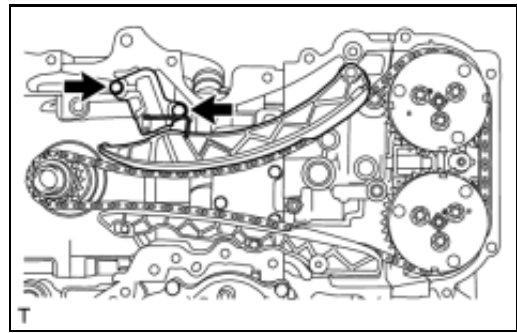
Torque:

6.4 N·m { 65 kgf·cm, 57in·lbf }

(j) Install a new O-ring to the cylinder block (bank 2).



(k) Install the chain tensioner slipper.



(l) Install the No. 2 chain tensioner assembly with the 2 bolts.

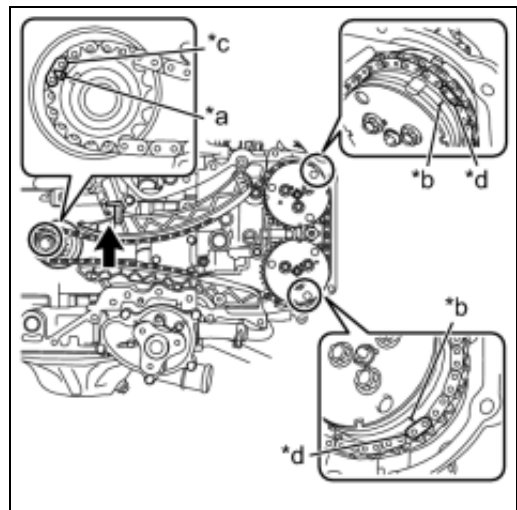
Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}

(m) Check that the chain is correctly installed.

Text in Illustration

*a	Alignment Mark
*b	Timing Mark
*c	Mark plate (Blue)
*d	Mark plate (Pink)



- (1) Timing chain mark plate (blue) is aligned with the alignment mark on the crankshaft timing gear or sprocket.
- (2) Timing chain mark plate (pink) is aligned with the timing mark on the camshaft timing intake gear assembly LH.
- (3) Timing chain mark plate (pink) is aligned with the timing mark on the camshaft timing exhaust gear assembly LH.

(n) Pull out the wire or the like from the No. 2 chain tensioner assembly.

(o) Temporarily install the pulley bolt to the crankshaft.

(p) Turn the crankshaft clockwise, and make sure that there are no abnormal conditions.

NOTICE:

Be sure to perform this confirmation.

2. INSTALL CHAIN SUB-ASSEMBLY (for Bank 1)

NOTICE:

Do not allow any foreign matter to adhere onto or to enter into the component parts during installation.

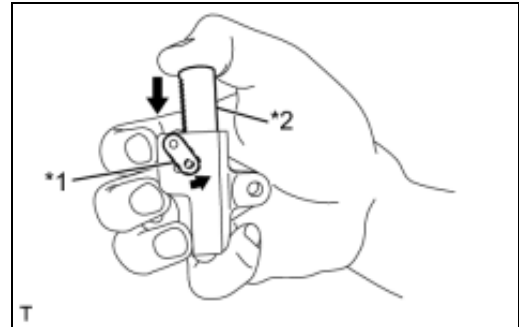
HINT:

Apply engine oil to all component parts of the chain sub-assembly.

- (a) Move the link plate in the direction of the arrow in the illustration to press in the plunger.

Text in Illustration

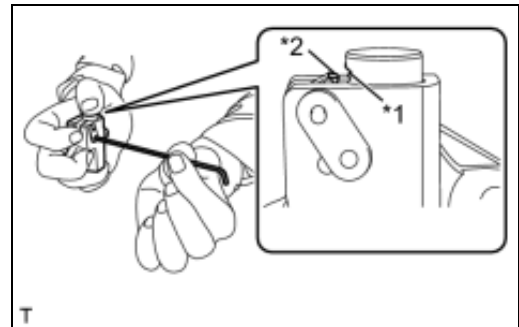
*1	Link Plate
*2	Plunger



- (b) Insert a 2.5 mm (0.098 in.) hexagon wrench into the No. 1 chain tensioner assembly through the stopper pin hole, and hold the plunger.

Text in Illustration

*1	First notch of the plunger rack
*2	Stopper Tooth

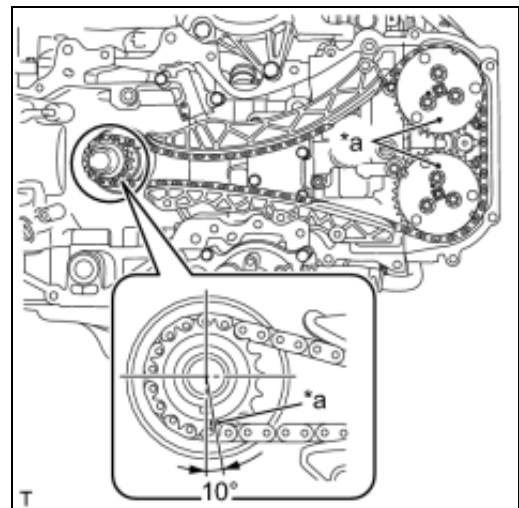
**HINT:**

If the stopper pin hole on the link plate and the stopper pin hole on the chain tensioner are not aligned, check that the first notch of the plunger rack is engaged with the stopper tooth. If not engaged, retract the plunger a little so that the first notch of the plunger rack is engaged with the stopper tooth.

- (c) Turn the crankshaft and align the alignment marks of the crankshaft timing gear or sprocket, camshaft timing intake gear assembly LH and camshaft timing exhaust gear assembly LH shown in the illustration.

Text in Illustration

*a	Alignment Mark
----	----------------

**HINT:**

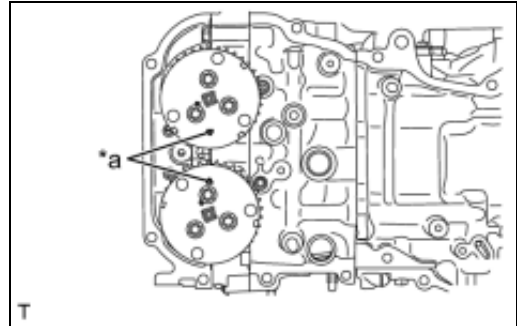
When the marks are aligned with the positions in the illustration, crankshaft key faces directly underneath.

(d) Align the alignment marks of the camshaft timing intake gear assembly RH and camshaft timing exhaust gear assembly RH as shown in the illustration.

NOTICE:

To avoid damaging the valves, do not turn the camshaft timing intake gear assembly RH and camshaft more than the zero-lift range (the range where the camshaft timing intake gear assemblies can be turned lightly by hand).

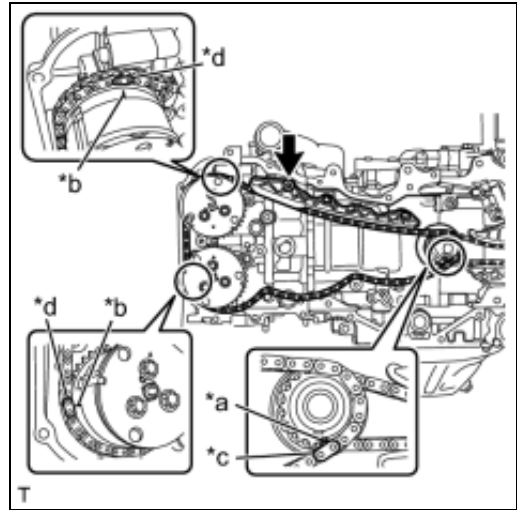
Text in Illustration



*a	Alignment Mark
----	----------------

(e) Align the timing chain mark plate (blue) with the alignment mark on the crankshaft timing gear or sprocket.

Text in Illustration



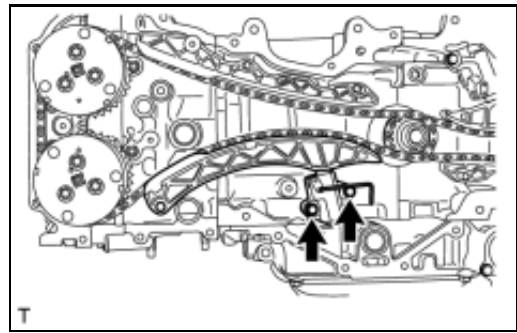
*a	Alignment Mark
*b	Timing Mark
*c	Mark plate (Blue)
*d	Mark plate (Pink)

- (f) Align the timing chain mark plate (pink) with the timing mark on the camshaft timing intake gear assembly RH.
- (g) Align the timing chain mark plate (pink) with the timing mark on the camshaft timing exhaust gear assembly RH.
- (h) Apply engine oil to the bolt.
- (i) Using a 5 mm hexagon socket wrench, install the No. 1 chain vibration damper with the bolt.

Torque:

6.4 N·m { 65 kgf·cm, 57in·lbf }

(j) Install the chain tensioner slipper.



(k) Install the No. 1 chain tensioner assembly with the 2 bolts.

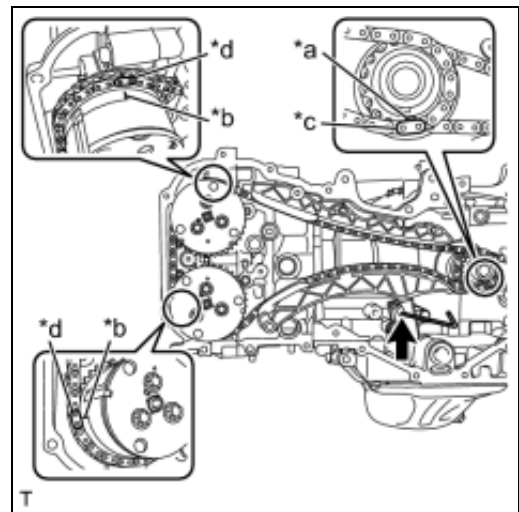
Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}

(l) Check that the chain is correctly installed.

Text in Illustration

*a	Alignment Mark
*b	Timing Mark
*c	Mark plate (Blue)
*d	Mark plate (Pink)



- (1) Timing chain mark plate (blue) is aligned with the alignment mark on the crankshaft timing gear or sprocket.
- (2) Timing chain mark plate (pink) is aligned with the timing mark on the camshaft timing intake gear assembly RH.
- (3) Timing chain mark plate (pink) is aligned with the timing mark on the camshaft timing exhaust gear assembly RH.

(m) Pull out the hexagon wrench from the No. 1 chain tensioner assembly.

(n) Turn the crankshaft clockwise, and make sure that there are no abnormal conditions.

NOTICE:

Be sure to perform this confirmation.

(o) Remove the pulley bolt.

3. INSTALL TIMING CHAIN OR BELT COVER SUB-ASSEMBLY



Last Modified: 4-14-2014	6.6 A	Doc ID: RM0000056U900BX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: TIMING CHAIN: REMOVAL; 2013 MY FR-S [03/2012 -]		

REMOVAL

1. REMOVE TIMING CHAIN OR BELT COVER SUB-ASSEMBLY

INFO

2. REMOVE CHAIN SUB-ASSEMBLY (for Bank 1)

(a) Temporarily install the pulley bolt to the crankshaft.

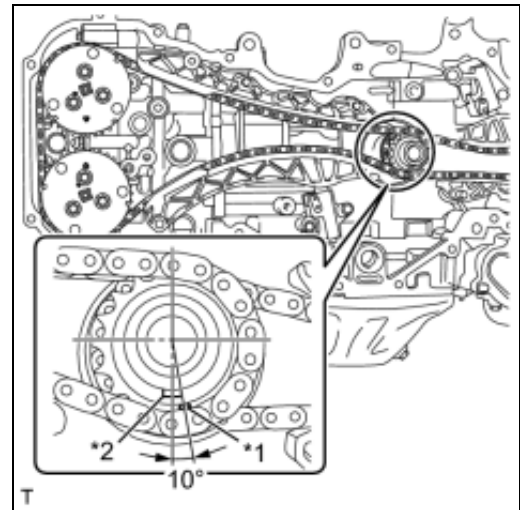
(b) Turn the crankshaft and align the alignment marks of the crankshaft timing gear or sprocket, camshaft timing intake gear assembly RH and camshaft timing exhaust gear assembly RH.

Text in Illustration

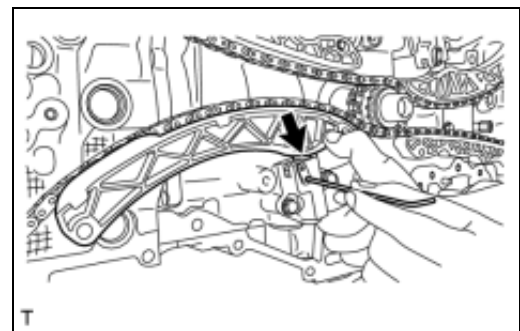
*1	Alignment Mark
*2	Key

HINT:

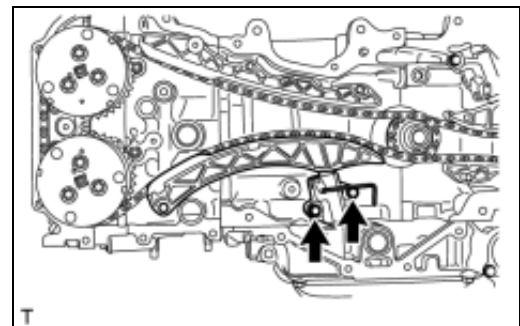
The crankshaft key faces downward at this time.



(c) Push down the chain tensioner slipper and insert a 2.5 mm (0.098 in.) hexagonal wrench through the stopper plate into the No. 1 chain tensioner assembly.

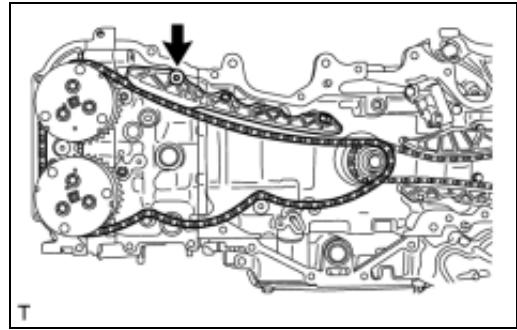


(d) Remove the 2 bolts and No. 1 chain tensioner assembly.



(e) Remove the chain tensioner slipper.

- (f) Using a 5 mm hexagonal wrench, remove the bolt and No. 1 chain vibration damper.



- (g) Remove the chain sub-assembly.

NOTICE:

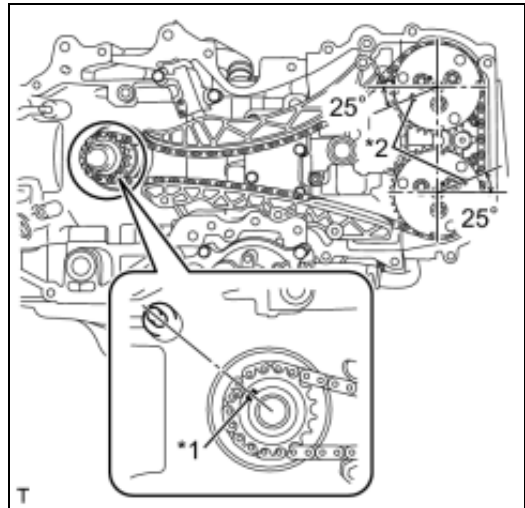
- With the chain sub-assembly removed, the valve heads may contact each other if the camshafts are turned, causing the valve stems to bend.
- To avoid this, do not turn the intake camshaft RH and the exhaust camshaft RH more than the zero-lift range (the range where camshafts can be turned lightly by hand).

HINT:

Arrange the removed parts in the correct order.

3. REMOVE CHAIN SUB-ASSEMBLY (for Bank 2)

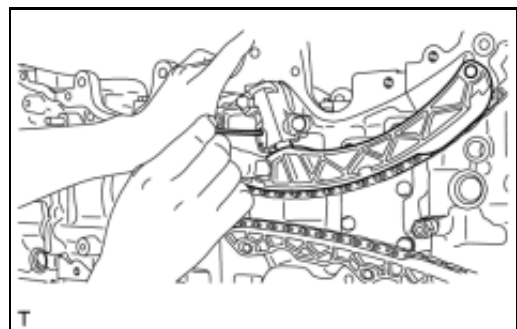
- (a) Turn the crankshaft and position each alignment mark on the crankshaft timing gear or sprocket, camshaft timing intake gear assembly LH and camshaft timing exhaust gear assembly LH as shown in the illustration.



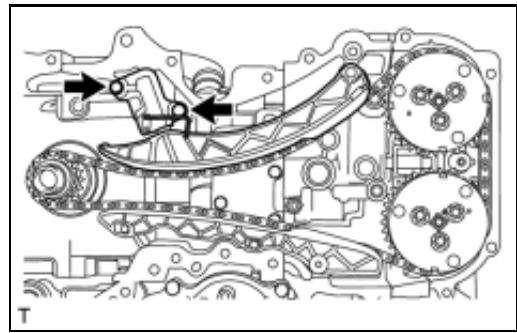
Text in Illustration

*1	Key
*2	Alignment Mark

- (b) Push the chain tensioner slipper and retain the plunger by inserting an approximately 1 mm (0.039 in.) wire through the stopper plate into the No. 2 chain tensioner assembly.

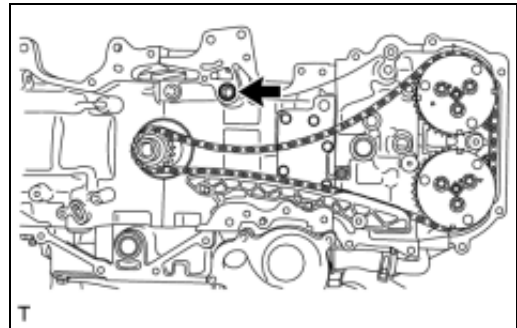


(c) Remove the 2 bolts and No. 2 chain tensioner assembly.

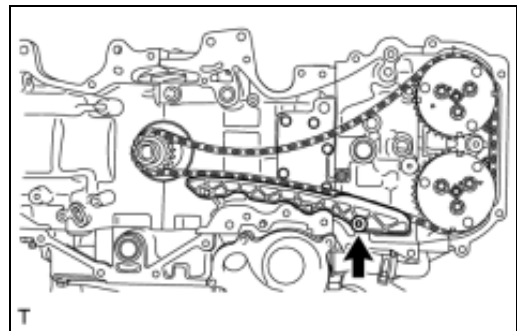


(d) Remove the chain tensioner slipper.

(e) Remove the O-ring from the cylinder block (bank 2).



(f) Using a 5 mm socket hexagon wrench, remove the bolt and No. 1 chain vibration damper.



(g) Remove the chain sub-assembly.

NOTICE:

- With the chain sub-assembly removed, the valve heads may contact each other if the camshafts are turned, causing the valve stems to bend. To avoid this, do not turn the exhaust camshaft LH more than the zero-lift range (the range where the camshaft can be turned lightly by hand).
- At this time, the No. 1 and No. 4 pistons are located near TDC. If the intake camshaft is turned, the valves may come into contact with the piston, causing the valve stems to bend. To avoid this, do not turn the intake camshaft LH.

HINT:

Arrange the removed parts in the correct order.

(h) Remove the pulley bolt.



Last Modified: 4-14-2014	6.6 N	Doc ID: RM000000RRR00NX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: VALVE CLEARANCE: ADJUSTMENT; 2013 MY FR-S [03/2012 -]		

ADJUSTMENT

1. REMOVE IGNITION COIL ASSEMBLY

INFO

2. REMOVE INJECTOR COVER (for Bank 1)

INFO

3. REMOVE INJECTOR DRIVER BRACKET

INFO

4. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY RH

INFO

5. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY LH

INFO

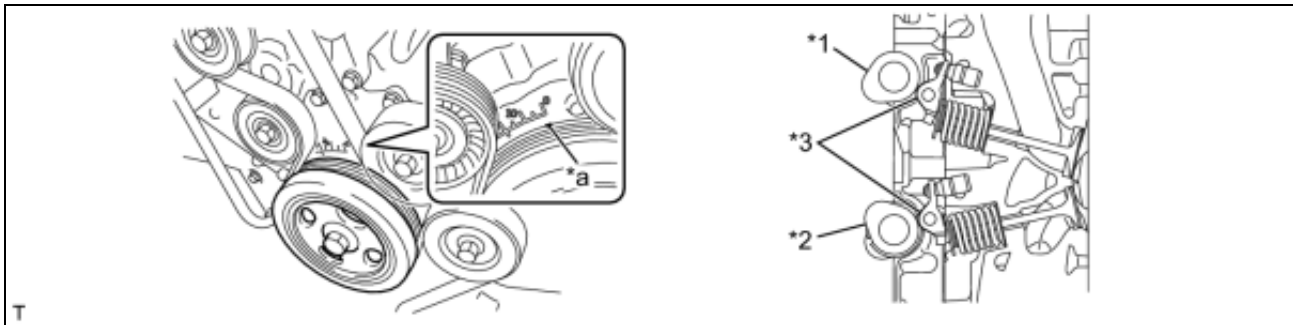
6. INSPECT VALVE CLEARANCE

NOTICE:

Inspect the valve clearance when the engine is cold.

(a) Set the No. 1 cylinder to the TDC/compression.

(1) Turn the crankshaft clockwise to align the timing mark on the crankshaft pulley with the indicator of the timing chain cover.



Text in Illustration

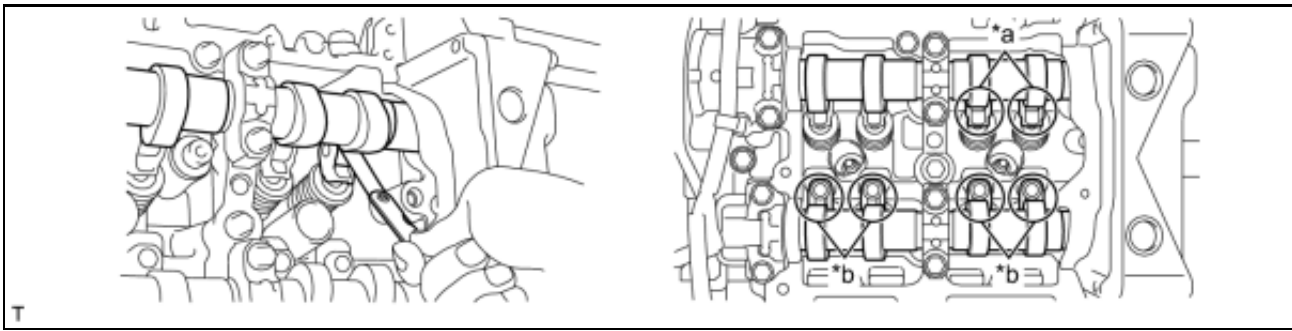
*1	Intake Camshaft	*2	Exhaust Camshaft
*3	No. 1 Valve Rocker Arm Sub-assembly	-	-
*a	Timing Mark	-	-

(b) At this time, check that the intake camshaft and exhaust camshaft do not depress the No. 1 cylinder intake side No. 1 valve rocker arm sub-assembly (intake valve) and exhaust side No. 1 valve rocker arm sub-assembly (exhaust valve).

HINT:

If the No. 1 valve rocker arm sub-assembly (valve) is depressed, turn the crank pulley by 360° in order to make the No. 1 cylinder piston at TDC/compression.

(c) Inspect the valve clearance indicated in the illustration.



Text in Illustration

*a	Intake Side	*b	Exhaust Side
----	-------------	----	--------------

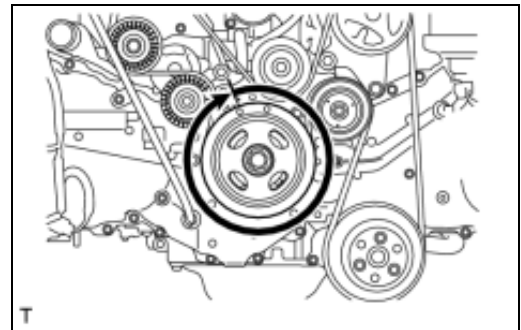
(d) Measure the clearance between the surface of the cam base circle and the roller surface of the No. 1 valve rocker arm sub-assembly using a feeler gauge.

Standard Valve Clearance (Cold):

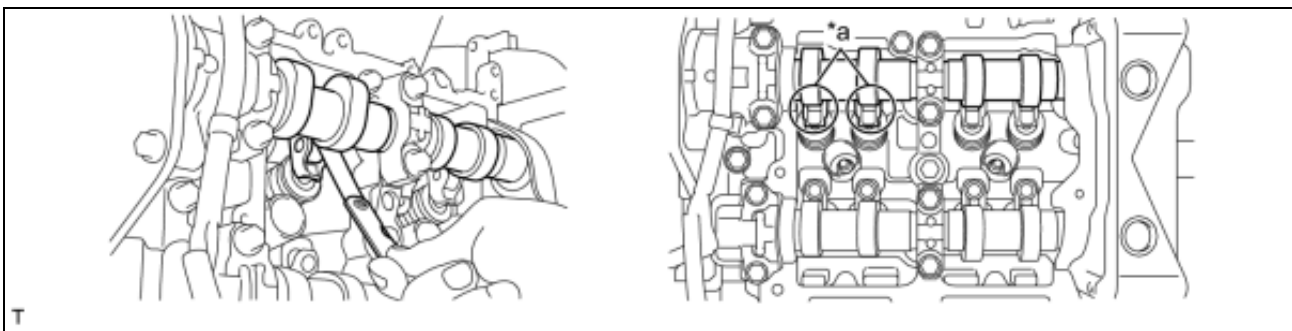
Intake 0.10 to 0.16 mm (0.0039 to 0.0063 in.)

Exhaust 0.21 to 0.27 mm (0.0083 to 0.0106 in.)

(e) Turn the crank pulley by 360°.



(f) Inspect the valve clearance indicated in the illustration.



Text in Illustration

*a	Intake Side	-	-
----	-------------	---	---

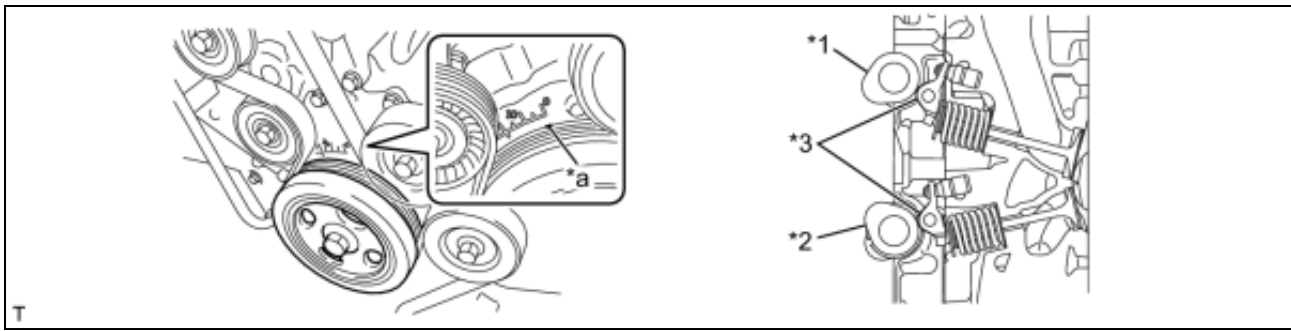
(g) Measure the clearance between the surface of the cam base circle and the roller surface of the No. 1 valve rocker arm sub-assembly using a feeler gauge.

Standard Valve Clearance (Cold):

Intake 0.10 to 0.16 mm (0.0039 to 0.0063 in.)

(h) Turn the crank pulley clockwise, set the No. 2 cylinder at TDC/compression, and then align the

timing mark (notch) with 0° position of the timing chain cover.



Text in Illustration

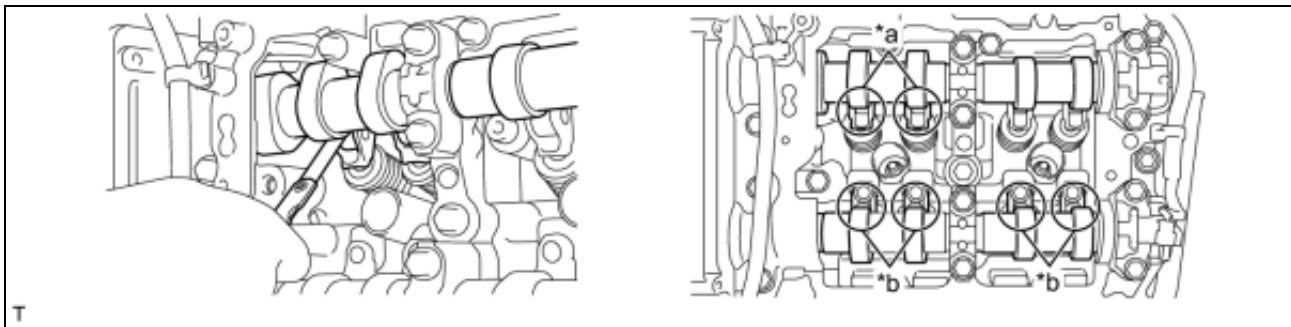
*1	Intake Camshaft	*2	Exhaust Camshaft
*3	No. 1 Valve Rocker Arm Sub-assembly	-	-
*a	Timing Mark	-	-

- (i) At this time, check that the intake camshaft and exhaust camshaft do not depress the No. 2 cylinder intake side No. 1 valve rocker arm sub-assembly (intake valve) and exhaust side No. 1 valve rocker arm sub-assembly (exhaust valve).

HINT:

If the No. 1 valve rocker arm sub-assembly (valve) is depressed, turn the crank pulley by 360° in order to make the No. 2 cylinder piston at TDC/compression.

- (j) Inspect the valve clearance indicated in the illustration.



Text in Illustration

*a	Intake Side	*b	Exhaust Side
----	-------------	----	--------------

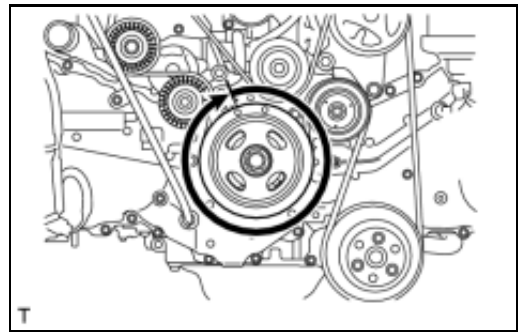
- (k) Measure the clearance between the surface of the cam base circle and the roller surface of the No. 1 valve rocker arm sub-assembly using a feeler gauge.

Standard Valve Clearance (Cold):

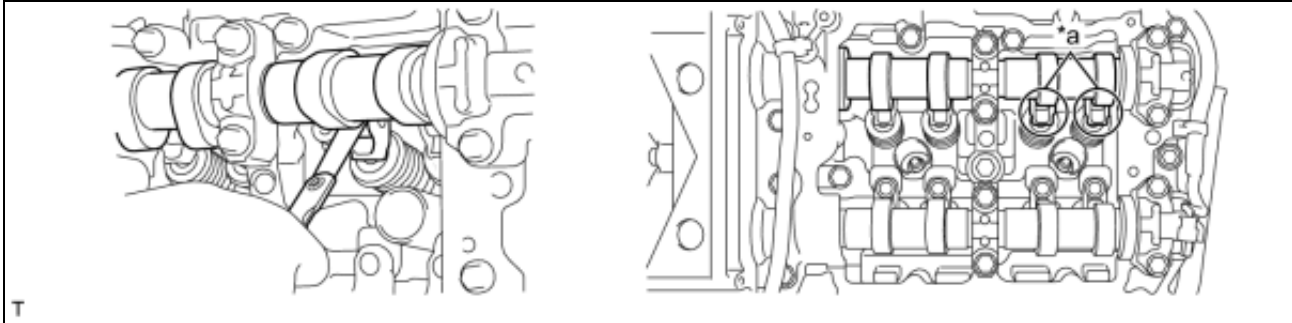
Intake 0.10 to 0.16 mm (0.0039 to 0.0063 in.)

Exhaust 0.21 to 0.27 mm (0.0083 to 0.0106 in.)

(l) Turn the crank pulley by 360°.



(m) Inspect the valve clearance indicated in the illustration.



Text in Illustration

*a	Intake Side	-	-
----	-------------	---	---

(n) Measure the clearance between the surface of the cam base circle and the roller surface of the No. 1 valve rocker arm sub-assembly using a feeler gauge.

Standard Valve Clearance (Cold):

Intake 0.10 to 0.16 mm (0.0039 to 0.0063 in.)

7. ADJUST VALVE CLEARANCE

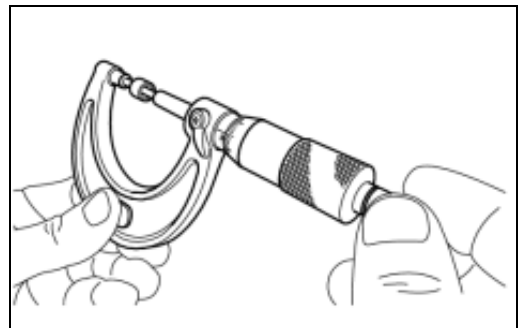
(a) Remove the camshaft housing sub-assembly.

INFO

(b) Remove the No. 1 valve rocker arm sub-assemblies.

(c) Remove the valve adjusting shims.

(d) Using a micrometer, measure the thickness of the removed valve adjusting shims.



(e) Calculate the thickness of the valve adjusting shim so that the valve clearance comes within the specified values.

Intake Side:

$$A = B + [C - 0.13 \text{ mm (0.0051 in.)}] \times 1.54$$

Exhaust Side:

$$A = B + [C - 0.24 \text{ mm (0.0094 in.)}] \times 1.69$$

A:

Required valve adjusting shim thickness

B:

Removed valve adjusting shim thickness

C:

Measured valve clearance

(f) Apply engine oil to the inner face of the valve adjusting shim, and install it to the valve.

NOTICE:

Check whether valve adjusting shim can be rotated smoothly on the valve.

(g) Install the No. 1 valve rocker arm sub-assemblies.

(h) Install the camshaft housing sub-assembly.

INFO

8. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY LH INFO

9. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY RH INFO

10. INSTALL INJECTOR DRIVER BRACKET INFO

11. INSTALL INJECTOR COVER (for Bank 1) INFO

12. INSTALL IGNITION COIL ASSEMBLY

INFO



Last Modified: 4-14-2014	6.6 G	Doc ID: RM00000409400QX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 ENGINE MECHANICAL: VALVE CLEARANCE: ON-VEHICLE INSPECTION; 2013 MY FR-S [03/2012 -]		

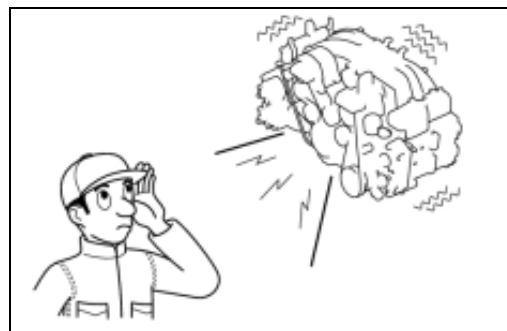
ON-VEHICLE INSPECTION

1. INSPECT VALVE CLEARANCE

- (a) Check for noise and vibration
- (1) Check for valve noise or a rough idle.
 - (2) Judge whether the valve clearance needs to be adjusted.

HINT:

If the valve noise is too loud or the idle is rough, inspect the valve clearance **INFO** .

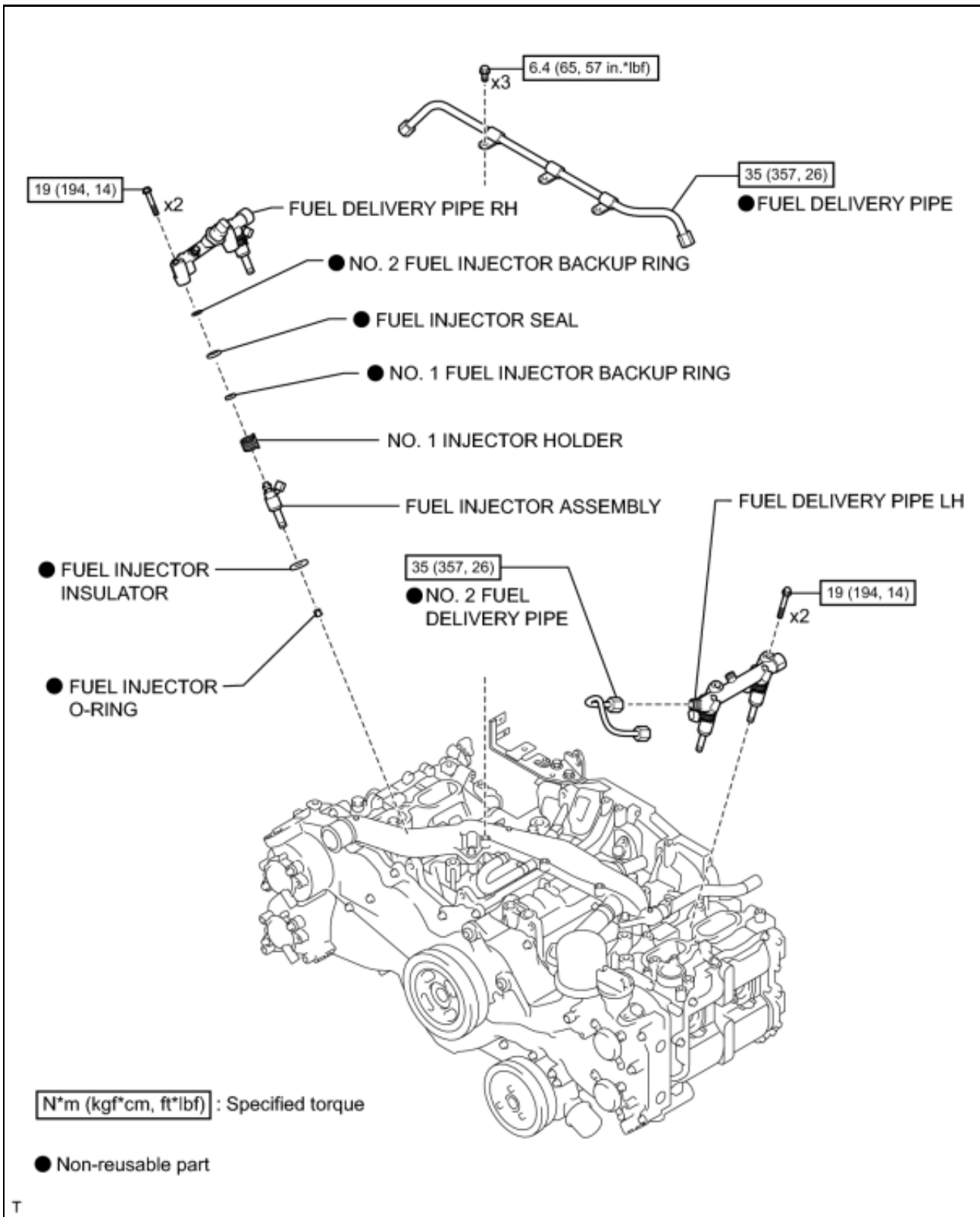


TOYOTA

Last Modified: 4-14-2014	6.6 K	Doc ID: RM000000PE206UX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL INJECTOR (for Direct Injection): COMPONENTS; 2013 MY FR-S [03/2012 -]		

[COMPONENTS](#)

[ILLUSTRATION](#)



T



Last Modified: 4-14-2014	6.6 G	Doc ID: RM000000WQQ07RX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL INJECTOR (for Direct Injection): INSPECTION; 2013 MY FR-S [03/2012 -]		

INSPECTION

1. INSPECT FUEL INJECTOR ASSEMBLY

NOTICE:

This inspection aims is to inspect the fuel injectors for opens or shorts, because the fuel injectors of this vehicle are of a high-pressure type and cannot be inspected for fuel injection volume.

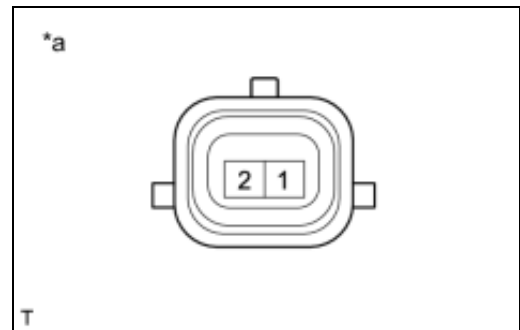
- (a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	1.9 Ω

Text in Illustration

*a	Component without harness connected (Fuel Injector Assembly)
----	---



If the result is not as specified, replace the fuel injector assembly.



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000Q4608BX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL INJECTOR (for Direct Injection): INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL FUEL INJECTOR SEAL

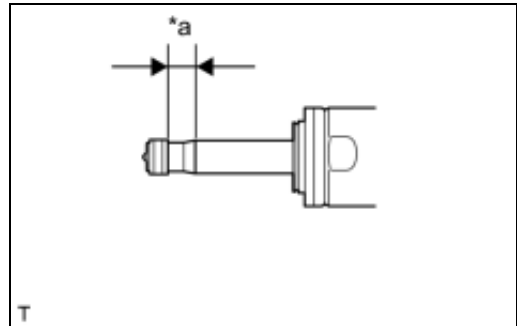
- (a) Apply engine conditioner to the injector area shown in the illustration. Using a piece of cloth, remove the carbon deposits from the injector and its grooves.

Text in Illustration

*a	Clean Area
----	------------

NOTICE:

- Do not clean the tip of the injector.
- Do not use a wire brush to clean the injector.
- If an injector is dropped or the tips of the injectors are struck, replace it with a new one.



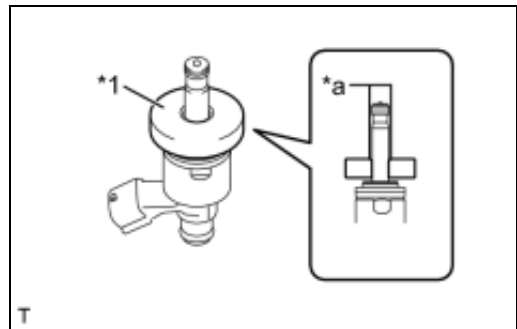
- (b) Apply engine oil to the injector contact surface of SST (guide). Then attach SST (guide) to the injector with the tapered inner portion facing the tip of the injector, as shown in the illustration.

SST: 09260-39020

09261-03020

Text in Illustration

*1	SST (Guide)
*a	Tapered Inner Portion



- (c) Install a new injector seal to SST (holder).

SST: 09260-39020

09261-03010

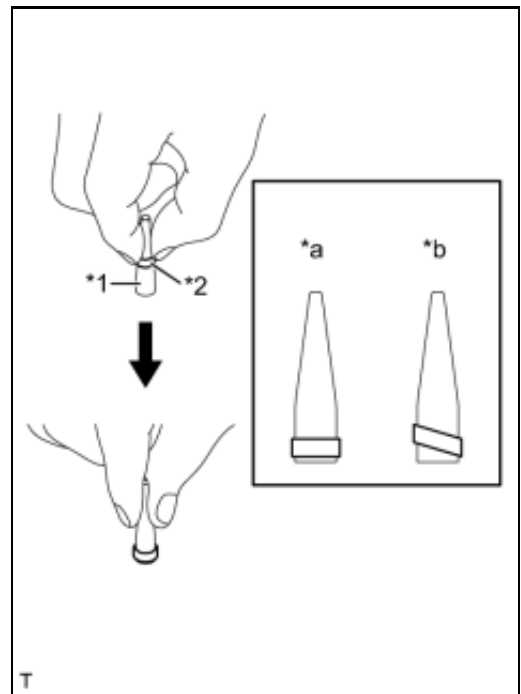
Text in Illustration

*1	SST (holder)
*2	Injector Seal

*a	CORRECT
*b	INCORRECT

NOTICE:

Be careful not to install the injector seal to SST (holder) at an angle. Doing so will stretch the seal and correcting this problem is very complicated.



(d) Install SST (holder with injector seal) to the tip of the injector. Slide the seal downward into the injector groove (injector connector side) with your fingers, as shown in the illustration.

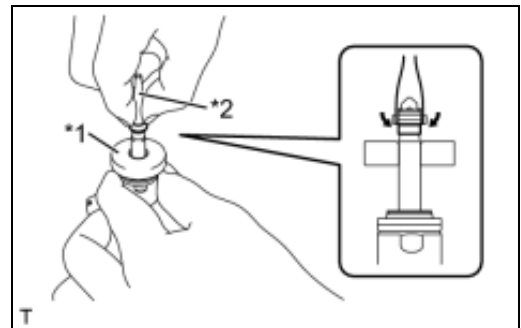
SST: 09260-39020

09261-03010

09261-03020

Text in Illustration

*1	SST (Guide)
*2	SST (Holder)



HINT:

Check that the seal covers the circumference of the injector groove as shown in the illustration.

(e) Using SST (holder), gently press downward on the injector seal (injector connector side). Then slowly slide SST (guide) toward the injector tip to settle the seal into the injector groove.

SST: 09260-39020

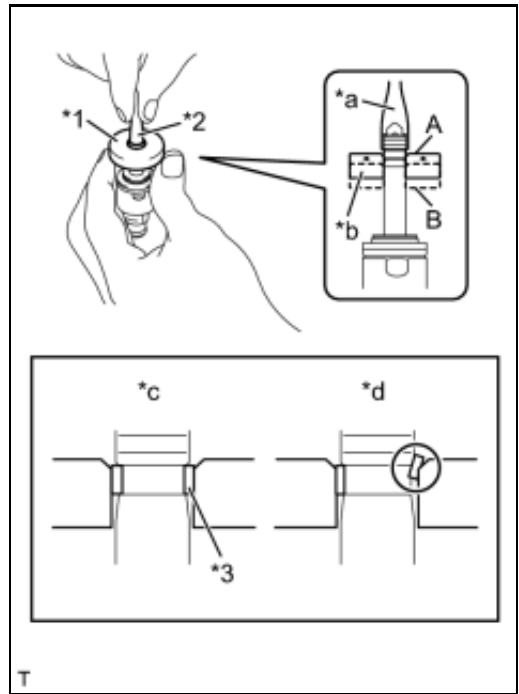
09261-03010

09261-03020

Text in Illustration

*1	SST (Guide)
*2	SST (Holder)

*3	Injector Seal
*a	Gently Press
*b	Slowly Slide
*c	CORRECT
*d	INCORRECT



NOTICE:

Be careful that the seal is not pinched between SST (guide) and the injector groove. Replace the seal if it becomes damaged.

HINT:

- When using SST (guide) to settle the seal into the groove, SST (guide) only needs to be slid upward to the position labeled A in the illustration.
- After using SST (guide) to settle the seal into the groove, return SST (guide) to its position labeled B in the illustration.

(f) Slowly slide SST (guide) toward the tip of the injector. When the injector contact surface of SST (guide) aligns with the seal (injector connector side) as shown in the illustration, hold the position for 5 seconds or more to fully align the seal into the injector groove.

SST: 09260-39020

09261-03020

Text in Illustration

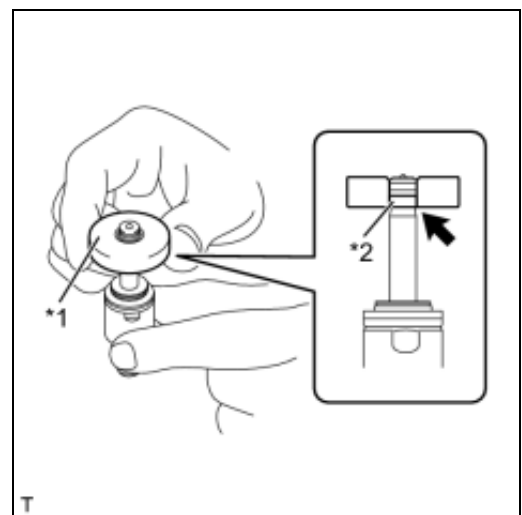
*1	SST (Guide)
*2	Injector Seal

NOTICE:

Be careful that the seal is not pinched between SST (guide) and the injector groove. Replace the seal if it becomes damaged.

HINT:

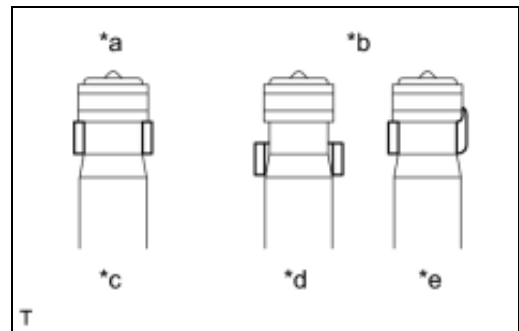
- Set SST (guide) so that its bottom surface and seal are flush.
- If there is difficulty in sliding SST upward, slowly wiggle it from side to side while sliding it up the injector little by little.



- (g) After installing the seals, check that they are not scratched, deformed or protruding from the injector groove.

Text in Illustration

*a	CORRECT
*b	INCORRECT
*c	Normal
*d	Protruding
*e	Deformed



NOTICE:

If a seal is scratched, deformed or protruding from the groove, replace it with a new one.

2. INSTALL FUEL INJECTOR ASSEMBLY

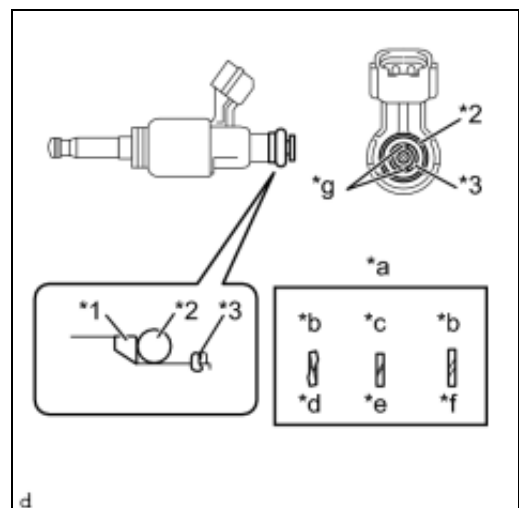
NOTICE:

If the tip of the fuel injector assembly is struck or the fuel injector assembly is dropped, replace the fuel injector assembly with a new one.

- (a) Install new fuel injector backup rings (No. 1 and No. 2) and a new fuel injector seal to the fuel injector assembly as shown in the illustration.

Text in Illustration

*1	No. 1 Fuel Injector Backup Ring
*2	Injector Seal
*3	No. 2 Fuel Injector Backup Ring
*a	Alignment Opening
*b	INCORRECT
*c	CORRECT
*d	Overlapped
*e	Normal
*f	Stretched
*g	Grooved Section



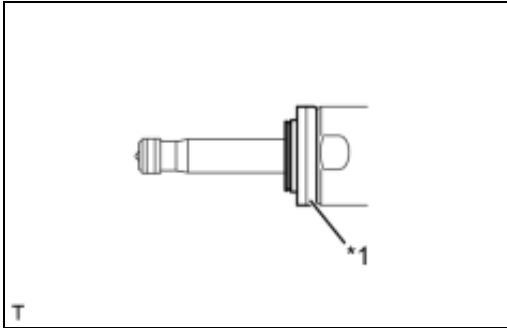
NOTICE:

- Check that there is no foreign matter or damaged areas in the injector seal groove.
- Check that the No. 1 fuel injector backup ring is installed in the correct direction.
- Install the No. 2 fuel injector backup ring so that the

grooved section faces the fuel delivery pipe.

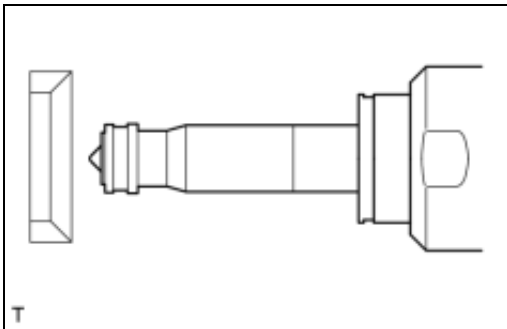
- Make sure that the backup rings and injector seal are installed in the correct order.
- Check that the alignment openings of the backup rings are not overlapped or stretched as shown in the illustration.
- After installing the injector seal, check that it is not contaminated with foreign matter and is not damaged.

(b) Install a new fuel injector insulator to the fuel injector.



Text in Illustration

*1	Fuel Injector Insulator
----	-------------------------

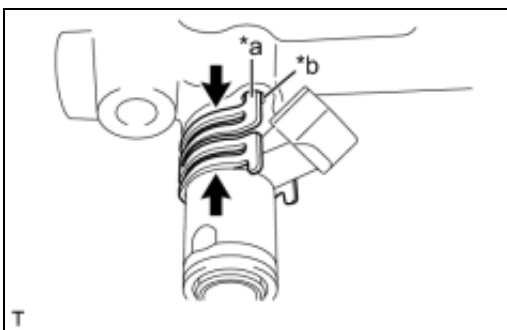


NOTICE:

Install a new fuel injector insulator to the fuel injector as shown in the illustration.


(c) Install the No. 1 injector holder.

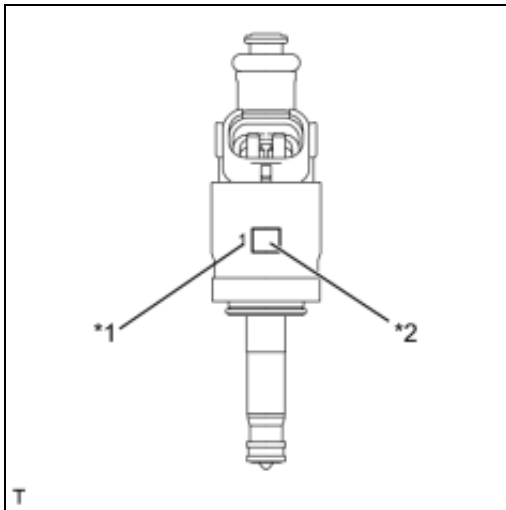
(d) Apply new engine oil to the surface of the injector insertion hole in the fuel delivery pipe.



Text in Illustration

*a	Protruding section
----	--------------------

*b	Baffle hole
	No gap

**NOTICE:**

- Check that there are no foreign objects or scratches in the inner face of the fuel injector assembly insertion hole in the fuel delivery pipe.
- Ensure that gasoline does not adhere to the fuel injector seal or to inside the attachment hole.
- Insert the fuel injector assembly in a straight line into the fuel delivery pipe without tilting it.
- Ensure that there is no gap between the No. 1 injector holder and the fuel injector pipe on the high-pressure side.
- If using a new fuel injector assembly, use one with the same numbers.

Text in Illustration

*1	Number
*2	Quick Response Code

NOTICE:

- Make sure that there is no gap between the delivery pipe and the No. 1 injector holder.
- Check that there is no foreign matter or damage to the injector insertion hole of the delivery pipe.
- Insert the injector straight into the delivery pipe without tilting it.

(e) Install the No. 1 injector holder while aligning the protrusion on the No. 1 injector holder with the baffle hole on the fuel delivery pipe.

3. INSTALL FUEL DELIVERY PIPE LH

(a) Install the fuel delivery pipe LH with the 2 bolts.

Torque:

19 N·m {194 kgf·cm, 14ft·lbf}

(b) Connect the 2 fuel injector assembly connectors.

4. INSTALL FUEL DELIVERY PIPE RH

(a) Install the fuel delivery pipe RH with the 2 bolts.

Torque:

19 N·m {194 kgf·cm, 14ft·lbf}

- (b) Connect the fuel pressure sensor connector and 2 fuel injector assembly connectors.

5. INSTALL FUEL DELIVERY PIPE

- (a) Temporarily install the new fuel delivery pipe with the 2 union nuts and 3 bolts.
(b) Tighten the 3 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}

- (c) Using a union nut wrench, tighten the 2 union nuts.

Torque:

35 N·m {357 kgf·cm, 26ft·lbf}

6. INSTALL NO. 2 FUEL DELIVERY PIPE

- (a) Temporarily install the new No. 2 fuel pipe with the 2 union nuts.
(b) Using a union nut wrench, tighten the 2 union nuts.

Torque:

35 N·m {357 kgf·cm, 26ft·lbf}

7. INSTALL INTAKE MANIFOLD

INFO



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000Q4808IX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL INJECTOR (for Direct Injection): REMOVAL; 2013 MY FR-S [03/2012 -]		

REMOVAL

1. REMOVE INTAKE MANIFOLD

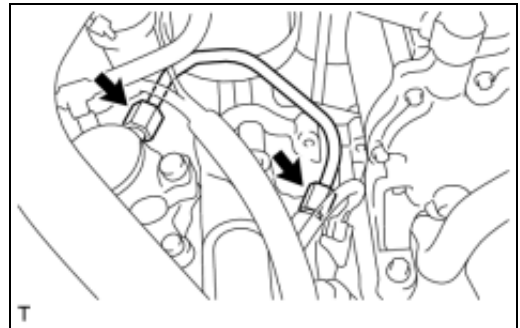
INFO

2. REMOVE NO. 2 FUEL DELIVERY PIPE

- (a) Using a union nut wrench, loosen the 2 union nuts and remove the No. 2 fuel delivery pipe.

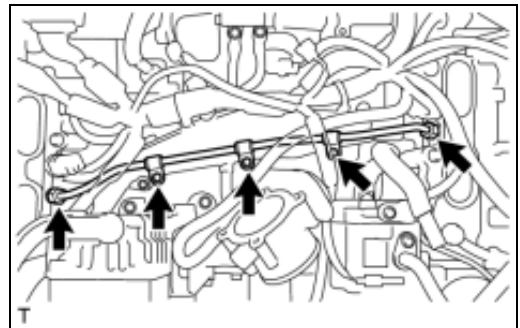
NOTICE:

When removing the No. 2 fuel delivery pipe, pull it out in a straight line to avoid damaging seal surface of the fuel delivery pipe LH.



3. REMOVE FUEL DELIVERY PIPE

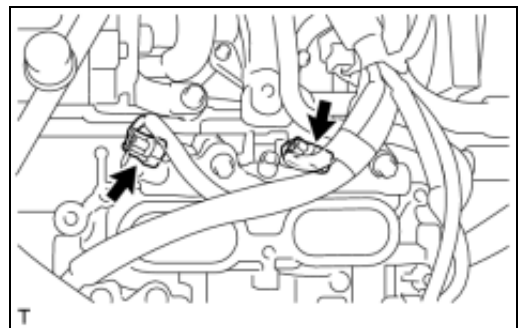
- (a) Remove the 3 bolts.



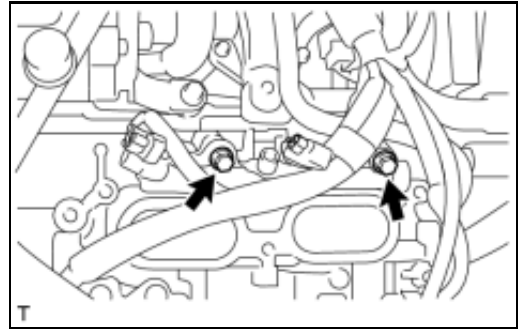
- (b) Using a union nut wrench, loosen the 2 union nuts and remove the fuel delivery pipe.

4. REMOVE FUEL DELIVERY PIPE LH

- (a) Disconnect the 2 fuel injector assembly connectors.

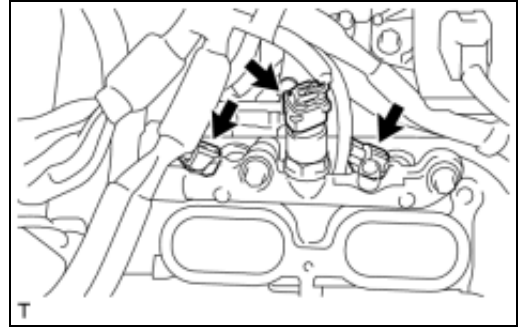


(b) Remove the 2 bolts and fuel delivery pipe LH.

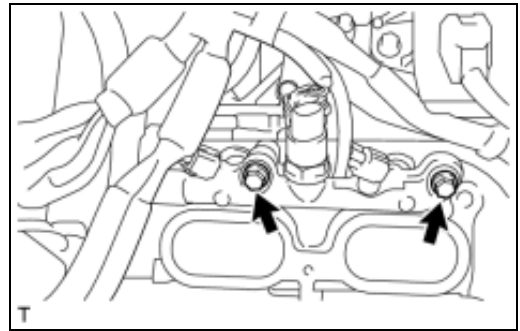


5. REMOVE FUEL DELIVERY PIPE RH

(a) Disconnect the fuel pressure sensor connector and 2 fuel injector assembly connectors.

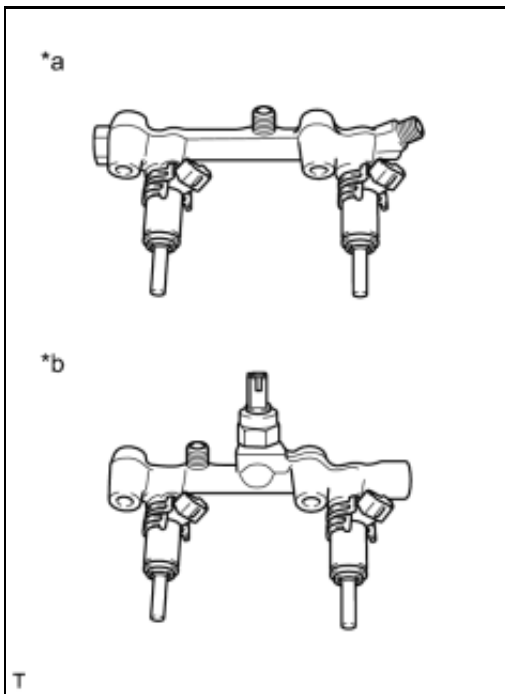


(b) Remove the 2 bolts and fuel delivery pipe RH.



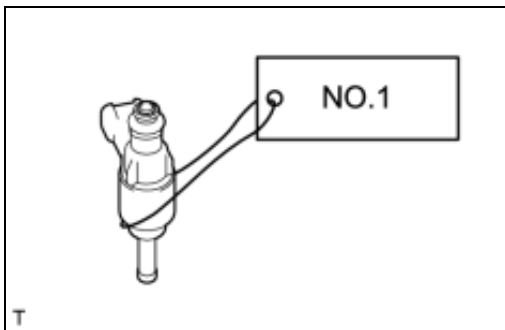
6. REMOVE FUEL INJECTOR ASSEMBLY

(a) Remove the 4 fuel injector assemblies from the fuel delivery pipe.



Text in Illustration

*a	for Bank 2
*b	for Bank 1



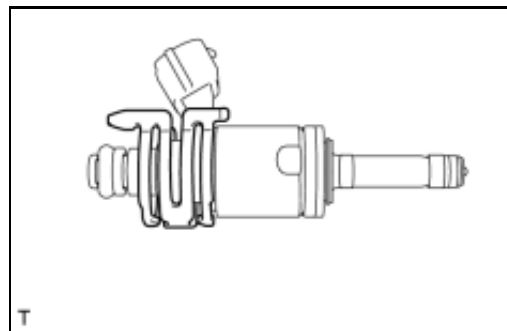
NOTICE:

- If the tip of the fuel injector assembly is struck or the fuel injector assembly is dropped, replace the fuel injector assembly with a new one.
- Pull and remove the fuel injector assembly in a straight line to avoid damaging the seal surface of the fuel delivery pipe.
- For re-installation, attach a tag or label to each fuel injector assembly.

NOTICE:

- Pull and remove the injector in a straight line to avoid damaging to the seal surface of the delivery pipe O-rings.
- For reinstallation, attach a tag or label to the injector shaft.

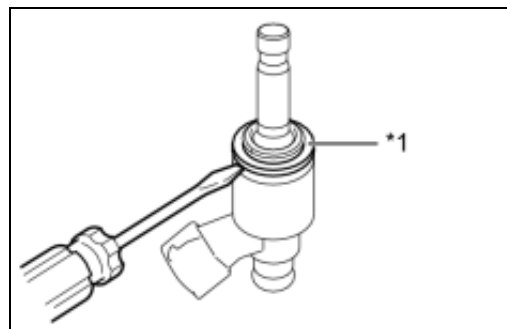
(b) Remove the No. 1 injector holders from the fuel injectors.



(c) Using a screwdriver, remove the fuel injector insulator.

Text in Illustration

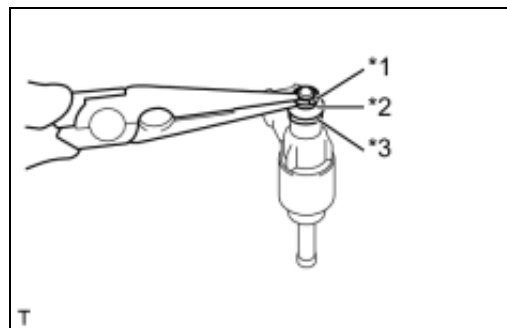
*1	Fuel Injector Insulator
----	-------------------------



(d) Using a needle nose plier, remove the No. 2 fuel injector backup ring.

Text in Illustration

*1	No. 2 Fuel Injector Backup Ring
*2	Fuel Injector Seal
*3	No. 1 Fuel Injector Backup Ring



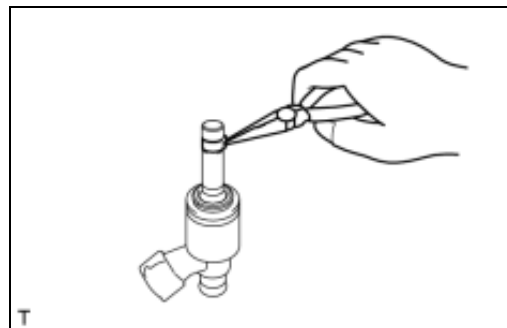
(e) Remove the fuel injector seal and No. 1 fuel injector backup ring.

7. REMOVE FUEL INJECTOR O-RING

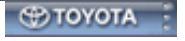
(a) Using the tips of a pair of needle nose pliers, pinch and pull one of the fuel injector O-ring at several points to stretch it. Repeat this for the other fuel injector O-ring.

NOTICE:

- Excessively pinching the fuel injector O-ring may damage the groove of the injector.
- If an injector is dropped or the tip of the injector is struck, replace it with a new one.



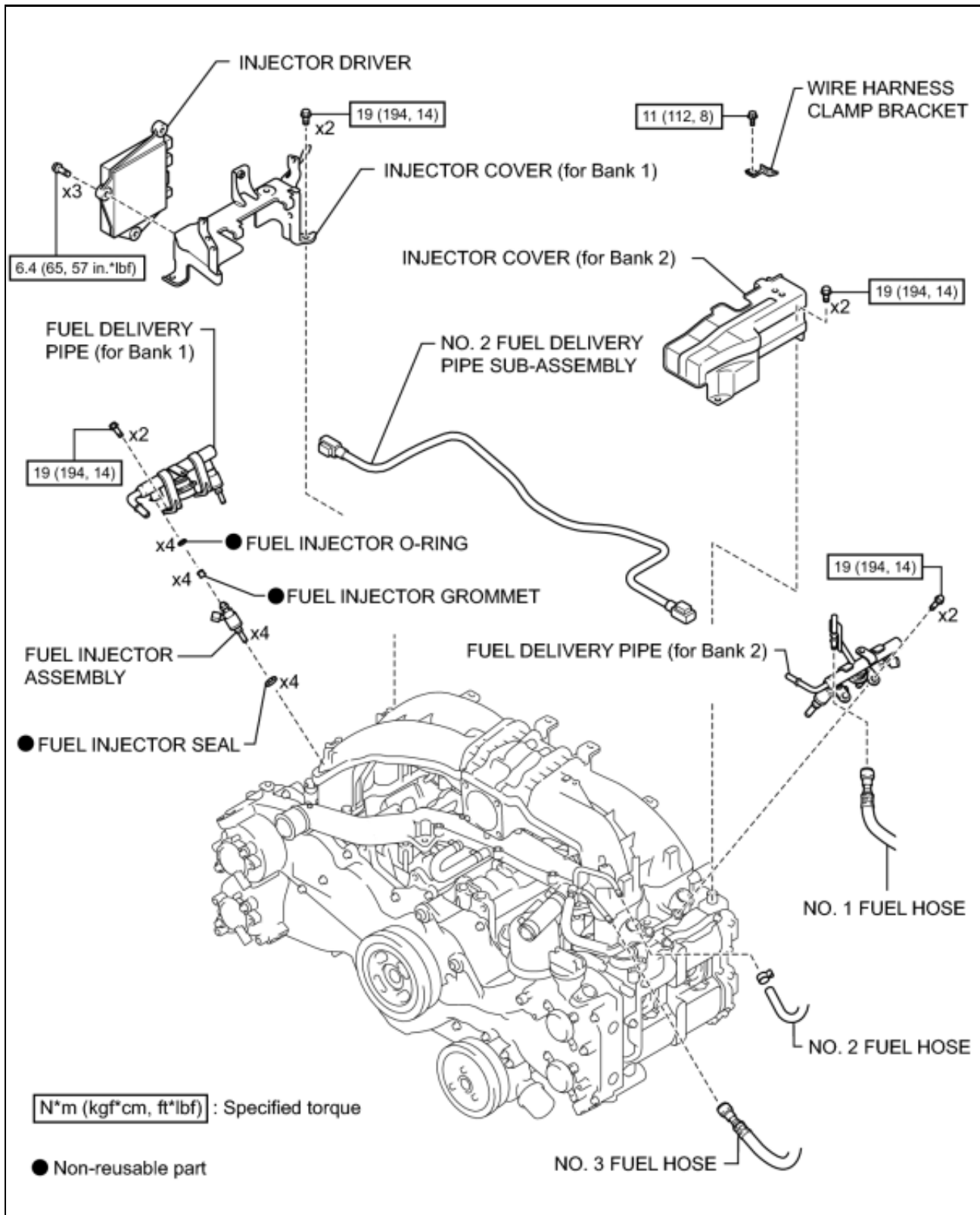
(b) Remove the injector seal from the injector.



Last Modified: 4-14-2014	6.6 K	Doc ID: RM000000PE206TX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL INJECTOR (for Port Injection): COMPONENTS; 2013 MY FR-S [03/2012 -]		

[COMPONENTS](#)

[ILLUSTRATION](#)



Last Modified: 4-14-2014	6.6 G	Doc ID: RM000000WQQ07QX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL INJECTOR (for Port Injection): INSPECTION; 2013 MY FR-S [03/2012 -]		

INSPECTION

1. INSPECT FUEL INJECTOR ASSEMBLY

- (a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	12 Ω

Text in Illustration

*a	Component without harness connected (Fuel Injector Assembly)
----	---

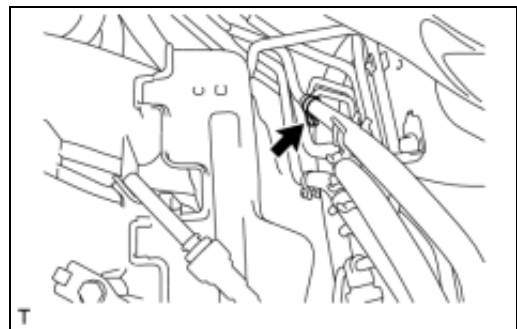
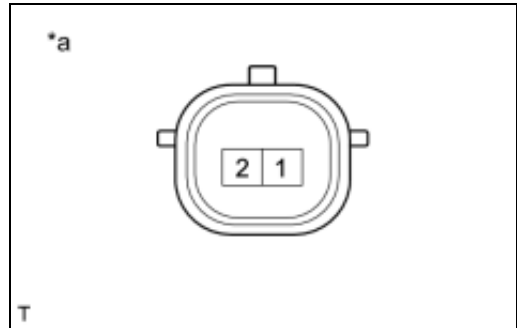
If the resistance is not as specified, replace the fuel injector assembly.

- (b) Inspect the injection volume.

CAUTION:

This test involves high-pressure fuel and electricity. Take all precautions regarding safe handling of both the fuel and the electricity. Perform this test in a safe area, and avoid any sparks or flames. Do not smoke.

- (c) Disconnect the fuel tube.



- (d) Connect SST (hose) to the fuel pipe (vehicle side) with SST (hose band).

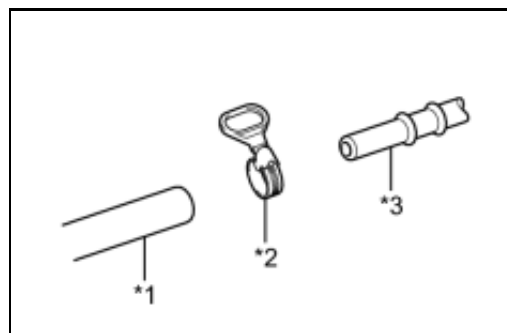
SST: 09268-31014

09268-41700

95336-08070

Text in Illustration

*1	SST (Hose)
*2	SST (Hose Band)
*3	Fuel Pipe (Vehicle Side)



(e) Install the O-ring to the fuel injector assembly.

(f) Install SST and vinyl tube to the fuel injector assembly.

SST: 09268-31014

09268-41141

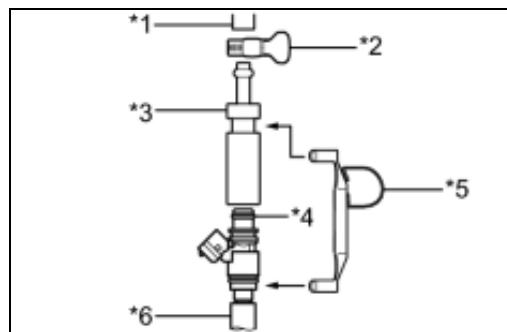
09268-41410

09268-41700

95336-08070

Text in Illustration

*1	SST (Hose)
*2	SST (Hose Band)
*3	SST (Adapter)
*4	O-ring
*5	SST (Clamp)
*6	Vinyl Tube



(g) Tie SST (clamp and adapter) together with SST (tie band) as shown in the illustration.

SST: 09268-31014

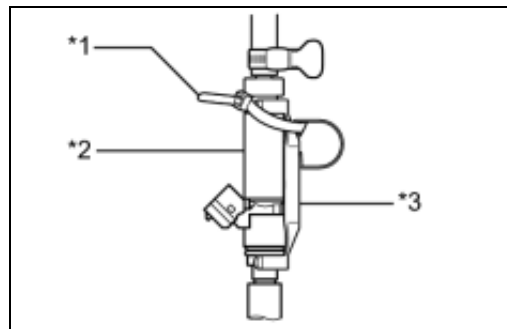
09268-41141

09268-41410

09268-41800

Text in Illustration

*1	SST (Tie Band)
*2	SST



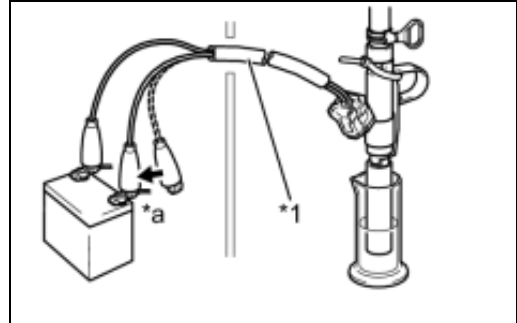
	(Adapter)
*3	SST (Clamp)

(h) Put the injector into a graduated cylinder.

SST: 09842-30090

Text in Illustration

*1	SST (Wire)
*a	Connect



CAUTION:

Install a strong rubber tube onto the injector to prevent gasoline from splashing.

(i) Operate the fuel pump (turn the ignition switch to ON).

(j) Connect SST (wire) to the injector and the battery for 15 seconds, and measure the injection volume with the graduated cylinder. Test each injector 2 or 3 times.

Standard injection volume:

84 to 103 cc (5.1 to 6.3 cu.in.) per 15 seconds

Difference between each injector:

19 cc (1.2 cu.in.) or less

NOTICE:

- Make sure that SST (EFI inspection wire I) is securely connected.
- Always turn on and off the voltage on the battery side, not on the fuel pump side.

If the injection volume is not as specified, replace the fuel injector assembly.

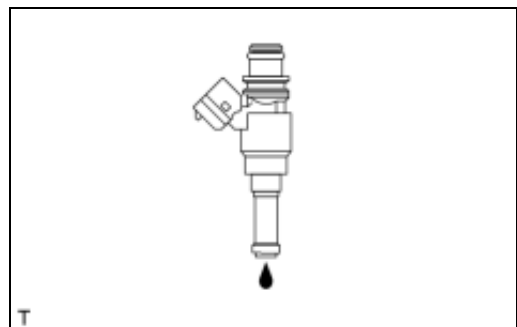
(k) Check for leakage.

(1) In the condition above, disconnect the tester probes of SST (wire) from the battery and check for fuel leakage from the fuel injector assembly.

Standard fuel drop:

1 drop or less in 22 minutes

If there is excessive leakage, replace the fuel injector assembly.



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000Q4608AX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL INJECTOR (for Port Injection): INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL FUEL INJECTOR ASSEMBLY

- (a) Apply gasoline to a new fuel injector O-ring and a new fuel injector grommet, and then install them to the injector.

NOTICE:

Check that there is no damage or foreign material in the groove of the injector when installing the fuel injector O-ring and fuel injector grommet.

- (b) Install the 4 fuel injector assemblies to the fuel delivery pipe.

NOTICE:

- Check that there are no foreign objects or scratches in the insertion opening of the fuel delivery pipe.
- Take sufficient care not to twist the O-ring.
- If the injector does not rotate smoothly after installing it to the fuel delivery pipe, remove the injector and reinstall it with a new O-ring.

2. INSTALL FUEL INJECTOR SEAL (for Bank 1)

- (a) Install 2 new fuel injector seals.

3. INSTALL FUEL DELIVERY PIPE (for Bank 1)

- (a) Install the fuel delivery pipe (for bank 1) (with injector) to the intake manifold with the 2 bolts.

Torque:

19 N·m {194 kgf·cm, 14ft·lbf}

- (b) Engage the clamp to connect the wire harness.
(c) Connect the 2 fuel injector assembly connectors.

HINT:

Connect the connector, aligning it with the baffles on the fuel injector assembly on the fuel delivery pipe (for bank 1).

- (d) Connect the No. 2 fuel delivery pipe sub-assembly to the fuel delivery pipe (for bank 1)  .

4. INSTALL FUEL INJECTOR SEAL (for Bank 2)

- (a) Install 2 new fuel injector seals.

5. INSTALL FUEL DELIVERY PIPE (for Bank 2)

- (a) Install the fuel delivery pipe (for bank 2) (with injector) to the intake manifold with the 2 bolts.

Torque:

19 N·m {194 kgf·cm, 14ft·lbf}

- (b) Connect the 2 injector connectors and clamp.

HINT:

Connect the connector, aligning it with the baffles on the fuel injector assembly on the fuel delivery pipe (for bank 2).

(c) Connect the No. 2 fuel delivery pipe sub-assembly to the fuel delivery pipe (for bank 2) **INFO** .

6. INSTALL INJECTOR COVER (for Bank 2)

(a) Install the injector cover to the intake manifold with the 2 bolts.

Torque:

19 N·m {194 kgf·cm, 14ft·lbf}

(b) Install the wire harness clamp bracket to the injector cover with the bolt.

Torque:

11 N·m {112 kgf·cm, 8ft·lbf}

7. CONNECT NO. 2 FUEL HOSE

(a) Connect the No. 2 fuel hose to the fuel delivery pipe sub-assembly with the clamp.

8. CONNECT NO. 3 FUEL HOSE

(a) Align the matchmarks on the the fuel delivery pipe and No. 3 fuel hose.

(b) Connect the No. 3 fuel hose to the fuel delivery pipe sub-assembly **INFO** .

9. CONNECT NO. 1 FUEL HOSE

(a) Align the matchmarks on fuel delivery pipe and the No. 1 fuel hose.

(b) Connect the No. 1 fuel hose to the fuel delivery pipe **INFO** .

10. INSTALL INJECTOR COVER (for Bank 1)

(a) Install the injector cover to the intake manifold with the 2 bolts.

Torque:

19 N·m {194 kgf·cm, 14ft·lbf}

(b) Engage the 4 clamps to install the wire harness to the injector cover.

11. INSTALL INJECTOR DRIVER **INFO**

12. INSTALL CHAMBER ASSEMBLY

INFO

13. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL **INFO**

14. INSPECT FOR FUEL LEAK **INFO**



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000Q4808HX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL INJECTOR (for Port Injection): REMOVAL; 2013 MY FR-S [03/2012 -]		

REMOVAL

1. DISCHARGE FUEL SYSTEM PRESSURE

INFO

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

INFO

3. REMOVE CHAMBER ASSEMBLY

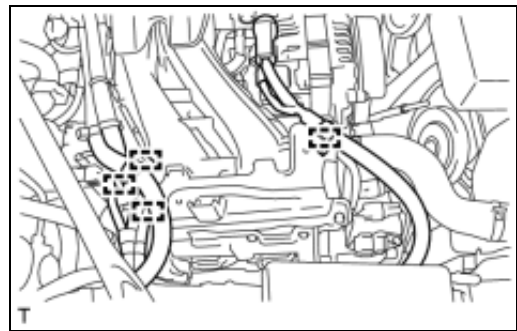
INFO

4. REMOVE INJECTOR DRIVER

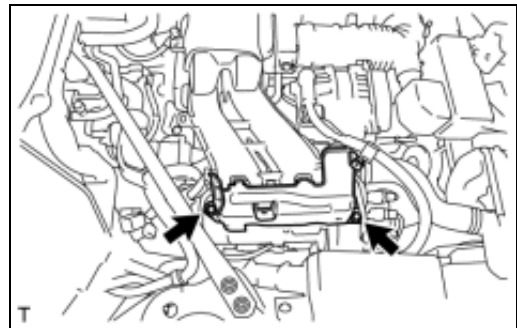
INFO

5. REMOVE INJECTOR COVER (for Bank 1)

- (a) Disengage the 4 clamps and separate the wire harness from the injector cover (for bank 1).



- (b) Remove the 2 bolts and injector cover (for bank 1).



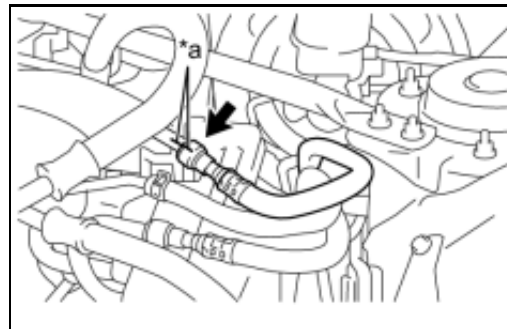
6. DISCONNECT NO. 1 FUEL HOSE

- (a) Place matchmarks on the fuel delivery pipe and the No. 1 fuel hose.

Text in Illustration

*a

Matchmark



(b) Using SST, disconnect the No. 1 fuel hose from the fuel delivery pipe sub-assembly **INFO** .

SST: SU003-03936

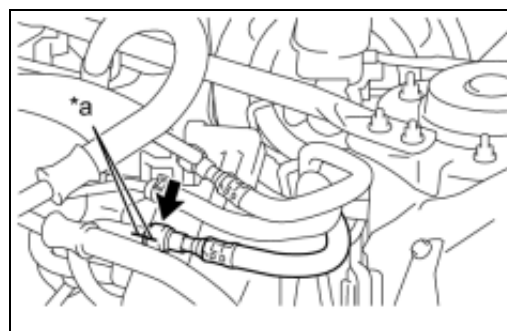
7. DISCONNECT NO. 3 FUEL HOSE

(a) Place matchmarks on the fuel delivery pipe and the No. 3 fuel hose from the fuel pipe.

Text in Illustration

*a

Matchmark

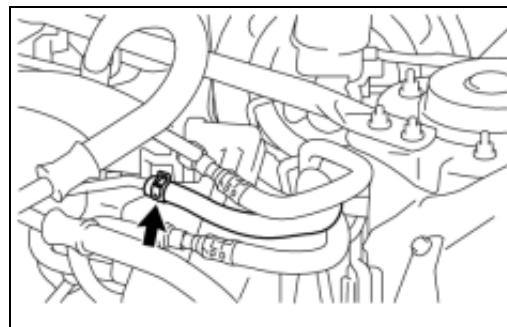


(b) Using SST, disconnect the No. 3 fuel hose from the fuel pipe **INFO** .

SST: SU003-03936

8. DISCONNECT NO. 2 FUEL HOSE

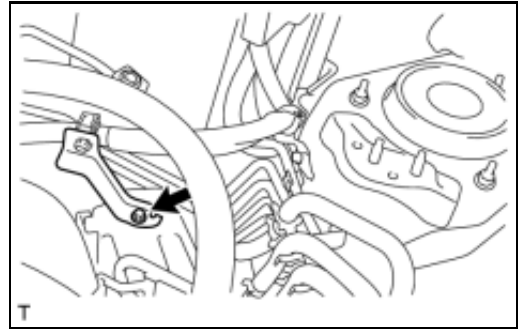
(a) Remove the clamp and disconnect the No. 2 fuel vapor feed hose from the fuel pipe.



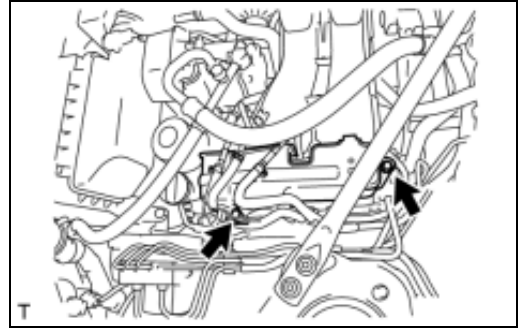
9. REMOVE INJECTOR COVER (for Bank 2)

(a) Remove the bolt and disconnect the wire harness clamp

bracket from the injector cover (for bank 2).

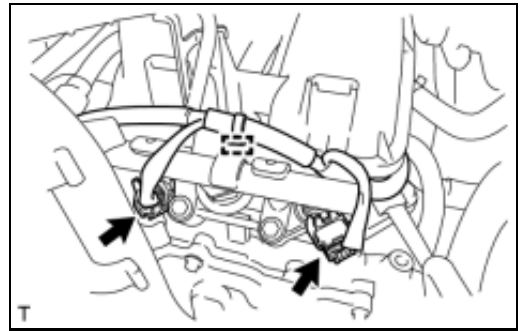


(b) Remove the 2 bolts and injector cover (for bank 2).



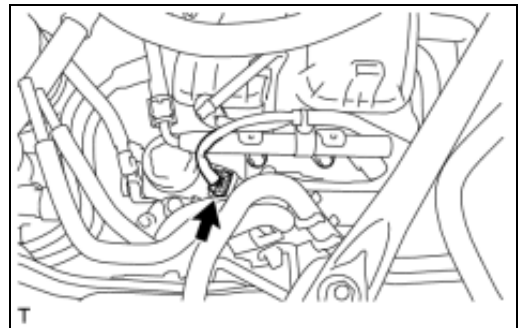
10. REMOVE FUEL DELIVERY PIPE (for Bank 2)

(a) Disconnect the 2 fuel injector assembly connectors.

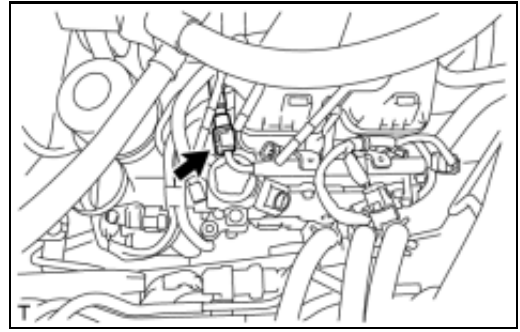


(b) Disengage the clamp and separate the wire harness.

(c) Disconnect the fuel pump assembly connector.



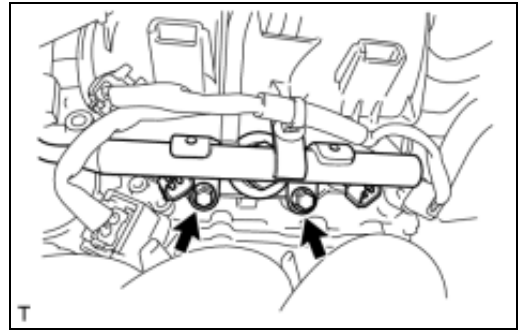
- (d) Disconnect the No. 2 fuel delivery pipe sub-assembly from the fuel delivery pipe (for bank 2) **INFO** .



- (e) Remove the 2 bolts and fuel delivery pipe (for bank 2).

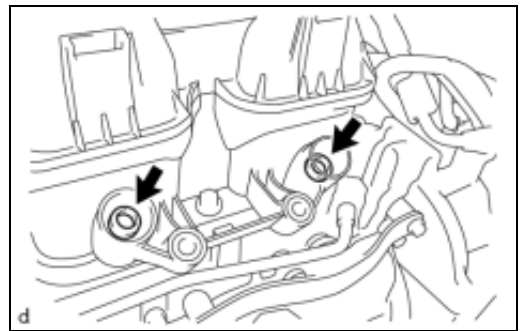
NOTICE:

When removing the fuel delivery pipe (for bank 2), hold the pipe by both ends and pull it straight upward.



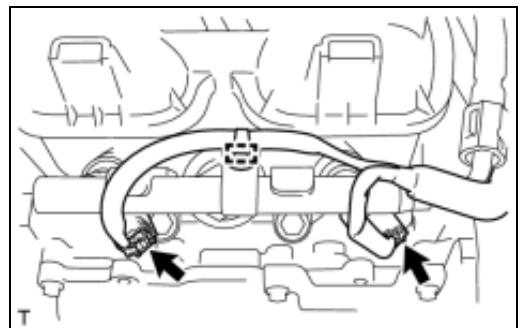
11. REMOVE FUEL INJECTOR SEAL (for Bank 2)

- (a) Remove the 2 fuel injector seals.



12. REMOVE FUEL DELIVERY PIPE (for Bank 1)

- (a) Disconnect the 2 fuel injector assembly connectors.



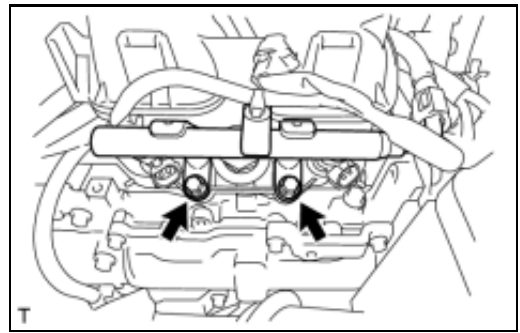
- (b) Disengage the clamp and separate the wire harness.

- (c) Disconnect the No. 2 fuel delivery pipe sub-assembly from the fuel delivery pipe (for bank 1) **INFO** .

(d) Remove the 2 bolts and fuel delivery pipe (for bank 1).

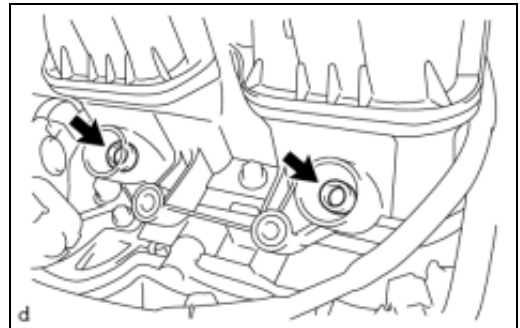
NOTICE:

When removing the fuel delivery pipe (for bank 1), hold the pipe by both ends and pull it straight upward.



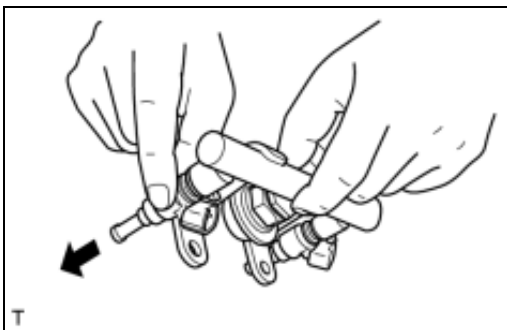
13. REMOVE FUEL INJECTOR SEAL (for Bank 1)

(a) Remove the 2 fuel injector seals.



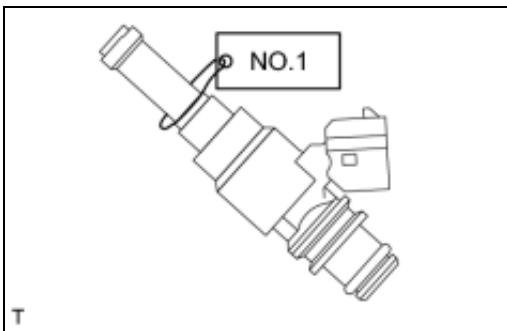
14. REMOVE FUEL INJECTOR ASSEMBLY

(a) Remove the 4 fuel injector assemblies from the fuel delivery pipe.



NOTICE:

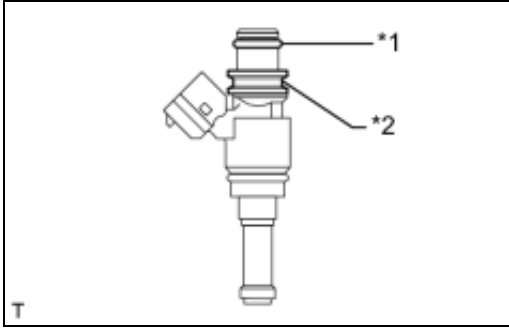
For reinstallation, attach a tag or label to the injector shaft.



(b) Remove the fuel injector O-ring and fuel injector grommet from the fuel injector assembly.

Text in Illustration

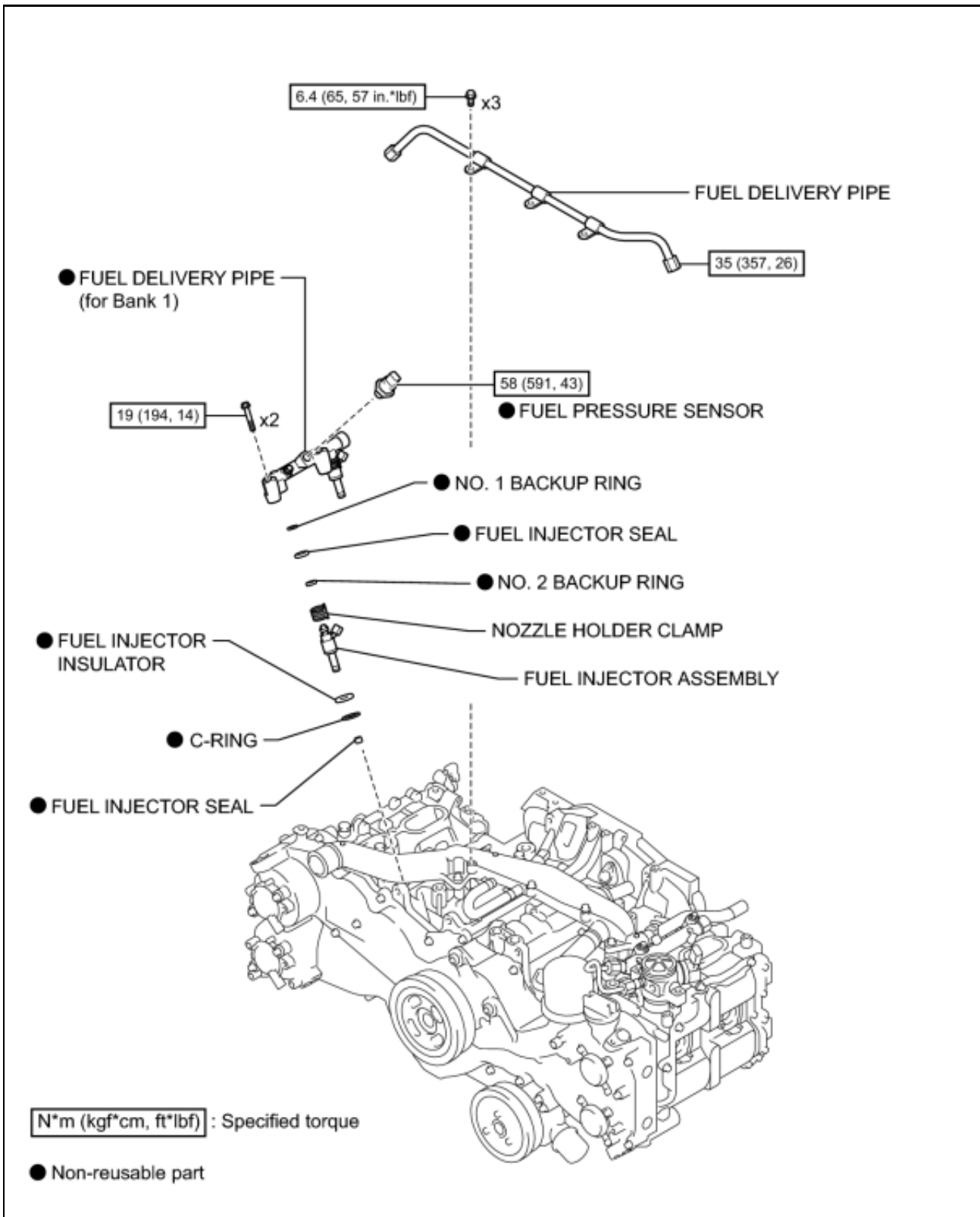
*1	Fuel Injector O-ring
*2	Fuel Injector Grommet



Last Modified: 4-14-2014	6.6 K	Doc ID: RM000000VIL02HX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL PRESSURE SENSOR: COMPONENTS; 2013 MY FR-S [03/2012 -]		

[COMPONENTS](#)

[ILLUSTRATION](#)



Last Modified: 4-14-2014	6.6 G	Doc ID: RM000000WU302HX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL PRESSURE SENSOR: INSPECTION; 2013 MY FR-S [03/2012 -]		

INSPECTION

1. INSPECT FUEL PRESSURE SENSOR

(a) Check the fuel pressure sensor output voltage.

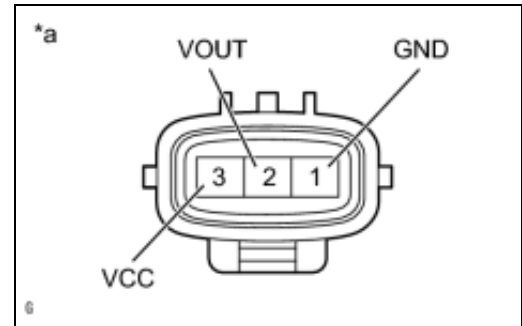
(1) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (GND) - 2 (VOUT)	Apply 5 V between terminals 3 (VCC) and 1 (GND)	Approximately 0.5 V

Text in Illustration

*a	Component without harness connected (Fuel Pressure Sensor)
----	--



NOTICE:

- Be careful when connecting the leads, as the fuel pressure sensor may be damaged if the leads are connected to the wrong terminals.
- Do not apply a voltage of 6 V or more to the terminals 3 (VCC) and 1 (GND).

HINT:

If a stable power supply is not available, use 4 1.2 V nickel-metal hydride batteries, etc.

If the resistance is not as specified, replace the fuel pressure sensor.



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000VIK030X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL PRESSURE SENSOR: INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL FUEL INJECTOR ASSEMBLY

NOTICE:

Be sure to use a new fuel delivery pipe and new fuel pressure sensor. INFO

2. INSTALL FUEL DELIVERY PIPE (for Bank 1)

(a) Install the fuel delivery pipe (for Bank 1) with the 2 bolts.

Torque:

19 N·m {194 kgf·cm, 14ft·lbf}

3. INSTALL FUEL PRESSURE SENSOR

(a) Temporarily install the new fuel pressure sensor by hand as much as possible to the fuel delivery pipe (for Bank 1).

(b) Tighten the fuel pressure sensor.

Torque:

58 N·m {591 kgf·cm, 43ft·lbf}

NOTICE:

- Ensure that no oil adheres to the threads of the fuel pressure sensor and No. 1 fuel delivery pipe sub-assembly RH.
- Do not allow any foreign matter to adhere when installing the fuel pressure sensor.
- Once the fuel pressure sensor is tightened to the specified torque, do not retighten or recheck it.

(c) Connect the fuel pressure sensor connector and 2 fuel injector connectors.

4. INSTALL FUEL DELIVERY PIPE INFO

5. INSTALL INTAKE MANIFOLD

INFO



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000VIM02ZX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL PRESSURE SENSOR: REMOVAL; 2013 MY FR-S [03/2012 -]		

REMOVAL

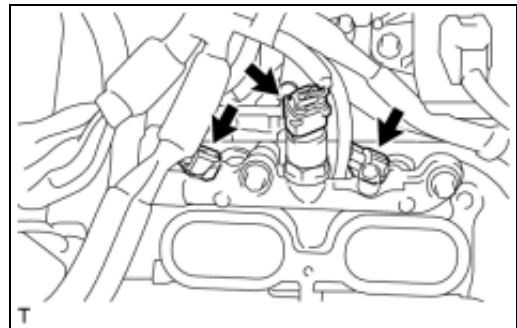
1. REMOVE INTAKE MANIFOLD

INFO

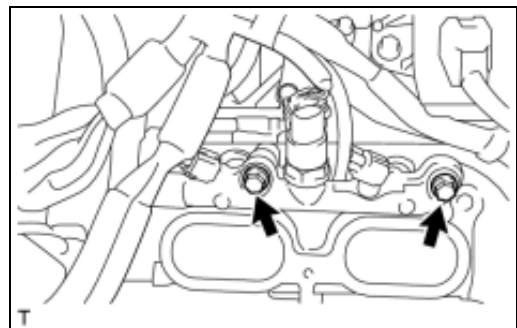
2. REMOVE FUEL DELIVERY PIPE INFO

3. REMOVE FUEL DELIVERY PIPE (for Bank 1)

- (a) Disconnect the fuel pressure sensor connector and 2 fuel injector connectors.

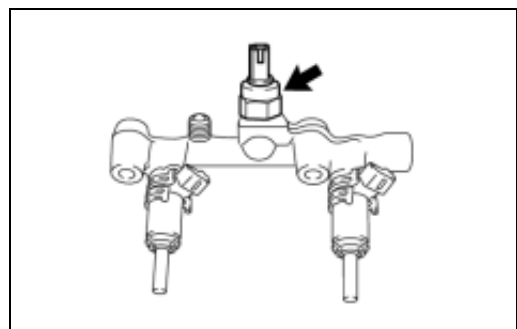


- (b) Remove the 2 bolts and the fuel delivery pipe (for Bank 1).



4. REMOVE FUEL PRESSURE SENSOR

- (a) Remove the fuel pressure sensor from the fuel delivery pipe (for Bank 1).

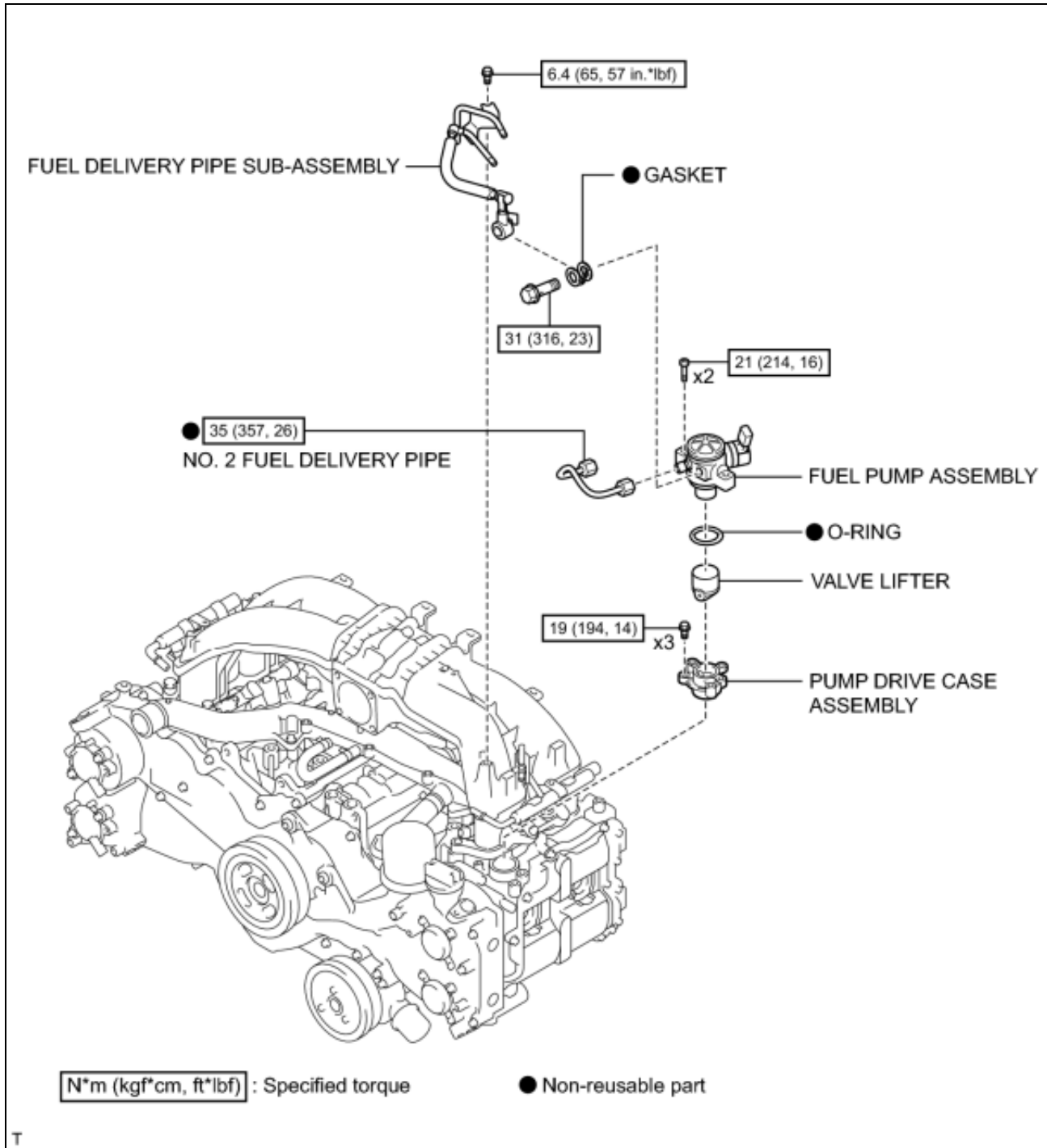


5. REMOVE FUEL INJECTOR ASSEMBLY INFO

Last Modified: 4-14-2014	6.6 K	Doc ID: RM000000VIR02GX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL PUMP (for High Pressure): COMPONENTS; 2013 MY FR-S [03/2012 -]		

COMPONENTS

ILLUSTRATION



Last Modified: 4-14-2014	6.6 G	Doc ID: RM0000053LC004X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL PUMP (for High Pressure): INSPECTION; 2013 MY FR-S [03/2012 -]		

INSPECTION

1. INSPECT FUEL PUMP ASSEMBLY

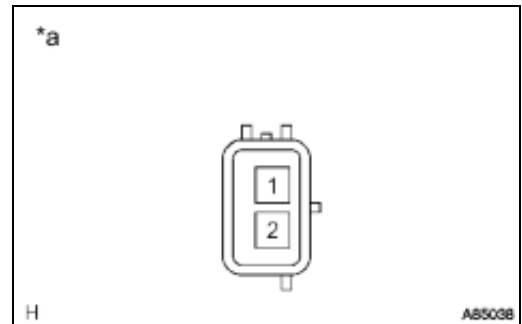
(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	0.45 to 0.55 Ω

Text in Illustration

*a	Component without harness connected (Fuel Pump Assembly)
----	---



If the result is not as specified, replace the fuel pump assembly.



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000VIQ02TX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL PUMP (for High Pressure): INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL PUMP DRIVE CASE ASSEMBLY

- (a) Apply seal packing in a continuous line as shown in the illustration.

Seal packing:

Three Bond 1217G, 1217H or equivalent

Standard seal diameter:

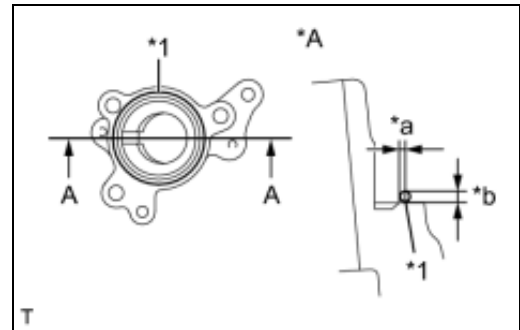
Within 1 mm (0.039 in.)

NOTICE:

- Install within 5 minutes of applying seal packing, and tighten the bolts within 15 minutes.
- Do not pour in engine oil for at least 2 hours after installation.
- Do not start the engine for at least 2 hours after installation.
- Do not allow seal packing to enter the engine oil passage.

Text in Illustration

*A	A-A cross-section
*1	Seal Packing
*a	Seal Application Position : Within 1 mm (0.039 in.) from Edge
*b	Seal Diameter : 2 to 4 mm (0.079 to 0.158 in.)



- (b) Using a 6 mm hexagon wrench, install the pump drive case assembly with the 3 bolts.

Torque:

19 N·m {194 kgf·cm, 14ft·lbf}

2. INSTALL VALVE LIFTER

- (a) Turn the crankshaft until the flat of the cam is facing the cylinder head cover's fuel pump attachment hole.

HINT:

When installing the fuel pump by following the procedure described above, it is easier to install the fuel pump and the No. 2 fuel pipe later if the crankshaft pointed side is not used to push up the pump activation surface.

- (b) Apply a coat of engine oil to the pump activation cam and pump lifter part.

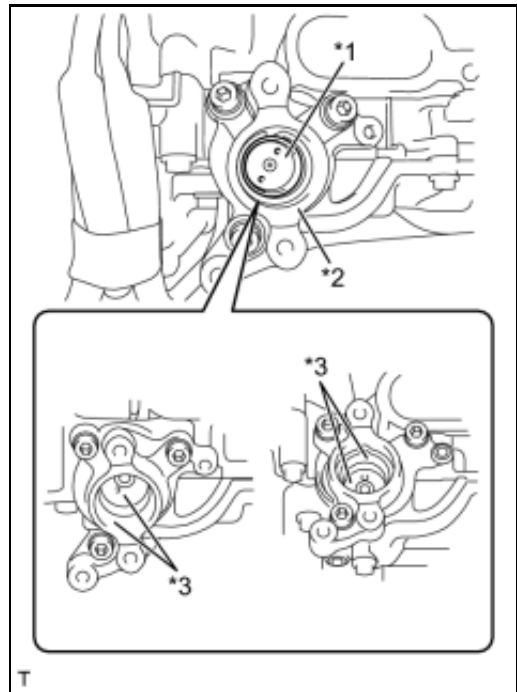
- (c) Apply new engine oil to the inside of the pump drive case assembly and the underside of the valve lifter, and install the valve lifter to the pump drive case assembly.

Text in Illustration

*1	Valve Lifter
*2	Pump Drive Case Assembly
*3	Location for applying new engine oil

HINT:

When applying oil to the underside of the valve lifter, drop a few drops of oil on the camshaft and the roller rocker arm from the valve lifter hole.



3. INSTALL FUEL PUMP ASSEMBLY

- (a) Apply a light coat of engine oil to a new O-ring and install it to the fuel pump assembly.
- (b) Using a "TORX" Plus Socket Wrench, install the fuel pump assembly with the 2 bolts.

Torque:

21 N·m {214 kgf·cm, 16ft·lbf}

4. CONNECT FUEL DELIVERY PIPE SUB-ASSEMBLY

- (a) Install the fuel delivery pipe sub-assembly to the fuel pump assembly with a new gasket and the union bolt.

Torque:

31 N·m {316 kgf·cm, 23ft·lbf}

5. INSTALL NO. 2 FUEL DELIVERY PIPE INFO

6. INSTALL INTAKE MANIFOLD

INFO



Last Modified: 4-14-2014	6.6 G	Doc ID: RM000000VIT02IX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL PUMP (for High Pressure): ON-VEHICLE INSPECTION; 2013 MY FR-S [03/2012 -]		

ON-VEHICLE INSPECTION

1. CHECK FUEL PUMP OPERATION

(a) Check fuel pressure.

- (1) Connect the Techstream to the DLC3.
- (2) Start the engine.
- (3) Turn the Techstream on.
- (4) Enter the following menus: Powertrain / Engine / Active Test / Control the Target Fuel Pressure.
- (5) Check that the fuel pressure fluctuates when the target fuel pressure changes.

HINT:

The target fuel pressure operation lowers the target fuel pressure by -12.5% or increases the target fuel pressure by 24.8%.

Standard:

Fuel pressure fluctuates in accordance with the Techstream operation.

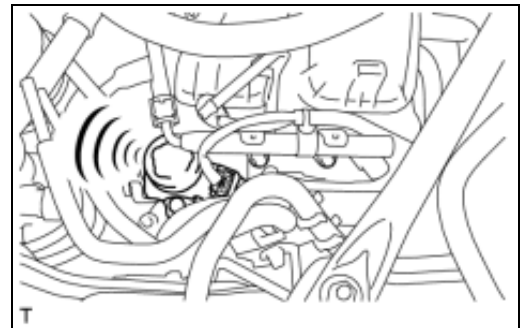
If the result is not as specified, replace the fuel pump or fuel pressure sensor.

(b) Check operating sound.

- (1) Remove the injector cover (for bank 2).
- (2) Start the engine.

(3) Using a sound scope, check the operating sound of the pump.

If no sound can be heard, check the fuel pump, wire harness and ECM.



(4) Stop the engine.

(5) Reinstall the injector cover (for bank 2).



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000VIS02SX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL PUMP (for High Pressure): REMOVAL; 2013 MY FR-S [03/2012 -]		

REMOVAL

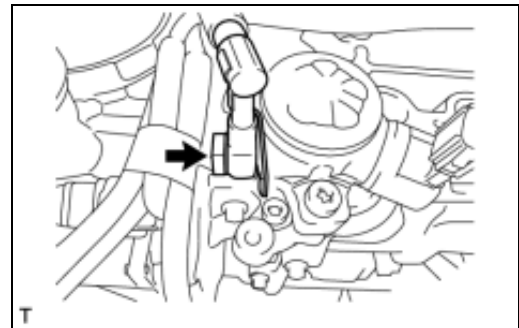
1. REMOVE INTAKE MANIFOLD

INFO

2. REMOVE NO. 2 FUEL DELIVERY PIPE INFO

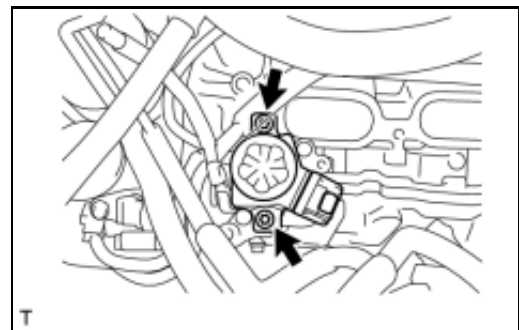
3. DISCONNECT FUEL DELIVERY PIPE SUB-ASSEMBLY

- (a) Remove the union bolt and gasket, and disconnect the fuel delivery pipe sub-assembly.



4. REMOVE FUEL PUMP ASSEMBLY

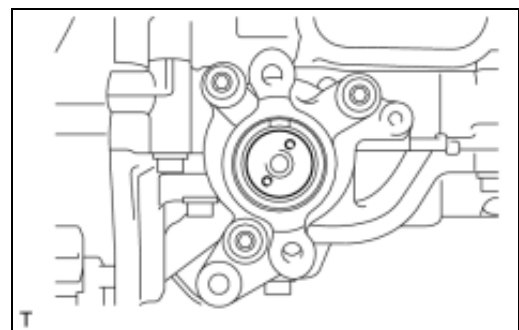
- (a) Using a "TORX" Plus Socket Wrench, remove the 2 bolts and fuel pump assembly.



- (b) Remove the O-ring from the fuel pump assembly.

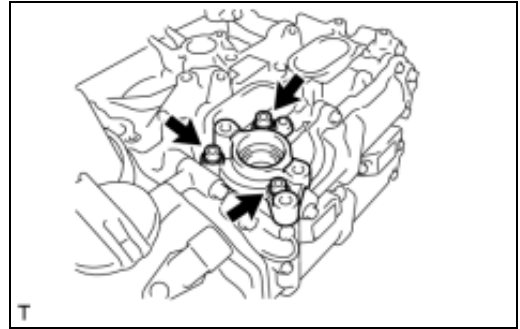
5. REMOVE VALVE LIFTER

- (a) Remove the valve lifter from the pump drive case assembly.



6. REMOVE PUMP DRIVE CASE ASSEMBLY

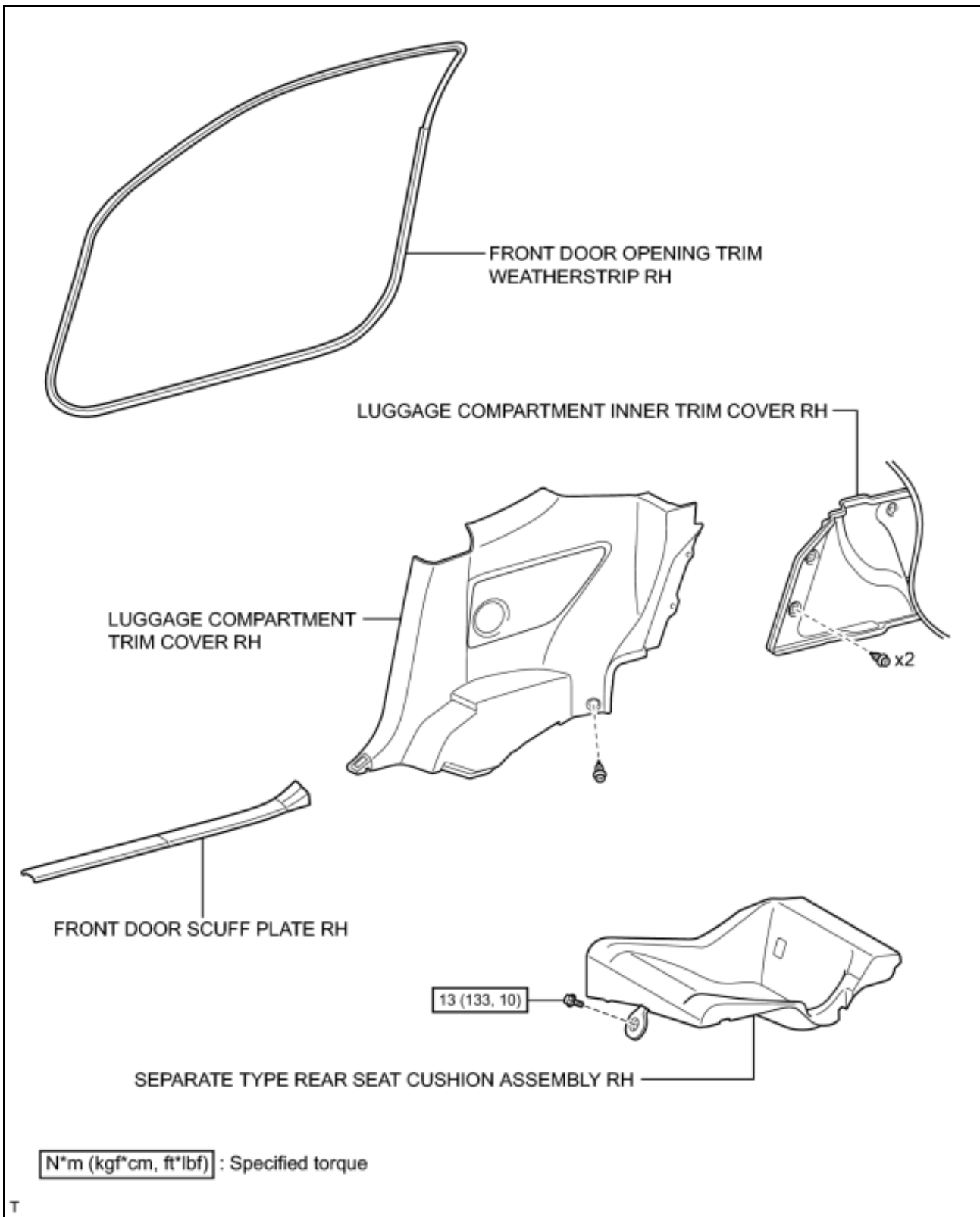
- (a) Using a 6 mm hexagon wrench, remove the 3 bolts and pump drive case assembly.



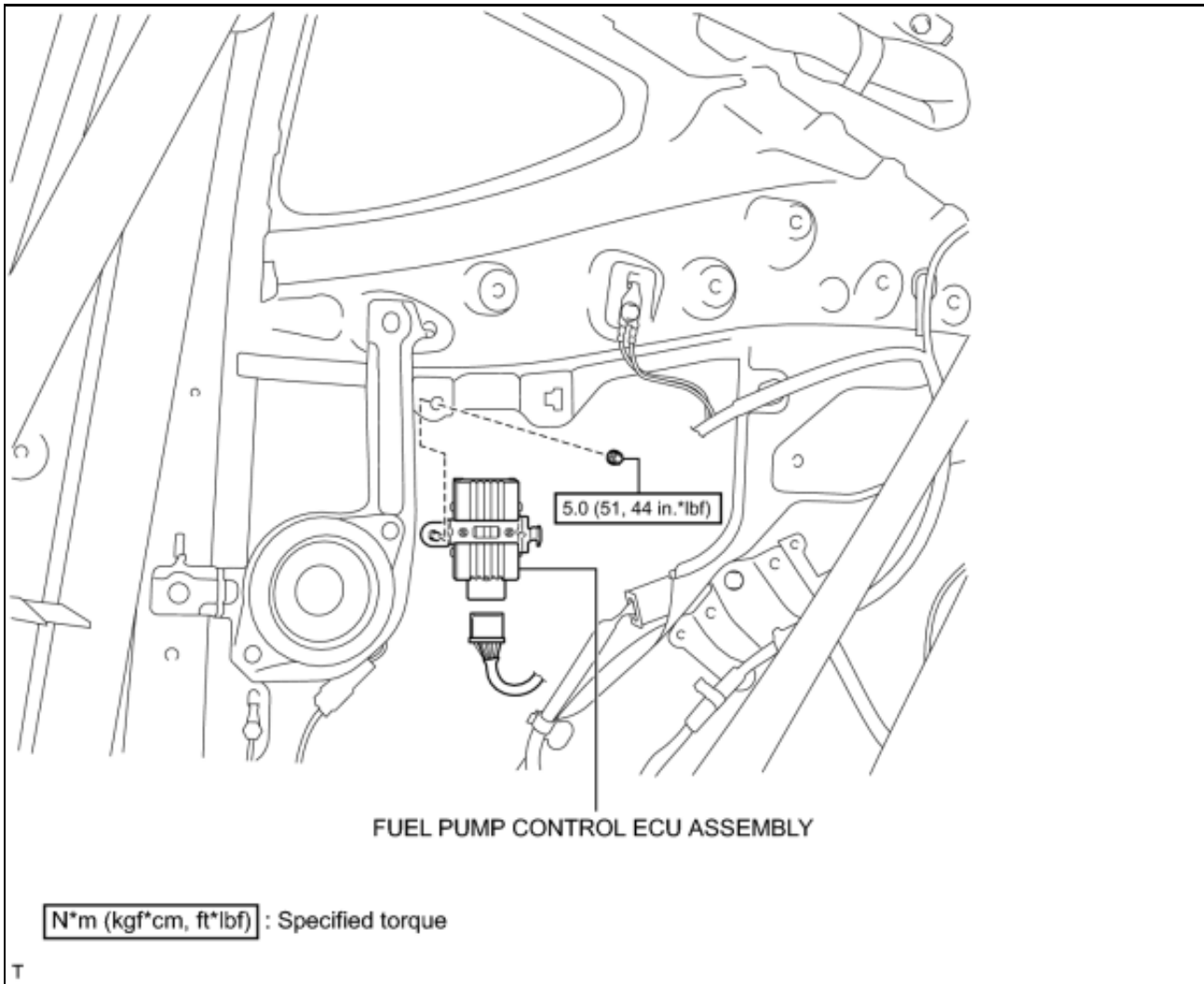
Last Modified: 4-14-2014	6.6 K	Doc ID: RM000000VIW02HX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL PUMP ECU: COMPONENTS; 2013 MY FR-S [03/2012 -]		

[COMPONENTS](#)

[ILLUSTRATION](#)



ILLUSTRATION



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000VIU044X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL PUMP ECU: INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL FUEL PUMP CONTROL ECU ASSEMBLY

- Attach the fuel pump control ECU assembly bracket to the body attachment hole, and pass the stud bolt through the hole in the body.
- Install the fuel pump control ECU assembly with the nut.

Torque:

5.0 N·m {51 kgf·cm, 44in·lbf}

NOTICE:

Do not reuse the fuel pump control ECU assembly if it has been subjected to shocks.

- Connect the fuel pump control ECU assembly connector.

2. INSTALL LUGGAGE COMPARTMENT TRIM COVER RH INFO

3. INSTALL LUGGAGE COMPARTMENT INNER TRIM COVER RH INFO

4. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY RH INFO

5. INSTALL FRONT DOOR SCUFF PLATE RH INFO

6. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP RH INFO

7. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL INFO



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000VIX041X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL PUMP ECU: REMOVAL; 2013 MY FR-S [03/2012 -]		

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

2. SEPARATE FRONT DOOR OPENING TRIM WEATHERSTRIP RH INFO

3. REMOVE FRONT DOOR SCUFF PLATE RH INFO

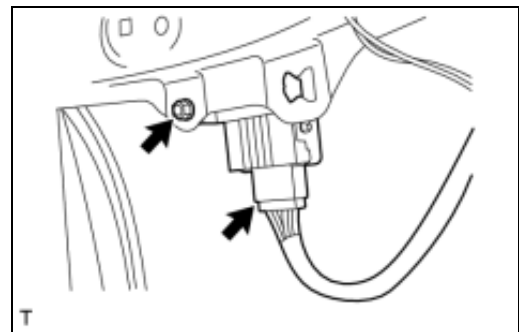
4. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY RH INFO

5. SEPARATE LUGGAGE COMPARTMENT INNER TRIM COVER RH INFO

6. REMOVE LUGGAGE COMPARTMENT TRIM COVER RH INFO

7. REMOVE FUEL PUMP CONTROL ECU ASSEMBLY

(a) Disconnect the fuel pump control ECU assembly connector.

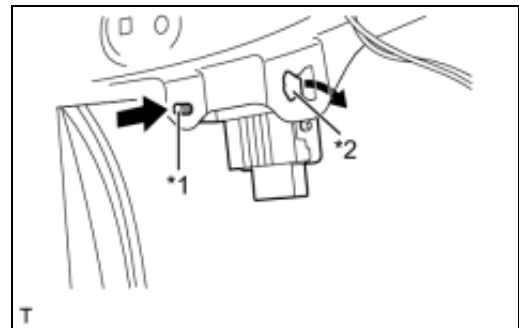


(b) Remove the nut.

(c) Push in the fuel pump control ECU assembly stud bolt.

Text in Illustration

*1	Stud Bolt
*2	Bracket



(d) Move the fuel pump control ECU assembly towards the rear of the vehicle, disengage the bracket, and remove the fuel pump control ECU assembly.

NOTICE:

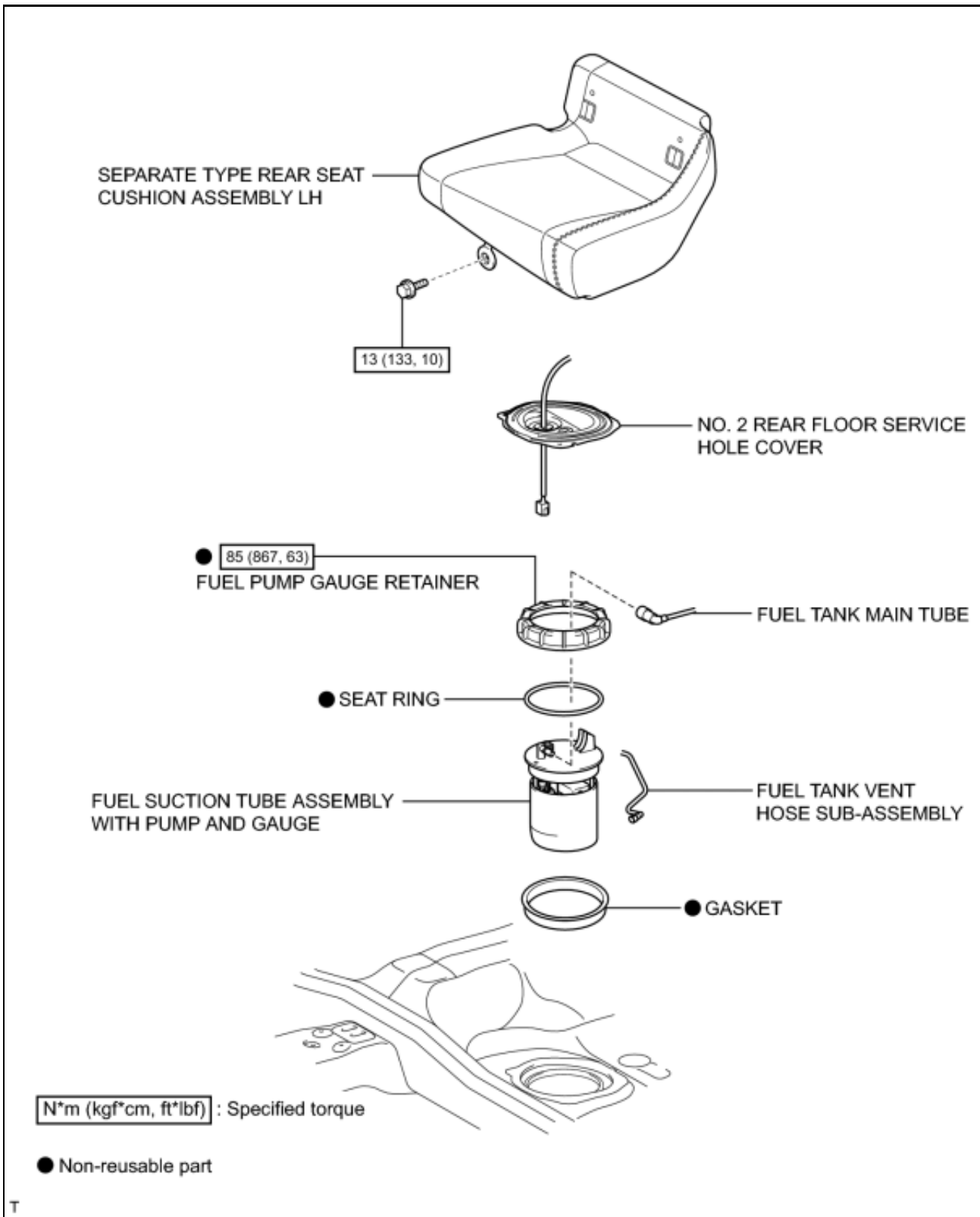
Do not reuse the fuel pump control ECU assembly if it has been subjected to shocks.



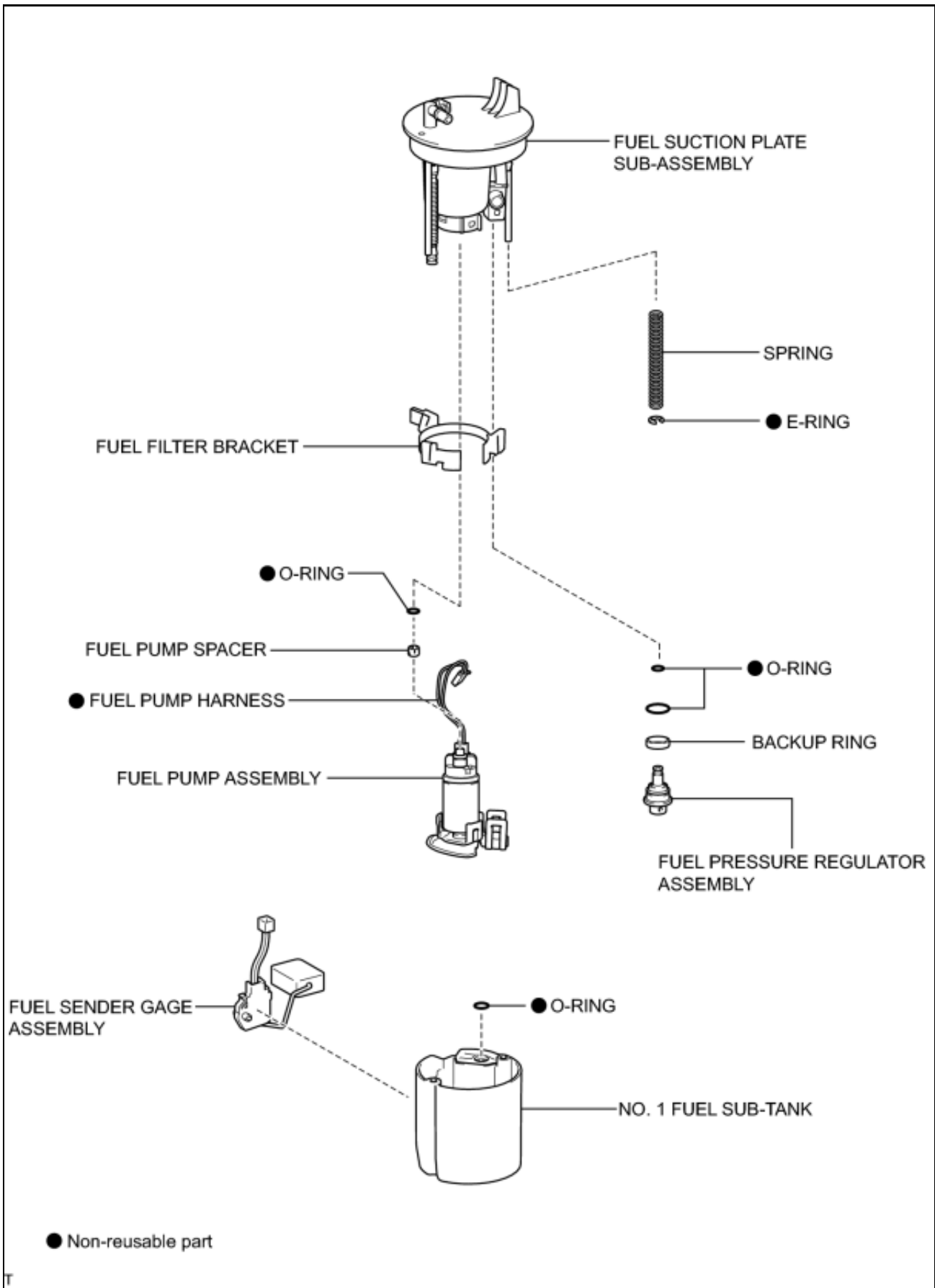
Last Modified: 4-14-2014	6.6 K	Doc ID: RM000000QDV05XX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL PUMP: COMPONENTS; 2013 MY FR-S [03/2012 -]		

[COMPONENTS](#)

[ILLUSTRATION](#)



ILLUSTRATION

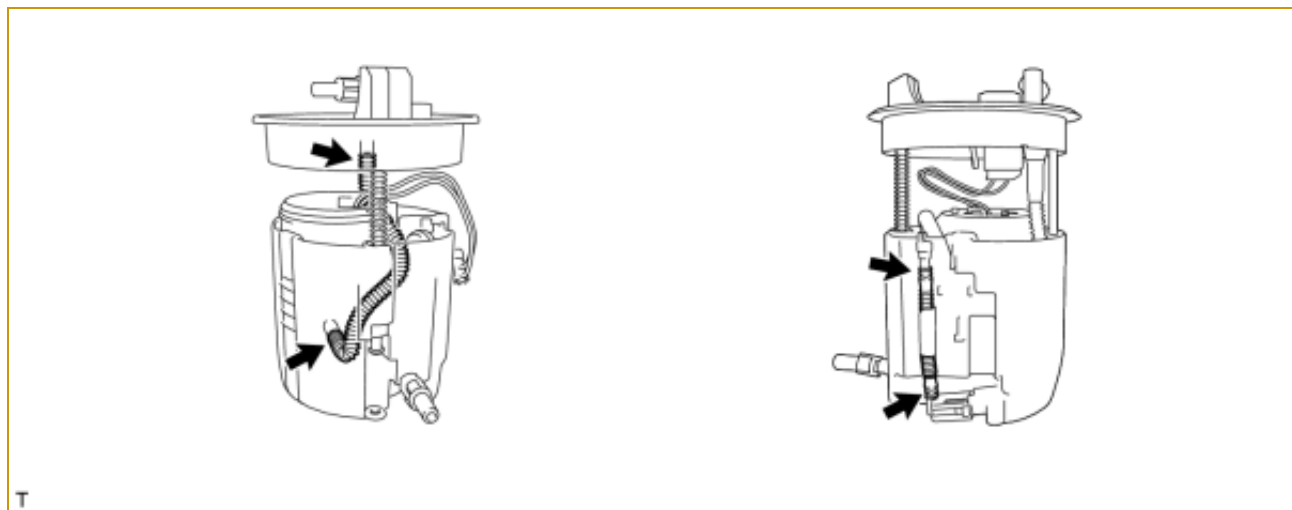


Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000QDW07JX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL PUMP: DISASSEMBLY; 2013 MY FR-S [03/2012 -]		

DISASSEMBLY

NOTICE:

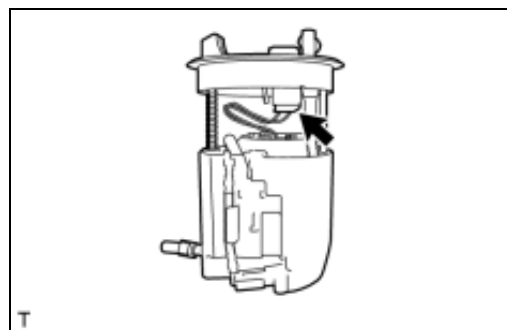
- Do not disconnect the hose indicated in the illustration.
- When replacing the fuel filter assembly, replace it together with the fuel suction plate sub-assembly.



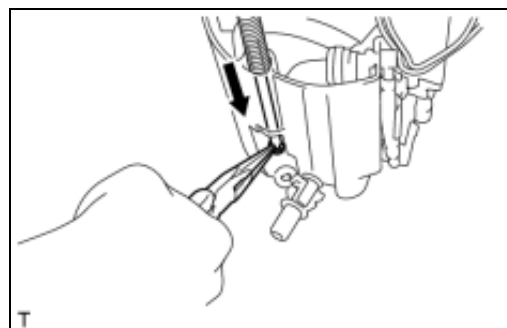
1. REMOVE FUEL SENDER GAGE ASSEMBLY INFO

2. REMOVE NO. 1 FUEL SUB-TANK

(a) Disconnect the fuel pump connector.



(b) Hold the fuel suction plate sub-assembly in the direction of the arrow as shown in the illustration.

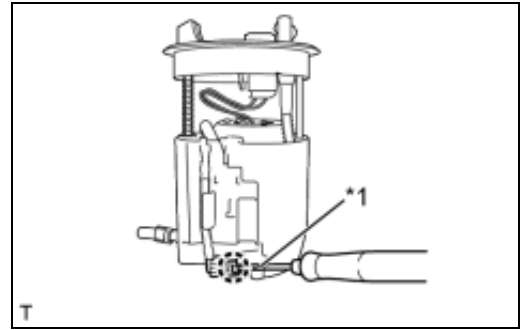


(c) Using needle nose plier, remove the E-ring.

- (d) Using a screwdriver with the tip taped, disengage the claw and separate the jet pump nozzle.

Text in Illustration

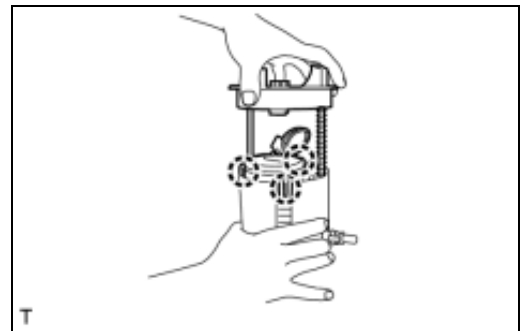
*1	Protective Tape
----	-----------------



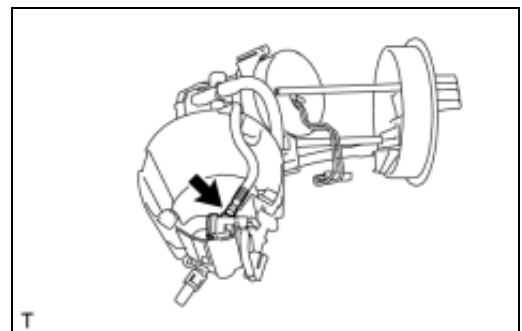
- (e) Using a screwdriver with the tip taped, disengage the 3 claws and separate the No. 1 fuel sub-tank.

NOTICE:

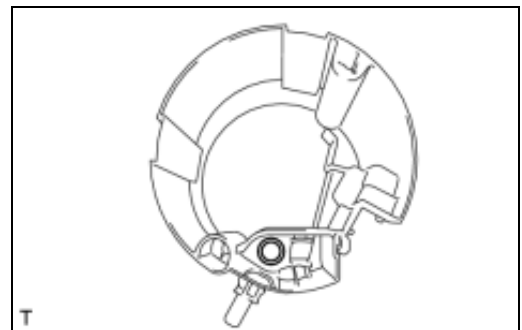
Do not damage the No. 1 fuel sub-tank or the fuel filter.



- (f) Using a screwdriver with the tip taped, disengage the claw and separate the jet pump.

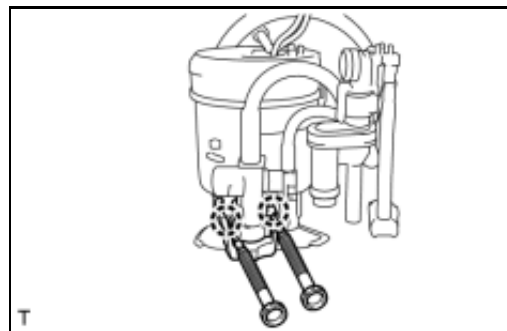


- (g) Remove the O-ring from the No. 1 fuel sub-tank.



3. REMOVE FUEL PUMP ASSEMBLY

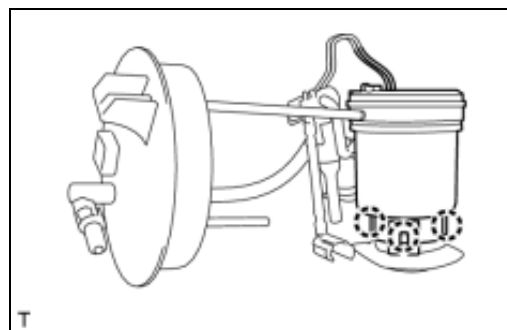
(a) Using 2 screwdrivers with the tip taped, disengage the 2 claws.



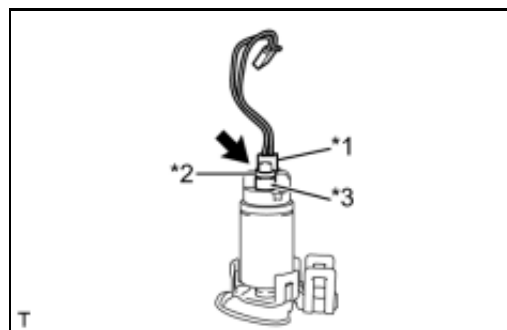
(b) Using a screwdriver with the tip taped, disengage the 3 claws and remove the fuel pump.

NOTICE:

Do not damage the fuel pump or the fuel filter.



(c) Disconnect the connector, and remove the fuel pump wire harness.



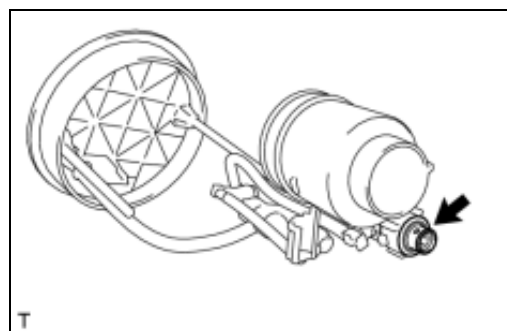
(d) Remove the O-ring and fuel pump spacer from the fuel pump assembly.

Text in Illustration

*1	fuel pump wire harness
*2	O-Ring
*3	Fuel Pump Spacer

4. REMOVE FUEL PRESSURE REGULATOR ASSEMBLY

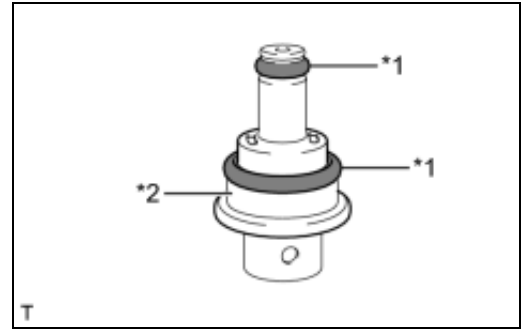
(a) Remove the fuel pressure regulator assembly from the fuel filter.



(b) Remove the 2 O-ring and backup ring from the fuel pressure regulator assembly.

Text in Illustration

*1	O-Ring
*2	Backup Ring



Last Modified: 4-14-2014	6.6 G	Doc ID: RM000000W1H055X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL PUMP: INSPECTION; 2013 MY FR-S [03/2012 -]		

INSPECTION

1. INSPECT FUEL PUMP ASSEMBLY

(a) Inspect the resistance of the fuel pump assembly.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	0.2 to 3.0 Ω

Text in Illustration

*a	Component without harness connected (Fuel Pump Assembly)
----	---

If the result is not as specified, replace the fuel pump assembly.

(b) Inspect the operation of the fuel pump assembly.

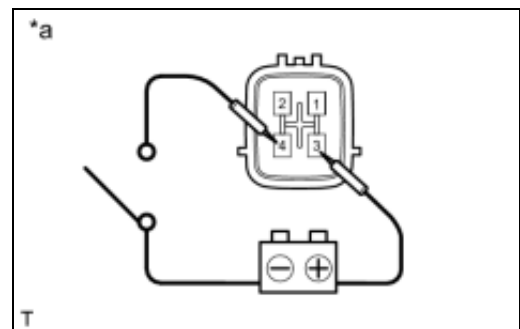
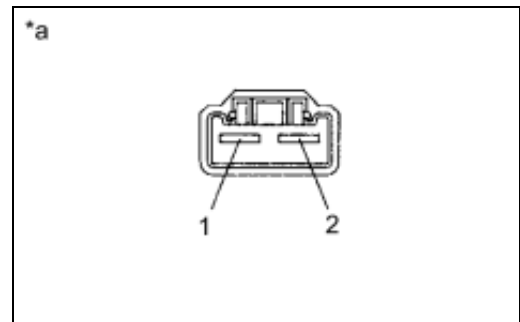
(1) Connect a battery's negative (-) lead to terminal 3 of the connector, and a positive (+) lead to terminal 4. Check that the fuel pump operates.

Text in Illustration

*a	Component without harness connected (Fuel Suction Tube Assembly with Pump and Gauge)
----	---

NOTICE:

- These tests must be performed within 10 seconds to prevent the coil from burning out.
- Keep the fuel pump as far away from the battery as possible.
- Always turn on and off the voltage on the battery side, and not on the fuel pump side.



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000QDU07TX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL PUMP: INSTALLATION; 2013 MY FR-S [03/2012 -]		

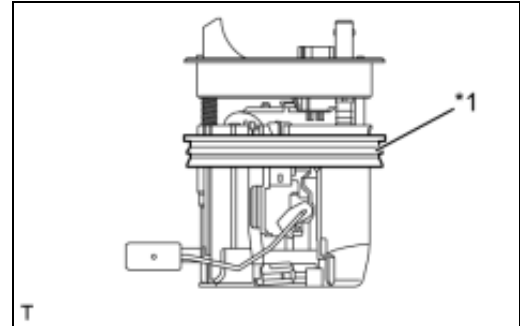
INSTALLATION

1. INSTALL FUEL SUCTION TUBE ASSEMBLY WITH PUMP AND GAUGE

- (a) Set the new gasket to the fuel suction tube assembly with pump and gauge.

Text in Illustration

*1	Gasket
----	--------

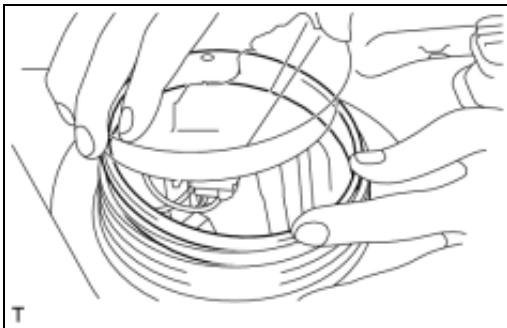


- (b) Connect the fuel tank vent hose sub-assembly [INFO](#).

NOTICE:

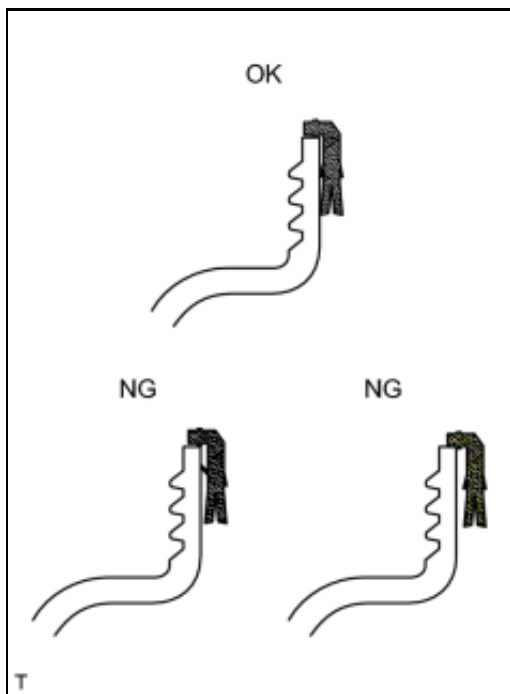
- When connecting the fuel tube connector, do not forcibly pull the fuel return vent tube sub-assembly.
- Be careful not to bend the arm of the fuel sender gauge assembly.

- (c) Insert the fuel suction tube assembly with pump and gauge inside the fuel tank assembly, and then attach the new gasket which has already been mounted on the fuel suction tube assembly with pump and gauge to the fuel tank assembly.



NOTICE:

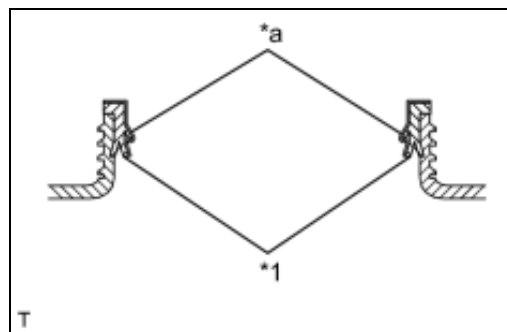
Gaps or misplaced attachment of the gasket may cause fuel to leak, so make sure that there are no gaps or misalignments anywhere around the gasket when attaching it to the fuel tank assembly.



(d) Apply a light coat of gasoline to a gasket.

Text in Illustration

*1	Gasket
*a	Application area



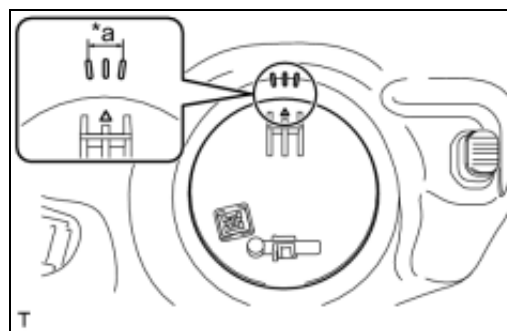
NOTICE:

- Apply gasoline in the area indicated in the illustration.
- Ensure that gasoline does not adhere to the threads of the fuel tank assembly.
- Check that there is no fuel or foreign matter in the seal section.

(e) Set the fuel suction tube assembly with pump and gauge within the fuel tank assembly installation position marks.

Text in Illustration

*a	Installation position marks
----	-----------------------------



(f) Attach a new sheet ring and fuel pump gauge retainer, and temporarily tighten the fuel pump gauge retainer.

(g) Temporarily install SST (plate and 4 claws) to the fuel pump gauge retainer.

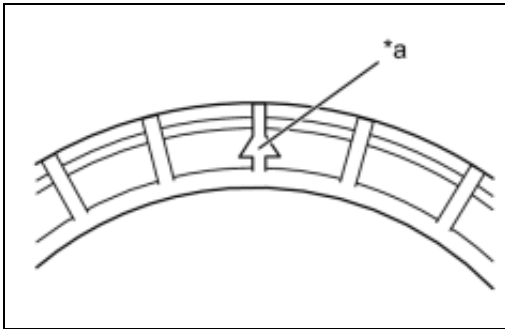
SST: 09808-14030

09808-01030

09808-01050

SST: 09808-01071**NOTICE:**

Do not apply a claw of SST at the marked part.

**Text in Illustration**

*a	Marked Part
----	-------------

HINT:

- Be sure to use SST (claws) as shown in the illustration.
- Engage SST (claws) securely with the fuel pump gauge retainer ribs to secure SST.

(h) While securely pressing SST (claws) against the fuel pump gauge retainer ribs, tighten the 4 bolts.

HINT:

Install SST while pressing SST (claws) against the fuel pump gauge retainer (towards the center of SST).

(i) Using SST, tighten the fuel pump gauge retainer.

Torque:

85 N·m {867 kgf·cm, 63ft·lbf}

NOTICE:

- Do not use any tools other than those specified in this operation. Damage to the fuel pump gauge retainer or fuel tank may result.
- Do not press down on SST excessively as this may make the fuel pump gauge retainer hard to rotate, and may damage components.
- Make sure to rotate SST horizontally. If SST is rotated at an angle, SST may come off.
- Do not spin SST too fast or use an impact wrench as this may result in damage to components.
- If SST comes off of the fuel pump gauge retainer, loosen SST (bolts) and reinstall SST.
- Check that the fuel suction tube assembly with pump and gauge position marks are within the fuel tank assembly installation position marks, as shown in the illustration.
- After tightening to the specified torque, check that it has been tightened to the correct torque.

HINT:

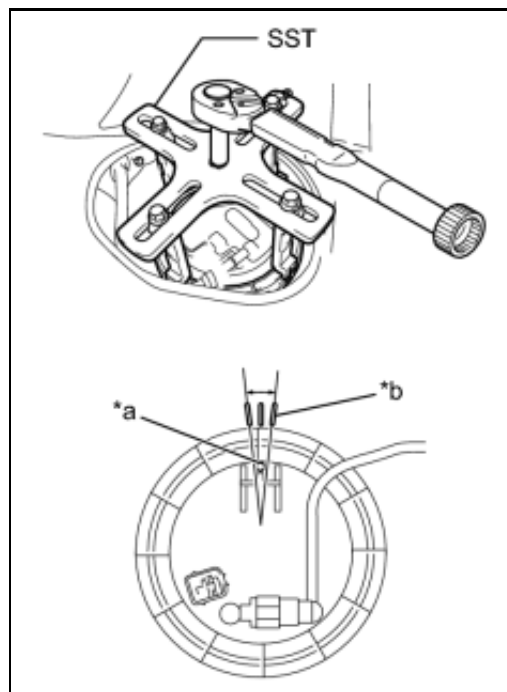
- Lightly press down on SST to prevent it from separating

from the fuel pump gauge retainer. While pressing SST, rotate the handle slowly to tighten the fuel pump gauge retainer.

- The tips of SST (claws) can be fitted onto the ribs of the fuel pump gauge retainer.

Text in Illustration

*a	Position mark
*b	Installation position marks



(j) Connect the fuel tank main tube [INFO](#).

2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL [INFO](#)

3. INSPECT FOR FUEL LEAK [INFO](#)

4. INSTALL NO. 2 REAR FLOOR SERVICE HOLE COVER

- (a) Connect the fuel suction tube assembly with pump and gauge connector.
 (b) Install the No. 2 rear floor service hole cover with new butyl tape.

5. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY LH [INFO](#)



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000QDU07UX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL PUMP: REASSEMBLY; 2013 MY FR-S [03/2012 -]		

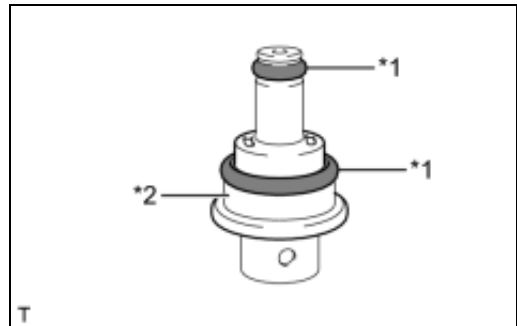
REASSEMBLY

1. INSTALL FUEL PRESSURE REGULATOR ASSEMBLY

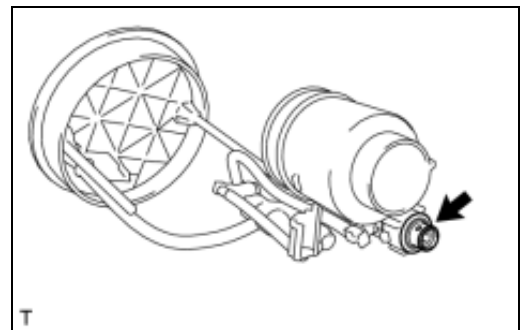
- (a) Apply a light coat of gasoline to new 2 O-rings, and install the 2 O-rings and backup ring to the fuel pressure regulator assembly.

Text in Illustration

*1	O-Ring
*2	Backup Ring



- (b) Install the fuel pressure regulator assembly to the fuel filter.

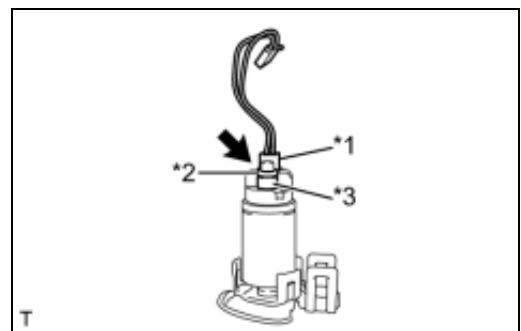


2. INSTALL FUEL PUMP ASSEMBLY

- (a) Install the new O-ring and fuel pump spacer to the fuel pump assembly.

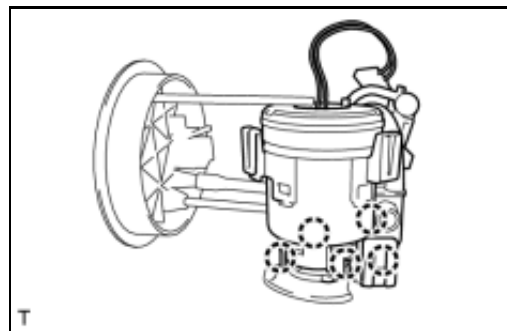
Text in Illustration

*1	Fuel Pump Wire harness
*2	O-Ring
*3	Fuel Pump Spacer



- (b) Connect the new fuel pump wire harness to the fuel pump assembly.

- (c) Apply a light coat of gasoline to a seal, and install it to the fuel pump assembly.



- (d) Attach the 5 claws of the fuel filter to install the fuel pump assembly.

NOTICE:

When installing the seal, make sure that it does not become pinched or cut.

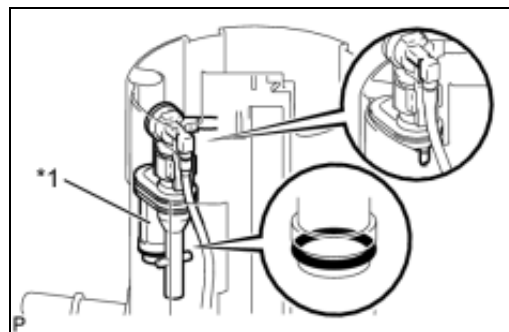
3. INSTALL NO. 1 FUEL SUB-TANK

- (a) Set the fuel suction plate sub-assembly to the No. 1 fuel sub-tank using the spring.

- (b) Apply a light coat of gasoline to a new O-ring and install the O-ring to the jet pump.

Text in Illustration

*1	Jet Pump
----	----------

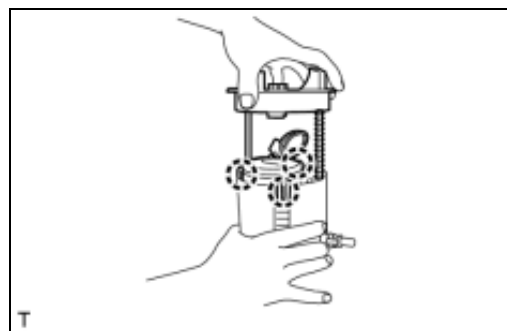


- (c) Install the jet pump to the No. 1 fuel sub-tank.

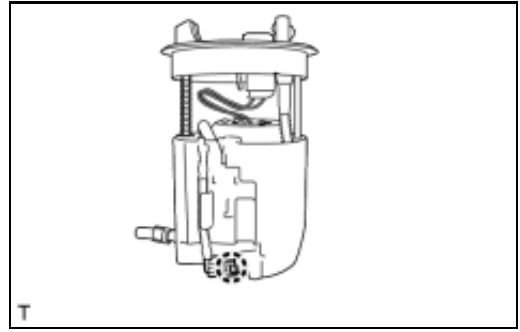
NOTICE:

- When installing the O-ring, make sure that it does not become pinched or cut.
- Securely attach the claws.

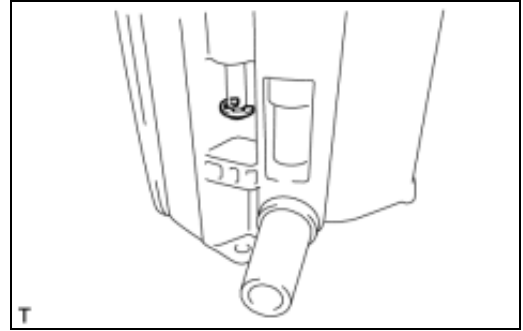
- (d) Attach the 3 claws to install the fuel filter assembly to the No. 1 fuel sub-tank.



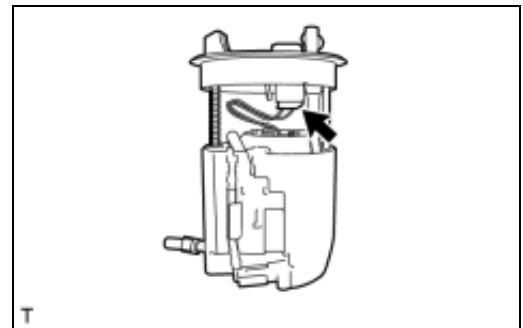
(e) Attach the claw to install the jet pump nozzle to the No. 1 fuel sub-tank.



(f) Install a new E-ring.



(g) Connect the fuel pump connector.



4. INSTALL FUEL SENDER GAGE ASSEMBLY [INFO](#)



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000QDW07IX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL PUMP: REMOVAL; 2013 MY FR-S [03/2012 -]		

REMOVAL

1. DISCHARGE FUEL SYSTEM PRESSURE

INFO

2. DRAIN FUEL

(a) If the fuel gauge reads 2/3 or more, carry out the following procedure to drain fuel.

CAUTION:

After running, the engine will be very hot, so take care to avoid burns.

NOTICE:

- Be sure not to scatter any fuel.
- In some cases, there may be fuel in the fuel filler pipe section. Use a gasoline-capable pump or a gasoline-capable hose with a diameter of 10 mm (0.3937 in.) or less, to drain fuel from the fuel filler pipe section.

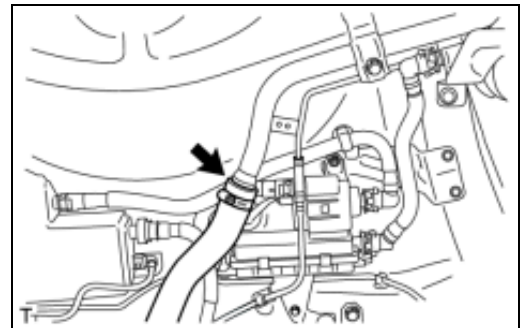
(1) Remove the center exhaust pipe assembly.

(2) Remove the tail exhaust pipe assembly.

(3) Loosen the hose clamp bolt and disconnect the fuel tank to filler pipe hose.

NOTICE:

Be sure not to scatter any fuel.



(4) Place a metal container below the vehicle, and use a gasoline-capable hose with a diameter of 10 mm or less to drain fuel from the opening of fuel tank assembly to filler pipe hose.

NOTICE:

- Be sure not to scatter any fuel.
- Static electricity could possibly ignite gasoline, so be sure to use earthed metal containers.

(5) Connect the fuel tank to filler pipe hose to the fuel tank filler pipe sub-assembly with the clamp.

Torque:

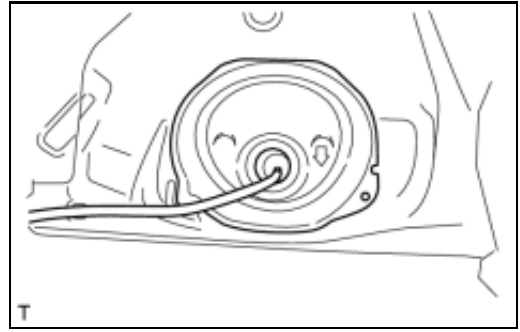
2.0 N·m {20 kgf·cm, 18in·lbf}

3. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

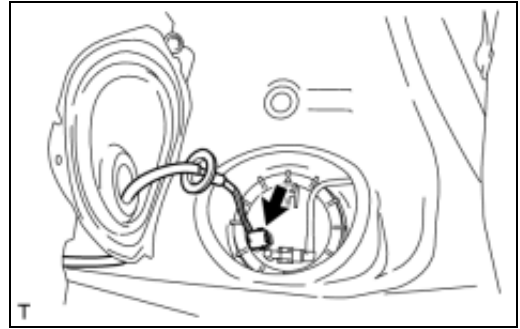
4. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY LH INFO

5. REMOVE NO. 2 REAR FLOOR SERVICE HOLE COVER

(a) Remove the No. 2 rear floor service hole cover.

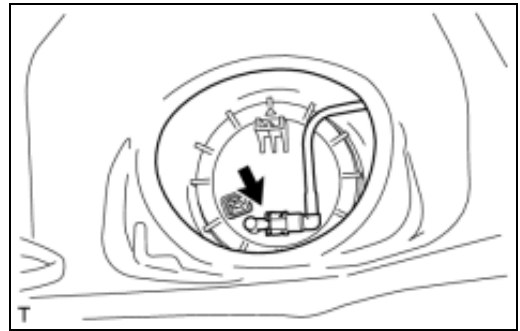


(b) Disconnect the fuel suction tube assembly with pump and gauge connector.

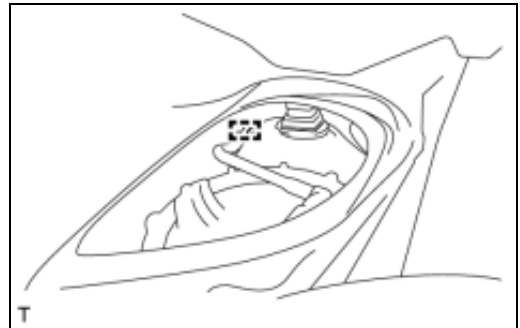


6. REMOVE FUEL SUCTION TUBE ASSEMBLY WITH PUMP AND GAUGE

(a) Disconnect the fuel tank main tube INFO.

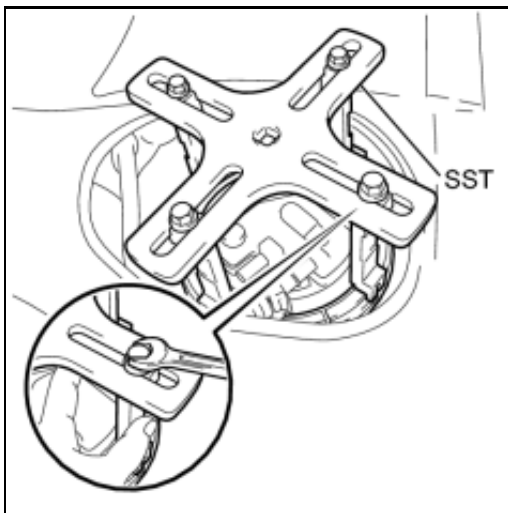


(b) Disengage the clamp and separate the fuel tank main tube from the fuel tank assembly.



(c) Remove the fuel pump gauge retainer.

(1) Temporarily install SST to the fuel pump gauge retainer.

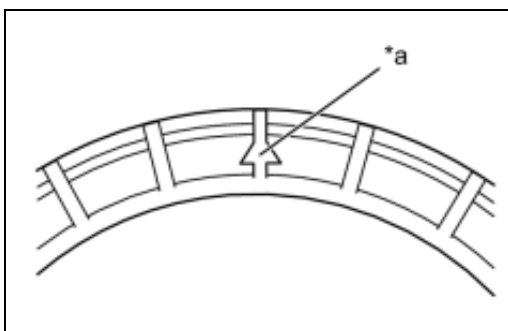
**SST: 09808-14030**

09808-01010

09808-01020

09808-01030

09808-01050

SST: 09808-01071**NOTICE:**

Do not apply a claw of SST at the marked part.

Text in Illustration

*a	Marked Part
----	-------------

HINT:

- Be sure to use SST (claws) as shown in the illustration.
- Engage SST (claws) securely with the fuel pump gauge retainer ribs to secure SST.

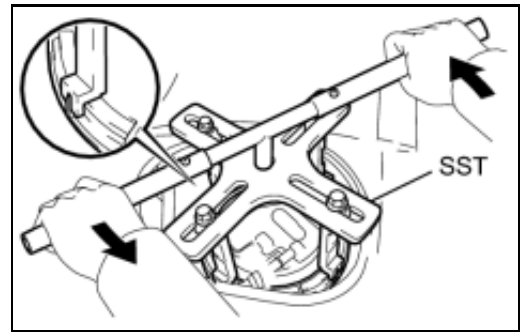
(2) While securely pressing SST (claws) against the fuel pump gauge retainer ribs, tighten the 4 bolts.

(3) Install SST (handle).

(4) Lightly press down on SST to prevent it from separating from the fuel pump gauge retainer. While pressing SST, rotate the handle slowly to loosen the fuel pump gauge retainer.

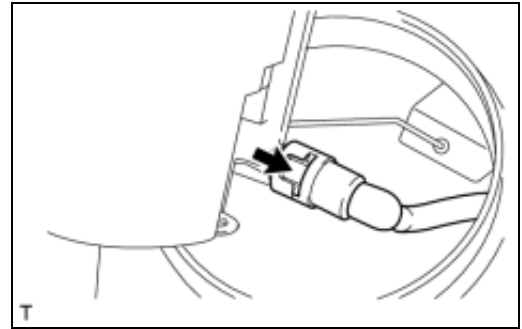
NOTICE:

- Do not use any tools other than those specified in this operation. Damage to the fuel pump gauge retainer or fuel tank may result.
- Do not press down on SST excessively as this may make the fuel pump gauge retainer hard to rotate and may damage components.
- Make sure to rotate SST (handle) horizontally. If SST (handle) is rotated at an angle, SST may come off.
- Do not spin SST too fast or use an impact wrench as this may result in damage to components.
- If SST comes off of the fuel pump gauge retainer, loosen SST (bolts) and reinstall SST.



(5) Disconnect the fuel tank vent hose sub-assembly

INFO



(6) Remove the fuel suction tube assembly with pump and gauge from the fuel tank assembly.

NOTICE:

- Do not pull the fuel return vent tube sub-assembly forcibly when disconnecting the fuel return vent tube sub-assembly.
- Be careful not to bend the arm of the fuel sender gauge assembly.
- Do not rotate the fuel suction tube assembly inside the fuel tank assembly, as doing so may bend the fuel sender gauge arm section.
- Be sure not to spill the fuel remaining in the fuel suction tube assembly on the exterior of the fuel tank assembly or interior of the vehicle.

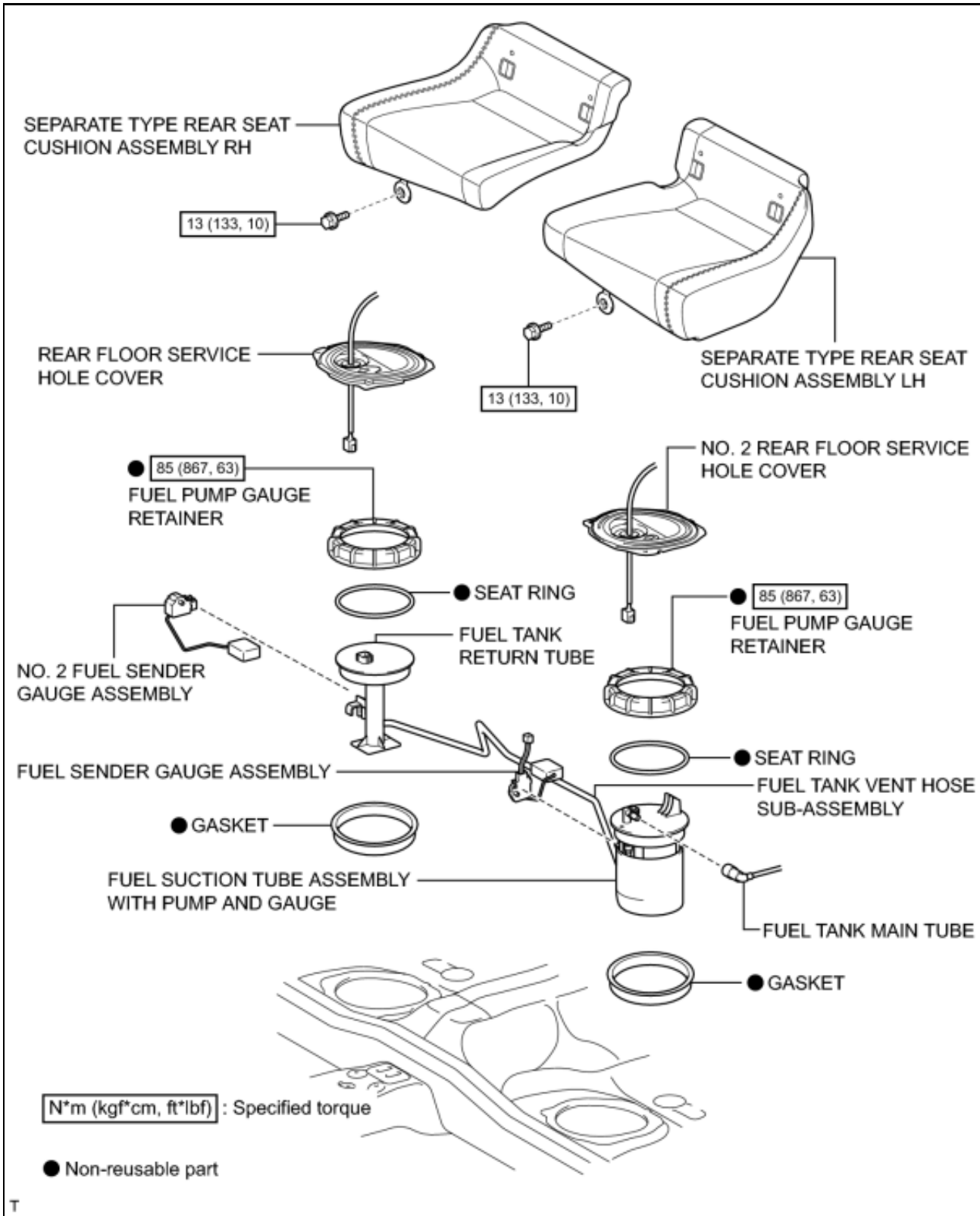
(7) Remove the gasket from the fuel tank assembly.



Last Modified: 4-14-2014	6.6 K	Doc ID: RM0000010U8010X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL SENDER GAUGE ASSEMBLY: COMPONENTS; 2013 MY FR-S [03/2012 -]		

[COMPONENTS](#)

[ILLUSTRATION](#)



T



Last Modified: 4-14-2014	6.6 G	Doc ID: RM0000014W605MX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL SENDER GAUGE ASSEMBLY: INSPECTION; 2013 MY FR-S [03/2012 -]		

INSPECTION

1. INSPECT FUEL SENDER GAUGE ASSEMBLY

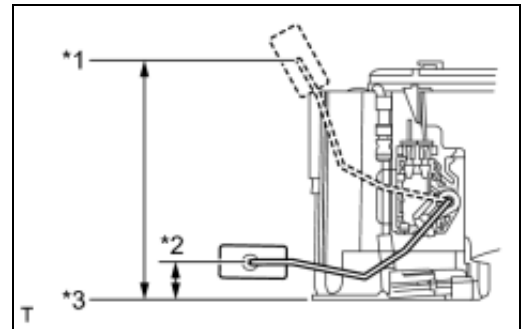
CAUTION:

Take special care of fire.

- (a) Inspect to see if there is any damage to the fuel sender gauge assembly.
- (b) Measure the dimensions between the fuel tank seat face and the float center with the float position at F (upper end) and at E (lower end).

Dimensions

Float position F (upper end) to fuel tank seat face	121 to 129 mm (4.764 to 5.079 in.)
Float position E (lower end) to fuel tank seat face	14.7 to 22.7 mm (0.579 to 0.894 in.)



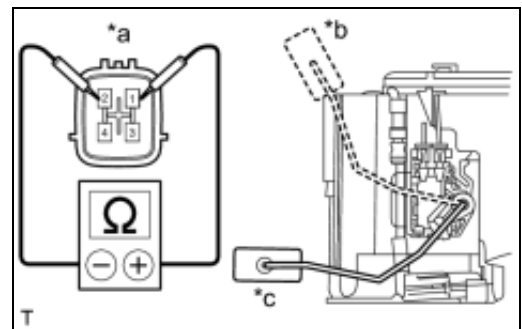
Text in Illustration

*1	Float position F (upper end)
*2	Float position E (lower end)
*3	Fuel tank seat face

- (c) Check that the float moves smoothly between F (upper) and E (lower).
- (d) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	Float position is F (upper end)	6.5 to 8.5 Ω
	Float position is E (lower end)	168 to 172 Ω



Text in Illustration

*a	Component without harness connected (Fuel Sender Gauge Assembly)
*b	F (upper end)
*c	E (lower end)

If the value is not as specified, replace the fuel sender gauge assembly.

2. INSPECT NO. 2 FUEL SENDER GAUGE ASSEMBLY

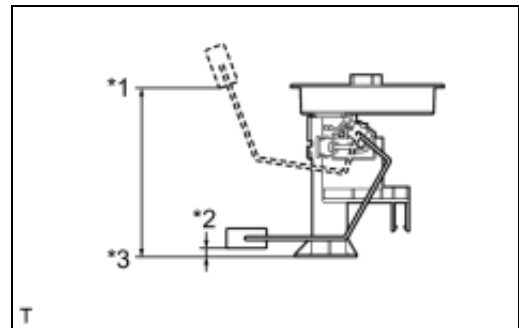
CAUTION:

Take special care of fire.

- (a) Inspect to see if there is any damage to the No. 2 fuel sender gauge assembly.
- (b) Measure the dimensions between the fuel tank seat face and the float center with the float position at F (upper end) and at E (lower end).

Dimensions

Float position F (upper end) to fuel tank seat face	150.3 to 158.3 mm (5.917 to 6.232 in.)
Float position E (lower end) to fuel tank seat face	0.7 to 8.7 mm (0.028 to 0.343 in.)



Text in Illustration

*1	Float position F (upper end)
*2	Float position E (lower end)
*3	Fuel tank seat face

- (c) Check that the float moves smoothly between F (upper) and E (lower).
- (d) Measure the resistance according to the value(s) in the table below.

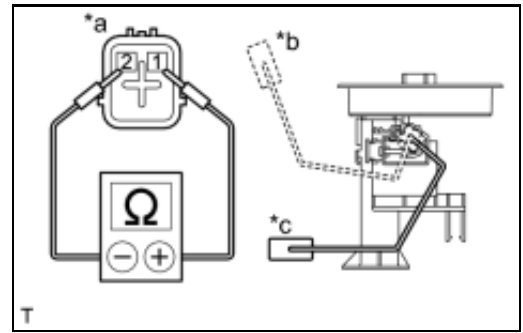
Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	Float position is F (upper end)	5.5 to 9.5 Ω
	Float position is E (lower end)	236 to 244 Ω

Text in Illustration

*a	Component without harness connected (No. 2 Fuel Sender Gauge Assembly)
*b	F (upper end)
*c	E (lower end)

If the value is not as specified, replace the fuel sender gauge assembly.

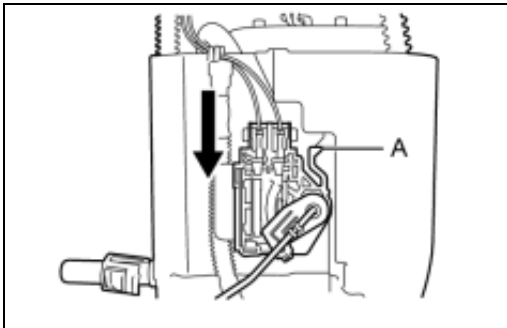


Last Modified: 4-14-2014	6.6 A	Doc ID: RM000001OU701VX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL SENDER GAUGE ASSEMBLY: INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL NO. 2 FUEL SENDER GAUGE ASSEMBLY

- (a) Slide the No. 2 fuel sender gauge assembly downwards and attach the claw labeled A to install the No. 2 fuel sender gauge assembly.



Text in Illustration

➔	Slide
---	-------

- (b) Connect the No. 2 fuel sender gauge assembly connector.
 (c) Engage the 4 clamps.

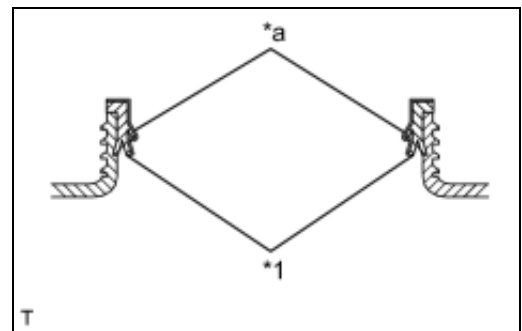
2. INSTALL FUEL TANK RETURN TUBE

- (a) Install a new gasket to the fuel tank assembly.

- (b) Apply a light coat of gasoline to a gasket.

Text in Illustration

*1	Gasket
*a	Application area



NOTICE:

- Apply gasoline in the area indicated in the illustration.
- Ensure that gasoline does not adhere to the threads of the fuel tank assembly.
- Check that there is no fuel or foreign matter in the seal section.

- (c) Engage the clamp to install the tube and set the fuel tank return tube into the fuel tank assembly.

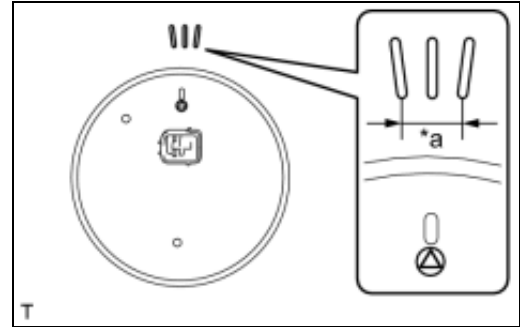
NOTICE:

Be careful not to bend the arm of the No. 2 fuel sender gauge assembly.

- (d) Set the fuel tank return tube within the fuel tank assembly installation position marks.

Text in Illustration

*a	Installation position marks
----	-----------------------------



- (e) Attach a new sheet ring and fuel pump gauge retainer, and temporarily tighten the fuel pump gauge retainer.
 (f) Temporarily install SST (plate and 4 claws) to the fuel pump gauge retainer.

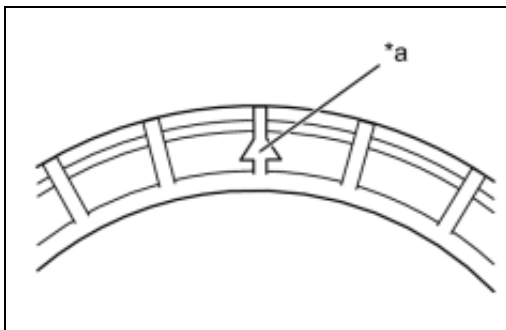
SST: 09808-14030

09808-01030

09808-01050

SST: 09808-01071**NOTICE:**

Do not apply a claw of SST at the marked part.

**Text in Illustration**

*a	Marked Part
----	-------------

HINT:

- Be sure to use SST (claws) as shown in the illustration.
- Engage SST (claws) securely with the fuel pump gauge retainer ribs to secure SST.

- (g) While securely pressing SST (claws) against the fuel pump gauge retainer ribs, tighten the 4 bolts.

HINT:

Install SST while pressing SST (claws) against the fuel pump gauge retainer (towards the center of SST).

- (h) Using SST, tighten the fuel pump gauge retainer.

Torque:

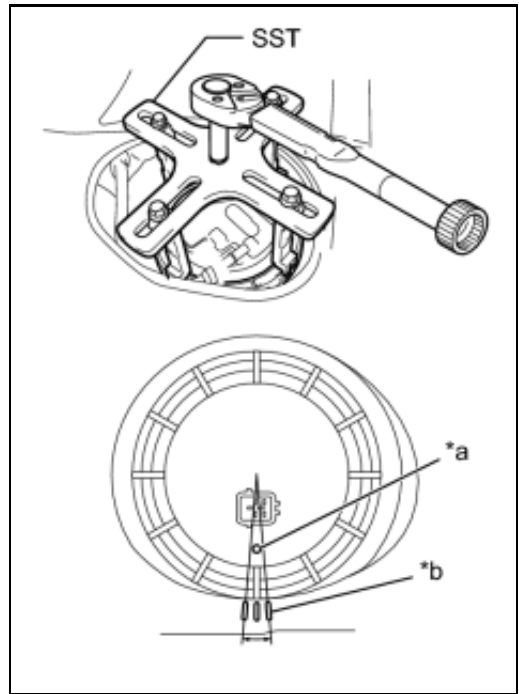
85 N·m {867 kgf·cm, 63ft·lbf}

NOTICE:

- Do not use any tools other than those specified in this operation. Damage to the fuel pump gauge retainer or fuel tank may result.
- Do not press down on SST excessively as this may make the fuel pump gauge retainer hard to rotate, and may damage components.
- Make sure to rotate SST horizontally. If SST is rotated at an angle, SST may come off.
- Do not spin SST too fast or use an impact wrench as this may result in damage to components.
- If SST comes off of the fuel pump gauge retainer, loosen SST (bolts) and reinstall SST.
- Check that the No. 2 fuel sender gauge assembly within the fuel tank assembly position marks are within the fuel tank assembly installation position marks, as shown in the illustration.
- After tightening to the specified torque, check that it has been tightened to the correct torque.

HINT:

- Lightly press down on SST to prevent it from separating from the fuel pump gauge retainer. While pressing SST, rotate the handle slowly to tighten the fuel pump gauge retainer.
- The tips of SST (claws) can be fitted onto the ribs of the fuel pump gauge retainer.

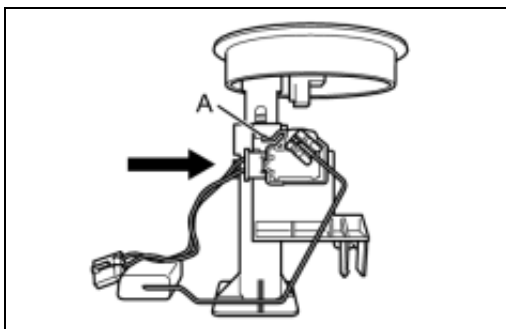


Text in Illustration

*a	Position mark
*b	Installation position marks

3. INSTALL FUEL SENDER GAUGE ASSEMBLY

- (a) Slide the fuel sender gauge assembly downwards and attach the claw labeled A to install the fuel sender gauge assembly.



Text in Illustration

➔	Slide
---	-------

- (b) Connect the fuel pump harness to the 2 clamps.
 (c) Connect the fuel sender gauge assembly connector.

4. INSTALL FUEL SUCTION TUBE ASSEMBLY WITH PUMP AND GAUGE INFO**5. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL** INFO**6. INSPECT FOR FUEL LEAK** INFO**7. INSTALL NO. 2 REAR FLOOR SERVICE HOLE COVER** INFO**8. INSTALL REAR FLOOR SERVICE HOLE COVER**

(a) Connect the fuel tank return tube connector.

(b) Install the rear floor service hole cover with new butyl tape.

9. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY RH INFO**10. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY LH** INFO

Last Modified: 4-14-2014	6.6 A	Doc ID: RM000001OU901TX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL SENDER GAUGE ASSEMBLY: REMOVAL; 2013 MY FR-S [03/2012 -]		

REMOVAL

1. DISCHARGE FUEL SYSTEM PRESSURE

INFO

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

INFO

3. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY RH

INFO

4. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY LH

INFO

5. REMOVE NO. 2 REAR FLOOR SERVICE HOLE COVER

INFO

6. REMOVE FUEL SUCTION TUBE ASSEMBLY WITH PUMP AND GAUGE

INFO

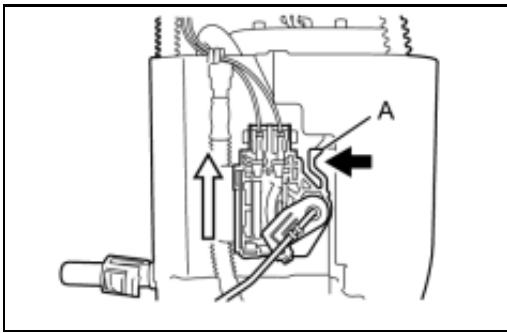
7. REMOVE FUEL SENDER GAUGE ASSEMBLY



(a) Disconnect the connector.

(b) Disconnect the fuel pump harness from the 4 clamps.



(c) Push the claw labeled A of the fuel sender gauge assembly, and then pull up the fuel sender gauge assembly to remove it.



NOTICE:

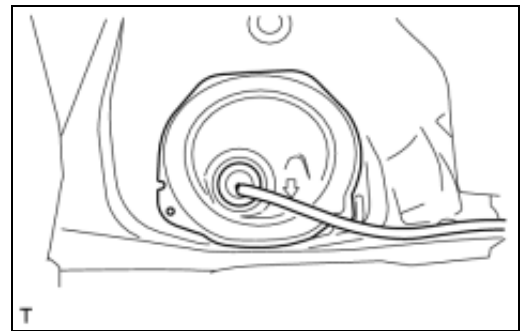
Be careful not to bend the arm of the fuel sender gauge assembly.

Text in Illustration

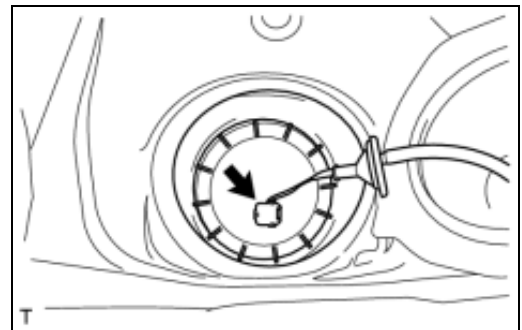
	Push
	Pull up

8. REMOVE REAR FLOOR SERVICE HOLE COVER

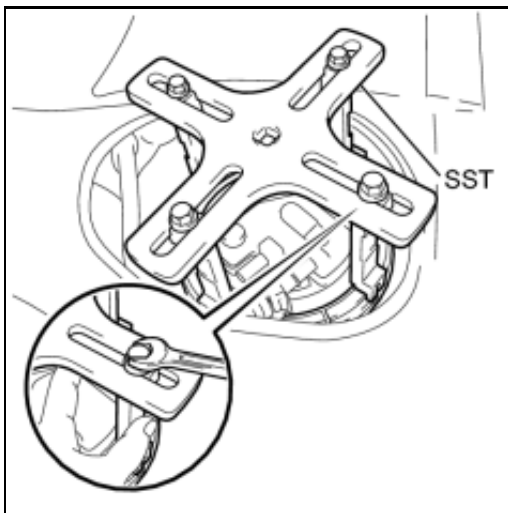
(a) Remove the rear floor service hole cover.



(b) Disconnect the fuel tank return tube connector.



9. REMOVE FUEL TANK RETURN TUBE



(a) Temporarily install SST to the fuel pump gauge retainer.

SST: 09808-14030

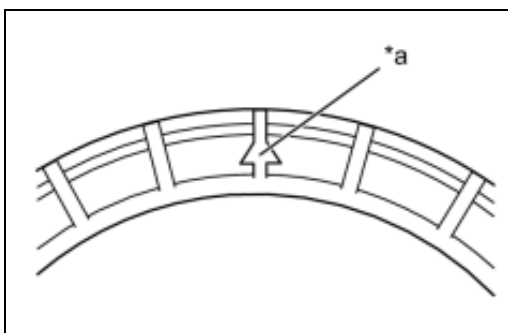
09808-01010

09808-01020

09808-01030

09808-01050

SST: 09808-01071



NOTICE:

Do not apply a claw of SST at the marked part.

Text in Illustration

*a	Marked Part
----	-------------

HINT:

- Be sure to use SST (claws) as shown in the illustration.
- Engage SST (claws) securely with the fuel pump gauge retainer ribs to secure SST.

(b) While securely pressing SST (claws) against the fuel pump gauge retainer ribs, tighten the 4 bolts.

(c) Install SST (handle).

(d) Lightly press down on SST to prevent it from separating from the fuel pump gauge retainer.

While pressing SST, rotate the handle slowly to loosen the fuel pump gauge retainer.

NOTICE:

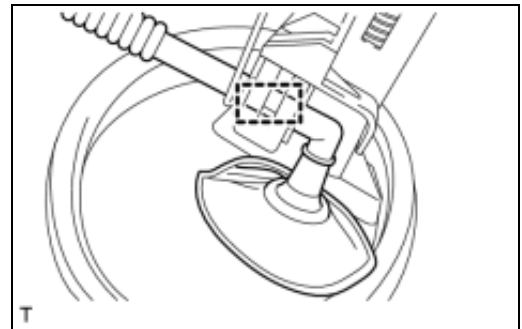
- Do not use any tools other than those specified in this operation.

Damage to the fuel pump gauge retainer or fuel tank may result.

- Do not press down on SST excessively as this may make the fuel pump gauge retainer hard to rotate and may damage components.
- Make sure to rotate SST (handle) horizontally. If SST (handle) is rotated at an angle, SST may come off.
- Do not spin SST too fast or use an impact wrench as this may result in damage to components.
- If SST comes off of the fuel pump gauge retainer, loosen SST (bolts) and reinstall SST.

(e) Remove the fuel pump gauge retainer.

(f) Disengage the clamp and separate the fuel tank vent hose sub-assembly from the fuel tank return tube.



(g) Remove the fuel tank return tube from the fuel tank assembly.

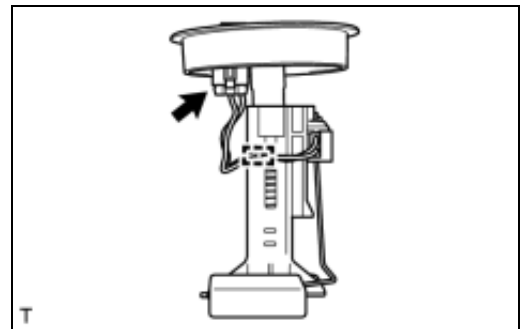
NOTICE:

Be careful not to bend the arm of the No. 2 fuel sender gauge assembly.

(h) Remove the gasket from the fuel tank assembly.

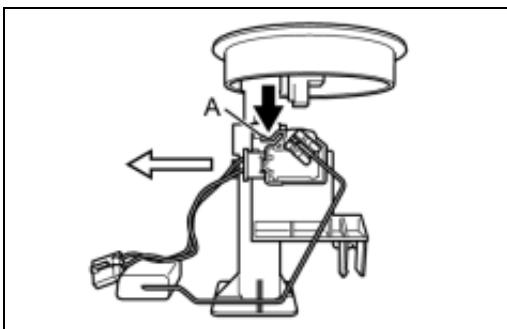
10. REMOVE NO. 2 FUEL SENDER GAUGE ASSEMBLY

(a) Disconnect the No. 2 fuel sender gauge assembly connector.





(b) Disconnect the fuel pump harness from the clamp.

(c) Push the claw labeled A of the No. 2 fuel sender gauge assembly, and then pull up the No. 2 fuel sender gauge assembly to remove it.



Text in Illustration

	Push
	Pull up



Last Modified: 4-14-2014	6.6 G	Doc ID: RM000000Q3M04GX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL SYSTEM: ON-VEHICLE INSPECTION; 2013 MY FR-S [03/2012 -]		

ON-VEHICLE INSPECTION

1. CHECK FUEL PUMP OPERATION AND INSPECT FOR FUEL LEAK

(a) Connect the Techstream to the DLC3.

(1) Turn the ignition switch to ON.

NOTICE:

Do not start the engine.

(2) Turn the Techstream on.

(3) Enter the following menus: Power train / Engine / Active Test / Control the Fuel Pump Speed.

(b) Check the fuel pump operation.

(1) Check for pressure in the fuel inlet tube from the fuel line. Check that sound of fuel flowing in the fuel tank can be heard.

If no sound can be heard, check the EFI MAIN 1 relay, fuel pump, ECM and wiring connector.

(c) Inspect for fuel leaks.

(1) Check that there are no fuel leaks anywhere on the system after performing maintenance.

If there is a fuel leak, repair or replace parts as necessary.

2. CHECK FUEL PRESSURE

(a) Check that the battery positive voltage is above 12 V.

(b) Discharge the fuel system pressure  .

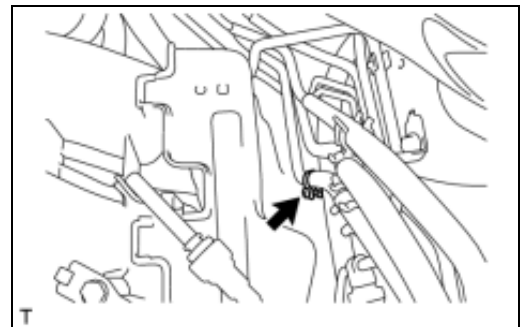
(c) Disconnect the cable from the negative (-) battery terminal.

NOTICE:

The power window system utilizes a mechanism in which the door glass moves down slightly when the door is opened, and in which the glass moves up when the door is closed the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

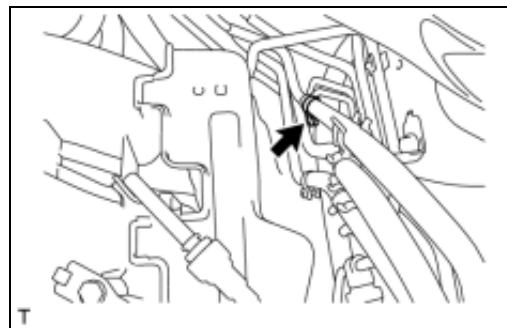
(d) Disconnect the No. 2 fuel tube. (Direct injection side)

(1) Loosen the hose clamp and disconnect the No. 2 fuel tube.



(e) Disconnect the fuel tube. (Port injection side)

(1) Loosen the hose clamp and disconnect the fuel tube.



(f) Install SST (pressure gauge) as shown in the illustration.

SST: 09268-31014

09268-41700

SST: 09268-45100

09268-41250

09268-41260

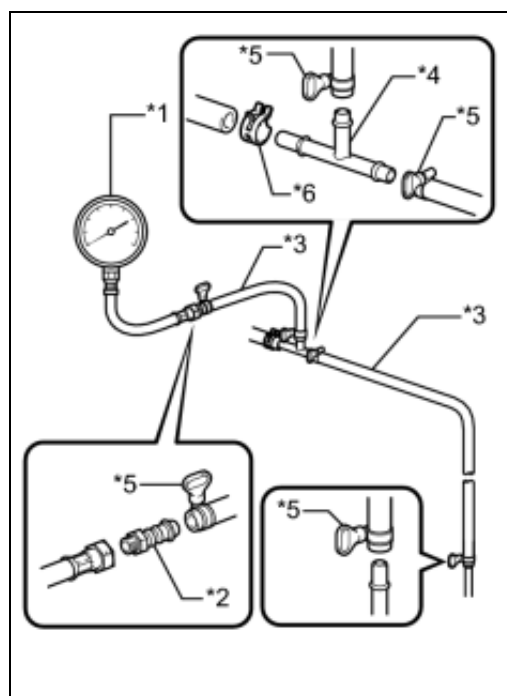
09268-41270

95336-08070

96135-51300

Text in Illustration

*1	SST (Pressure Gauge)
*2	SST (Straight joint)
*3	SST (Hose)
*4	SST (T-joint)
*5	SST (Hose Band)
*6	SST (Clip)



(g) Wipe off any gasoline.

(h) Reconnect the cable to the negative (-) battery terminal.

(i) Operate the fuel pump.

(1) Connect the Techstream to the DLC3.

(2) Turn the ignition switch to ON.

NOTICE:

Do not start the engine.

(3) Turn the Techstream on.

(4) Enter the following menus: Power train / Engine / Active Test / Control the Fuel Pump Speed.

(j) Measure the fuel pressure.

Standard fuel pressure:

350 to 500 kPa (4 to 5 kgf/cm² , 51 to 73 psi)

If the fuel pressure is higher than the specification, replace the fuel pump (built-in fuel tank).

If the pressure is lower than the specification, check the fuel hoses, connections, and fuel pump (built-in fuel tank).

(k) Start the engine.

(l) Measure the fuel pressure when idle.

Standard fuel pressure:

350 to 500 kPa (4 to 5 kgf/cm² , 51 to 73 psi)

If the pressure is not as specified, check the fuel pump and injectors.

(m) Stop the engine.

(n) Check that the fuel pressure remains as specified for 5 minutes after the engine has stopped.

Standard fuel pressure:

147 kPa (1.5 kgf/cm² , 21 psi) or more

If the pressure is not as specified, check the fuel pump or injectors.

(o) After checking the fuel pressure, disconnect the cable from the negative (-) battery terminal and carefully remove SST and the fuel tube connector to prevent fuel from spilling.

(p) Reconnect the No. 2 fuel tube with the clamp. (Direct injection side)

(q) Reconnect the fuel tube with the clamp. (Port injection side)

(r) Inspect for fuel leaks (Step 1).

3. CHECK FUEL PRESSURE (for High Pressure)

(a) Connect the Techstream to the DLC3.

(1) Turn the ignition switch to ON.

(2) Turn the Techstream on.

(b) Start and warm up the engine.

(c) Run the engine at idle.

(d) Enter the following menus: Power train / Engine / Data List / Fuel Press.

(e) Check the high pressure side fuel pressure.

Standard fuel pressure:

3000 to 5000 kPa (30.6 to 51.0 kgf/cm² , 435 to 725 psi)

If the pressure is not as specified, check the fuel pump, high pressure side fuel pump, fuel pressure sensor and wirings.

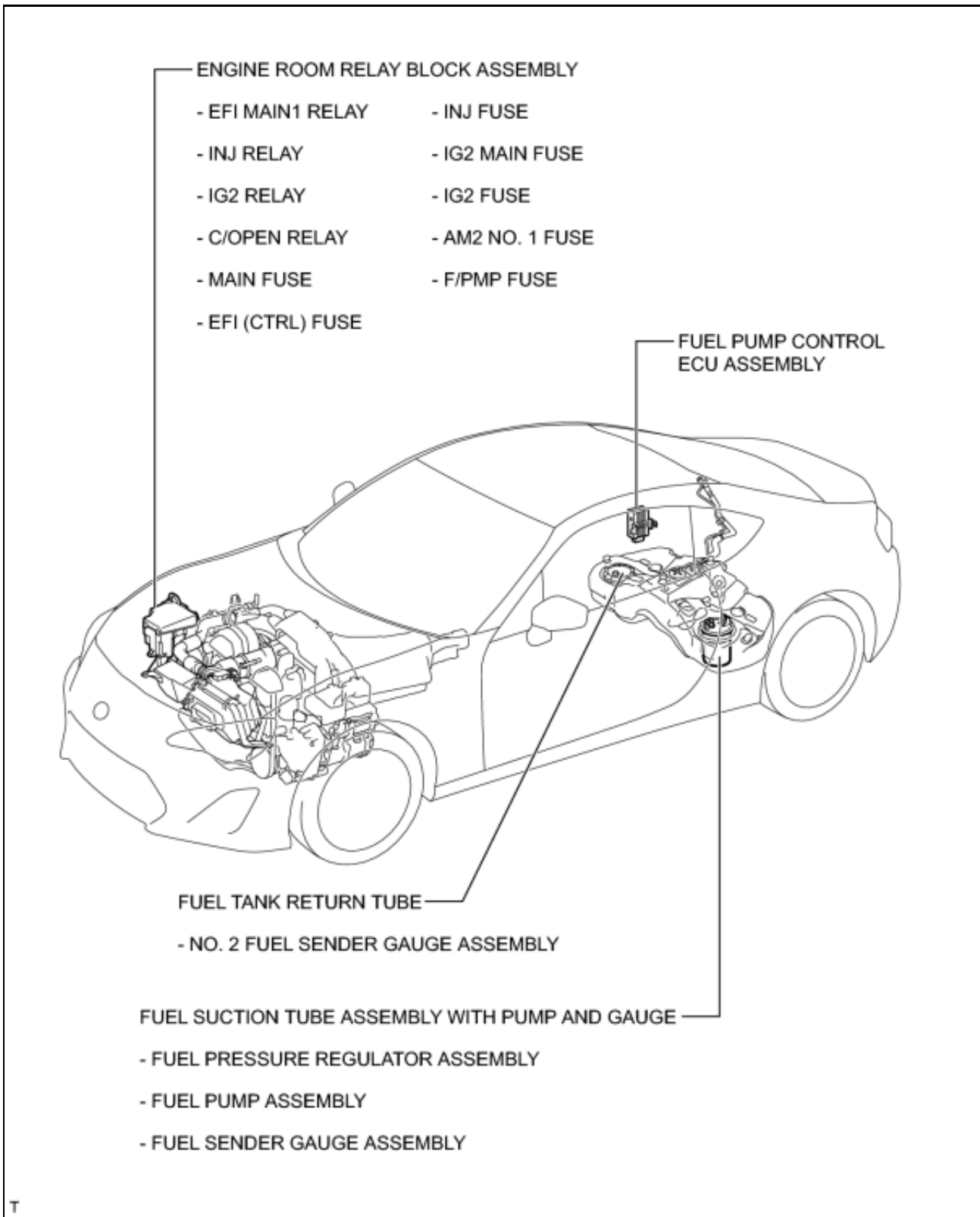
(f) Stop the engine.



Last Modified: 4-14-2014	6.6 R	Doc ID: RM000000VHO03YX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL SYSTEM: PARTS LOCATION; 2013 MY FR-S [03/2012 -]		

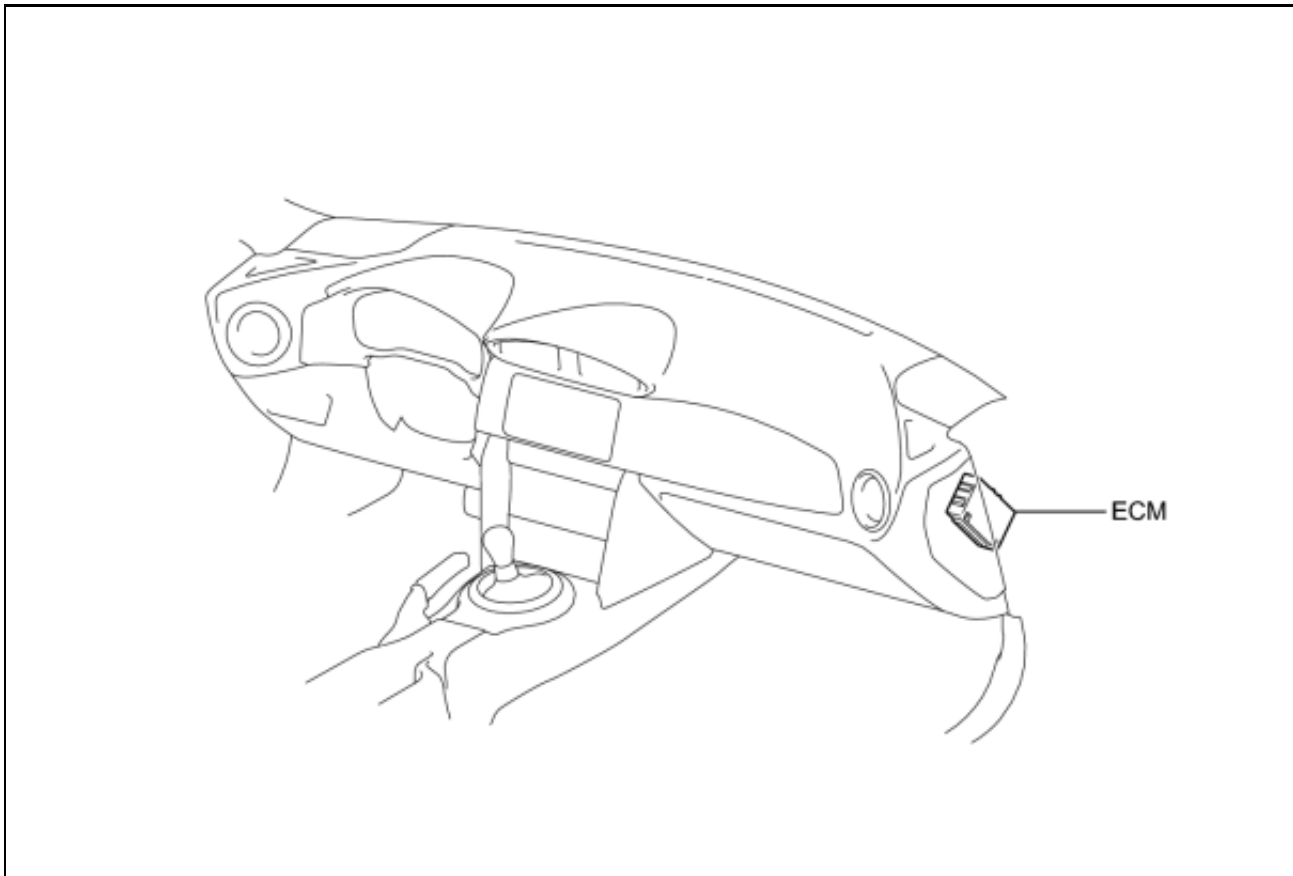
[PARTS LOCATION](#)

[ILLUSTRATION](#)

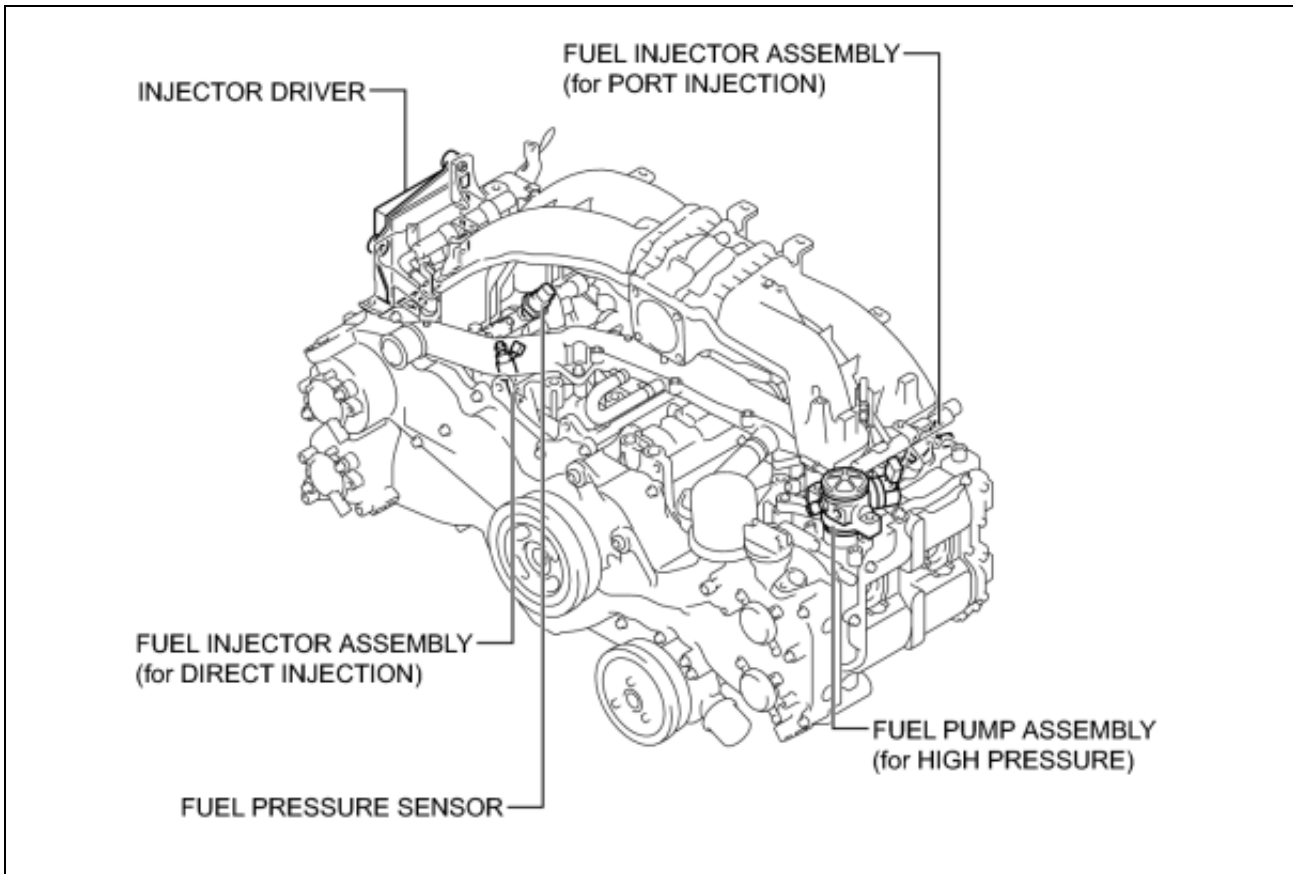


T

ILLUSTRATION



ILLUSTRATION



Last Modified: 4-14-2014	6.6 L	Doc ID: RM000000Q3K042X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL SYSTEM: PRECAUTION; 2013 MY FR-S [03/2012 -]		

PRECAUTION

NOTICE:

Before working on the fuel system, disconnect the cable from the negative (-) battery terminal.

CAUTION:

- Do not smoke or be near an open flame when working on the fuel system.
- Keep gasoline away from rubber or leather parts.
- Do not allow fuel to spray when removing the pipe between the high pressure side fuel pump and the fuel injector. The fuel in the pipe is highly pressurized.

1. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the battery terminal. Therefore, make sure to read the disconnecting the cable from the battery terminal notice before proceeding with work INFO.

2. DISCHARGE FUEL SYSTEM PRESSURE

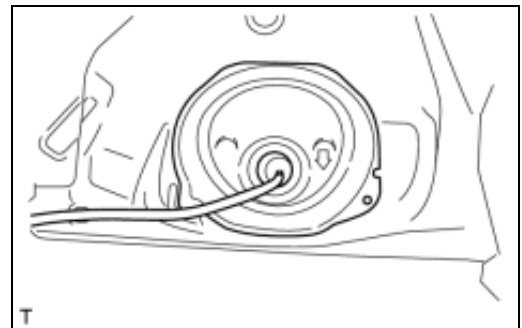
CAUTION:

- Make sure the engine coolant temperature is 60°C (140°F) or less when performing this procedure.
- Do not disconnect any part of the fuel system until you have discharged the fuel system pressure.
- Even after discharging the fuel pressure, place a piece of cloth or equivalent over fittings as you separate them to reduce the risk of fuel spray on yourself or in the engine compartment.

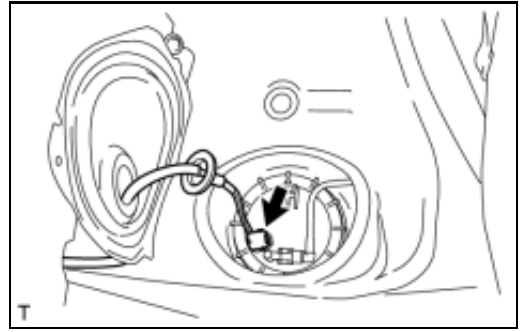
(a) Disconnect the cable from the negative (-) battery terminal.

(b) Remove rear seat cushion assembly LH.

(c) Remove the No. 2 rear floor service hole cover.



- (d) Disconnect the fuel suction tube assembly with pump and gauge connector.



- (e) Connect the cable to the negative (-) battery terminal.
 (f) Start the engine. After the engine has stopped on its own, turn the ignition switch off.

HINT:

Some DTCs may be stored. Clear the DTCs before proceeding to the next step.

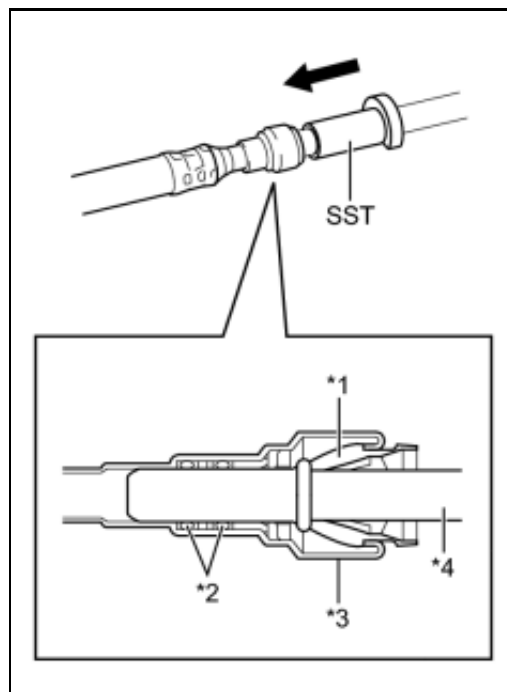
- (g) Crank the engine again, then check that the engine does not start.
 (h) Loosen the fuel tank cap, then discharge the pressure in the fuel tank completely.
 (i) Connect the fuel suction tube assembly with pump and gauge connector.
 (j) Install the No. 2 rear floor service hole cover.
 (k) Install rear seat cushion assembly LH.

3. FUEL SYSTEM

- (a) When disconnecting a fuel pressure line, a large amount of gasoline will spill out. Perform the following procedure:
- (1) Discharge fuel system pressure.
 - (2) Put a container under the connection.
 - (3) Disconnect the fuel pump tube.
 - (4) Drain the fuel remaining inside the fuel pump tube into the container.
 - (5) Cover the disconnected pipe and connector with a plastic bag to prevent damage and contamination.
- (b) Observe these precautions when connecting the fuel tube connector (for metallic type).


(1) Attach SST to the fuel pipe.

SST: SU003-03936



(2) Insert SST in the fuel tube connector side, and remove the fuel tube from the fuel pipe.

Text in Illustration

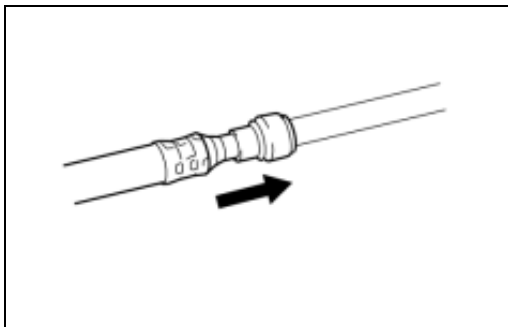
*1	Retainer
*2	O-Ring
*3	Housing
*4	Fuel Pipe
	Insert

(3) Cover the disconnected fuel pipe and fuel tube connector with plastic bags to prevent damage and contamination.

(c) Observe these precautions when connecting the fuel tube connector (for metallic type).

(1) Check for damage or foreign matter on the connected part of the fuel pipe.

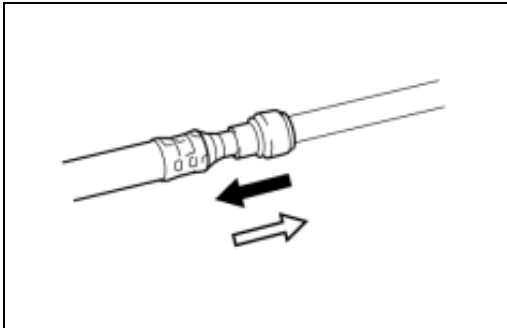
(2) Align the fuel tube connector axis with the fuel pipe axis, and push the fuel tube connector in until the retainer makes a clicking sound.



Text in Illustration

	Push
--	------



(3) After connecting the fuel tube connector, pull the fuel tube connector and pipe, and then push them to check that they are connected firmly.



NOTICE:

Be sure to always finish checking the fuel pipe connections by pushing.

Text in Illustration

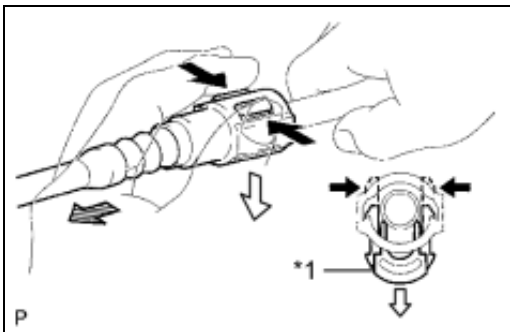
	Pull
	Push

(4) Inspect for fuel leaks INFO.



(d) Observe these precautions when disconnecting the fuel tube connector (for quick type A).

(1) Check that there is no damage or foreign matter on the part of the pipe that contacts the connector.

(2) Detach the 2 claws of the connector retainer. Push down on the connector and disconnect it from the pipe.



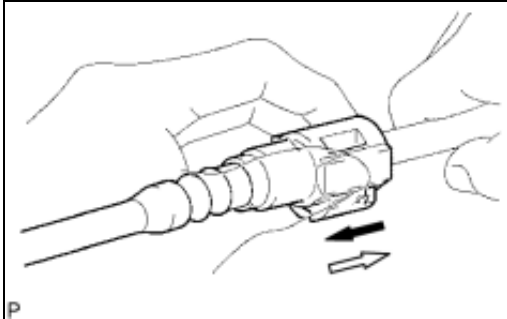
Text in Illustration

*1	Retainer
	Push
	Down



	Pull
---	------

HINT:

If the connector and pipe are stuck, pinch the fuel pipe by hand and push and pull the connector to disconnect it.

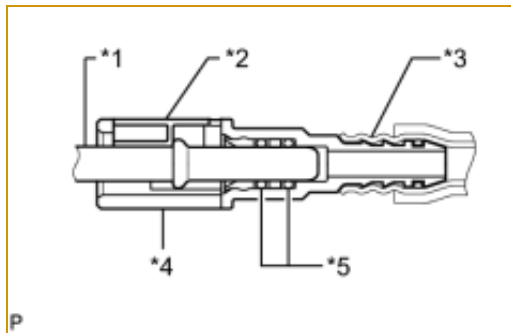


Text in Illustration

	Pull
	Push

NOTICE:

- Check for any dirt and foreign matter contamination in the pipe and around the connector. Clean if necessary. Foreign matter may damage the O-ring or cause leaks in the seal between the pipe



and connector.

- Do not use any tools to separate the pipe and connector.
- Do not allow any scratches or foreign matter on the parts when disconnecting them, as the fuel tube joint contains the O-rings that seal the plug.
- Check for any dirt and foreign matter on the pipe seal surface. Clean if necessary.
- Do not forcibly bend, twist or turn the nylon tube.
- Protect the disconnected part by covering it with a plastic bag and tape after disconnecting the main tube.
- If the pipe and connector are stuck together, pinch the tube between your fingers and turn it carefully to free it. Then disconnect the main tube.

Text in Illustration

*1	Pipe
*2	Retainer
*3	Nylon Tube

*4	Connector
*5	O-Ring

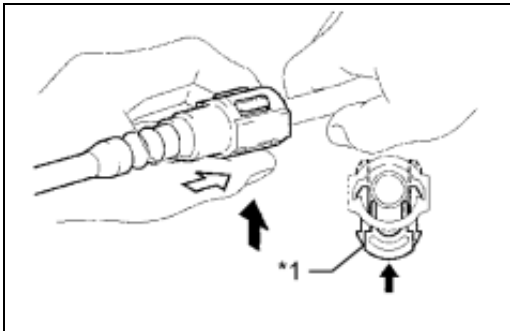
(3) Check for foreign matter on the seal surface of the disconnected pipe. Clean it if necessary.

(4) To protect the disconnected pipe and connector from damage and foreign matter, cover them with a plastic bag.

(e) Observe these precautions when connecting the fuel tube connector (for quick type A).

(1) Check for foreign matter on the pipe and around the connector before connecting it. Clean it if necessary.

(2) Align the axis of the connector with the axis of the pipe. Push the pipe into the connector, and then push up on the retainer.

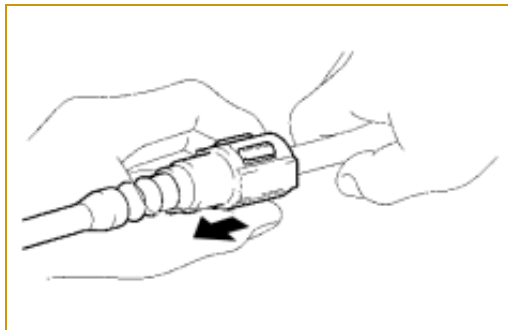


Text in Illustration

*1	Retainer
➔	Up
➔	Push

NOTICE:

- Before connecting the tube connectors to the pipes, check if there is any damage or foreign matter



in the connectors.

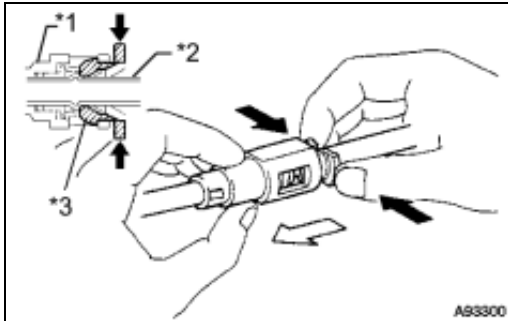
- After connecting the pipe and the connector, check that the pipe and connector are securely connected by trying to pull them apart.

Text in Illustration

➔	Pull
---	------

(3) Inspect for fuel leaks **INFO** .

(f) Perform the following procedure when disconnecting a fuel tube connector (Quick Type B).



Text in Illustration

*1	Fuel Tube Connector
*2	Fuel Pipe
*3	Retainer
	Pinch
	Pull Out

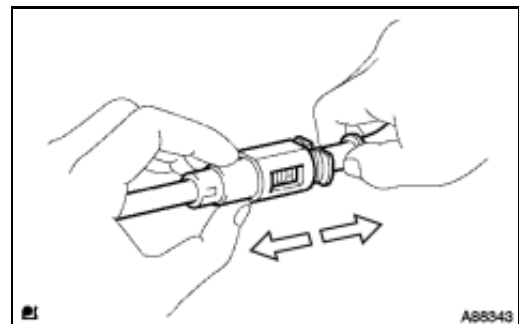
(1) Check that there is no dirt or other foreign matter around the fuel tube connector before disconnecting it. Clean the joint if necessary.

(2) Pinch the retainer as illustrated, then pull out the fuel tube connector from the fuel pipe.

NOTICE:

Be sure to disconnect the fuel tube connector by hand.

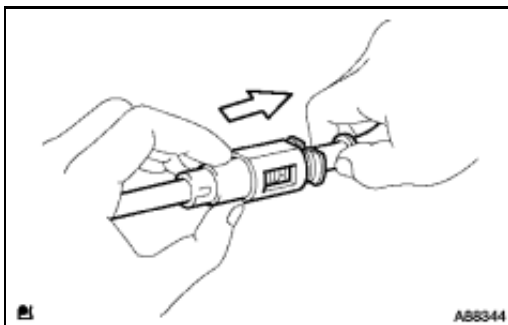
(3) If the fuel tube connector and fuel pipe are stuck, pinch the fuel pipe, and then push and pull the fuel tube connector to release and disconnect the fuel tube connector.



(4) Check if there is any dirt or other foreign matter on the seal surface of the disconnected fuel pipe and clean it away as necessary.

(5) Cover the disconnected fuel pipe and fuel tube connector with plastic bags to prevent damage and contamination.

(g) Perform the following procedure when connecting a fuel tube connector (Quick Type B).

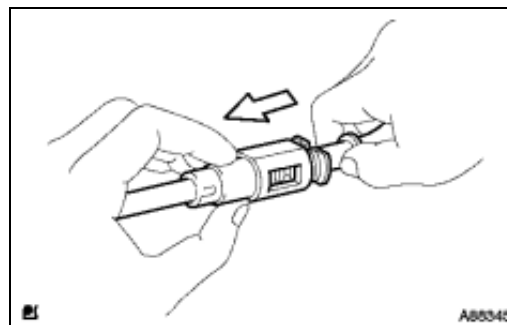


- (1) Check for damage or foreign matter on the connected part of the fuel pipe.
- (2) Align the fuel tube connector with the fuel pipe, and then push in the fuel tube connector until the retainer makes a "click" sound.

HINT:

If the fuel pipe is difficult to push into the fuel tube connector, apply a light coat of engine oil to the tip of the fuel pipe and reinsert it.

- (3) After finishing the connection, check that the fuel pipe and the fuel tube connector are securely connected by pulling on them.



- (4) Inspect for fuel leaks **INFO** .

4. INSPECT FOR FUEL LEAK

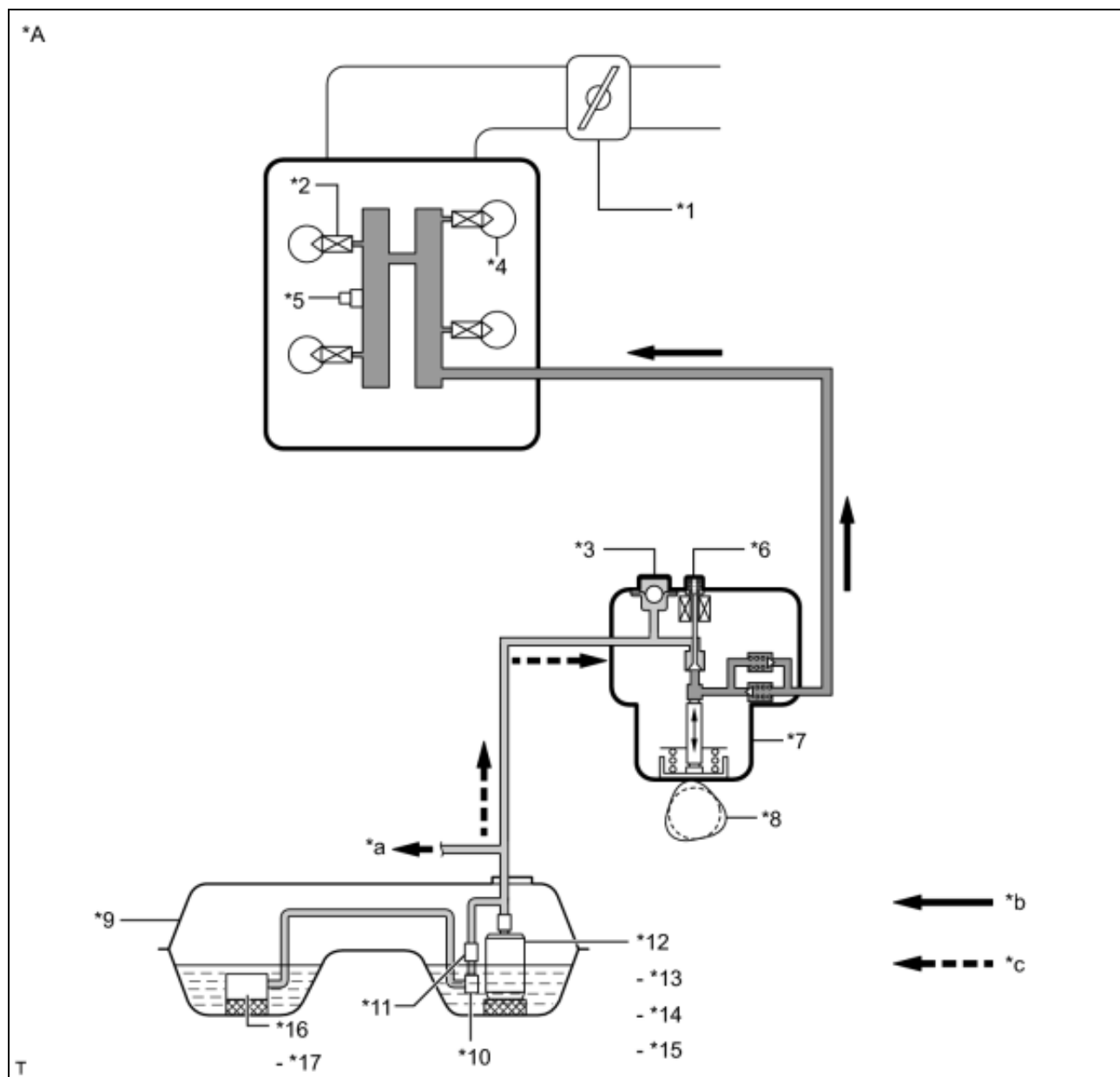
- (a) Check that there are no fuel leaks anywhere on the fuel system after performing maintenance

INFO .

Last Modified: 4-14-2014	6.6 U	Doc ID: RM000000PDZ03ZX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL SYSTEM: SYSTEM DIAGRAM; 2013 MY FR-S [03/2012 -]		

SYSTEM DIAGRAM

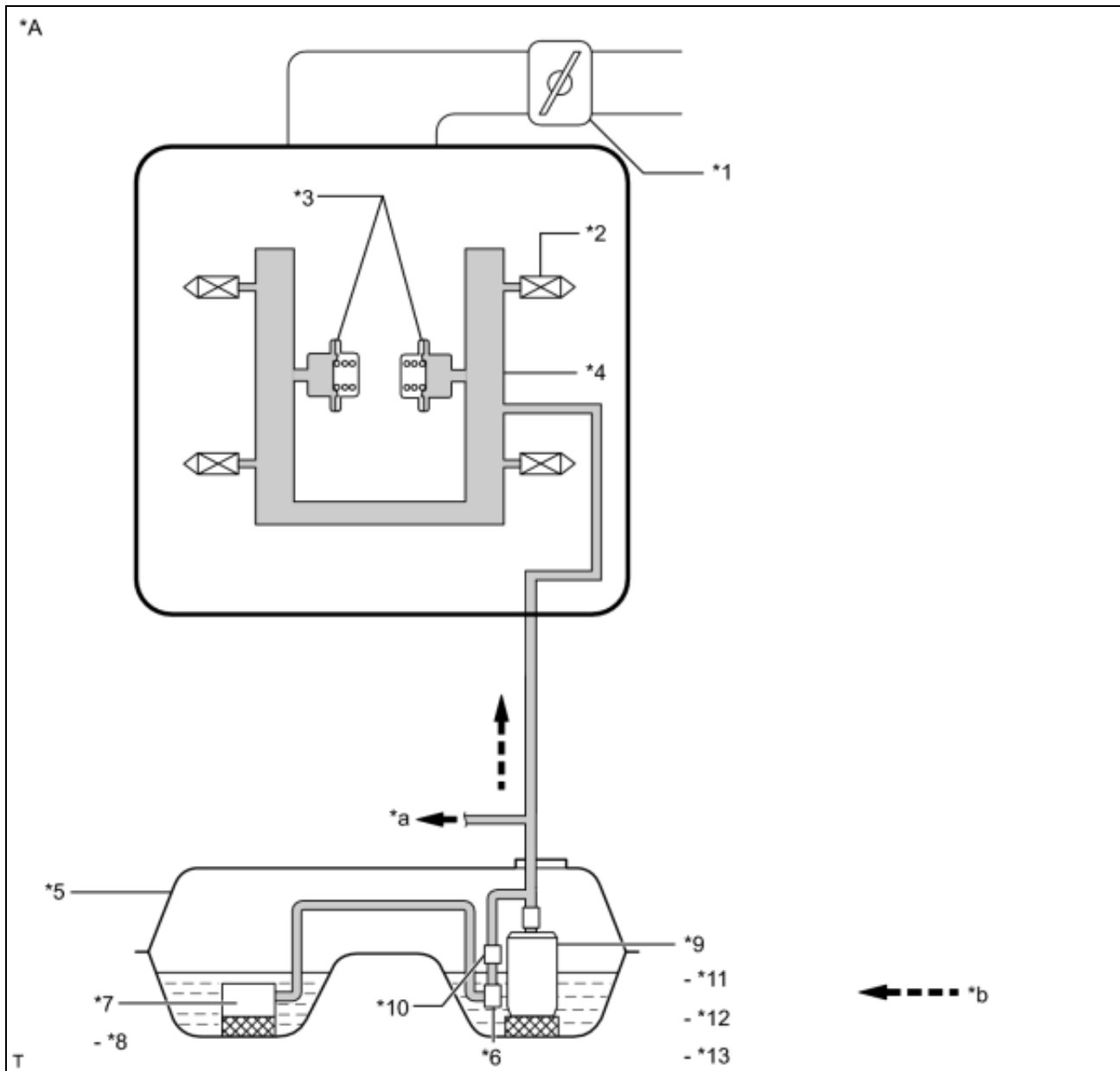
1. FUEL FLOW DIAGRAM



Text in Illustration

*A	Direct Injection Side	-	-
*1	Throttle with Motor Body Assembly	*2	Fuel Injector Assembly (for Direct Injection)
*3	Fuel Pressure Pulsation Damper	*4	Cylinder
*5	Fuel Pressure Sensor	*6	Solenoid Spill Valve
*7		*8	Camshaft

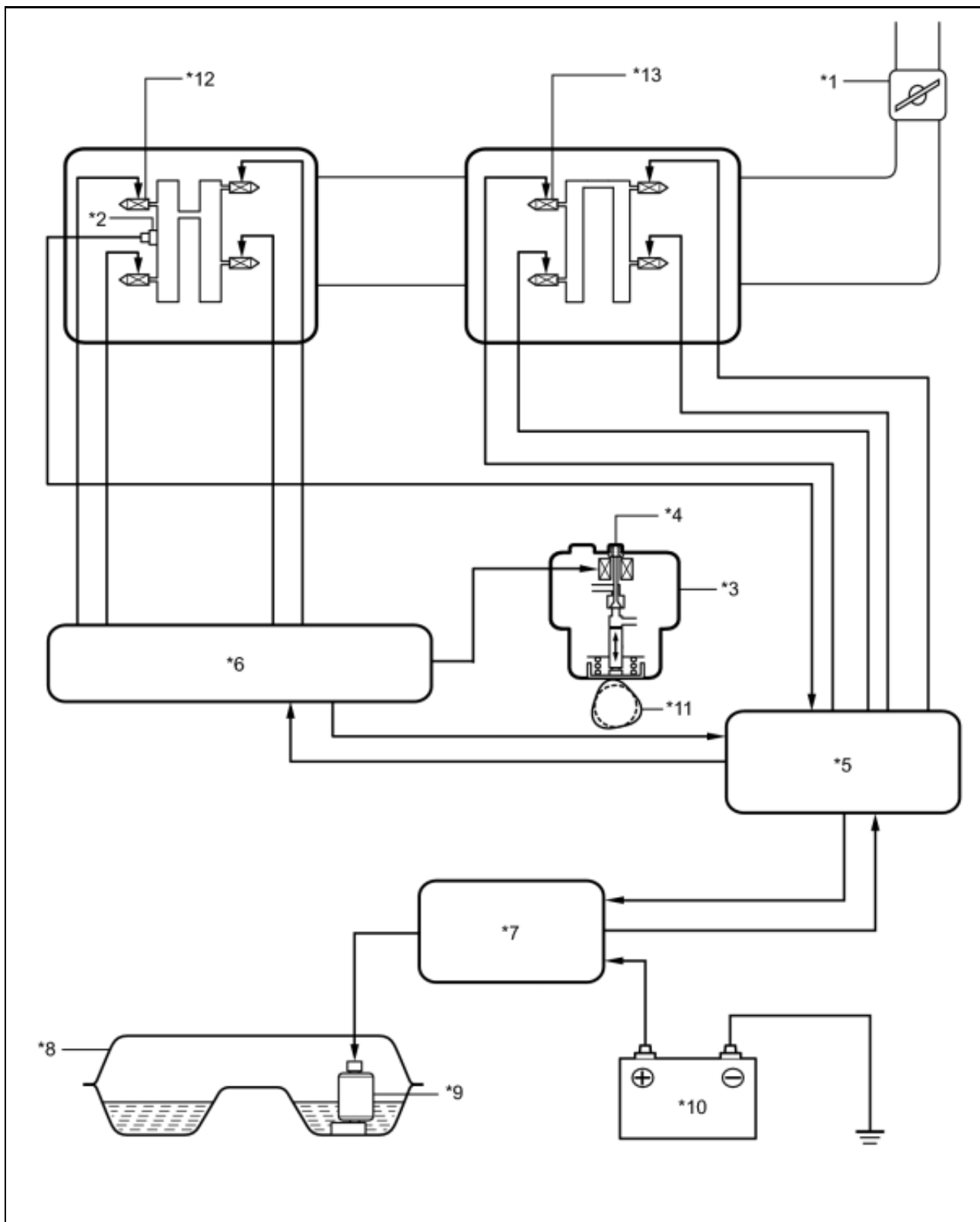
	Fuel Pump Assembly (for High Pressure)		
*9	Fuel Tank Assembly	*10	Jet Pump
*11	Fuel Pressure Regulator	*12	Fuel Suction Tube Assembly with Pump and Gauge
*13	Fuel Sender Gauge Assembly	*14	Fuel Pump Assembly
*15	Fuel Filter	*16	Fuel Tank Return Tube
*17	No. 2 Fuel Sender Gauge Assembly	-	-
*a	to Fuel Injector Assembly (for Port Injection)	*b	High Pressure Fuel Line
*c	Low Pressure Fuel Line	-	-



Text in Illustration

*A	Port Injection Side	-	-
*1	Throttle with Motor Body Assembly	*2	Fuel Injector Assembly (for Port Injection)
*3	Fuel Pressure Pulsation Damper	*4	Fuel Delivery Pipe
*5	Fuel Tank Assembly	*6	Jet Pump
*7	Fuel Tank Return Tube	*8	No. 2 Fuel Sender Gauge Assembly
*9	Fuel Suction Tube Assembly with Pump and Gauge	*10	Fuel Pressure Regulator
*11	Fuel Sender Gauge Assembly	*12	Fuel Pump Assembly
*13	Fuel Filter	-	-
*a	to Fuel Injector Assembly (for Direct Injection)	*b	Low Pressure Fuel Line

2. ELECTRICAL CONTROL DIAGRAM

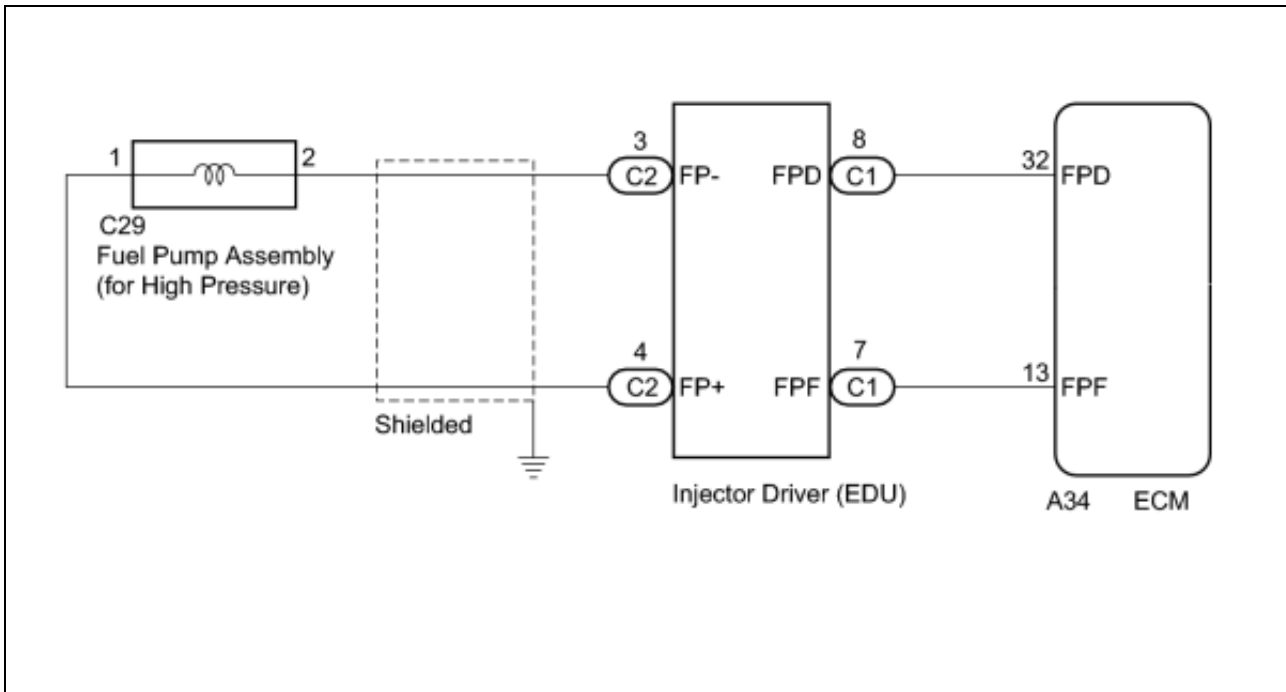


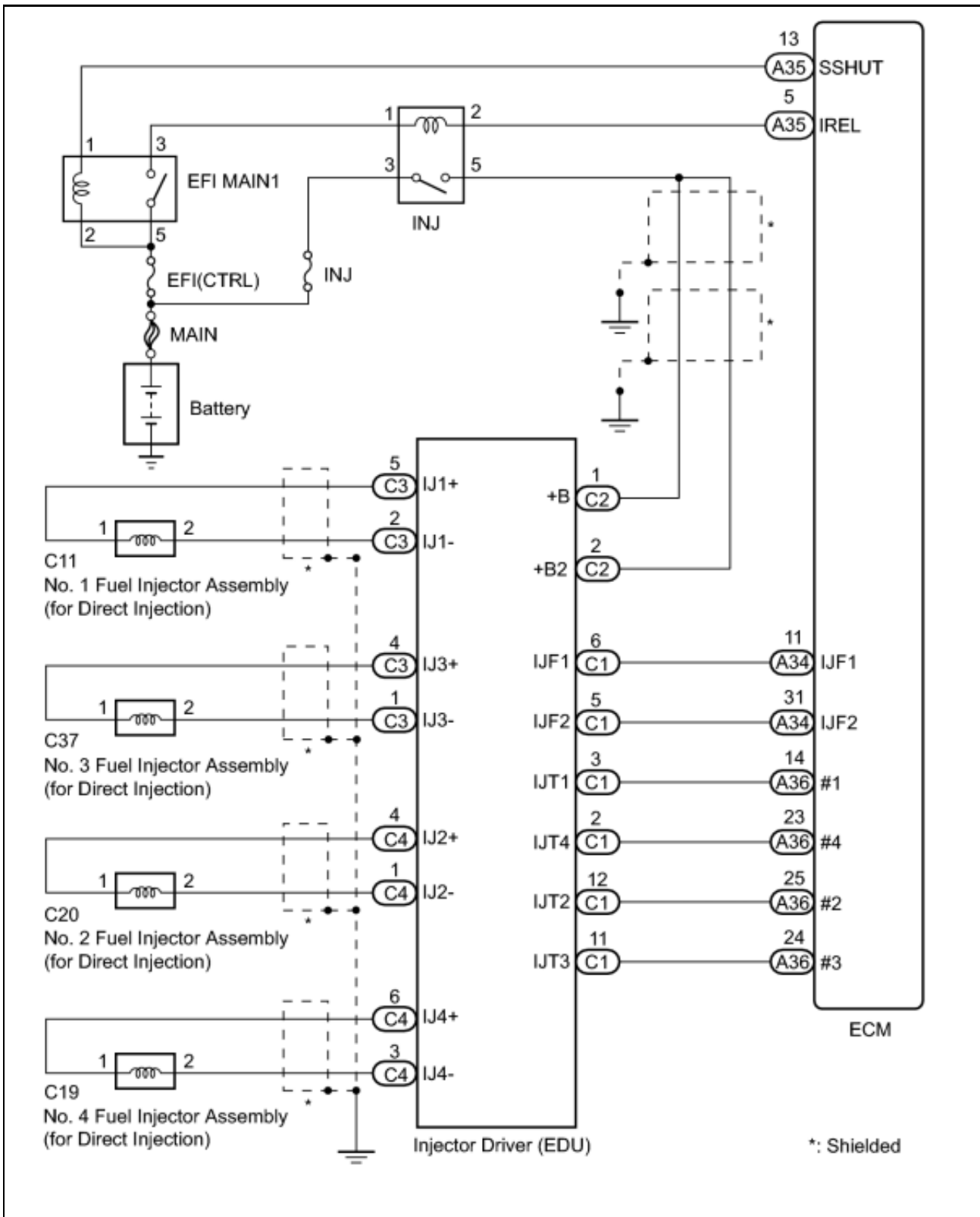
Text in Illustration

*1	Throttle with Motor Body Assembly	*2	Fuel Pressure Sensor
*3	Fuel Pump Assembly (for High Pressure)	*4	Solenoid Spill Valve
*5	ECM	*6	Injector Driver
*7	Fuel Pump Control ECU Assembly	*8	Fuel Tank Assembly

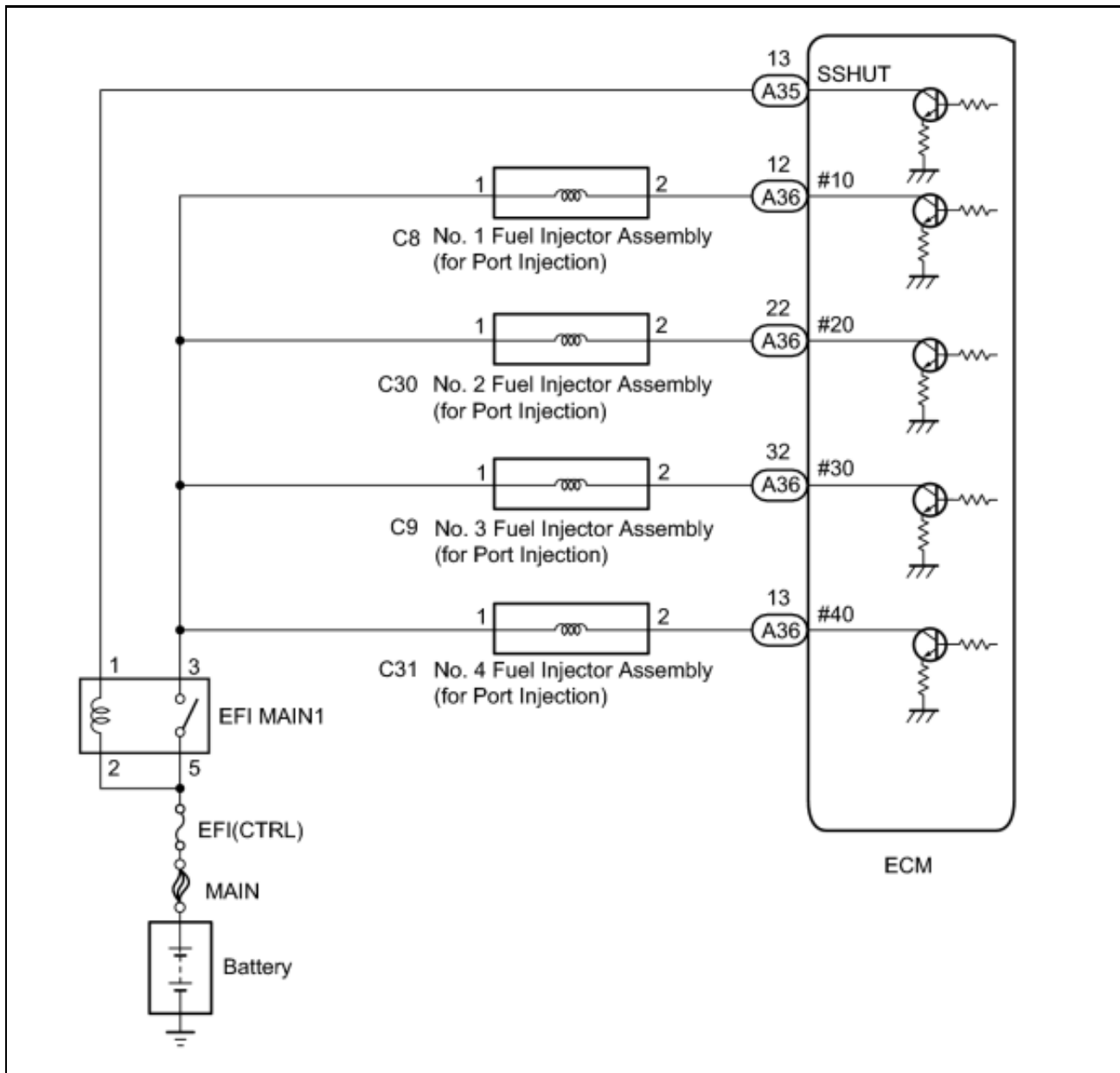
*9	Fuel Pump Assembly	*10	Battery
*11	Camshaft	*12	Fuel Injector Assembly (for Direct Injection)
*13	Fuel Injector Assembly (for Port Injection)	-	-

3. HIGH PRESSURE SIDE FUEL SYSTEM WIRING DIAGRAM





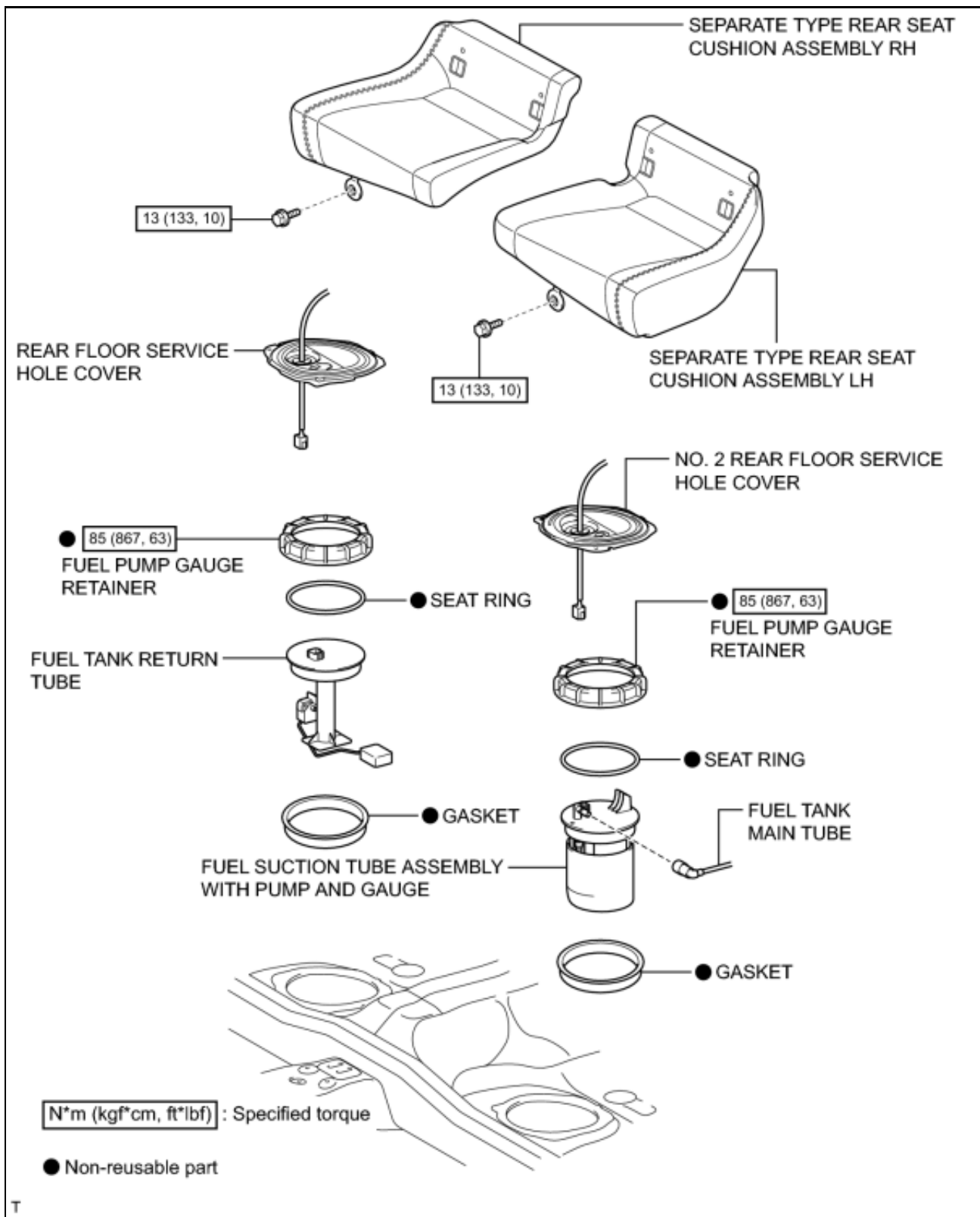
4. LOW PRESSURE SIDE FUEL SYSTEM WIRING DIAGRAM



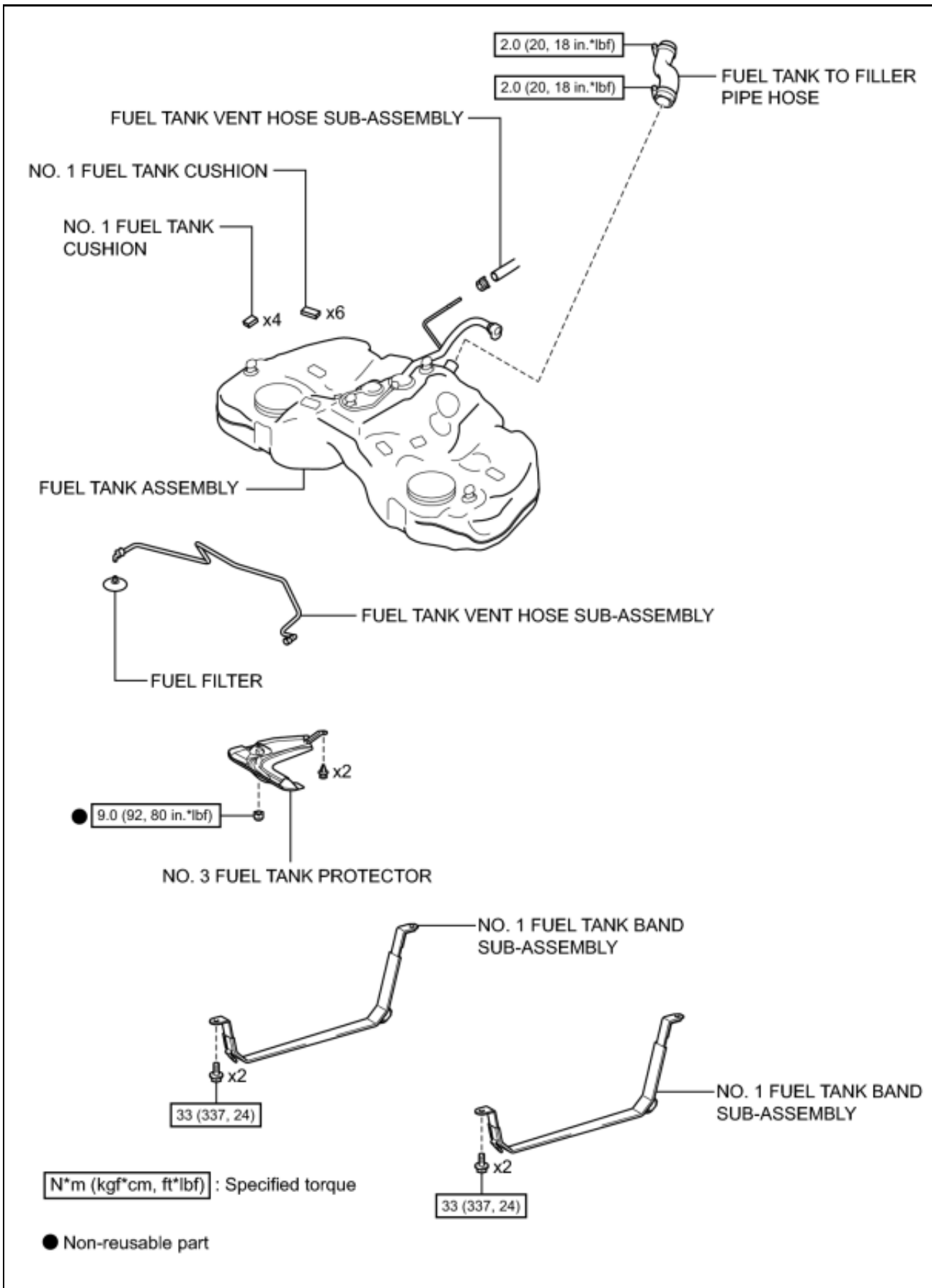
Last Modified: 4-14-2014	6.6 K	Doc ID: RM000000QDY03WX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL TANK: COMPONENTS; 2013 MY FR-S [03/2012 -]		

[COMPONENTS](#)

[ILLUSTRATION](#)



ILLUSTRATION



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000QDX057X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL TANK: INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL NO. 1 FUEL TANK CUSHION

- (a) Install 10 new No. 1 fuel tank cushions to the fuel tank assembly.

2. INSTALL NO. 2 FUEL TANK MAIN TUBE SUB-ASSEMBLY

- (a) Install the fuel filter to the No. 2 fuel tank main tube sub-assembly.
 (b) Install the No. 2 fuel tank main tube sub-assembly to the fuel tank assembly.

3. INSTALL FUEL TANK TO FILLER PIPE HOSE

- (a) Install the fuel tank to filler pipe hose to the fuel tank assembly with the clamp.
 (b) Tighten the hose clamp bolt.

Torque:

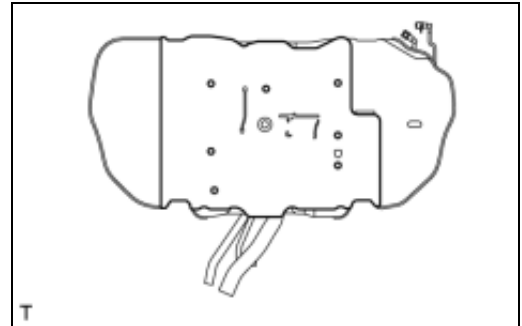
2.0 N·m {20 kgf·cm, 18in·lbf}

4. INSTALL FUEL TANK ASSEMBLY

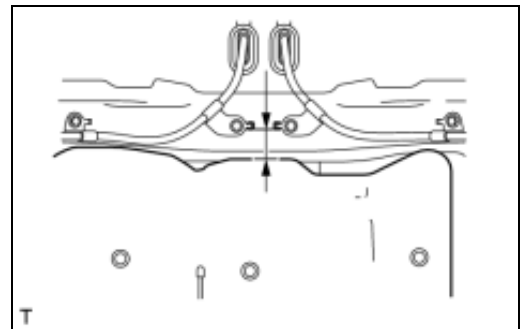
- (a) Inspect the fuel tank cover.

HINT:

The fuel tank cover is used as a base when attaching the fuel tank assembly, so inspect for any deformation, cracking, or other damage. If any faults are found, replace with a new one.



- (b) Hold the fuel tank assembly with an engine lifter.
 (c) Temporarily install the fuel tank assembly to the body with the 2 No. 1 fuel tank bands and 4 bolts.



- (d) Adjust the position of the fuel tank assembly to achieve the required separation between the front edge of the fuel tank cover and the holes used for fixing the parking brake cable bracket in place.

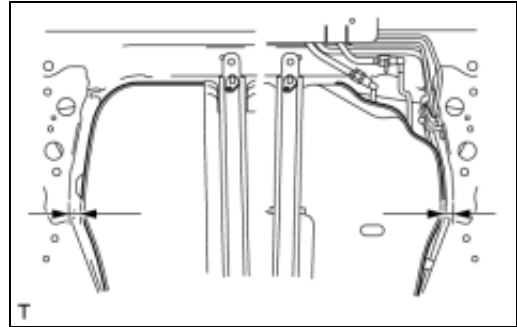
Standard:

42 to 44 mm (1.6535 to 1.7323 in.)

- (e) Adjust the position of the fuel tank assembly to achieve the required difference in clearance between the left and right sides of the fuel tank assembly and the body.

Standard:

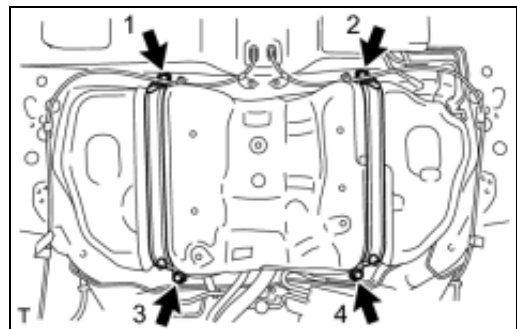
Below 2 mm (0.0787 in.)



- (f) Tighten the 4 bolts in the order shown in the illustration.

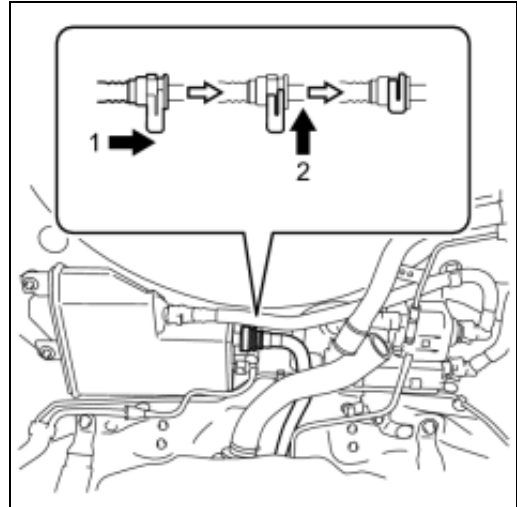
Torque:

33 N·m {337 kgf·cm, 24ft·lbf}



5. INSTALL CHARCOAL CANISTER ASSEMBLY

- (a) Connect the quick connector as indicated by the arrows in the order shown in the illustration.



6. CONNECT FUEL TANK VENT HOSE SUB-ASSEMBLY

- (a) Engage the clamp to install the tube.
 (b) Connect the fuel tank vent hose sub-assembly with the clamp.

7. CONNECT FUEL TANK TO FILLER PIPE HOSE

- (a) Connect the fuel tank to filler pipe hose to the fuel tank filler pipe sub-assembly with the clamp.
 (b) Tighten the hose clamp bolt.

Torque:

2.5 N·m {25 kgf·cm, 22in·lbf}

8. REMOVE NO. 3 PARKING BRAKE CABLE ASSEMBLY INFO**9. REMOVE NO. 2 PARKING BRAKE CABLE ASSEMBLY** INFO**10. INSTALL NO. 3 FUEL TANK PROTECTOR**

(a) Install the No. 3 fuel tank protector with a new nut and 2 clips.

Torque:

9.0 N·m {92 kgf·cm, 80in·lbf}

11. INSTALL REAR SUSPENSION MEMBER SUB-ASSEMBLYINFO**12. INSTALL FUEL TANK RETURN TUBE** INFO**13. INSTALL FUEL SUCTION TUBE ASSEMBLY WITH PUMP AND GAUGE** INFO**14. ADD FUEL****15. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL** INFO**16. INSPECT FOR FUEL LEAK** INFO**17. INSTALL NO. 2 REAR FLOOR SERVICE HOLE COVER** INFO**18. INSTALL REAR FLOOR SERVICE HOLE COVER** INFO**19. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY LH** INFO**20. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY RH** INFO

Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000QDZ052X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: FUEL TANK: REMOVAL; 2013 MY FR-S [03/2012 -]		

REMOVAL

1. DISCHARGE FUEL SYSTEM PRESSURE

INFO

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

INFO

3. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY LH

INFO

4. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY RH

INFO

5. REMOVE NO. 2 REAR FLOOR SERVICE HOLE COVER

INFO

6. REMOVE REAR FLOOR SERVICE HOLE COVER

INFO

7. REMOVE FUEL SUCTION TUBE ASSEMBLY WITH PUMP AND GAUGE

INFO

8. REMOVE FUEL TANK RETURN TUBE

INFO

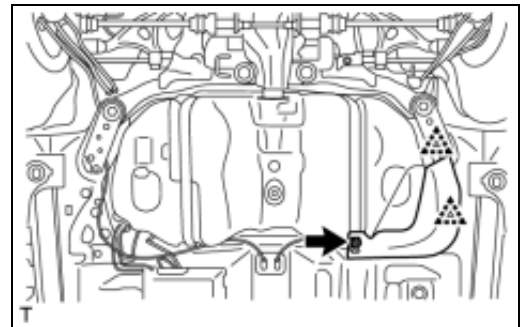
9. DRAIN FUEL

10. REMOVE REAR SUSPENSION MEMBER SUB-ASSEMBLY

INFO

11. REMOVE NO. 3 FUEL TANK PROTECTOR

(a) Remove the nut, 2 clips and No. 3 fuel tank protector.



12. REMOVE NO. 3 PARKING BRAKE CABLE ASSEMBLY

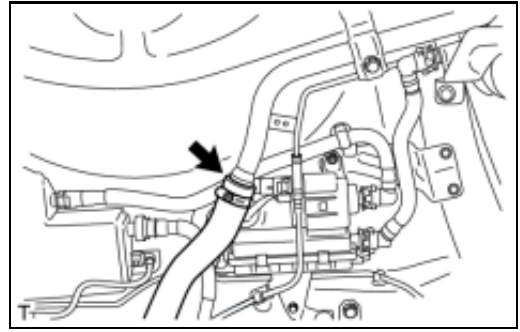
INFO

13. REMOVE NO. 2 PARKING BRAKE CABLE ASSEMBLY

INFO

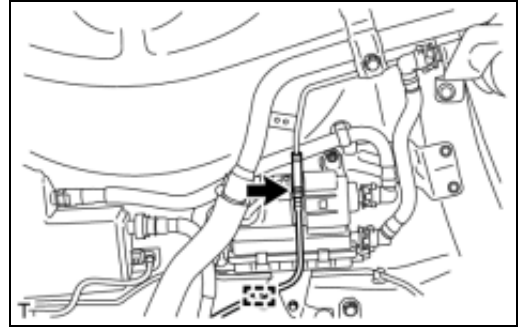
14. DISCONNECT FUEL TANK TO FILLER PIPE HOSE

- (a) Loosen the hose clamp bolt and disconnect the fuel tank to filler pipe hose.



15. DISCONNECT FUEL TANK VENT HOSE SUB-ASSEMBLY

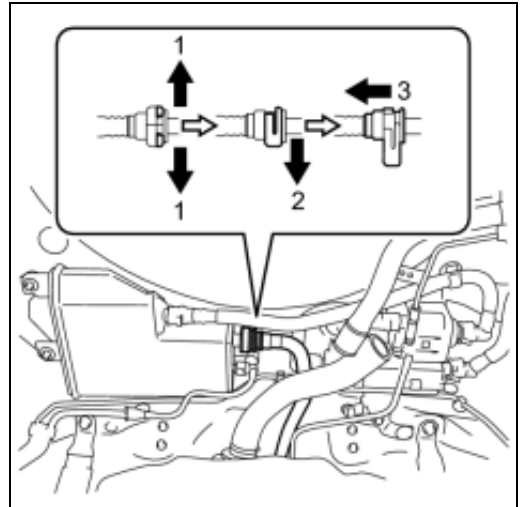
- (a) Remove the clamp and disconnect the fuel tank vent hose sub-assembly.



- (b) Disengage the clamp and separate the tube.

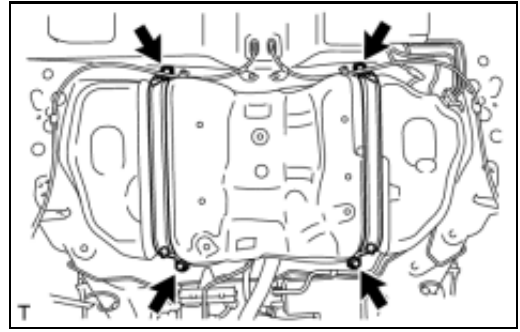
16. SEPARATE CHARCOAL CANISTER ASSEMBLY

- (a) Disconnect the quick connector as indicated by the arrows in the order shown in the illustration.



17. REMOVE FUEL TANK ASSEMBLY

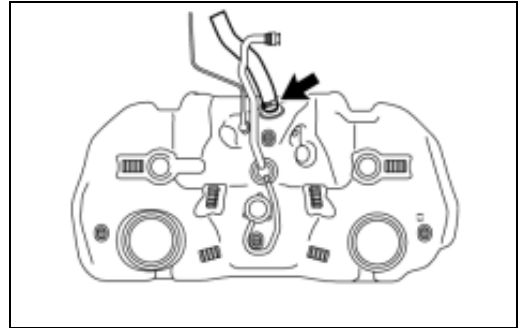
(a) Place an engine lifter under the fuel tank assembly.



(b) Remove the 4 bolts, 2 No. 1 fuel tank bands and fuel tank assembly.

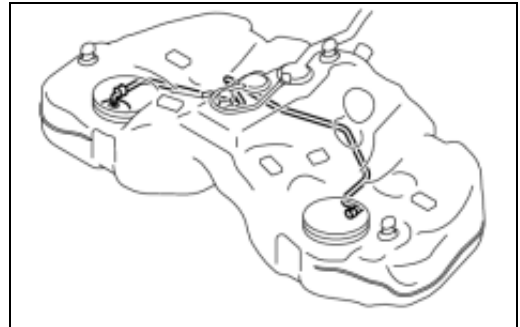
18. REMOVE FUEL TANK TO FILLER PIPE HOSE

(a) Loosen the hose clamp bolt and remove the fuel tank to filler pipe hose from the fuel tank.

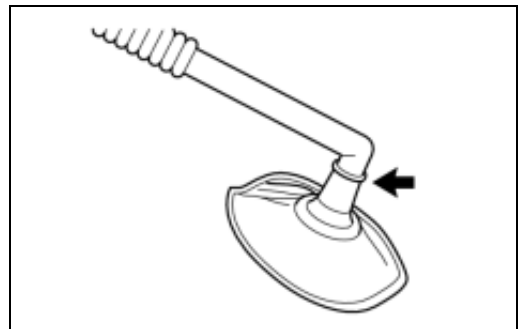


19. REMOVE NO. 2 FUEL TANK MAIN TUBE SUB-ASSEMBLY

(a) Remove the No. 2 fuel tank main tube sub-assembly from the fuel tank assembly.

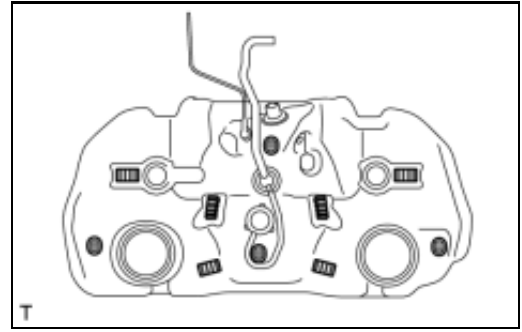


(b) Remove the fuel filter from the No. 2 fuel tank main tube sub-assembly.



20. REMOVE NO. 1 FUEL TANK CUSHION

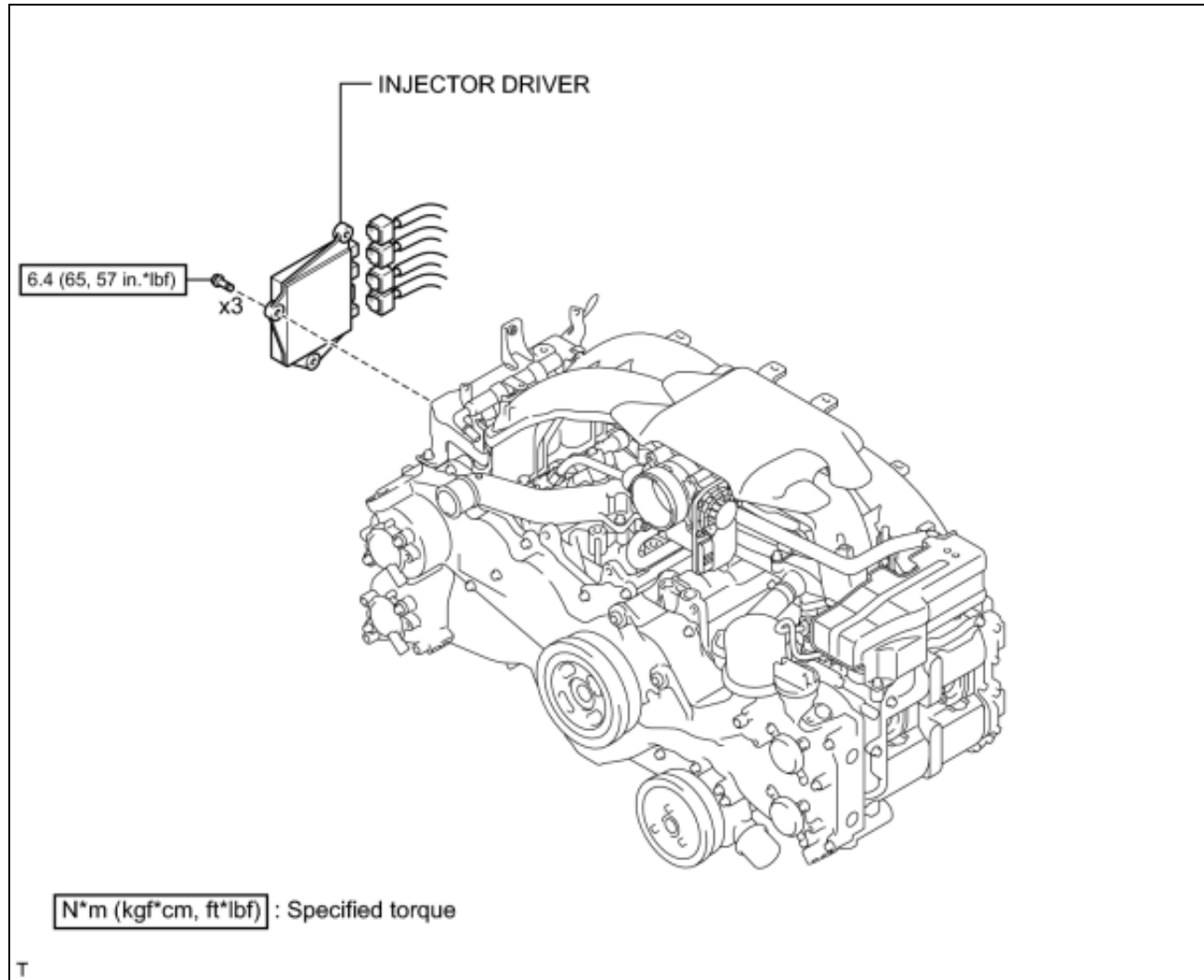
- (a) Remove the 10 No. 1 fuel tank cushions shown in the illustration.



Last Modified: 4-14-2014	6.6 K	Doc ID: RM000000VIO02JX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: INJECTOR DRIVER: COMPONENTS; 2013 MY FR-S [03/2012 -]		

COMPONENTS

ILLUSTRATION



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000VIN02UX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: INJECTOR DRIVER: INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL INJECTOR DRIVER

NOTICE:

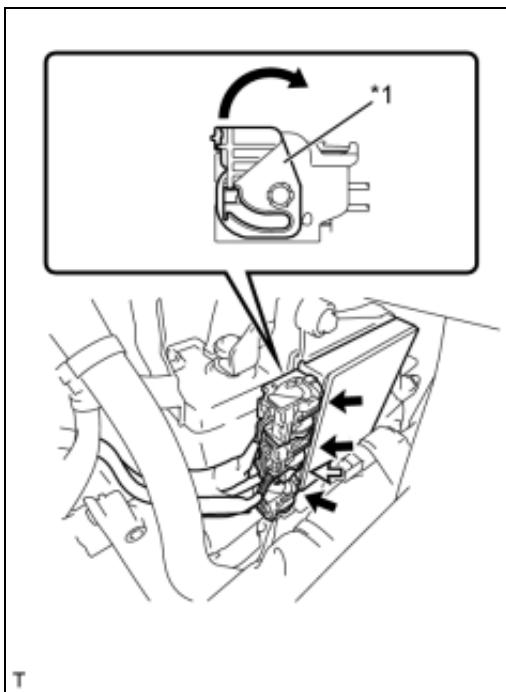
- Be careful not to drop or strike the injector driver.
- The injector driver is grounded at the bolt and the nut. To ensure that it is grounded, clean all oil and foreign matter from the installation areas of the injector driver and engine before installing the injector driver.

(a) Install the injector driver with the 3 bolts.

Torque:

6.4 N·m { 65 kgf·cm, 57in·lbf }

(b) Connect the 4 connectors to the injector driver. Move the lock levers in the direction indicated by the arrow to lock the 3 connectors.



Text in Illustration

*1	Lock Lever
	Lock with Connector
	Normal Connector

2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL INFO



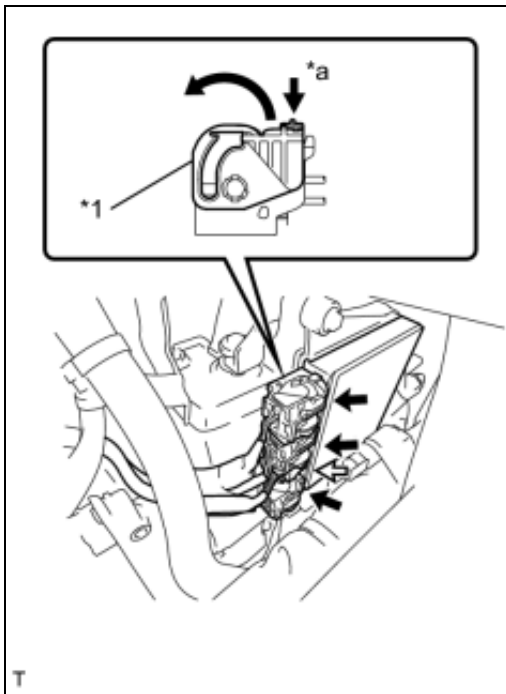
Last Modified: 4-14-2014	6.6 A	Doc ID: RM000000VIP02SX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 FUEL: INJECTOR DRIVER: REMOVAL; 2013 MY FR-S [03/2012 -]		

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

2. REMOVE INJECTOR DRIVER

- (a) Move the lock levers in the direction indicated by the arrow to release the 3 connector locks. Disconnect the 4 connectors from the injector driver.



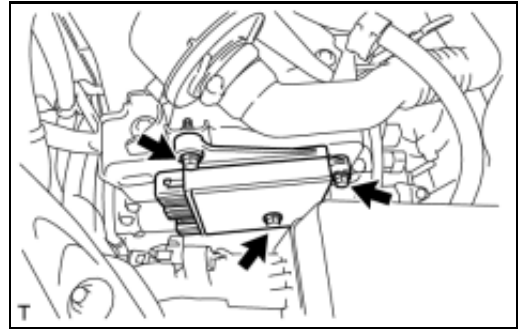
Text in Illustration

*1	Lock Lever
*a	Release
	Lock with Connector
	Normal Connector

- (b) Remove the 3 bolts and injector driver.

NOTICE:

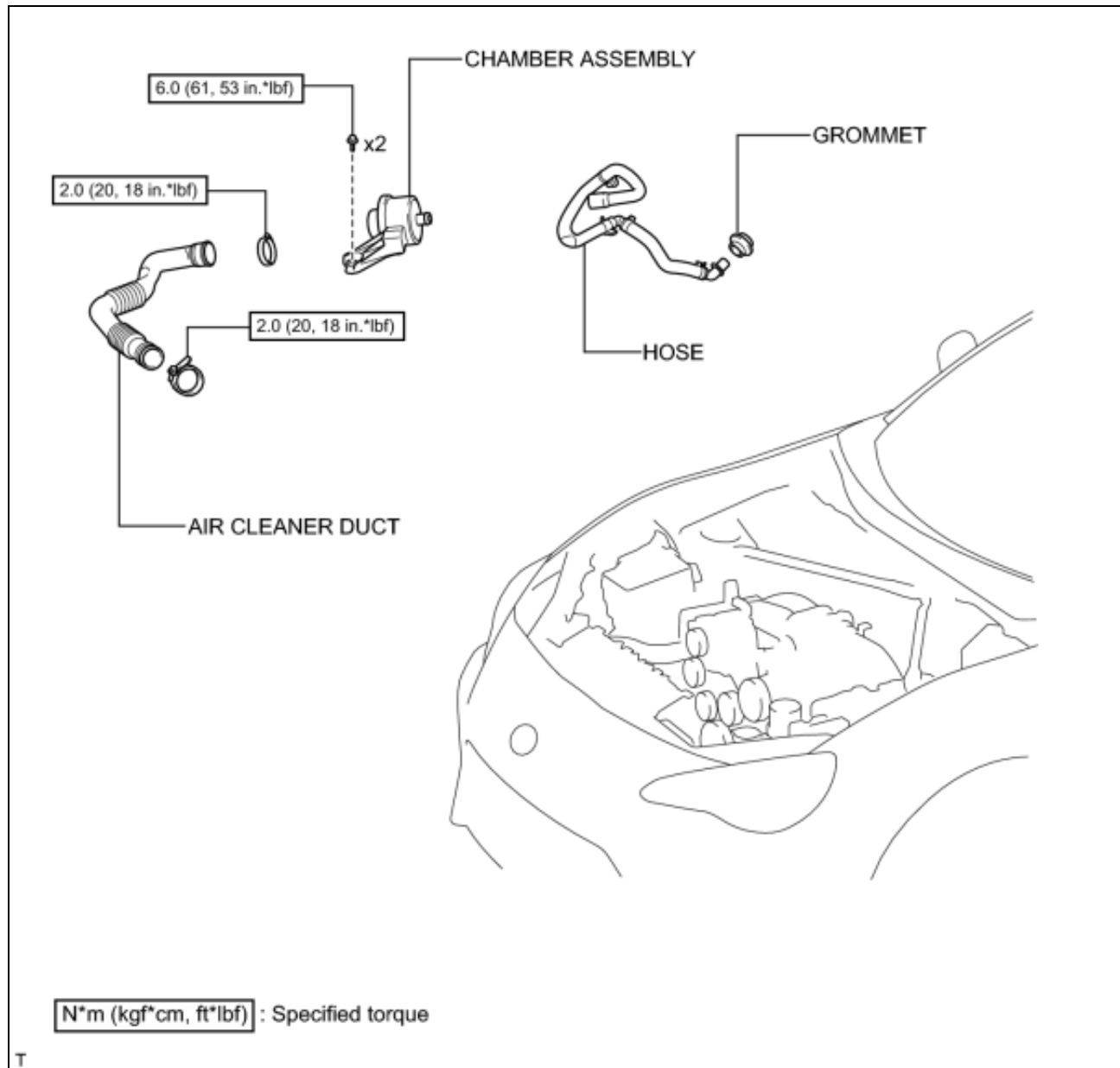
Be careful not to drop or strike the injector driver.



Last Modified: 4-14-2014	6.6 K	Doc ID: RM000003VQK009X
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 INTAKE / EXHAUST: CHAMBER: COMPONENTS; 2013 MY FR-S [03/2012 -]		

COMPONENTS

ILLUSTRATION



Last Modified: 4-14-2014	6.6 G	Doc ID: RM000001QE000JX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 INTAKE / EXHAUST: CHAMBER: INSPECTION; 2013 MY FR-S [03/2012 -]		

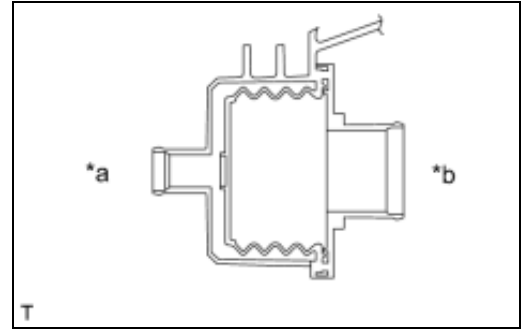
INSPECTION

1. INSPECT CHAMBER ASSEMBLY

(a) Check operation of the chamber assembly.

- (1) Blow air into exhaust side. Check that air does not come out of intake side.

*a	Exhaust Side
*b	Intake Side



Last Modified: 4-14-2014	6.6 A	Doc ID: RM000001QDX00RX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 INTAKE / EXHAUST: CHAMBER: INSTALLATION; 2013 MY FR-S [03/2012 -]		

INSTALLATION

1. INSTALL CHAMBER ASSEMBLY

(a) Install the air cleaner duct to the chamber assembly with a hose clamp.

Torque:

2.0 N·m {20 kgf·cm, 18in·lbf}

2. INSTALL AIR CLEANER DUCT

(a) Install the 2 bolts and the air cleaner duct with the chamber.

Torque:

6.0 N·m {61 kgf·cm, 53in·lbf}

(b) Install the air cleaner duct with a hose clamp.

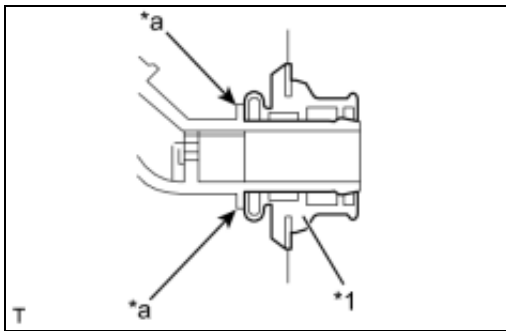
Torque:

2.0 N·m {20 kgf·cm, 18in·lbf}

3. INSTALL HOSE

(a) Engage the 2 clamps and install the hose.

(b) Insert the hose in until its flange contacts that of the grommet.

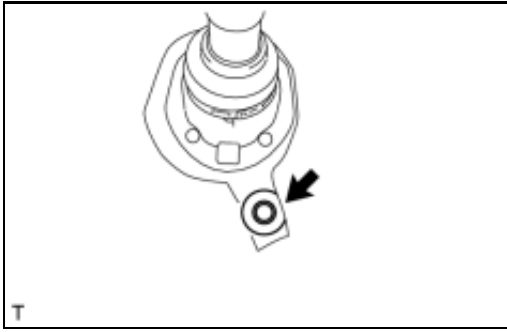


Text in Illustration

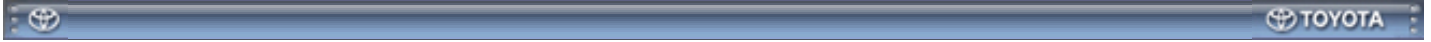
*1	Grommet
*a	Flange

NOTICE:

- Do not convolute the grommet when insert the hose to the grommet.
- Check the grommet from the vehicle interior side to verify that it is properly installed onto the body.



(c) Connect the hose.

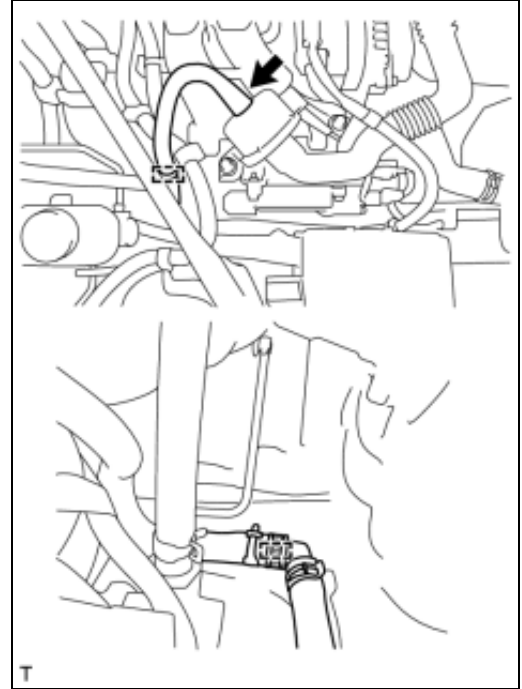


Last Modified: 4-14-2014	6.6 A	Doc ID: RM000001QDZ00SX
Model Year: 2013	Model: FR-S	Prod Date Range: [03/2012 -]
Title: FA20 INTAKE / EXHAUST: CHAMBER: REMOVAL; 2013 MY FR-S [03/2012 -]		

REMOVAL

1. REMOVE HOSE

(a) Disconnect the hose.

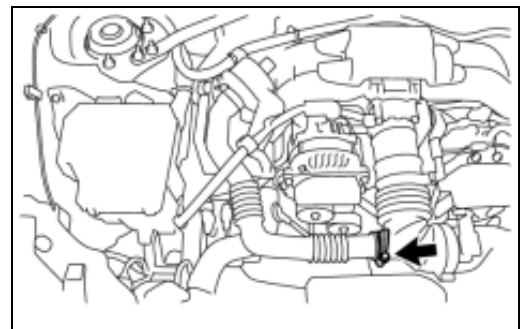


(b) Disengage the 2 clamps.

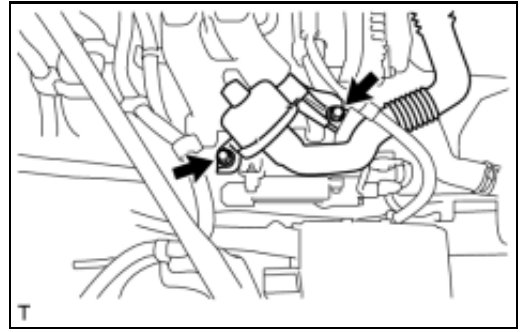
(c) Remove the grommet and the hose.

2. REMOVE AIR CLEANER DUCT

(a) Loosen the hose clamp.

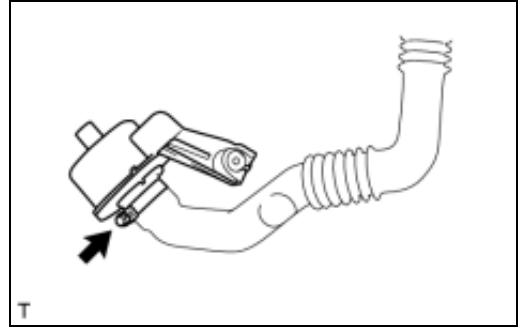


- (b) Remove the 2 bolts and the air cleaner duct with the chamber assembly.



3. REMOVE CHAMBER ASSEMBLY

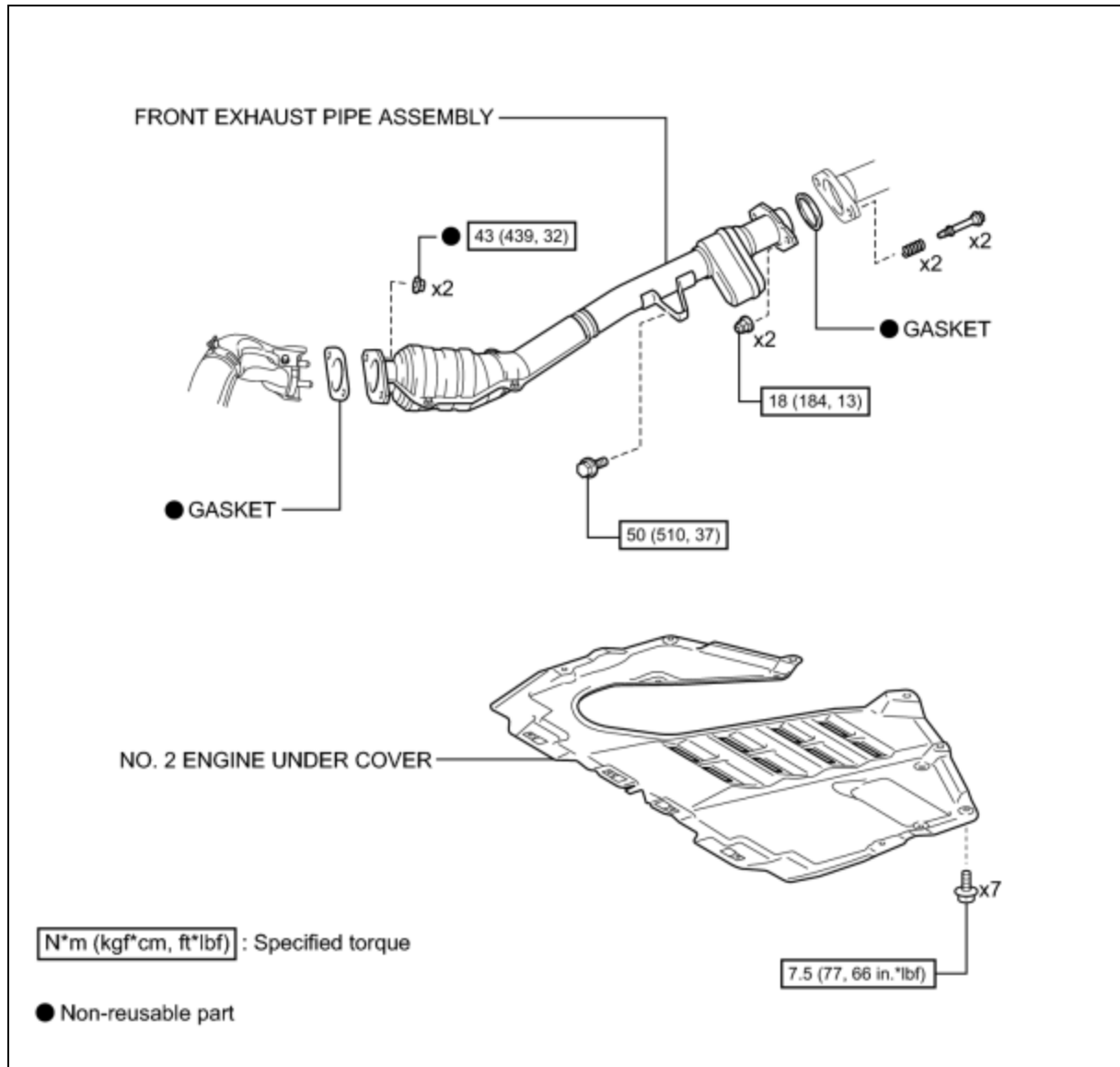
- (a) Loosen the hose clamp and remove the chamber assembly.



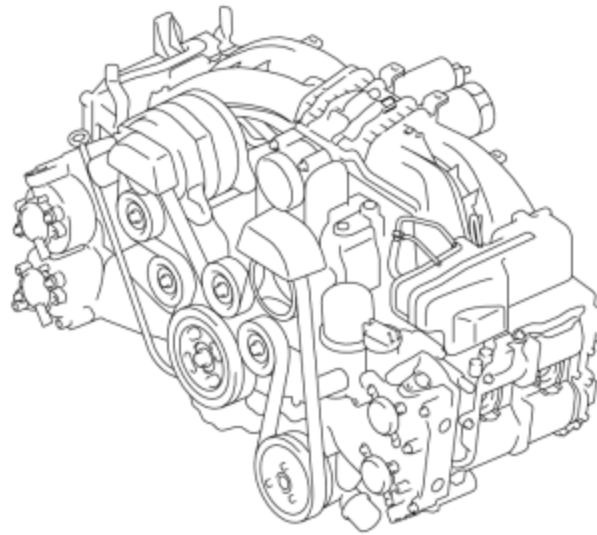
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000497C007X
Title: FA20 INTAKE / EXHAUST: EXHAUST MANIFOLD: COMPONENTS (2013 FR-S)		

COMPONENTS

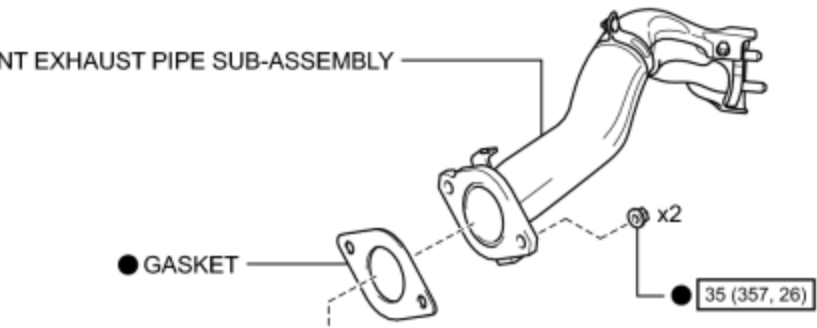
ILLUSTRATION



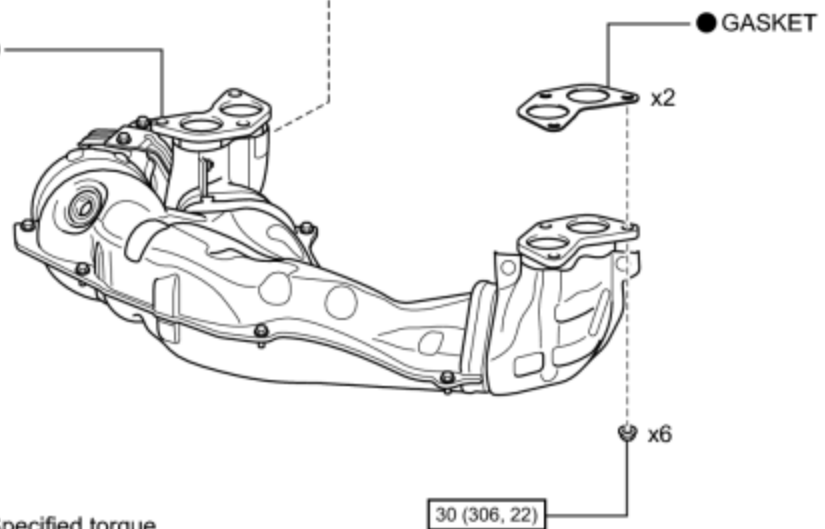
ILLUSTRATION



FRONT EXHAUST PIPE SUB-ASSEMBLY



EXHAUST MANIFOLD



N*m (kgf*cm, ft*lb) : Specified torque

● Non-reusable part



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000497B007X
Title: FA20 INTAKE / EXHAUST: EXHAUST MANIFOLD: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL EXHAUST MANIFOLD

- (a) Install 2 new gaskets.
- (b) Install the exhaust manifold with the 6 new nuts.

Torque: 30 N·m (306 kgf·cm, 22ft·lbf)

NOTICE:

Do not reuse the nuts.

- (c) Install new gasket to the exhaust manifold.
- (d) Install 2 new nuts and the front exhaust pipe sub-assembly.

Torque: 35 N·m (357 kgf·cm, 26ft·lbf)

2. INSTALL FRONT EXHAUST PIPE ASSEMBLY INFO

3. INSTALL NO. 2 ENGINE UNDER COVER INFO

4. INSTALL HEATED OXYGEN SENSOR

INFO

5. INSTALL AIR FUEL RATIO SENSOR

INFO

6. INSPECT FOR EXHAUST GAS LEAK INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000497D007X
Title: FA20 INTAKE / EXHAUST: EXHAUST MANIFOLD: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE AIR FUEL RATIO SENSOR

INFO

2. REMOVE HEATED OXYGEN SENSOR

INFO

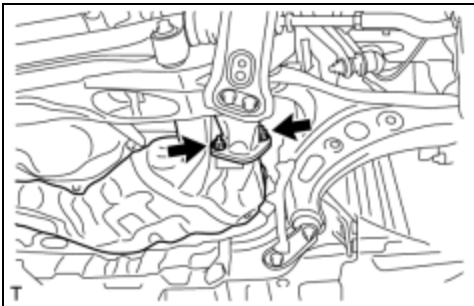
3. REMOVE NO. 2 ENGINE UNDER COVER

INFO

4. REMOVE FRONT EXHAUST PIPE ASSEMBLY

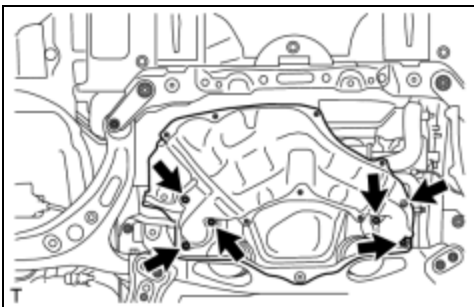
INFO

5. REMOVE EXHAUST MANIFOLD



(a) Remove the 2 nuts and disconnect the front exhaust pipe sub-assembly.

(b) Remove the gasket.



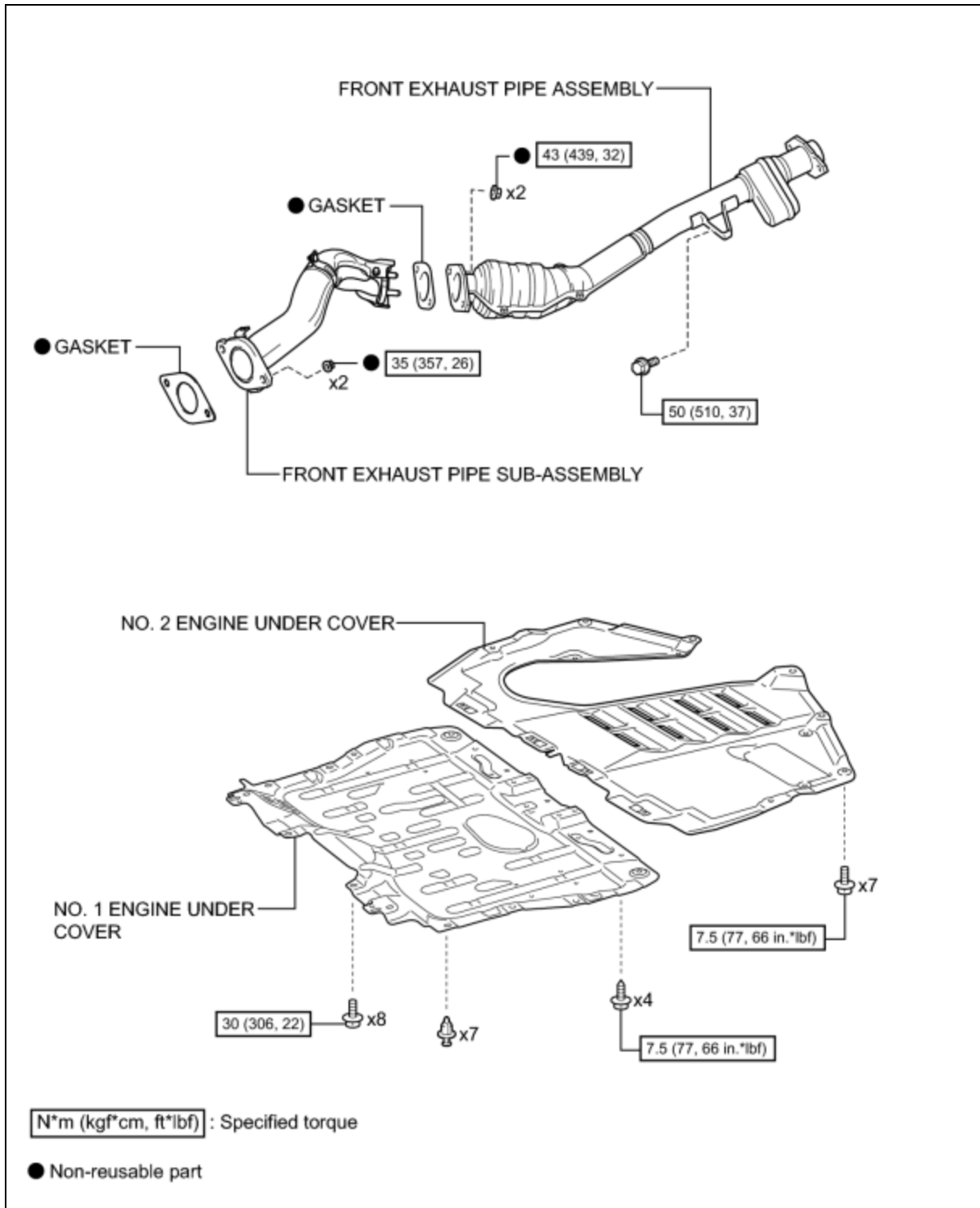
(c) Remove the 6 nuts and the exhaust manifold.

(d) Remove the 2 gaskets.

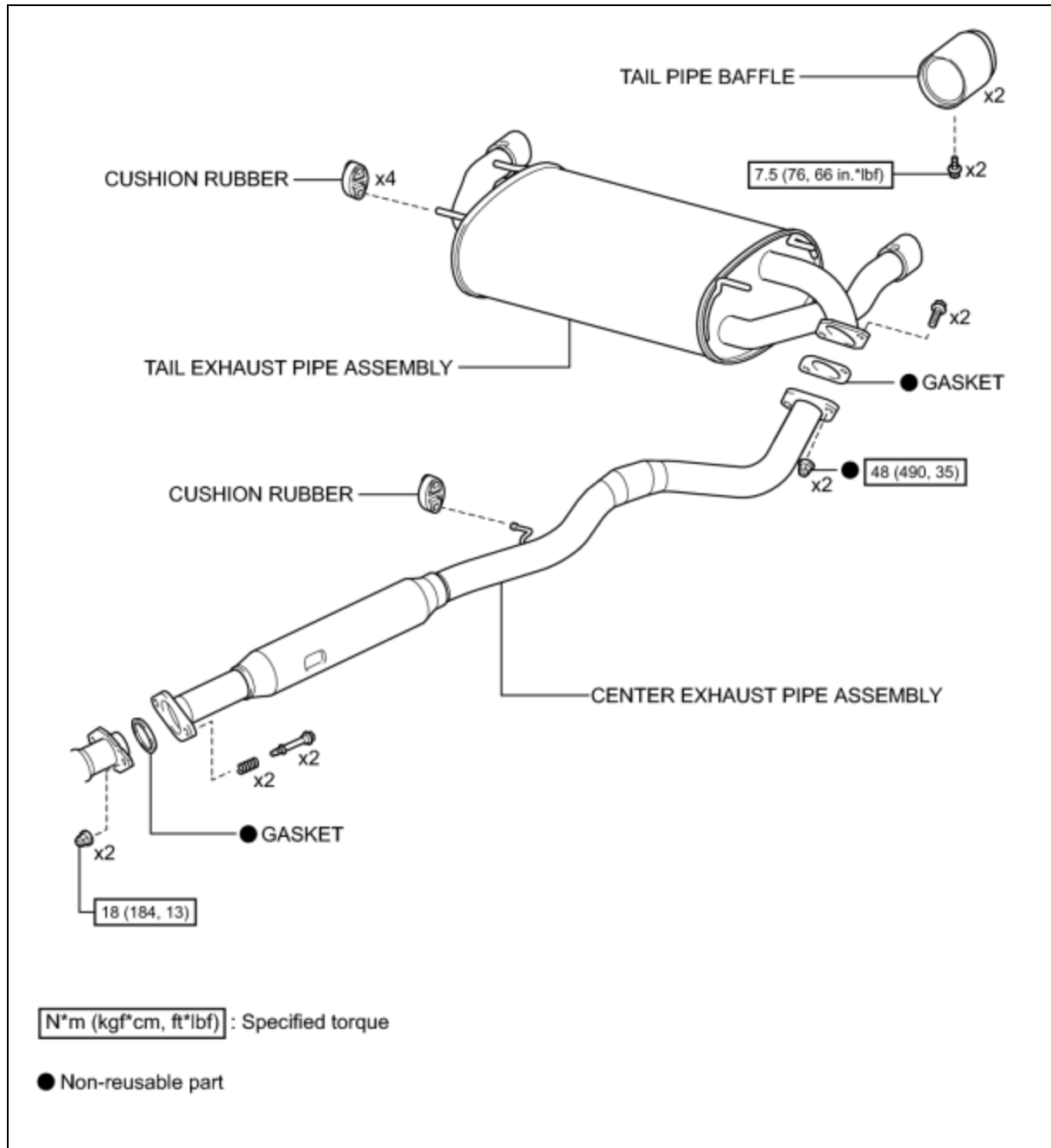
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000QD104LX
Title: FA20 INTAKE / EXHAUST: EXHAUST PIPE: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000QD005KX
Title: FA20 INTAKE / EXHAUST: EXHAUST PIPE: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL FRONT EXHAUST PIPE SUB-ASSEMBLY

- (a) Rope up the front exhaust pipe sub-assembly to the front suspension crossmember.

HINT:

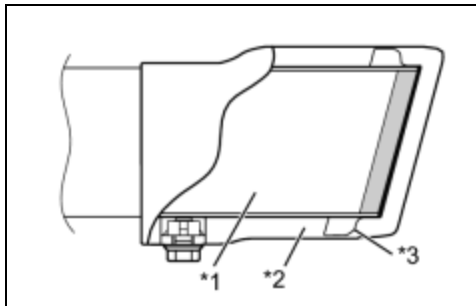
This operation is necessary in order to prevent the front exhaust pipe sub-assembly from falling off.

- (b) Remove the SST. 


SST: 09250-53010

2. INSTALL TAIL PIPE BAFFLE

- (a) Press in the tail pipe baffle until the tail exhaust pipe assembly plate contact shown in the illustration.



Text in Illustration

*1	Tail Exhaust Pipe Assembly
*2	Tail Pipe Baffle
*2	Plate
	Contact area

- (b) Install the 2 bolts and the 2 tail pipe baffles.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

3. INSTALL TAIL EXHAUST PIPE ASSEMBLY

- (a) Install the 4 cushion rubbers and the tail exhaust pipe assembly.

4. INSTALL CENTER EXHAUST PIPE ASSEMBLY

- (a) Install the center exhaust pipe assembly with the cushion rubber.
(b) Install the 2 new gaskets and the center exhaust pipe assembly with the 2 new nuts and the 2

bolts.

Torque: 48 N·m (490 kgf·cm, 35ft·lbf)

NOTICE:

- Do not reuse the gaskets.
- Do not reuse the nuts.

5. INSTALL FRONT EXHAUST PIPE ASSEMBLY

- (a) Temporarily install the front exhaust pipe assembly to the bracket with the bolt.
- (b) Install the new gaskets and the front exhaust pipe assembly to the center exhaust pipe assembly with the 2 nuts.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

NOTICE:

- Do not reuse the gaskets.
- Do not reuse the nuts.

- (c) Install the new gaskets and the front exhaust pipe assembly to the front exhaust pipe sub-assembly with the 2 new nuts.

Torque: 43 N·m (439 kgf·cm, 32ft·lbf)

NOTICE:

- Do not reuse the gaskets.
- Do not reuse the nuts.

- (d) Fully tighten the bolt.

Torque: 50 N·m (510 kgf·cm, 37ft·lbf)

6. INSPECT FOR EXHAUST GAS LEAK

- (a) If gas is leaking, tighten the areas necessary to stop the leak. Replace the damaged parts as necessary.

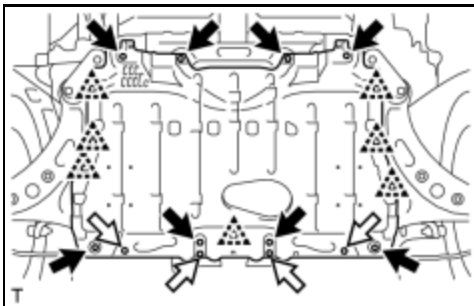
7. INSTALL NO. 2 ENGINE UNDER COVER

- (a) Install the 7 bolts and the No. 2 engine under cover.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

8. INSTALL NO. 1 ENGINE UNDER COVER

- (a) Install the No. 1 engine under cover with the 12 bolts and engage the 7 clips.



	Bolt A
---	--------



Bolt B

Bolt A - Torque: 30 N·m (306 kgf·cm, 22ft·lbf)

Bolt B - Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

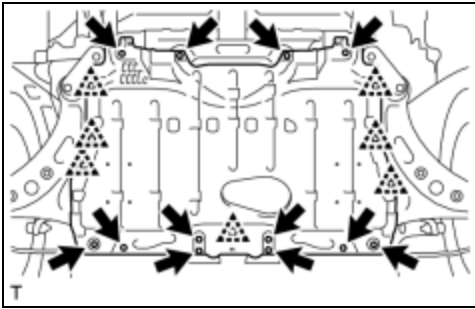


TOYOTA

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000QD205FX
Title: FA20 INTAKE / EXHAUST: EXHAUST PIPE: REMOVAL (2013 FR-S)		

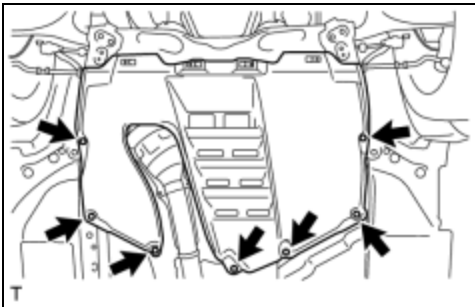
REMOVAL

1. REMOVE NO. 1 ENGINE UNDER COVER



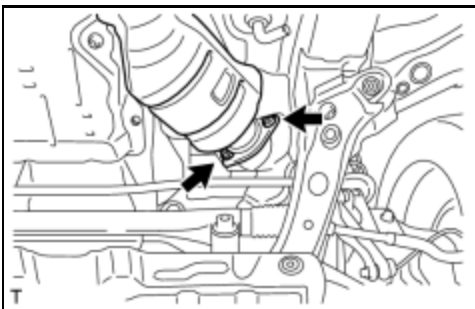
(a) Disengage the 7 clips and remove the 12 bolts and No. 1 engine under cover.

2. REMOVE NO. 2 ENGINE UNDER COVER

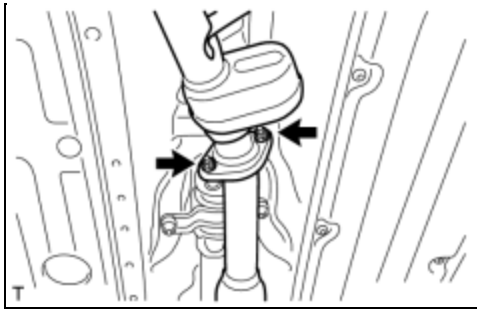


(a) Remove the 7 bolts and the No. 2 engine under cover.

3. REMOVE FRONT EXHAUST PIPE ASSEMBLY

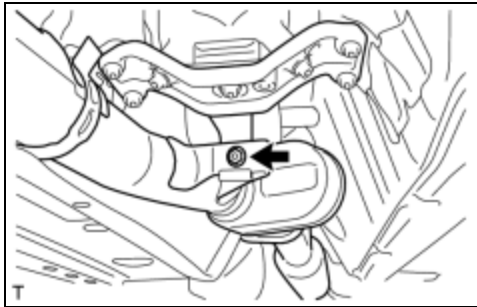


(a) Remove the 2 nuts and disconnect the exhaust joint pipe.



(b) Remove the 2 nuts and the 2 bolts.

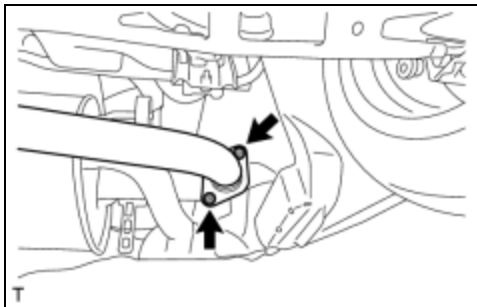
(c) Remove the 2 compression springs and disconnect the center exhaust pipe assembly.



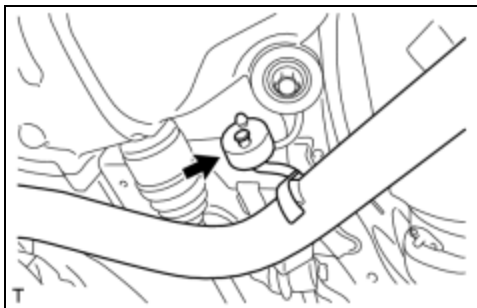
(d) Remove the bolt and the front exhaust pipe assembly.

(e) Remove the 2 gaskets.

4. REMOVE CENTER EXHAUST PIPE ASSEMBLY



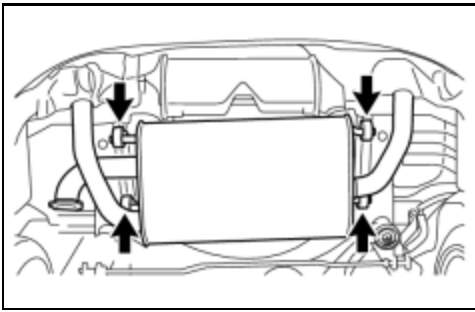
(a) Remove the 2 nuts and 2 bolts, and disconnect the tail exhaust pipe assembly.



(b) Remove the cushion rubber and the center exhaust pipe assembly.

(c) Remove the gasket.

5. REMOVE TAIL EXHAUST PIPE ASSEMBLY

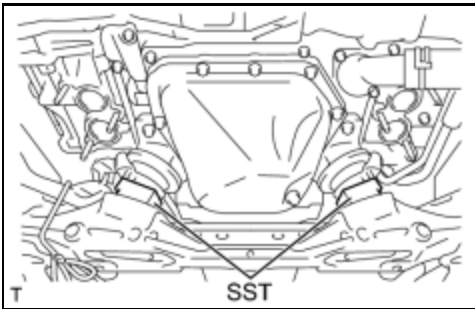


- (a) Remove the 4 cushion rubbers and the tail exhaust pipe assembly.

6. REMOVE TAIL PIPE BAFFLE

- (a) Remove the 2 bolts and the 2 tail pipe baffles.

7. REMOVE FRONT EXHAUST PIPE SUB-ASSEMBLY



- (a) Set the SST. [INFO](#)

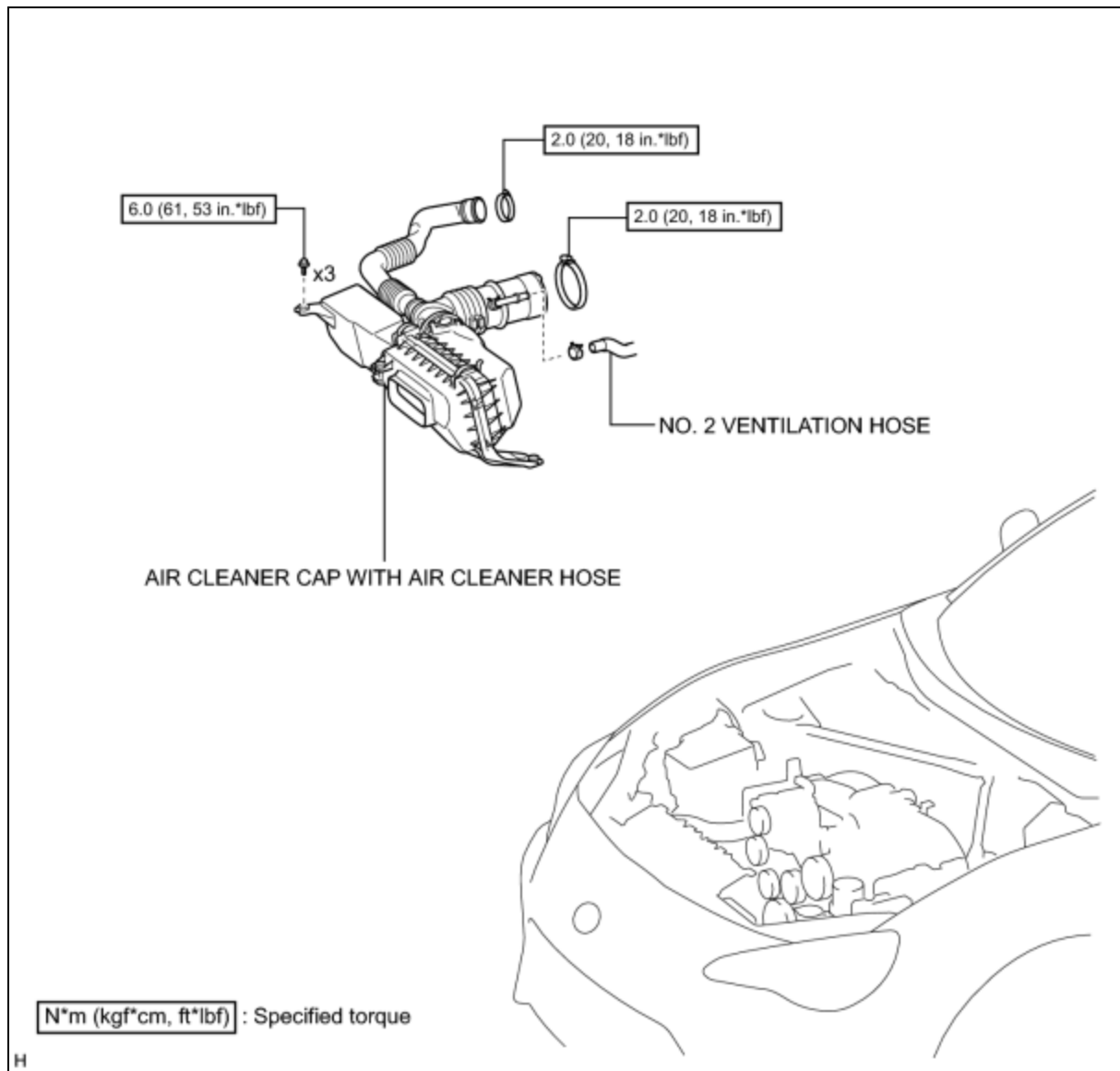
SST: 09250-53010

- (b) Remove the rope that is tying the joint pipe to the front suspension cross member sub-assembly.
(c) Remove the exhaust joint pipe.

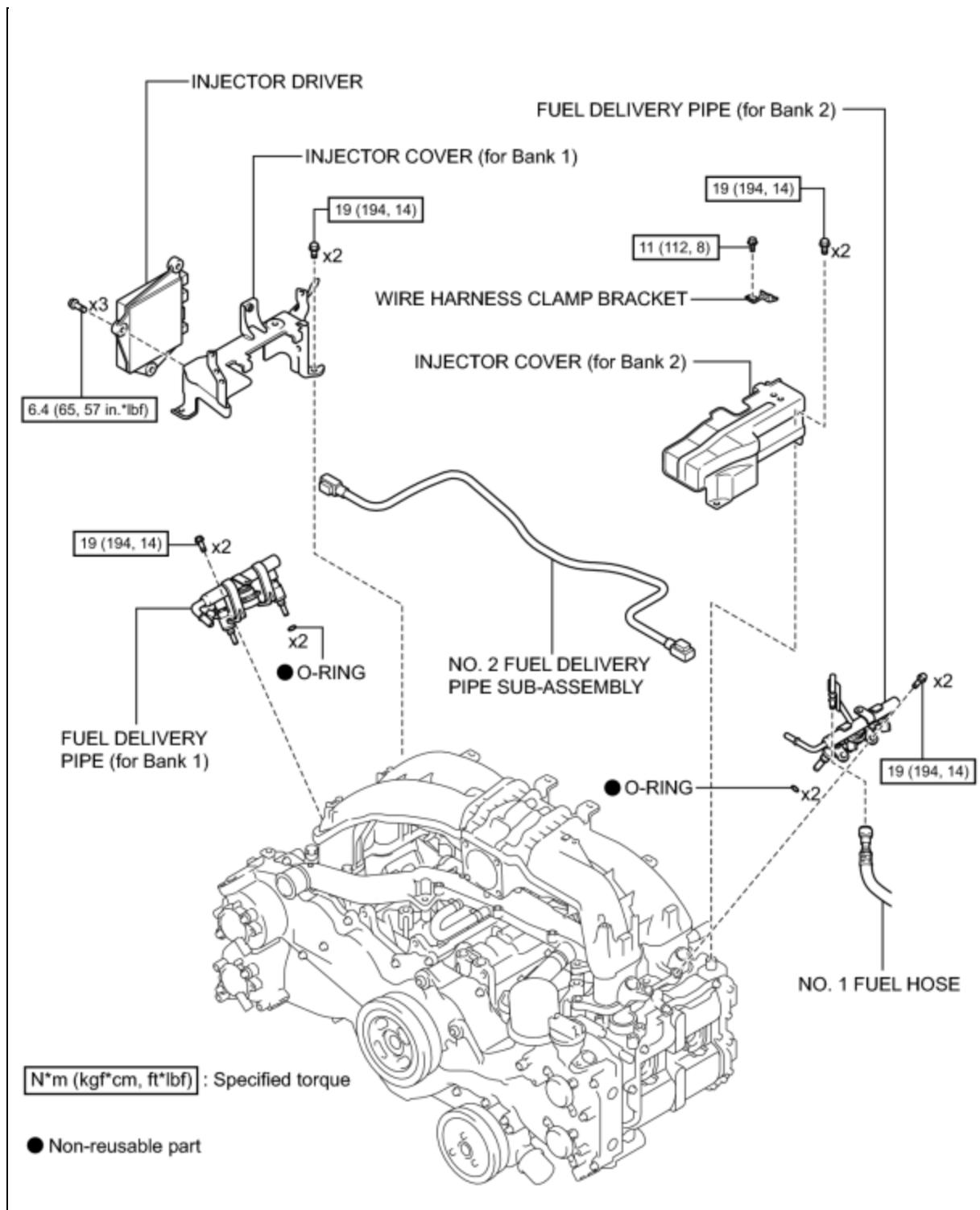
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000Q0T024X
Title: FA20 INTAKE / EXHAUST: INTAKE MANIFOLD: COMPONENTS (2013 FR-S)		

COMPONENTS

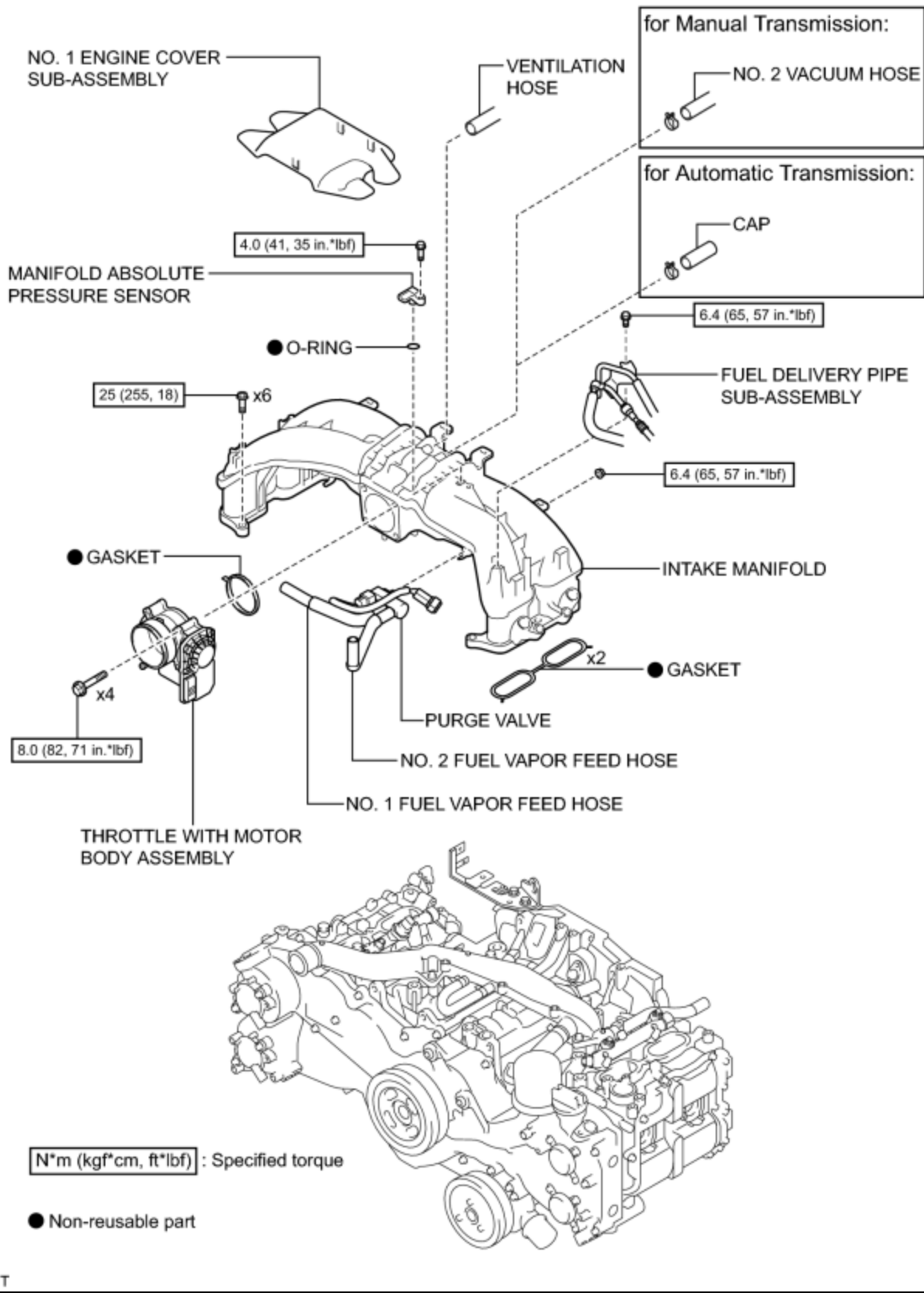
ILLUSTRATION



ILLUSTRATION



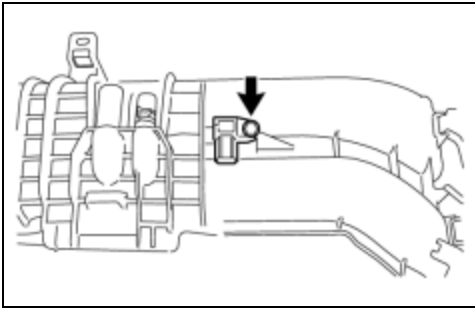
ILLUSTRATION



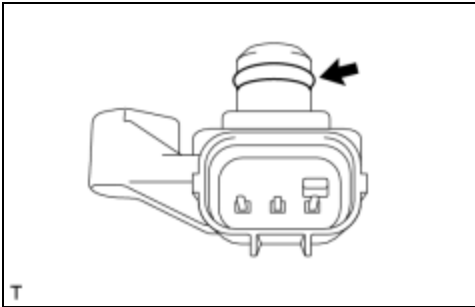
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MU900WX
Title: FA20 INTAKE / EXHAUST: INTAKE MANIFOLD: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. REMOVE MANIFOLD ABSOLUTE PRESSURE SENSOR

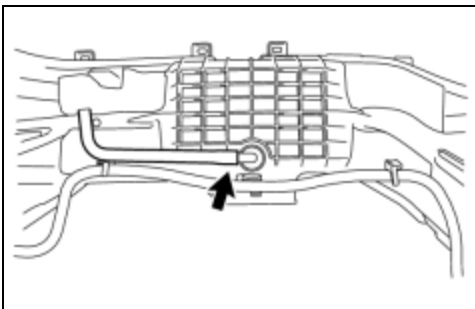


- (a) Remove the bolt and manifold absolute pressure sensor from the intake manifold.

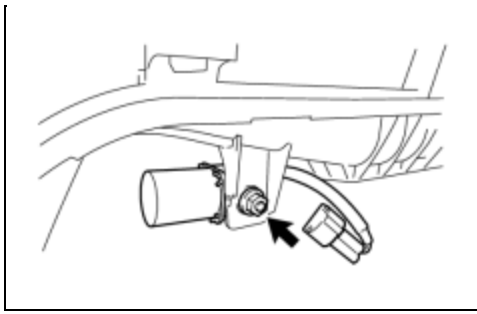


- (b) Remove the O-ring from the manifold absolute pressure sensor.

2. REMOVE PURGE VALVE

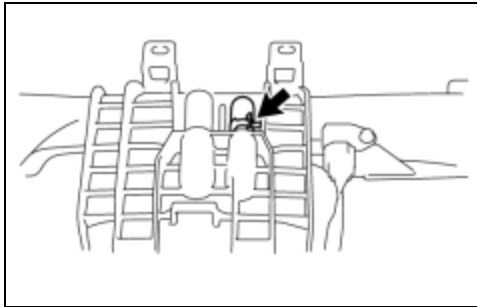


- (a) Disconnect the No. 1 fuel vapor feed hose from the intake manifold.



(b) Remove the nut and purge valve.

3. REMOVE CAP (for Automatic Transmission)



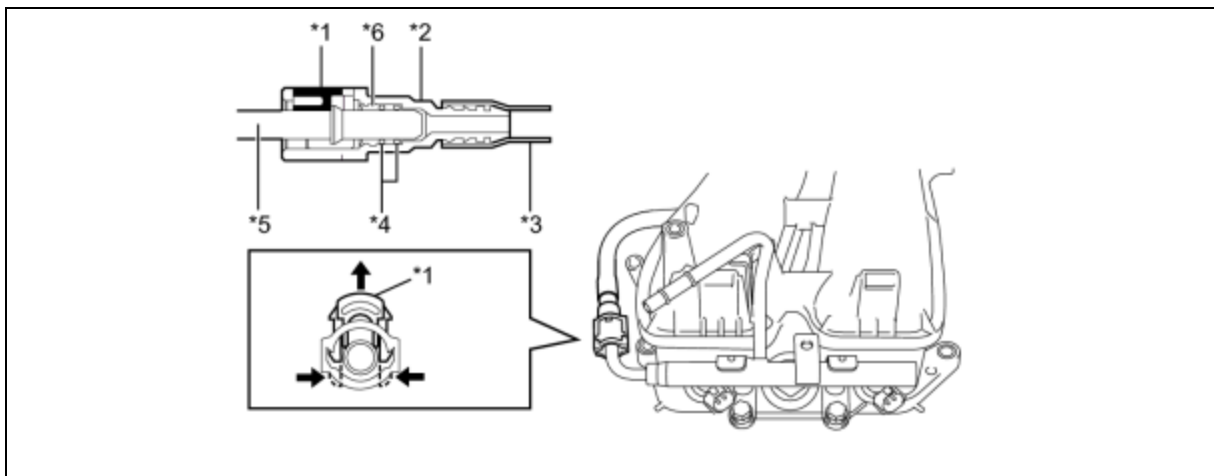
(a) Remove the cap from the intake manifold.

4. REMOVE FUEL DELIVERY PIPE (for Bank 2)

(a) Disconnect the No. 2 fuel delivery pipe sub-assembly from the fuel delivery pipe.

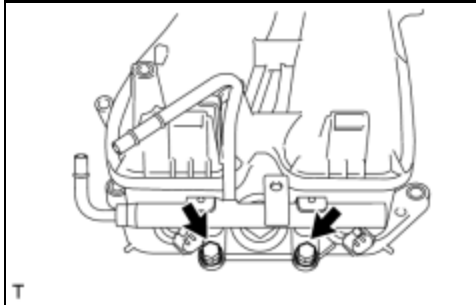
NOTICE:

- If the connector and pipe are stuck, pinch the fuel delivery pipe by hand and push and pull the connector to disconnect it
- Do not allow any scratches or foreign matter on the parts when disconnecting them, as the No. 2 fuel delivery pipe sub-assembly joint contains the O-rings that seal the plug.
- Do not use any tools to separate the pipe and connector.
- Do not forcibly bend, twist or turn the nylon tube.
- If the pipe and connector are stuck together, pinch the tube between your fingers and turn it carefully to free it. Then, disconnect the main tube.
- Protect the disconnected part by covering it with a plastic bag and tape after disconnecting the main tube.
- Check that the top hat cannot be pulled out.



Text in Illustration

*1	Retainer	*2	No. 2 Fuel Delivery Pipe Sub-assembly Connector
*3	Nylon Tube	*4	O-ring
*5	fuel delivery pipe	*6	Top Hat



(b) Remove the 2 bolts and the fuel delivery pipe from the intake manifold.

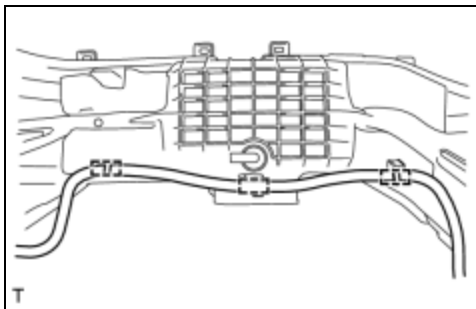
(c) Remove the 2 O-rings.

5. REMOVE FUEL DELIVERY PIPE (for Bank 1)

HINT:

Use the same procedure described for the fuel delivery pipe (for bank 2).

6. REMOVE NO. 2 FUEL DELIVERY PIPE SUB-ASSEMBLY



(a) Disengage the 3 clamps and remove the No. 2 fuel delivery pipe sub-assembly from the intake manifold.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VFL02UX
Title: FA20 INTAKE / EXHAUST: INTAKE MANIFOLD: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL INTAKE MANIFOLD

- (a) Install the 2 new gaskets to the intake manifold.
- (b) Install the intake manifold with the 6 bolts.
Torque: 25 N·m (255 kgf·cm, 18ft·lbf)
- (c) Engage the 2 clamps.
- (d) Engage the 4 connectors and connect the wire harness.
- (e) Connect the fuel pump connector.
- (f) Engage the clamp and connect the engine wire harness.
- (g) Engage the 5 clamps and connect the battery cable.
- (h) Connect the purge valve connector.
- (i) Connect the manifold absolute pressure sensor connector.

2. CONNECT VENTILATION HOSE

- (a) Connect the ventilation hose.

3. CONNECT NO. 2 VACUUM HOSE (for Manual Transmission) INFO

4. INSTALL NO. 1 ENGINE COVER SUB-ASSEMBLY

- (a) Engage the 3 claws and install the No. 1 engine cover sub-assembly.

5. CONNECT FUEL DELIVERY PIPE SUB-ASSEMBLY

- (a) Connect the No. 2 fuel vapor feed hose.
- (b) Install the bolt and connect the fuel delivery pipe sub-assembly.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

6. CONNECT NO. 1 FUEL HOSE INFO

7. INSTALL INJECTOR COVER (for Bank 2) INFO

8. INSTALL INJECTOR COVER (for Bank 1) INFO

9. INSTALL INJECTOR DRIVER INFO

10. CONNECT THROTTLE WITH MOTOR BODY ASSEMBLY

- (a) Install a new gasket to the intake manifold.
- (b) Install the 4 bolts and throttle with motor body assembly to intake manifold.

Torque: 8.0 N·m (82 kgf·cm, 71in·lbf)

11. INSTALL AIR CLEANER CAP WITH AIR CLEANER HOSE INFO

12. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

13. INSPECT FUEL PUMP OPERATION AND INSPECT FOR FUEL LEAK [INFO](#)

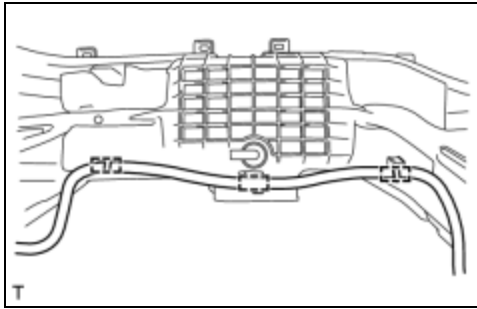
14. INSPECT THROTTLE WITH MOTOR BODY ASSEMBLY [INFO](#)



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000MU600XX
Title: FA20 INTAKE / EXHAUST: INTAKE MANIFOLD: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL NO. 2 FUEL DELIVERY PIPE SUB-ASSEMBLY



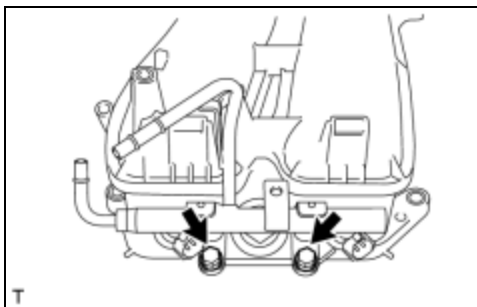
- (a) Install the No. 2 fuel delivery pipe sub-assembly to the intake manifold with the 3 clamps.

2. INSTALL FUEL DELIVERY PIPE (for Bank 2)

- (a) Apply a gasoline to the contact surfaces of the new O-ring on each fuel injector assembly.
 (b) Install a new O-ring to each fuel injector assembly.
 (c) Install the fuel injector assembly to the intake manifold with fuel delivery pipe.

NOTICE:

- Do not damage the fuel injector assembly or the O-ring.
- Do not twist the O-ring.



- (d) Install the fuel delivery pipe with the 2 bolts.

Torque: 19 N·m (194 kgf·cm, 14ft·lbf)

- (e) Check that the fuel injectors rotate smoothly.

NOTICE:

If the fuel injectors do not rotate smoothly, the probable cause is incorrect installation of the O-rings. Replace the O-rings.

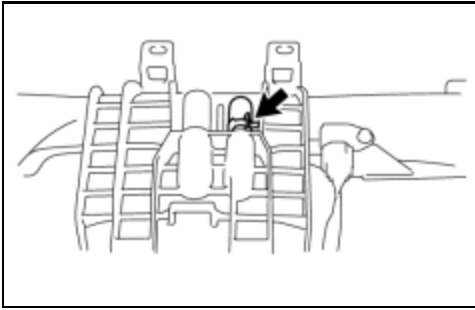
- (f) Position the fuel injector connector outward.

3. INSTALL FUEL DELIVERY PIPE (for Bank 1)

HINT:

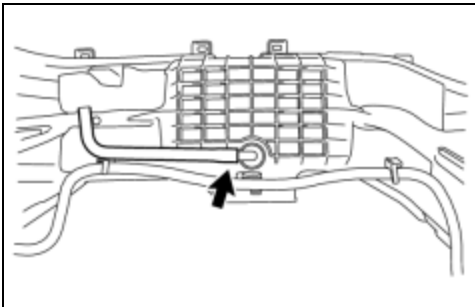
Use the same procedure described for the fuel delivery pipe (for bank 2).

4. INSTALL CAP (for Automatic Transmission)

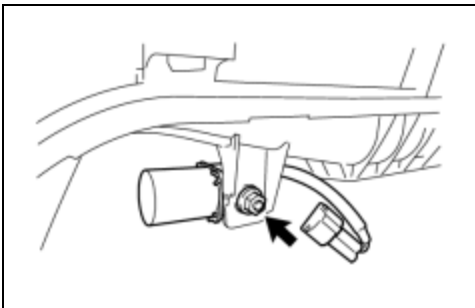


(a) Install the clamp and cap to the intake manifold.

5. INSTALL PURGE VALVE



(a) Connect the No.1 fuel vapor feed hose to the intake manifold.

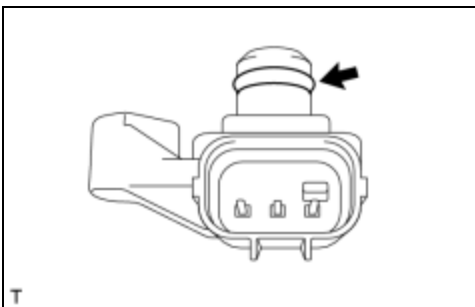


(b) Install the nut and purge valve to the intake manifold.

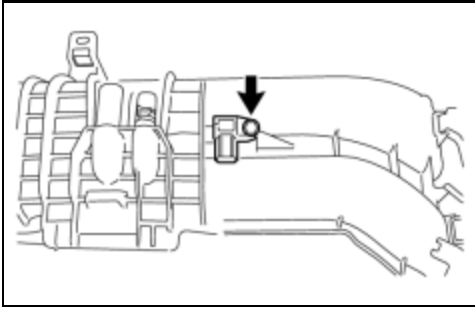
Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

6. INSTALL MANIFOLD ABSOLUTE PRESSURE SENSOR

(a) Apply engine oil to the contact surfaces of the new O-ring on manifold absolute pressure sensor.



(b) Install a new O-ring to the manifold absolute pressure sensor.



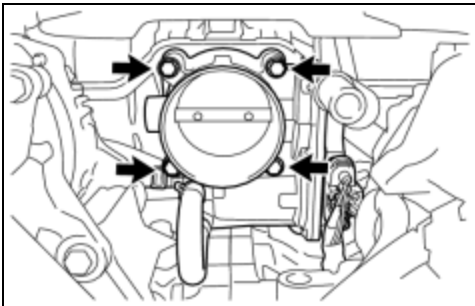
(c) Install the manifold absolute pressure sensor to the intake manifold with the bolt.

Torque: 4.0 N·m (41 kgf·cm, 35in·lbf)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000Q0U02UX
Title: FA20 INTAKE / EXHAUST: INTAKE MANIFOLD: REMOVAL (2013 FR-S)		

REMOVAL

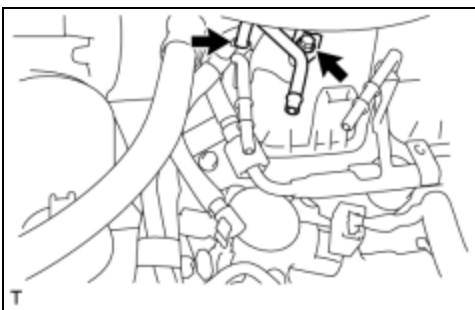
1. CHECK FUEL PUMP OPERATION AND INSPECT FOR FUEL LEAK INFO
2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO
3. REMOVE AIR CLEANER CAP WITH AIR CLEANER HOSE INFO
4. REMOVE THROTTLE WITH MOTOR BODY ASSEMBLY



(a) Remove the 4 bolts and the throttle with motor body assembly.

(b) Remove the gasket.

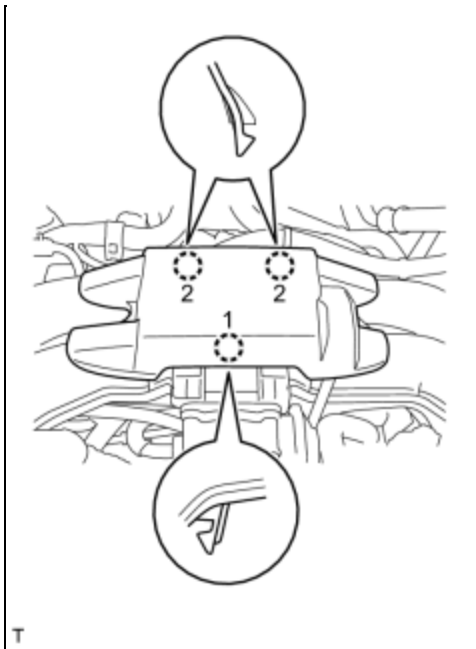
5. REMOVE INJECTOR DRIVER INFO
6. REMOVE INJECTOR COVER (for Bank 2) INFO
7. REMOVE INJECTOR COVER (for Bank 1) INFO
8. DISCONNECT NO. 1 FUEL HOSE INFO



9. DISCONNECT FUEL DELIVERY PIPE SUB-ASSEMBLY

- (a) Remove the bolt and disconnect the fuel delivery pipe sub-assembly.
- (b) Disconnect the No. 2 fuel vapor feed hose and move the fuel delivery pipe toward the front of the vehicle.

10. REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY



(a) Disengage the 3 craws and remove the No. 1 engine cover sub-assembly.

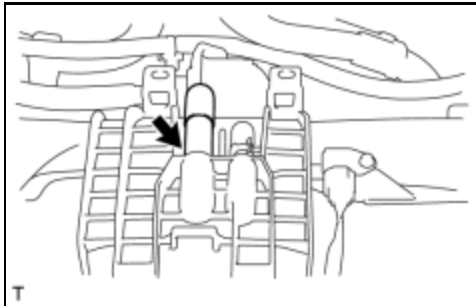
HINT:

Disengage the 3 craws in the order shown in the illustration.

11. DISCONNECT NO. 2 VACUUM HOSE (for Manual Transmission)

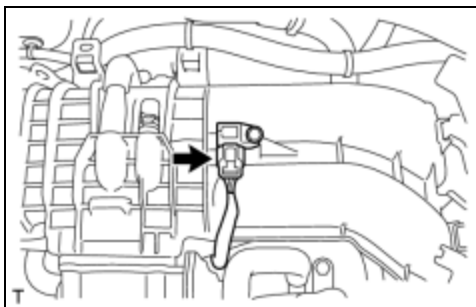
INFO

12. DISCONNECT VENTILATION HOSE

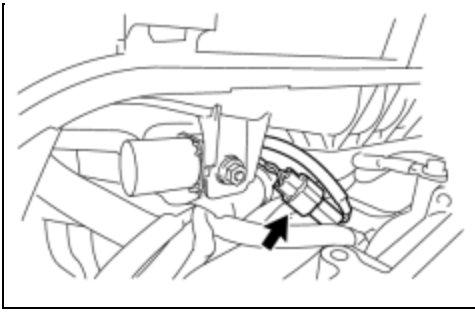


(a) Disconnect the ventilation hose.

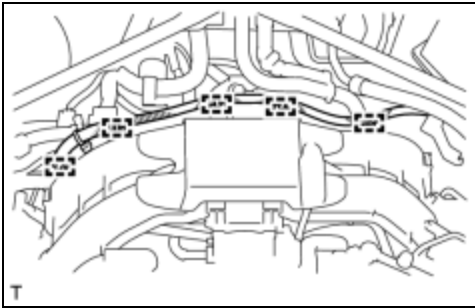
13. REMOVE INTAKE MANIFOLD



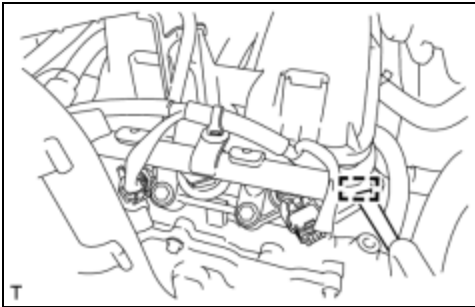
(a) Disconnect the manifold absolute pressure sensor connector.



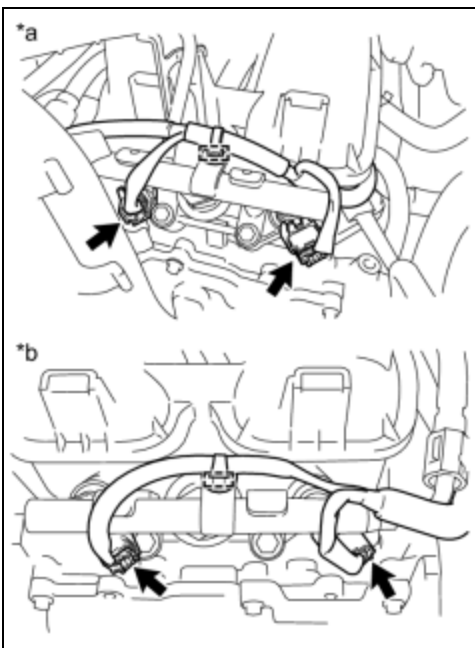
(b) Disconnect the purge valve connector.



(c) Disengage the 5 clamps and disconnect the battery cable.



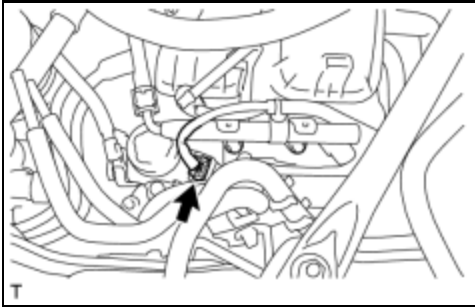
(d) Disengage the clamp and disconnect the engine wire harness.



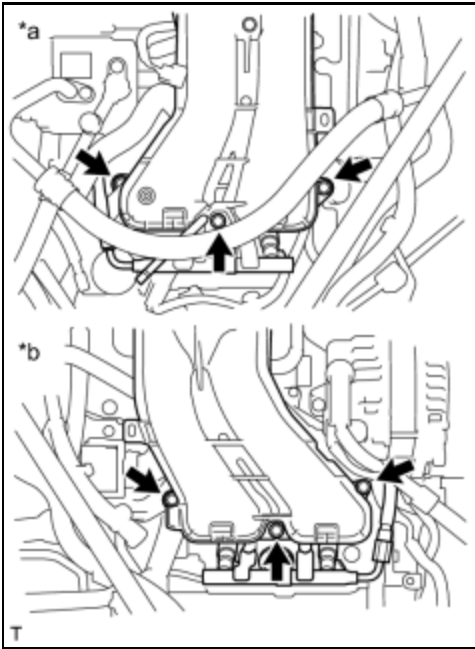
(e) Disengage the 2 clamps and disconnect the 4 connectors.

Text in Illustration

*a	Bank 2 Side
*b	Bank 1 Side



(f) Disconnect the fuel pump connector.



(g) Remove the 6 bolts, intake manifold and 2 gaskets.

Text in Illustration

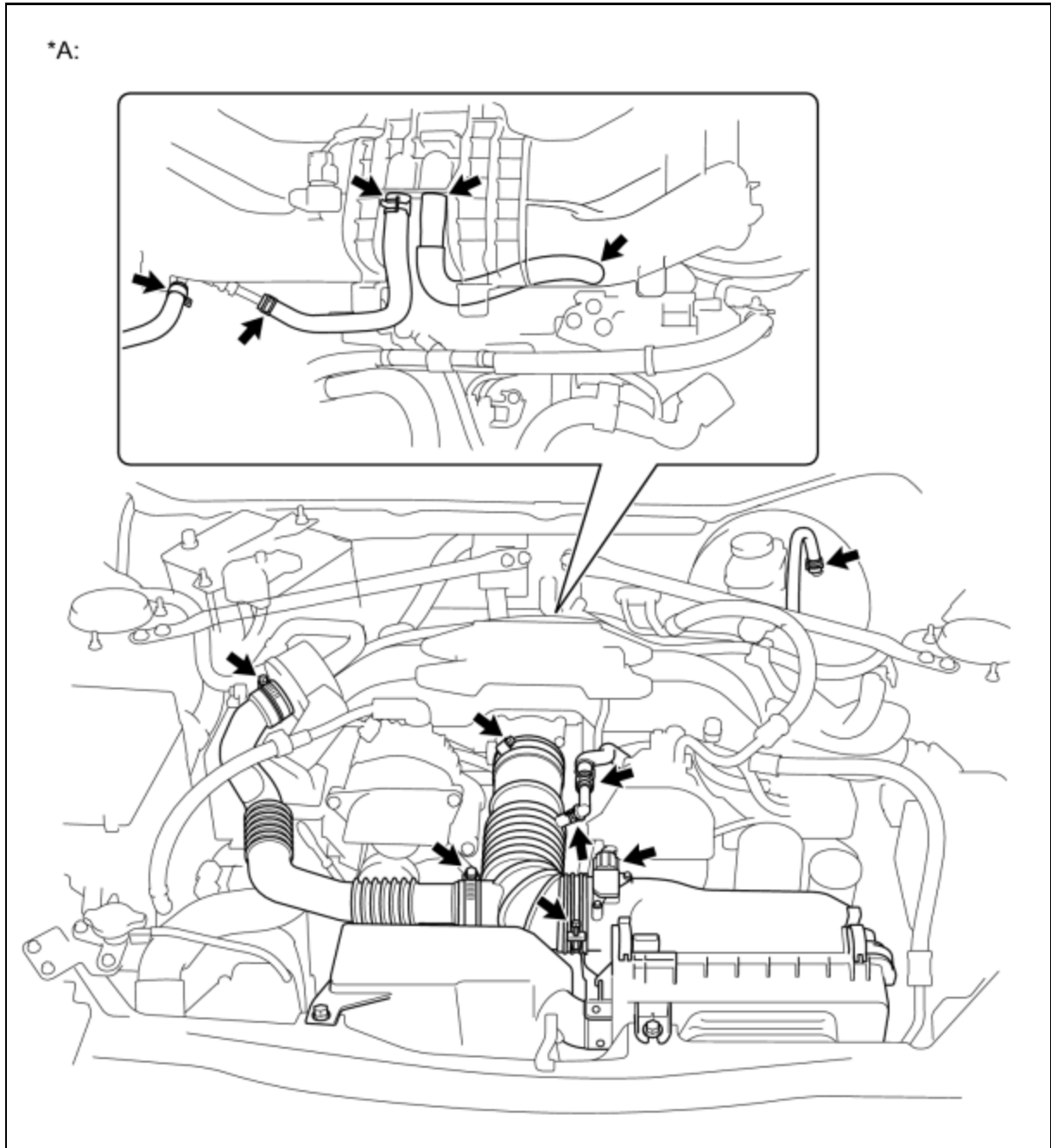
*a	Bank 2 Side
*b	Bank 1 Side

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000Q2601JX
Title: FA20 INTAKE / EXHAUST: INTAKE SYSTEM: ON-VEHICLE INSPECTION (2013 FR-S)		

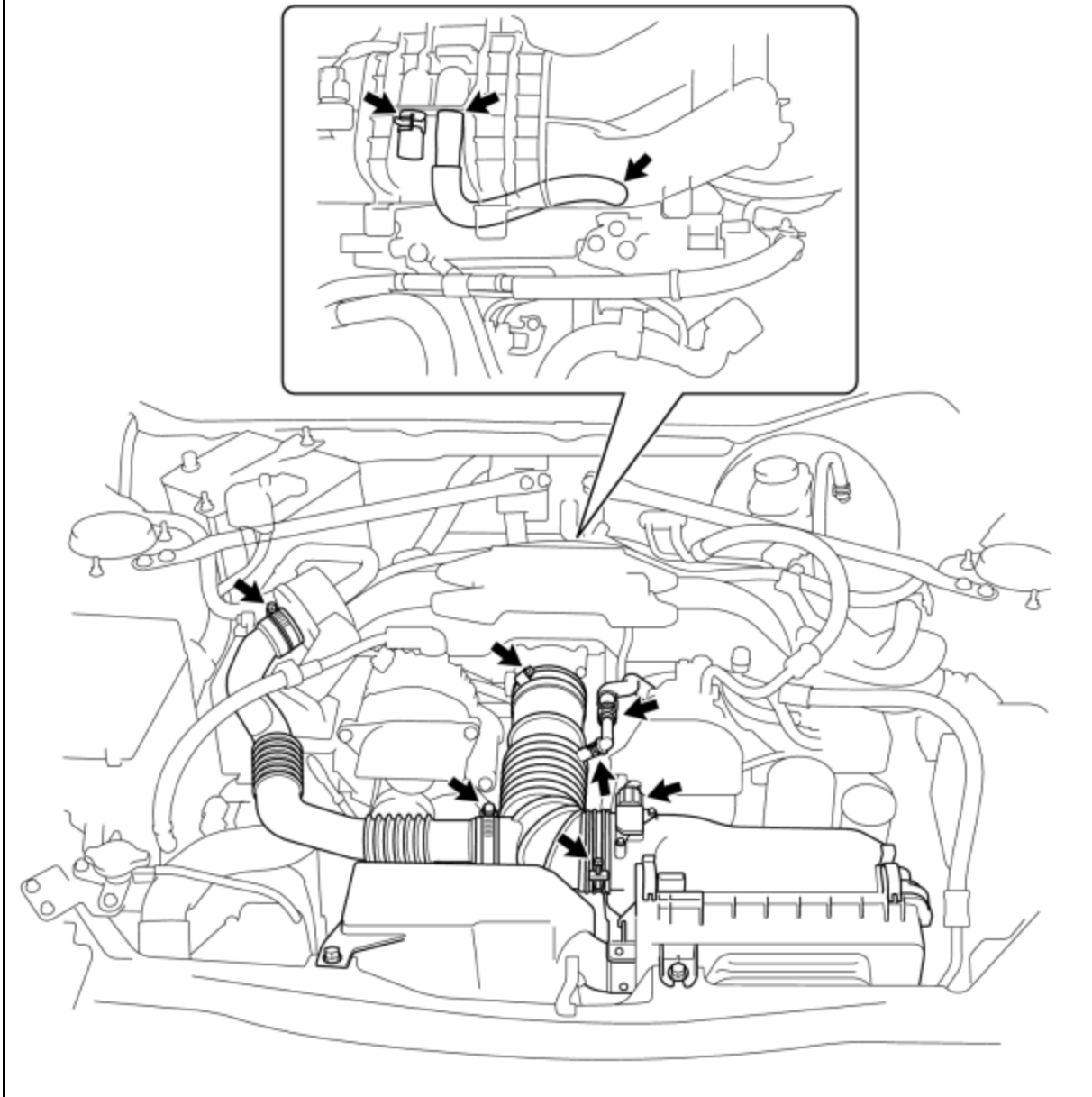
ON-VEHICLE INSPECTION

1. INSPECT INTAKE SYSTEM

- (a) Check that there is no air suction at the points shown in the illustration.



*B:



Text in Illustration

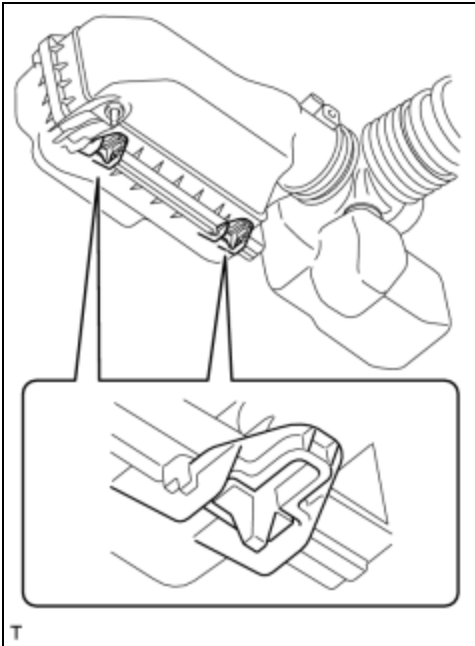
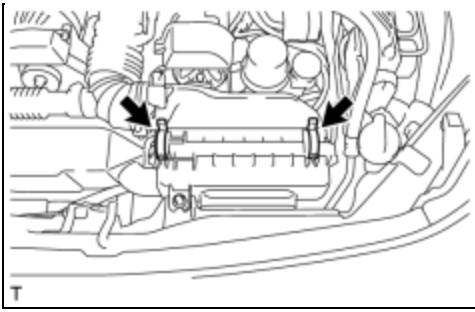
*A	for Manual Transmission	*B	for Automatic Transmission
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NOTICE:

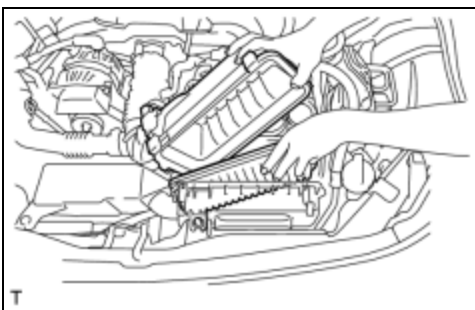
Disengagement, cracks or damage in the intake component may cause an idling defect.

2. INSPECT AIR CLEANER FILTER ELEMENT SUB-ASSEMBLY

(a) Disengage the 2 clips.



(b) Lift the rear air cleaner case, and disengage the 2 claws.



(c) Lift the rear air cleaner case as shown in the illustration, and remove the air cleaner filter element sub-assembly.

(d) Check that the air cleaner element is moderately clean.

Standard air cleaner element condition:

Not too dirty.

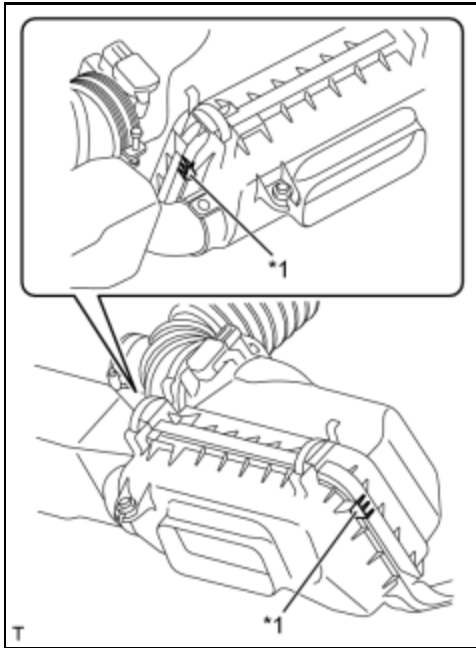
NOTICE:

If the element is too dirty, replace the air cleaner filter element.

(e) Use compressed air if the air cleaner filter element needs to be cleaned.

(f) Lift the rear air cleaner case, and install the air cleaner filter element sub-assembly.

(g) Engage the 2 claws.



(h) Engage the 2 clips.

NOTICE:

- Securely engage the lower side claws of the air cleaner case.
- Check if the right and left locating lugs of the air cleaner case do not get into the opposite air cleaner case.

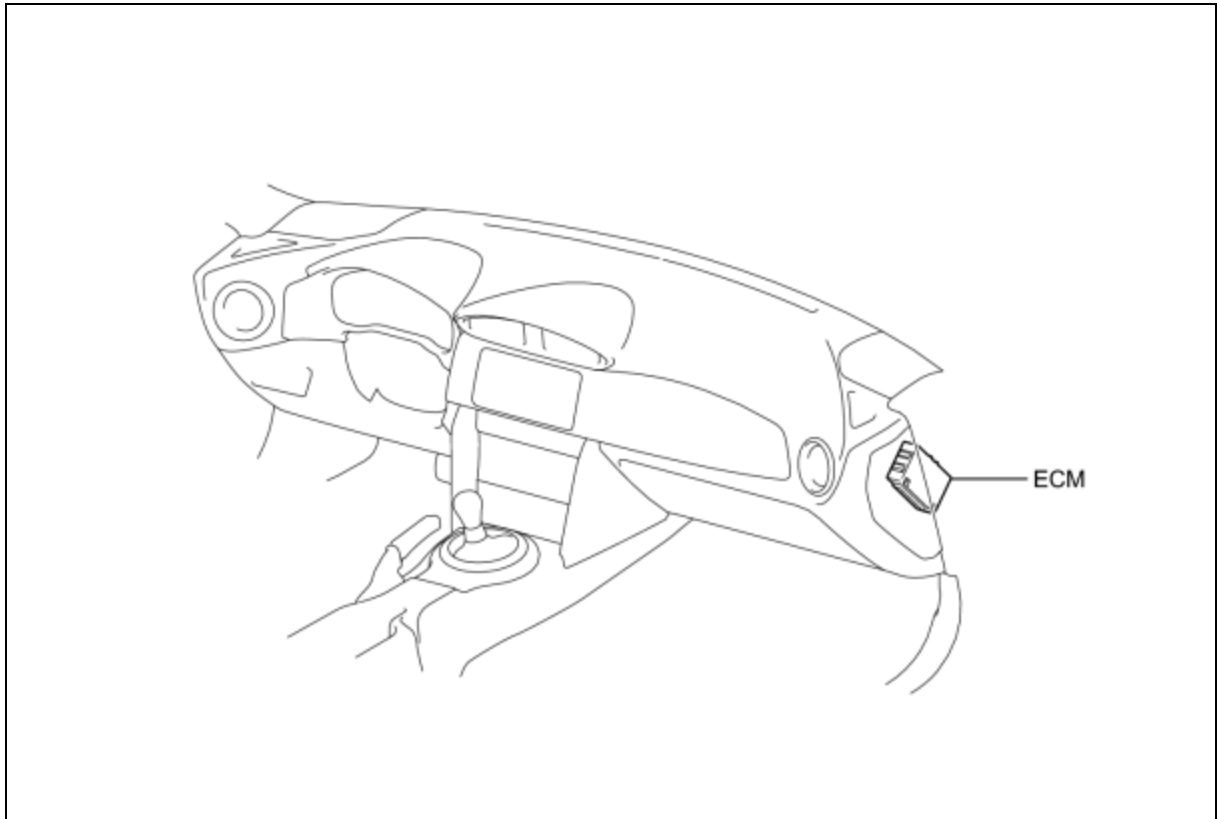
Text in Illustration

*1	Locating Lugs
----	---------------

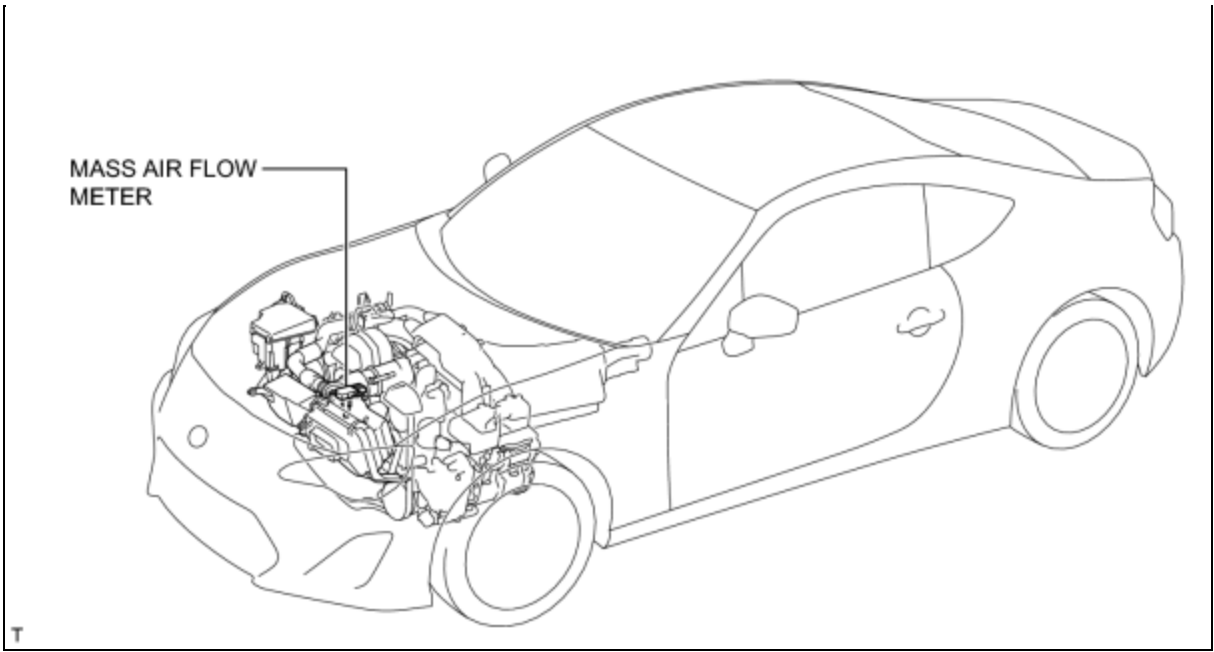
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VDM01FX
Title: FA20 INTAKE / EXHAUST: INTAKE SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION

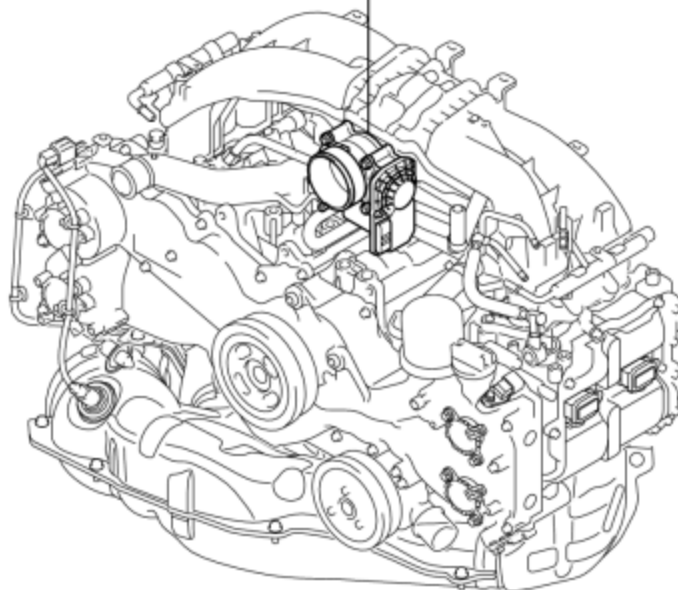


ILLUSTRATION

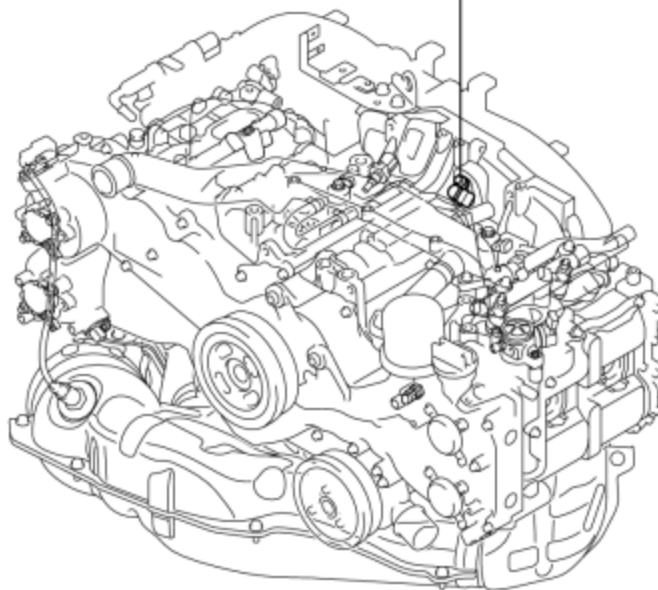


ILLUSTRATION

THROTTLE WITH MOTOR BODY ASSEMBLY



CRANKSHAFT POSITION SENSOR

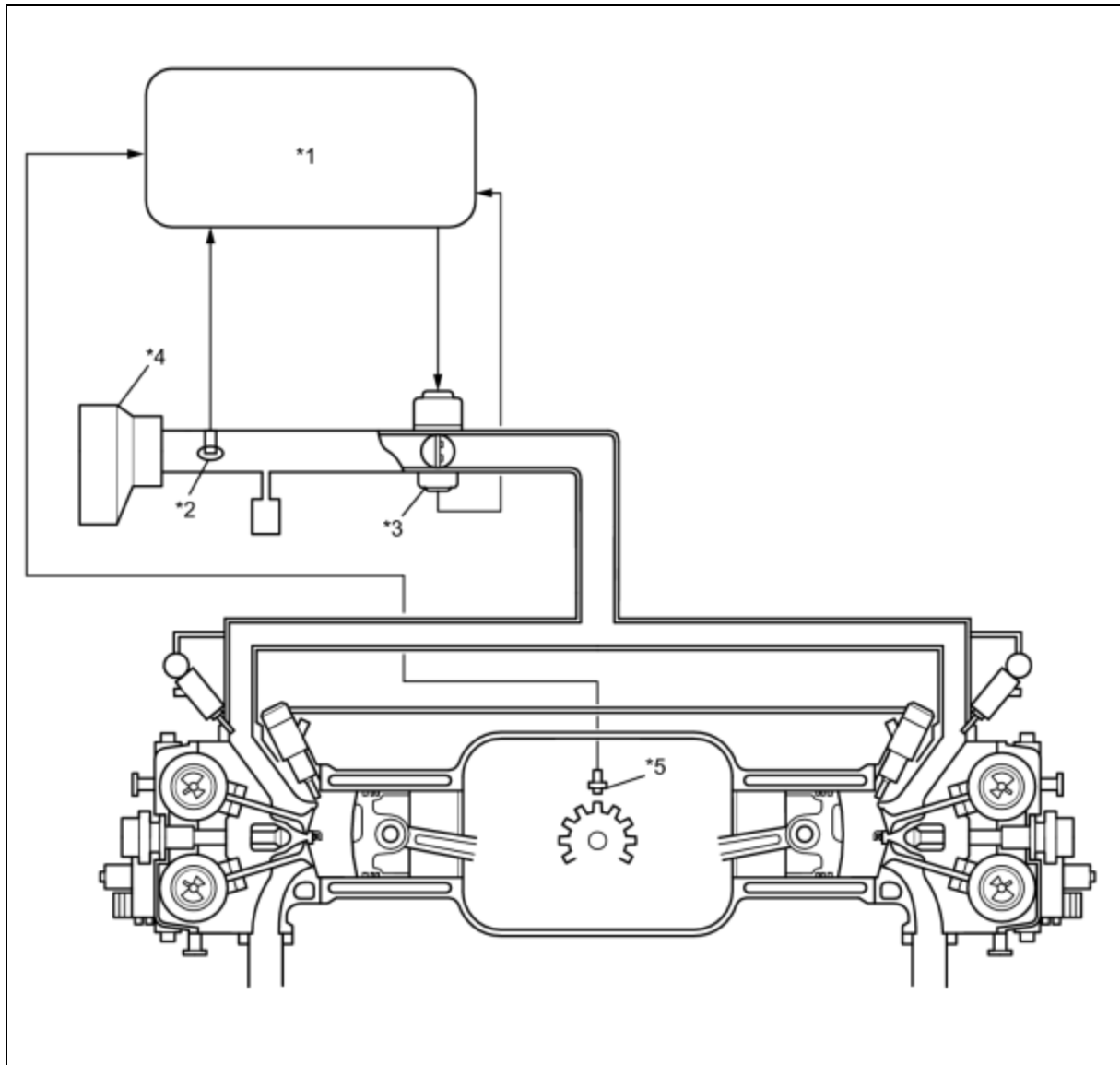


T

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PE701HX
Title: FA20 INTAKE / EXHAUST: INTAKE SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

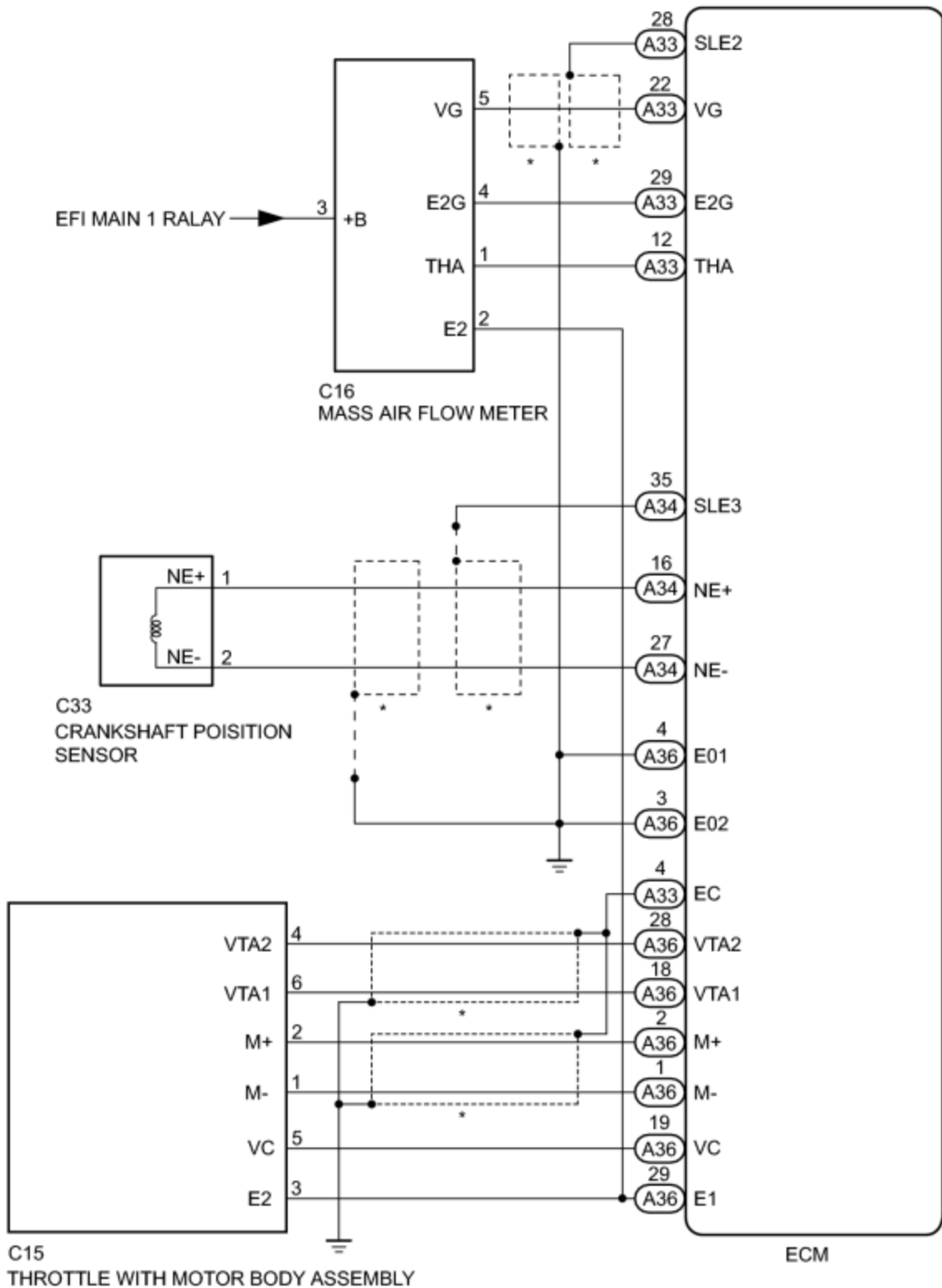
SYSTEM DIAGRAM

1. INTAKE AIR CONTROL SYSTEM VALVE DIAGRAM



Text in Illustration

*1	ECM	*2	Mass Air Flow Meter
*3	Throttle with Motor Body Assembly	*4	Air Cleaner
*5	Crankshaft Position Sensor	-	-



*:Shielded

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000T5102GX
Title: FA20 LUBRICATION: LUBRICATION SYSTEM: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. CHECK ENGINE OIL QUALITY

(a) Check the oil for deterioration, water contamination, discoloring or thinning.

If the quality is visibly poor, replace the oil and oil filter element.

2. CHECK ENGINE OIL LEVEL

(a) Warm up and stop the engine, and then wait for 5 minutes. The oil level should be between the dipstick's low level and full level marks.

If low, check for leakage and add oil up to the full level mark.

NOTICE:

Do not add engine oil above the full level mark.

HINT:

Engine oil is always being consumed when driving the vehicle.

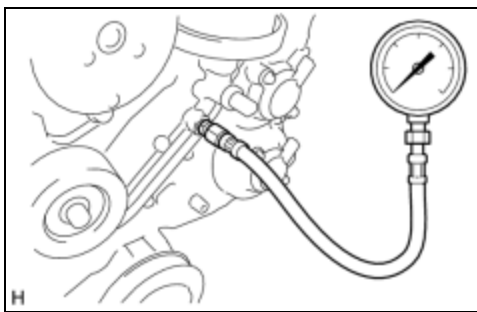
Generally, engine oil consumed at a rate of 1 liter every 3000 km, or 1 US qts. every 2000 miles.

In the following situations, oil consumption may increase and it may be necessary to add oil between maintenances.

- The engine is new.
- The oil quality is poor or the viscosity is inappropriate.
- The engine speed or load is high, the vehicle is towing something or the vehicle is being accelerated and decelerated frequently.
- The engine is idled for a very long time or the vehicle is frequently driven in traffic.

3. CHECK OIL PRESSURE

(a) Remove the oil pressure switch assembly **INFO** .



(b) Install the oil pressure gauge with adapter.

(c) Install the air cleaner assembly **INFO** .

(d) Warm up the engine.

(e) Check the oil pressure under the following conditions.

Specification Oil Pressure:

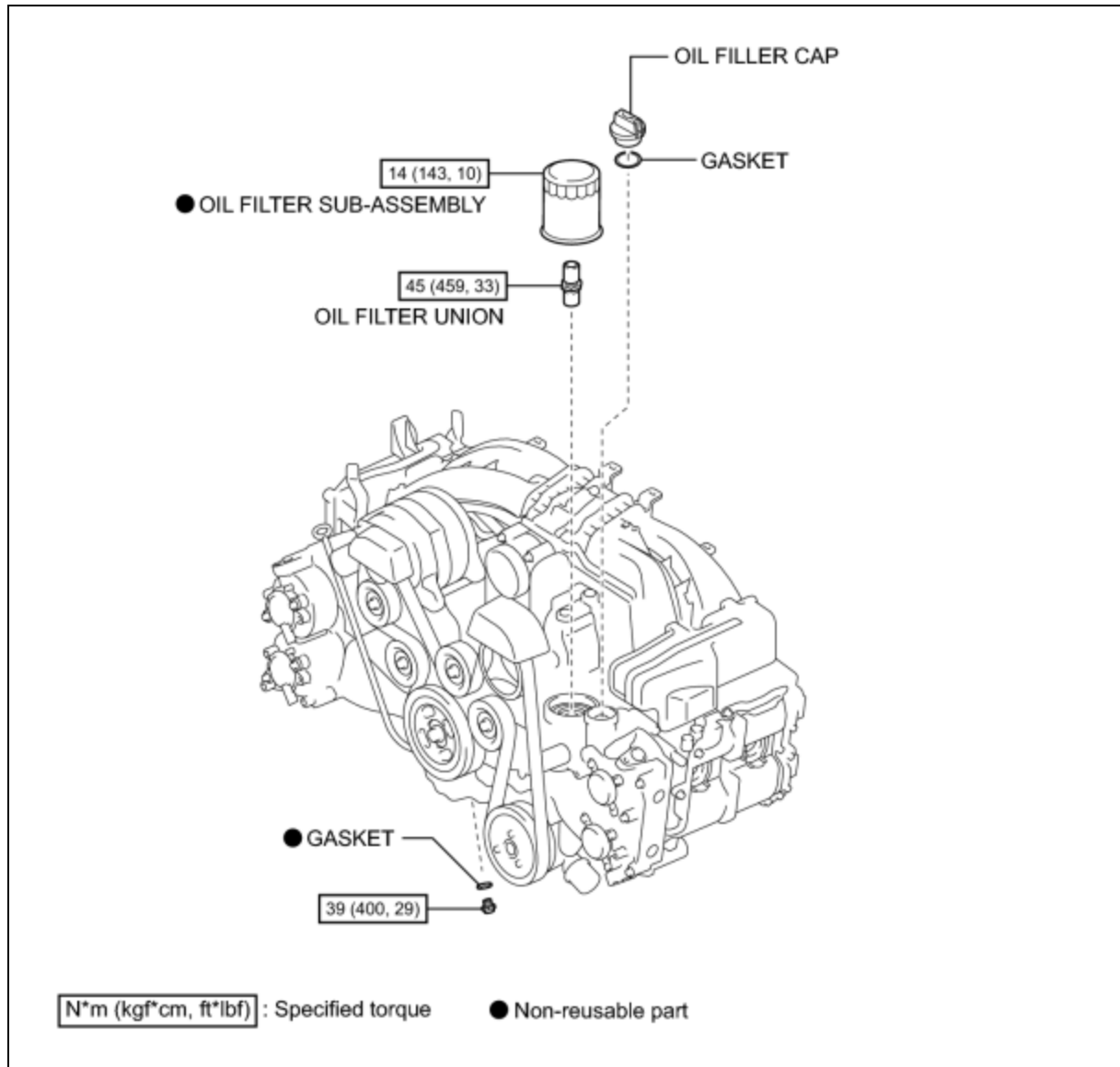
ITEM	ENGINE OIL TEMPERATURE	OIL PRESSURE
Idle	80°C (176°F)	50 kPa (0.5 kgf/cm ² , 7.3 psi) or more
6000 rpm		500 kPa (5.1 kgf/cm ² , 73 psi) or more

- (f) Remove the air cleaner assembly [INFO](#) .
- (g) Remove the oil pressure gauge with adapter.
- (h) Install the oil pressure switch assembly [INFO](#) .
- (i) Inspect for engine oil leaks.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000T50021X
Title: FA20 LUBRICATION: OIL AND OIL FILTER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000T4Z02CX
Title: FA20 LUBRICATION: OIL AND OIL FILTER: REPLACEMENT (2013 FR-S)		

REPLACEMENT

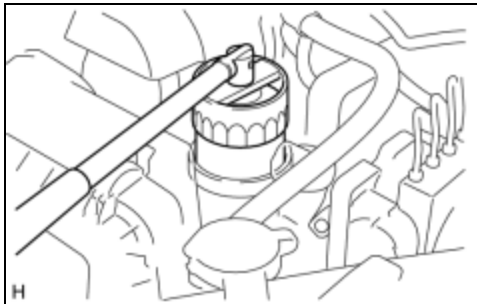
CAUTION:

- Prolonged and repeated contact with engine oil will result in removal of natural oils from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer.
- Precautions should be taken when replacing engine oil to minimize the risk of your skin making contact with used engine oil. Protective clothing and gloves that cannot be penetrated by oil should be worn. The skin should be washed with soap and water, or use waterless hand cleaner, to remove any used engine oil thoroughly. Do not use gasoline, thinners, or solvents.
- In order to preserve the environment, used oil and used oil filters must be disposed of at designated disposal sites.

1. DRAIN ENGINE OIL

- Remove the oil filler cap.
- Remove the oil pan drain plug and drain the oil into a container.
- Clean and install the oil pan drain plug with a new oil pan drain plug gasket.

Torque: 39 N·m (400 kgf·cm, 29ft·lbf)

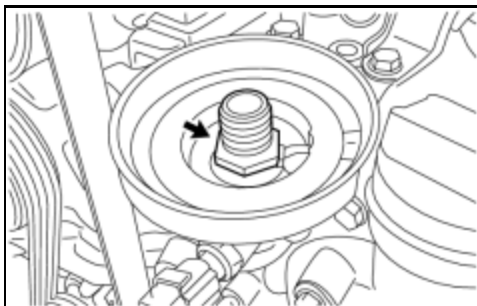


2. REMOVE OIL FILTER SUB-ASSEMBLY

- Remove any foreign matter and clean the installation surface of the engine.
- Using SST, remove the oil filter sub-assembly.

SST: 09228-22020

3. REMOVE OIL FILTER UNION



- Remove the oil filter union.

4. INSTALL OIL FILTER UNION

(a) Install the oil filter union.

Torque: 45 N·m (459 kgf·cm, 33ft·lbf)

5. INSTALL OIL FILTER SUB-ASSEMBLY

(a) Remove any foreign matter and clean the inside and installation surface of the engine.

(b) Apply a light layer of engine oil to the seal rubber of a new oil filter sub-assembly.

(c) Tighten the oil filter sub-assembly by hand.

NOTICE:

Do not damage the seal rubber of the oil filter sub-assembly.

(d) Using SST, tighten the oil filter sub-assembly.

SST: 09228-22020

Torque: 14 N·m (143 kgf·cm, 10ft·lbf)

6. ADD ENGINE OIL

(a) Add new engine oil and install the oil filler cap.

Standard Oil Grade:

OIL GRADE	OIL VISCOSITY (SAE)
API grade SL "energy-conserving", SM "energy-conserving", SN "resource-conserving" or ILSAC multigrade engine oil	<ul style="list-style-type: none">• 0W-20• 5W-30
API grade SL, SM or SN multigrade engine oil	<ul style="list-style-type: none">• 5W-20

Standard Capacity:

ITEM	CAPACITY
Drain and refill with oil filter change	5.4 liters (5.7 US qts, 4.8 Imp. qts)
Drain and refill without oil filter change	5.2 liters (5.5 US qts, 4.6 Imp. qts)
Dry fill	6.3 liters (6.7 US qts, 5.5 Imp. qts)

7. INSPECT FOR ENGINE OIL LEAK

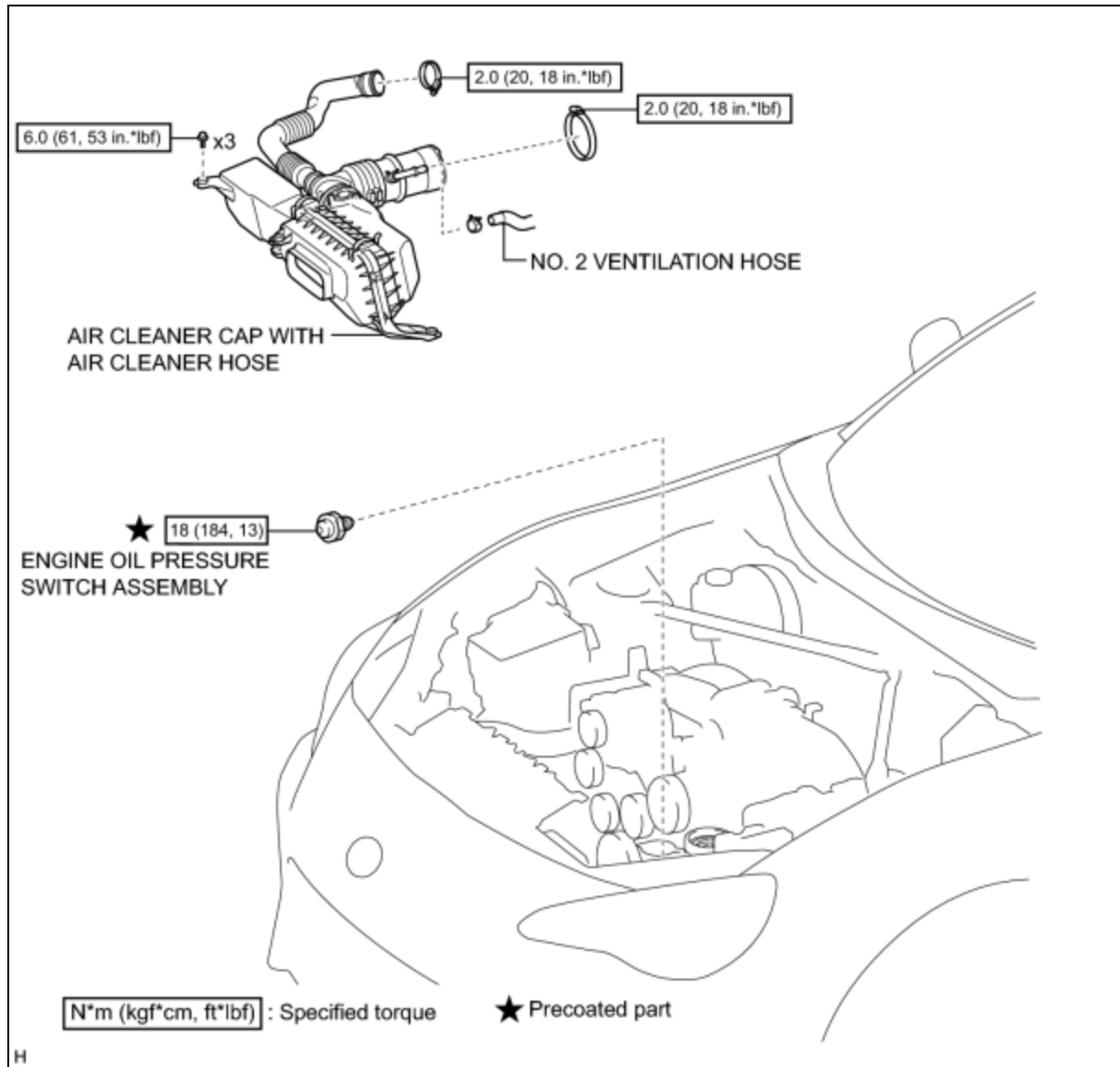
(a) Start the engine. Make sure that there are no oil leaks from the connection point of the oil filter sub-assembly.

8. CHECK ENGINE OIL LEVEL INFO

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000364101CX
Title: FA20 LUBRICATION: OIL PRESSURE SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION

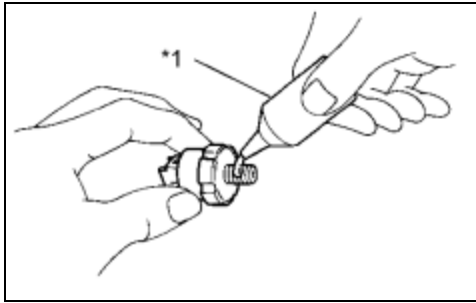


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Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002ZA5074X
Title: FA20 LUBRICATION: OIL PRESSURE SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL ENGINE OIL PRESSURE SWITCH ASSEMBLY



- (a) Apply adhesive to 2 or 3 threads of the engine oil pressure switch assembly.

Text in Illustration

*1	Adhesive
----	----------

Adhesive:

Toyota Genuine Adhesive 1324, Three Bond 1324 or equivalent

- (b) Using a 24 mm deep socket wrench, install the engine oil pressure switch assembly.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

NOTICE:

Do not start the engine for at least 1 hour after installation.

- (c) Connect the engine oil pressure switch connector.

2. INSTALL AIR CLEANER CAP WITH AIR CLEANER HOSE INFO

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL INFO

4. INSPECT FOR OIL LEAK

- (a) Start the engine.
 (b) Check for engine oil leaks from the engine oil pressure switch assembly.

5. CHECK ENGINE OIL LEVEL INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002ZA8072X
Title: FA20 LUBRICATION: OIL PRESSURE SWITCH: REMOVAL (2013 FR-S)		

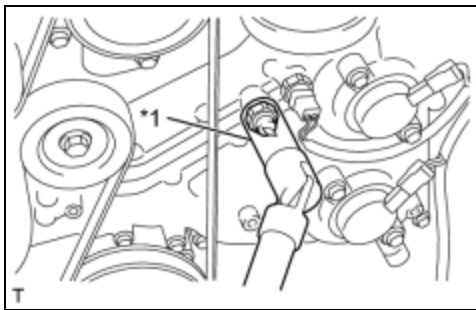
REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

2. REMOVE AIR CLEANER CAP WITH AIR CLEANER HOSE INFO

3. REMOVE ENGINE OIL PRESSURE SWITCH ASSEMBLY

(a) Disconnect the engine oil pressure switch connector.



(b) Using a 24 mm deep socket wrench, remove the engine oil pressure switch assembly.

Text in Illustration

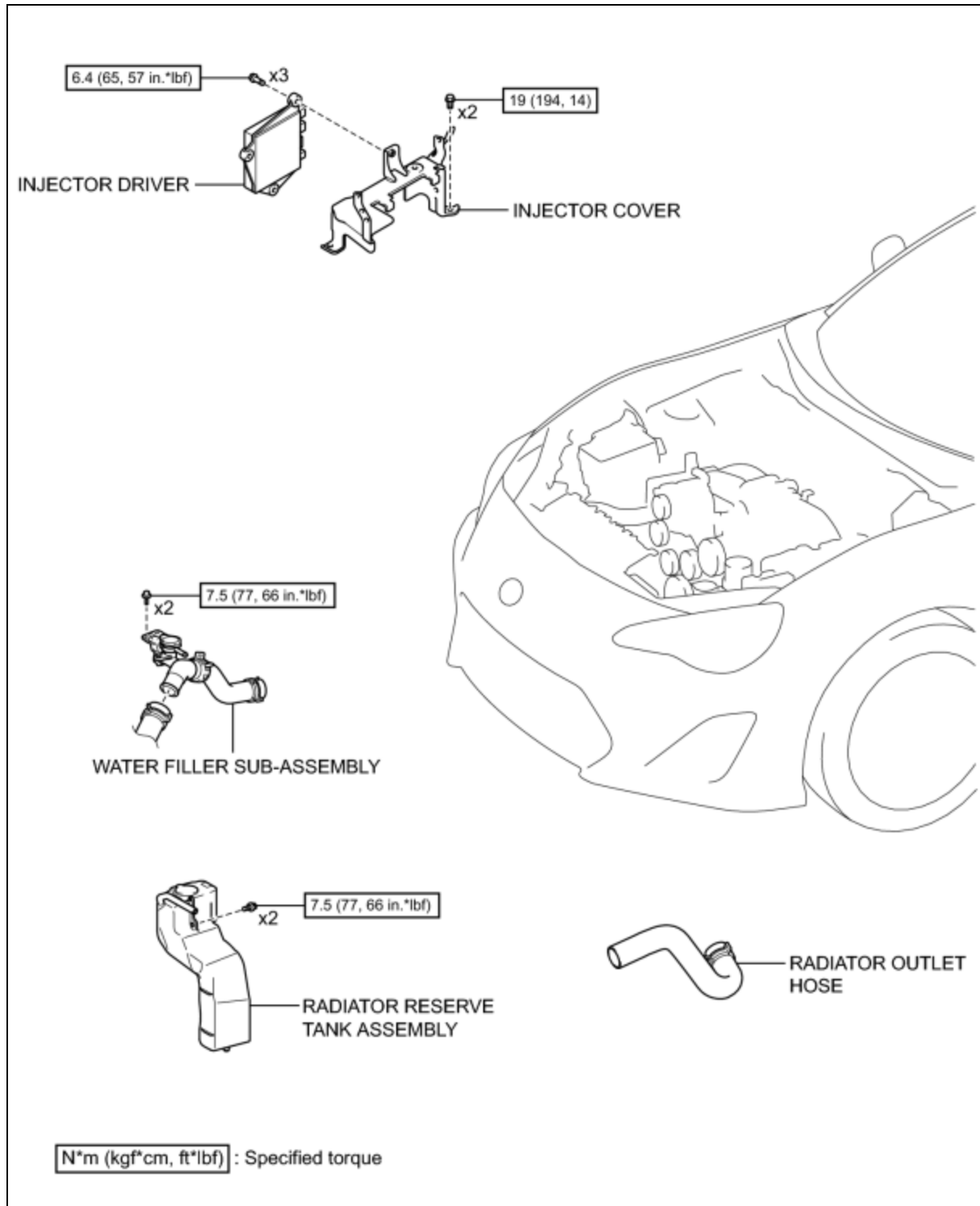
*1	24 mm Deep Socket Wrench
----	--------------------------



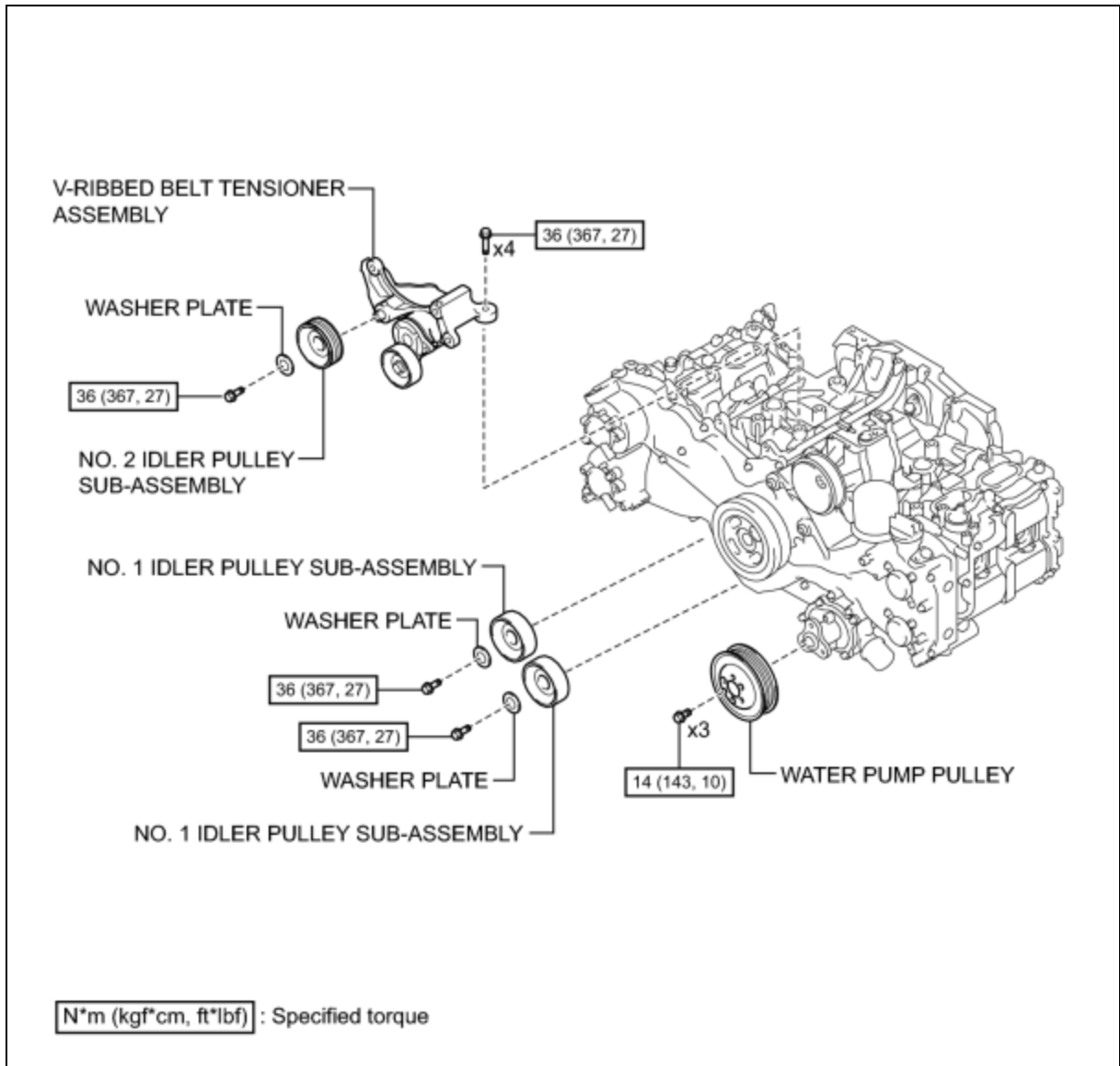
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000T56024X
Title: FA20 LUBRICATION: OIL PUMP: COMPONENTS (2013 FR-S)		

COMPONENTS

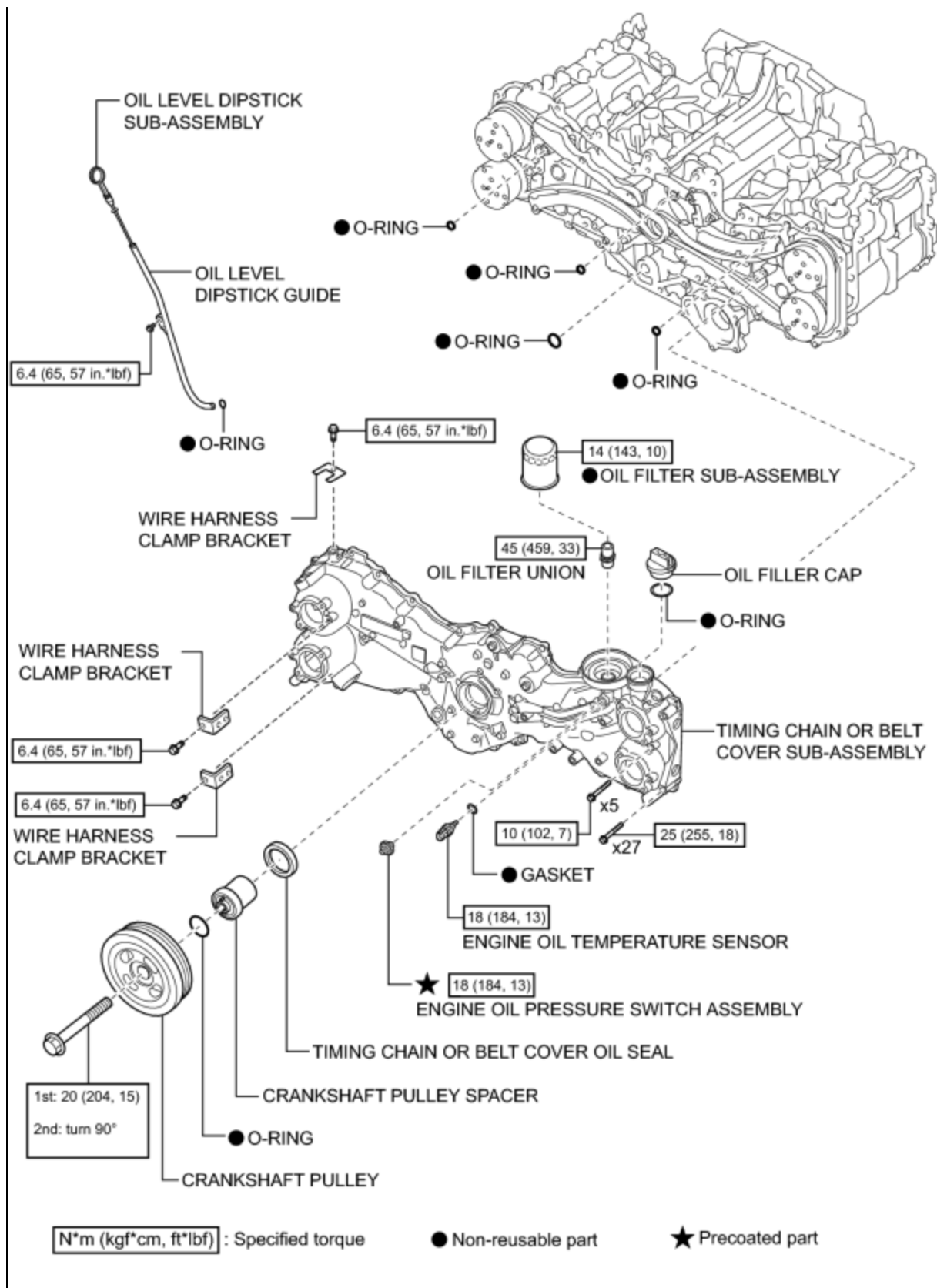
ILLUSTRATION



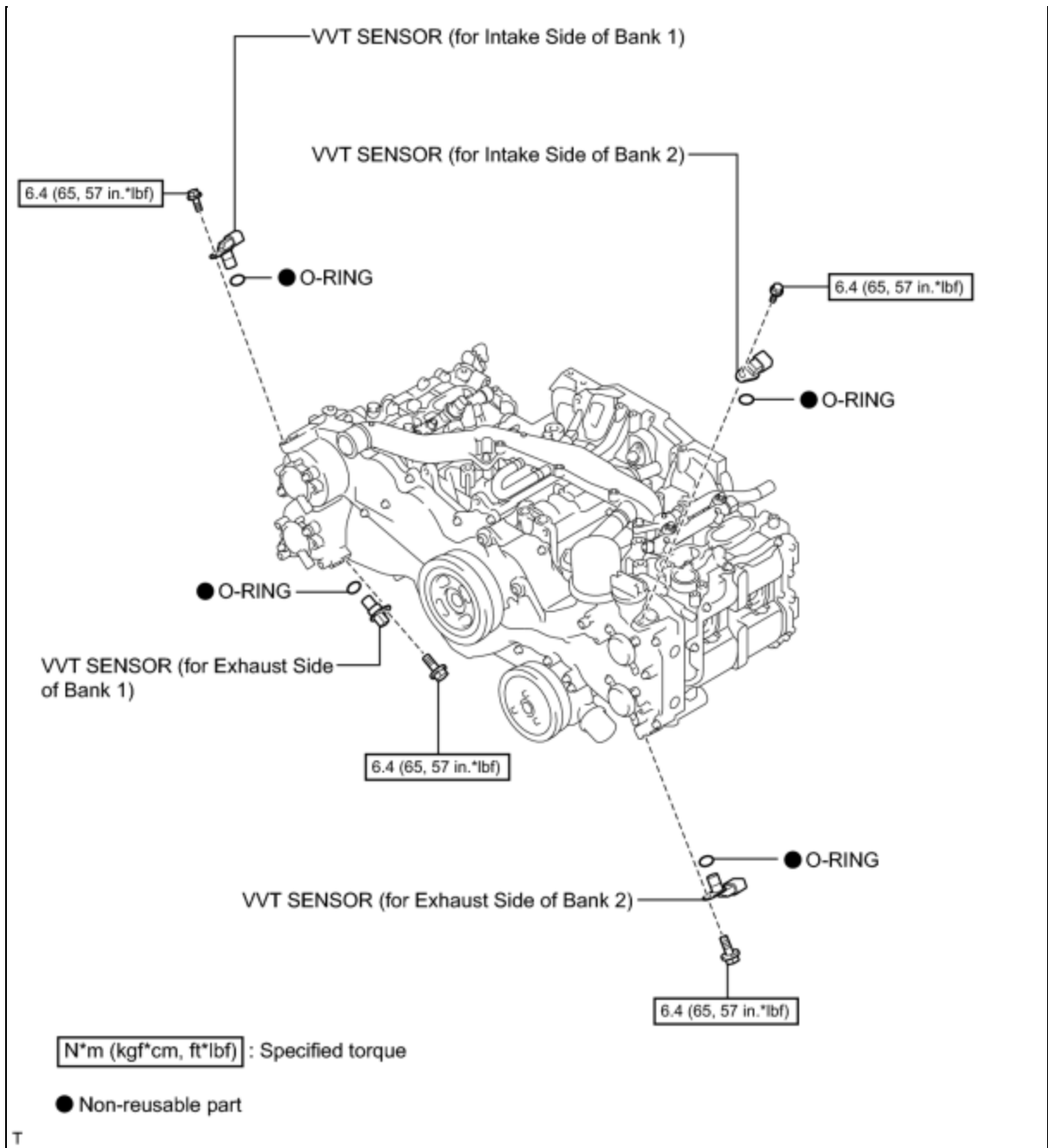
ILLUSTRATION



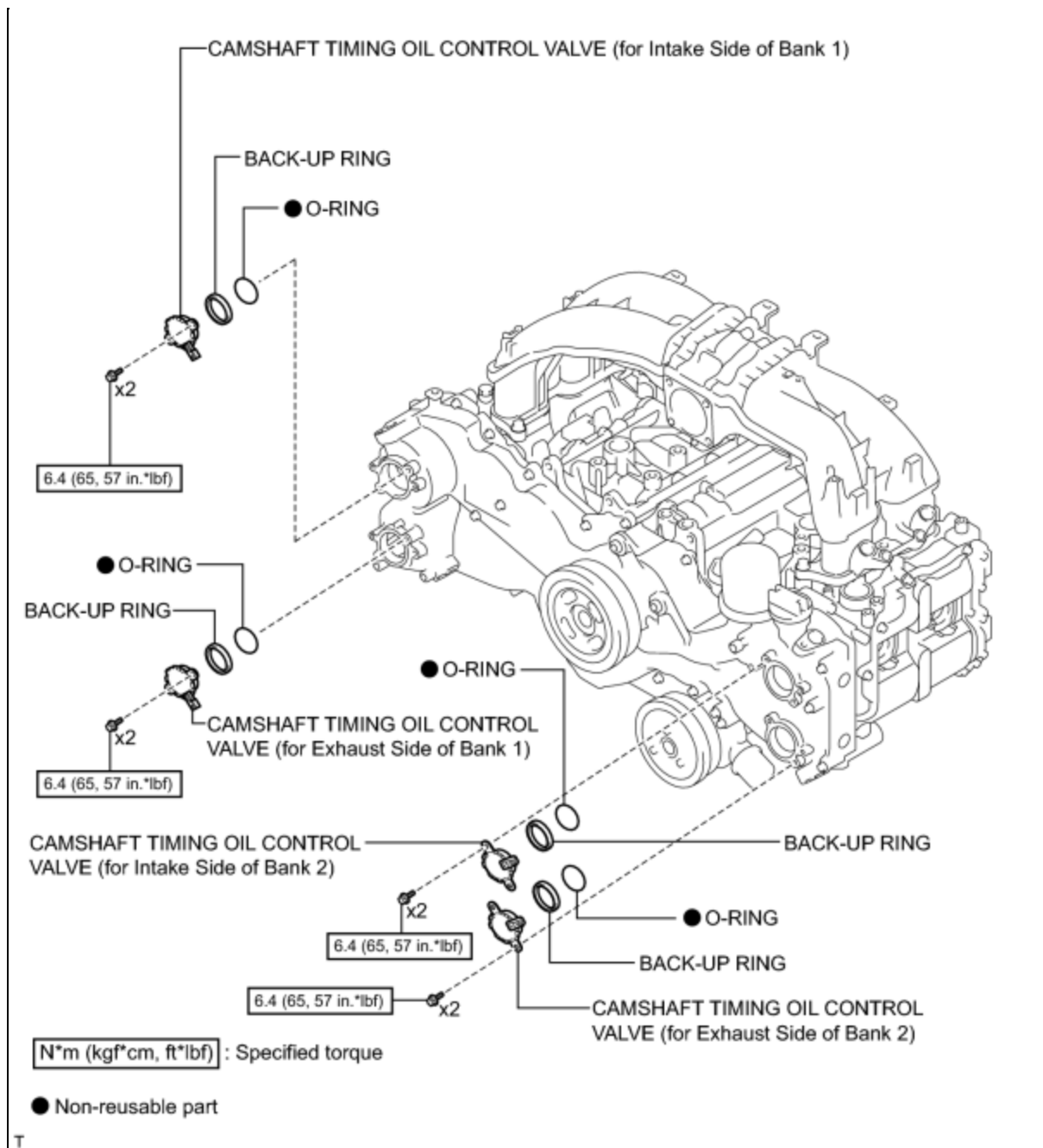
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION



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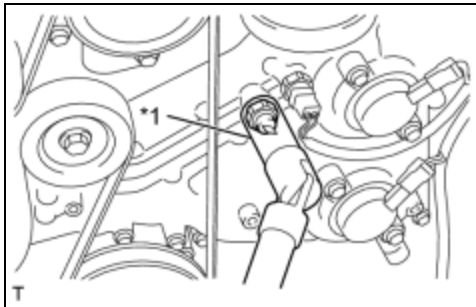
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000591J000X
Title: FA20 LUBRICATION: OIL PUMP: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. REMOVE OIL FILTER SUB-ASSEMBLY INFO

2. REMOVE OIL FILTER UNION INFO

3. REMOVE ENGINE OIL PRESSURE SWITCH ASSEMBLY

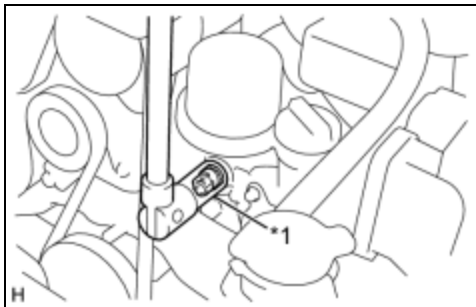


(a) Using a 24 mm deep socket wrench, remove the engine oil pressure switch assembly.

Text in Illustration

*1	24 mm Deep Socket Wrench
----	--------------------------

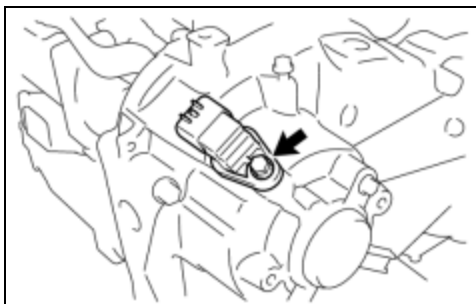
4. REMOVE ENGINE OIL TEMPERATURE SENSOR



(a) Using a 19 mm deep socket wrench, remove the engine oil temperature sensor.

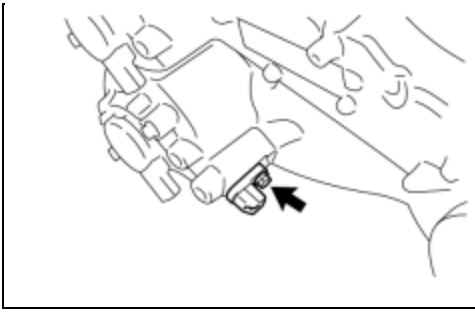
Text in Illustration

*1	19 mm Deep Socket Wrench
----	--------------------------



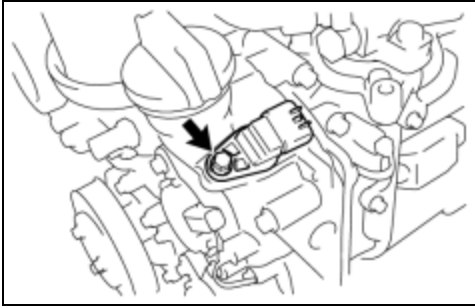
5. REMOVE VVT SENSOR (for Intake Side of Bank 1)

- (a) Remove the bolt and VVT sensor.
- (b) Remove the O-ring from the VVT sensor.



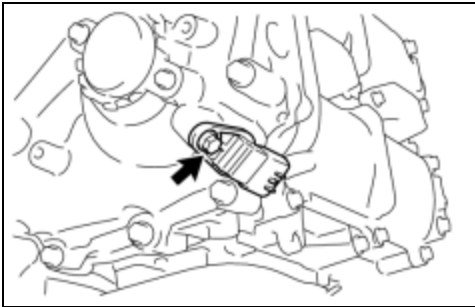
6. REMOVE VVT SENSOR (for Exhaust Side of Bank 1)

- (a) Remove the bolt and VVT sensor.
- (b) Remove the O-ring from the VVT sensor.



7. REMOVE VVT SENSOR (for Intake Side of Bank 2)

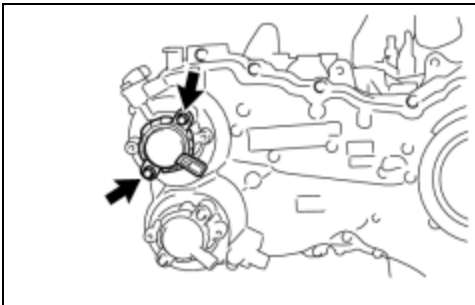
- (a) Remove the bolt and VVT sensor.
- (b) Remove the O-ring from the VVT sensor.



8. REMOVE VVT SENSOR (for Exhaust Side of Bank 2)

- (a) Remove the bolt and VVT sensor.
- (b) Remove the O-ring from the VVT sensor.

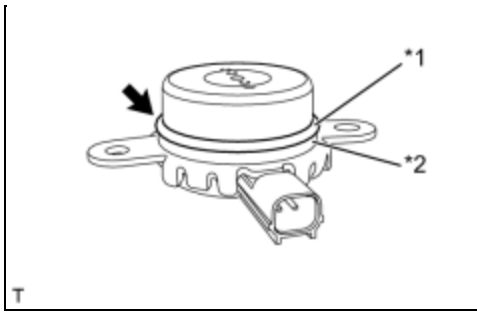
9. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE (for Intake Side of Bank 1)



- (a) Remove the 2 bolts and camshaft timing oil control valve.

- (b) Remove the O-ring from the camshaft timing oil control valve.

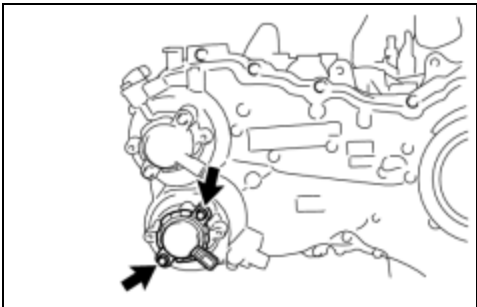
Text in Illustration



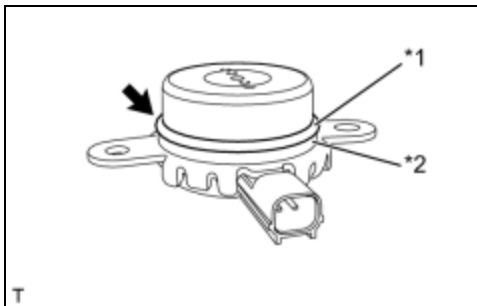
*1	O-ring
*2	Back-up Ring

(c) Remove the back-up ring from the camshaft timing oil control valve.

10. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE (for Exhaust Side of Bank 1)



(a) Remove the 2 bolts and camshaft timing oil control valve.



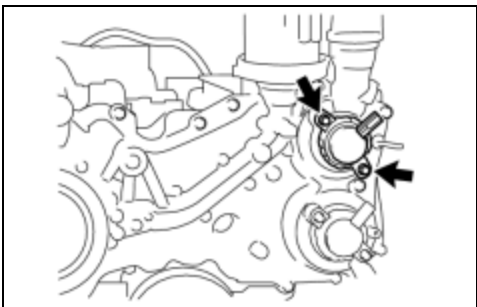
(b) Remove the O-ring from the camshaft timing oil control valve.

Text in Illustration

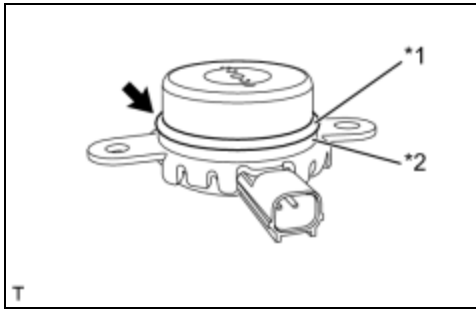
*1	O-ring
*2	Back-up Ring

(c) Remove the back-up ring from the camshaft timing oil control valve.

11. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE (for Intake Side of Bank 2)



(a) Remove the 2 bolts and camshaft timing oil control valve.



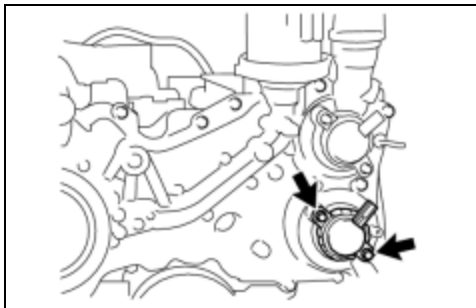
(b) Remove the O-ring from the camshaft timing oil control valve.

Text in Illustration

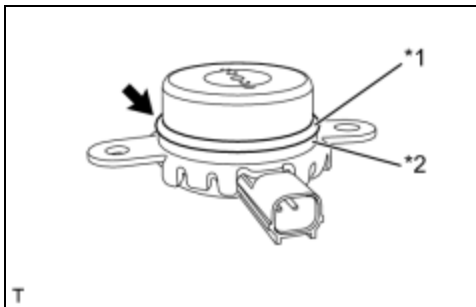
*1	O-ring
*2	Back-up Ring

(c) Remove the back-up ring from the camshaft timing oil control valve.

12. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE (for Exhaust Side of Bank 2)



(a) Remove the 2 bolts and camshaft timing oil control valve.



(b) Remove the O-ring from the camshaft timing oil control valve.

Text in Illustration

*1	O-ring
*2	Back-up Ring

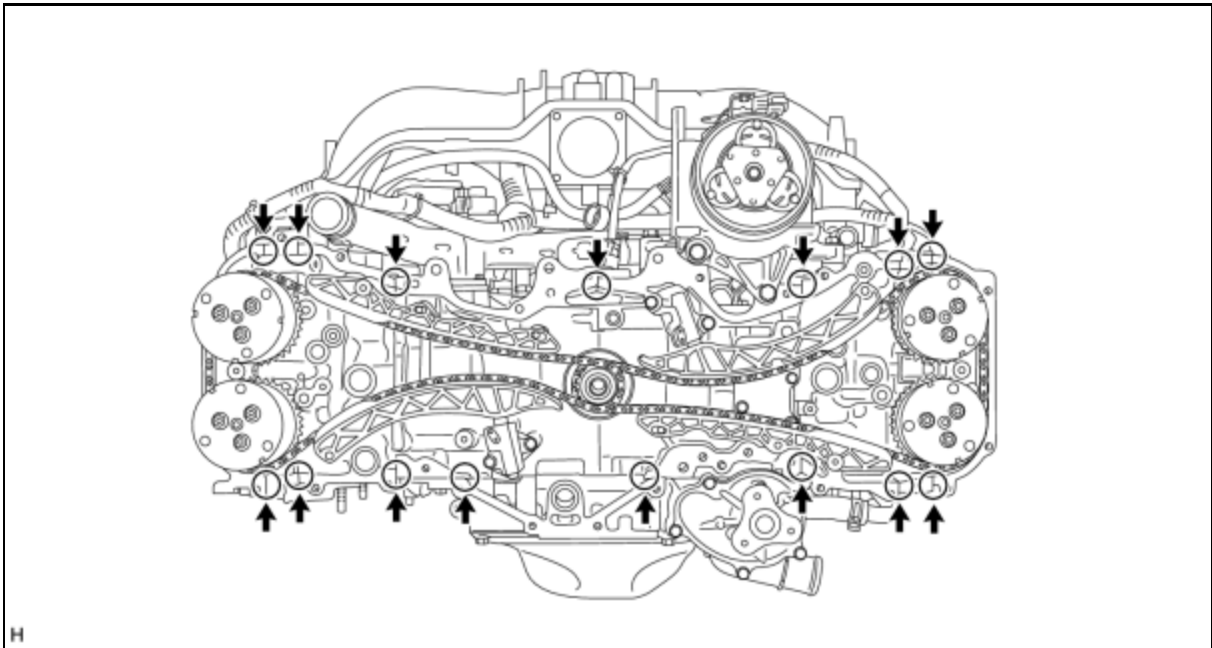
(c) Remove the back-up ring from the camshaft timing oil control valve.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000T5302TX
Title: FA20 LUBRICATION: OIL PUMP: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL TIMING CHAIN OR BELT COVER SUB-ASSEMBLY

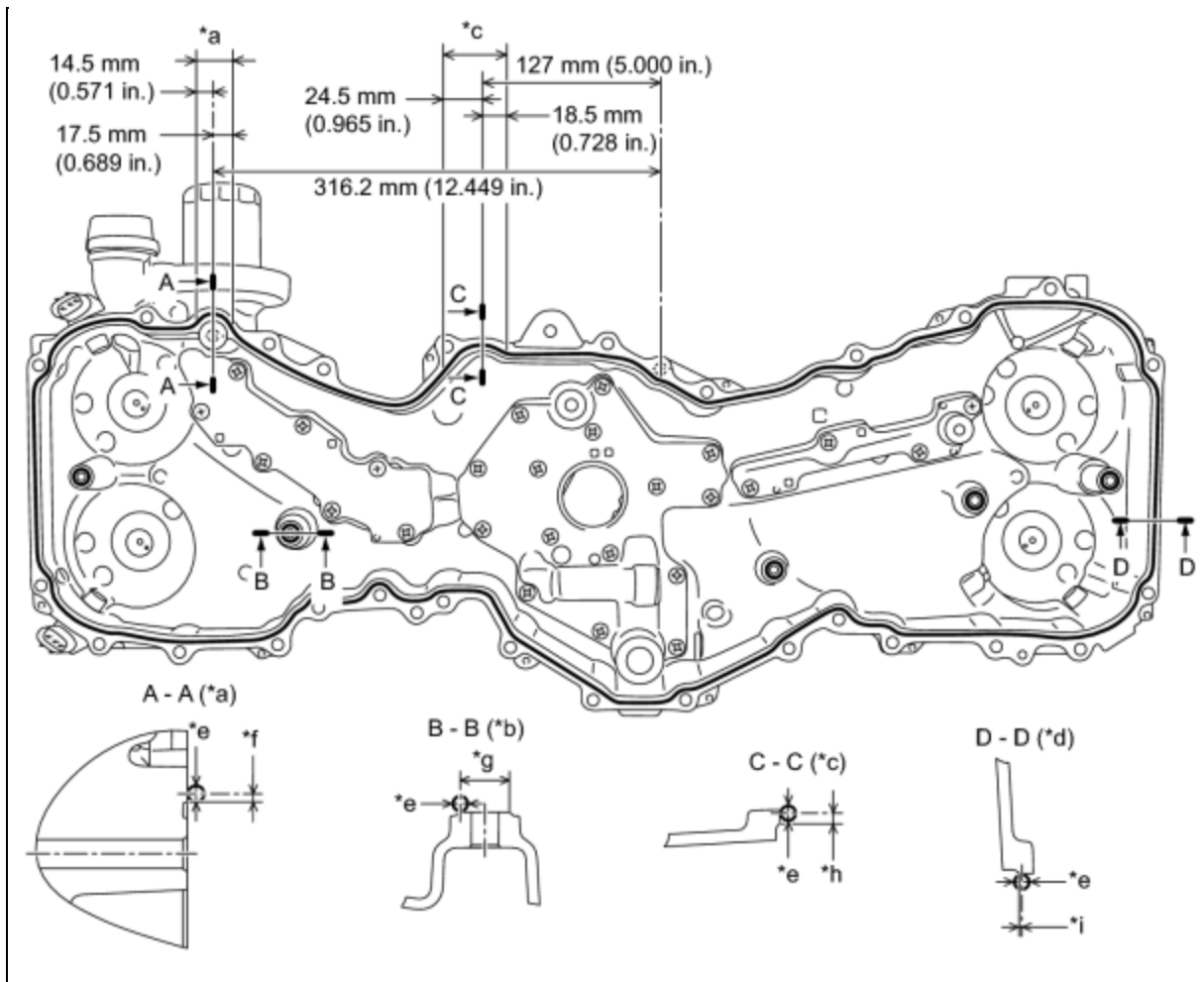
- (a) Apply a light coat of engine oil to the 4 O-rings.
- (b) Remove any old packing material remaining on the sealing surfaces before applying seal packing.
- (c) Apply seal packing in a continuous line to the engine unit as shown in the illustration.



Seal packing:

Toyota Genuine Seal Packing Black, Three Bond 1217G or equivalent

- (d) Apply seal packing in a line to the timing chain cover as shown in the following illustration.



Text in Illustration

*a	Range A	*b	Boss (5 locations)
*c	Range B	*d	Other than ranges A and B
*e	φ3.5 to 4.5 mm (0.138 to 0.177 in.)	*f	2 mm (0.079 in.)
*g	φ12 mm (0.472 in.)	*h	2.5 mm (0.098 in.)
*i	0.5 mm (0.020 in.)	-	-

Seal packing:

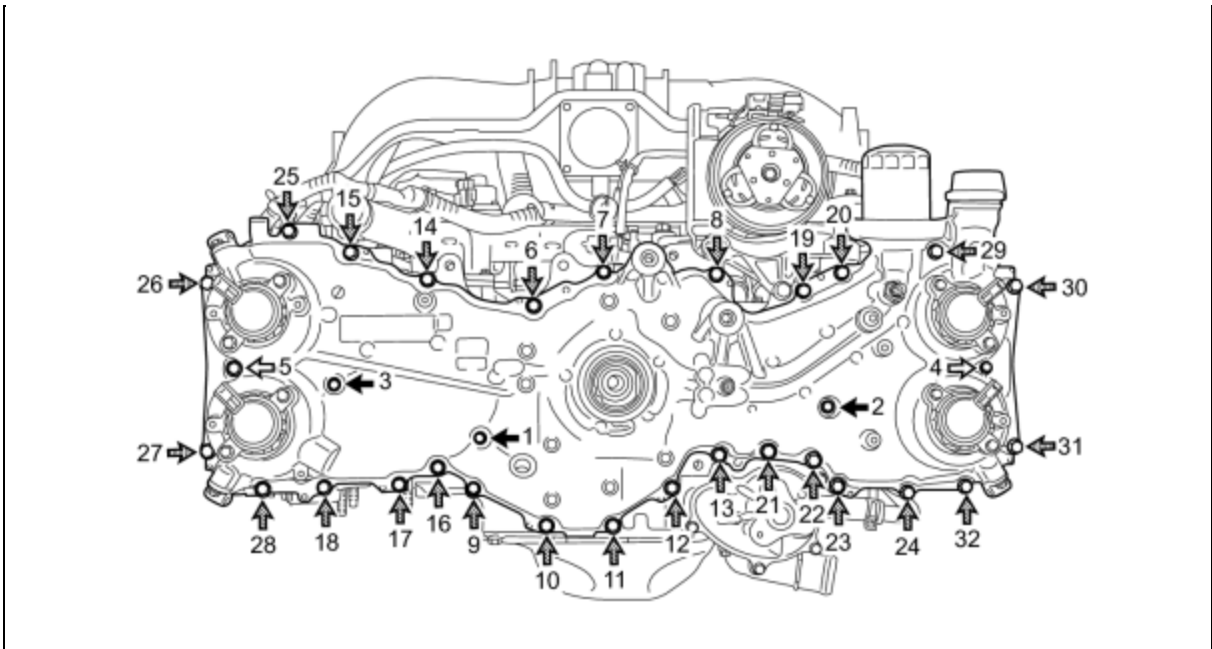
Toyota Genuine Seal Packing 1217G or equivalent

NOTICE:





- If the contact surfaces are wet, wipe them with an oil-free cloth before applying seal packing.
- Install the chain cover within 3 minutes and tighten the bolts within 10 minutes after applying seal packing.
- Do not add engine oil for at least 2 hours after installing.
- Do not start the engine for at least 2 hours after installing.

(e) Temporarily tighten the timing chain cover with the 32 bolts.

(f) Fully tighten the 32 bolts shown in the illustration.



Text in Illustration

	Bolt A		Bolt B
	Bolt C		Bolt D

for bolt A and B - Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

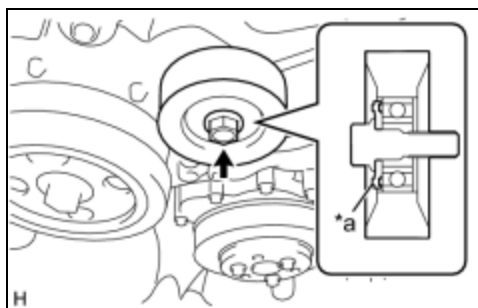
for bolt C and D - Torque: 25 N·m (255 kgf·cm, 18ft·lbf)

Bolt Length:

ITEM	LENGTH	ITEM	LENGTH
Bolt A	20 mm (0.787 in.)	Bolt B	25 mm (0.984 in.)
Bolt C	60 mm (2.362 in.)	Bolt D	50 mm (1.969 in.)

2. INSTALL TIMING CHAIN OR BELT COVER OIL SEAL INFO

3. INSTALL NO. 1 IDLER PULLEY SUB-ASSEMBLY



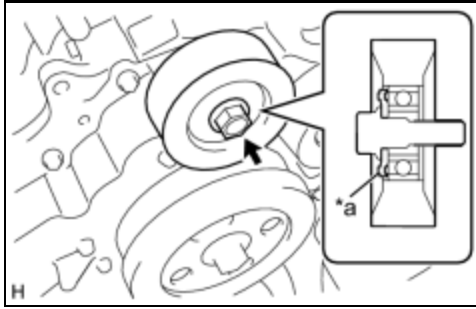
(a) Install the washer plate to the No. 1 idler pulley sub-assembly as shown in the illustration.

Text in Illustration

*a	Protrusion
----	------------

(b) Install the washer plate and No. 1 idler pulley sub-assembly with the bolt.

Torque: 36 N·m (367 kgf·cm, 27ft·lbf)



(c) Install the washer plate to the No. 1 idler pulley sub-assembly as shown in the illustration.

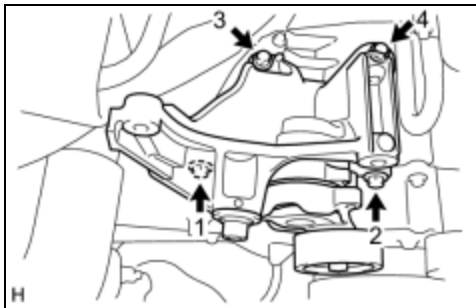
Text in Illustration

*a

Protrusion

(d) Install the washer plate and No. 1 idler pulley sub-assembly with the bolt.

Torque: 36 N·m (367 kgf·cm, 27ft·lbf)



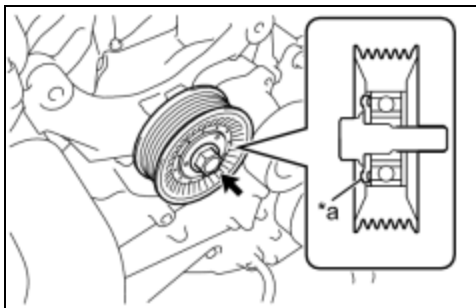
4. INSTALL V-RIBBED BELT TENSIONER ASSEMBLY

(a) Temporarily install the V-ribbed belt tensioner with the 5 bolts.

(b) Tighten the 4 bolts in the order shown in the illustration.

Torque: 36 N·m (367 kgf·cm, 27ft·lbf)

5. INSTALL NO. 2 IDLER PULLEY SUB-ASSEMBLY



(a) Install the washer plate to the No. 2 idler pulley sub-assembly as shown in the illustration.

Text in Illustration

*a

Protrusion

(b) Install the washer plate and No. 2 idler pulley sub-assembly with the bolt.

Torque: 36 N·m (367 kgf·cm, 27ft·lbf)

6. INSTALL OIL LEVEL DIPSTICK GUIDE

(a) Install a new O-ring to the oil level dipstick guide.

(b) Apply a light coat of engine oil to the O-ring.

(c) Install the oil level dipstick guide with the bolt.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

(d) Install the oil level dipstick sub-assembly.

7. CONNECT ENGINE WIRE

- (a) Connect the camshaft position sensor connector and camshaft timing oil control valve connector.
- (b) Engage the wire harness clamp.
- (c) Connect the engine oil pressure switch connector and engine oil temperature sensor connector.
- (d) Connect the camshaft position sensor connector and camshaft timing oil control valve connector.
- (e) Connect the 2 camshaft position sensor connectors and camshaft timing oil control valve connector.
- (f) Connect the camshaft position sensor connector.
- (g) Install the wire harness bracket with the bolt.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

- (h) Engage the wire harness clamp.
- (i) Install the 2 wire harness brackets with the 2 bolts.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

8. INSTALL INJECTOR COVER (for Bank 1) INFO

9. INSTALL CRANKSHAFT PULLEY INFO

10. INSTALL WATER PUMP PULLEY INFO

11. CONNECT RADIATOR OUTLET HOSE INFO

12. INSTALL EXHAUST MANIFOLD

INFO

13. INSTALL WATER FILLER SUB-ASSEMBLY INFO

14. INSTALL RADIATOR RESERVE TANK ASSEMBLY INFO

15. INSTALL INJECTOR DRIVER INFO

16. INSTALL GENERATOR ASSEMBLY

INFO

17. ADD ENGINE COOLANT

18. ADD ENGINE OIL INFO

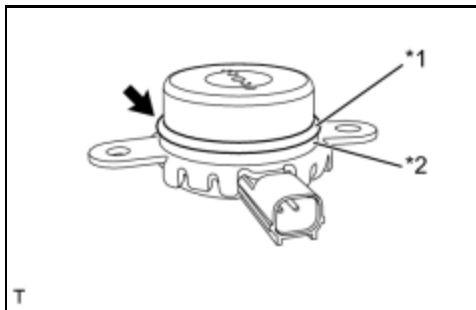
19. INSPECT FOR ENGINE OIL LEAK INFO

20. CHECK ENGINE OIL LEVEL INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000591K000X
Title: FA20 LUBRICATION: OIL PUMP: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE (for Exhaust Side of Bank 2)

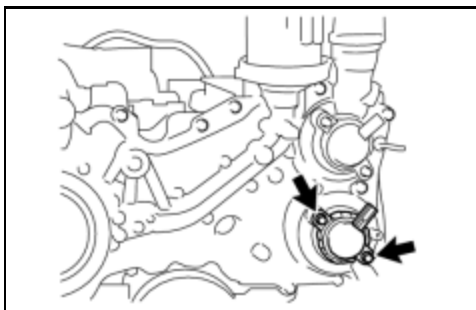


(a) Install the back-up ring to the camshaft timing oil control valve.

Text in Illustration

*1	O-ring
*2	Back-up Ring

(b) Apply a light coat of engine oil to a new O-ring and install it to the camshaft timing oil control valve.



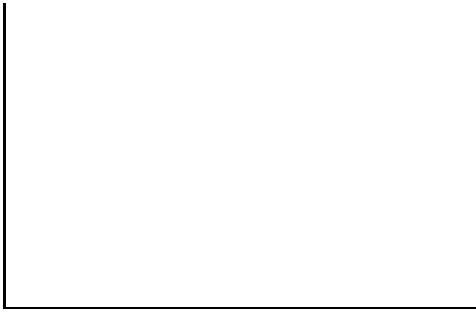
(c) Install the camshaft timing oil control valve with the 2 bolts.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

NOTICE:

- If a component has been dropped or subjected to a strong impact, replace it.
- Make sure that the O-ring is not damaged or does not jump out of position during installation.

2. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE (for Intake Side of Bank 2)

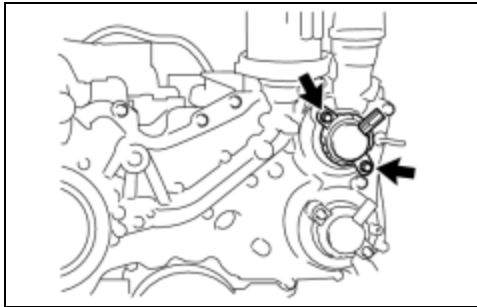


(a) Install the back-up ring to the camshaft timing oil control valve.

Text in Illustration

*1	O-ring
*2	Back-up Ring

(b) Apply a light coat of engine oil to a new O-ring and install it to the camshaft timing oil control valve.



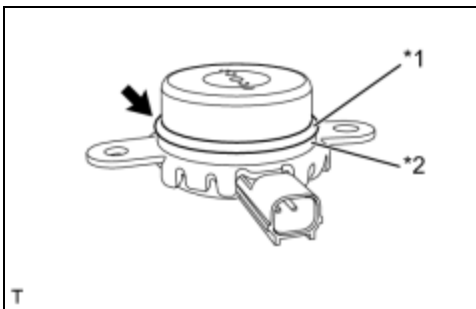
(c) Install the camshaft timing oil control valve with the 2 bolts.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

NOTICE:

- If a component has been dropped or subjected to a strong impact, replace it.
- Make sure that the O-ring is not damaged or does not jump out of position during installation.

3. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE (for Exhaust Side of Bank 1)

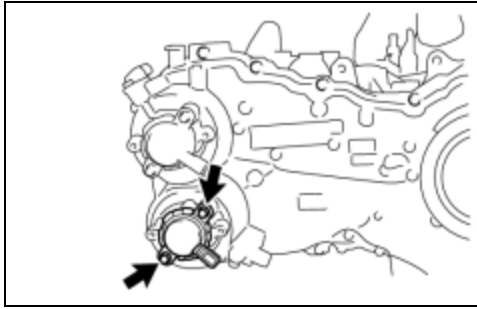


(a) Install the back-up ring to the camshaft timing oil control valve.

Text in Illustration

*1	O-ring
*2	Back-up Ring

(b) Apply a light coat of engine oil to a new O-ring and install it to the camshaft timing oil control valve.



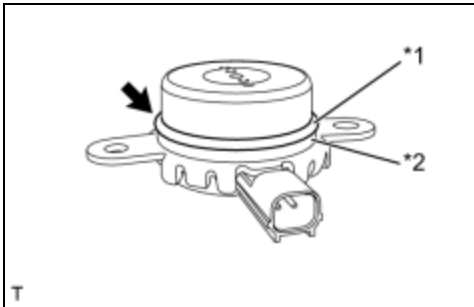
(c) Install the camshaft timing oil control valve with the 2 bolts.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

NOTICE:

- If a component has been dropped or subjected to a strong impact, replace it.
- Make sure that the O-ring is not damaged or does not jump out of position during installation.

4. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE (for Intake Side of Bank 1)

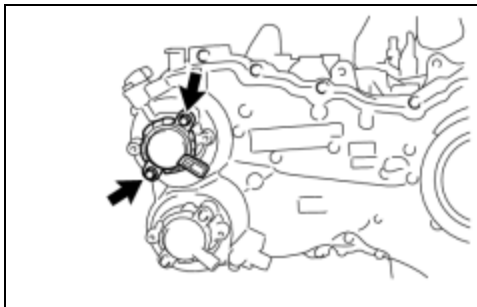


(a) Install the back-up ring to the camshaft timing oil control valve.

Text in Illustration

*1	O-ring
*2	Back-up Ring

(b) Apply a light coat of engine oil to a new O-ring and install it to the camshaft timing oil control valve.



(c) Install the camshaft timing oil control valve with the 2 bolts.

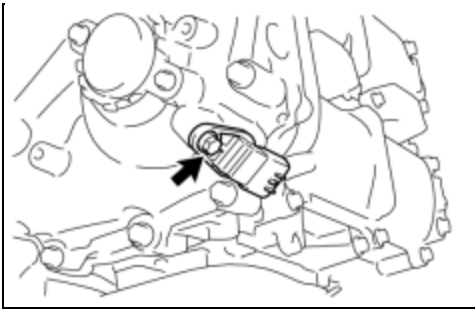
Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

NOTICE:

- If a component has been dropped or subjected to a strong impact, replace it.
- Make sure that the O-ring is not damaged or does not jump out of position during installation.

5. INSTALL VVT SENSOR (for Exhaust Side of Bank 2)

(a) Apply a light coat of engine oil to the new O-ring of the VVT sensor.

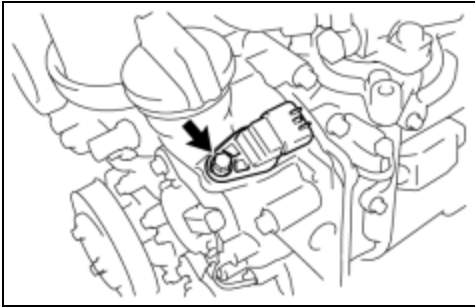


(b) Install the VVT sensor with the bolt.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

6. INSTALL VVT SENSOR (for Intake Side of Bank 2)

(a) Apply a light coat of engine oil to the new O-ring of the VVT sensor.

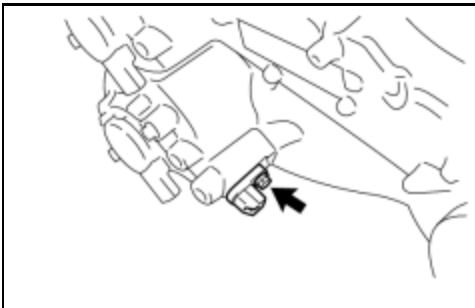


(b) Install the VVT sensor with the bolt.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

7. INSTALL VVT SENSOR (for Exhaust Side of Bank 1)

(a) Apply a light coat of engine oil to the new O-ring of the VVT sensor.

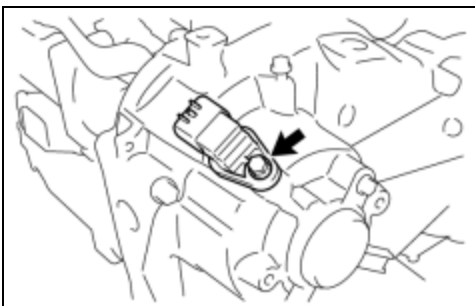


(b) Install the VVT sensor with the bolt.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

8. INSTALL VVT SENSOR (for Intake Side of Bank 1)

(a) Apply a light coat of engine oil to the new O-ring of the VVT sensor.

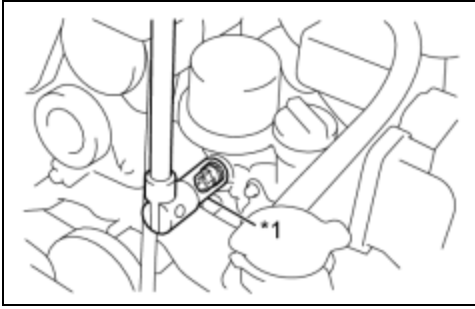


(b) Install the VVT sensor with the bolt.

Torque: 6.4 N·m (65 kgf·cm, 57in·lbf)

9. INSTALL ENGINE OIL TEMPERATURE SENSOR

- (a) Install a new gasket to the engine oil temperature sensor.



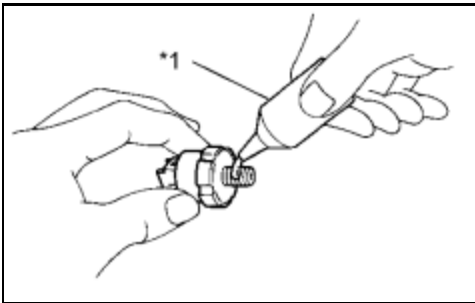
- (b) Using a 19 mm deep socket wrench, install the engine oil temperature sensor to the cylinder head sub-assembly.

Text in Illustration

*1	19 mm Deep Socket Wrench
----	--------------------------

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

10. INSTALL ENGINE OIL PRESSURE SWITCH ASSEMBLY



- (a) Apply adhesive to 2 or 3 threads of the engine oil pressure switch assembly.

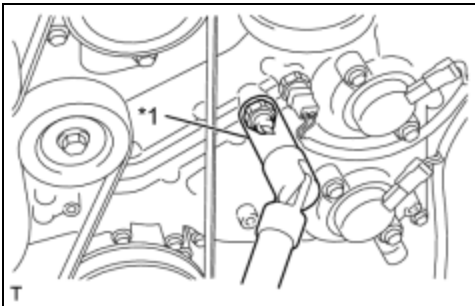
Text in Illustration

*1	Adhesive
----	----------

Adhesive:

Toyota Genuine Adhesive 1324, Three Bond 1324 or equivalent

- (b) Using a 24 mm deep socket wrench, install the engine oil pressure switch assembly.



Text in Illustration

*1	24 mm Deep Socket Wrench
----	--------------------------

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

NOTICE:

Do not start the engine for at least 1 hour after installation.

11. INSTALL OIL FILTER UNION INFO

12. INSTALL OIL FILTER SUB-ASSEMBLY INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000T5702RX
Title: FA20 LUBRICATION: OIL PUMP: REMOVAL (2013 FR-S)		

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

2. DRAIN ENGINE COOLANT INFO

3. REMOVE GENERATOR ASSEMBLY

INFO

4. REMOVE INJECTOR DRIVER INFO

5. REMOVE RADIATOR RESERVE TANK ASSEMBLY INFO

6. REMOVE WATER FILLER SUB-ASSEMBLY INFO

7. REMOVE EXHAUST MANIFOLD

INFO

8. DISCONNECT RADIATOR OUTLET HOSE INFO

9. DRAIN ENGINE OIL INFO

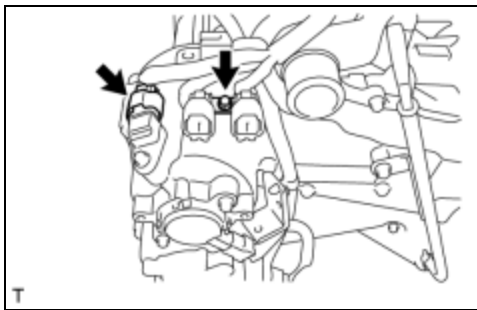
10. REMOVE WATER PUMP PULLEY INFO

11. REMOVE CRANKSHAFT PULLEY INFO

12. REMOVE INJECTOR COVER (for Bank 1) INFO

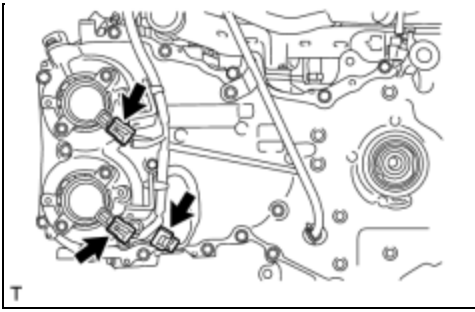
13. DISCONNECT ENGINE WIRE

(a) Remove the 2 bolts and disconnect the 2 wire harness clamp brackets from the engine assembly.

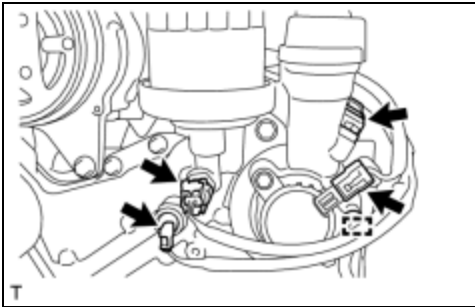


(b) Remove the bolts and disconnect the wire harness clamp bracket from the engine assembly.

(c) Disconnect the camshaft position sensor connector.



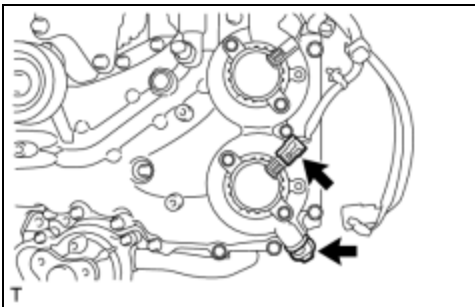
(d) Disconnect the camshaft position sensor connector and 2 camshaft timing oil control valve connectors.



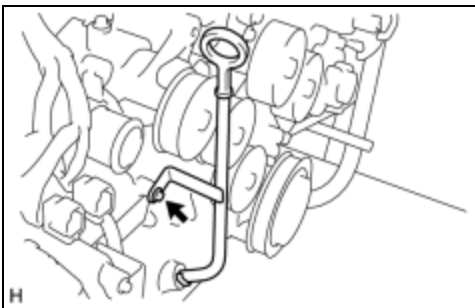
(e) Disconnect the camshaft position sensor connector and camshaft timing oil control valve connector.

(f) Disconnect the engine oil pressure switch connector and engine oil temperature connector.

(g) Disengage the clamp.



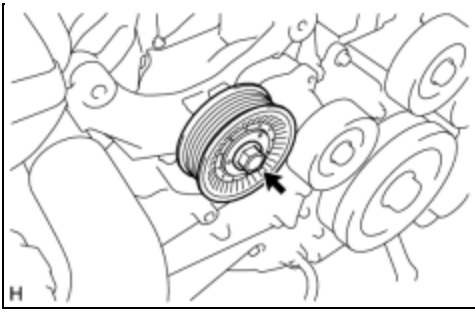
(h) Disconnect the camshaft position sensor connector and camshaft timing oil control valve connector.



14. REMOVE OIL LEVEL DIPSTICK GUIDE

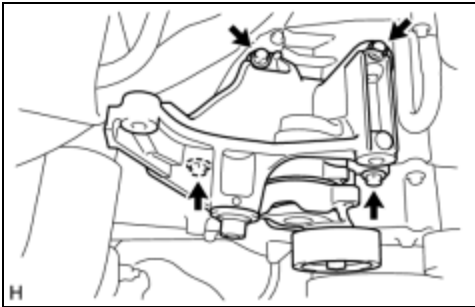
- (a) Remove the oil level dipstick sub-assembly.
- (b) Remove the bolt and oil level dipstick guide.
- (c) Remove the O-ring from the oil level dipstick guide.

15. REMOVE NO. 2 IDLER PULLEY SUB-ASSEMBLY



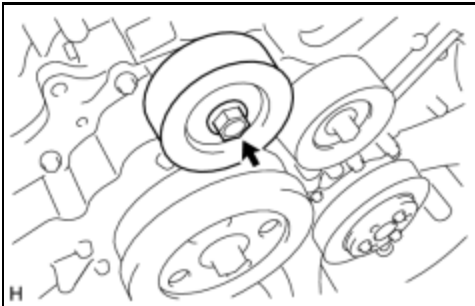
- (a) Remove the bolt, washer plate and No. 2 idler pulley sub-assembly.

16. REMOVE V-RIBBED BELT TENSIONER ASSEMBLY

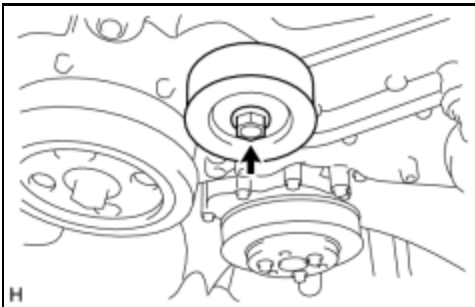


- (a) Remove the 4 bolts and V-ribbed belt tensioner assembly.

17. REMOVE NO. 1 IDLER PULLEY SUB-ASSEMBLY



- (a) Remove the bolt, washer plate and No. 1 idler pulley sub-assembly.



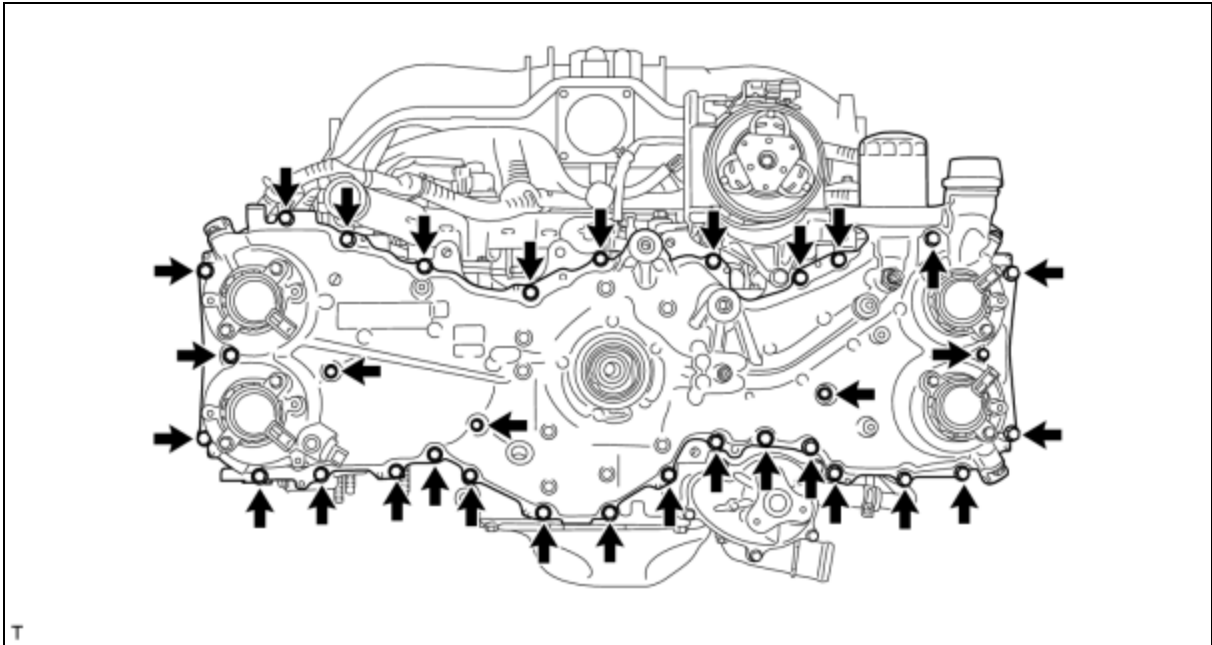
- (b) Remove the bolt, washer plate and No. 1 idler pulley sub-assembly.

18. REMOVE TIMING CHAIN OR BELT COVER OIL SEAL

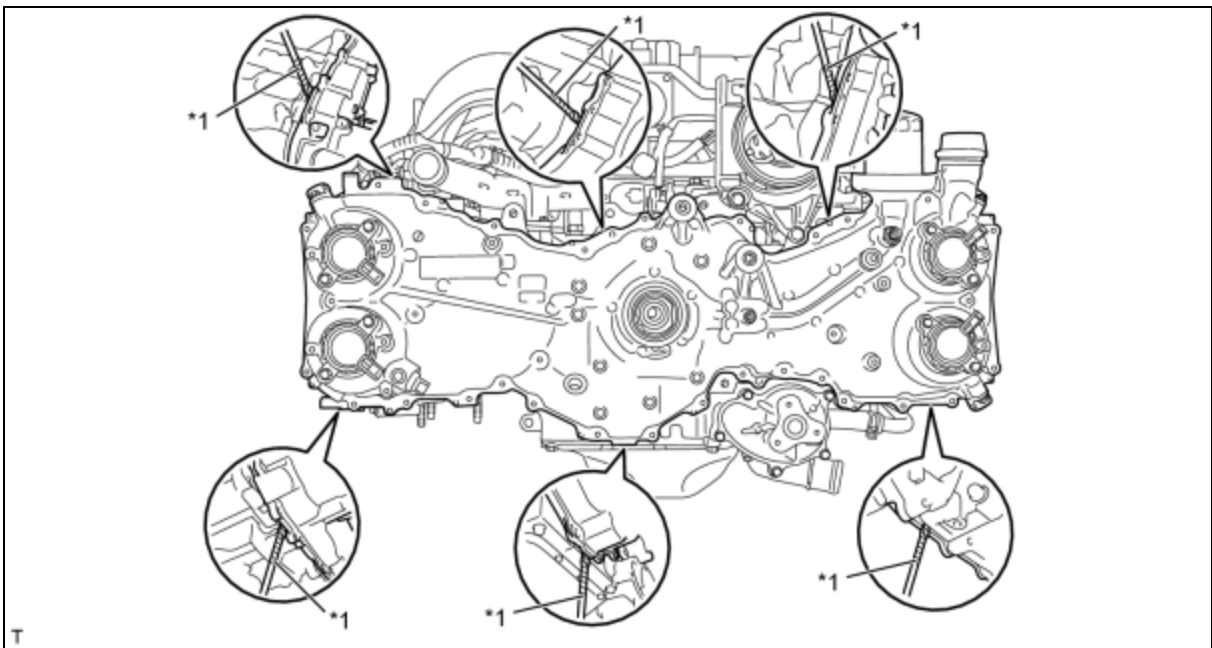
INFO

19. REMOVE TIMING CHAIN OR BELT COVER SUB-ASSEMBLY

(a) Remove the 32 bolts.



(b) Using a screwdriver with its tip wrapped with protective tape, remove the timing chain or belt cover sub-assembly by prying between the timing chain or belt cover sub-assembly and cylinder head or cylinder block.



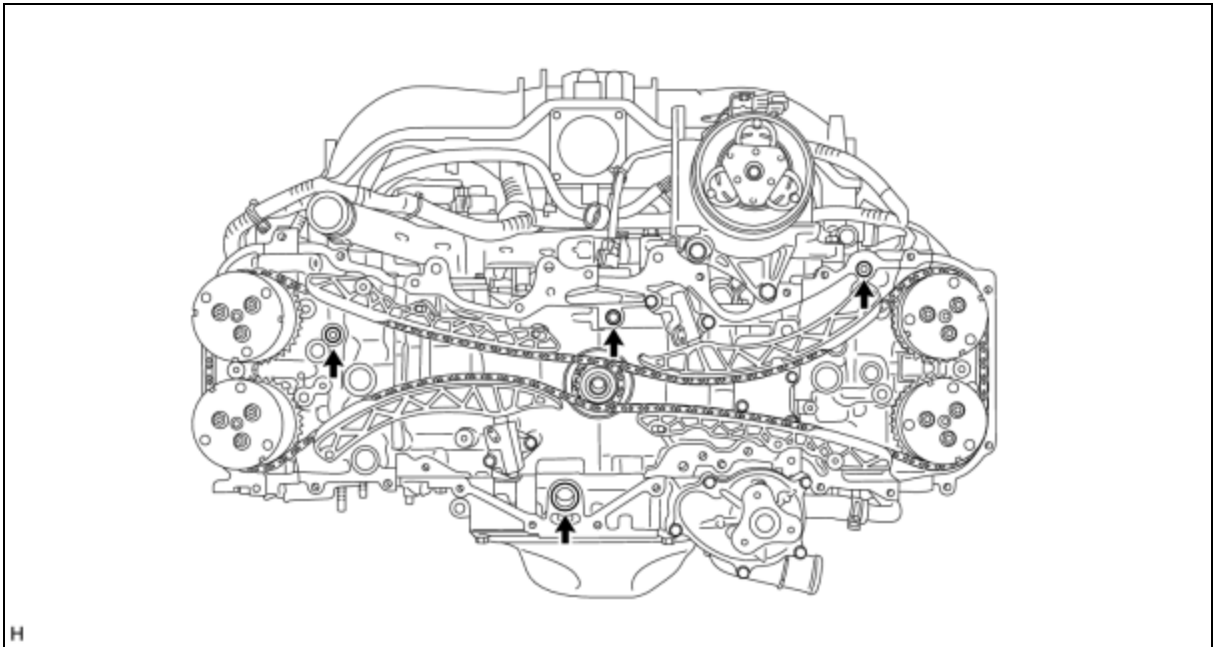
Text in Illustration

*1	Protective Tape	-	-
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NOTICE:

Be careful not to damage the contact surfaces of the cylinder head, cylinder block or chain cover.

(c) Remove the 4 O-rings.

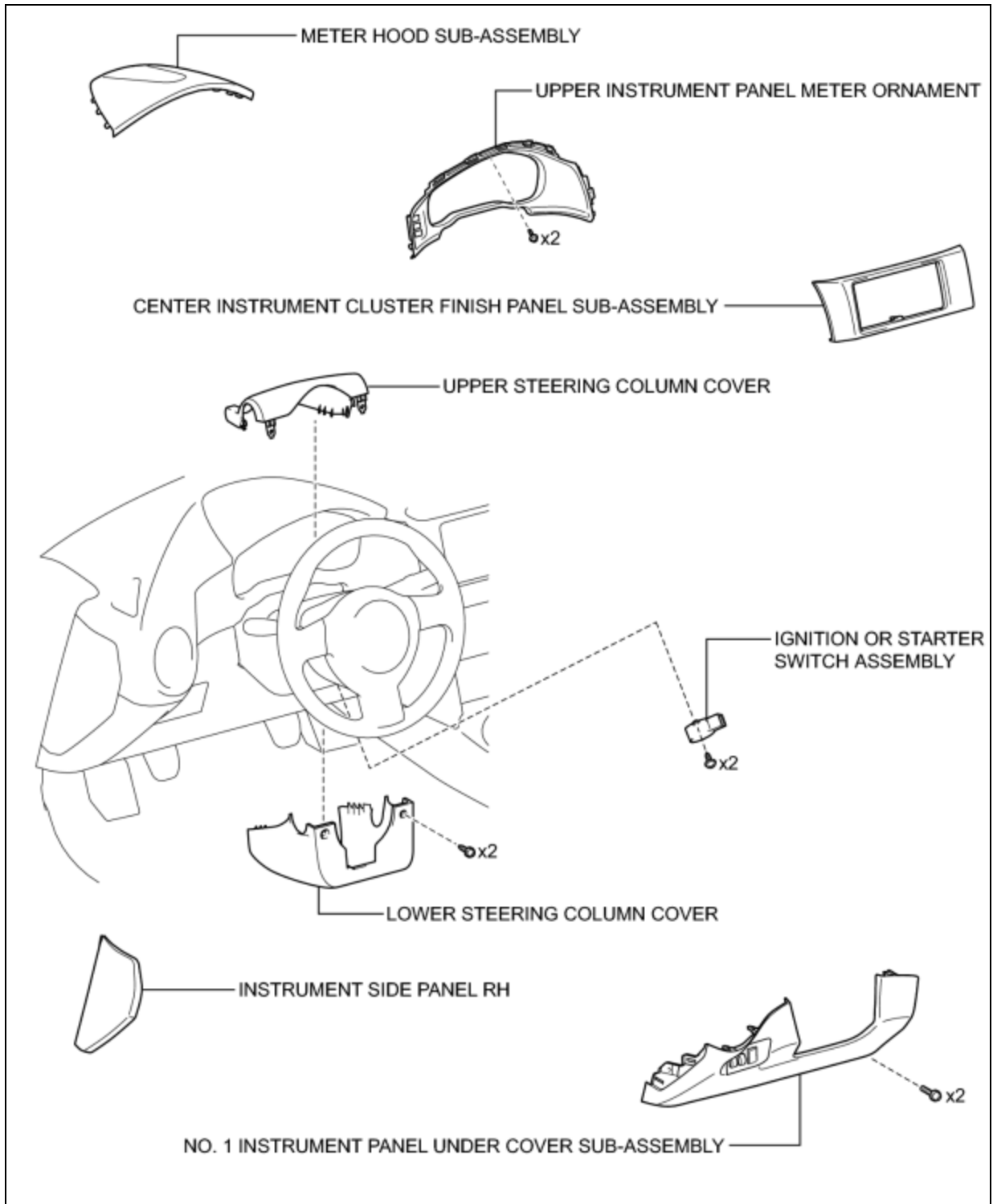


H

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003VP800LX
Title: FA20 STARTING: IGNITION SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



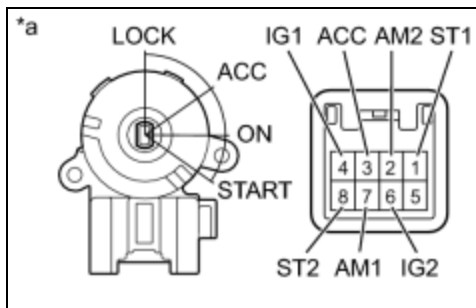
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003VP700NX
Title: FA20 STARTING: IGNITION SWITCH: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT IGNITION OR STARTER SWITCH ASSEMBLY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
All combinations of all terminals	LOCK	10 k Ω or higher
2 (AM2) - 3 (ACC)	ACC	Below 1 Ω
2 (AM2) - 3 (ACC) - 4 (IG1) 6 (IG2) - 7 (AM1)	ON	Below 1 Ω
1 (ST1) - 2 (AM2) - 4 (IG1) 6 (IG2) - 7 (AM1) - 8 (ST2)	START	Below 1 Ω

Text in Illustration

*a	Component without harness connected (Ignition or starter Switch Assembly)
----	---

If the result is not as specified, replace the ignition or starter switch assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003VP600UX
Title: FA20 STARTING: IGNITION SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL IGNITION OR STARTER SWITCH ASSEMBLY

- (a) Install the 2 screws, and install the ignition or starter switch.
- (b) Connect the connector.

2. INSTALL UPPER STEERING COLUMN COVER [INFO](#)

3. INSTALL LOWER STEERING COLUMN COVER [INFO](#)

4. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)

5. INSTALL UPPER INSTRUMENT PANEL METER ORNAMENT [INFO](#)

6. INSTALL METER HOOD SUB-ASSEMBLY [INFO](#)

7. INSTALL CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY [INFO](#)

8. INSTALL INSTRUMENT SIDE PANEL RH [INFO](#)



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003VP900UX
Title: FA20 STARTING: IGNITION SWITCH: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE INSTRUMENT SIDE PANEL RH [INFO](#)
2. REMOVE CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY [INFO](#)
3. REMOVE METER HOOD SUB-ASSEMBLY [INFO](#)
4. REMOVE UPPER INSTRUMENT PANEL METER ORNAMENT [INFO](#)
5. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)
6. REMOVE LOWER STEERING COLUMN COVER [INFO](#)
7. REMOVE UPPER STEERING COLUMN COVER [INFO](#)
8. REMOVE IGNITION OR STARTER SWITCH ASSEMBLY



(a) Disconnect the connector.

(b) Remove the 2 screws, and remove the ignition switch.

Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002U5203MX
Title: FA20 STARTING: KEY INTER LOCK SYSTEM: Key Cannot be Removed or Inserted (2013 FR-S)		

[Key Cannot be Removed or Inserted](#)

DESCRIPTION

When an ACC signal and a P signal is input, the control unit relay assembly outputs a signal to the key inter lock solenoid.

WIRING DIAGRAM

Refer to System Diagram [INFO](#) .

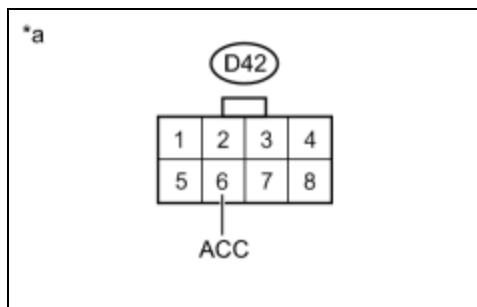
INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CHECK WIRE HARNESS AND CONNECTOR (ACC VOLTAGE)
-----------	---



(a) Disconnect the D42 control unit relay assembly connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
D42-6 (ACC) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to control unit relay assembly)
----	--

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

2. CHECK WIRE HARNESS AND CONNECTOR (CONTROL UNIT RELAY ASSEMBLY - BODY GROUND)

- (a) Disconnect the D42 control unit relay assembly connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D42-1 (E) - Body ground	Always	Below 1 Ω

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

3. INSPECT P SWITCH (FLOOR SHIFT SHIFT LEVER HOUSING)

- (a) Inspect the P switch (floor shift shift lever housing) INFO.

NG ► REPLACE P SWITCH (FLOOR SHIFT SHIFT LEVER HOUSING)

OK
▼

4. CHECK WIRE HARNESS AND CONNECTOR (CONTROL UNIT RELAY ASSEMBLY - P SWITCH (FLOOR SHIFT SHIFT LEVER HOUSING))

- (a) Disconnect the D42 control unit relay assembly connector.

(b) Disconnect the D28 P switch (floor shift shift lever housing) connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D42-4 (P) - D28-1 (P)	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D42-4 (P) or D28-1 (P) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



5.	CHECK WIRE HARNESS AND CONNECTOR (P SWITCH (FLOOR SHIFT SHIFT LEVER HOUSING) - BODY GROUND)
-----------	--

(a) Disconnect the D28 P switch (floor shift shift lever housing) connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

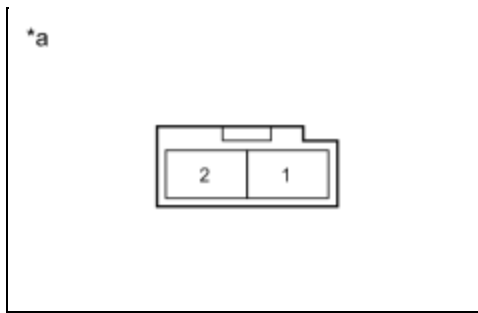
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D28-3 (E) - Body ground	Always	Below 1 Ω

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



6.	CHECK KEY INTER LOCK SOLENOID
-----------	--------------------------------------



(a) Disconnect the D60 key inter lock solenoid connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	13.05 to 15.95 Ω

Text in Illustration

*a	Component without harness connected (Key Inter Lock Solenoid)
----	--

NG **REPLACE KEY INTER LOCK SOLENOID**

OK

7.	CHECK WIRE HARNESS AND CONNECTOR (CONTROL UNIT RELAY ASSEMBLY - KEY INTER LOCK SOLENOID)
-----------	---

(a) Disconnect the D42 control unit relay assembly connector.

(b) Disconnect the D60 key inter lock solenoid connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D42-5 (KLS+) - D60-2	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D42-5 (KLS+) or D60-2 - Body ground	Always	10 kΩ or higher

REPAIR OR REPLACE HARNESS OR

OK


8.	CHECK WIRE HARNESS AND CONNECTOR (KEY INTER LOCK SOLENOID - BODY GROUND)
----	---

- (a) Disconnect the D60 key inter lock solenoid connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D60-1 - Body ground	Always	Below 1 Ω

NG  REPAIR OR REPLACE HARNESS OR CONNECTOR

OK  REPLACE CONTROL UNIT RELAY ASSEMBLY

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000057TO000X
Title: FA20 STARTING: KEY INTER LOCK SYSTEM: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. CHECK KEY INTER LOCK OPERATION

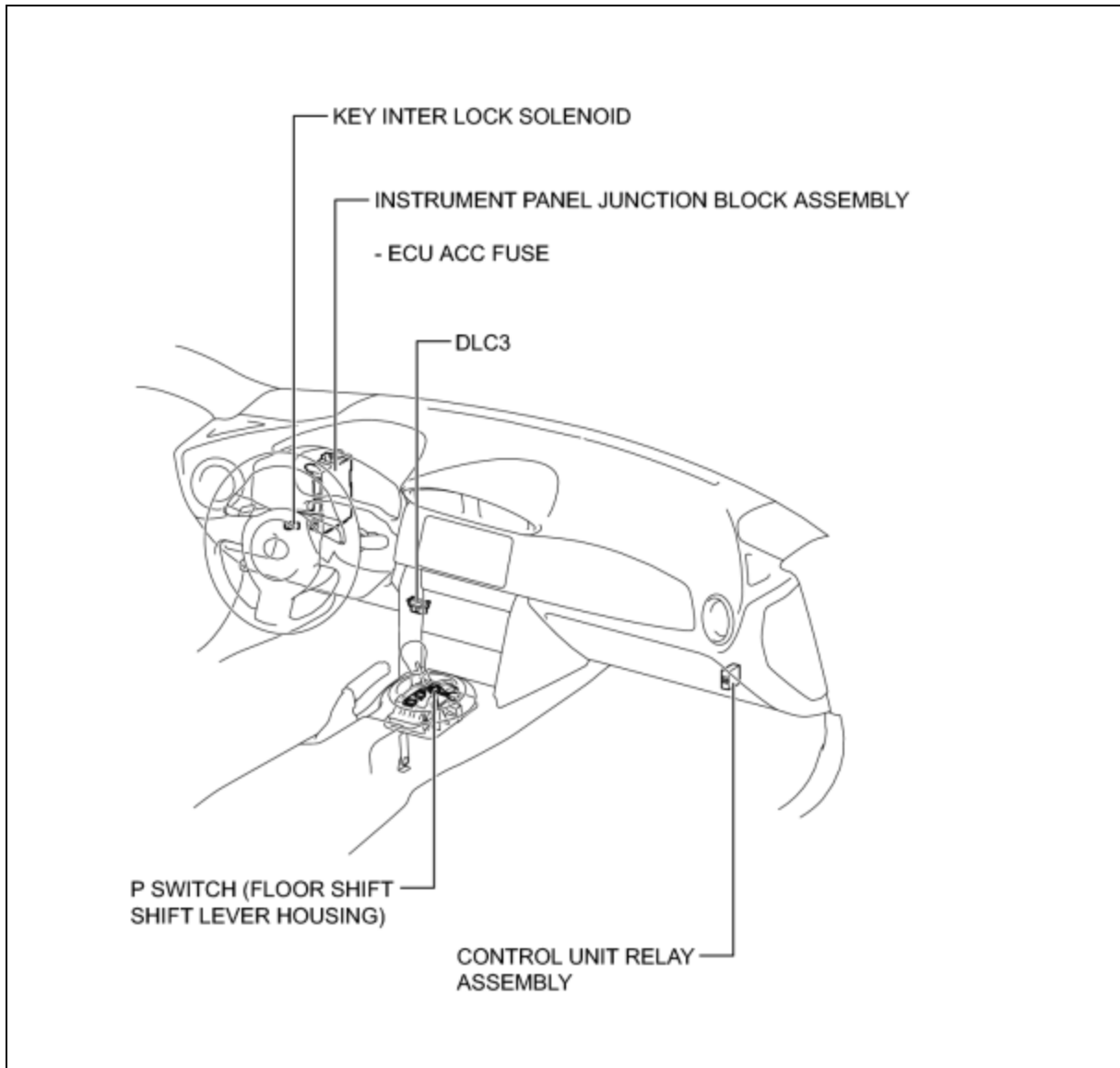
- (a) Turn the ignition switch to ON.
- (b) Depress the brake pedal and move the shift lever to any position other than P.
- (c) Check that the ignition key cannot be turned to LOCK.
- (d) Move the shift lever to P, turn the ignition key to LOCK and check that the ignition key can be removed. If the operation cannot be done as specified, inspect the key inter lock circuit.



Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000BNP000X
Title: FA20 STARTING: KEY INTER LOCK SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003N4Y00WX
Title: FA20 STARTING: KEY INTER LOCK SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

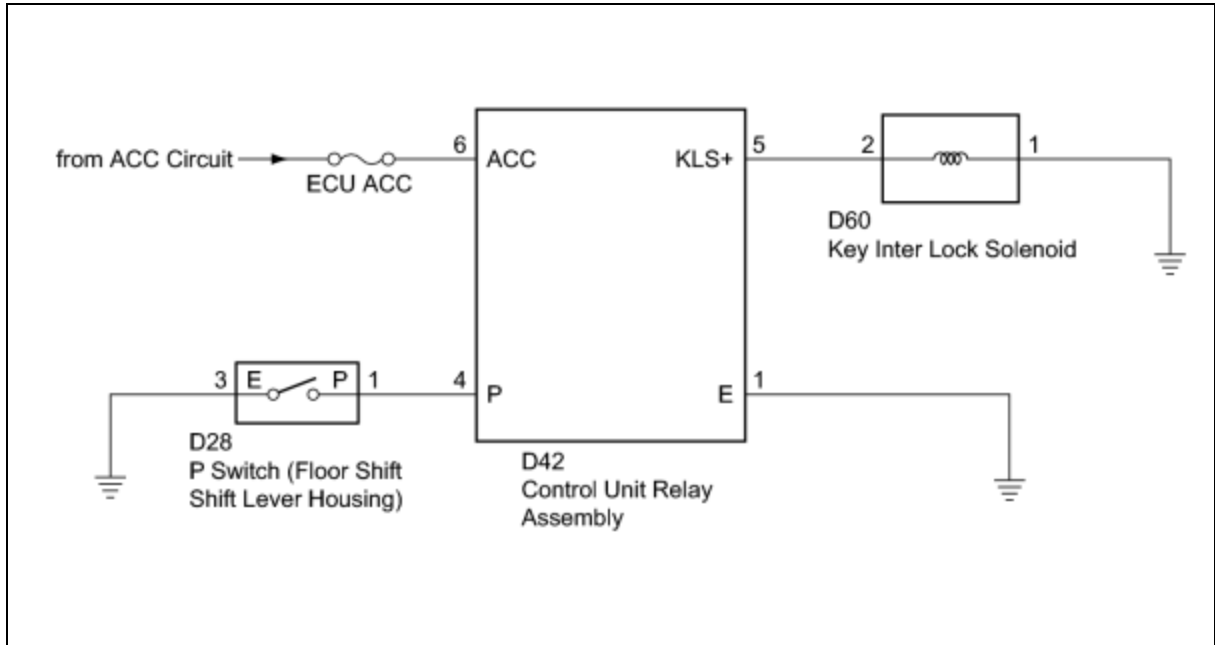
Key Inter Lock System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Key cannot be removed or inserted	Key inter lock circuit	INFO



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003N95014X
Title: FA20 STARTING: KEY INTER LOCK SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

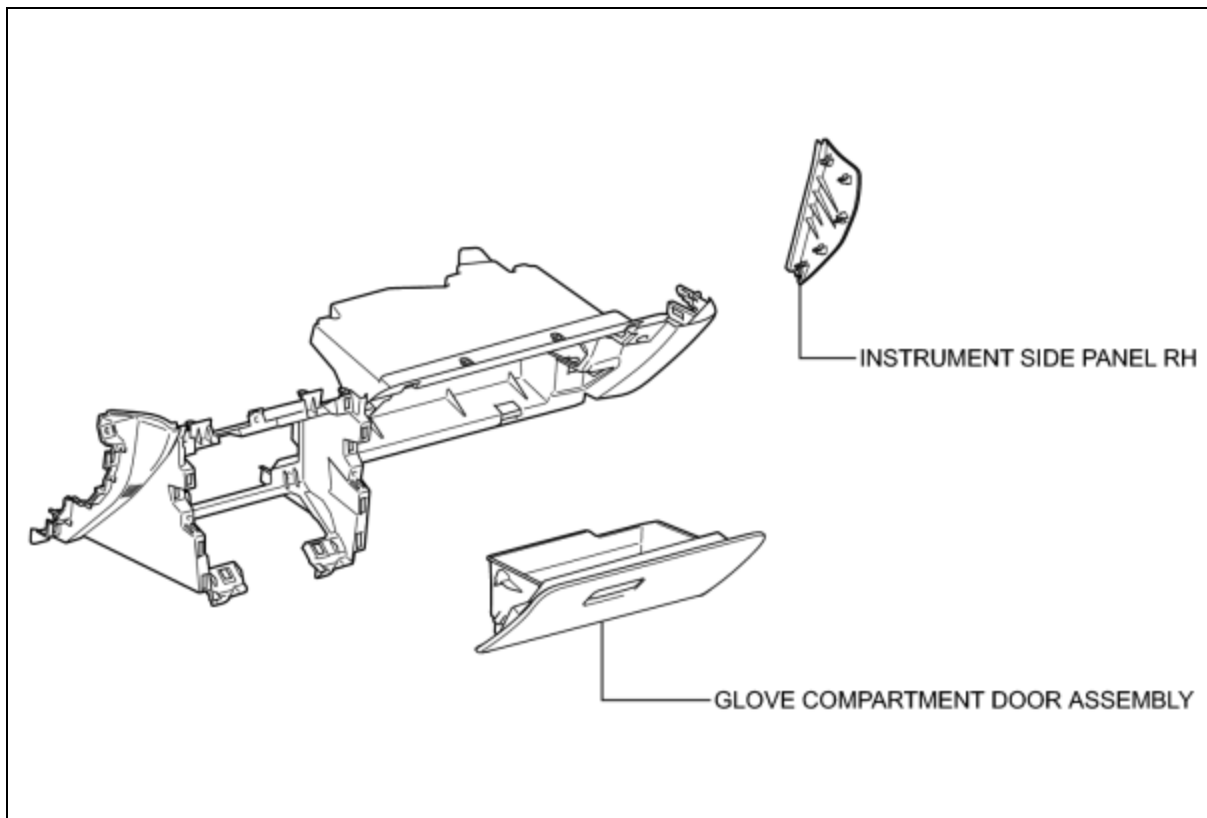
SYSTEM DIAGRAM



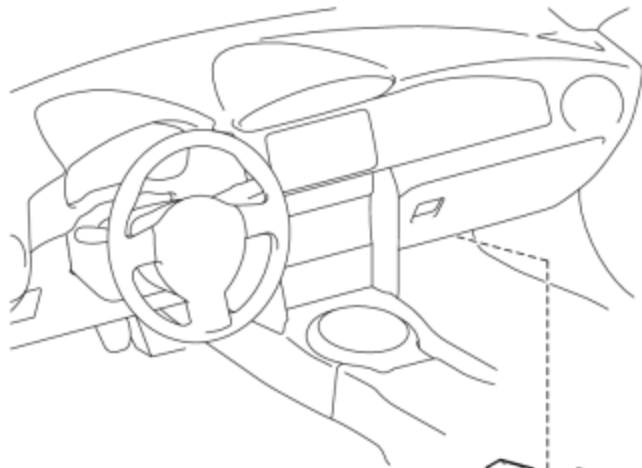
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000048MW007X
Title: FA20 STARTING: KEY LOCK UNIT: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



6.0 (61, 53 in.*lbf)

CONTROL UNIT RELAY ASSEMBLY

N*m (kgf*cm, ft*lbf) : Specified torque



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000048QE007X
Title: FA20 STARTING: KEY LOCK UNIT: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL CONTROL UNIT RELAY ASSEMBLY

(a) Install the control unit relay with the bolt.

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

2. INSTALL GLOVE COMPARTMENT DOOR ASSEMBLY [INFO](#)

3. INSTALL INSTRUMENT SIDE PANEL RH [INFO](#)

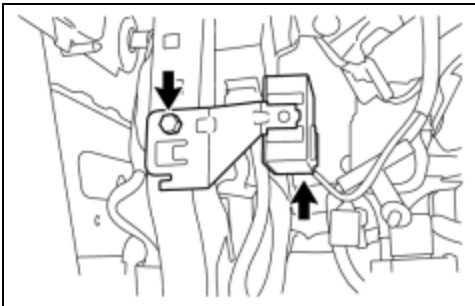
4. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL [INFO](#)



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000048QF007X
Title: FA20 STARTING: KEY LOCK UNIT: REMOVAL (2013 FR-S)		

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO
2. REMOVE INSTRUMENT SIDE PANEL RH INFO
3. REMOVE GLOVE COMPARTMENT DOOR ASSEMBLY INFO
4. REMOVE CONTROL UNIT RELAY ASSEMBLY



(a) Disconnect the control unit relay assembly connector.

(b) Remove the bolt and control unit relay assembly unit.

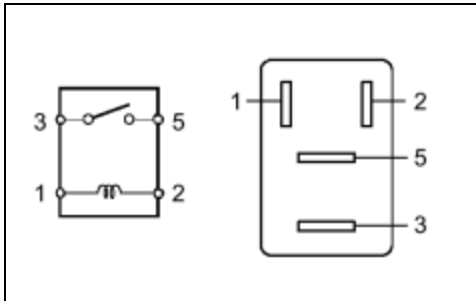
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001FFP03HX
Title: FA20 STARTING: RELAY: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT ST RELAY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



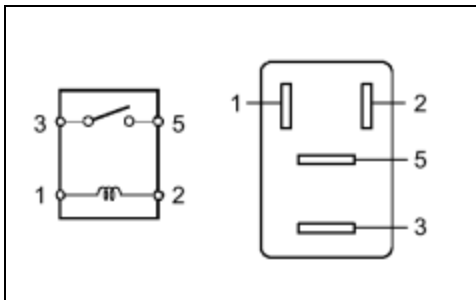
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	Battery voltage not applied to terminals 1 and 2 Measurement temperature : 20 °C	93.8 to 136.4 kΩ
3 - 5	Battery voltage not applied to terminals 1 and 2	10 kΩ or higher
3 - 5	Battery voltage applied to terminals 1 and 2	Below 1 Ω

If the result is not as specified, replace the starter relay.

2. REMOVE INHIBITOR RELAY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



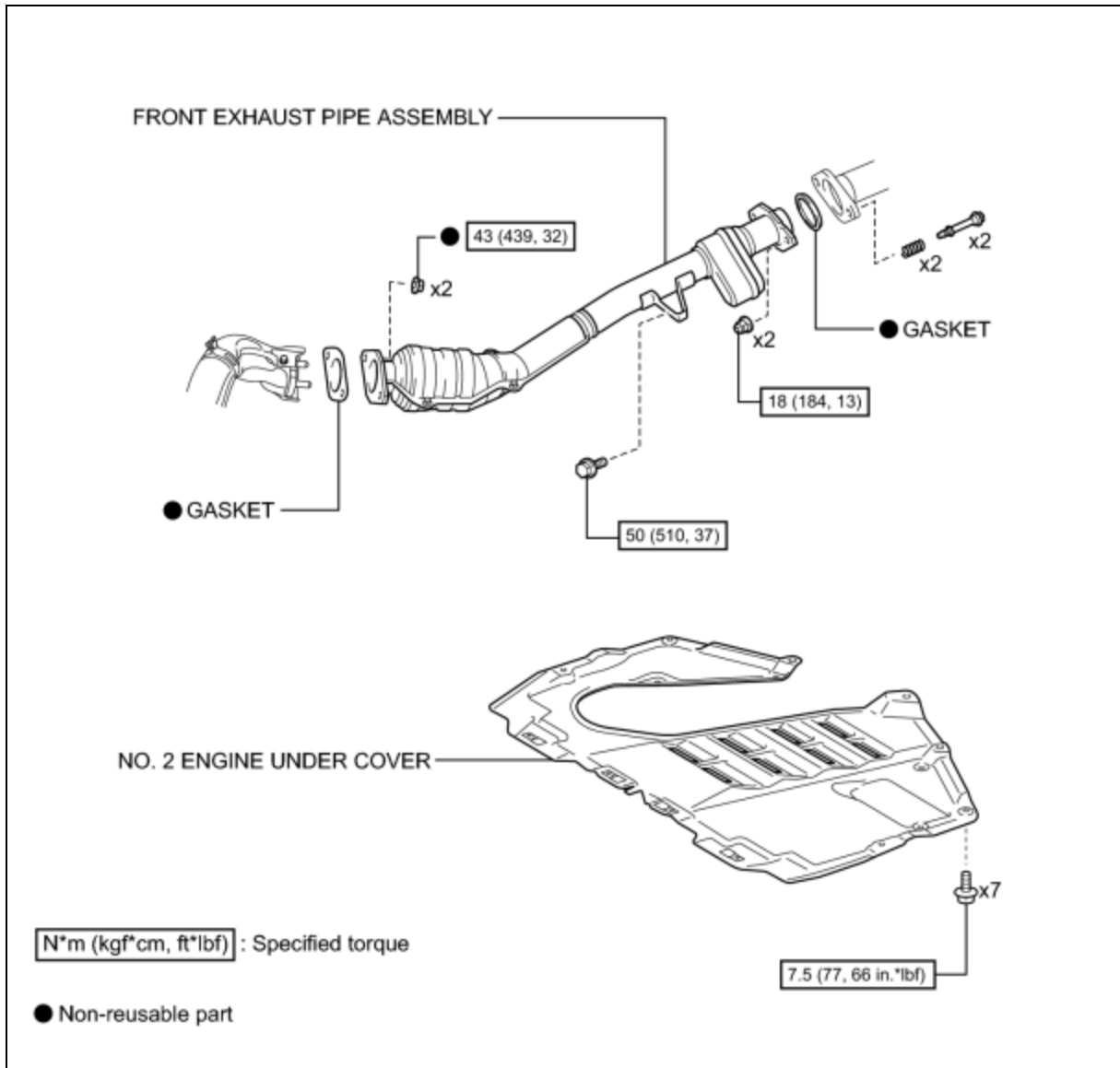
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	Battery voltage not applied to terminals 1 and 2 Measurement temperature : 20 °C	93.8 to 136.4 kΩ
3 - 5	Battery voltage not applied to terminals 1 and 2	10 kΩ or higher
3 - 5	Battery voltage applied to terminals 1 and 2	Below 1 Ω

If the result is not as specified, replace the starter relay.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001UBV007X
Title: FA20 STARTING: STARTER: COMPONENTS (2013 FR-S)		

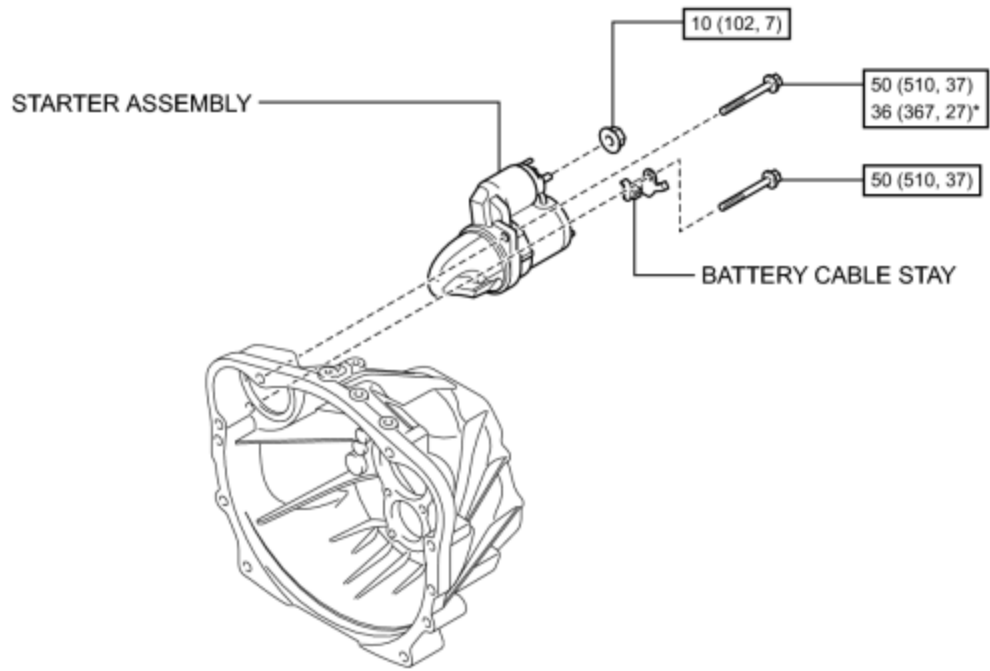
COMPONENTS

ILLUSTRATION

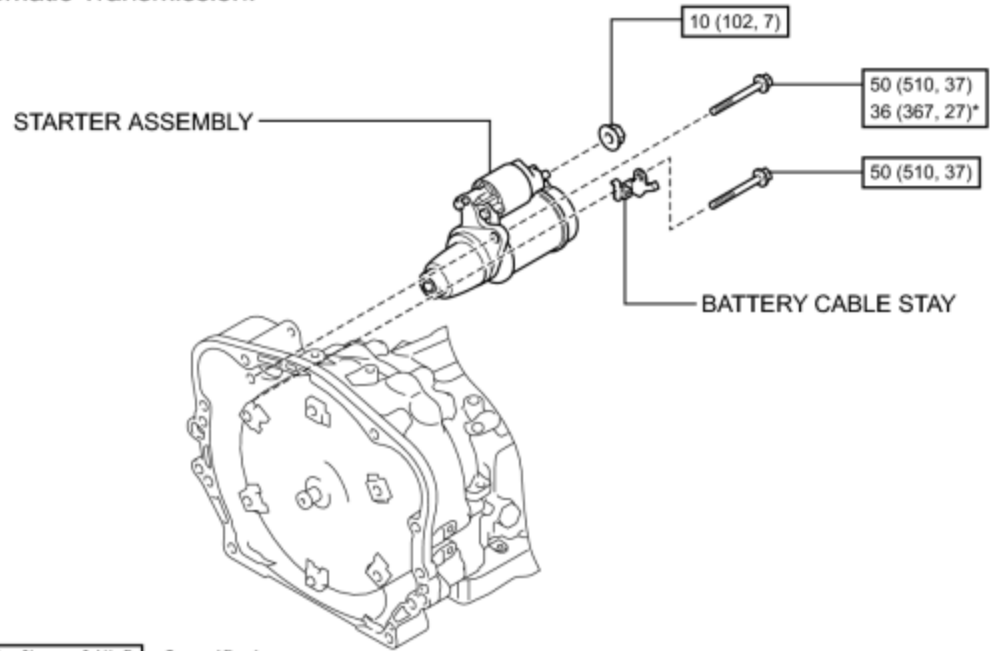


ILLUSTRATION

for Manual Transmission:



for Automatic Transmission:



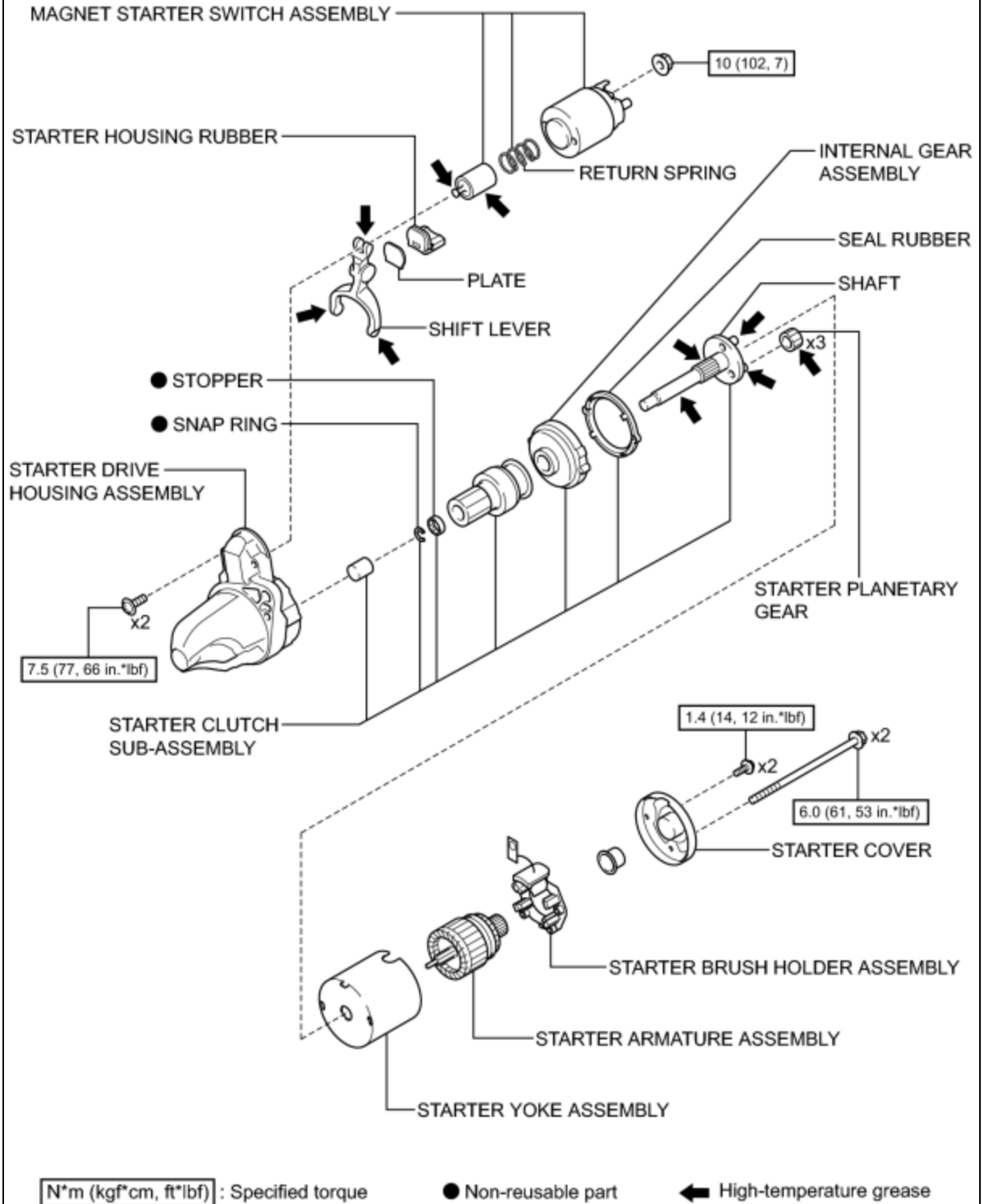
N*m (kgf*cm, ft*lb) : Specified torque

* For use with SST

T

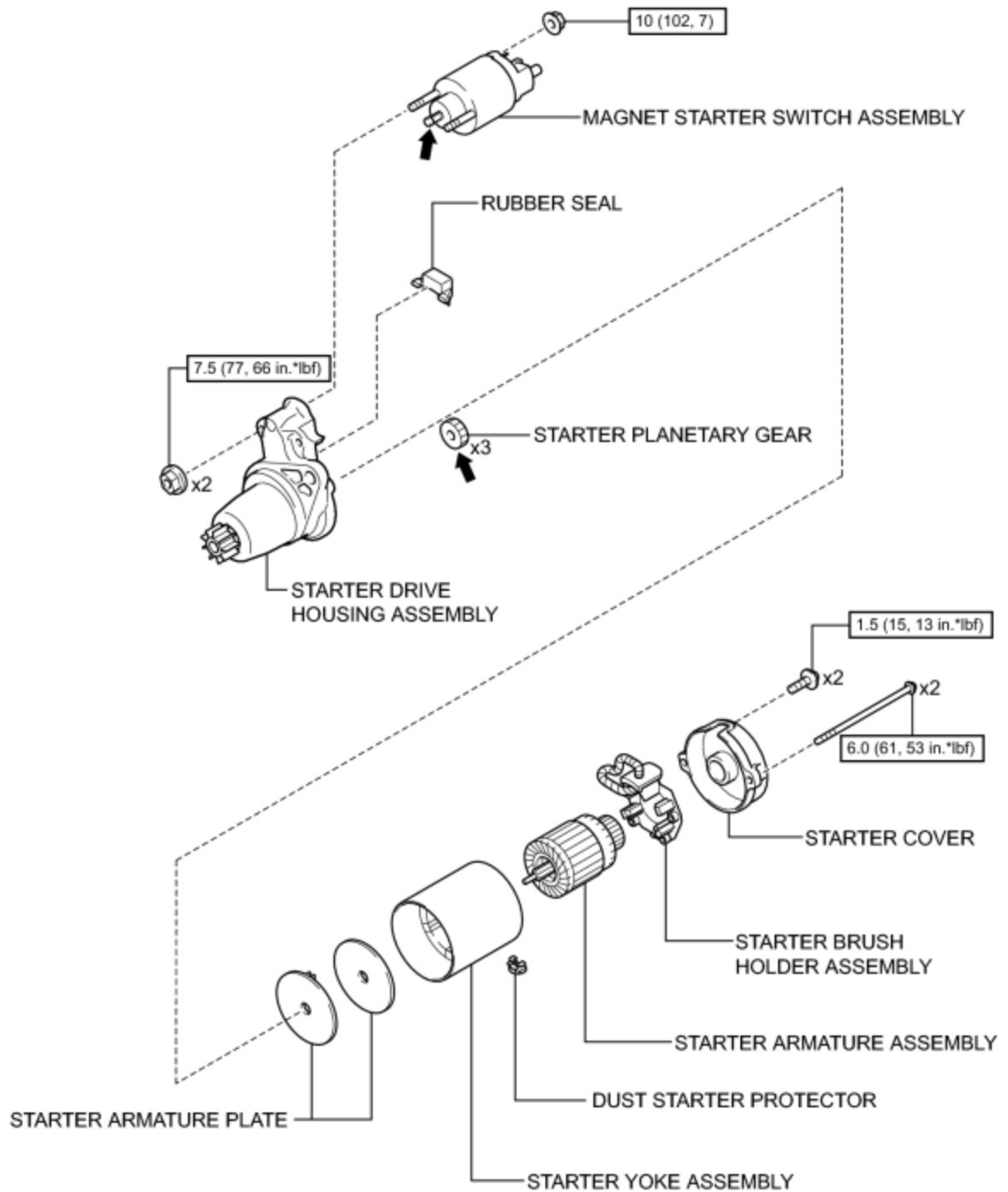
ILLUSTRATION

for Manual Transmission:



ILLUSTRATION

for Automatic Transmission:



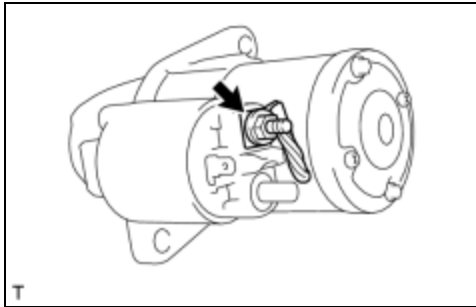
N·m (kgf·cm, ft·lbf) : Specified torque ← High-temperature grease

T

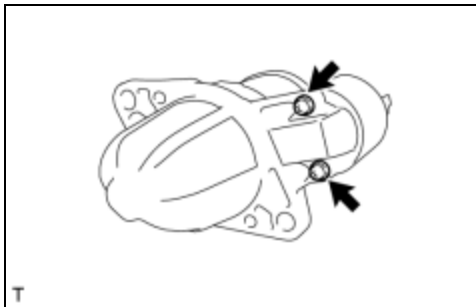
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000EGY01TX
Title: FA20 STARTING: STARTER: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. REMOVE MAGNET STARTER SWITCH ASSEMBLY (for Manual Transmission)

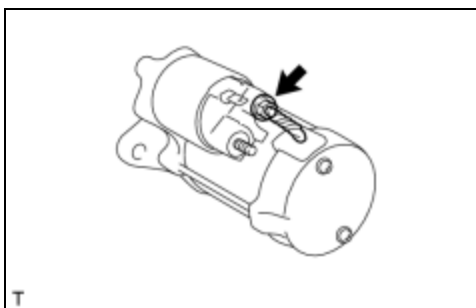


- (a) Remove the nut and disconnect the lead wire from terminal C.

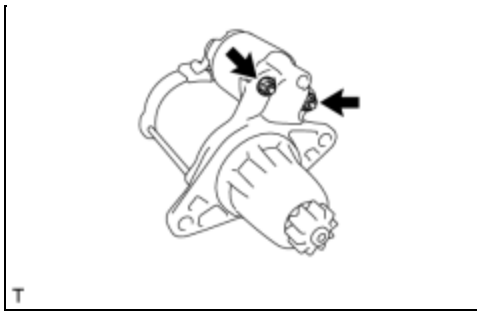


- (b) Remove the 2 screws and the magnet starter switch assembly from the starter drive housing assembly.

2. REMOVE MAGNET STARTER SWITCH ASSEMBLY (for Automatic Transmission)

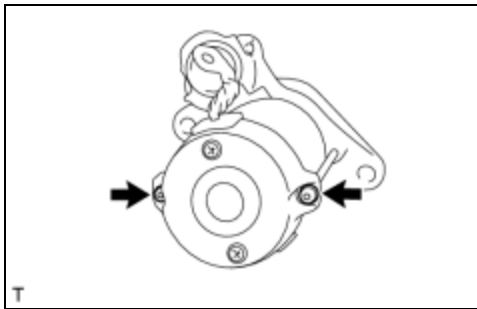


- (a) Remove the nut and disconnect the lead wire from terminal C.

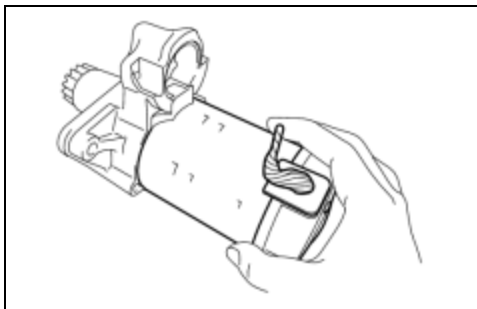


- (b) Remove the 2 nuts and the magnet starter switch assembly from the starter drive housing assembly.

3. REMOVE STARTER YOKE ASSEMBLY (for Automatic Transmission)

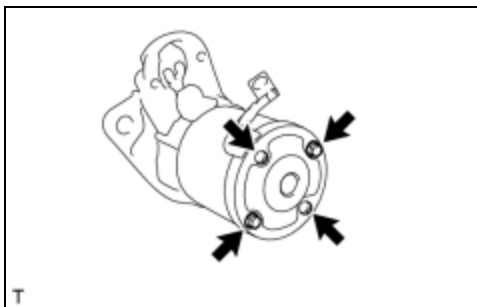


- (a) Using a "TORX" socket wrench T25, remove the 2 through bolts.



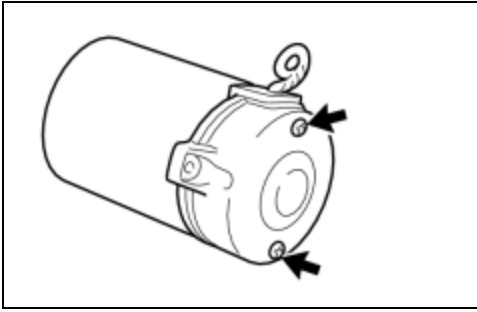
- (b) Remove the starter yoke assembly and starter cover from the starter drive housing assembly.

4. REMOVE STARTER COVER (for Manual Transmission)

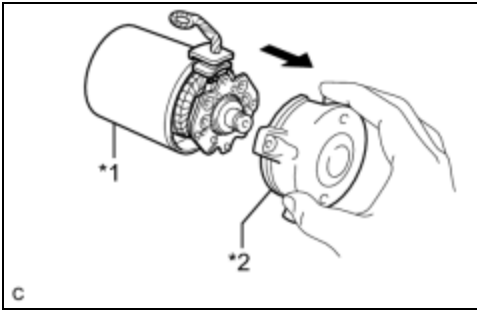


- (a) Remove the 2 through bolts and 2 screws, and remove the starter cover.

5. REMOVE STARTER COVER (for Automatic Transmission)



(a) Remove the 2 screws.



(b) Remove the starter cover from the starter yoke assembly.

Text in Illustration

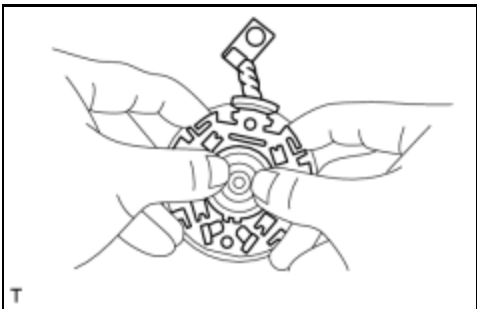
*1	Starter Yoke Assembly
*2	Starter Cover

NOTICE:

Hold the lead wire and remove the starter cover.

(c) Remove the dust starter protect from the starter yoke assembly.

6. REMOVE STARTER BRUSH HOLDER ASSEMBLY (for Manual Transmission)

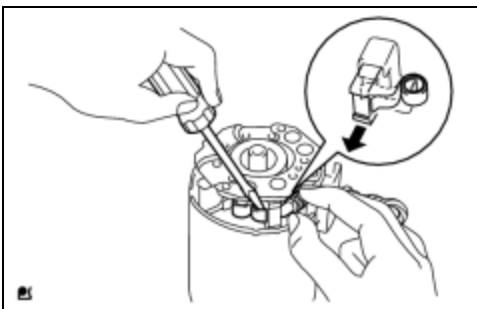


(a) Remove the starter brush holder assembly.

HINT:

Hold the brush with your fingers so that the brush spring does not come flying out.

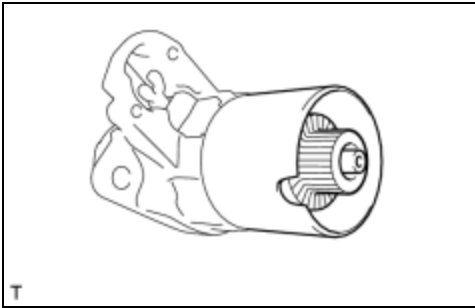
7. REMOVE STARTER BRUSH HOLDER ASSEMBLY (for Automatic Transmission)



(a) Using a screwdriver, disengage the spring from the brush.

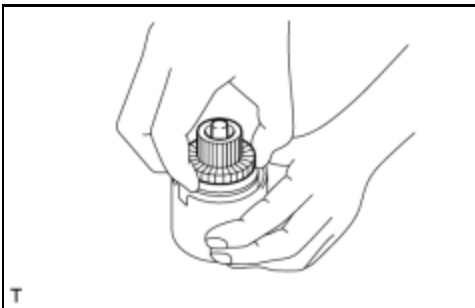
- (b) Disconnect the 4 brush from the starter brush holder assembly.
- (c) Remove the starter brush holder assembly.

8. REMOVE STARTER YOKE ASSEMBLY (for Manual Transmission)



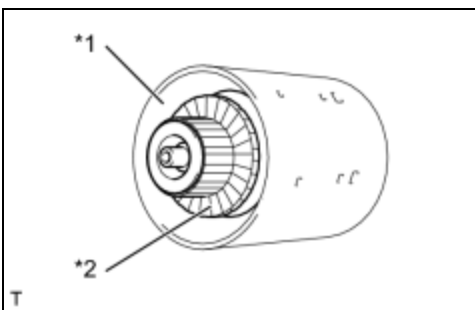
- (a) Remove the starter yoke assembly and starter armature assembly together from the starter drive housing assembly.

9. REMOVE STARTER ARMATURE ASSEMBLY (for Manual Transmission)



- (a) Pull out the starter armature assembly from the starter yoke assembly.

10. REMOVE STARTER ARMATURE ASSEMBLY (for Automatic Transmission)



- (a) Pull out the starter armature assembly from the starter yoke assembly.

Text in Illustration

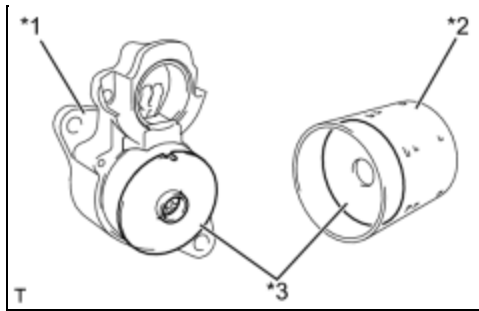
*1	Starter Yoke Assembly
*2	Starter Armature Assembly

11. REMOVE STARTER ARMATURE PLATE (for Automatic Transmission)

- (a) Remove the starter armature plate from the starter yoke assembly and starter drive housing assembly.

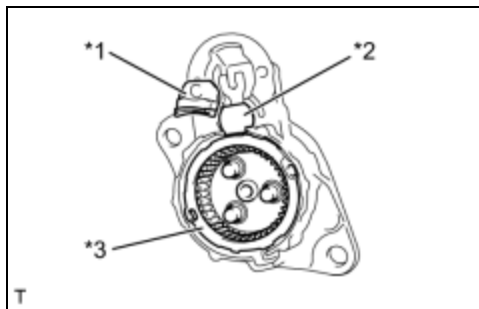
Text in Illustration

*1	Starter Drive Housing Assembly
----	--------------------------------



*2	Starter Yoke Assembly
*3	Starter Armature Plate

12. REMOVE STARTER HOUSING RUBBER (for Manual Transmission)

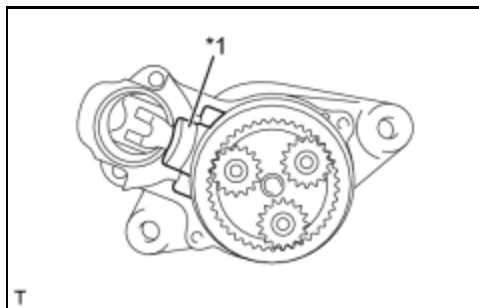


(a) Remove the starter housing rubber, seal rubber and plate from the starter drive housing assembly.

Text in Illustration

*1	Starter Housing Rubber
*2	Plate
*3	Seal Rubber

13. REMOVE RUBBER SEAL (for Automatic Transmission)

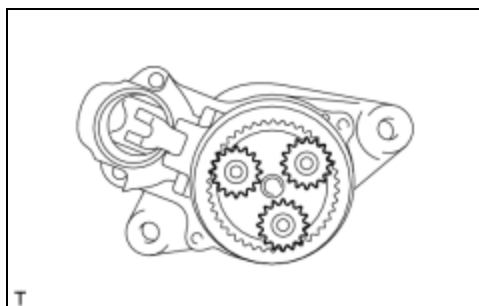


(a) Remove the rubber seal from the starter drive housing assembly.

Text in Illustration

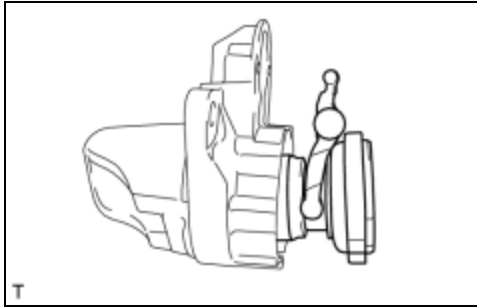
*1	Rubber Seal
----	-------------

14. REMOVE STARTER PLANETARY GEAR

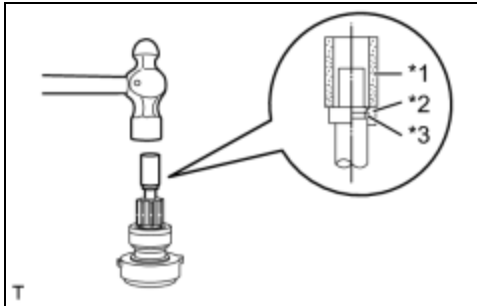


(a) Remove the 3 starter planetary gears from the starter clutch sub-assembly.

15. REMOVE STARTER CLUTCH SUB-ASSEMBLY (for Manual Transmission)



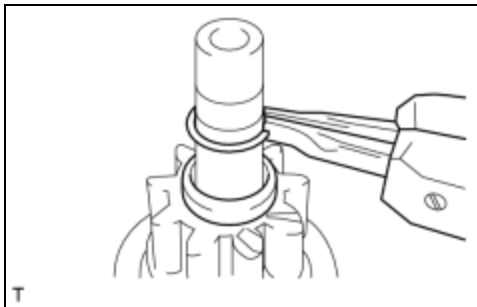
- (a) Remove the starter clutch sub-assembly together with the drive lever set pin from the starter drive housing assembly.



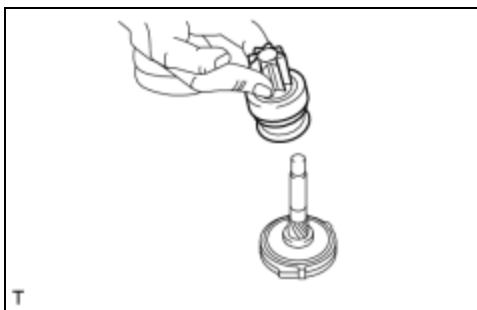
- (b) Using a 14 mm deep socket wrench, remove the stopper from snap ring.

Text in Illustration

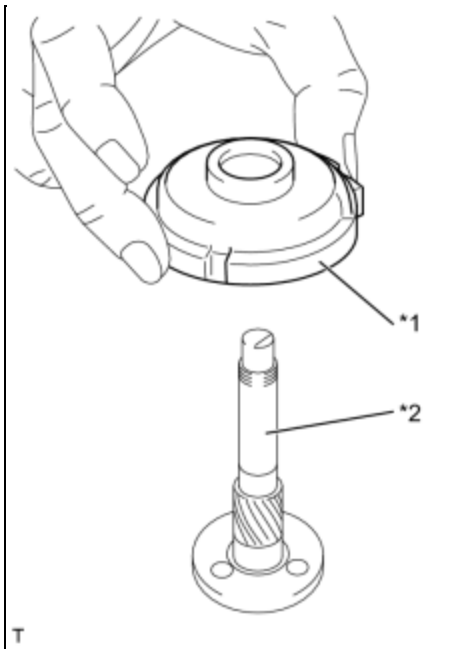
*1	14 mm Deep Socket Wrench
*2	Stopper
*3	Snap Ring



- (c) Using snap ring pliers, remove the snap ring and stopper.



- (d) Pull out the over running clutch from the shaft.



(e) Remove the internal gear assembly from the shaft.

Text in Illustration

*1	Internal Gear Assembly
*2	Shaft

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000162401EX
Title: FA20 STARTING: STARTER: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT STARTER ASSEMBLY

CAUTION:

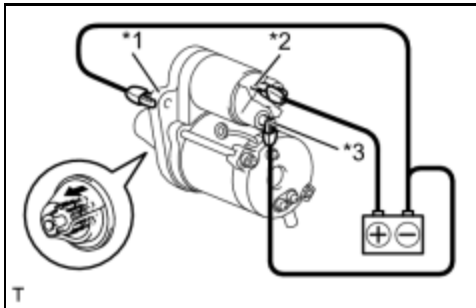
As a large electric current passes through the cable during this inspection, a thick cable must be used. If not, the cable may become hot and cause injury.

NOTICE:

The following tests must each be performed within 3 to 5 seconds to prevent the coil from burning out.

- (a) Mount the starter in a vise between aluminum plates.
- (b) Perform a pull-in test.
 - (1) Remove the nut, and then disconnect the lead wire from terminal C.

- (2) Connect the battery to the starter as shown in the illustration. Check that the clutch pinion gear extends.



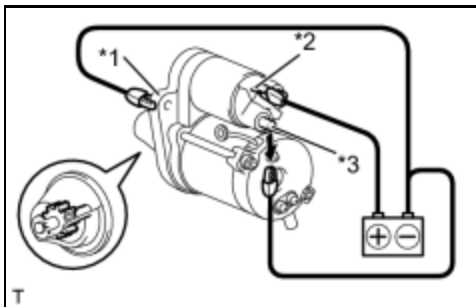
Text in Illustration

*1	Body
*2	Terminal 50
*3	Terminal C

If the clutch pinion gear does not move, inspect the magnet starter switch assembly. If the magnet starter switch assembly is not as specified, replace it.

- (c) Perform a holding test.

- (1) Disconnect the negative (-) terminal lead from terminal C while the conditions specified in the pull-in test above are maintained. Check that the pinion gear remains out.



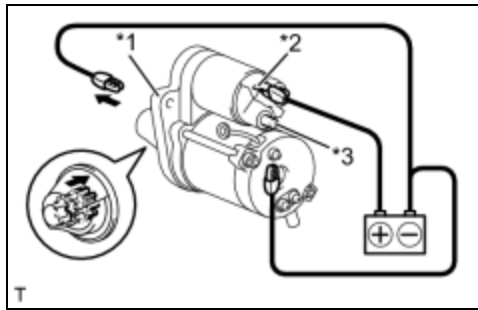
Text in Illustration

*1	Body
*2	Terminal 50
*3	Terminal C

If the clutch pinion gear returns inward, inspect the magnet starter switch assembly. If the magnet starter switch assembly is not as specified, replace it.

(d) Inspect the clutch pinion gear return.

(1) Disconnect the negative (-) terminal lead from the starter body. Check that the clutch pinion gear returns inward.



Text in Illustration

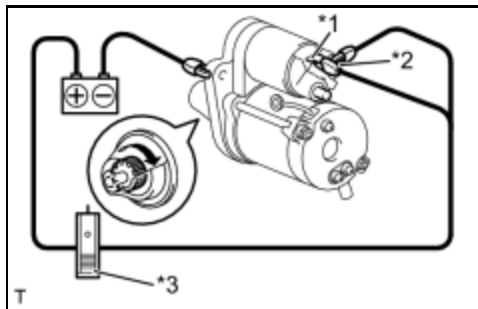
*1	Body
*2	Terminal 50
*3	Terminal C

If the clutch pinion gear does not return inward, inspect the magnet starter switch assembly. If the magnet starter switch assembly is not as specified, replace it.

(e) Perform an operation test without load.

(1) Connect the lead wire to terminal C with the nut.

Torque: 10 N·m (102 kgf·cm, 7ft·lbf)



(2) Connect the battery and an ammeter to the starter as shown in the illustration.

Text in Illustration

*1	Terminal 50
*2	Terminal 30
*3	Ammeter

(3) Check that the starter rotates smoothly and steadily while the clutch pinion gear is extended. Then measure the current.

Standard Current:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Battery positive terminal - Terminal 30 - Terminal 50	11.5 V	Below 90 A

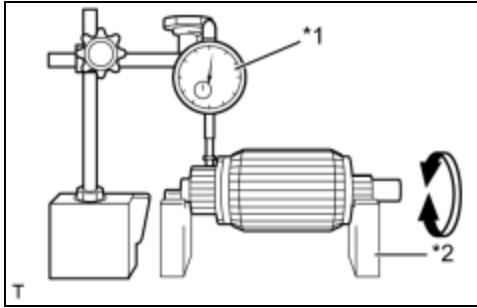
If the result is not as specified, inspect the starter assembly.

HINT:

Inspect the starter armature assembly, starter commutator end frame assembly and magnet starter switch assembly. If there is a malfunction, replace the part and perform again this test.

2. INSPECT STARTER ARMATURE ASSEMBLY (for Manual Transmission)

(a) Check the commutator for signs of seizure or stepped wear caused by roughness of the surface. If there is light wear, use sandpaper to repair.

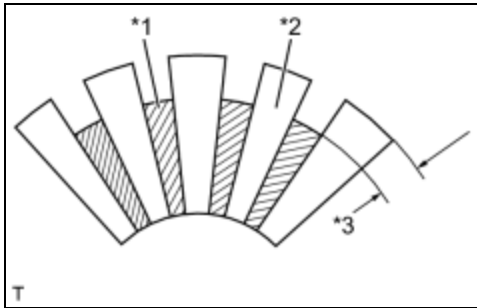


(b) Check for runout on the commutator. If excessive, replace the armature.

Standard runout:
0.05 mm (0.002 in.)
Maximum runout:
0.10 mm (0.004 in.)

Text in Illustration

*1	Dial Gauge
*2	V-block

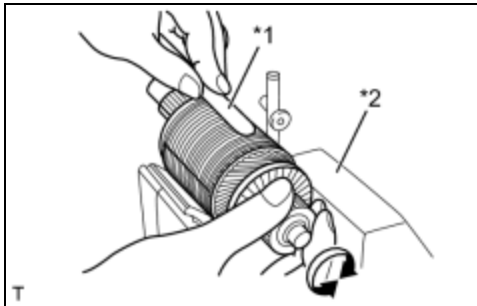


(c) Check the depth of the segment mold. If it is not within the standard, replace the armature.

Standard depth:
0.50 mm (0.020 in.)

Text in Illustration

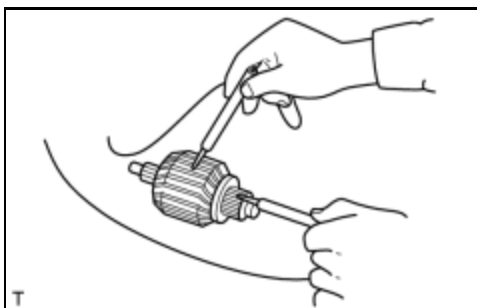
*1	Mold
*2	Segment
*3	Depth of Mold



(d) Place the armature on the growler tester to check for short circuits. While slowly turning the armature, support the steel sheet for the armature core. If the circuit of the armature is shorted, the steel sheet will vibrate, causing it to move towards the core. When the steel sheet has moved or vibrated, replace the armature.

Text in Illustration

*1	Steel Sheet
*2	Growler Tester



(e) Touch the probe of one side to the commutator segment, and the other probe to the shaft. If there is continuity, replace the armature.

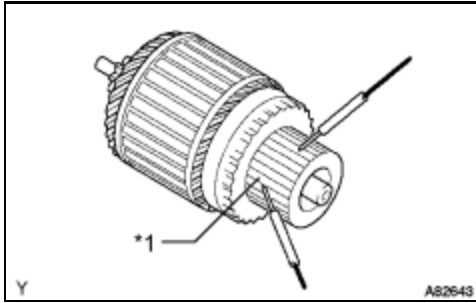
3. INSPECT STARTER ARMATURE ASSEMBLY (for Automatic Transmission)

(a) Check the commutator for dirt and/or burns on the surface.

If the surface is dirty or burnt, correct it with sandpaper (No. 400) or a lathe. If necessary, replace the starter armature assembly.

(b) Inspect the commutator for an open circuit.

(1) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*1	Segment
----	---------

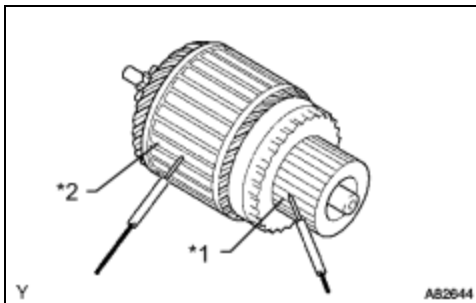
Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Segment - Segment	Always	Below 1 Ω

If the result is not as specified, replace the starter armature assembly.

(c) Inspect the commutator for short circuits.

(1) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*1	Segment
*2	Coil Core

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Segment - Coil core	Always	10 k Ω or higher

If the result is not as specified, replace the starter armature assembly.

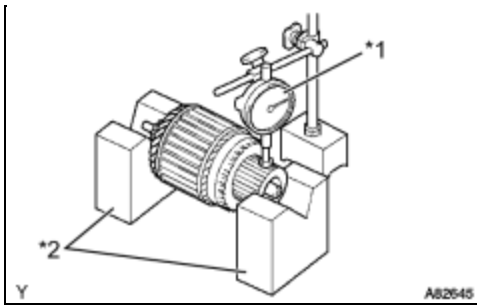
(d) Check the commutator for signs of seizure or stepped wear caused by roughness of the surface. If there is light wear, use sandpaper to repair.

(e) Check for runout on the commutator. If excessive, replace the armature.

Standard runout:
0.02 mm (0.0008 in.)
Maximum runout:
0.05 mm (0.002 in.)

Text in Illustration

*1	Dial Gauge
----	------------

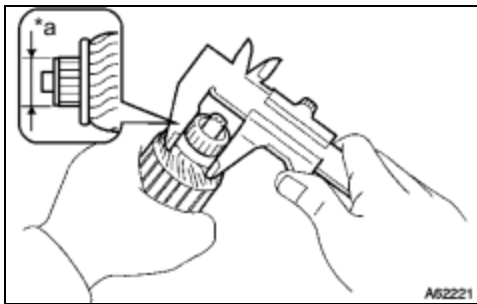


*2	V-block

If the result is not as specified, replace the starter armature assembly.

(f) Using vernier caliper, measure the commutator diameter.

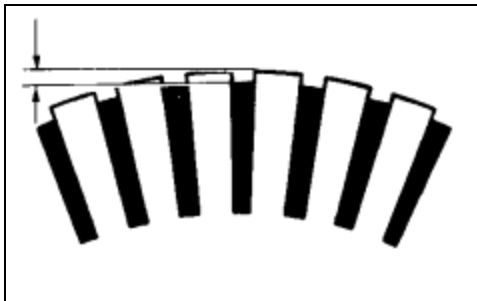
Text in Illustration



*a	Diameter
----	----------

Standard diameter:
29 mm (1.1417 in.)
Minimum diameter:
28 mm (1.1024 in.)

If the diameter is less than the minimum, replace the starter armature assembly.



(g) Using vernier caliper, measure the under cut depth of the segment. If it is not within the standard, replace the starter armature assembly.

Standard depth:
0.7 mm (0.0276 in.)
Minimum depth:
0.2 mm (0.0079 in.)

4. INSPECT STARTER YOKE ASSEMBLY (for Manual Transmission)

(a) Make sure that the pole is set at the predetermined position.

5. INSPECT STARTER BRUSH HOLDER ASSEMBLY (for Manual Transmission)

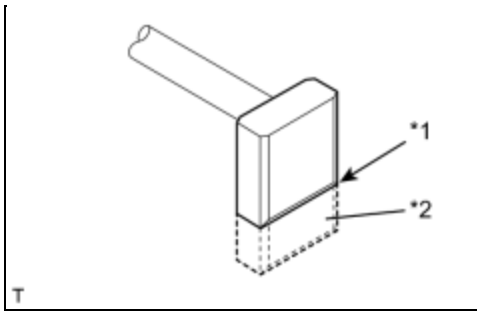
(a) Visually check the brush. If there is any abnormal wear or cracks, replace the brush.

(b) Measure the length of the brush. If it exceeds the service limits, replace the brush.

Standard length:
12.3 mm (0.484 in.)
Minimum length:
7.0 mm (0.276 in.)

Text in Illustration





*1	Service Limit Line
*2	Brush

(c) Check that the brush moves smoothly in the brush holder.

(d) Measure the brush spring force with a spring scale. Replace the brush holder if below the service limit.

Standard brush spring force:

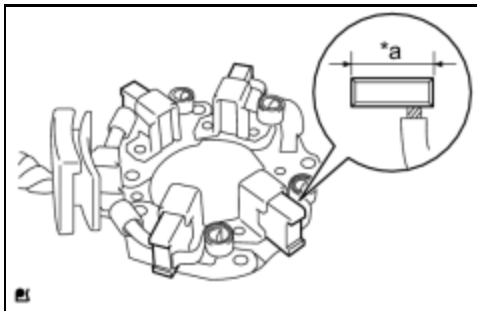
15.9 to 19.5 N (1.6 to 2.0 kgf, 3.6 to 4.4 lbf)

Minimum brush spring force:

2.5 N (0.3 kgf, 0.6 lbf)

6. INSPECT STARTER BRUSH HOLDER ASSEMBLY (for Automatic Transmission)

(a) Using a vernier caliper, measure the brush length.



Text in Illustration

*a	Length
----	--------

Standard length:

14.4 mm (0.5669 in.)

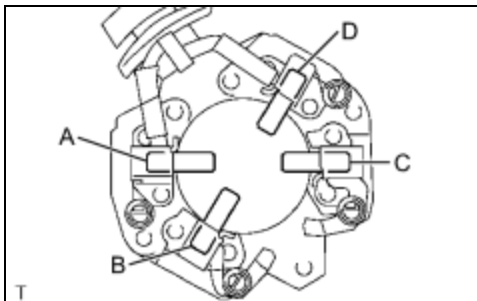
Minimum length:

9.0 mm (0.3543 in.)

If the length is less than the minimum, replace the starter brush holder assembly.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

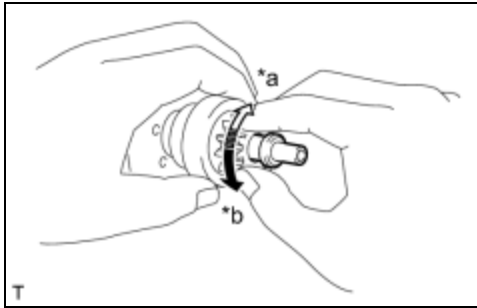


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A - B A - C B - D C - D	Always	10 k Ω or higher
A - D B - C	Always	Below 1 Ω

If the result is not as specified, replace the starter brush holder assembly.

7. INSPECT STARTER CLUTCH SUB-ASSEMBLY (for Manual Transmission)

- (a) Check the gear teeth on the planetary gear, internal gear and starter clutch for wear or damage.
If any of the gears is damaged, replace the starter center bearing clutch sub-assembly.
- (b) Check the starter clutch pinion gear.



- (1) Hold the starter clutch, rotate the pinion gear clockwise and check that it turns freely. Try to rotate the pinion gear counterclockwise and check that it locks.

Text in Illustration

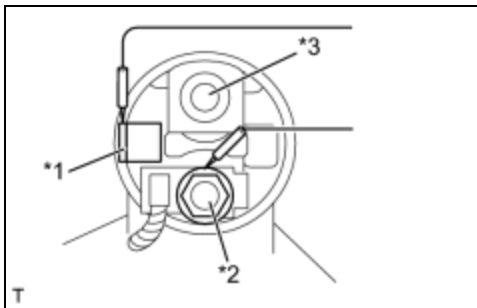
*a	Free
*b	Lock

If necessary, replace the starter clutch sub-assembly.

8. INSPECT MAGNET STARTER SWITCH ASSEMBLY (for Manual Transmission)

- (a) Check that there is continuity between terminals 50 and C, and between terminal 50 and ground. Also, check to be sure there is no continuity between terminal C and 30.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Terminal C - Terminal 50	Always	Below 1 Ω
Terminal 50 - Switch body	Always	Below 1 Ω
Terminal C - Terminal 30	Always	1 M Ω or higher

Text in Illustration

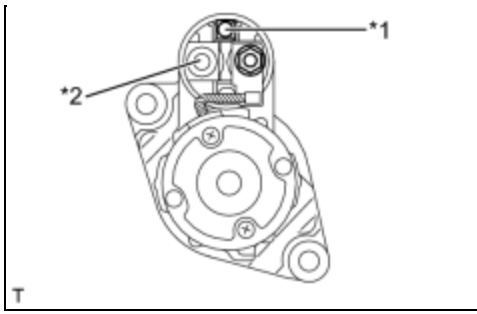
*1	Terminal 50
*2	Terminal C
*3	Terminal 30

- (b) Using a lead wire, connect the switch assembly terminal 50 to the positive terminal of the battery, and the starter body to the ground terminal of the battery. The pinion should be forced to be pushed out on the shaft.

HINT:

With the pinion forced to be pushed out on the shaft, the starter motor can sometimes rotate because the current flows, through pull-in coil, to motor. This is not a problem.

- (c) Disconnect the connector from terminal C. Then, using a lead wire, connect the positive terminal of the battery and



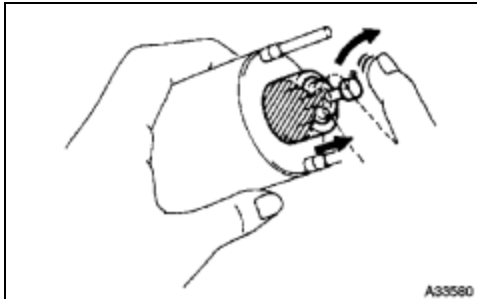
terminal C, and ground terminal to starter body. In this test set up, the pinion should return to its original position even when it is pulled out with a screwdriver.

Text in Illustration

*1	Terminal 50
*2	Terminal C

9. INSPECT MAGNET STARTER SWITCH ASSEMBLY (for Automatic Transmission)

(a) Check the plunger.



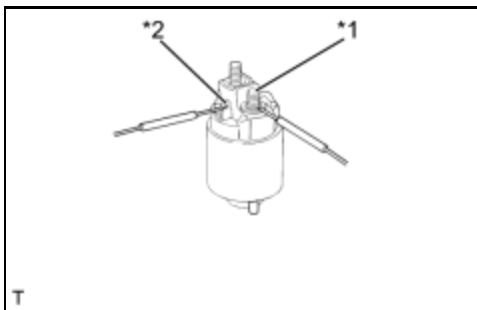
(1) Push in the plunger and check that it returns quickly to its original position.

If necessary, replace the magnet starter switch assembly.

(b) Inspect the pull-in coil.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Terminal C - Terminal 50	Always	Below 1 Ω

Text in Illustration

*1	Terminal C
*2	Terminal 50

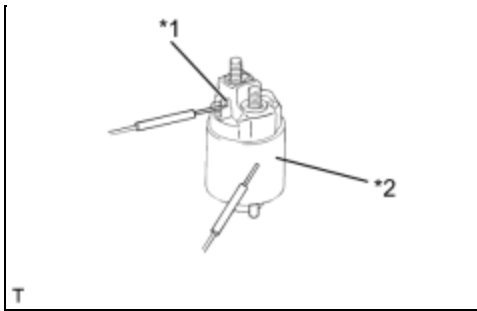
If the result is not as specified, replace the magnet starter switch assembly.

(c) Inspect the holding coil.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED
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		CONDITION
Terminal 50 - Switch body	Always	Below 2 Ω

Text in Illustration

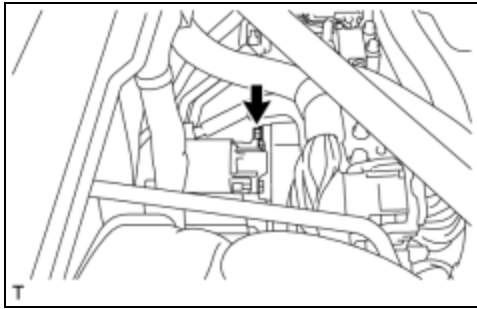
*1	Terminal 50
*2	Switch Body

If the result is not as specified, replace the magnet starter switch assembly.

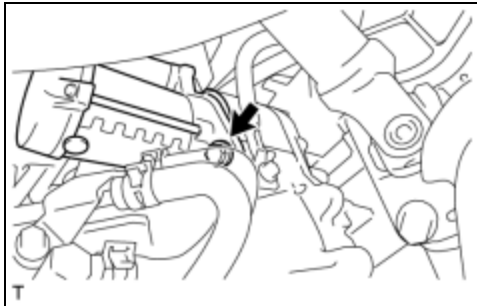
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000V3F029X
Title: FA20 STARTING: STARTER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL STARTER ASSEMBLY



(a) Temporarily install the upper side bolts.



(b) Install the lower side bolt.

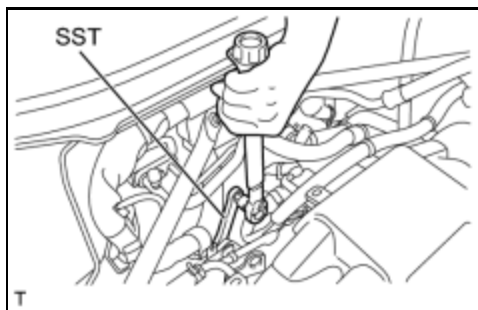
Torque: 50 N·m (510 kgf·cm, 37ft·lbf)

(c) Install the upper side bolt and starter assembly.

SST: 09249-37010

without SST - Torque: 50 N·m (510 kgf·cm, 37ft·lbf)

with SST - Torque: 36 N·m (367 kgf·cm, 27ft·lbf)



HINT:

- Use a torque wrench with a fulcrum length of 260 mm (10.2 in.). When using a torque wrench with a fulcrum length that is not 260 mm (10.24 in.), calculate the torque specification for the torque wrench and SST based on the "without SST" torque specification [INFO](#).
- Make sure SST and the wrench are connected in a straight line.

(d) Engage the wire clamp.

(e) Connect the starter connector.

(f) Connect the starter wire with the nut.

Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

2. INSTALL FRONT EXHAUST PIPE ASSEMBLY [INFO](#)

3. INSTALL NO. 2 ENGINE UNDER COVER [INFO](#)

4. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL [INFO](#)

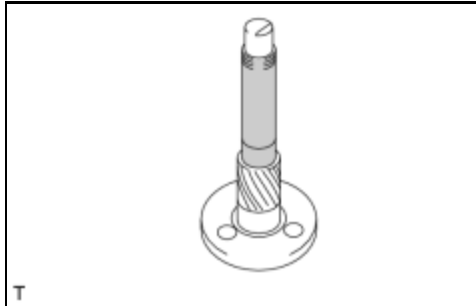


Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000EH001TX
Title: FA20 STARTING: STARTER: REASSEMBLY (2013 FR-S)		


REASSEMBLY

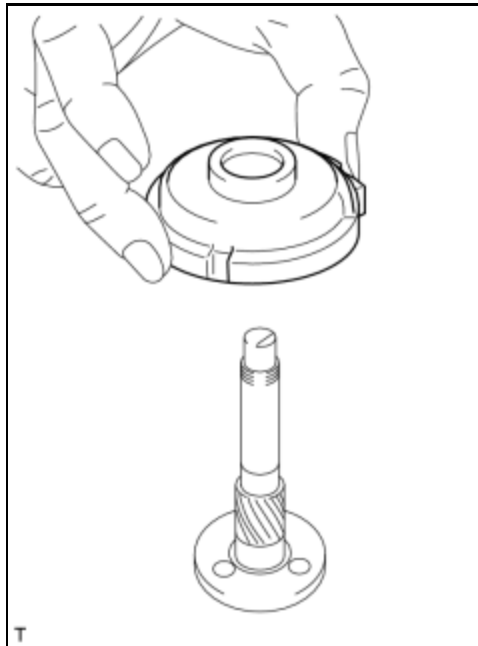
1. INSTALL STARTER CLUTCH SUB-ASSEMBLY (for Manual Transmission)

- (a) Apply high-temperature grease to the shaft as shown in the illustration.



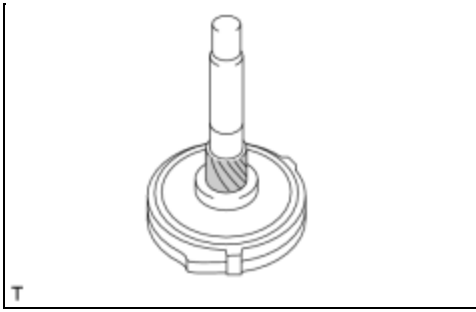
Text in Illustration

	High-temperature Grease
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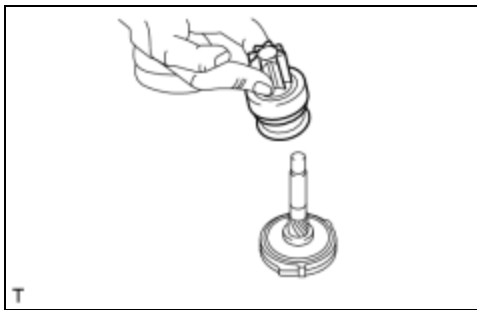
- (b) Install the internal gear to the shaft.

- (c) Apply high-temperature grease to the shaft as shown in the illustration.

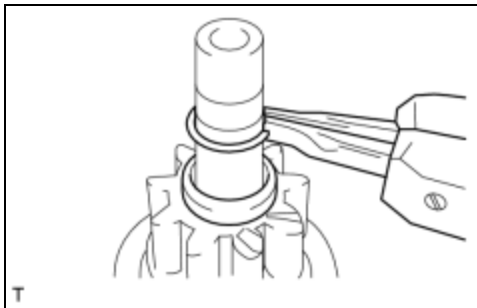


Text in Illustration

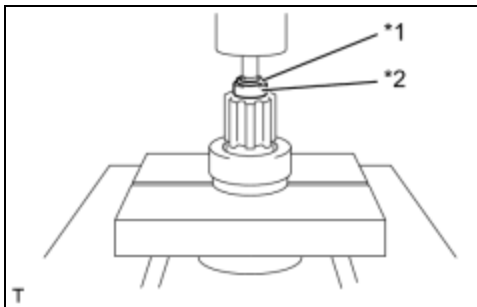
	<p>High-temperature Grease</p>
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(d) Install the over running clutch to the shaft.



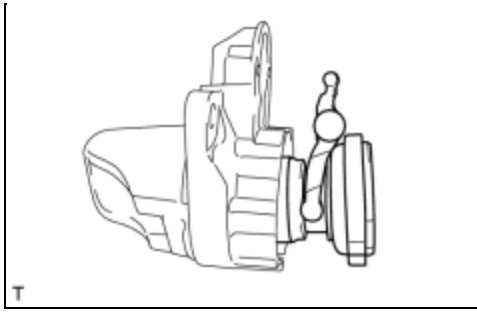
(e) Install the stopper to the shaft.
Using snap ring pliers, install the snap ring.



(f) Using a press, press the snap ring into the stopper.

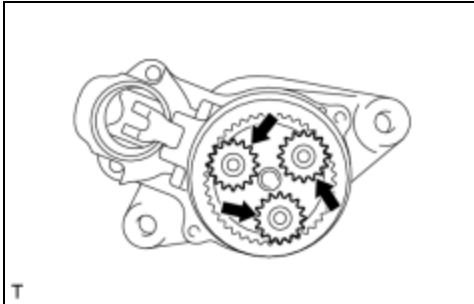
Text in Illustration

*1	Snap Ring
*2	Stopper




(g) Install the starter clutch sub-assembly together with the drive lever set pin to the starter drive housing assembly.

2. INSTALL STARTER PLANETARY GEAR (for Manual Transmission)

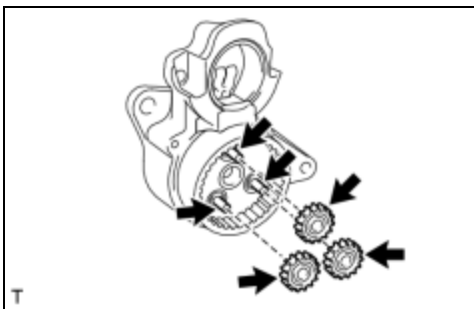


- (a) Apply high-temperature grease to the planetary gears and pins of the planetary shaft.
- (b) Install the 3 starter planetary gears.

Text in Illustration


	High-temperature Grease
---	-------------------------

3. INSTALL STARTER PLANETARY GEAR (for Automatic Transmission)

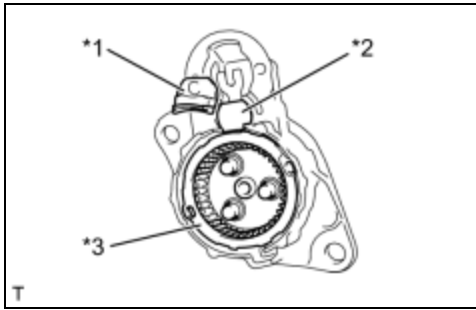


- (a) Apply high-temperature grease to the planetary gears and pins of the planetary shaft.
- (b) Install the 3 starter planetary gears.

Text in Illustration

	High-temperature Grease
---	-------------------------

4. INSTALL STARTER HOUSING RUBBER (for Manual Transmission)

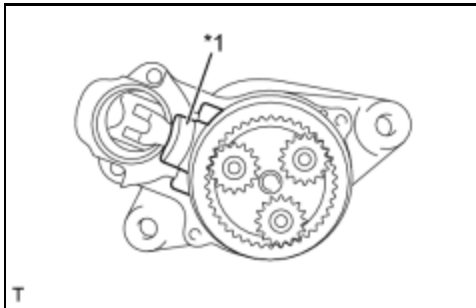


(a) Install the starter housing rubber, seal rubber and plate to the starter drive housing assembly.

Text in Illustration

*1	Starter Housing Rubber
*2	Plate
*3	Seal Rubber

5. INSTALL RUBBER SEAL (for Automatic Transmission)

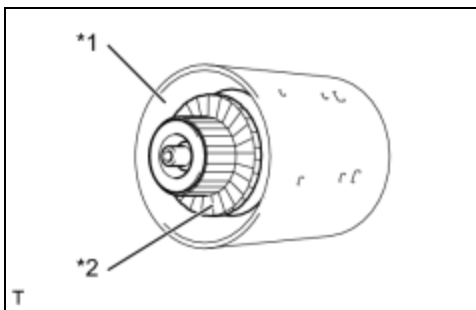


(a) Install the rubber seal to the starter drive housing assembly.

Text in Illustration

*1	Rubber Seal
----	-------------

6. INSTALL STARTER ARMATURE ASSEMBLY (for Automatic Transmission)

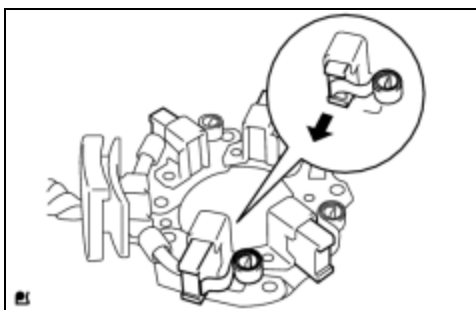


(a) Install the starter armature assembly to the starter yoke assembly.

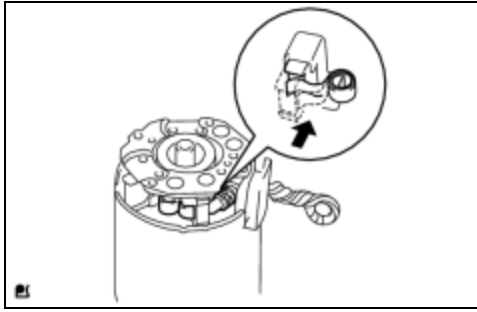
Text in Illustration

*1	Starter Yoke Assembly
*2	Starter Armature Assembly

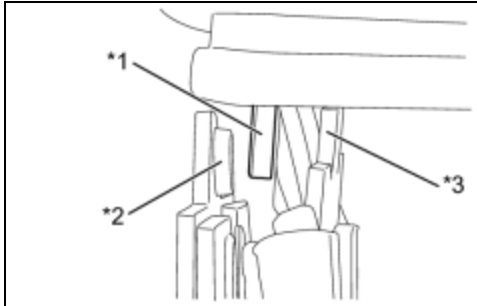
7. INSTALL STARTER BRUSH HOLDER ASSEMBLY (for Automatic Transmission)



(a) Install the 4 brushes and 4 brush springs.



(b) Install the starter brush holder assembly to the starter armature assembly. Push the 4 brushes.



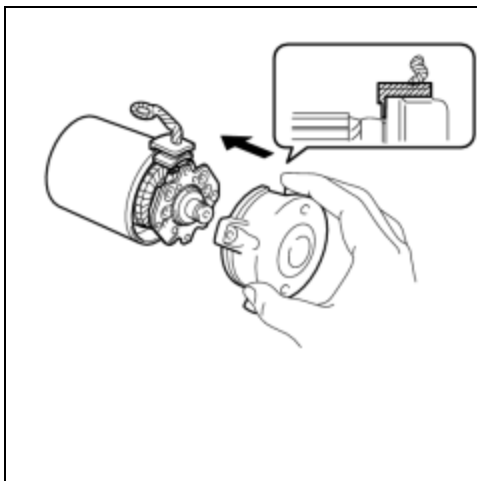
(c) Insert the grommet between the positive (+) motor read wire and the negative (-) brush holder plate.

Text in Illustration

*1	Grommet
*2	Negative (-) Brush Holder Plate
*3	Positive (+) Motor Read Wire

8. INSTALL STARTER COVER (for Automatic Transmission)

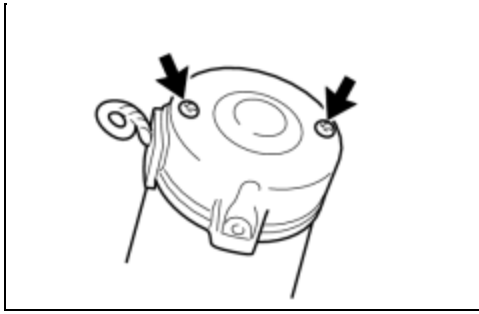
(a) Install the dust starter protector to the starter yoke assembly.



(b) Align the starter brush holder assembly read wire rubber with the groove of the starter cover.

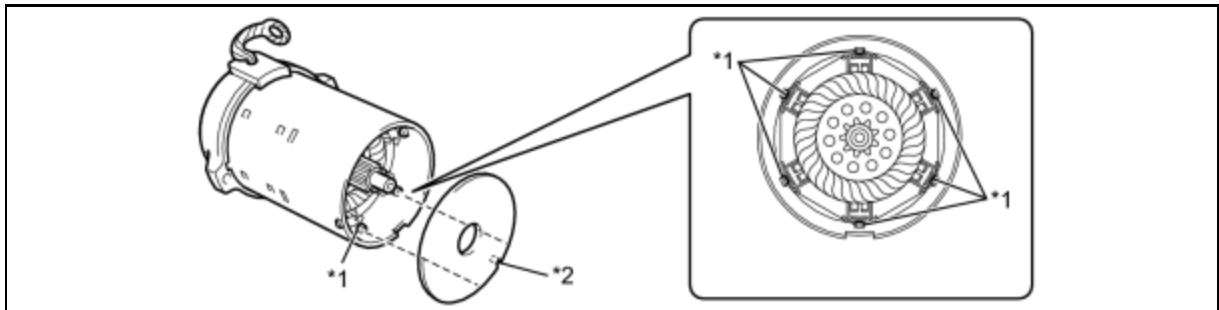
(c) Install the starter cover to the starter brush holder assembly with 2 screws.

- Torque: 1.5 N·m (15 kgf·cm, 13in·lbf)



9. INSTALL STARTER ARMATURE PLATE (for Automatic Transmission)

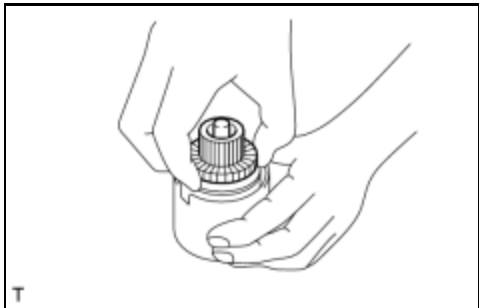
- (a) Align the claw of the starter yoke assembly with the groove the starter armature plate.
- (b) Install the starter armature plate to the starter yoke assembly.



Text in illustration

*1	Claw	*2	Groove
----	------	----	--------

10. INSTALL STARTER ARMATURE ASSEMBLY (for Manual Transmission)



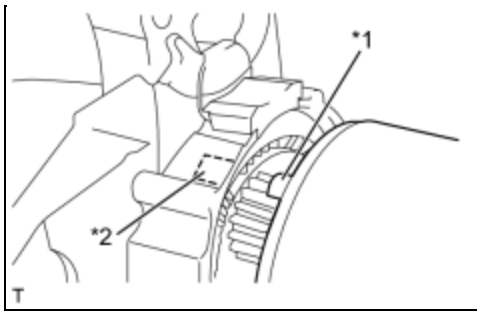
- (a) Install the starter armature assembly to the starter yoke assembly.

11. INSTALL STARTER YOKE ASSEMBLY (for Manual Transmission)

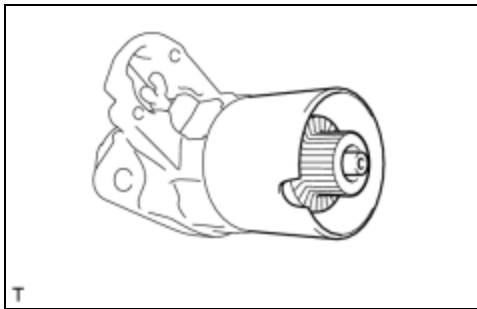
- (a) Align the claw of the starter yoke assembly with the groove inside the starter drive housing assembly.

Text in Illustration

*1	Claw
----	------

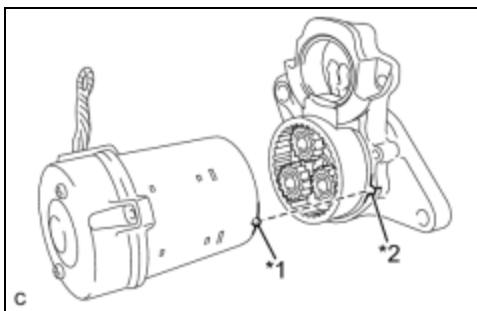


*2	Groove



- (b) Install the starter yoke assembly together with the starter armature assembly to the starter drive housing assembly.

12. INSTALL STARTER YOKE ASSEMBLY (for Automatic Transmission)

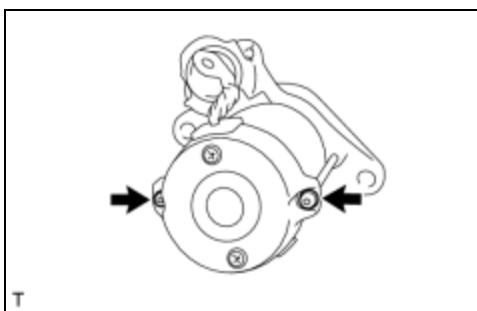


- (a) Align the claw of the starter yoke assembly with the groove inside the starter drive housing assembly.

Install the starter yoke assembly together with the starter armature assembly to the starter drive housing assembly.

Text in Illustration

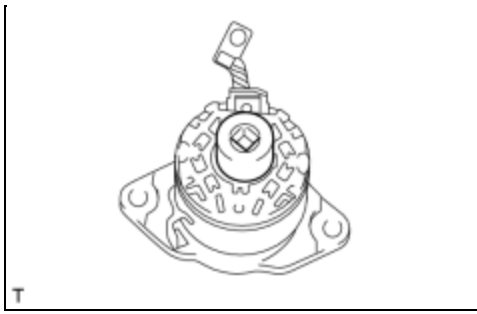
*1	Claw
*2	Groove



- (b) Using a "TORX" socket wrench T25, install the 2 through bolts.

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

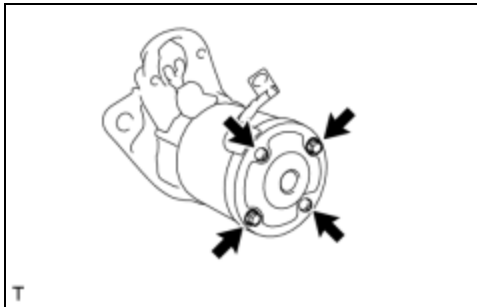
13. INSTALL STARTER BRUSH HOLDER ASSEMBLY (for Manual Transmission)



- (a) Install a 24 mm socket to the starter brush holder assembly.

- (b) Install the starter brush holder assembly to the starter armature assembly.

14. INSTALL STARTER COVER (for Manual Transmission)

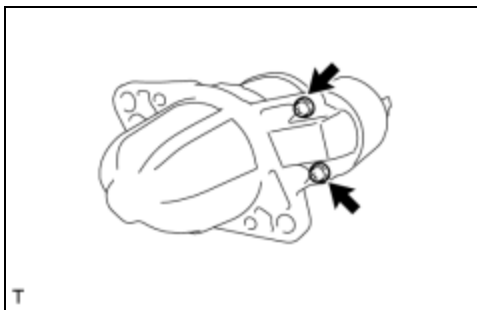


- (a) Install the starter cover with 2 screws and 2 bolts.

Bolt - Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

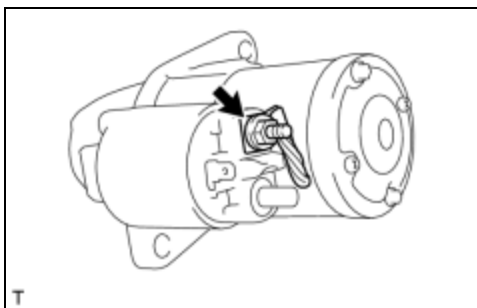
Screw - Torque: 1.4 N·m (14 kgf·cm, 12in·lbf)

15. INSTALL MAGNET STARTER SWITCH ASSEMBLY (for Manual Transmission)



- (a) Install the magnet starter switch assembly with the 2 screws.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

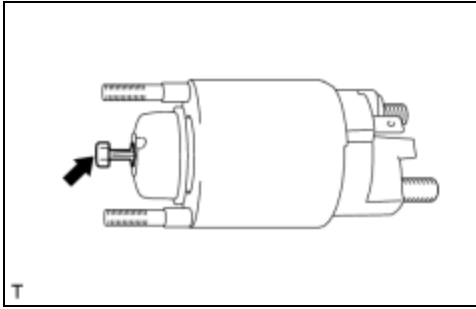


- (b) Connect the lead wire to terminal C with the nut.


Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

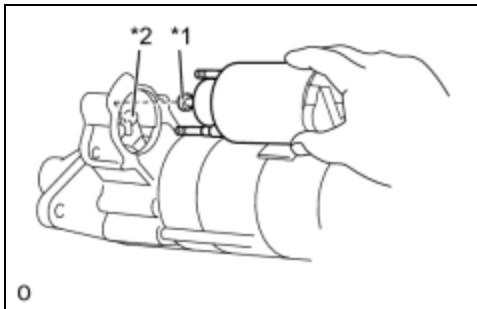
16. INSTALL MAGNET STARTER SWITCH ASSEMBLY (for Automatic Transmission)

- (a) Apply high-temperature grease to the plunger and hook as shown in the illustration.



Text in Illustration

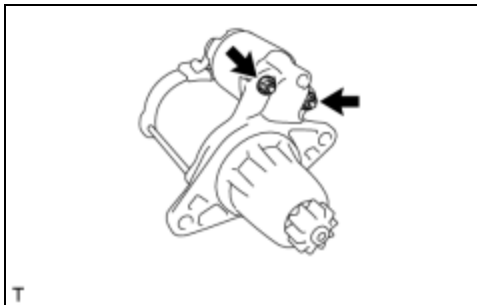
	High-temperature grease
---	-------------------------



(b) Hook the plunger and hook of the magnet starter switch assembly to the lever of the starter drive housing assembly.

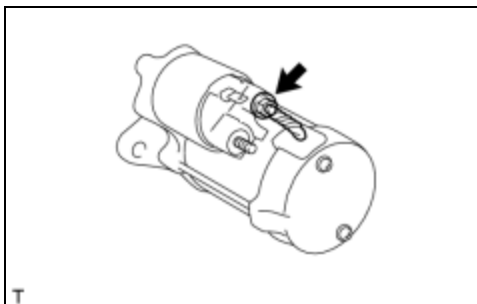
Text in Illustration

*1	Plunger and Hook
*2	Lever



(c) Install the magnet starter switch assembly with the 2 screws.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)



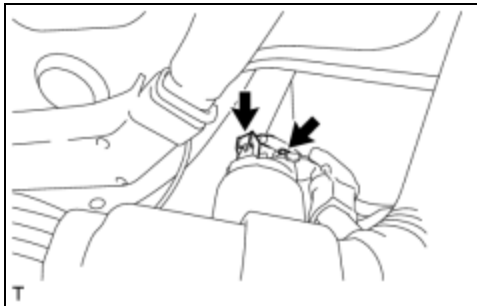
(d) Connect the lead wire to terminal C with the nut.

Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000V3I029X
Title: FA20 STARTING: STARTER: REMOVAL (2013 FR-S)		

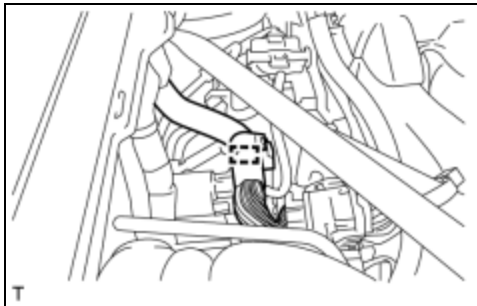
REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL [INFO](#)
2. REMOVE NO. 2 ENGINE UNDER COVER [INFO](#)
3. REMOVE FRONT EXHAUST PIPE ASSEMBLY [INFO](#)
4. REMOVE STARTER ASSEMBLY

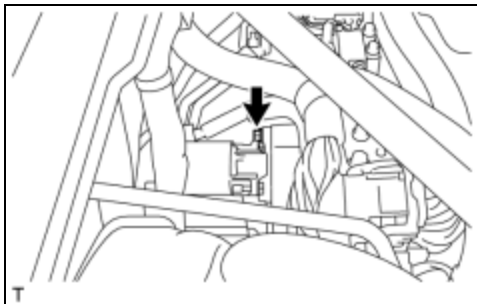


(a) Remove the nut and disconnect the starter wire.

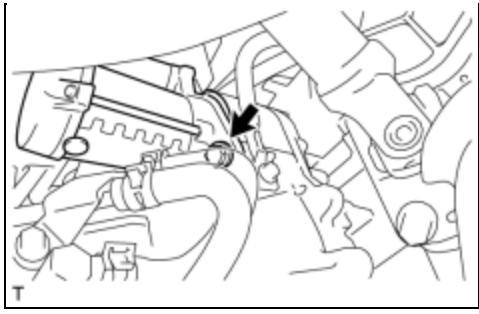
(b) Disconnect the starter connector.



(c) Disengage the wire clamp.



(d) Remove the upper side bolt.

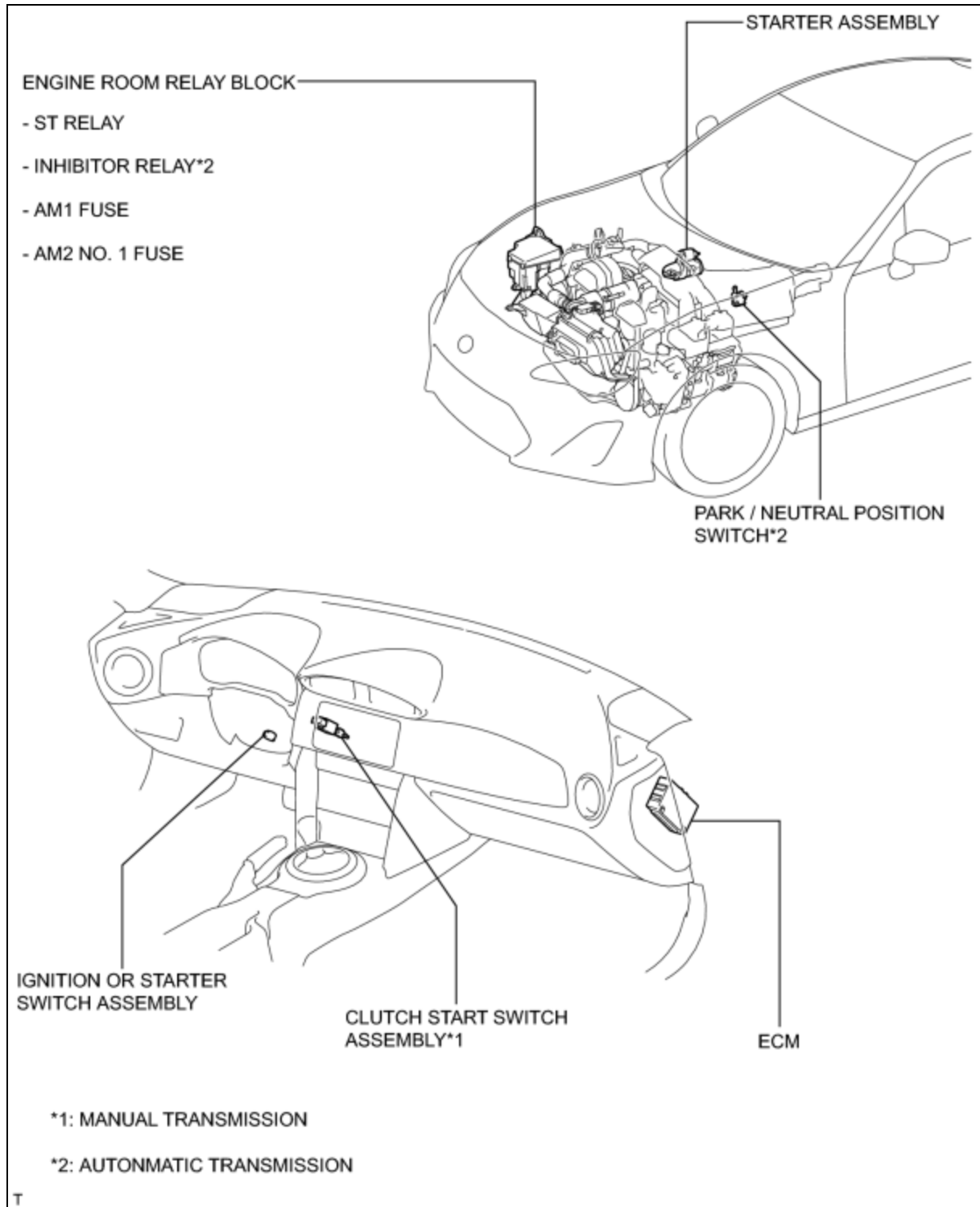


(e) Remove the lower side bolt, battery cable stay and starter assembly.

Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000048MU006X
Title: FA20 STARTING: STARTING SYSTEM: PARTS LOCATION (2013 FR-S)		

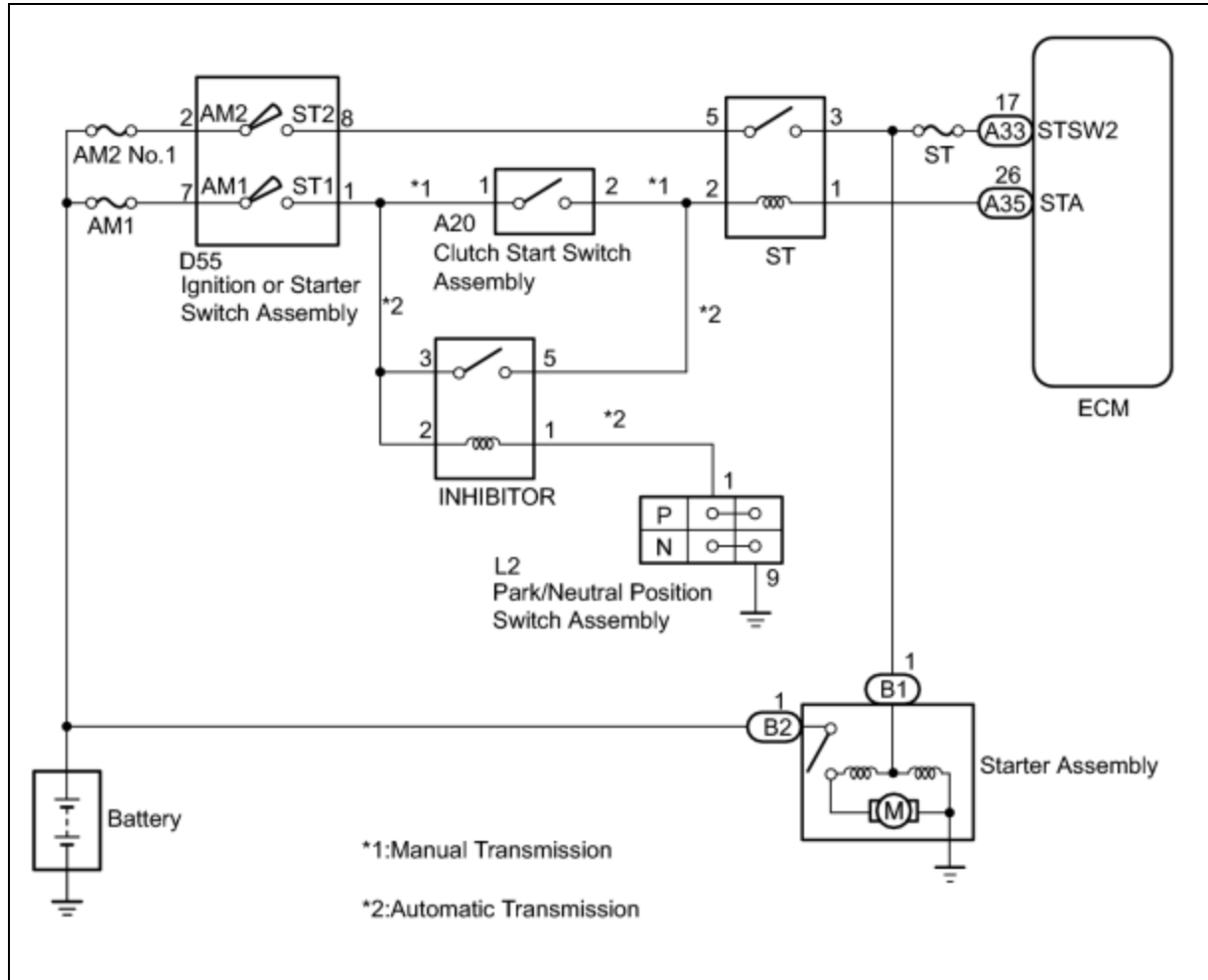
PARTS LOCATION

ILLUSTRATION



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000048MV006X
Title: FA20 STARTING: STARTING SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDN0LXX
Title: FA20 BATTERY / CHARGING: CHARGING SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under Normal Condition are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch to ON.
- (e) Turn the Techstream on.
- (f) Enter the following menus: Powertrain / Engine / Data List.
- (g) Check the values by referring to the table below.

ECM

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Battery Voltage	Battery voltage: Min.: 0 V, Max.: 65.535 V	11 to 14 V: Idling	When the battery voltage is below 11 V, other systems may be affected. Reference figures: <ul style="list-style-type: none"> • IG ON: 12.5 V • When cranking: 9.834 V • When idling (after warming up): 13.359 V
Battery Current	Battery current: Min.: -125 A, Max.: 125 A	Changes in response to the amount of electricity generated by the alternator: while running after warming up.	When a malfunction occurs, there may be a problem with the IB voltage system or the sensor power source.
Battery Temperature	Battery temperature: Min.: -40°C (-40°F), Max.: 6513.5°C (11756.3°F)	Changes in response to the actual temperature: while running after warming up.	When a malfunction occurs, there may be a problem with the THB voltage system or the sensor power source.
	Displays the voltage		

Alt Vol - Non Active Test	required when the regulator is not being forcefully driven: Min.: 0 V, Max.: 80 V	Changes in response to the battery fluid temperature and running state (12.4 to 14.6 V): after starting the engine.	When a malfunction occurs, there may be problems with charging control systems.
Alt Vol - Active Test	Displays the voltage required when the regulator is being forcefully driven: Min.: 0 V, Max.: 80 V	Specified voltage required when performing the "generation required voltage" active test: after starting the engine.	<ul style="list-style-type: none"> • Displays the voltage generated when performing the active test. • When a malfunction occurs, there may be problems with the charging control systems.
Alternator Duty	Displays the charging control signal: Min.: 0%, Max.: 255 %	Changes in response to the amount of electricity generated by the alternator: while charging control.	When a malfunction occurs, there may be problems with the charging control systems.
Request Voltage to Alternator	Displays the alternator generation control mode: Min.: 0%, Max.: 255 %	Changes in response to the amount of electricity generated by the alternator: while charging control.	When a malfunction occurs, there may be problems with the charging control systems.
# Codes (Include History)	Number of DTCs: Min.: 0, Max.: 255	0	-

2. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine / Active Test.
- Perform the Active Test by referring to the table below.


ECM

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Voltage of Alternator	Fluctuations in the required alternator generated voltage.	Between 12.8 and 14.3 V	While engine running.

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDJOVJX
Title: FA20 BATTERY / CHARGING: CHARGING SYSTEM: DIAGNOSIS SYSTEM (2013 FR-S)		

DIAGNOSIS SYSTEM

1. DLC3 (Data Link Connector 3)

(a) Check the DLC3  .

2. BATTERY VOLTAGE

Standard voltage:

11 to 14 V

If the voltage is below 11 V, replace or recharge the battery.



Last Modified: 3-27-2012	6.4 S	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MXP02KX
Title: FA20 BATTERY / CHARGING: CHARGING SYSTEM: DIAGNOSTIC TROUBLE CODE CHART (2013 FR-S)		


DIAGNOSTIC TROUBLE CODE CHART

DTC CODE	DETECTION ITEM	SEE PAGE
P0516	Battery Temperature Sensor Circuit Low	INFO
P0517	Battery Temperature Sensor Circuit High	INFO
P1530	Short in Battery Current Sensor Circuit	INFO
P1531	Open in Battery Current Sensor Circuit	INFO
P1532	Battery Current Sensor Circuit	INFO

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDK0XKX
Title: FA20 BATTERY / CHARGING: CHARGING SYSTEM: DTC CHECK / CLEAR (2013 FR-S)		

DTC CHECK / CLEAR

1. CHECK DTC

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / DTC.
- (e) Check the DTC(s), and then write them down.
- (f) Check the details of the DTC(s)  .

2. CLEAR DTC

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / DTC.
- (e) Clear the DTCs.

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MXV01SX
Title: FA20 BATTERY / CHARGING: CHARGING SYSTEM: FAIL-SAFE CHART (2013 FR-S)		

[FAIL-SAFE CHART](#)

If any of the following DTCs are stored, the ECM enters fail-safe mode to allow the vehicle to be driven temporarily.

DTC NO.	COMPONENT	FAIL-SAFE OPERATION	FAIL-SAFE DEACTIVATION CONDITION
P0516, P0517, P1530, P1531 and P1532	Generator	Generator command is fixed.	Pass condition detected



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PD90TJX
Title: FA20 BATTERY / CHARGING: CHARGING SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

*: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	CUSTOMER PROBLEM ANALYSIS
-----------	----------------------------------

HINT:

- In troubleshooting, confirm that the problem symptoms have been accurately identified. Preconceptions should be discarded in order to make an accurate judgment. To clearly understand what the problem symptoms are, it is extremely important to ask the customer about the problem and the conditions at the time the malfunction occurred.
- Gather as much information as possible for reference. Past problems that seem unrelated may also help in some cases.
 - The following 5 items are important points in the problem analysis:

What	Vehicle model, system name
When	Date, time, occurrence frequency
Where	Road conditions
Under what conditions?	Running conditions, driving conditions, weather conditions
How did it happen?	Problem symptoms

NEXT



3.	INSPECT BATTERY VOLTAGE
-----------	--------------------------------

Standard voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding to the next step.

NEXT



4.	INSPECT COMMUNICATION FUNCTION OF CAN COMMUNICATION SYSTEM*
-----------	--

(a) Use the Techstream to check if the CAN communication system is functioning normally INFO

Result

RESULT	PROCEED TO
CAN DTCs are not output	A
CAN DTCs are output	B

B **GO TO CAN COMMUNICATION SYSTEM .**

A



5.	CHECK FOR DTC*
-----------	-----------------------

HINT:

Refer to DTC Check / Clear INFO .

Result

RESULT	PROCEED TO
No code	A
Trouble code	B

B **GO TO DTC CHART**

A



6.	REFER TO PROBLEM SYMPTOMS TABLE
-----------	--

HINT:

Refer to Problem Symptoms Table  .

Result

RESULT	PROCEED TO
Malfunctioning parts not confirmed	A
Malfunctioning parts confirmed	B

B  GO TO STEP 10

A



7.	OVERALL ANALYSIS AND TROUBLESHOOTING*
-----------	--

HINT:

Refer to Data List / Active Test  .

Result

RESULT	PROCEED TO
Malfunctioning parts not confirmed	A
Malfunctioning parts confirmed	B

B  GO TO STEP 10

A



8.	CHECK ECU CIRCUIT
-----------	--------------------------

HINT:

Refer to Terminals of ECU  .

NG  GO TO STEP 10

OK



9.	CHECK FOR INTERMITTENT PROBLEMS
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HINT:

Refer to Symptom Simulation  .

NEXT



10.	CONDUCT PARTS INSPECTION
-----	--------------------------

NEXT



11.	IDENTIFY PROBLEM
-----	------------------

NEXT



12.	ADJUST AND/OR REPAIR
-----	----------------------

NEXT



13.	CONDUCT CONFIRMATION TEST
-----	---------------------------

NEXT  END

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001AR909JX
Title: FA20 BATTERY / CHARGING: CHARGING SYSTEM: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. CHECK BATTERY CONDITION

NOTICE:

If the battery is weak or if the engine is difficult to start, perform the following procedures.

(a) Check the battery for damage and deformation. If severe damage, deformation or leakage is found, replace the battery.

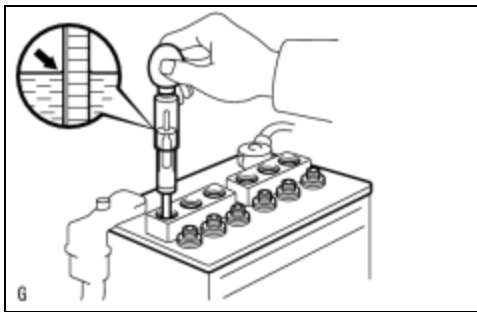
(b) Check the volume of electrolyte quantity in each cell.

- If the electrolyte volume is below the lower line, add distilled water to each cell. Then, recharge the battery and check the electrolyte specific gravity.

Standard specific gravity:

1.25 to 1.29 at 20°C (68°F)

If the electrolyte volume is above the lower line, check the battery voltage when cranking the engine. If the battery voltage is less than 9.6 V, recharge or replace the battery.



HINT:

Before checking the battery voltage, turn off all the electrical systems (headlights, blower motor, rear defogger, etc.).

2. INSPECT BATTERY TERMINAL AND FUSE

(a) Check that the battery terminals are not loose or corroded.

If the terminal is corroded, clean the terminal.

(b) Measure the resistance of the H-fuses and fuses.

Standard resistance:

Below 1 Ω

If the result is not as specified, replace the fuse.

3. INSPECT FAN AND GENERATOR V BELT INFO

4. INSPECT GENERATOR WIRING

(a) Visually check the generator wiring.

(1) Check that the wiring is in good condition.

5. CHECK FOR ABNORMAL NOISES

(a) Listen for abnormal noises from the generator.

(1) Check that no abnormal noises are heard from the generator while the engine is running.

6. INSPECT CHARGE WARNING LIGHT CIRCUIT

(a) Turn the ignition switch to ON. Check that the charge warning light comes on.

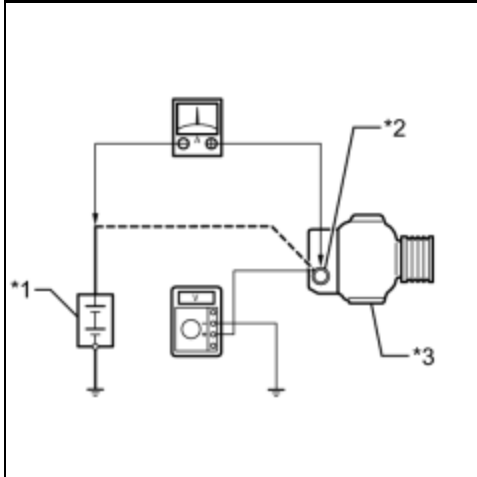
(b) Start the engine and check that the light goes off.

If the light does not operate as specified, troubleshoot the charge warning light circuit.

7. INSPECT CHARGING CIRCUIT WITHOUT LOAD

(a) Connect a voltmeter and ammeter to the charging circuit as follows.

(1) Disconnect the wire from terminal B of the generator, and then connect it to the negative (-) lead of an ammeter.



Text in Illustration

*1	Battery
*2	Terminal B
*3	Generator Assembly

(2) Connect the positive (+) lead of the ammeter to terminal B of the generator.

(3) Connect the positive (+) lead of a voltmeter to terminal B of the generator.

(4) Ground the negative (-) lead of the voltmeter.

(b) Check the charging circuit.

(1) Maintain the engine speed at 2000 rpm and check the reading on the ammeter and voltmeter.

Standard current:

10 A or less

Standard voltage:

11.3 to 15.6 V

If the result is not as specified, replace the generator assembly.

HINT:

If the battery is not fully charged, the ammeter reading will sometimes be higher than the standard current.

8. INSPECT CHARGING CIRCUIT WITH LOAD

(a) With the engine running at 2000 rpm, turn the high beam headlights on and turn the heater blower switch to the HI position.

(b) Check the reading on the ammeter.

Standard current:

30 A or higher

If the ammeter reading is below the standard current, repair the generator.

HINT:

If the battery is fully charged, the indication will sometimes be below the standard current. If this is the case, add more electrical load (operate the wipers, rear window defogger, etc.) and check the reading on the ammeter again.

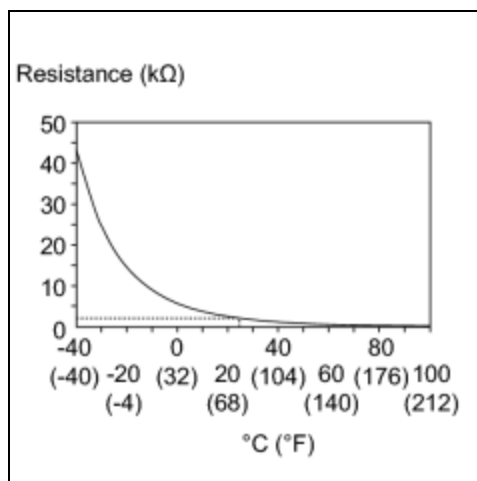


Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010BK0E1X
Title: FA20 BATTERY / CHARGING: CHARGING SYSTEM: P0516,P0517: Battery Temperature Sensor Circuit Low (2013 FR-S)		

DTC	P0516	Battery Temperature Sensor Circuit Low
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DTC	P0517	Battery Temperature Sensor Circuit High
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DESCRIPTION



The battery temperature sensor installed on the battery current sensor assembly detects the battery temperature.

A thermistor is integrated into the battery temperature sensor, and the resistance in the battery temperature sensor changes according to the battery temperature.

The resistance of the thermistor in the battery temperature sensor decreases as the battery temperature increases. The resistance increases as the temperature decreases.

The battery temperature sensor is connected to the ECM. The ECM supplies 5 V from the THB terminal to the battery temperature sensor through resistor R.

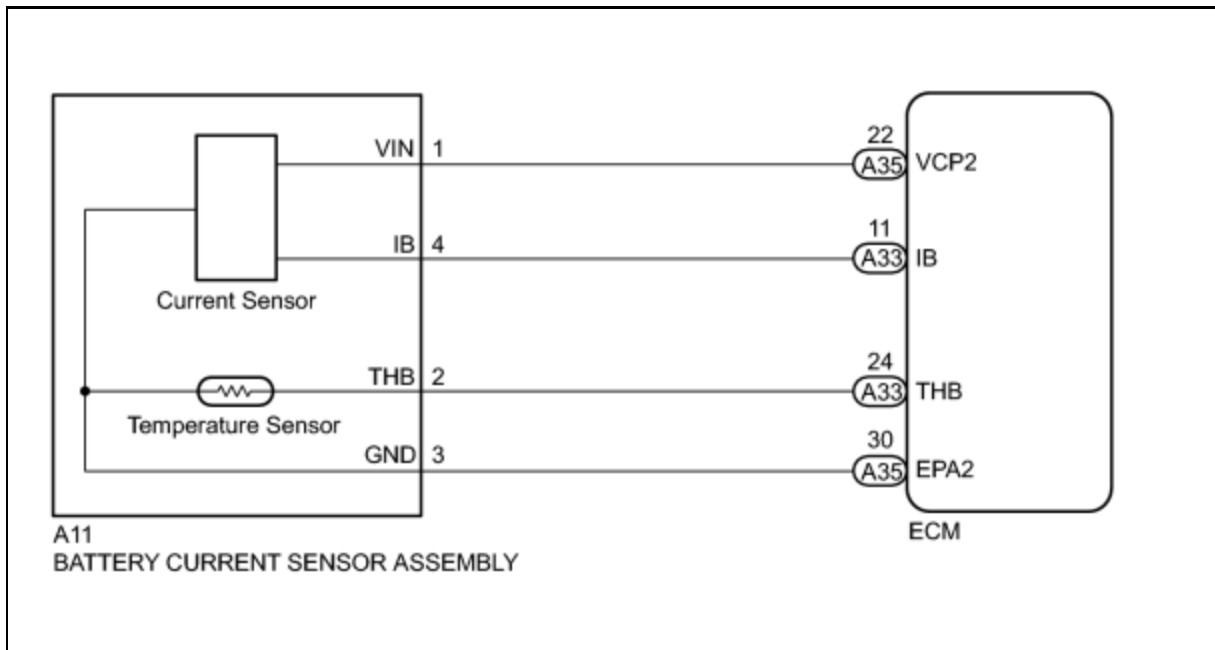
The battery temperature sensor and resistor R are connected in series. This results in fluctuations in the voltage supplied from the THB terminal when the resistance changes according to the battery temperature.

The ECM determines the battery temperature according to fluctuations in voltage. When the battery temperature is high, the ECM determines to reduce the amount of current supplied from the generator in order to protect the battery.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
		<ul style="list-style-type: none"> Battery current

P0516	<ul style="list-style-type: none"> • Engine speed is 500 r/min or more, battery voltage is 10.9 V or more, and 1 second or more have elapsed after starting. • Battery temperature sensor output is less than 0.104 V, and duration of the malfunction is 0.5 seconds or more (1-trip detection logic). 	<ul style="list-style-type: none"> • sensor assembly (battery temperature sensor) • Short to GND in battery temperature sensor circuit • ECM
P0517	<ul style="list-style-type: none"> • Engine speed is 500 r/min or more, battery voltage is 10.9 V or more, and 1 second or more have elapsed after starting. • Battery temperature sensor output is more than 4.867 V, and duration of the malfunction is 0.5 seconds or more (1-trip detection logic). 	<ul style="list-style-type: none"> • Battery current sensor assembly (battery temperature sensor) • Open in battery temperature sensor circuit • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	INSPECT BATTERY CURRENT SENSOR ASSEMBLY
----	--

(a) Disconnect the cable from the negative (-) battery terminal.



(b) Disconnect the A11 battery current sensor assembly connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
2 (THB) - 3 (GND)	20 to 30°C (68 to 86°F)	1.5 to 2.6 kΩ

Text in Illustration

*a	Component without harness connected (Battery Current Sensor Assembly)
----	--

(d) Reconnect the cable to the negative (-) battery terminal.

NG ▶ **REPLACE BATTERY CURRENT SENSOR ASSEMBLY**

OK



2.	CHECK HARNESS AND CONNECTOR (BATTERY CURRENT SENSOR ASSEMBLY - ECM)
-----------	--

(a) Disconnect the A33 and A35 ECM connectors.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-24 (THB) - A11-2 (THB)	Always	Below 1 Ω
A35-30 (EPA2) - A11-3 (GND)	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-24 (THB) or A11-2 (THB) - Body ground	Always	10 kΩ or higher

A35-30 (EPA2) or A11-3 (GND) - Body ground	Always	10 kΩ or higher
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NG ► **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ► **REPLACE ECM**



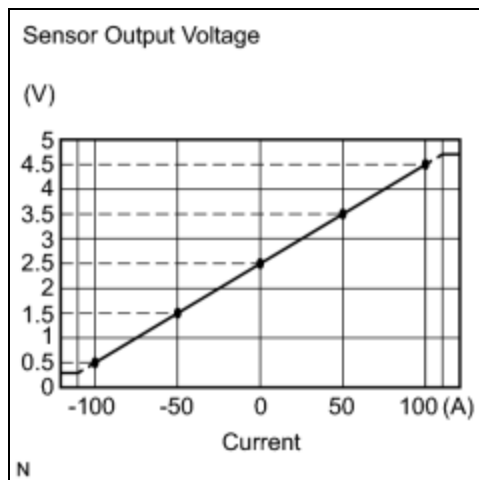
Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010BL058X
Title: FA20 BATTERY / CHARGING: CHARGING SYSTEM: P1530-P1532: Short in Battery Current Sensor Circuit (2013 FR-S)		

DTC	P1530	Short in Battery Current Sensor Circuit
------------	--------------	--

DTC	P1531	Open in Battery Current Sensor Circuit
------------	--------------	---

DTC	P1532	Battery Current Sensor Circuit
------------	--------------	---------------------------------------

DESCRIPTION



The battery current sensor assembly installed on the negative (-) battery terminal detects the amount of current supplied from the generator.

The battery current sensor assembly changes current to voltage (at the negative (-) battery terminal) and sends it to the ECM. The ECM controls the voltage of the generator based on the signals from the battery current sensor assembly.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P1530	<ul style="list-style-type: none"> Engine speed is 500 r/min or more, battery voltage is 10.9 V or more, and 1 second or more have elapsed after starting. Battery current sensor output is less than 0.347 V, and duration of the malfunction is 0.5 seconds or more (1-trip detection logic). 	<ul style="list-style-type: none"> Battery current sensor assembly Open or short to GND in battery current

		<ul style="list-style-type: none"> sensor circuit • ECM
P1531	<ul style="list-style-type: none"> • Engine speed is 500 r/min or more, battery voltage is 10.9 V or more, and 1 second or more have elapsed after starting. • Battery current sensor output is more than 4.653 V, and duration of the malfunction is 0.5 seconds or more (1-trip detection logic). 	<ul style="list-style-type: none"> • Battery current sensor assembly • Short to +B or VC in battery current sensor circuit • ECM
P1532	<ul style="list-style-type: none"> • Ignition switch ON • Current sensor fixing diagnosis: The difference between the maximum and minimum current value when changing charging states is less than 0.07 V, and the charging state changes 10 times or more in succession when malfunctioning (1-trip detection logic). • Charging side properties diagnosis: After the alternator target DUTY has changed from 60% or more to less than 40%, with the alternator target DUTY is less than 40%, the battery voltage is less than 13.2 V and the battery current sensor voltage is 2.6 V or more and less than 5 V, and the duration of the malfunction is 30 seconds or more (1-trip detection logic). • Discharge side properties diagnosis: After the alternator target DUTY has changed from less than 40% to 60% or more, with the alternator target DUTY at 60% or more, the battery voltage is more than 13.7 V and the battery current sensor voltage is 0 V or more and less than 2.4 V and the duration of malfunction is 30 seconds or more (1-trip detection logic). 	<ul style="list-style-type: none"> • Battery current sensor assembly • Short in battery current sensor circuit • ECM

WIRING DIAGRAM

Refer to DTC P0516  .

INSPECTION PROCEDURE

PROCEDURE

1.	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO P1530, P1531, P1532)
-----------	---

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine / DTC.

(e) Read the DTC.

Result

RESULT	PROCEED TO
DTC P1530, P1531 and P1532 are output	A
DTC P1530, P1531, P1532 and other DTCs are output	B

HINT:

If any DTCs other than P1530, P1531 and P1532 are output, troubleshoot those DTCs first.

B ► [GO TO DTC CHART](#)

A



2.	READ VALUE USING TECHSTREAM (BATTERY CURRENT)
-----------	--

(a) Turn all of the electrical systems (headlights, blower motor, rear defogger, etc.) off.

(b) Connect the Techstream to the DLC3.

(c) Turn the ignition switch to ON.

(d) Turn the Techstream on.

(e) Enter the following menus: Powertrain / Engine / Data List / Battery Current.

Result

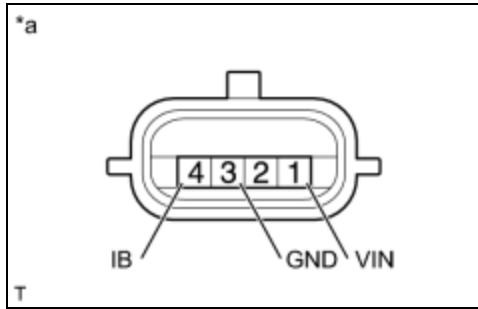
RESULT	PROCEED TO
Battery current is fixed at 0 A, or fluctuates by +/- 1 A or less between -100 and 100 A	A
Battery current fluctuates between -20 and 0 A	B

B ► [USE SIMULATION METHOD TO CHECK](#)

A



3.	INSPECT BATTERY CURRENT SENSOR ASSEMBLY
-----------	--



(a) Disconnect the cable from the negative (-) battery terminal.

(b) Disconnect the A11 battery current sensor assembly connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (VIN) - 3 (GND)	Always	3 to 10 kΩ
1 (VIN) - 4 (IB)	Always	Below 0.5 kΩ
3 (GND) - 4 (IB)	Always	3 to 10 kΩ

Text in Illustration

*a	Component without harness connected (Battery Current Sensor Assembly)
----	--

(d) Reconnect the cable to the negative (-) battery terminal.

NG ▶ REPLACE BATTERY CURRENT SENSOR ASSEMBLY

OK



4.	CHECK HARNESS AND CONNECTOR (BATTERY CURRENT SENSOR ASSEMBLY - ECM)
-----------	--

(a) Disconnect the A33 and A35 ECM connectors.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-11 (IB) - A11-4 (IB)	Always	Below 1 Ω
A35-22 (VCP2) - A11-1 (VIN)	Always	Below 1 Ω

A35-30 (EPA2) - A11-3 (GND)

Always

Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-11 (IB) or A11-4 (IB) - Body ground	Always	10 k Ω or higher
A35-22 (VCP2) or A11-1 (VIN) - Body ground	Always	10 k Ω or higher
A35-30 (EPA2) or A11-3 (GND) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

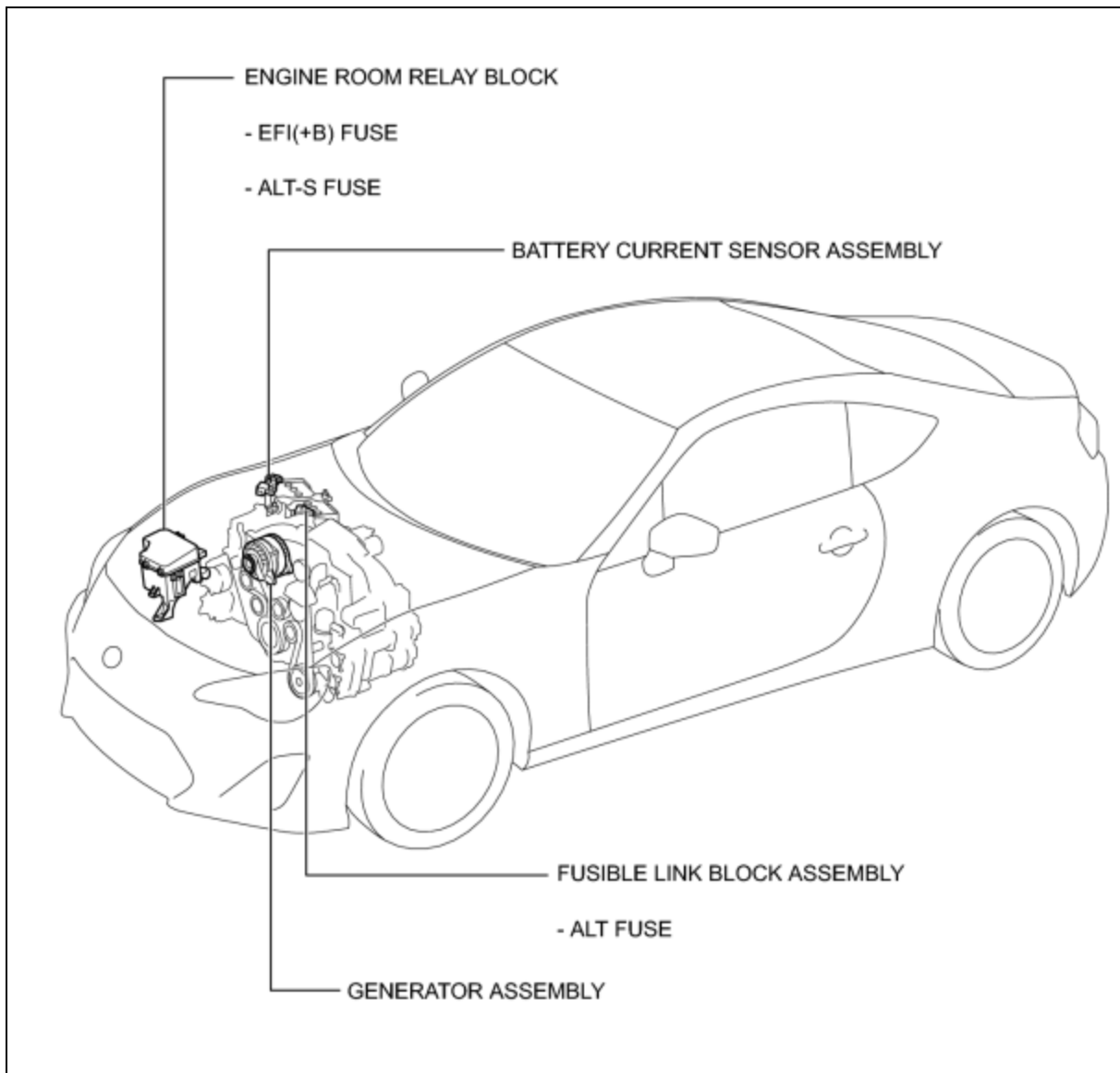
OK  **REPLACE ECM**



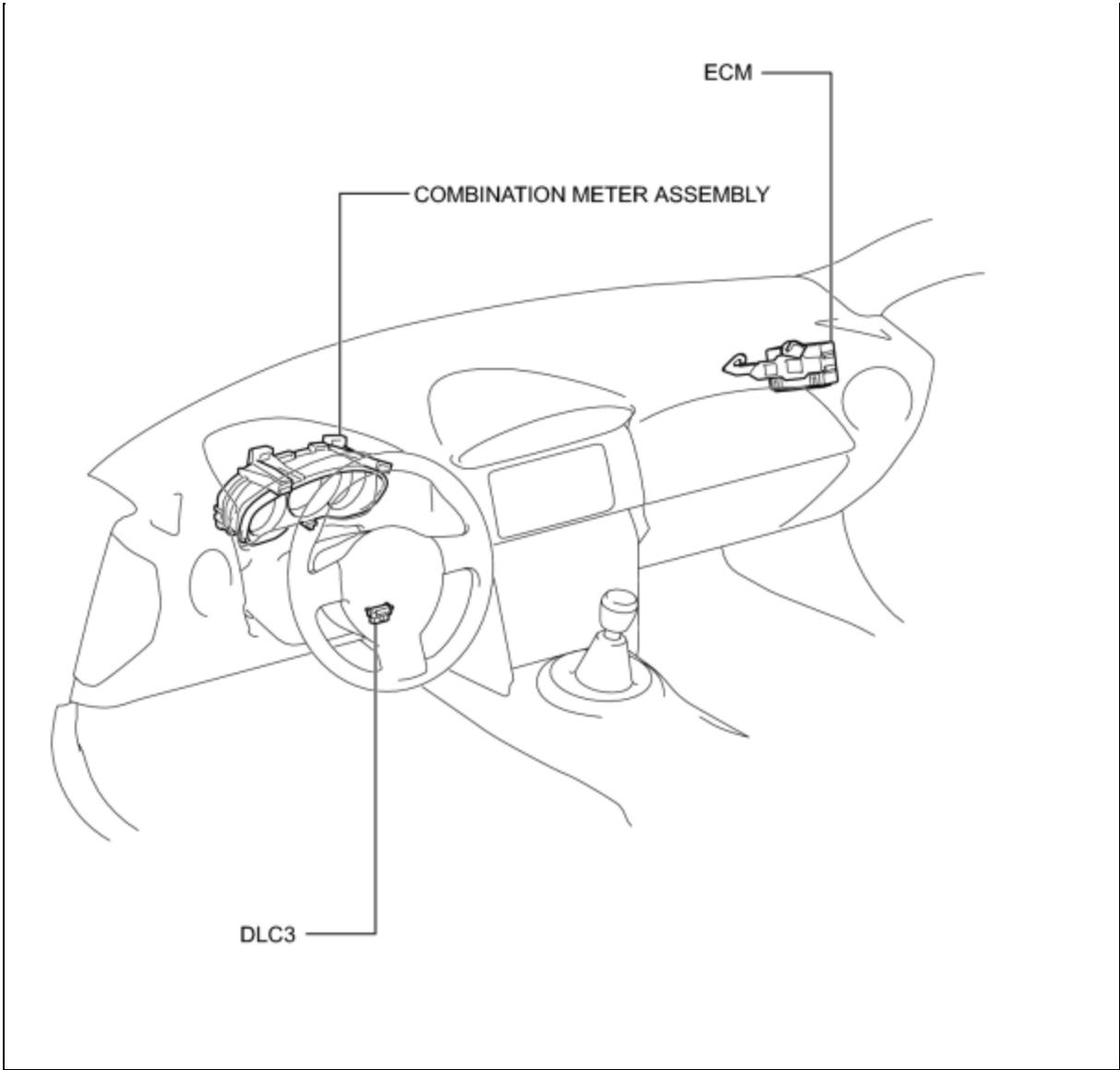
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003SCX00LX
Title: FA20 BATTERY / CHARGING: CHARGING SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001GNI01AX
Title: FA20 BATTERY / CHARGING: CHARGING SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

1. PRECAUTION

- (a) Check that the battery cables are connected to the correct terminals.
- (b) Disconnect the battery cables when the battery is given a quick charge.
- (c) Do not perform tests with a high voltage insulation resistance tester.
- (d) Never disconnect the battery cables while the engine is running.
- (e) Check that the charging cable nuts are tightened on terminal B of the generator and on the engine room relay block.



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MXQ01AX
Title: FA20 BATTERY / CHARGING: CHARGING SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

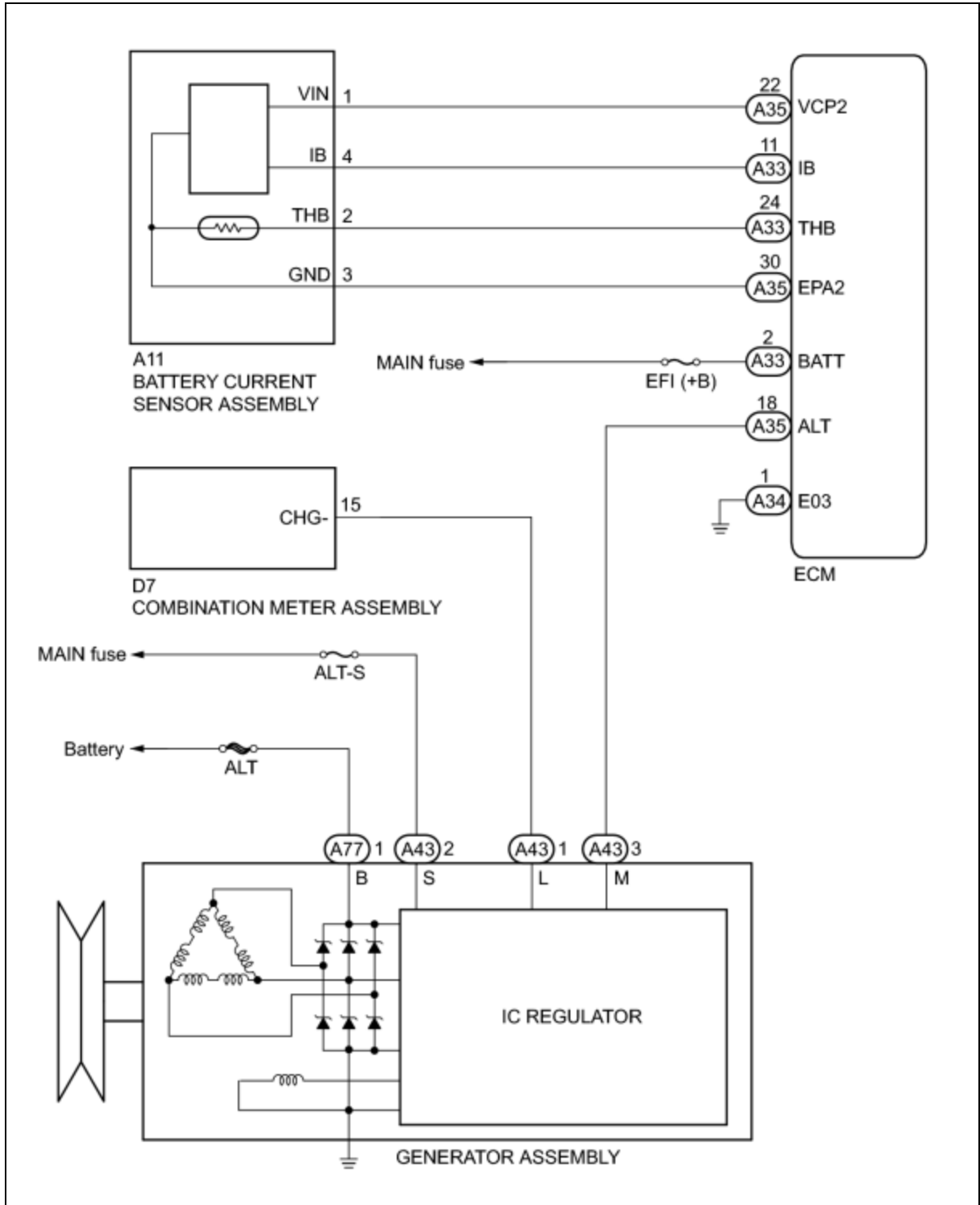
- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Charging System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Charging warning light comes on	Battery	INFO
	Generator assembly	INFO
	Charging system	INFO

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HWM00YX
Title: FA20 BATTERY / CHARGING: CHARGING SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

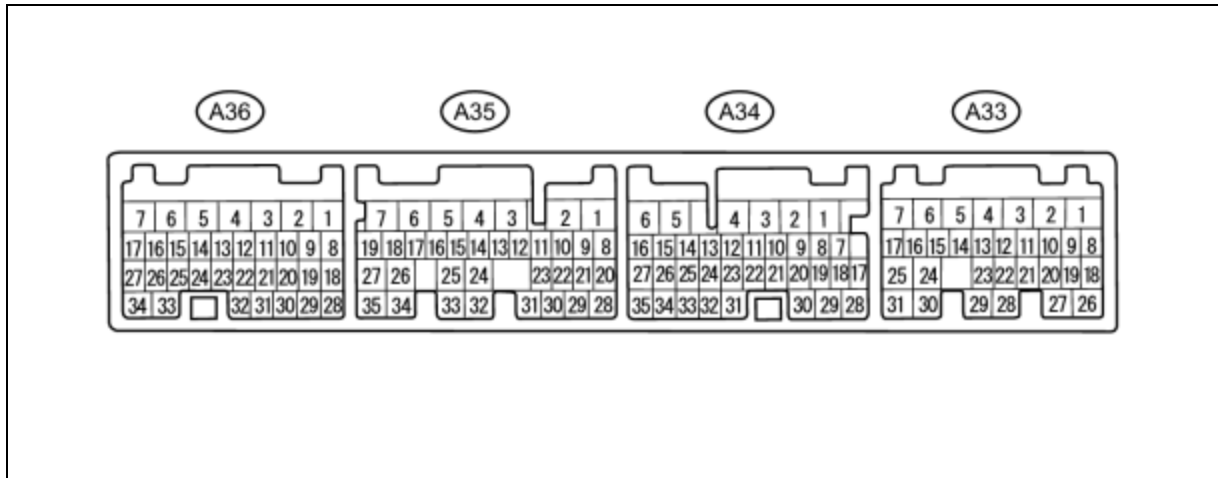
SYSTEM DIAGRAM



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000220604OX
Title: FA20 BATTERY / CHARGING: CHARGING SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. CHECK ECM



(a) Measure the resistance, voltage and waveform according to the value(s) in the table below.

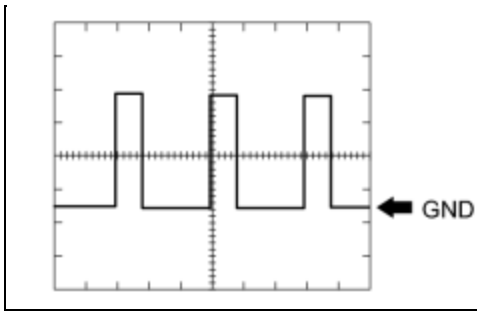
TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A33-2 (BATT) - A34-1 (E03)	W - B-R	Battery power	Always	11 to 14 V
A33-11 (IB) - A35-30 (EPA2)	R-B - Y-B	Battery current sensor	Ignition switch ON	0.5 to 4.5 V
A33-24 (THB) - A35-30 (EPA2)	R-W - Y- B	Battery temperature sensor	Ignition switch ON 20 to 50°C (68 to 122°F)	1.1 to 2.4 V
A34-1 (E03) - Body ground	B-R - Body ground	Body ground	Always	Below 1 Ω
A35-18 (ALT) - A34-1 (E03)	V - B-R	Generator	Idling with warm engine	Pulse generation (See waveform 1)
A35-22 (VCP2) - A35-30 (EPA2)	G-B - Y-B	Power source of battery current sensor assembly	Ignition switch ON	4.5 to 5.5 V

If the result is not as specified, the ECU may have a malfunction.

(b) WAVEFORM 1

Generator

TESTER CONNECTION	TOOL SETTING	VEHICLE CONDITION	SPECIFIED CONDITION



A35-18 (ALT) - A34-1 (E03)	2 V/DIV., 2 msec./DIV.	Idling with warm engine	Correct waveform as shown in illustration

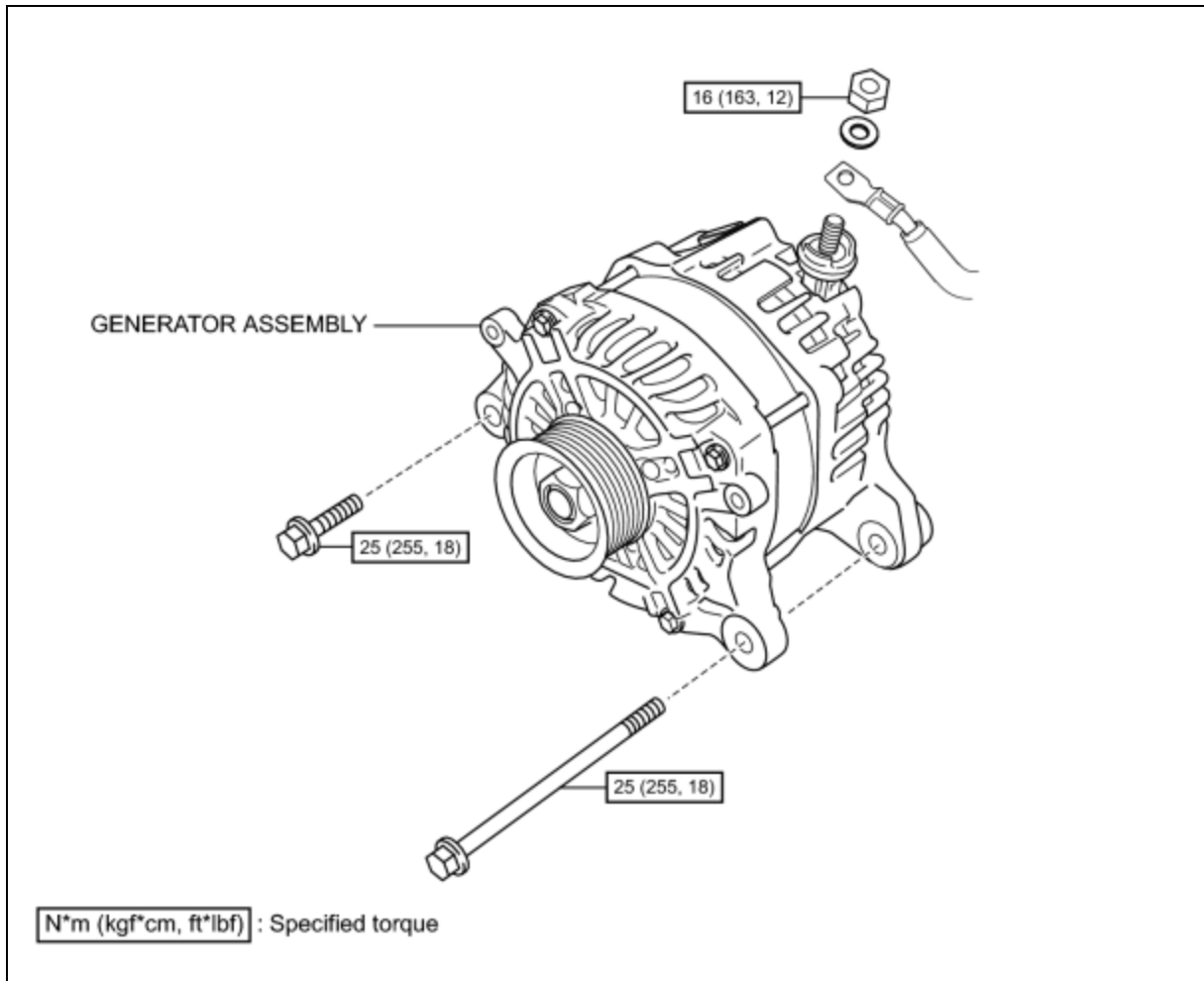
HINT:

- The oscilloscope waveform shown in the illustration is an example for reference only. Noise, chattering, etc. are not shown.
- A constant value is not output, as the duty ratio varies depending on the electrical load and battery condition.

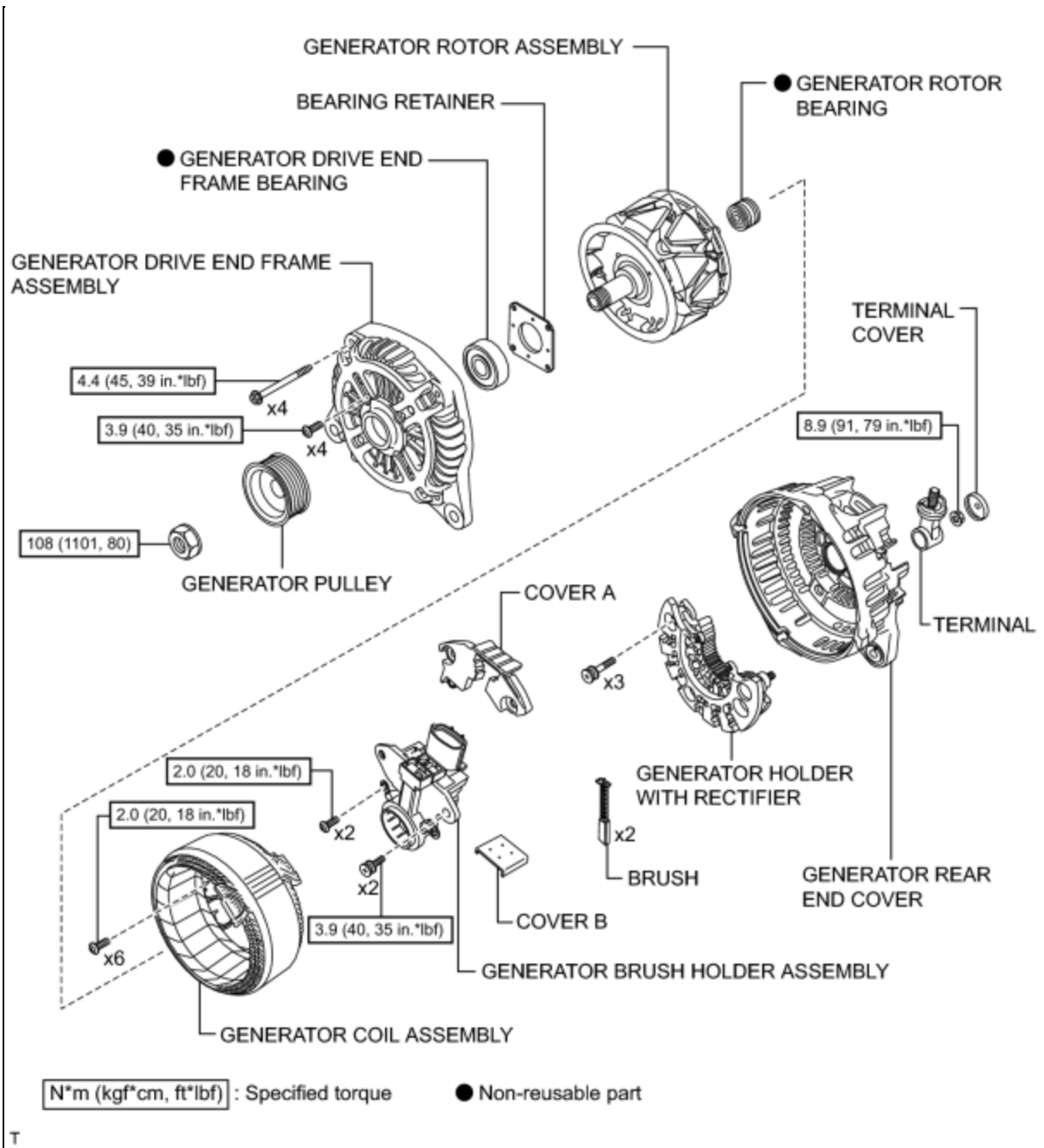
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000017VI01GX
Title: FA20 BATTERY / CHARGING: GENERATOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION

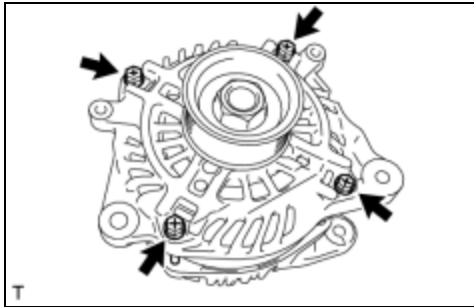


T

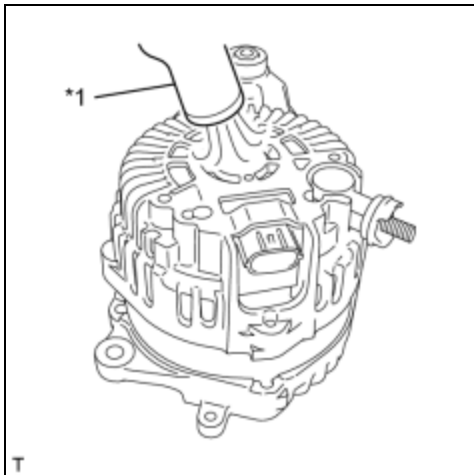
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000017VK02QX
Title: FA20 BATTERY / CHARGING: GENERATOR: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. REMOVE GENERATOR REAR END COVER



(a) Remove the 4 through bolts.



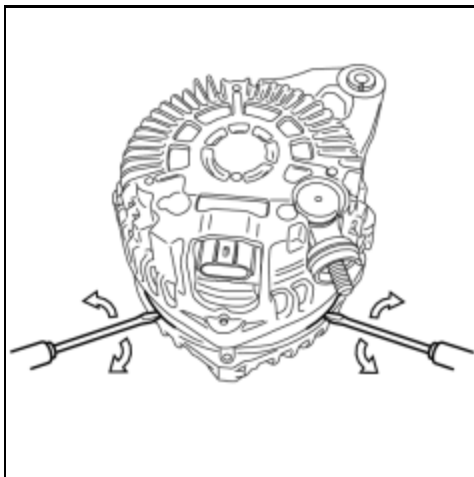
(b) Using the heat gun, heat the generator rear end cover.

Heating Temperature:

ITEM	TEMPERATURE
Generator Rear End Cover	50 to 60°C (122 to 140°F)

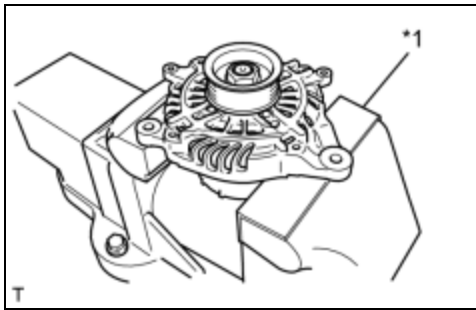
Text in Illustration

*1	Heat gun
----	----------



(c) Insert the 2 screw drivers, remove the generator rear end cover as shown in the illustration.

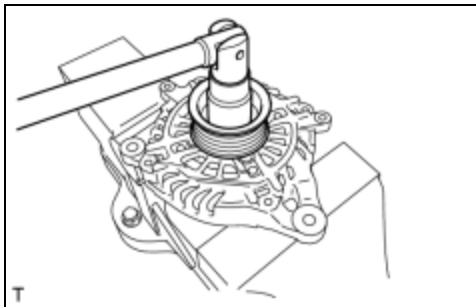
2. REMOVE GENERATOR PULLEY



(a) Mount the generator in a vise between aluminum plates.

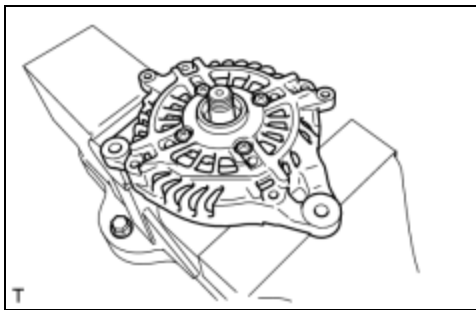
Text in Illustration

*1	Aluminium plate
----	-----------------



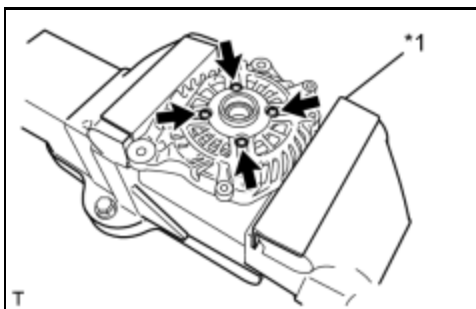
(b) Remove the nut and generator pulley.

3. REMOVE GENERATOR DRIVE END FRAME ASSEMBLY



(a) Remove the generator drive end frame assembly from the generator rotor assembly.

4. REMOVE GENERATOR DRIVE END FRAME BEARING

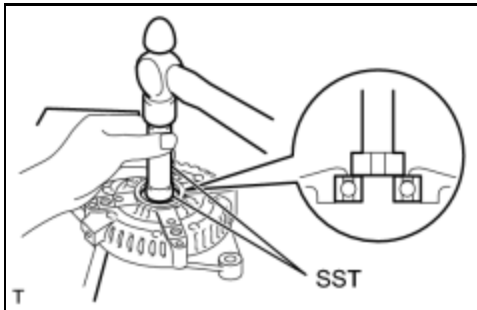


(a) Mount the generator drive end frame assembly in a vise between aluminum plates.

(b) Remove the 4 bolts and bearing retainer.

Text in Illustration

*1	Aluminium plate
----	-----------------



(c) Using SST and a hammer, tap out the bearing.

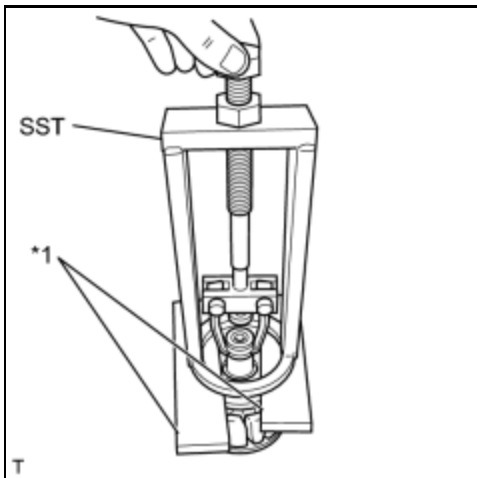
SST: 09950-60010

09951-00250

SST: 09950-70010

09951-07100

5. REMOVE GENERATOR ROTOR BEARING

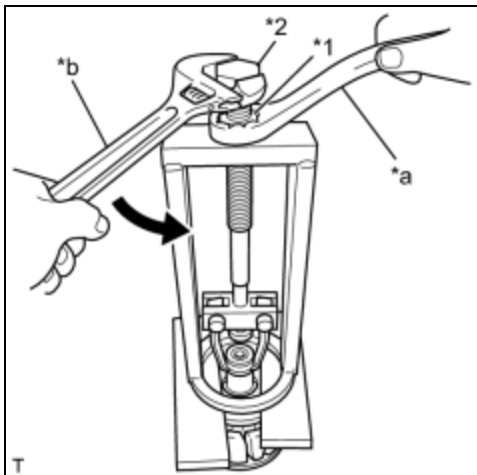


(a) Set the SST to the generator rotor assembly between wooden blocks.

SST: 09387-00041

Text in Illustration

*1	Wooden block
----	--------------

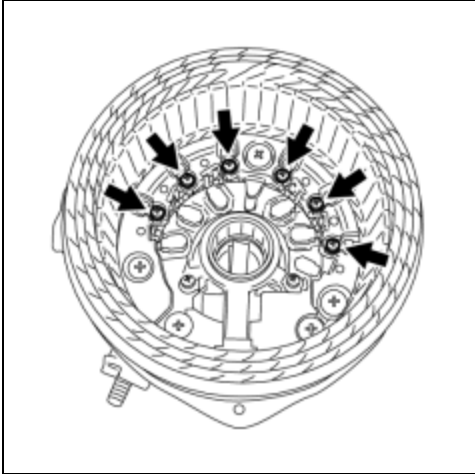


(b) Hold the SST nut, and turn the SST bolt to remove the generator rotor bearing.

Text in Illustration

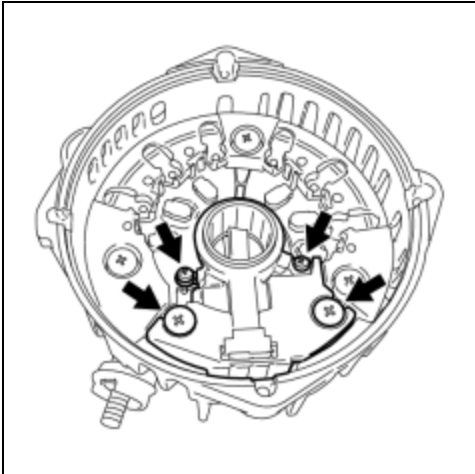
*1	SST Nut
*2	SST Bolt
*a	Hold
*b	Turn

6. REMOVE GENERATOR COIL ASSEMBLY



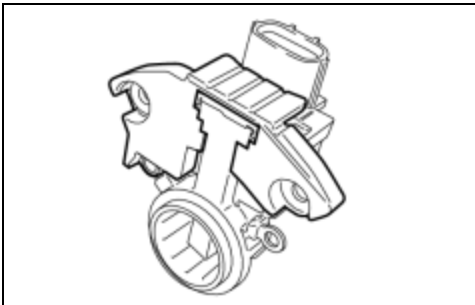
(a) Remove the 6 bolts and generator coil assembly.

7. REMOVE GENERATOR BRUSH HOLDER ASSEMBLY

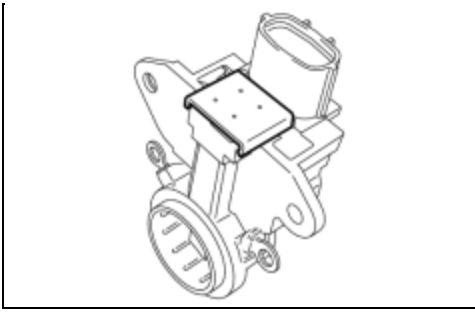


(a) Remove the 4 bolts and generator brush holder assembly.

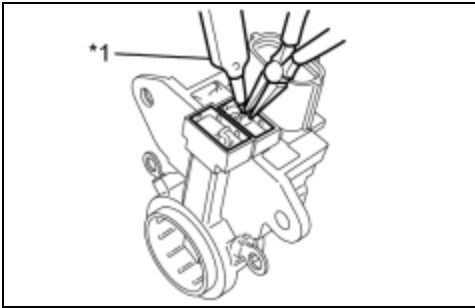
8. REMOVE BRUSH



(a) Remove the cover A from the brush holder assembly.



(b) Remove the cover B from the brush holder assembly.

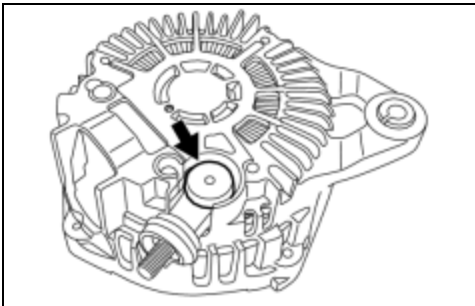


(c) Using a soldering iron, separate the 2 brushes from the brush holder assembly.

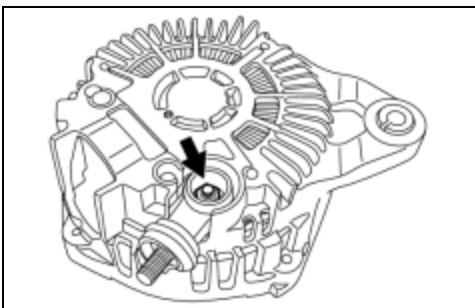
Text in Illustration

*1	Soldering iron
----	----------------

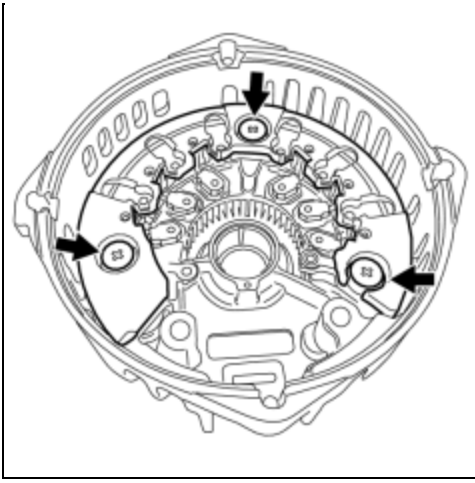
9. REMOVE GENERATOR HOLDER WITH RECTIFIER



(a) Remove the terminal cover.



(b) Remove the nut and the terminal.



(c) Remove the 3 bolts and the generator holder with rectifier.

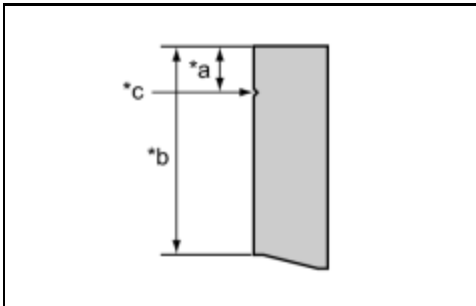


Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000017VH02NX
Title: FA20 BATTERY / CHARGING: GENERATOR: INSPECTION (2013 FR-S)		

INSPECTION


1. INSPECT BRUSH

(a) Using a vernier caliper, measure the brush length.



Standard length:
22.5 mm (0.885 in)
Minimum length:
5.0 mm (0.196 in)

Text in Illustration

*a	Minimum length
*b	Standard length
*c	Mark of minimum length
	Brush

If the brush length is less than the minimum, replace the brush.

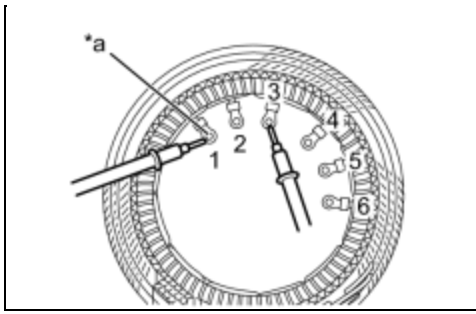
2. INSPECT GENERATOR COIL ASSEMBLY

(a) Check the resistance.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	Always	Below 1 Ω
1 - 3		
2 - 3		
4 - 5		



	4 - 6	
	5 - 6	

Text in Illustration

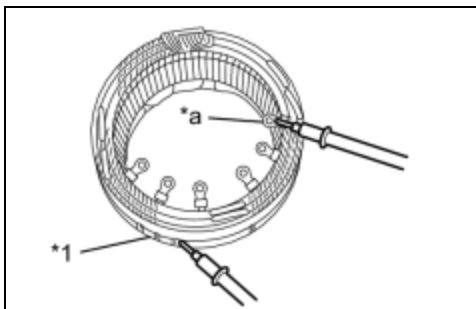
*a	Lead wire
----	-----------

If the result is not as specified, replace the generator coil assembly.

(b) Check the resistance.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Stator core - Lead wire	Always	10 k Ω or higher

Text in Illustration

*1	Stator core
*a	Lead wire

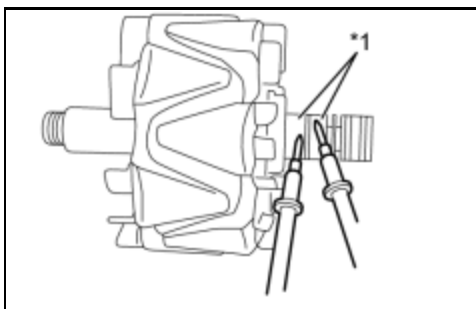
If the result is not as specified, replace the generator coil assembly.

3. INSPECT GENERATOR ROTOR ASSEMBLY

(a) Check the generator rotor assembly for an open circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Slip ring - Slip ring	20°C (68°F)	2.0 to 2.4 Ω

Text in Illustration

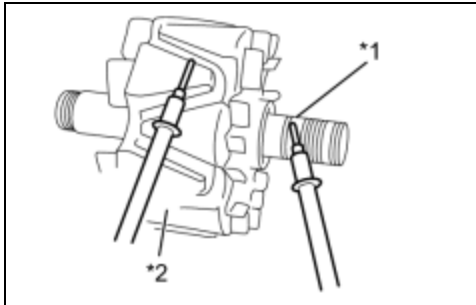
*1	Slip Ring
----	-----------

If the result is not as specified, replace the generator rotor assembly.

(b) Check if the generator rotor assembly is grounded.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Slip ring - Rotor core	Always	10 kΩ or higher

Text in Illustration

*1	Slip Ring
*2	Rotor Core

If the result is not as specified, replace the generator rotor assembly.

(c) Check the slip ring diameter.

(1) Using a vernier caliper, measure the diameter of each slip ring.

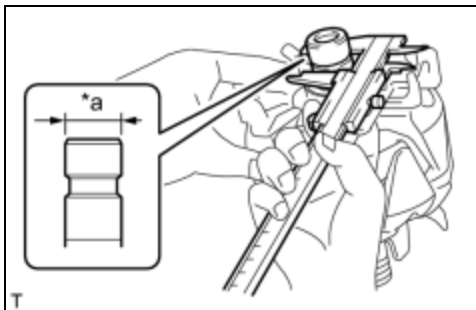
Standard diameter:

22.7 mm (0.893 in.)

Minimum diameter:

22.1 mm (0.870 in.)

If the diameter is less than the minimum, replace the generator rotor assembly.



Text in Illustration

*a	Diameter of Slip Ring
----	-----------------------

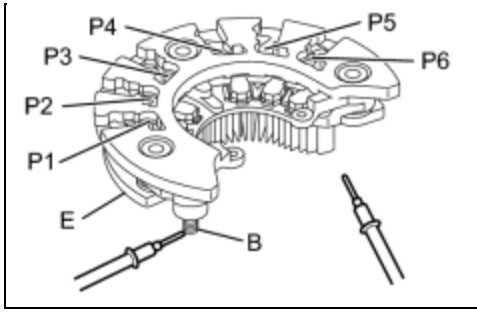
4. INSPECT GENERATOR HOLDER WITH RECTIFIER

(a) Check the resistance.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
P1, P2, P3, P4, P5, P6 - B	P1, P2, P3, P4, P5, P6 (Tester positive) B (Tester negative)	Below 1 Ω
	P1, P2, P3, P4, P5, P6 (Tester negative) B (Tester positive)	10 kΩ or higher



P1, P2, P3, P4, P5, P6 - E	P1, P2, P3, P4, P5, P6 (Tester positive) E (Tester negative)	10 kΩ or higher
	P1, P2, P3, P4, P5, P6 (Tester negative) E (Tester positive)	Below 1 Ω

If the result is not as specified, replace the generator holder with rectifier.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000017VG01NX
Title: FA20 BATTERY / CHARGING: GENERATOR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL GENERATOR ASSEMBLY

(a) Install the generator with the 2 bolts.

Torque: 25 N·m (255 kgf·cm, 18ft·lbf)

(b) Connect the generator connector.

(c) Connect the generator wire with the nut.

Torque: 16 N·m (163 kgf·cm, 12ft·lbf)

(d) Install the terminal cap.

2. INSTALL FAN AND GENERATOR V BELT

INFO

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

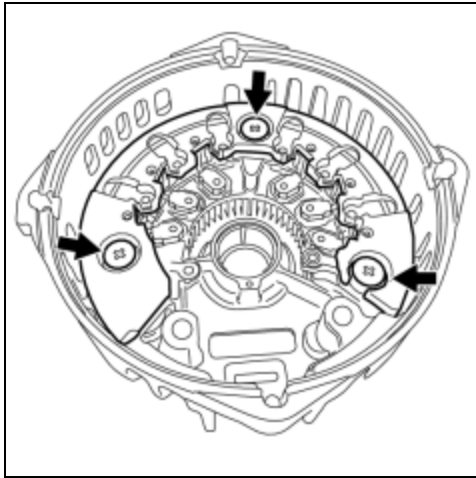
Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)



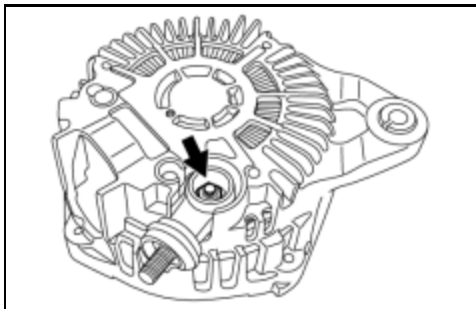
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000017VL02TX
Title: FA20 BATTERY / CHARGING: GENERATOR: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL GENERATOR HOLDER WITH RECTIFIER

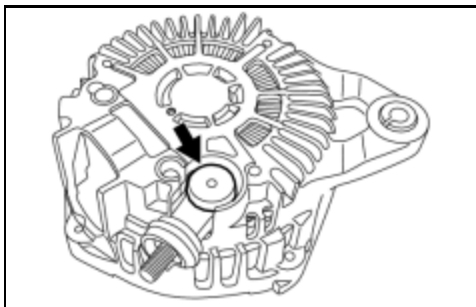


(a) Install the generator holder with rectifier with the 3 bolts.



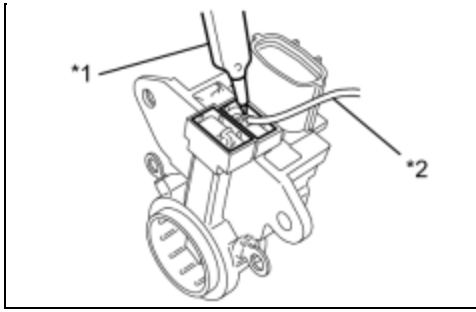
(b) Install the terminal with the nut.

Torque: 8.9 N·m (91 kgf·cm, 79in·lbf)



(c) Install the terminal cover.

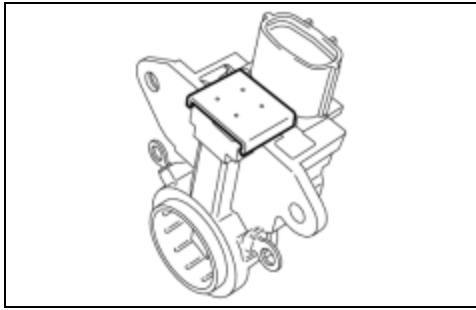
2. INSTALL BRUSH



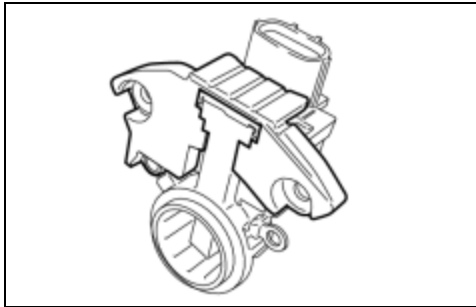
(a) Using a soldering iron, install the 2 brushes to the brush holder assembly.

Text in Illustration

*1	Soldering iron
*2	Solder

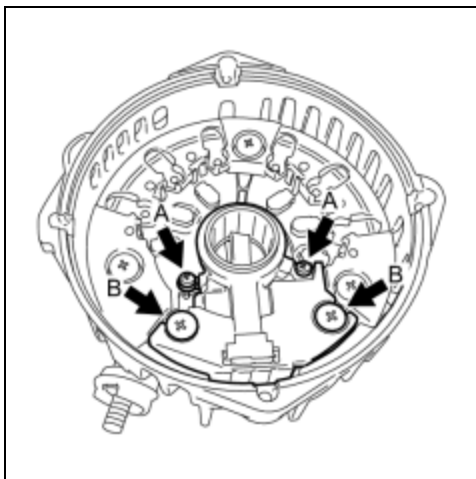


(b) Install the cover B to the brush holder assembly.



(c) Install the cover A to the brush holder assembly.

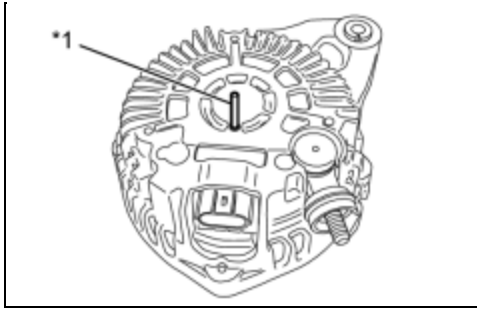
3. INSTALL GENERATOR BRUSH HOLDER ASSEMBLY



(a) Install the generator brush holder assembly with the 4 bolts.

Bolt A - Torque: 2.0 N·m (20 kgf·cm, 18in·lbf)

Bolt B - Torque: 3.9 N·m (40 kgf·cm, 35in·lbf)



- (b) While pushing the 2 brushes into the generator rear end cover, insert a 1.0 mm (0.0394 in.) pin into the generator rear end cover.

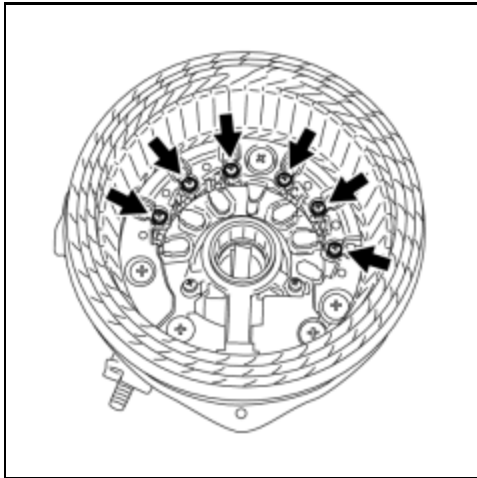
NOTICE:

Remove the pin after reassembling the generator.

Text in Illustration

*1	Pin 1.0 mm (0.0394 in.)
----	-------------------------

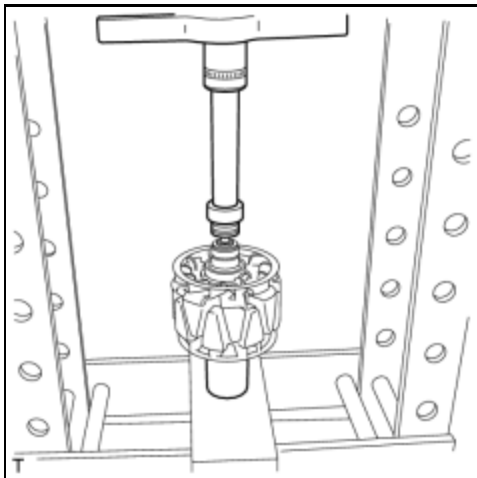
4. INSTALL GENERATOR COIL ASSEMBLY



- (a) Install the generator coil assembly with the 6 bolts.

Torque: 2.0 N·m (20 kgf·cm, 18in·lbf)

5. INSTALL GENERATOR ROTOR BEARING



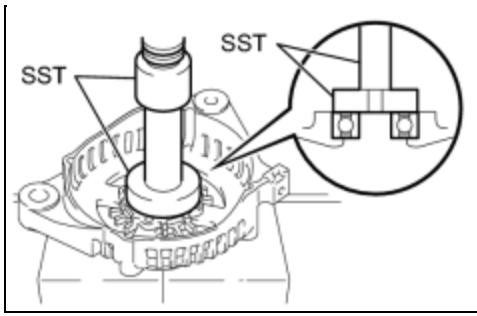
- (a) Using SST and a press, press in a new generator rotor bearing.

SST: 09632-36010

SST: 09820-36010

6. INSTALL GENERATOR DRIVE END FRAME BEARING

- (a) Using SST and a press, press in a new generator drive



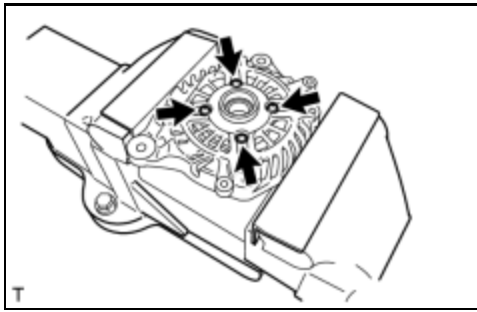
end frame bearing.

SST: 09950-60010

09951-00520

SST: 09950-70010

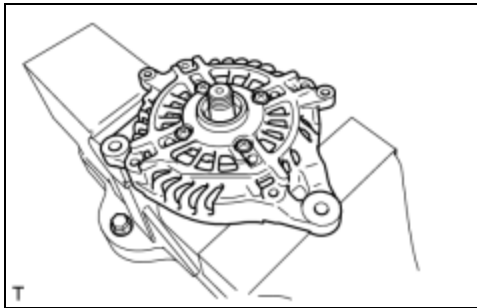
09951-07100



(b) Install the bearing retainer with the 4 screws.

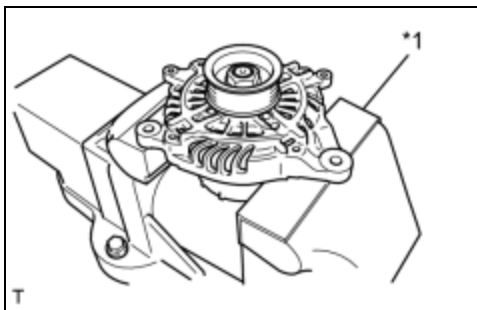
Torque: 3.9 N·m (40 kgf·cm, 35in·lbf)

7. INSTALL GENERATOR DRIVE END FRAME ASSEMBLY



(a) Install the generator drive end frame assembly to the generator rotor assembly.

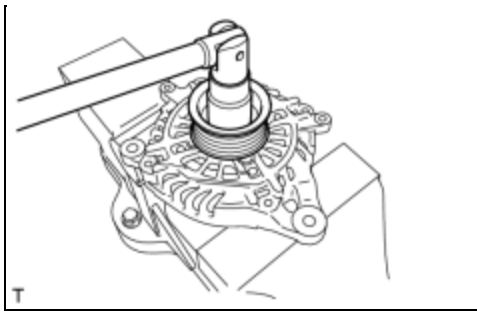
8. INSTALL GENERATOR PULLEY



(a) Mount the generator in a vise between aluminum plates.

Text in Illustration

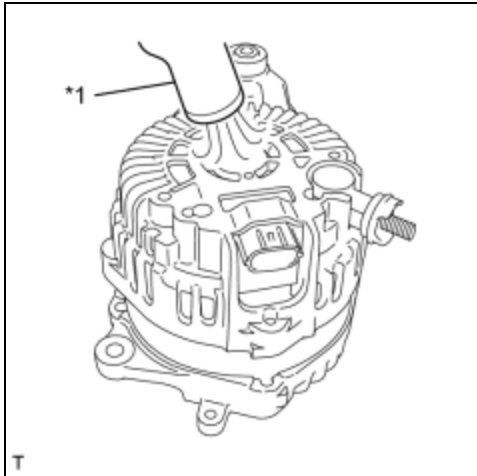
*1	Aluminium plate
----	-----------------



(b) Install the generator pulley with the nut.

Torque: 108 N·m (1101 kgf·cm, 80ft·lbf)

9. INSTALL GENERATOR REAR END COVER



(a) using the heat gun, heat the generator rear end cover.

Heating Temperature:

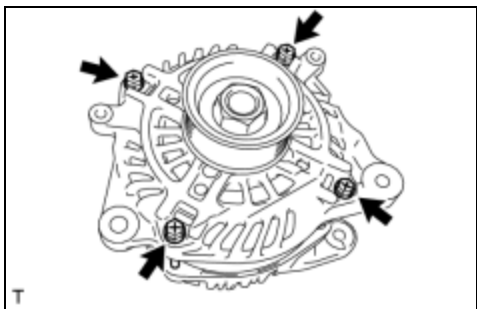
ITEM	TEMPERATURE
Generator Rear End Cover	50 to 60°C (122 to 140°F)

Text in Illustration

*1	Heat gun
----	----------

(b) Install the generator rear end cover.

(c) Pull out the pin of the generator rear end cover.



(d) Install the 4 through bolts.

Torque: 4.4 N·m (45 kgf·cm, 39in·lbf)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000017VJ01HX
Title: FA20 BATTERY / CHARGING: GENERATOR: REMOVAL (2013 FR-S)		

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

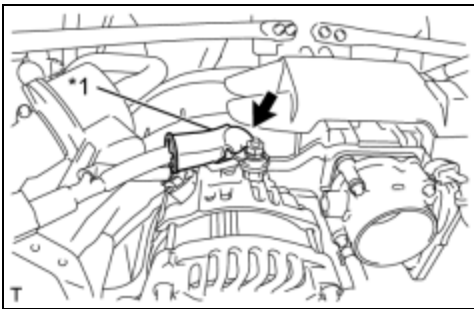
NOTICE:

The power window system utilizes a mechanism in which the door glass moves down slightly when the door is opened, and in which the glass moves up when the door closed in order to prevent the door molding from being damaged. When the negative (-) battery terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

2. REMOVE FAN AND GENERATOR V BELT

NFC

3. REMOVE GENERATOR ASSEMBLY

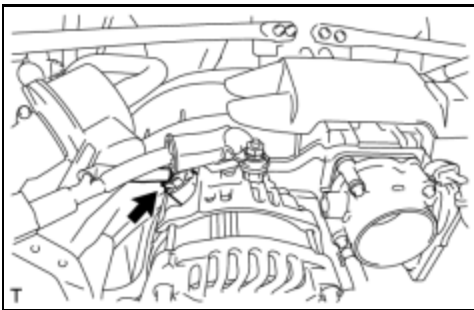


(a) Remove the terminal cap.

Text in illustration

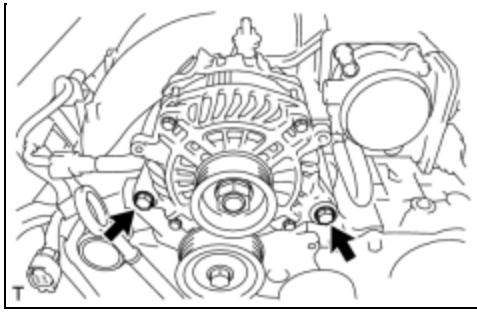
*1	terminal cap
----	--------------

(b) Remove the nut and disconnect the generator wire.



(c) Disconnect the generator connector.

(d) Remove the 2 bolts and generator assembly.



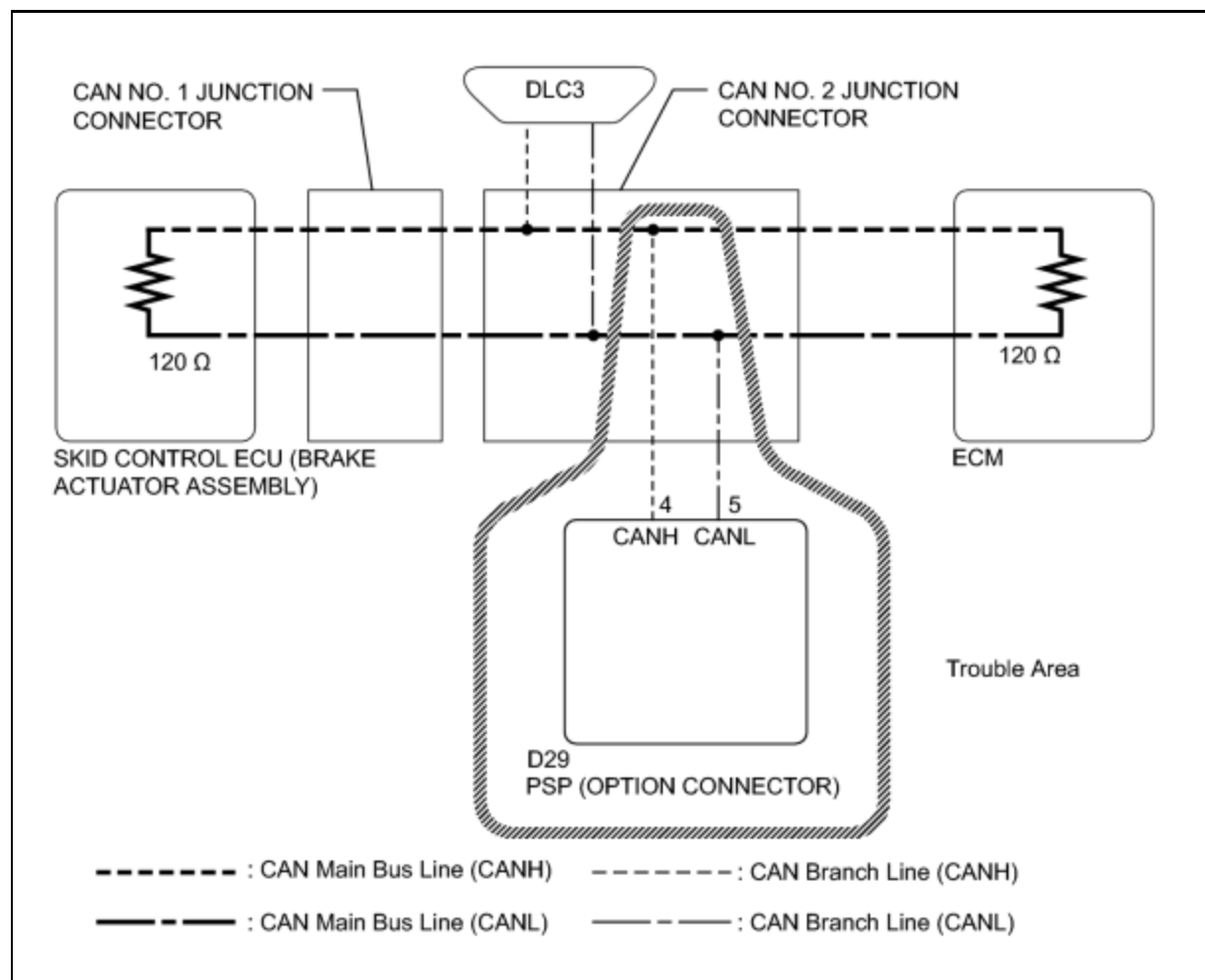
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000109K06OX
Title: NETWORKING: CAN COMMUNICATION SYSTEM: Bus Buffer ECU Communication Stop Mode (2013 FR-S)		

Bus Buffer ECU Communication Stop Mode

DESCRIPTION

DETECTION ITEM	SYMPTOM	TROUBLE AREA
Bus Buffer ECU Communication Stop Mode	Communication system DTCs (DTCs that start with U) that are output correspond to "Bus Buffer ECU Communication Stop Mode" in "DTC Combination Table" INFO	PSP (option connector) branch line or connector

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

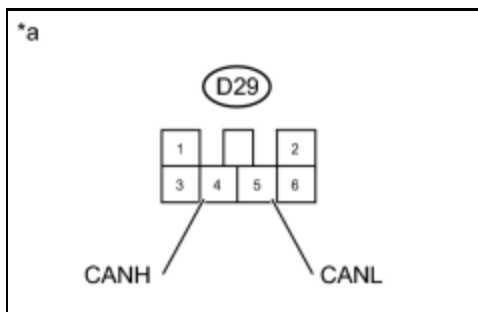
- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output **INFO**.
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.
- DTC check procedure: Turn the ignition switch to ON and wait at least 10 seconds.
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed **INFO**.

HINT:

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or wire harness while performing the inspection below may help determine the cause of the malfunction.

PROCEDURE

1.	CHECK FOR OPEN IN CAN BUS LINES (PSP (OPTION CONNECTOR) BRANCH LINE)
-----------	---



(a) Disconnect the cable from the negative (-) battery terminal.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D29-4 (CANH) - D29-5 (CANL)	Cable disconnected from negative (-) battery terminal	57 to 63 Ω

Text in Illustration

*a	Front view of wire harness connector (to PSP (Option Connector))
----	---

NG ▶ REPAIR OR REPLACE CAN BRANCH LINE OR
CONNECTOR (PSP (OPTION CONNECTOR))

OK ▶ END



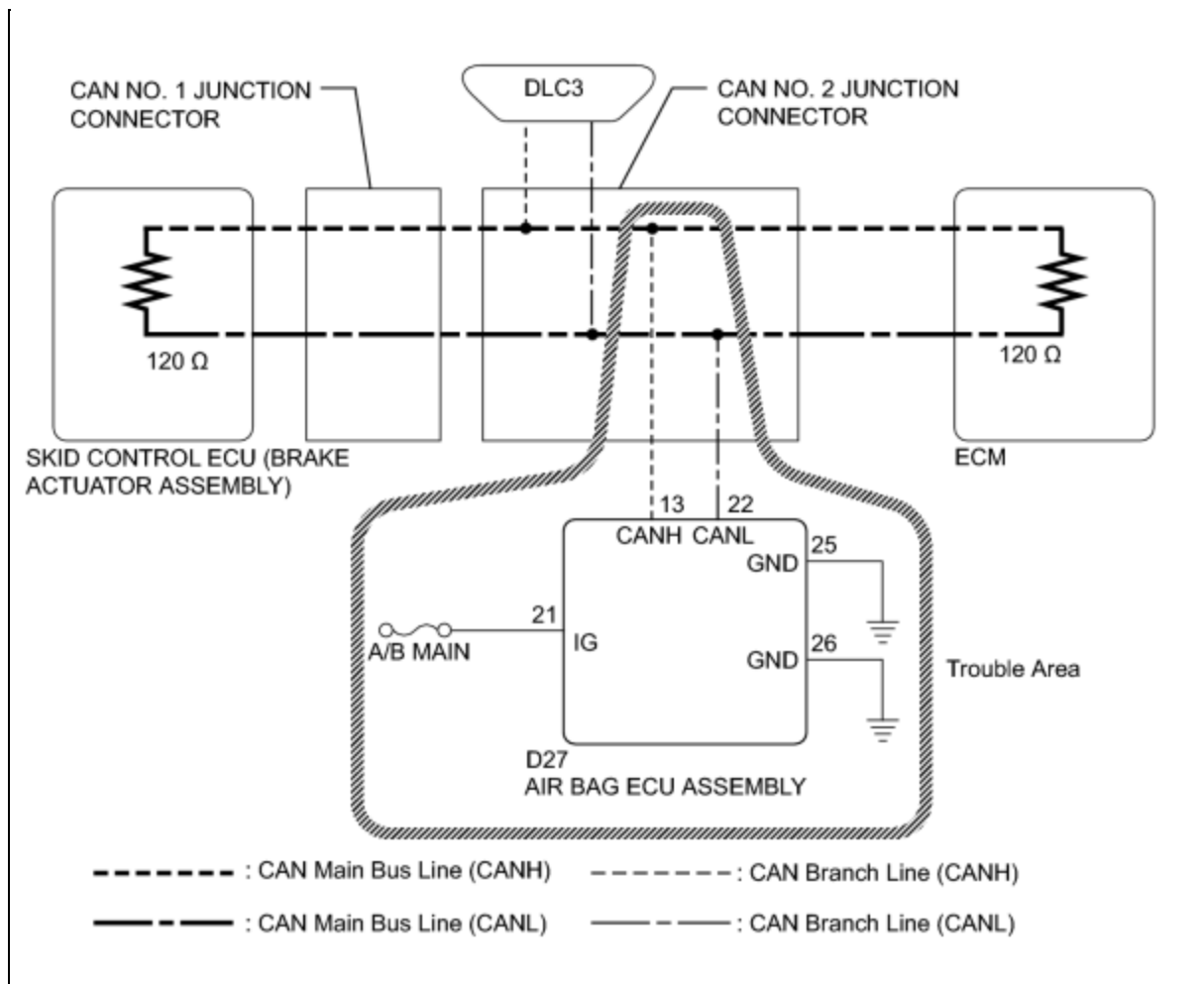
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001WG905CX
Title: NETWORKING: CAN COMMUNICATION SYSTEM: Center Airbag Sensor Communication Stop Mode (2013 FR-S)		

[Center Airbag Sensor Communication Stop Mode](#)

DESCRIPTION

DETECTION ITEM	SYMPTOM	TROUBLE AREA
Center Airbag Sensor Communication Stop Mode	<p>Either condition is met:</p> <ul style="list-style-type: none"> • "Airbag" is not displayed on the "CAN Bus Check" screen of the Techstream INFO • Communication system DTCs (DTCs that start with U) that are output correspond to "Center Airbag Sensor Communication Stop Mode" in "DTC Combination Table" INFO 	<ul style="list-style-type: none"> • Air bag ECU assembly branch line or connector • Power source circuit of air bag ECU assembly • Air bag ECU assembly ground circuit • Air bag ECU assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output **INFO**.
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.
- DTC check procedure: Turn the ignition switch to ON and wait at least 60 seconds.
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed **INFO**.

HINT:

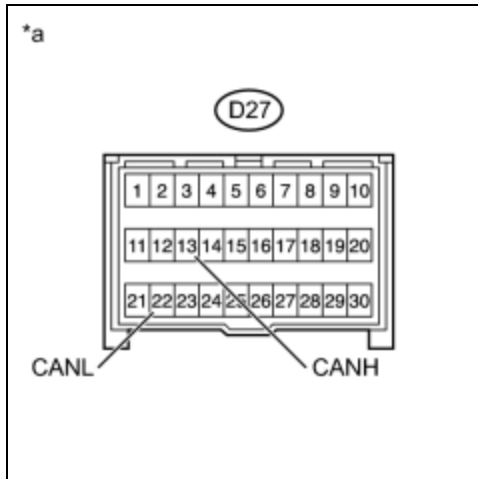
- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or

wire harness while performing the inspection below may help determine the cause of the malfunction.

PROCEDURE

1.	CHECK FOR OPEN IN CAN BUS LINES (AIR BAG ECU ASSEMBLY BRANCH LINE)
-----------	---

(a) Disconnect the cable from the negative (-) battery terminal.



(b) Disconnect the D27 air bag ECU assembly connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D27-13 (CANH) - D27-22 (CANL)	Cable disconnected from negative (-) battery terminal	57 to 63 Ω

Text in Illustration

*a	Front view of wire harness connector (to Air Bag ECU Assembly)
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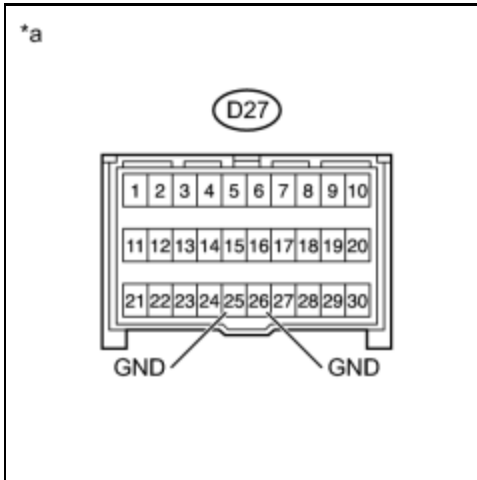
NG ► REPAIR OR REPLACE CAN BRANCH LINE OR CONNECTOR (AIR BAG ECU ASSEMBLY)

OK
▼

2.	CHECK HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT)
-----------	---

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

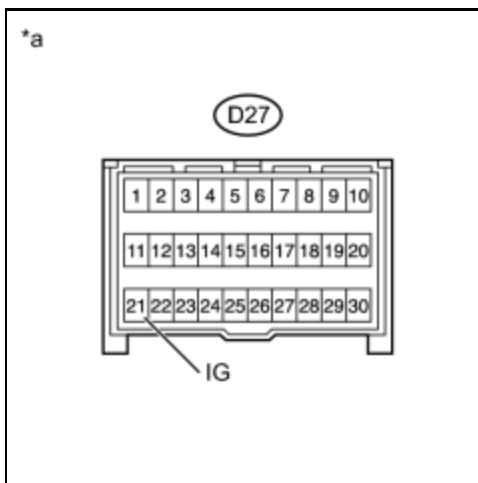


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D27-25 (GND) - Body ground	Cable disconnected from negative (-) battery terminal	Below 1 Ω
D27-26 (GND) - Body ground	Cable disconnected from negative (-) battery terminal	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Air Bag ECU Assembly)
----	--

(b) Connect the cable to the negative (-) battery terminal.



(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D27-21 (IG) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Air Bag ECU Assembly)
----	--

OK ► REPLACE AIR BAG ECU ASSEMBLY



Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001FAD05LX
Title: NETWORKING: CAN COMMUNICATION SYSTEM: Check CAN Bus Line for Short to +B (2013 FR-S)		

Check CAN Bus Line for Short to +B

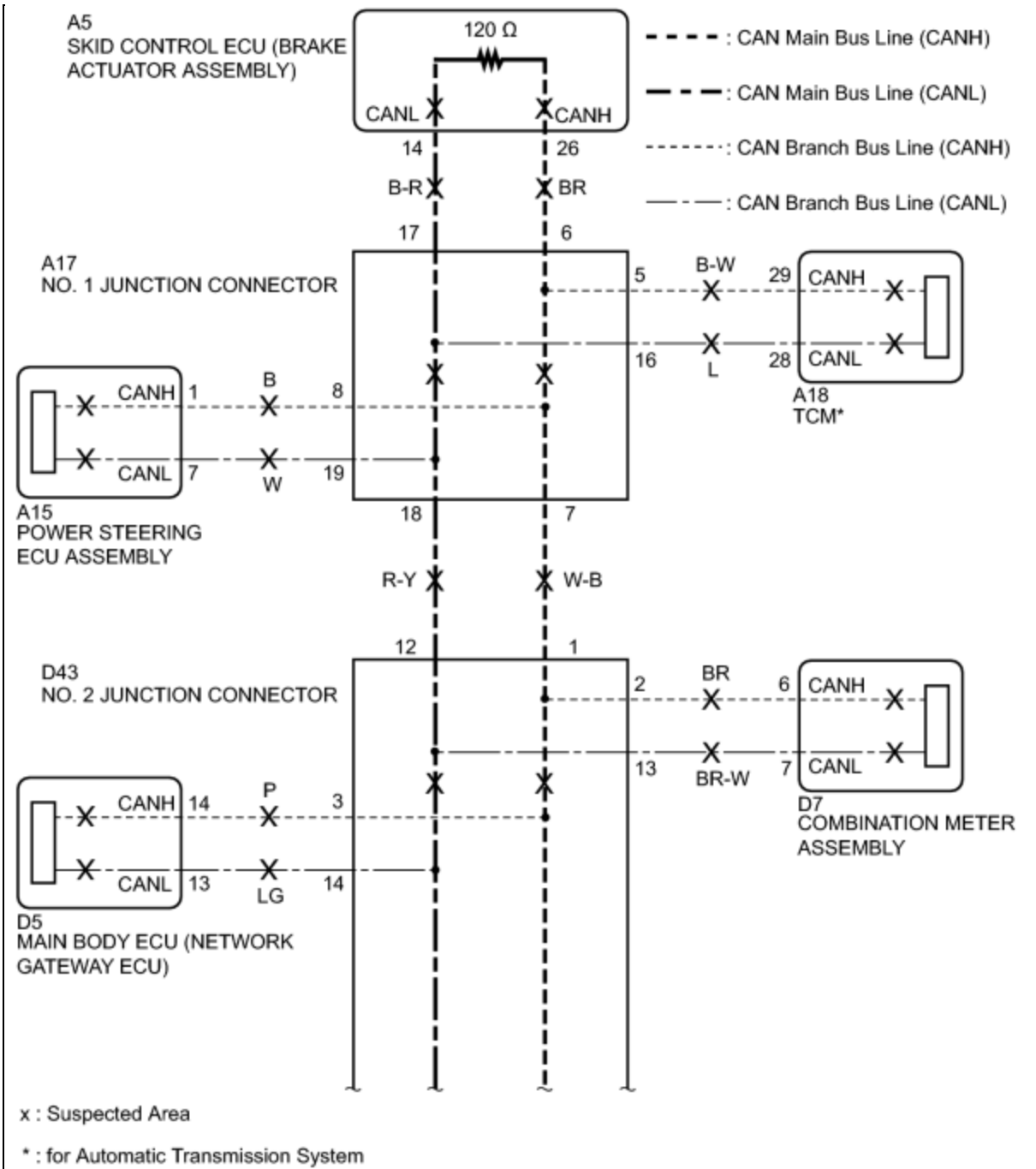
DESCRIPTION

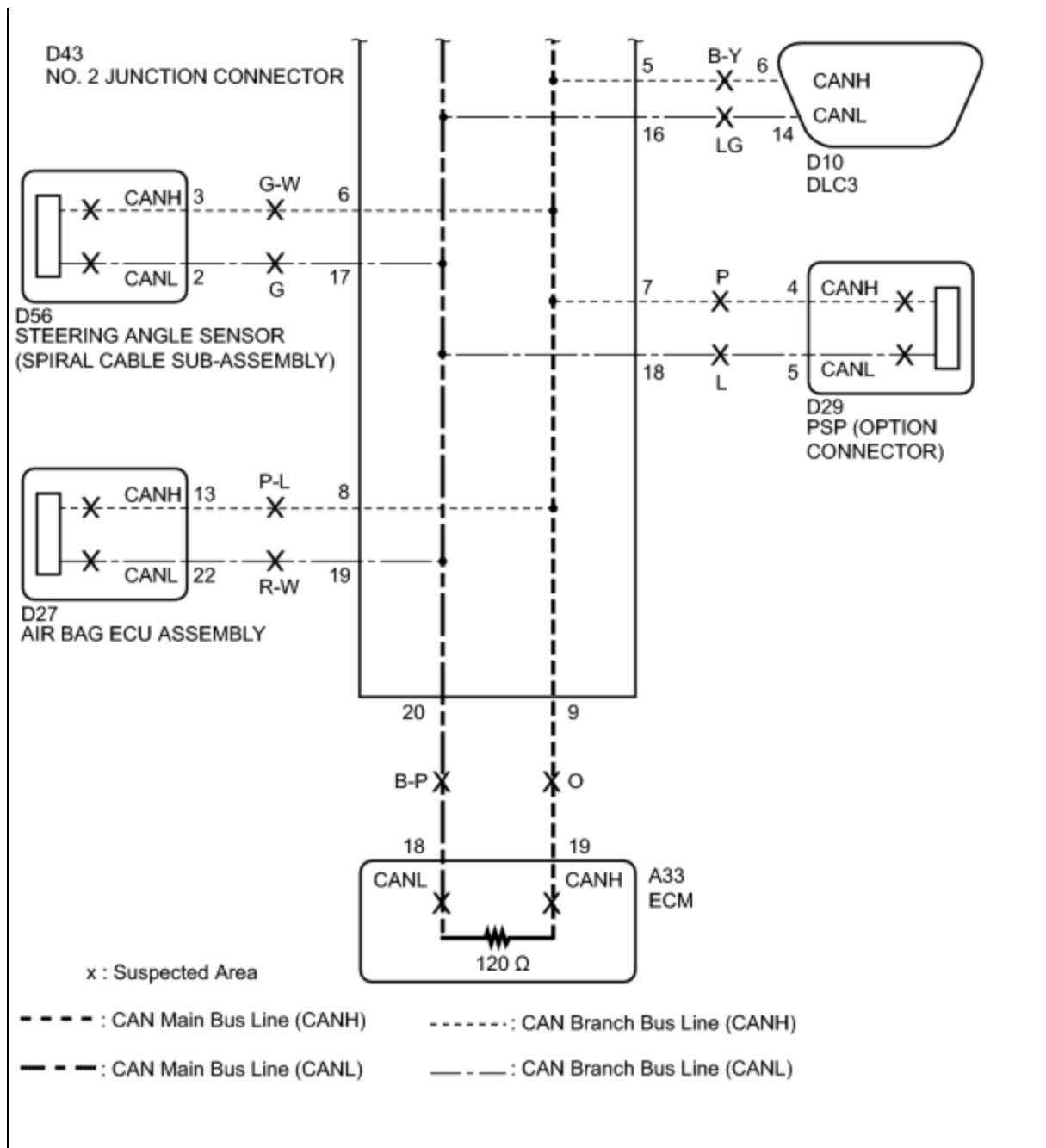
There may be a short circuit between one of the CAN bus lines and +B when no resistance exists between terminals 6 (CANH) and 16 (BAT) or 14 (CANL) and 16 (BAT) of the DLC3.

SYMPTOM	TROUBLE AREA
<p>No resistance exists between terminals 6 (CANH) and 16 (BAT) or 14 (CANL) and 16 (BAT) of DLC3.</p>	<ul style="list-style-type: none"> Short to +B in CAN main bus line Short to +B in CAN branch line Main body ECU (network gateway ECU) Combination meter assembly ECM TCM* Skid control ECU (brake actuator assembly) Steering angle sensor (spiral cable sub-assembly) Power steering ECU assembly Air bag ECU assembly CAN No. 1 junction connector CAN No. 2 junction connector

*: for Automatic Transmission System

WIRING DIAGRAM





INSPECTION PROCEDURE

NOTICE:

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output **INFO**.
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.

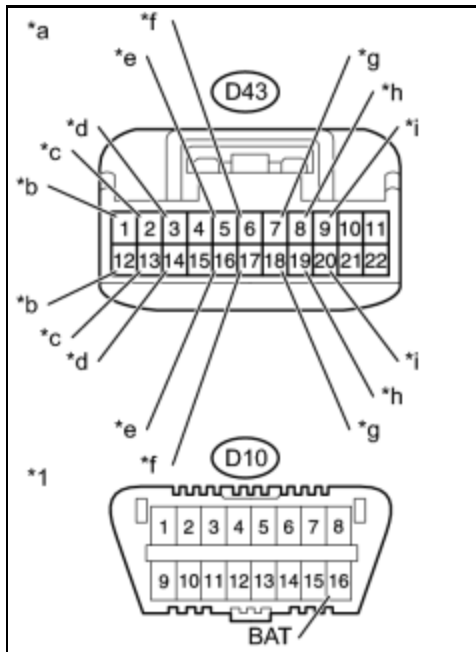
- DTC check procedure: Turn the ignition switch to ON, wait at least 60 seconds,
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed INFO.

HINT:

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or wire harness while performing the inspection below may help determine the cause of the malfunction.

PROCEDURE

1. CHECK FOR SHORT TO +B IN CAN BUS LINE (CAN NO. 2 J/C)



(a) Disconnect the wire harness connector from the D43 CAN No. 2 junction connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	CONNECTED TO
D43-1 - D10-16 (BAT)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher	CAN No. 1 junction connector
D43-12 - D10-16 (BAT)			
D43-2 - D10-16 (BAT)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher	Combination meter assembly
D43-13 - D10-			

16 (BAT)			
D43-3 - D10-16 (BAT)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher	Main body ECU (network gateway ECU)
D43-14 - D10-16 (BAT)			
D43-5 - D10-16 (BAT)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher	DLC3
D43-16 - D10-16 (BAT)			
D43-6 - D10-16 (BAT)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher	Steering angle sensor (spiral cable sub-assembly)
D43-17 - D10-16 (BAT)			
D43-7 - D10-16 (BAT)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher	PSP (option connector)
D43-18 - D10-16 (BAT)			
D43-8 - D10-16 (BAT)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher	Air bag ECU assembly
D43-19 - D10-16 (BAT)			
D43-9 - D10-16 (BAT)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher	ECM
D43-20 - D10-16 (BAT)			

Text in Illustration

*1	DLC3
*a	Front view of wire harness connector (to CAN No. 2 Junction Connector)
*b	to CAN No. 1 Junction Connector
*c	to Combination Meter Assembly
*d	to Main Body ECU (Network Gateway ECU)
*e	to DLC3
*f	to Steering Angle Sensor (Spiral Cable Sub-assembly)
*g	to PSP (Option Connector)
*h	to Air Bag ECU Assembly
*i	to ECM

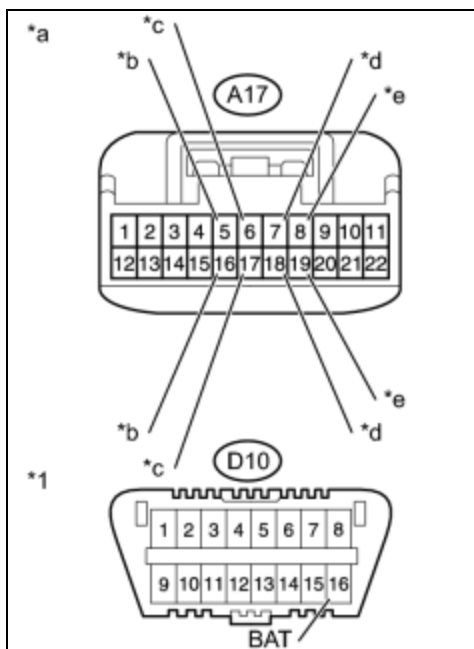
Result:

RESULT	PROCEED TO

OK	A
NG (CAN No. 1 junction connector main line)	B
NG (ECM main line)	C
NG (ECU or sensor branch line)	D
NG (DLC3 branch line or PSP (option connector) branch line)	E

- B** ▶ CHECK FOR SHORT TO +B IN CAN BUS LINE (CAN NO. 1 J/C)
- C** ▶ REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 2 J/C - ECM)
- D** ▶ CHECK FOR SHORT TO +B IN CONNECTED COMPONENT (ECU, SENSOR)
- E** ▶ REPAIR OR REPLACE CAN BRANCH LINE CONNECTED TO DLC3 OR PSP (OPTION CONNECTOR)
- A** ▶ REPLACE CAN NO. 2 JUNCTION CONNECTOR

2. CHECK FOR SHORT TO +B IN CAN BUS LINE (CAN NO. 1 J/C)



(a) Disconnect the wire harness connector from the A17 CAN No. 1 junction connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	CONNECTED TO
A17-5 - D10-16 (BAT)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher	TCM
A17-16 - D10-16 (BAT)			
A17-6 - D10-16 (BAT)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher	Skid control ECU (brake actuator assembly)
A17-17 - D10-16 (BAT)			
A17-7 - D10-16 (BAT)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher	CAN No. 2 junction connector
A17-18 - D10-16 (BAT)			
A17-8 - D10-16 (BAT)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher	Power steering ECU assembly
A17-19 - D10-16 (BAT)			

Text in Illustration

*1	DLC3
*a	Front view of wire harness connector (to CAN No. 1 Junction Connector)
*b	to TCM
*c	to Skid Control ECU (Brake Actuator Assembly)
*d	to CAN No. 2 Junction Connector
*e	to Power Steering ECU Assembly

Result:

RESULT	PROCEED TO
OK	A
NG (CAN No. 2 junction connector main line)	B
NG (skid control ECU (brake actuator assembly) main line)	C
NG (ECU or sensor branch line)	D

B  **REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 2 J/C - CAN NO. 1 J/C)**

- C ► REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 1 J/C - SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY))
- D ► CHECK FOR SHORT TO +B IN CONNECTED COMPONENT (ECU, SENSOR)
- A ► REPLACE CAN NO. 1 JUNCTION CONNECTOR

3. CHECK FOR SHORT TO +B IN CONNECTED COMPONENT (ECU, SENSOR)

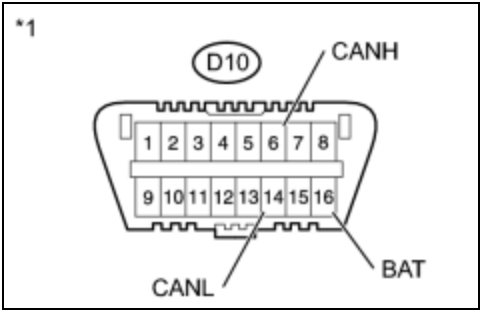
- (a) Reconnect all the wire harness connectors (the A17 CAN No. 1 junction connector and D43 CAN No. 2 junction connector).
- (b) Disconnect the ECU or sensor connected to the CAN bus line that is shorted to +B.

HINT:

If the ECU or sensor has multiple connectors, disconnect the connector that includes the CAN bus lines. To determine the ECU or sensor that is connected to the shorted bus line, refer to the terminals of ECU tables INFO.

- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D10-6 (CANH) - D10-16 (BAT)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher
D10-14 (CANL) - D10-16 (BAT)		

Text in Illustration

*1	DLC3
----	------

HINT:

If the resistance changes to 6 kΩ or higher when the connector is disconnected from the ECU (or sensor), there may be a short in the ECU (or sensor).

- NG ► REPAIR OR REPLACE REPAIR OR REPLACE CORRESPONDING ECU/SENSOR WIRE OR CONNECTOR

OK ► REPLACE CORRESPONDING ECU OR SENSOR



Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001FAD05PX
Title: NETWORKING: CAN COMMUNICATION SYSTEM: Check CAN Bus Line for Short to GND (2013 FR-S)		

[Check CAN Bus Line for Short to GND](#)

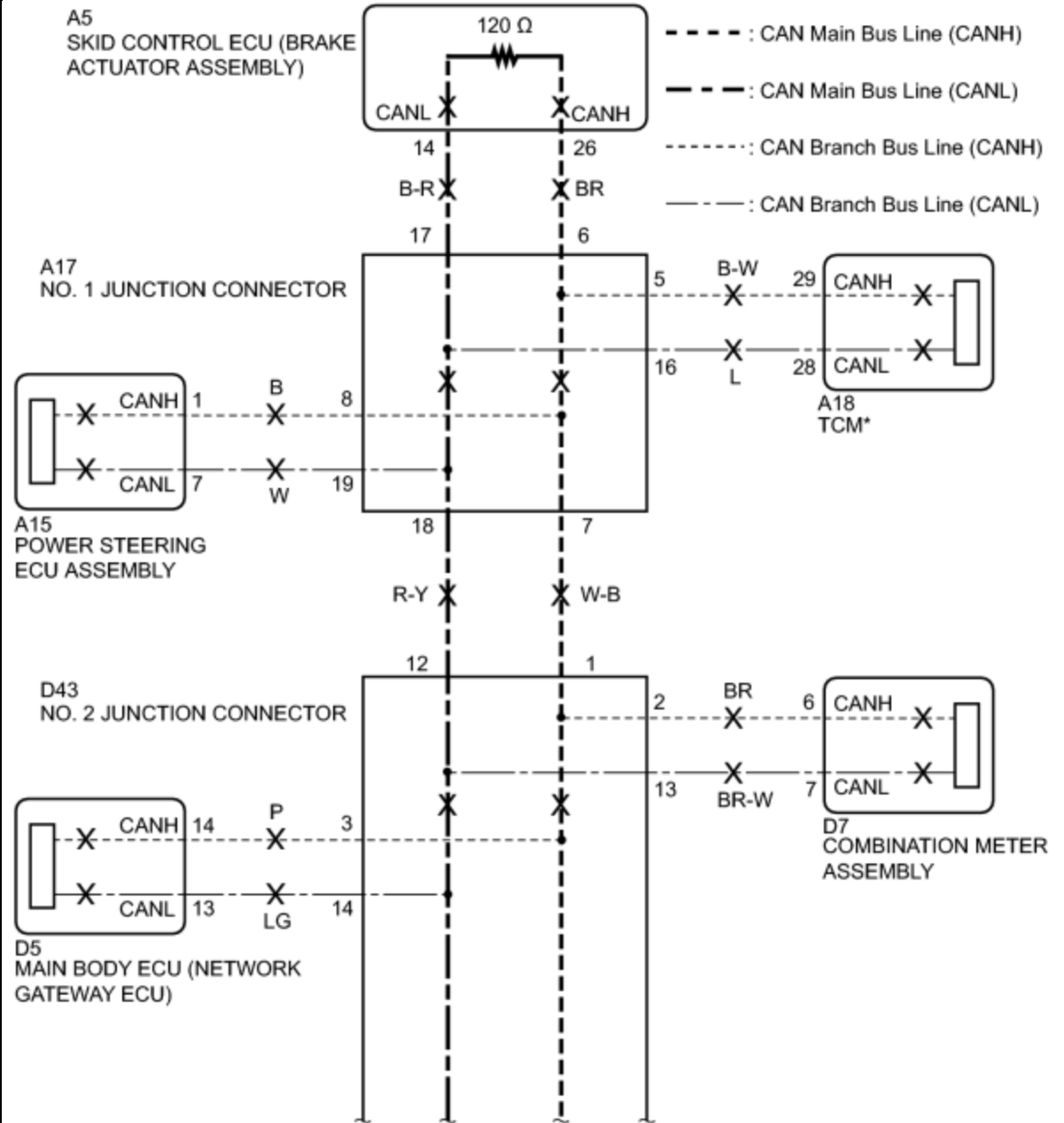
DESCRIPTION

There may be a short circuit between one of the CAN bus lines and GND when there is no resistance between terminals 6 (CANH) and 4 (CG) or 14 (CANL) and 4 (CG) of the DLC3.

SYMPTOM	TROUBLE AREA
No resistance exists between terminals 6 (CANH) and 4 (CG) or 14 (CANL) and 4 (CG) of DLC3.	<ul style="list-style-type: none"> • Short to ground in CAN main bus line • Short to ground in CAN branch line • Main body ECU (network gateway ECU) • Combination meter assembly • ECM • TCM* • Skid control ECU (brake actuator assembly) • Steering angle sensor (spiral cable sub-assembly) • Power steering ECU assembly • Air bag ECU assembly • CAN No. 1 junction connector • CAN No. 2 junction connector

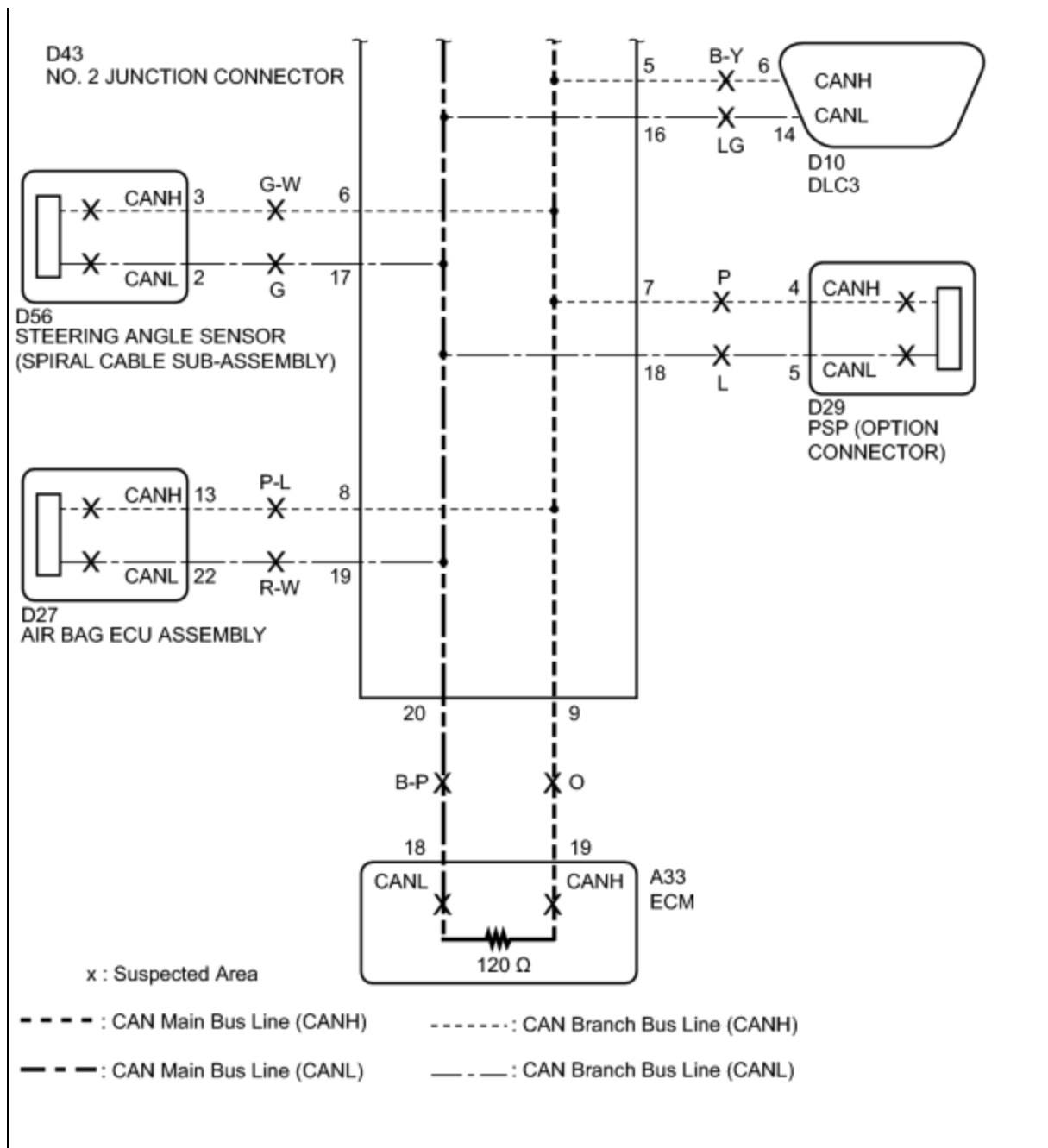
*: for Automatic Transmission System

WIRING DIAGRAM



x : Suspected Area

* : for Automatic Transmission System



INSPECTION PROCEDURE

NOTICE:

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output **INFO**.
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.

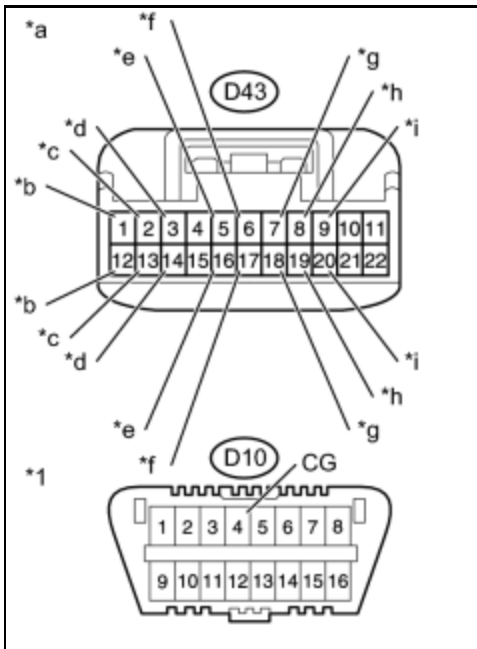
- DTC check procedure: Turn the ignition switch to ON, wait at least 60 seconds,
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed INFO.

HINT:

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or wire harness while performing the inspection below may help determine the cause of the malfunction.

PROCEDURE

1. CHECK FOR SHORT TO GND IN CAN BUS LINE (CAN NO. 2 J/C)



(a) Disconnect the wire harness connector from the D43 CAN No. 2 junction connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	CONNECTED TO
D43-1 - D10-4 (CG)	Cable disconnected from negative (-) battery terminal	200 Ω or higher	CAN No. 1 junction connector
D43-12 - D10-4 (CG)			
D43-2 - D10-4 (CG)	Cable disconnected from negative (-) battery terminal	200 Ω or higher	Combination meter assembly
D43-13 -			

D10-4 (CG)			
D43-3 - D10-4 (CG)	Cable disconnected from negative (-) battery terminal	200 Ω or higher	Main body ECU (network gateway ECU)
D43-14 - D10-4 (CG)			
D43-5 - D10-4 (CG)	Cable disconnected from negative (-) battery terminal	200 Ω or higher	DLC3
D43-16 - D10-4 (CG)			
D43-6 - D10-4 (CG)	Cable disconnected from negative (-) battery terminal	200 Ω or higher	Steering angle sensor (spiral cable sub-assembly)
D43-17 - D10-4 (CG)			
D43-7 - D10-4 (CG)	Cable disconnected from negative (-) battery terminal	200 Ω or higher	PSP (option connector)
D43-18 - D10-4 (CG)			
D43-8 - D10-4 (CG)	Cable disconnected from negative (-) battery terminal	200 Ω or higher	Air bag ECU assembly
D43-19 - D10-4 (CG)			
D43-9 - D10-4 (CG)	Cable disconnected from negative (-) battery terminal	200 Ω or higher	ECM
D43-20 - D10-4 (CG)			

Text in Illustration

*1	DLC3
*a	Front view of wire harness connector (to CAN No. 2 Junction Connector)
*b	to CAN No. 1 Junction Connector
*c	to Combination Meter Assembly
*d	to Main Body ECU (Network Gateway ECU)
*e	to DLC3
*f	to Steering Angle Sensor (Spiral Cable Sub-assembly)
*g	to PSP (Option Connector)
*h	to Air Bag ECU Assembly
*i	to ECM

Result:

RESULT	PROCEED TO

OK	A
NG (CAN No. 1 junction connector main line)	B
NG (ECM main line)	C
NG (ECU or sensor branch line)	D
NG (DLC3 branch line or PSP (option connector) branch line)	E

B ▶ CHECK FOR SHORT TO GND IN CAN BUS LINE (CAN NO. 1 J/C)

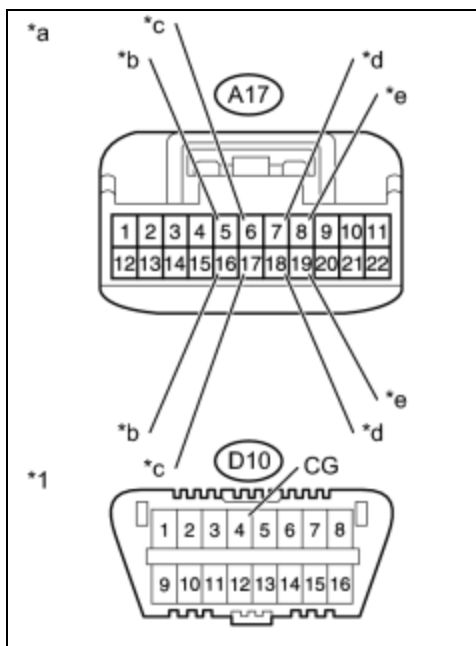
C ▶ REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 2 J/C - ECM)

D ▶ CHECK FOR SHORT TO GND IN CONNECTED COMPONENT (ECU, SENSOR)

E ▶ REPAIR OR REPLACE CAN BRANCH LINE CONNECTED TO DLC3 OR PSP (OPTION CONNECTOR)

A ▶ REPLACE CAN NO. 2 JUNCTION CONNECTOR

2. CHECK FOR SHORT TO GND IN CAN BUS LINE (CAN NO. 1 J/C)



(a) Disconnect the wire harness connector from the A17 CAN No. 1 junction connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	CONNECTED TO
A17-5 - D10-4 (CG)	Cable disconnected from negative (-) battery terminal	200 Ω or higher	TCM
A17-16 - D10-4 (CG)			
A17-6 - D10-4 (CG)	Cable disconnected from negative (-) battery terminal	200 Ω or higher	Skid control ECU (brake actuator assembly)
A17-17 - D10-4 (CG)			
A17-7 - D10-4 (CG)	Cable disconnected from negative (-) battery terminal	200 Ω or higher	CAN No. 2 junction connector
A17-18 - D10-4 (CG)			
A17-8 - D10-4 (CG)	Cable disconnected from negative (-) battery terminal	200 Ω or higher	Power steering ECU assembly
A17-19 - D10-4 (CG)			

Text in Illustration

*1	DLC3
*a	Front view of wire harness connector (to CAN No. 1 Junction Connector)
*b	to TCM
*c	to Skid Control ECU (Brake Actuator Assembly)
*d	to CAN No. 2 Junction Connector
*e	to Power Steering ECU Assembly

Result:

RESULT	PROCEED TO
OK	A
NG (CAN No. 2 junction connector main line)	B
NG (skid control ECU (brake actuator assembly) main line)	C
NG (ECU or sensor branch line)	D

B  **REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 2 J/C - CAN NO. 1 J/C)**

- C ► REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 1 J/C - SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY))
- D ► CHECK FOR SHORT TO GND IN CONNECTED COMPONENT (ECU, SENSOR)
- A ► REPLACE CAN NO. 1 JUNCTION CONNECTOR

3. CHECK FOR SHORT TO GND IN CONNECTED COMPONENT (ECU, SENSOR)

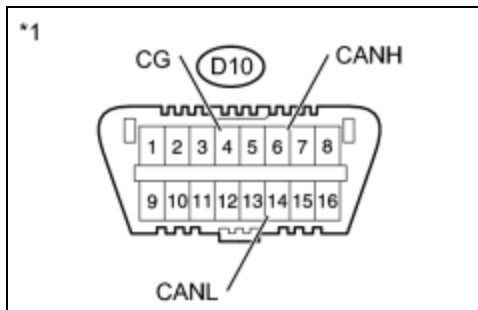
- (a) Reconnect all the wire harness connectors (the A17 CAN No. 1 junction connector and D43 CAN No. 2 junction connector).
- (b) Disconnect the ECU or sensor connected to the CAN bus line that is shorted to ground.

HINT:

If the ECU or sensor has multiple connectors, disconnect the connector that includes the CAN bus lines. To determine the ECU or sensor that is connected to the shorted bus line, refer to the terminals of ECU tables INFO.

- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D10-6 (CANH) - D10-4 (CG)	Cable disconnected from negative (-) battery terminal	200 Ω or higher
D10-14 (CANL) - D10-4 (CG)		

Text in Illustration

*1	DLC3
----	------

HINT:

If the resistance changes to 200 Ω or higher when the connector is disconnected from the ECU (or sensor), there may be a short in the ECU (or sensor).

- NG ► REPAIR OR REPLACE REPAIR OR REPLACE CORRESPONDING ECU/SENSOR WIRE OR CONNECTOR

OK ► REPLACE CORRESPONDING ECU OR SENSOR



Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001FAD05IX
Title: NETWORKING: CAN COMMUNICATION SYSTEM: Check CAN Bus Lines for Short Circuit (2013 FR-S)		

[Check CAN Bus Lines for Short Circuit](#)

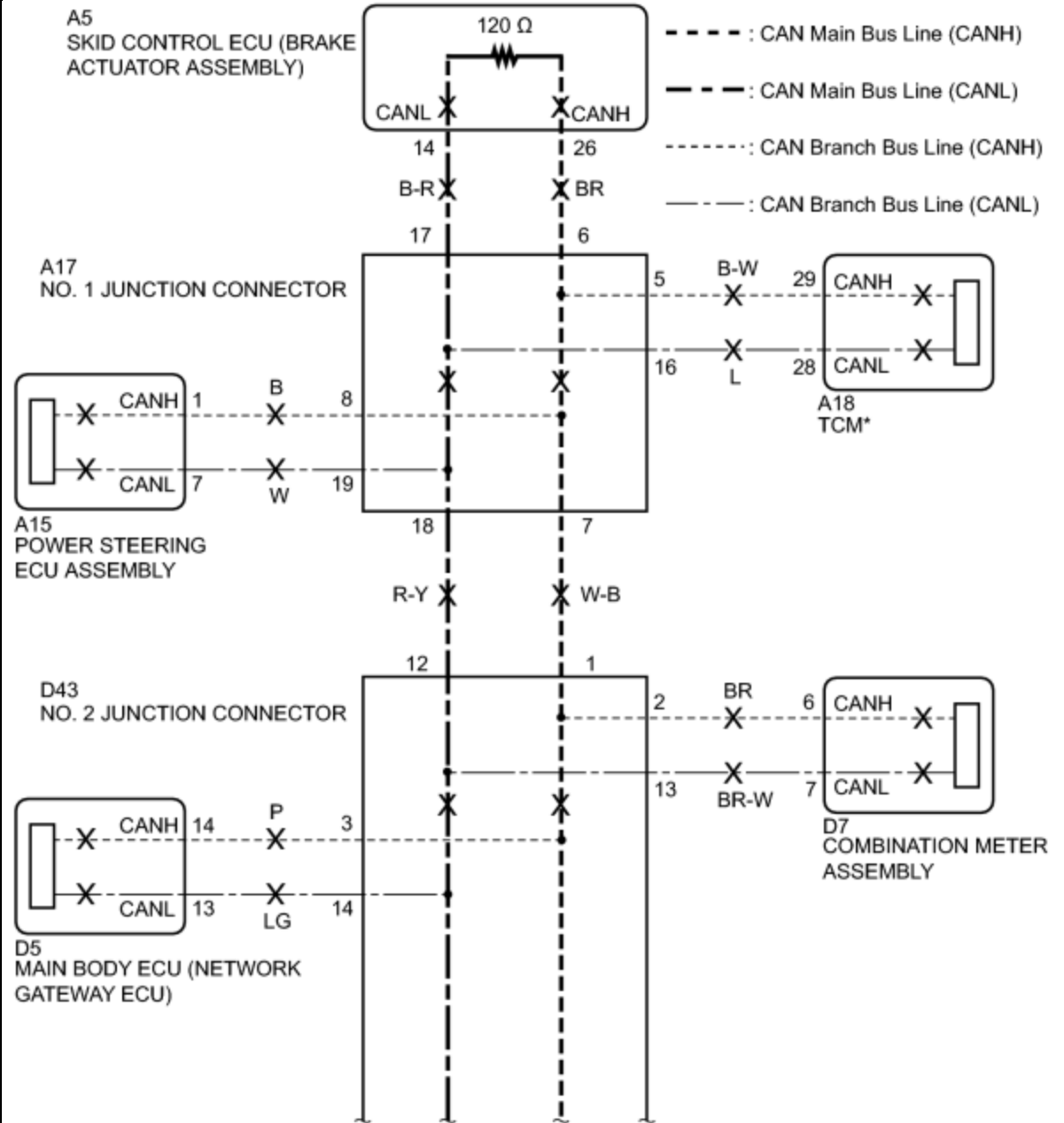
DESCRIPTION

There may be a short circuit between the V bus main lines and/or CAN branch lines when the resistance between terminals 6 (CANH) and 14 (CANL) of the DLC3 is below 57 Ω .

SYMPTOM	TROUBLE AREA
<p>Resistance between terminals 6 (CANH) and 14 (CANL) of DLC3 is below 57 Ω.</p>	<ul style="list-style-type: none"> • Short in CAN main bus line • Short in CAN branch line • Main body ECU (network gateway ECU) • Combination meter assembly • ECM • TCM* • Skid control ECU (brake actuator assembly) • Steering angle sensor (spiral cable sub-assembly) • Power steering ECU assembly • Air bag ECU assembly • CAN No. 1 junction connector • CAN No. 2 junction connector

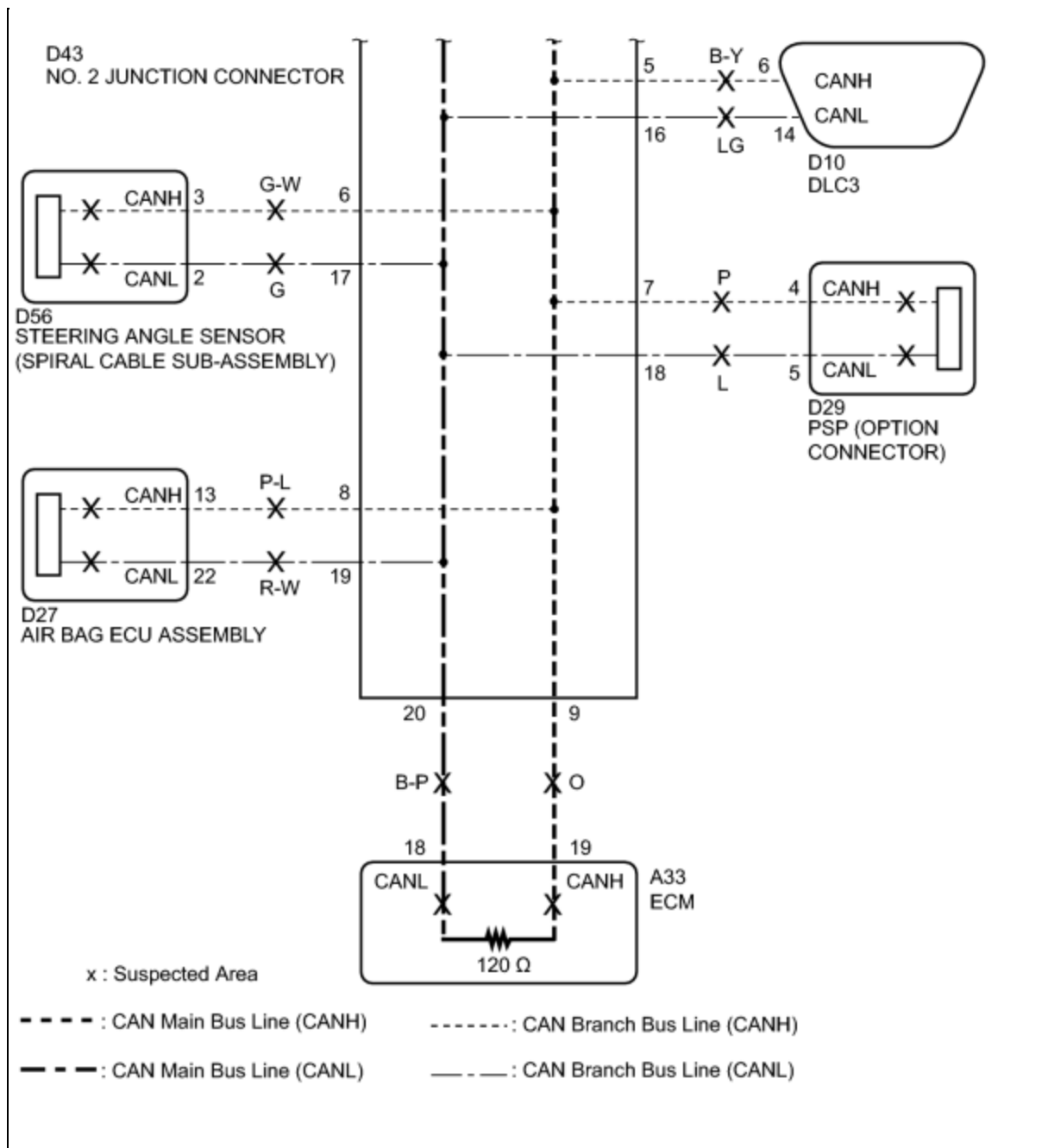
*: for Automatic Transmission System

WIRING DIAGRAM



x : Suspected Area

* : for Automatic Transmission System



INSPECTION PROCEDURE

NOTICE:

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output **INFO**.
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.

- DTC check procedure: Turn the ignition switch to ON, wait at least 60 seconds,
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed **INFO** .

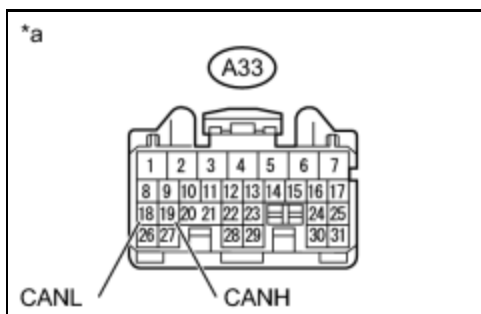
HINT:

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or wire harness while performing the inspection below may help determine the cause of the malfunction.

PROCEDURE

1. CHECK FOR SHORT IN CAN BUS LINES (ECM)

(a) Disconnect the cable from the negative (-) battery terminal.



(b) Disconnect the A33 ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

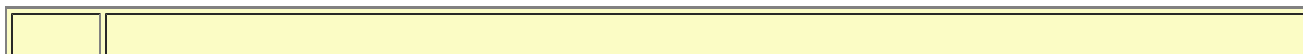
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-19 (CANH) - A33-18 (CANL)	Cable disconnected from negative (-) battery terminal	114 to 126 Ω

Text in Illustration

*a	Front view of wire harness connector (to ECM)
----	---

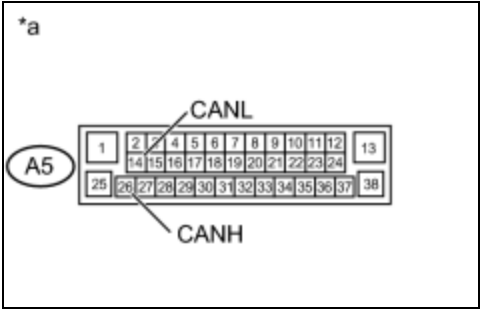
NG ► **CHECK FOR SHORT IN CAN BUS LINES (SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY))**

OK ► **REPLACE ECM**



2. CHECK FOR SHORT IN CAN BUS LINES (SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY))

(a) Reconnect the A33 ECM connector.



(b) Disconnect the A5 skid control ECU (brake actuator assembly) connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-26 (CANH) - A5-14 (CANL)	Cable disconnected from negative (-) battery terminal	114 to 126 Ω

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
----	--

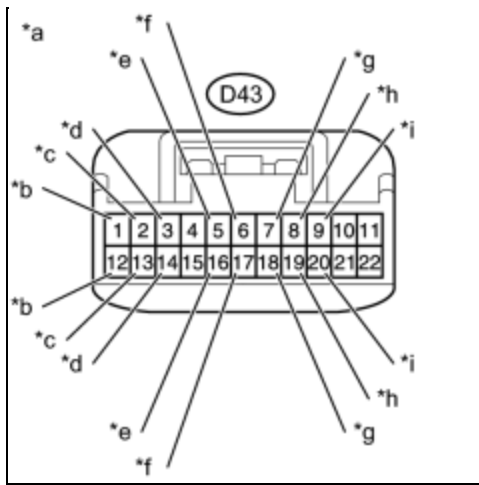
NG ► CHECK FOR SHORT IN CAN BUS LINES (CAN NO. 2 J/C)

OK ► REPLACE SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY)

3. CHECK FOR SHORT IN CAN BUS LINES (CAN NO. 2 J/C)

(a) Reconnect the A5 skid control ECU (brake actuator assembly) connector.

(b) Disconnect the wire harness connector from the D43 CAN No. 2 junction connector.



(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	CONNECTED TO
D43-1 - D43-12	Cable disconnected from negative (-) battery terminal	114 to 126 Ω	CAN No. 1 junction connector
D43-2 - D43-13	Cable disconnected from negative (-) battery terminal	200 Ω or higher	Combination meter assembly
D43-3 - D43-14	Cable disconnected from negative (-) battery terminal	200 Ω or higher	Main body ECU (network gateway ECU)
D43-5 - D43-16	Cable disconnected from negative (-) battery terminal	1 M Ω or higher	DLC3
D43-6 - D43-17	Cable disconnected from negative (-) battery terminal	200 Ω or higher	Steering angle sensor (spiral cable sub-assembly)
D43-7 - D43-18	Cable disconnected from negative (-) battery terminal	1 M Ω or higher	PSP (option connector)
D43-8 - D43-19	Cable disconnected from negative (-) battery terminal	200 Ω or higher	Air bag ECU assembly
D43-9 - D43-20	Cable disconnected from negative (-) battery terminal	114 to 126 Ω	ECM

Text in Illustration

*a	Front view of wire harness connector (to CAN No. 2 Junction Connector)
*b	to CAN No. 1 Junction Connector
*c	to Combination Meter Assembly
*d	to Main Body ECU (Network Gateway ECU)
*e	to DLC3
*f	to Steering Angle Sensor (Spiral Cable Sub-assembly)

*g	to PSP (Option Connector)
*h	to Air Bag ECU Assembly
*i	to ECM

Result:

RESULT	PROCEED TO
OK	A
NG (CAN No. 1 junction connector main line)	B
NG (ECM main line)	C
NG (ECU or sensor branch line)	D
NG (DLC3 branch line or PSP (option connector) branch line)	E

B ▶ CHECK FOR SHORT IN CAN BUS LINES (CAN NO. 1 J/C)

C ▶ REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 2 J/C - ECM)

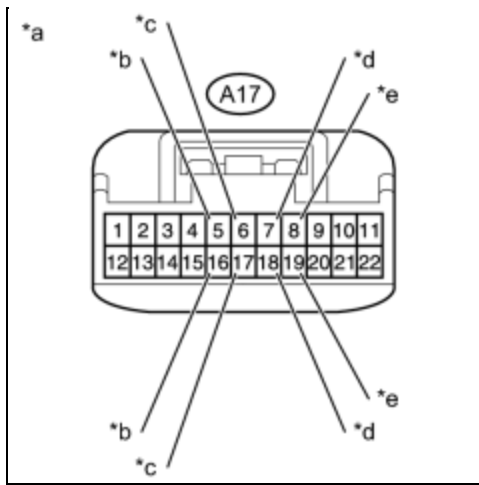
D ▶ CHECK FOR SHORT IN CONNECTED COMPONENT (ECU, SENSOR)

E ▶ REPAIR OR REPLACE CAN BRANCH LINE CONNECTED TO DLC3 OR PSP (OPTION CONNECTOR)

A ▶ REPLACE CAN NO. 2 JUNCTION CONNECTOR

4.	CHECK FOR SHORT IN CAN BUS LINES (CAN NO. 1 J/C)
-----------	---

(a) Disconnect the wire harness connector from the A17 CAN No. 1 junction connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	CONNECTED TO
A17-5 - A17-16	Cable disconnected from negative (-) battery terminal	200 Ω or higher	TCM
A17-6 - A17-17	Cable disconnected from negative (-) battery terminal	114 to 126 Ω	Skid control ECU (brake actuator assembly)
A17-7 - A17-18	Cable disconnected from negative (-) battery terminal	1 M Ω or higher	CAN No. 2 junction connector
A17-8 - A17-19	Cable disconnected from negative (-) battery terminal	200 Ω or higher	Power steering ECU assembly

Text in Illustration

*a	Front view of wire harness connector (to CAN No. 1 Junction Connector)
*b	to TCM
*c	to Skid Control ECU (Brake Actuator Assembly)
*d	to CAN No. 2 Junction Connector
*e	to Power Steering ECU Assembly

Result:

RESULT	PROCEED TO
OK	A
NG (CAN No. 2 junction connector main line)	B
NG (skid control ECU (brake actuator assembly) main line)	C
NG (ECU or sensor branch line)	D

B ▶ REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 2 J/C - CAN NO. 1 J/C)

C ▶ REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 1 J/C - SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY))

D ▶ CHECK FOR SHORT IN CONNECTED COMPONENT (ECU, SENSOR)

A ▶ REPLACE CAN NO. 1 JUNCTION CONNECTOR

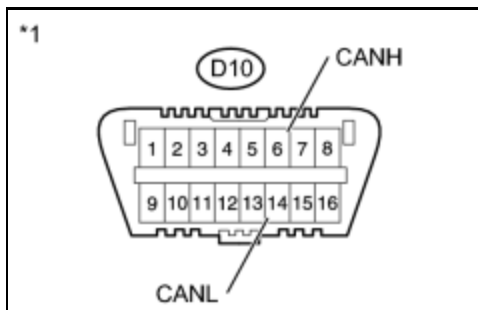
5. CHECK FOR SHORT IN CONNECTED COMPONENT (ECU, SENSOR)

(a) Reconnect all the wire harness connectors (the A17 CAN No. 1 junction connector and D43 CAN No. 2 junction connector).

(b) Disconnect the connector that includes terminals CANH and CANL from the ECU (or sensor) to which the short circuited branch line is connected **INFO**.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D10-6 (CANH) - D10-14 (CANL)	Cable disconnected from negative (-) battery terminal	57 to 63 Ω

Text in Illustration

*1	DLC3
----	------

HINT:

- If the resistance becomes normal (between 57 and 63 Ω) when the connector is disconnected from the ECU (or sensor), there may be a short in the ECU (or sensor).
- If the resistance does not become normal (between 57 and 63 Ω) when the connector is disconnected from the ECU (or sensor), repair or replace the short circuited branch line or connector.

NG ▶ REPAIR OR REPLACE CORRESPONDING ECU OR SENSOR BUS LINE OR CONNECTOR

OK  REPLACE CORRESPONDING ECU OR SENSOR



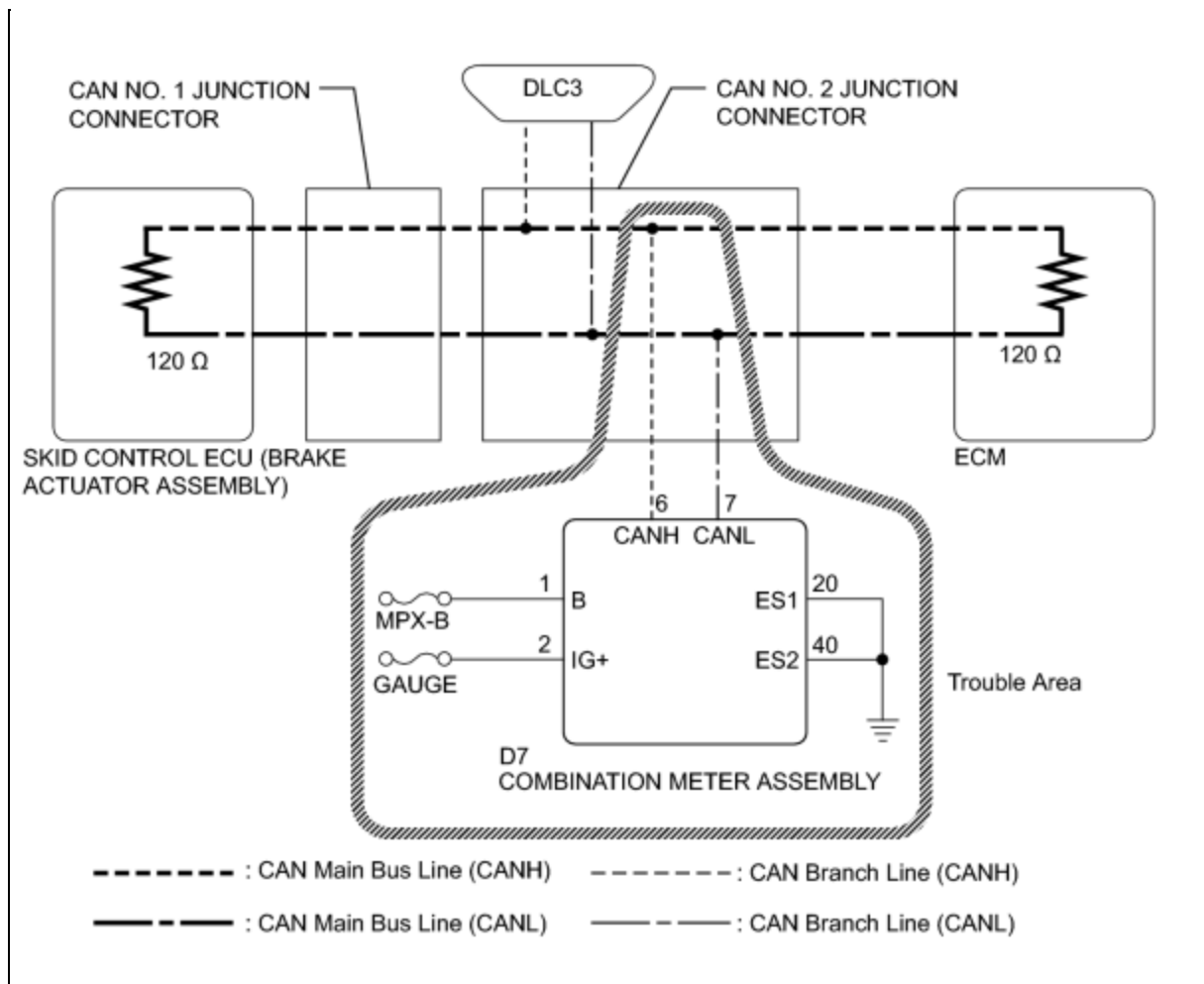
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001F1S06SX
Title: NETWORKING: CAN COMMUNICATION SYSTEM: Combination Meter ECU Communication Stop Mode (2013 FR-S)		

[Combination Meter ECU Communication Stop Mode](#)

DESCRIPTION

DETECTION ITEM	SYMPTOM	TROUBLE AREA
Combination Meter ECU Communication Stop Mode	Either condition is met: <ul style="list-style-type: none"> • "Combination Meter" is not displayed on the "CAN Bus Check" screen of the Techstream INFO • Communication system DTCs (DTCs that start with U) that are output correspond to "Combination Meter ECU Communication Stop Mode" in "DTC Combination Table" INFO 	<ul style="list-style-type: none"> • Combination meter assembly branch line or connector • Power source circuit of combination meter assembly • Combination meter assembly ground circuit • Combination meter assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output **INFO**.
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.
- DTC check procedure: Turn the ignition switch to ON and wait at least 10 seconds.
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed **INFO**.

HINT:

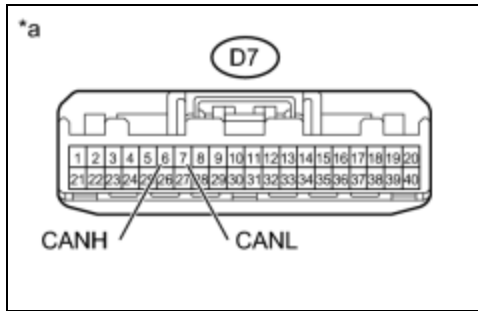
- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or

wire harness while performing the inspection below may help determine the cause of the malfunction.

PROCEDURE

1.	CHECK FOR OPEN IN CAN BUS LINES (COMBINATION METER ASSEMBLY BRANCH LINE)
-----------	---

(a) Disconnect the cable from the negative (-) battery terminal.



(b) Disconnect the D7 combination meter assembly connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D7-6 (CANH) - D7-7 (CANL)	Cable disconnected from negative (-) battery terminal	57 to 63 Ω

Text in Illustration

*a	Front view of wire harness connector (to Combination Meter Assembly)
----	--

NG ► **REPAIR OR REPLACE CAN BRANCH LINE OR CONNECTOR (COMBINATION METER ASSEMBLY)**

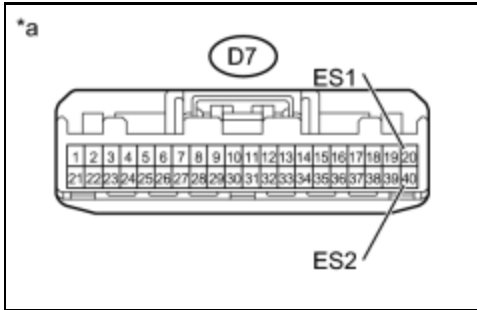
OK



2.	CHECK HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT)
-----------	---

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

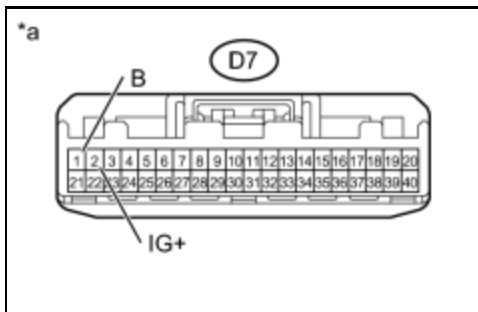


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D7-20 (ES1) - Body ground	Cable disconnected from negative (-) battery terminal	Below 1 Ω
D7-40 (ES2) - Body ground	Cable disconnected from negative (-) battery terminal	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Combination Meter Assembly)
----	--

(b) Connect the cable to the negative (-) battery terminal.



(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D7-1 (B) - Body ground	Ignition switch off	11 to 14 V
D7-2 (IG+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Combination Meter Assembly)
----	--

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)

OK ► REPLACE COMBINATION METER ASSEMBLY

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Model Year: 2013	Model: FR-S	Doc ID: RM000004UCE002X
Title: NETWORKING: CAN COMMUNICATION SYSTEM: DIAGNOSIS SYSTEM (2013 FR-S)		

DIAGNOSIS SYSTEM

1. ECUS OR SENSORS WHICH COMMUNICATE THROUGH CAN COMMUNICATION SYSTEM

(a) V Bus

- (1) Main body ECU (network gateway ECU)
- (2) Combination meter assembly
- (3) ECM
- (4) TCM*
- (5) Skid control ECU (brake actuator assembly)
- (6) Steering angle sensor (spiral cable sub-assembly)
- (7) Power steering ECU assembly
- (8) Air bag ECU assembly
- (9) PSP (option connector)

*: for Automatic Transmission System

2. CHECK FOR INSTALLED SYSTEMS (ECUS AND SENSORS) THAT ADOPT CAN COMMUNICATION

(a) The systems (ECUs and sensors) that adopt CAN communication vary depending on the vehicle and optional equipment. Check which systems (ECUs and sensors) are installed on the vehicle.

HINT:

The names of ECUs and sensors shown on the Techstream display may differ from those shown in the DTC Table by ECU section that follows.

ECU/SENSOR NAME	TECHSTREAM DISPLAY	APPLICABILITY
Main body ECU (network gateway ECU)	Main Body	Installed on all vehicles
Combination meter assembly	Combination Meter	Installed on all vehicles
ECM	ECM (Engine)	Installed on all vehicles
TCM	TCM	for Automatic Transmission System
Skid control ECU (brake actuator assembly)	Skid Control (ABS/VSC/TRAC)	Installed on all vehicles
Steering angle sensor (spiral cable sub-assembly)	Spiral cable (Steering Angle Sensor)	Installed on all vehicles
Power steering ECU assembly	Power Steering (EPS)	Installed on all vehicles
Air bag ECU assembly	Airbag	Installed on all vehicles
PSP (option connector)	-	Installed on all vehicles


3. CAN BUS CHECK

HINT:

The ECUs and sensors that are properly connected to the CAN communication system can be displayed using the Techstream.

(a) Using the Techstream, select "CAN Bus Check" from "System Select".

NOTICE:

- It may be possible to select buses that do not have ECUs or sensors from the bus selection pull-down menu. This is not a malfunction. (This occurs when optional devices are not on a sub bus that is monitored by a gateway function equipped ECU.)
- In the bus selection pull down menu, all buses applicable to the model are displayed (e.g. LIN communication buses are also displayed). Therefore, refer to the wiring diagrams to check the names of the sub buses for CAN communication  .

HINT:

Different connection statuses are indicated by the background color of the ECUs and sensors that are displayed.

Explanation of CAN Bus Check (Communication Bus Check) screen

BUS TYPE	BACKGROUND COLOR	CONNECTION STATUS
V Bus	White	Communication has been normal since the start of the CAN bus check.
	Yellow	Communication stop occurred at least once since the start of the CAN bus check, but communication is currently occurring (unstable communication).
	Red	Communication was established at least once since the start of the CAN bus check, but communication is currently not occurring (unstable communication).
	Not displayed	Communication stop has continued since the start of the CAN bus check.* 1
Sub bus (gateway function equipped ECU that does not have history of connected ECUs)*2	White	Communication has been normal since the start of the CAN bus check.
	Yellow	Communication stop occurred at least once since the start of the CAN bus check, but communication is currently occurring (unstable communication).
	Red	Communication was established at least once since the start of the CAN bus check, but communication is currently not occurring (unstable communication).
	Not displayed	Communication stop has continued since the start of the CAN bus check.* 1
Sub bus (gateway function equipped ECU that has history of connected ECUs)*3	White	Communication has been normal since the start of the CAN bus check.
	Yellow	Communication stop occurred at least once since the start of the CAN bus check, but communication is currently occurring (unstable communication).
	Red	Currently not communicating (either of the following): <ul style="list-style-type: none"> • Communication stop has continued since the start of the CAN bus check • Communication was established at least once since the start of the CAN bus check, but communication is currently not occurring
	Not displayed	Either of the following: <ul style="list-style-type: none"> • If a gateway function equipped ECU cannot communicate, the sub bus and ECUs connected to the sub bus will not be displayed. • If no ECUs are connected to the sub bus, "There is no system found on the Communication Bus" will be

displayed.

HINT:

- Gateway function equipped ECUs relay signals between the ECUs connected to the different buses.
 - *1: ECUs that are present in the vehicle but are not displayed on the CAN Bus Check.
 - *2: Gateway function equipped ECU that does not memorize the sub bus ECUs that are connected to it.
 - *3: Gateway function equipped ECU that memorizes the sub bus ECUs that are connected to it.
 - If none of the connected ECUs are displayed, or there is no response from the vehicle to the Techstream, check the DLC3 branch and the V bus main bus lines for a malfunction.
- (b) Observe the connection response screen for approximately 2 minutes to check for a change in connection status of the connected ECUs and sensors.

HINT:

- If an open occurs in one of the lines of a CAN branch (except DLC3), output from the other branch line (the line that is not open) will be unstable and it may interfere the response (display) of other ECUs and sensors.
- If the connection status changes during the inspection, repair the open in the branch line of the ECU or sensor that does not respond (is not detected) and then perform the CAN bus check again.

4. HOW TO INTERPRET CAN BUS CHECK (COMMUNICATION BUS CHECK) SCREEN

- (a) When a communication stop is currently occurring, the probable malfunctioning part can be determined from the CAN bus check and by using the following methods.

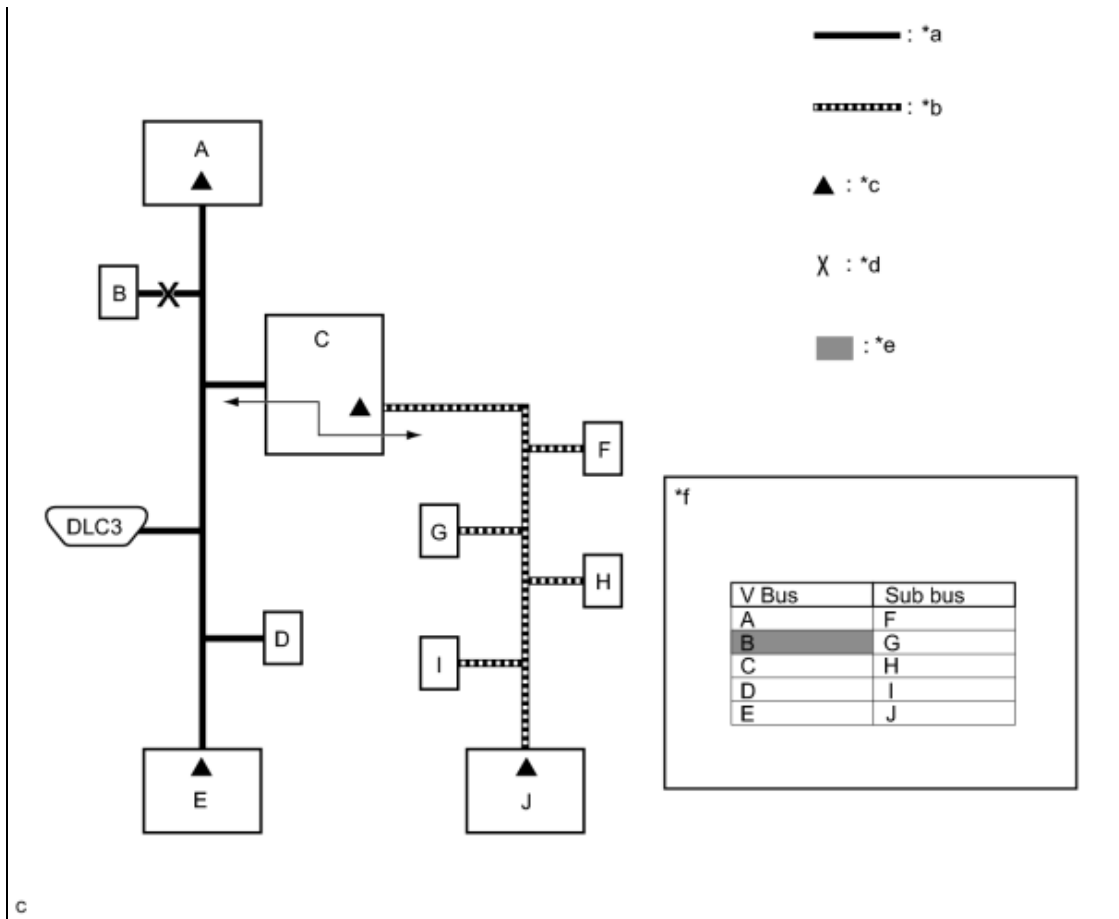
NOTICE:

The following CAN bus wiring diagram is provided only as an example. This wiring diagram is different from the actual wiring diagram for this vehicle.

HINT:

- When a communication stop is currently occurring, it is easier to determine the probable malfunctioning part from the CAN bus check rather than from communication DTCs.
 - Wait for approximately 2 minutes after turning the Ignition switch ON (or simulate the driving conditions that enable the malfunction to be reproduced) and select the CAN bus check. Then observe the communication status of each ECU on the screen.
- (b) If a communication error of only 1 ECU or sensor is indicated on the CAN Bus Check screen, a communication stop of the ECU or sensor is suspected.

Example: Open in both CAN branch lines of ECU B on the V bus



Text in Illustration

*a	V Bus	*b	Sub bus
*c	Terminating Resistor	*d	Location of malfunction
*e	Not displayed or background color changes to red or yellow	*f	CAN Bus Check screen

HINT:

When there are communication stops, ECUs are present in the vehicle even though they are not displayed on the CAN Bus Check screen.

- (c) If communication errors for multiple ECUs or sensors are indicated on the CAN Bus Check screen, then a communication stop of the ECU or sensor that shows a more serious communication stop (an ECU or a sensor which is not displayed) is suspected.

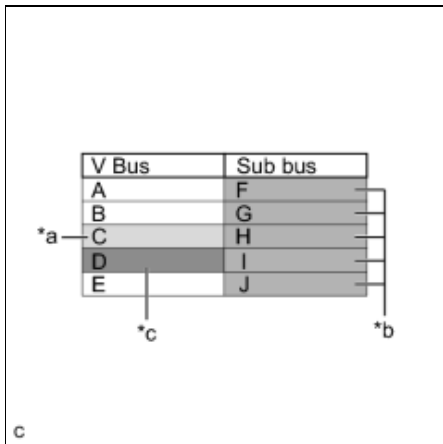
Example: Open in a CAN branch line for ECU D on the V bus

Text in Illustration

*a	Background color periodically changes to yellow or red
*b	Not displayed or background color is yellow or red
*c	Not displayed

Explanation of CAN Bus Check (Communication Bus Check) screen

BUS TYPE	BACKGROUND COLOR	CONNECTION STATUS
		Communication has been normal



V Bus	White	since the start of the CAN bus check.
	Yellow	Communication stop occurred at least once since the start of the CAN bus check, but communication is currently occurring (unstable communication).
	Red	Communication was established at least once since the start of the CAN bus check, but communication is currently not occurring (unstable communication).
	Not displayed	Communication stop has continued since the start of the CAN bus check. *1
Sub bus (gateway function equipped ECU that does not have history of connected ECUs)*2	White	Communication has been normal since the start of the CAN bus check.
	Yellow	Communication stop occurred at least once since the start of the CAN bus check, but communication is currently occurring (unstable communication).
	Red	Communication was established at least once since the start of the CAN bus check, but communication is currently not occurring (unstable communication).
	Not displayed	Communication stop has continued since the start of the CAN bus check. *1
Sub bus (gateway function equipped ECU that has history of connected ECUs)*3	White	Communication has been normal since the start of the CAN bus check.
	Yellow	Communication stop occurred at least once since the start of the CAN bus check, but communication is currently occurring (unstable communication).
	Red	Currently not communicating (either of the following): <ul style="list-style-type: none"> • Communication stop has continued since the start of the CAN bus check • Communication was established at least once since the start of the CAN bus check, but communication is currently not occurring
		Either of the following: <ul style="list-style-type: none"> • If a gateway function

	Not displayed	<p>equipped ECU cannot communicate, the sub bus and ECUs connected to the sub bus will not be displayed.</p> <ul style="list-style-type: none"> If no ECUs are connected to the sub bus, "There is no system found on the Communication Bus" will be displayed.
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HINT:

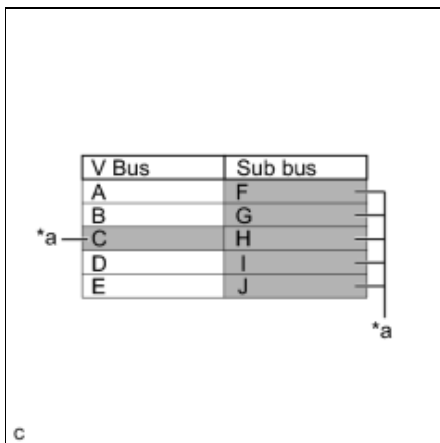
- Gateway function equipped ECUs relay signals between the ECUs connected to the different buses.
- *1: ECUs that are present in the vehicle but are not displayed on the CAN Bus Check screen.
- *2: Gateway function equipped ECU that does not memorize the sub bus ECUs that are connected to it.
- *3: Gateway function equipped ECU that memorizes the sub bus ECUs that are connected to it.
- The example of the CAN Bus Check screen in the illustration shows the result of electrical noise on the CAN bus which is caused by an open in a CAN branch line of ECU D (output from the other branch line is unstable) and the communication of ECU C is also unstable. In addition, in this example, ECU C is equipped with a gateway function. Therefore, communication is also unstable between the sub bus ECUs of ECU C and the V bus.
- The example in the illustration shows that ECU D is not displayed on the CAN Bus Check screen. This indicates a more significant communication stop. In this case, a communication stop of ECU D is suspected.

(d) If a communication error is indicated on both the V bus and sub bus on the CAN Bus Check screen, suspect any communication stop displayed for the V bus first.

Example: Open in both CAN branch lines of ECU C on the V bus

Text in Illustration

*a	Not displayed or background color changes to red
----	--



HINT:

- In the CAN bus check, it is possible to confirm the communication status of ECUs connected to the V bus after connecting the Techstream to the DLC3. As for the sub buses, it is possible to confirm which sub bus connected ECUs can communicate with a gateway function equipped ECU on the V bus.
- If a gateway function equipped ECU has a communication error, ECUs connected to the gateway function equipped ECU are also affected, and communication stops will be indicated.
- The CAN Bus Check screen in the illustration shows that ECU C has a gateway function and a communication stop in ECU C is suspected.

(e) If the CAN Bus Check screen indicates a communication stop only in

the sub bus, a communication stop in the sub bus is suspected.

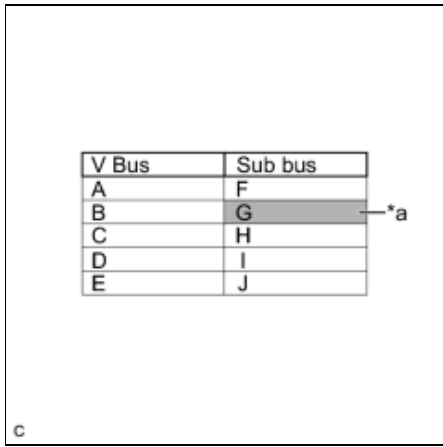
Example: Open in both CAN branch lines of ECU G on the sub bus

Text in Illustration

*a	Background color changes to red
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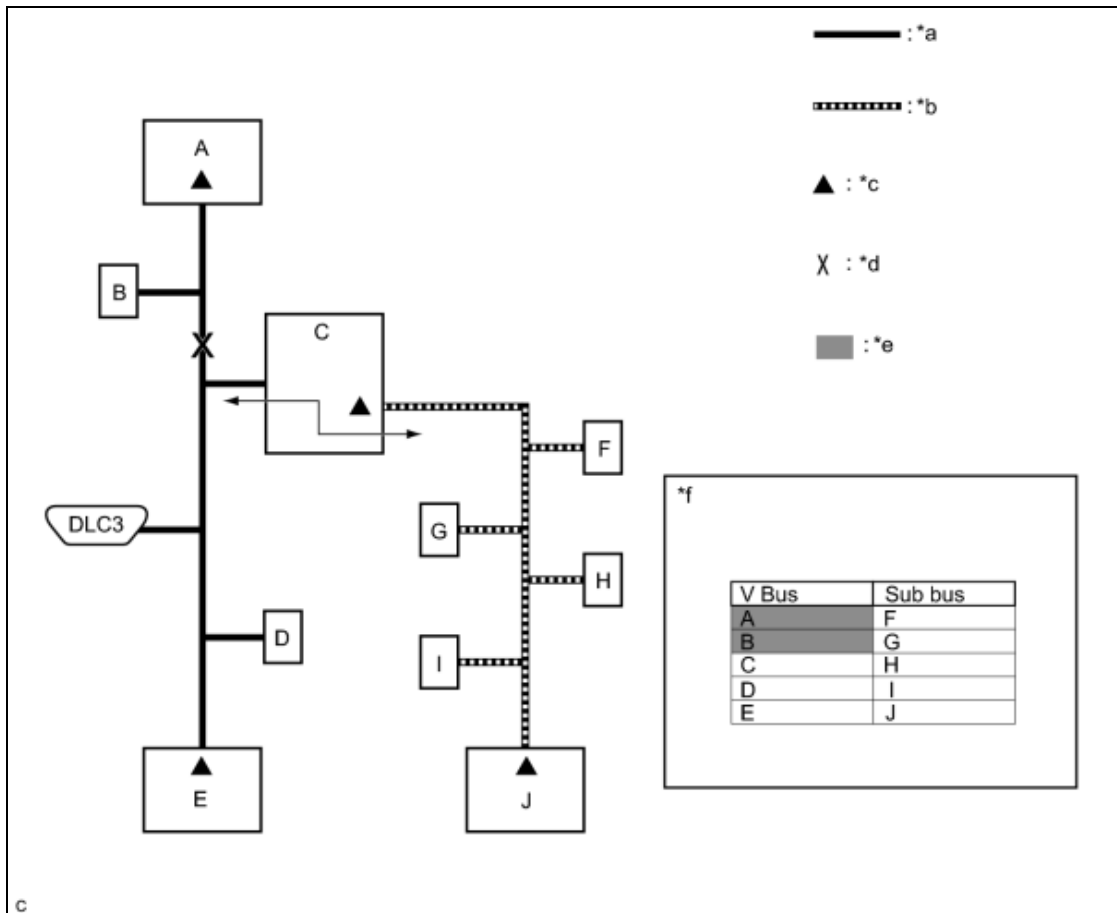
HINT:

- A communication error in a sub bus does not affect the V bus or other buses.
- When a gateway function equipped ECU has memorized the ECUs that are connected to the sub bus, if any of the ECUs connected to the gateway function equipped ECU has a communication error, the background color changes to yellow or red. (The displayed name will not disappear.)



(f) If both of the V bus main bus lines are open, ECUs or sensors that are located farther away from the DLC3 than the open part will be displayed as a communication stop on the CAN Bus Check screen.

(In this case, ECU A and B are not displayed or their background color changes to red.)



Text in Illustration

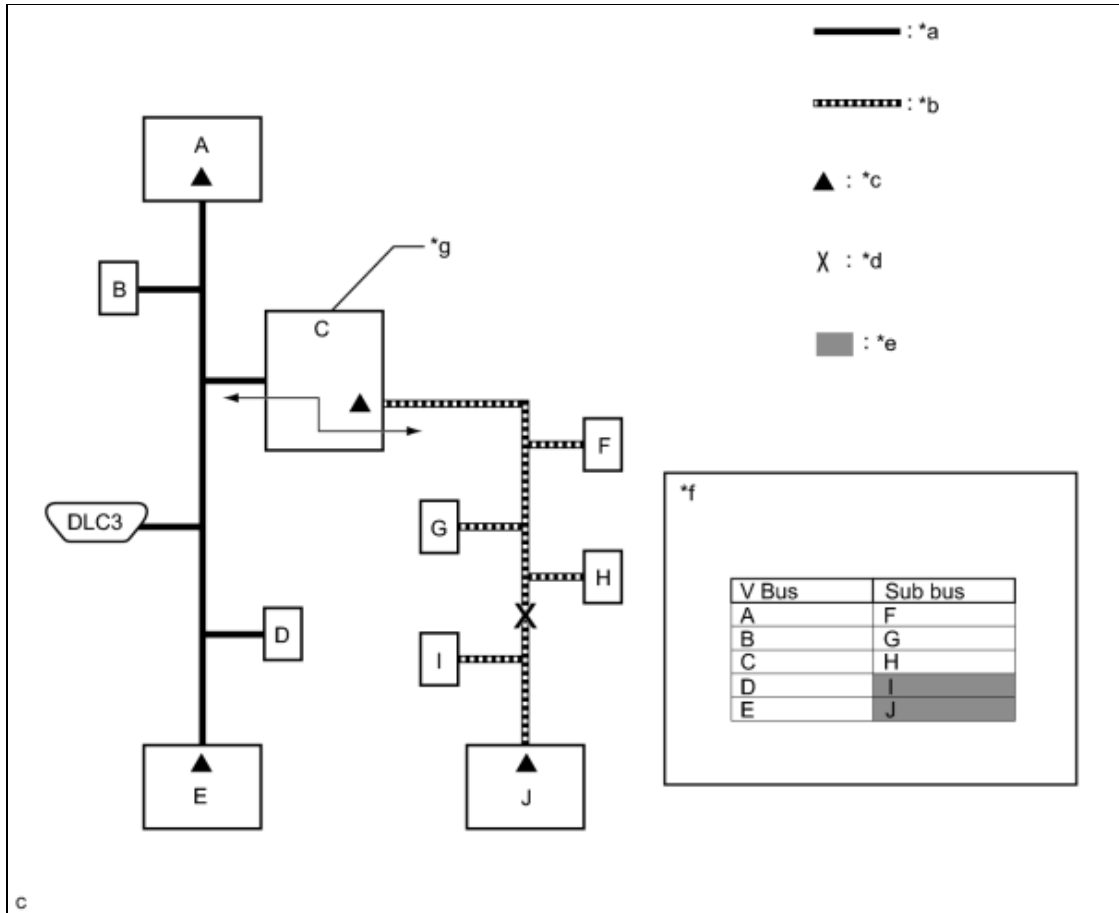
*a	V Bus	*b	Sub Bus
*c	Terminating Resistor	*d	Location of malfunction
*e	Not displayed or background color is red	*f	CAN Bus Check screen

HINT:

If a communication error occurs in an ECU, it is not displayed on the CAN Bus Check screen even though the ECU is present.

(g) If both of the sub bus main bus lines are open, the ECUs that are located farther away from the gateway function equipped ECU than the open part will be displayed as a communication stop on the CAN Bus Check screen.

(In this case, ECU I and J are not displayed or their background color changes to red.)



Text in Illustration

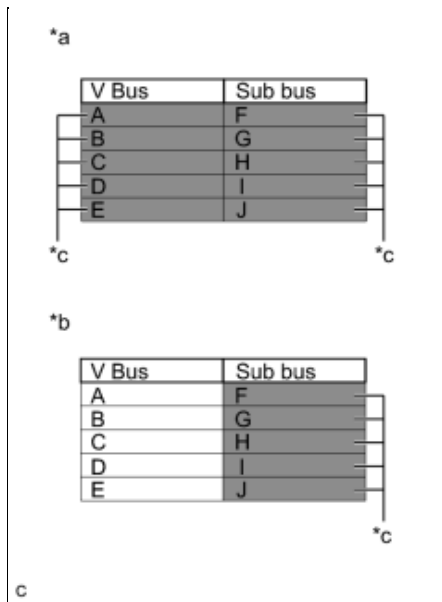
*a	V Bus	*b	Sub Bus
*c	Terminating Resistor	*d	Location of malfunction
*e	Not displayed or background color is red	*f	CAN Bus Check screen
*g	Gateway function equipped ECU	-	-

(h) When any of the following malfunctions occurs, CAN communication cannot be established and almost all ECUs and sensors on the bus show a communication error on the CAN Bus Check screen.

Text in Illustration

*a	When any of the following malfunctions occurs on the V bus
*b	When any of the following malfunctions occurs on a sub bus
*c	Not displayed

Details of Malfunction



Short between CAN lines (CANH and CANL)	
Short between a CAN line (CANH or CANL) and +B	
Short between a CAN line (CANH or CANL) and ground	
Open in a CAN main bus line	

HINT:

- When a malfunction occurs on the V bus, almost all ECUs and sensors on the V bus and sub bus indicate a communication error (almost all ECUs are not displayed). As communication with the gateway function equipped ECU that is connected to the V bus stops, communication from the ECUs connected to the sub bus that is monitored by the gateway function equipped ECU also stops (these ECUs are not displayed).
- When a malfunction occurs in a sub bus, almost all ECUs connected to the sub bus indicate a communication error.
- A communication error in a sub bus does not affect the V bus or other buses.
- The malfunctioning part can be determined by checking for a short circuit between CAN bus lines or between a CAN bus line and ground or +B short using an electrical tester.

5. HOW TO INTERPRET COMMUNICATION DTCS (DTCS THAT START WITH U)

(a) If a CAN communication error cannot be reproduced, determine the suspected malfunctioning part using the DTCS stored in ECUs that are connected to the CAN buses by following the procedure below.

HINT:

Communication DTCS (DTCS that start with U) indicate a communication error between the ECU that stores the DTC and the ECU that is indicated by the DTC.

(1) If multiple ECUs store a communication DTC for a particular ECU, a communication stop of the ECU is suspected.

Output from	Output DTC	Tester display
Hybrid Control	U0140	Lost Communication with Body Control Module
	C1657	Hybrid Powertrain Control Module
Advanced Parking Guidance System	C1659	Brake System Malfunction
	U0140	Lost Communication with Main Body ECU
ABS/VSC/TRAC	U0073	Control Module Communication Bus OFF
	U0100	Lost Communication with ECM/ PCM "A"
	U0101	Lost Communication with TCM
	U0151	Lost Communication with Restraints Control Module
	U0155	Lost Communication with Instrument Panel Cluster (IPC) Control Module
	U0164	Lost Communication with HVAC Control Module
	U0293	Lost Communication with Hybrid Powertrain Control Module
	U0327	Software Incompatibility with Vehicle Security
	U1133	Lost Communication with PMN Module
Smart Key	U0142	Lost Communication with Body Control Module "B"
Pre-Collision	B2060	ABS Malfunction
	B2090	Driving Support System Malfunction
Pre-Collision 2	C1A40	ENG / EHV Device
Transmission Control	U0146	Lost Communication with Body ECU

Text in Illustration

*a	Items to be checked	-	-
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NOTICE:

- This DTC table is from another model, and is only used here to show an example of DTCs that are output when there is an open in a CAN branch line for the main body ECU. This table does not show DTCs applicable to this vehicle.
- Even though a DTC title may indicate a communication error with a specific ECU, the ECU name used in the DTC name on the Techstream may differ depending on the ECU that stores the DTC. (Regarding output DTCs, refer to step 6 and the DTC chart for each ECU.)

HINT:

As multiple ECUs indicate a communication stop with the main body ECU, the possibility of a communication stop of the main body ECU is high.

- (2) If almost all of the communication DTCs of an ECU are stored, a communication stop of the ECU is suspected.

Output from	Output DTC	Tester display
Hybrid Control	U0140	Lost Communication with Body Control Module
Advanced Parking Guidance System	C1657	Hybrid Powertrain Control Module
	C1659	Brake System Malfunction
ABS/VSC/TRAC	U0140	Lost Communication with Main Body ECU
	U0073	Control Module Communication Bus OFF
Main Body	U0100	Lost Communication with ECM/PCM "A"
	U0101	Lost Communication with TCM
	U0151	Lost Communication with Restraints Control Module
	U0155	Lost Communication with Instrument Panel Cluster (IPC) Control Module
	U0164	Lost Communication with HVAC Control Module
	U0293	Lost Communication with Hybrid Powertrain Control Module
	U0327	Software Incompatibility with Vehicle Security
	U1133	Lost Communication with PMN Module
Smart Key	U0142	Lost Communication with Body Control Module "B"
Pre-Collision	B2060	ABS Malfunction
	B2090	Driving Support System Malfunction
Pre-Collision 2	C1A40	ENG / EHV Device
Transmission Control	U0146	Lost Communication with Body ECU

Text in Illustration

*a	Items to be checked	-	-
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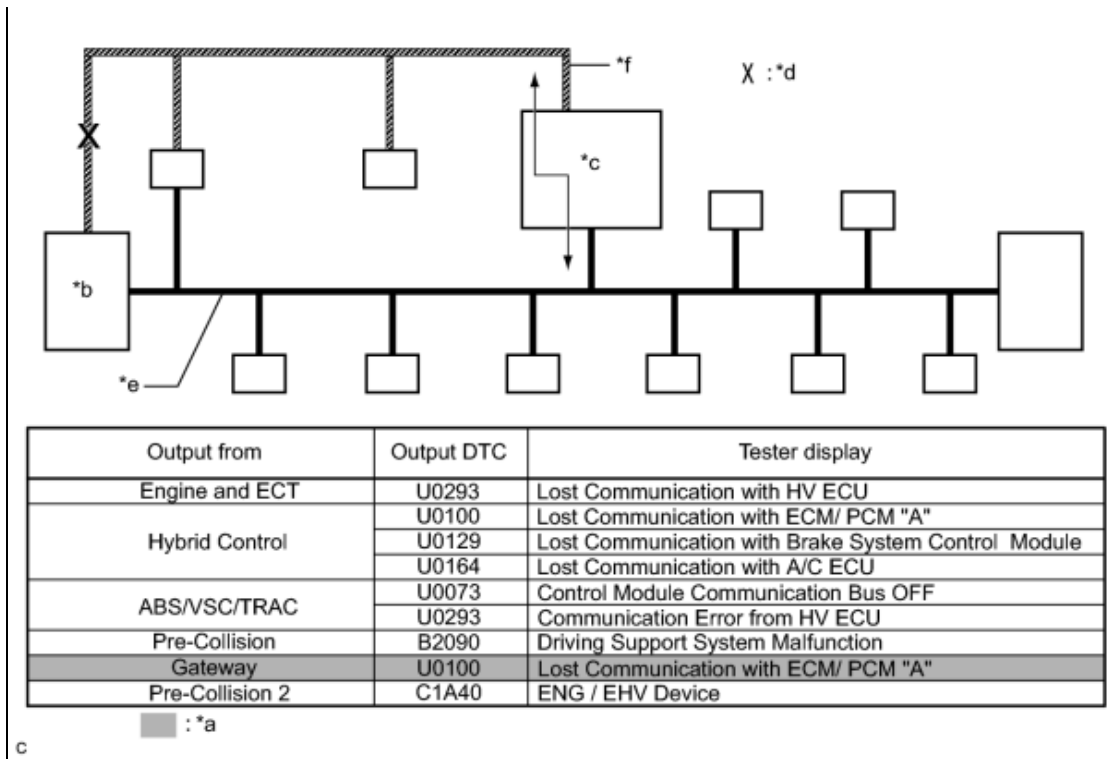
NOTICE:

This DTC table is from another model, and is only used here to show an example of DTCs that are output when there is an open in a CAN branch line for the main body ECU. This table does not show DTCs applicable to this vehicle.

HINT:

If almost all of the DTCs of the main body ECU are stored, the possibility of a communication stop of the main body ECU is high.

- (3) When a CAN communication error occurs, many DTCs are output. DTCs other than communication error DTCs (such as DTCs that start with C or B) and communication DTCs for the ABS system are important DTCs, however it may be easier to determine the malfunctioning part by examining the overall situation without considering these DTCs.
- (b) To help determine the part of the sub bus that has a communication error, prioritize the communication stop DTCs stored in the gateway function equipped ECU.



Text in Illustration

*a	Items to be checked	*b	ECM
*c	Gateway function equipped ECU	*d	Location of malfunction
*e	V Bus	*f	Sub Bus

NOTICE:

This DTC table is from another model, and is only used here to show the ECUs connected to both a V bus and a sub bus. It shows DTCs output when there is an open in the main bus lines for the ECM on the sub bus. This table does not show DTCs applicable to this vehicle.

HINT:

- As gateway function equipped ECUs (sub bus monitor ECU) monitor signals from all ECUs that are connected to sub buses, gateway function equipped ECUs can detect ECUs with a communication stop more accurately.
 - When there is a communication stop for the gateway function equipped ECU (gateway), communication with ECUs connected to other buses such as the V bus stops. Therefore, communication DTCs for ECUs connected to other buses are also stored.
- (c) When any of the following malfunctions occurs, many DTCs are likely to be output from many ECUs. Because of this, it may be difficult to determine the probable malfunctioning part.
- Short between CAN lines (CANH and CANL)
 - Short between a CAN line (CANH or CANL) and ground
 - Short between a CAN line (CANH or CANL) and +B
 - Open in a CAN branch line (CANH or CANL) of an ECU or sensor
 - Open in a CAN main bus line (CANH or CANL) between 2 ECUs that have a terminating resistor

6. DTC TABLE BY ECU

HINT:

- In the CAN communication system, the CAN communication DTCs of each ECU can be displayed using the Techstream.
- If CAN communication system DTCs are output, trouble cannot be determined only by the DTCs. Perform troubleshooting according to How to Proceed with Troubleshooting **INFO**.
- If system function temporarily returns to normal, DTCs may not be output again even though the following DTC

check procedures are used.

(a) Main Body ECU (Network Gateway ECU) / Techstream Display "Main Body"

DTC	DETECTION ITEM	DTC DETECTION CONDITION	DTC DETECTION PRE-CONDITION	DTC CHECK PROCEDURE	WARNING INDICATION IN METER	DTC STORAGE METHOD
U0073	Control Module Communication Bus "A" Off	Main body ECU (network gateway computer) communications stopped because of an error with high-speed CAN.	Both conditions are met: <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the main body ECU (network gateway ECU) is 10 V or more. 	Turn the ignition switch to ON and wait for at least 15 seconds.	-	DTC is stored until it is cleared using the Techstream.
U0100	Lost Communication With ECM/PCM "A"	The main body ECU (network gateway ECU) does not receive data from the ECM.	Both conditions are met: <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the main body ECU (network gateway ECU) is 10 V or more. 	Turn the ignition switch to ON and wait for at least 15 seconds.	-	DTC is stored until it is cleared using the Techstream.
U0101	Lost Communication with TCM	The main body ECU (network gateway ECU) does not receive data from the TCM.	Both conditions are met: <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the main body ECU (network 	Turn the ignition switch to ON and wait for at least 15 seconds.	-	DTC is stored until it is cleared using the Techstream.

			gateway ECU) is 10 V or more.			
U0122	Lost Communication with Vehicle Dynamics Control Module	The main body ECU (network gateway ECU) does not receive data from the skid control ECU (brake actuator assembly).	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the main body ECU (network gateway ECU) is 10 V or more. 	Turn the ignition switch to ON and wait for at least 15 seconds.	-	DTC is stored until it is cleared using the Techstream.
U0155	Lost Communication with Instrument Panel Cluster (IPC) Control Module	The main body ECU (network gateway ECU) does not receive data from the combination meter assembly.	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the main body ECU (network gateway ECU) is 10 V or more. 	Turn the ignition switch to ON and wait for at least 15 seconds.	-	DTC is stored until it is cleared using the Techstream.
U0401	Invalid Data Received From ECM/PCM "A"	The main body ECU (network gateway computer) detects abnormal data from the ECM.	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the main body ECU (network gateway ECU) is 10 V or more. 	Turn the ignition switch to ON and wait for at least 15 seconds.	-	DTC is stored until it is cleared using the Techstream.

U0402	Invalid Data Received From TCM	The main body ECU (network gateway computer) detects abnormal data from the TCM.	Both conditions are met: <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the main body ECU (network gateway ECU) is 10 V or more. 	Turn the ignition switch to ON and wait for at least 15 seconds.	-	DTC is stored until it is cleared using the Techstream.
U0416	Invalid Data Received From Vehicle Dynamics Control Module	The main body ECU (network gateway computer) detects abnormal data from the skid control ECU (brake actuator assembly).	Both conditions are met: <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the main body ECU (network gateway ECU) is 10 V or more. 	Turn the ignition switch to ON and wait for at least 15 seconds.	-	DTC is stored until it is cleared using the Techstream.
U0423	Invalid Data Received From Instrument Panel Cluster Control Module	The main body ECU (network gateway computer) detects abnormal data from the combination meter assembly.	Both conditions are met: <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the main body ECU (network gateway ECU) is 10 V or more. 	Turn the ignition switch to ON and wait for at least 15 seconds.	-	DTC is stored until it is cleared using the Techstream.
			Both conditions are met:			

U1201	CAN Fail/Error Counter Circuit	Unstable communications because of an error with high-speed CAN.	<ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the main body ECU (network gateway ECU) is 10 V or more. 	Turn the ignition switch to ON and wait for at least 15 seconds.	-	DTC is stored until it is cleared using the Techstream.
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HINT:

This ECU uses the CAN communication system for DTC communication.

(b) Combination Meter Assembly / Techstream Display "Combination Meter"

DTC	DETECTION ITEM	DTC DETECTION CONDITION	DTC DETECTION PRE-CONDITION	DTC CHECK PROCEDURE	WARNING INDICATION IN METER	DTC STORAGE METHOD
U0073	Control Module Communication Bus "A" Off	The combination meter assembly communications stopped because of an error with high-speed CAN.	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the combination meter assembly is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	-	DTC is stored until it is cleared using the Techstream.
U0100	Lost Communication with ECM/PCM "A"	The combination meter assembly does not receive data from the ECM.	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the combination 	Turn the ignition switch to ON and wait for at least 10 seconds.	-	DTC is stored until it is cleared using the Techstream.

			meter assembly is 10 V or more.			
U0122	Lost Communication with Vehicle Dynamics Control Module	The combination meter assembly does not receive data from the skid control ECU (brake actuator assembly).	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the combination meter assembly is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	-	DTC is stored until it is cleared using the Techstream.
U0131	Lost Communication with Power Steering Control Module	The combination meter assembly does not receive data from the power steering ECU assembly.	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the combination meter assembly is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	-	DTC is stored until it is cleared using the Techstream.
U0140	Lost Communication with Body Control Module	The combination meter assembly does not receive data from the main body ECU (network gateway ECU).	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the combination meter assembly is 10 V or 	Turn the ignition switch to ON and wait for at least 10 seconds.	-	DTC is stored until it is cleared using the Techstream.

			more.			
U0151	Lost Communication with Restraints Control Module	The combination meter assembly does not receive data from the air bag ECU assembly.	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the combination meter assembly is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	-	DTC is stored until it is cleared using the Techstream.

HINT:

This ECU uses the CAN communication system for DTC communication.

(c) ECM / Techstream Display "Engine"

DTC	DETECTION ITEM	DTC DETECTION CONDITION	DTC DETECTION PRE-CONDITION	DTC CHECK PROCEDURE	WARNING INDICATION IN METER	DTC STORAGE METHOD
U0073	Control Module Communication Bus "A" Off	The ECM communications stopped because of an error with high-speed CAN.	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the ECM is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	MIL warning light illuminates.	DTC is stored until it is cleared using the Techstream.
			<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned 			

U0101	Lost Communication with TCM	The ECM does not receive data from the TCM.	<p>to ON and 1 second elapses.</p> <ul style="list-style-type: none"> The power source voltage of the ECM is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	MIL warning light illuminates.	DTC is stored until it is cleared using the Techstream.
U0122	Lost Communication with Vehicle Dynamics Control Module	The ECM does not receive data from the skid control ECU (brake actuator assembly).	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the ECM is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	MIL warning light illuminates.	DTC is stored until it is cleared using the Techstream.
U0155	Lost Communication With Instrument Panel Cluster (IPC) Control Module	The ECM does not receive data from the combination meter assembly.	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the ECM is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	MIL warning light illuminates.	DTC is stored until it is cleared using the Techstream.
			<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition 			

U0402	Invalid Data Received from TCM	The ECM detects abnormal data from the TCM.	<p>switch is turned to ON and 1 second elapses.</p> <ul style="list-style-type: none"> The power source voltage of the ECM is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	MIL warning light illuminates.	DTC is stored until it is cleared using the Techstream.
U0416	Invalid Data Received from Vehicle Dynamics Control Module	The ECM detects abnormal data from the skid control ECU (brake actuator assembly).	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the ECM is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	MIL warning light illuminates.	DTC is stored until it is cleared using the Techstream.
U0423	Invalid Data Received from Instrument Panel Cluster Control Module	The ECM detects abnormal data from the combination meter assembly.	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the ECM is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	MIL warning light illuminates.	DTC is stored until it is cleared using the Techstream.

HINT:

This ECU uses the CAN communication system for DTC communication.

(d) TCM / Techstream Display "ECT"

DTC	DETECTION ITEM	DTC DETECTION CONDITION	DTC DETECTION PRE-CONDITION	DTC CHECK PROCEDURE	WARNING INDICATION IN METER	DTC STORAGE METHOD
U0073	Control Module Communication Bus "A" Off	The TCM communications stopped because of an error with high-speed CAN.	Both conditions are met: <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the TCM is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	-	DTC is stored until it is cleared using the Techstream.
U0100	Lost Communication with ECM/PCM "A"	The TCM does not receive data from the ECM.	Both conditions are met: <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the TCM is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	-	DTC is stored until it is cleared using the Techstream.
	Lost Communication	The TCM does not	Both conditions are met: <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 	Turn the ignition switch to ON		DTC is stored until

U0122	with Vehicle Dynamics Control Module	receive data from the skid control ECU (brake actuator assembly).	<p>second elapses.</p> <ul style="list-style-type: none"> The power source voltage of the TCM is 10 V or more. 	and wait for at least 10 seconds.	-	it is cleared using the Techstream.
U0140	Lost Communication with Body Control Module	The TCM does not receive data from the main body ECU (network gateway ECU).	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the TCM is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	-	DTC is stored until it is cleared using the Techstream.
U0155	Lost Communication With Instrument Panel Cluster (IPC) Control Module	The TCM does not receive data from the combination meter assembly.	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the TCM is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	-	DTC is stored until it is cleared using the Techstream.
			<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch 			

U0401	Invalid Data Received from ECM/PCM "A"	The TCM detects abnormal data from the ECM.	<p>is turned to ON and 1 second elapses.</p> <ul style="list-style-type: none"> The power source voltage of the TCM is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	-	DTC is stored until it is cleared using the Techstream.
U0416	Invalid Data Received from Vehicle Dynamics Control Module	The TCM detects abnormal data from the skid control ECU (brake actuator assembly).	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the TCM is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	-	DTC is stored until it is cleared using the Techstream.
U0422	Invalid Data Received from Body Control Module	The TCM detects abnormal data from the main body ECU (network gateway computer).	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the TCM is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	-	DTC is stored until it is cleared using the Techstream.
			Both conditions are met:			

U0423	Invalid Data Received from Instrument Panel Cluster Control Module	The TCM detects abnormal data from the combination meter assembly.	<ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the TCM is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	-	DTC is stored until it is cleared using the Techstream.
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HINT:

This ECU uses the CAN communication system for DTC communication.

(e) Skid Control ECU (Brake Actuator Assembly) / Techstream Display "ABS/VSC/TRAC"

DTC	DETECTION ITEM	DTC DETECTION CONDITION	DTC DETECTION PRE-CONDITION	DTC CHECK PROCEDURE	WARNING INDICATION IN METER	DTC STORAGE METHOD
U0073	Control Module Communication Bus OFF	The skid control ECU (brake actuator assembly) communications stopped because of an error with high-speed CAN.	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the skid control ECU (brake actuator assembly) is 10 V or more. 	Turn the ignition switch to ON and wait for at least 60 seconds.	ABS warning light illuminates.	DTC is stored until it is cleared using the Techstream.
U0100	Lost Communication With ECM/PCM "A"	The skid control ECU (brake actuator assembly) does not receive data from the ECM.	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of 	Turn the ignition switch to ON and wait for at least 10	ABS warning light illuminates.	DTC is stored until it is cleared using the

			the skid control ECU (brake actuator assembly) is 10 V or more.	seconds.		Techstream.
U0101	Lost Communication with TCM	The skid control ECU (brake actuator assembly) does not receive data from the TCM.	Both conditions are met: <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the skid control ECU (brake actuator assembly) is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	ABS warning light illuminates.	DTC is stored until it is cleared using the Techstream.
U0126	Lost Communication With Steering Angle Sensor Module	The skid control ECU (brake actuator assembly) does not receive data from the steering angle sensor (spiral cable sub-assembly).	Both conditions are met: <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the skid control ECU (brake actuator assembly) is 10 V or more. 	Turn the ignition switch to ON and wait for at least 60 seconds.	ABS warning light illuminates.	DTC is stored until it is cleared using the Techstream.

HINT:

This ECU uses the CAN communication system for DTC communication.

(f) Steering Angle Sensor (Spiral Cable Sub-assembly) / Techstream Display "-"

HINT:

The steering angle sensor is connected to the CAN communication system, but CAN communication DTCs are not output.

(g) Power Steering ECU Assembly / Techstream Display "EMPS"

DTC	DETECTION ITEM	DTC DETECTION CONDITION	DTC DETECTION PRE-CONDITION	DTC CHECK PROCEDURE	WARNING INDICATION IN METER	DTC STORAGE METHOD
U0100	Lost Communication with ECM/PCM "A"	The power steering ECU assembly does not receive data from the ECM.	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the power steering ECU assembly is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	EPS warning light illuminates.	DTC is stored until it is cleared using the Techstream.
U0122	Lost Communication with Vehicle Dynamics Control Module	The power steering ECU assembly does not receive data from the skid control ECU (brake actuator assembly).	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the power steering ECU assembly is 10 V or more. 	Turn the ignition switch to ON and wait for at least 10 seconds.	EPS warning light illuminates.	DTC is stored until it is cleared using the Techstream.
U0416	Invalid Data Received from Vehicle Dynamics Control Module	The power steering ECU assembly does not send data to the skid control ECU (brake actuator assembly).	<p>Both conditions are met:</p> <ul style="list-style-type: none"> The ignition switch is turned to ON and 1 second elapses. The power source voltage of the power steering ECU assembly is 10 V or 	Turn the ignition switch to ON and wait for at least 10 seconds.	EPS warning light illuminates.	DTC is stored until it is cleared using the Techstream.

more.

HINT:

This ECU uses the CAN communication system for DTC communication.

(h) Air Bag ECU Assembly / Techstream Display "SRS Airbag"

DTC	DETECTION ITEM	DTC DETECTION CONDITION	DTC DETECTION PRE-CONDITION	DTC CHECK PROCEDURE	WARNING INDICATION IN METER	DTC STORAGE METHOD
U0073	Control Module Communication Bus "A" Off	Air bag ECU assembly communications stopped because of an error with high-speed CAN.	Both conditions are met: <ul style="list-style-type: none">• The ignition switch is turned to ON and 1 second elapses.• The power source voltage of the air bag ECU assembly is 10 V or more.	Turn the ignition switch to ON and wait for at least 60 seconds.	-	DTC is stored until it is cleared using the Techstream.

HINT:

This ECU uses the CAN communication system for DTC communication.

(i) PSP (Option Connector) / Techstream Display "-"

HINT:

The PSP (option connector) is connected to the CAN communication system, but CAN communication DTCs are not output.

7. DTC COMBINATION TABLE (OPEN IN CAN BRANCH OF V BUS, PAST COMMUNICATION ERROR)

(a) Regarding the past communication error of ECUs and sensors connected to the V bus (in this case, normal was displayed when performing the CAN bus check, but communication DTCs are output), the probable CAN branch that had a malfunction can be determined based on the following DTC combination table.

HINT:

- Based on the table below and DTCs output from ECUs connected via CAN communication, the probable part for which communication stop occurred can be determined.
- Regarding an open in a CAN branch and a communication stop that is currently occurring, the malfunctioning part can be confirmed easily by performing the CAN bus check using the Techstream because the ECU or sensor connected to the CAN branch does not respond (the ECU or sensor name will not be displayed on the screen).
- If an open in a CAN main bus line, a short between the CAN bus lines (CANH and CANL) or a +B or ground short in the CAN bus occurs, DTCs of almost all ECUs (or sensors) on the CAN bus may be output, or a message indicating a communication error may be displayed on the Techstream screen. In this case, check the resistance of the CAN bus (steps 7 to 9) first.
- If an open occurs in just one of the lines of a CAN branch, DTCs which are not related to malfunctioning parts may be output (DTCs may be displayed randomly), or a message indicating a communication error may be displayed.

DTC		TROUBLE MODE				
OUTPUT ECU	OUTPUT DTC	SKID CONTROL ECU COMMUNICATION STOP MODE <small>INFO</small>	POWER STEERING ECU COMMUNICATION STOP MODE <small>INFO</small>	STEERING ANGLE SENSOR COMMUNICATION STOP MODE <small>INFO</small>	ECM COMMUNICATION STOP MODE <small>INFO</small>	TRANSMISSION CONTROL ECU COMMUNICATION STOP MODE <small>INFO</small>
Skid Control ECU (Brake Actuator Assembly)	U0073	○*1	X	X	X	X
	U0100	○*1	X	X	○	X
	U0101	○*1	X	X	X	○
	U0126	○*1	X	○	X	X
Power Steering ECU Assembly	U0100	X	○*1	X	○	X
	U0122	○	○*1	X	X	X
	U0416	X	X*1	X	X	X
ECM	U0073	X	X	X	○*1	X
	U0101	X	X	X	○*1	○
	U0122	○	X	X	○*1	X
	U0155	X	X	X	○*1	X
	U0402	X	X	X	○*1	○
	U0416	○	X	X	○*1	X
	U0423	X	X	X	X*1	X
TCM	U0073	X	X	X	X	○*1
	U0100	X	X	X	○	○*1
	U0122	○	X	X	X	○*1
	U0140	X	X	X	X	○*1
	U0155	X	X	X	X	○*1
	U0416	X	X	X	X	X*1
	U0422	X	X	X	X	X*1
	U0423	X	X	X	X	X*1
Main Body ECU (Network Gateway ECU)	U0073	X	X	X	X	X
	U0100	X	X	X	○	X
	U0101	X	X	X	X	○
	U0122	○	X	X	X	X
	U0155	X	X	X	X	X
	U0401	X	X	X	X*2	X
	U0402	X	X	X	X	X*2
	U0416	X*2	X	X	X	X
	U0423	X	X	X	X	X
	U1201	X	X	X	X	X
Combination	U0073	X	X	X	X	X
	U0100	X	X	X	○	X
	U0122	○	X	X	X	X

Meter Assembly	U0131	X	X	X	X	X
	U0140	X	X	X	X	X
	U0151	X	X	X	X	X
Air Bag ECU Assembly	U0073	X	X	X	X	X

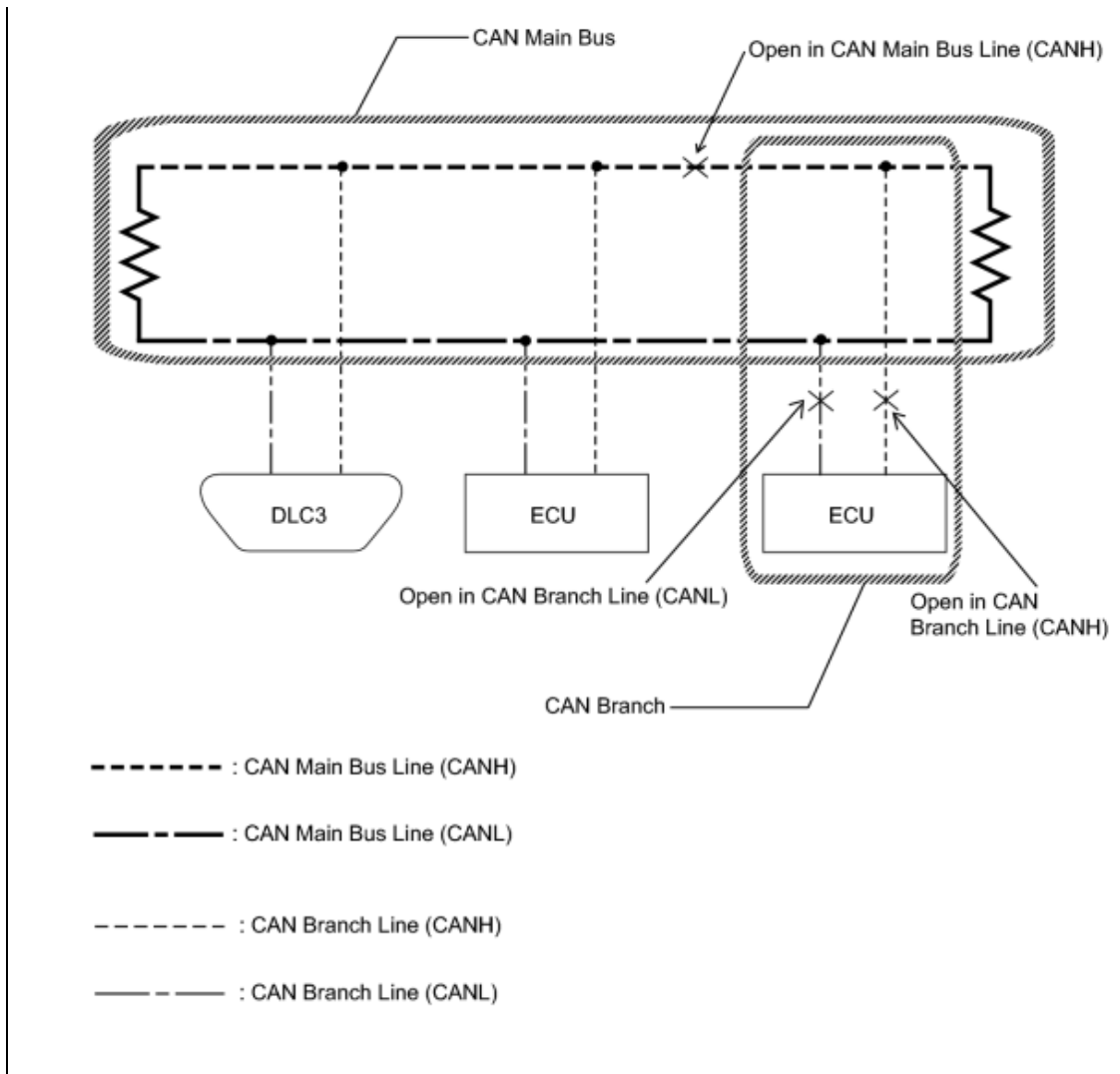
DTC		TROUBLE MODE				
OUTPUT ECU	OUTPUT DTC	MAIN BODY ECU COMMUNICATION STOP MODE INFO	COMBINATION METER ECU COMMUNICATION STOP MODE INFO	CENTER AIRBAG SENSOR COMMUNICATION STOP MODE INFO	BUS BUFFER ECU COMMUNICATION STOP MODE INFO	
Skid Control ECU (Brake Actuator Assembly)	U0073	X	X	X	X	
	U0100	X	X	X	X	
	U0101	X	X	X	X	
	U0126	X	X	X	X	
Power Steering ECU Assembly	U0100	X	X	X	X	
	U0122	X	X	X	X	
	U0416	X	X	X	X	
ECM	U0073	X	X	X	X	
	U0101	X	X	X	X	
	U0122	X	X	X	X	
	U0155	X	○	X	X	
	U0402	X	X	X	X	
	U0416	X	X	X	X	
	U0423	X	X	X	X	
TCM	U0073	X	X	X	X	
	U0100	X	X	X	X	
	U0122	X	X	X	X	
	U0140	○	X	X	X	
	U0155	X	○	X	X	
	U0401	X	X	X	X	
	U0416	X	X	X	X	
	U0422	X	X	X	X	
	U0423	X	X	X	X	
Main Body ECU (Network Gateway ECU)	U0073	○*1	X	X	X	
	U0100	○*1	X	X	X	
	U0101	○*1	X	X	X	
	U0122	○*1	X	X	X	
	U0155	○*1	○	X	X	
	U0401	X*1	X	X	X	
	U0402	X*1	X	X	X	

	U0416	X*1	X	X	X
	U0423	X*1	X*2	X	X
	U1201	o*1	X	X	X
Combination Meter Assembly	U0073	X	o*1	X	X
	U0100	X	o*1	X	X
	U0122	X	o*1	X	X
	U0131	X	o*1	X	X
	U0140	o	o*1	X	X
	U0151	X	o*1	o	X
Air Bag ECU Assembly	U0073	X	X	o*1	X

HINT:

- o: Set
- X: Not set or may be set according to the malfunctioning part when one line of a CAN branch is open.
- -: DTC is not output.
- *:1 DTC is not output during communication error, but will be output as a history DTC (past DTC) when communication returns to normal.
- *:2 DTC may not be stored depending on conditions.

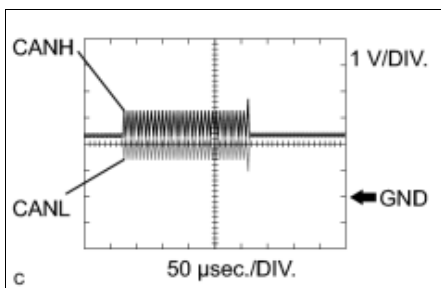
8. CAN BUS WAVEFORMS



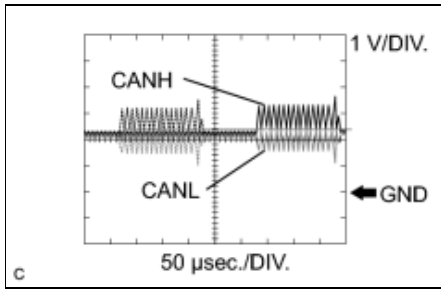
HINT:

- This waveform is measured between terminals CANH and GND, and terminals CANL and GND of the DLC3. (Use this as a reference for diagnosis of CAN communication lines.)
- When malfunctions in multiple ECUs are suspected based on CAN Bus Check and DTCs checked using the Techstream, check the resistance of the CAN bus using an ohmmeter first INFO. If no problems are found, check the following waveforms.
- If a waveform is not similar to one of the following 3 patterns (Group 1), then an open in a CAN main bus line, an open in a CAN branch line, or a short between a CAN line (CANH or CANL) and ground is suspected (Group 2).
- Wiggle the connector and wire harness to check if the waveform changes.

(a) CAN bus waveforms (Group 1)



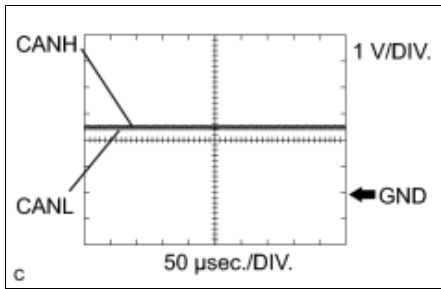
(1) Normal waveform



(2) Open in both of the lines (CANH and CANL) of a CAN branch

HINT:

- Waveforms (waveforms shown using dotted lines) are not present from an ECU or sensor connected to a CAN branch with an open circuit in both lines. (Waveforms from other ECUs or sensors are normal.)
- Because this waveform is similar to a normal waveform, instead of using the waveform, the malfunctioning part can be narrowed down by performing a CAN bus check.



(3) Short between the CAN bus lines (CANH and CANL)

HINT:

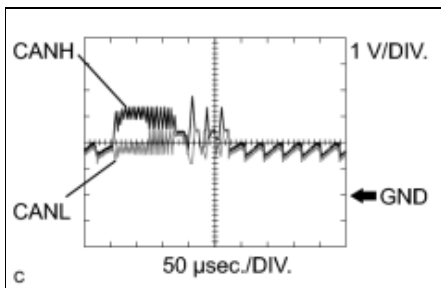
- Waveforms disappear.
- If the malfunction is in an ECU, disconnecting the ECU will change the waveform. If the waveform does not change, a malfunction in the wire harness is suspected.

(b) CAN bus waveforms (reference) (Group 2)

NOTICE:

The following CAN bus waveforms can be used only as reference. The actual measured waveform may differ significantly depending on the location of the open or short circuit.

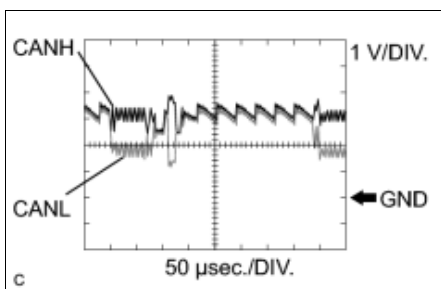
(1) Open in a CAN branch line (CANH)



HINT:

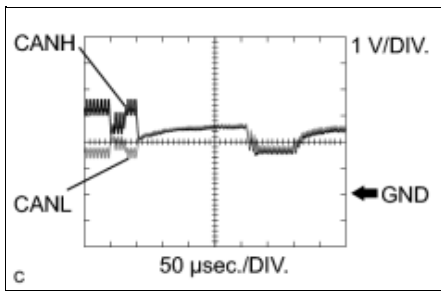
- An abnormal waveform is output from an ECU with an open in one of its CAN branch lines. Because this abnormal output interferes with the signals from other ECUs, the output of other ECUs will also appear abnormal.
- Narrow down the malfunctioning part by checking DTCs or performing a CAN bus check, or by checking waveform changes when ECUs or sensors are disconnected. The waveform will change to one for an open in both sides of a CAN branch when the ECU or sensor with an open CAN branch line is disconnected.

(2) Open in a CAN branch line (CANL)



HINT:

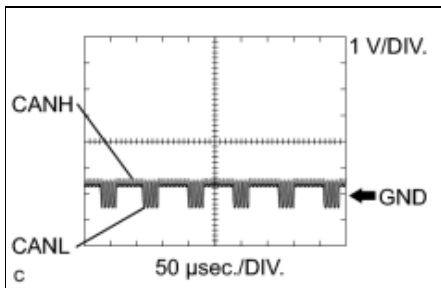
- An abnormal waveform is output from an ECU with an open in one of its CAN branch lines. Because this abnormal output interferes with the signals from other ECUs, the output of other ECUs will also appear abnormal.
- Narrow down the malfunctioning part by checking DTCs or performing a CAN bus check, or by checking waveform changes when ECUs or sensors are disconnected. The waveform will change to one for an open in both sides of a CAN branch when the ECU or sensor with an open CAN branch line is disconnected.



(3) Open in a CAN main bus line (CANH)

HINT:

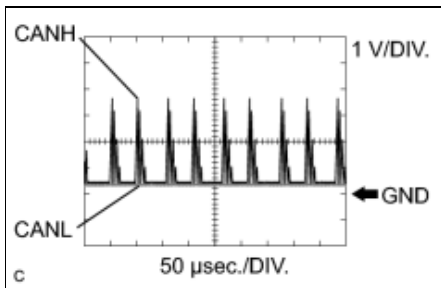
- Waveforms of ECUs or sensors that are nearer to the DLC3 than the open part are almost normal.
- Waveforms of ECUs or sensors that are on the opposite side of the DLC3 from the open part are abnormal.
- An open in a CAN main bus line can be confirmed by measuring the resistance between the CANH and CANL terminals of any CAN branch.



(4) Short between a CAN bus line (CANH) and ground

HINT:

- Narrow down the shorted part by checking for waveform changes when disconnecting connectors from the CAN junction connector or when disconnecting ECUs or sensors.
- A short to ground in the CANH line can be confirmed by measuring the resistance between CANH and ground using an ohmmeter.



(5) Short between a CAN bus line (CANL) and ground

HINT:

- Narrow down the shorted part by checking for waveform changes when disconnecting connectors from the CAN junction connector or when disconnecting ECUs or sensors.
- A short to ground in the CANL line can be confirmed by measuring the resistance between CANL and ground using an ohmmeter.

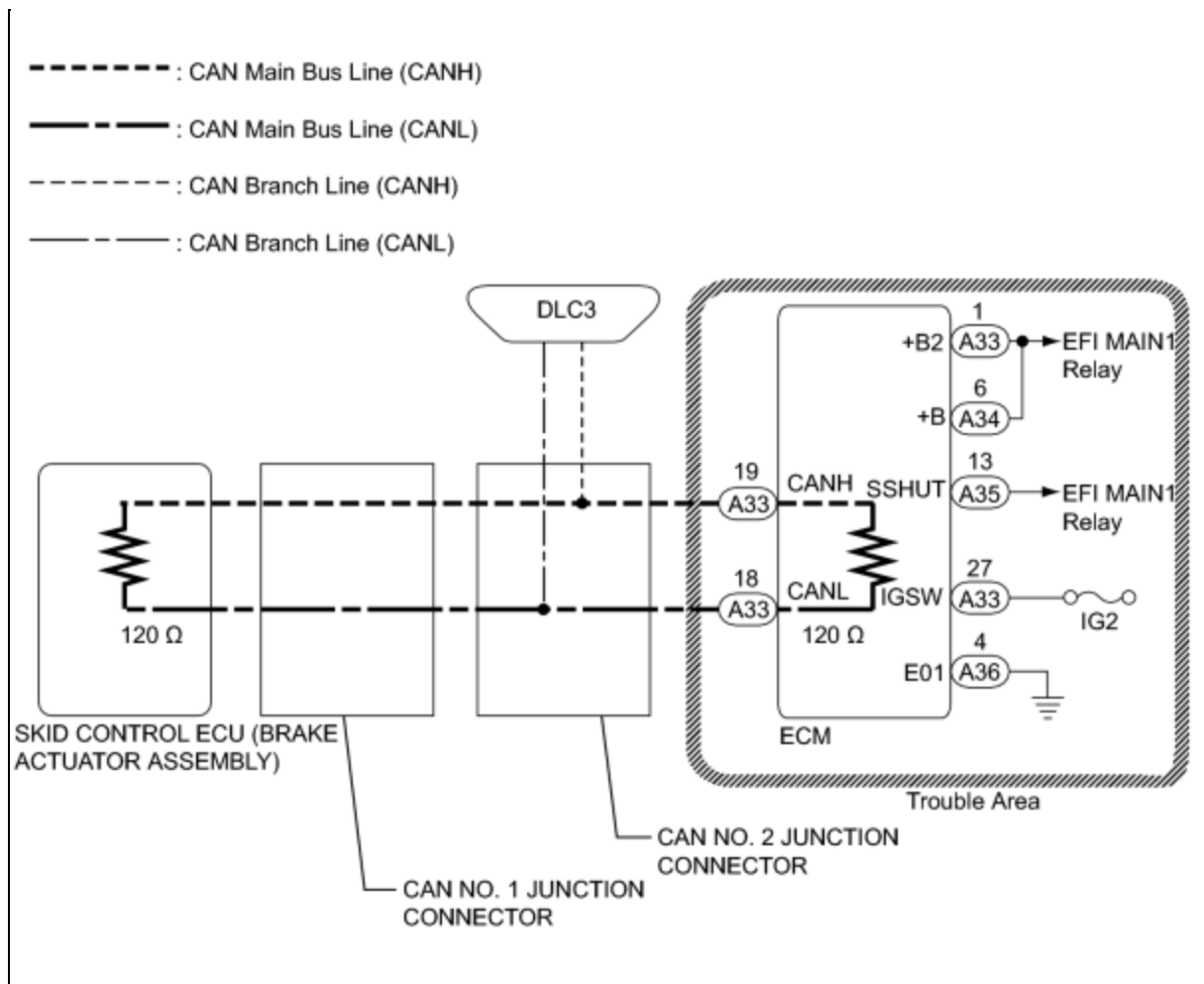
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WIP0B6X
Title: NETWORKING: CAN COMMUNICATION SYSTEM: ECM Communication Stop Mode (2013 FR-S)		

[ECM Communication Stop Mode](#)

DESCRIPTION

DETECTION ITEM	SYMPTOM	TROUBLE AREA
ECM Communication Stop Mode	<p>Either condition is met:</p> <ul style="list-style-type: none"> • "ECM (Engine)" is not displayed on the "CAN Bus Check" screen of the Techstream INFO • Communication system DTCs (DTCs that start with U) that are output correspond to "ECM Communication Stop Mode" in "DTC Combination Table" INFO 	<ul style="list-style-type: none"> • Power source circuit of ECM • ECM main line or connector • ECM ground circuit • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output **INFO**.
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.
- DTC check procedure: Turn the ignition switch to ON and wait at least 10 seconds.
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed **INFO**.

HINT:

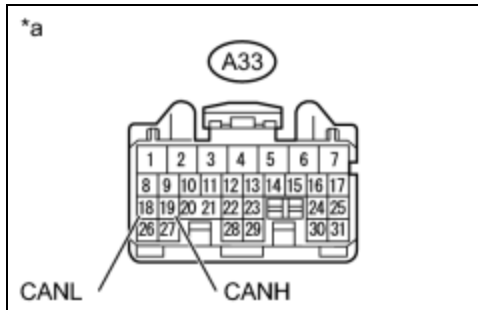
- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or

wire harness while performing the inspection below may help determine the cause of the malfunction.

PROCEDURE

1. CHECK FOR OPEN IN CAN BUS LINES (ECM MAIN LINE)

(a) Disconnect the cable from the negative (-) battery terminal.



(b) Disconnect the A33 ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-19 (CANH) - A33-18 (CANL)	Cable disconnected from negative (-) battery terminal	114 to 126 Ω

Text in Illustration

*a	Front view of wire harness connector (to ECM)
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**REPAIR OR REPLACE CAN MAIN BUS LINE
NG OR CONNECTOR (ECM MAIN LINE)**

OK
▼

2. CHECK ECM POWER SOURCE CIRCUIT

(a) Check the ECM power source circuit INFO.

**REPAIR OR REPLACE HARNESS OR
NG CONNECTOR (POWER SOURCE CIRCUIT)**

OK ► REPLACE ECM



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WI60A6X
Title: NETWORKING: CAN COMMUNICATION SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

1. PRECAUTIONS WHEN TROUBLESHOOTING

NOTICE:

- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output.
 - If the CAN communication system is malfunctioning, check the contact pressure of the terminals in connectors, as insufficient terminal contact pressure may be the cause INFO.
 - Refer to Diagnosis System for the DTCs for the CAN communication system.
 - Refer to troubleshooting of each system if DTCs regarding the CAN communication system are not output.
 - Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
 - After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.
- (a) CAN communication DTCs are output for CAN main bus and CAN branch malfunctions as well as for internal malfunctions or power source malfunctions of ECUs or sensors for systems using CAN communication. Therefore, when DTCs for internal malfunctions or power source malfunctions of corresponding systems are output at the same time as CAN communication DTCs, troubleshoot according to the internal malfunction and power source malfunction DTCs.
- (b) The DLC3 branch and V bus main bus circuits can be checked for malfunctions by inspecting at the DLC3 terminals using an electrical tester.

NOTICE:

- When inspecting at the DLC3 connector, do not connect the tester directly to the terminals. Instead, connect using service wires.
 - Inspections for an open in an ECU or sensor branch, or inspections for buses other than the V bus cannot be performed from the DLC3.
- (c) An open in a branch for ECUs or sensors that are connected to the CAN main bus can be checked by performing a CAN bus check using the Techstream. (This inspection is possible when the DLC3 branch and V bus main bus lines are normal.)
- (d) If the V bus had a communication error, the probable ECU or sensor for which communication stopped can be determined using the combination of communication DTCs (DTCs that start with U) that are output.
- (e) When an open circuit is detected, before disconnecting the related connectors for inspection, push in on the connector body to check that the connector is not loose or disconnected.
- (f) When a connector is disconnected, check that the terminals and the connector body are not cracked, deformed or corroded.

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1. VEHICLE BROUGHT TO WORKSHOP

HINT:

- If the ignition switch can be turned to ON when the vehicle is brought in for repair, check for DTCs and check the illumination condition of the indicators in the combination meter assembly and the basic operation of the vehicle (such as steering operation) promptly.
- Do not turn the ignition switch off until the inspection of the vehicle is finished, as some fail-safe functions are canceled when the ignition switch is turned off.
- If the ignition switch cannot be turned to ON when the vehicle is brought in, measure the voltage of the battery. If the voltage is below 11 V, recharge or replace the battery before performing troubleshooting.

NEXT



2. CUSTOMER PROBLEM ANALYSIS

HINT:

- When troubleshooting, confirm that the problem symptoms have been accurately identified. Preconceptions should be discarded in order to make an accurate judgment. To clearly understand what the problem symptoms are, it is extremely important to ask the customer about the problem and the conditions at the time the malfunction occurred.
- Ask the customer if the vehicle is/was equipped with additional devices such as a theft deterrent device or monitor. (If equipped, explain the customer that the additional devices will be removed before performing troubleshooting as the malfunction cannot be checked properly.)

(a) It is useful to confirm the symptoms and the conditions in which the vehicle was operating at the time when a malfunction occurred. This helps to narrow down the malfunctioning part.

HINT:

- What was affected (system, part or meter warning indicators)
- What happened (details of the malfunction)
- When (occurrence date and time, frequency and if it recurs or not)
- Under what kind of situation did the problem occur (driving and operating condition at the occurrence and weather)
- Road type or condition (city, suburb, paved road, unpaved road, highway, etc.)
- Return conditions (what made the vehicle return to normal. Example: ignition switch was turned off)

Points to be Confirmed

Symptom	<ul style="list-style-type: none">• Electric power steering<ul style="list-style-type: none">- Normal- A little heavier than usual- There was no assist• Multi-information display<ul style="list-style-type: none">- Whether each display has stopped updating• Others
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Meter warning lights	<ul style="list-style-type: none"> • Illumination of warning lights and the order in which they illuminated <ul style="list-style-type: none"> - Slip indicator light - ABS warning light - Check Engine warning light - Brake warning light - SRS warning light - Others • Meter display <ul style="list-style-type: none"> - Shift indicator - Speedometer - Tachometer (if it is fixed at 0 rpm) - Engine coolant temperature gauge (if it is fixed at COLD)
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NEXT



3.	CHECK TECHSTREAM OPERATION
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HINT:

Read the Techstream operators manual before use INFO.

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Check that the Techstream and ECUs can communicate with the ignition switch ON.

HINT:

- If communication is impossible, the Techstream screen will indicate an error.
- If communication between the Techstream and ECUs is impossible, either the Techstream or vehicle has a malfunction.
- When communication between the Techstream and the vehicle is impossible, but communication is possible when the Techstream is connected to another vehicle, the vehicle has the malfunction. Inspect the CANH and CANL branch lines of the DLC3 and the ECU power source circuits (in this case perform steps 7 to 9 first). In addition, check that the BAT terminal of the DLC3 receives battery voltage (11 V or more).
- If communication between the Techstream and ECUs is still impossible even when the Techstream is connected to another vehicle, the Techstream has a malfunction. Perform the self tests described in the Techstream operators manual. (The Techstream may be malfunctioning or its battery may be discharged.)

RESULT	PROCEED TO
OK (Communication between the Techstream and the vehicle is possible.)	A
OK (Communication between the Techstream and the vehicle is impossible but communication	B

is possible when connected to another vehicle.)	
NG (Communication is not possible between the Techstream and the vehicle, nor between the Techstream and another vehicle.)	C

B ▶ Go to step 7

C ▶ Refer to Techstream operator's manual

A



4.	CHECK DTC
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(a) Using the Techstream, perform Health Check to read current and history DTCs and record them.

NOTICE:

- CAN communication DTCs are output when there is an open or short in any of the communication lines. Any problems with the power source of a corresponding ECU or sensor, or problems in the ECU, the sensor itself also cause these DTCs to be output.
- If a CAN communication line connector is disconnected with the ignition switch ON, the ECUs of the corresponding system and related systems store a DTC.

HINT:

- If an open in a CAN main bus line, a short between the CAN bus lines (CANH and CANL) or a +B or ground short in a CAN bus occurs, DTCs of almost all ECUs and sensors on the CAN bus may be output (or a message indicating a communication error may be displayed on the Techstream screen). In this case, check the resistance of the CAN bus (steps 7 to 9) first.
- If an open occurs in just one of the lines of a CAN branch, DTCs which are not related to malfunctioning parts may be output (DTCs may be displayed randomly), or a message indicating a communication error may be displayed on the Techstream.

(b) Read the freeze frame data using the Techstream and record it.

NEXT



5.	CHECK COMMUNICATION MALFUNCTION CHECK (CONNECTION STATUS CHECK USING TECHSTREAM)
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(a) Select "CAN Bus Check" from the screen on the Techstream.

(b) Record all the DTCs stored for ECUs and sensors.

NEXT



6. CHECK CAN BUS CHECK (CONNECTION STATUS CHECK USING TECHSTREAM)

- (a) Based on the vehicle equipment and specifications, confirm the systems that use CAN communication INFO.
- (b) Select "CAN Bus Check" from the screen on the Techstream.
- (c) Observe the screen for approximately 2 minutes to check the ECUs and sensors displayed on the screen.

NEXT



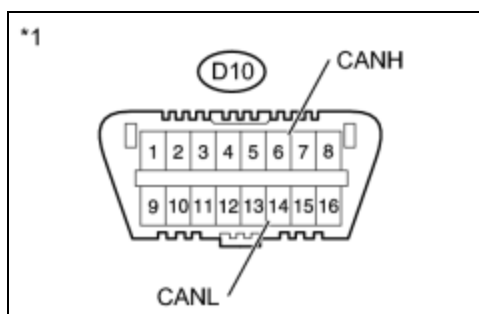
7. CHECK DLC3 BRANCH LINE AND V BUS MAIN LINE (CANH - CANL)

NOTICE:

Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.

HINT:

Operating the ignition switch, any other switches or a door triggers the related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.



- (a) Disconnect the cable from the negative (-) battery terminal.

- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D10-6 (CANH) - D10-14 (CANL)	Cable disconnected from negative (-) battery terminal	57 to 63 Ω

Text in Illustration

*1	DLC3
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Result:

RESULT	PROCEED TO
OK	A
NG (64 Ω or higher)	B
NG (Below 57 Ω)	C

B ► GO TO OPEN IN CAN MAIN BUS LINE

C ► GO TO SHORT IN CAN BUS LINES

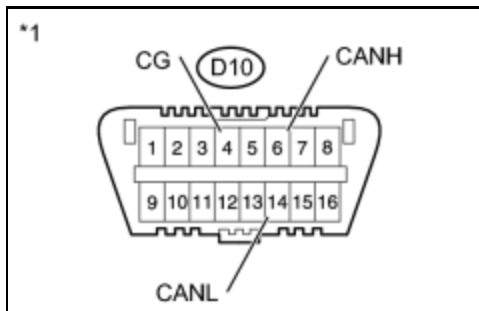
A



8.	CHECK FOR SHORT TO GND IN V BUS (CANH, CANL - CG)
----	--

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D10-6 (CANH) - D10-4 (CG)	Cable disconnected from negative (-) battery terminal	200 Ω or higher
D10-14 (CANL) - D10-4 (CG)	Cable disconnected from negative (-) battery terminal	200 Ω or higher

Text in Illustration

*1	DLC3
----	------

NG ► GO TO SHORT TO GND IN CAN BUS LINE

OK

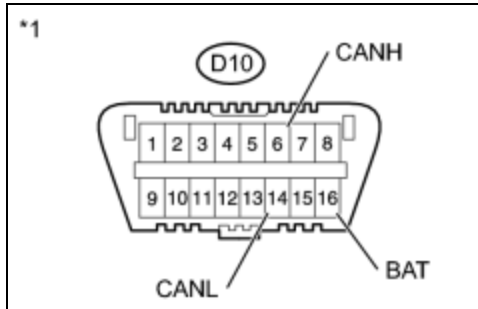


--	--

9. CHECK FOR SHORT TO +B IN V BUS (CANH, CANL - BAT)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D10-6 (CANH) - D10-16 (BAT)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher
D10-14 (CANL) - D10-16 (BAT)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher

Text in Illustration

*1	DLC3
----	------

NG ► GO TO SHORT TO +B IN CAN BUS LINE

OK



10. CHECK RESULT OF CAN BUS CHECK (CONNECTION STATUS CHECK USING TECHSTREAM)

(a) Inspect or repair the probable malfunctioning part based on the check result of step 6 (the step in which CAN Bus Check was performed).

Result of CAN Bus Check (Connection Status Check Using Techstream):


RESULT	PROCEED TO
All ECUs and sensors connected to the CAN communication system are displayed on the screen. (CAN bus circuit is currently normal.)	A
One of the ECUs and sensors connected to the V Bus is not displayed on the screen. (Open in ECU or sensor branch lines, or communication interrupted.)	B
In addition to the ECUs and sensors which are connected to the CAN communication system but are not displayed on the screen, there are ECUs or sensors for which the detection status changes (changes between detected and not detected) during the inspection. (Open in one side of ECU or sensor branch lines.)	C

NOTICE:

Non-installed ECUs or sensors will not be displayed. Do not mistake them for being in communication stop mode.

- It may be possible to select buses that do not have ECUs or sensors from the bus selection pull-down menu on the Techstream. This is not a malfunction.

HINT:

- Regarding CAN Bus Check, refer to How to Interpret CAN Bus Diagnosis (CAN Bus Check) Screen  .
- If the detection status of ECUs changes during the inspection, one of the branch lines of a connected ECU or sensor may be open. (Signals from the ECU or sensor that has an open in one of its branch lines create electrical noise, affecting response to the Techstream and the ECUs and whether or not sensors displayed.)

B  **GO TO COMMUNICATION STOP MODE TABLE**

C  **GO TO OPEN IN ONE SIDE OF CAN BRANCH LINE**


A



11.	CHECK RESULT OF COMMUNICATION MALFUNCTION CHECK (SELECT THE MALFUNCTIONING BUS)
------------	--

- (a) Inspect or repair the probable malfunctioning part based on the check result of step 5 (the step in which checking for communication malfunction DTCs was performed).


HINT:

- When checking for communication DTCs, refer to How to Interpret Communication DTCs (DTCs that start with U)  .
- If communication DTCs are stored, and all ECUs and sensors connected to the CAN communication system are displayed on the Communication Bus Check (CAN bus check) screen of the Techstream, a past malfunction that is currently not occurring is suspected.
- When a CAN branch of the V bus is malfunctioning, because the ECUs and sensors related to it detect the malfunction, the problem area can be determined using the combination of DTCs that are output.

NEXT



12.	DTC COMBINATION TABLE
------------	------------------------------

- (a) Confirm the problem according to the combination of output DTCs regarding the CAN communication system  .

RESULT	PROCEED TO
Combination of DTCs is not in DTC Combination Table	A
Combination of DTCs is in DTC Combination Table	B

HINT:


CAN communication system history DTCs may indicate the problem if CAN communication system DTCs are output and all ECUs and sensors connected to the CAN communication system are displayed on "CAN Bus Check" of the Techstream.

B  **GO TO COMMUNICATION STOP MODE TABLE**

A



13.	IDENTIFICATION OF PROBLEM (PAST MALFUNCTION IN MAIN BUS OF V BUS)
------------	--

- (a) Connect the cable to the negative (-) battery terminal.
- (b) Clear the DTCs using the Techstream.
- (c) Perform the tests in Symptom Simulation to check the wire harnesses and connectors including those for V bus main bus lines  .
- (d) Based on the results of the check, inspect the parts that output DTCs to determine the malfunctioning part.

HINT:

If DTCs are output, do not turn the ignition switch off.

NEXT



14.	REPAIR OR REPLACEMENT
------------	------------------------------

NEXT



15.	CONFIRMATION TEST*
------------	---------------------------

NEXT  END



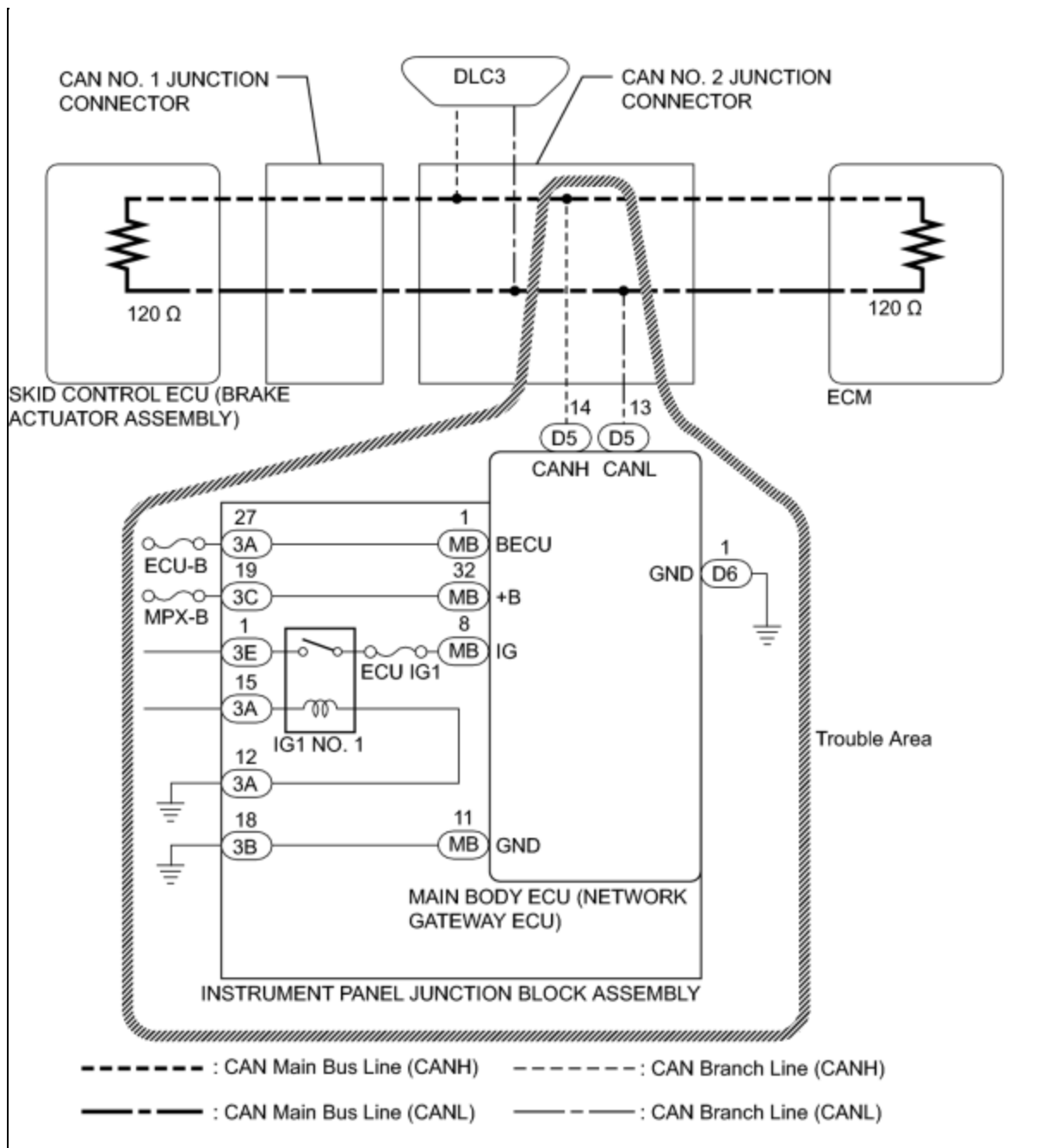
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001F1V05UX
Title: NETWORKING: CAN COMMUNICATION SYSTEM: Main Body ECU Communication Stop Mode (2013 FR-S)		

[Main Body ECU Communication Stop Mode](#)

DESCRIPTION

DETECTION ITEM	SYMPTOM	TROUBLE AREA
Main Body ECU Communication Stop Mode	<p>Either condition is met:</p> <ul style="list-style-type: none"> • "Main Body" is not displayed on the "CAN Bus Check" screen of the Techstream INFO • Communication system DTCs (DTCs that start with U) that are output correspond to "Main Body ECU Communication Stop Mode" in "DTC Combination Table" INFO 	<ul style="list-style-type: none"> • Main body ECU (network gateway ECU) branch line or connector • Power source circuit of main body ECU (network gateway ECU) • Main body ECU (network gateway ECU) ground circuit • Main body ECU (network gateway ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output **INFO**.
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.

- DTC check procedure: Turn the ignition switch to ON and wait at least 15 seconds.
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed **INFO** .

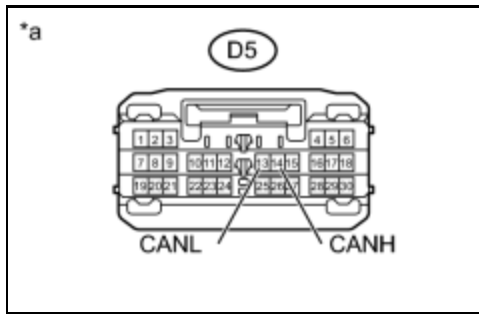
HINT:

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or wire harness while performing the inspection below may help determine the cause of the malfunction.

PROCEDURE

1.	CHECK FOR OPEN IN CAN BUS LINES (MAIN BODY ECU (NETWORK GATEWAY ECU) BRANCH LINE)
-----------	--

(a) Disconnect the cable from the negative (-) battery terminal.



(b) Disconnect the D5 main body ECU (network gateway ECU) connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D5-14 (CANH) - D5-13 (CANL)	Cable disconnected from negative (-) battery terminal	57 to 63 Ω

Text in Illustration

*a	Front view of wire harness connector (to Main Body ECU (Network Gateway ECU))
----	---

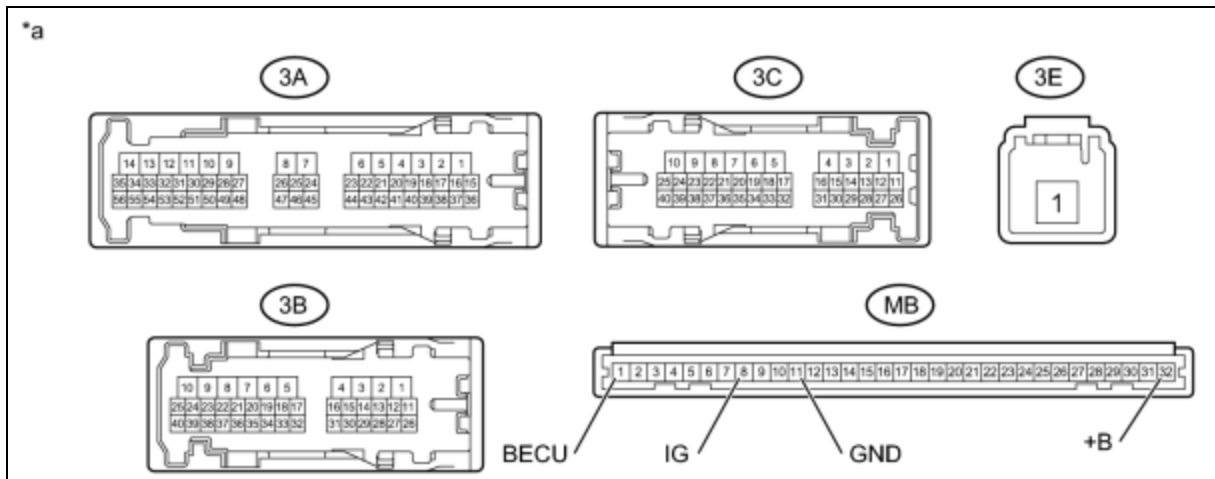
NG **REPAIR OR REPLACE CAN BRANCH LINE OR CONNECTOR (MAIN BODY ECU (NETWORK GATEWAY ECU))**

OK



2. CHECK INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

- (a) Remove the main body ECU (network gateway ECU) **INFO** .
- (b) Remove the instrument panel junction block assembly **INFO** .



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	---	---	---

- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3E-1 - MB-8 (IG)	Battery voltage is applied to terminals 3A-15 and 3A-12	Below 1 Ω
MB-1 (BECU) - 3A-27	Always	Below 1 Ω
MB-11 (GND) - 3B-18	Always	Below 1 Ω
MB-32 (+B) - 3C-19	Always	Below 1 Ω

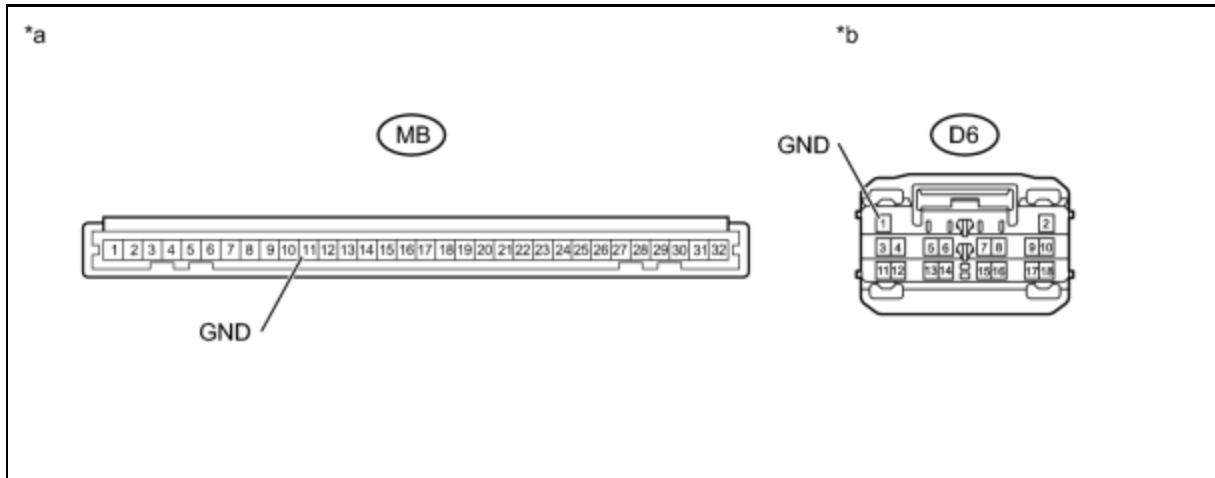
NG **REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY**

OK



3. CHECK HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT)

(a) Install the instrument panel junction block assembly.



Text in Illustration

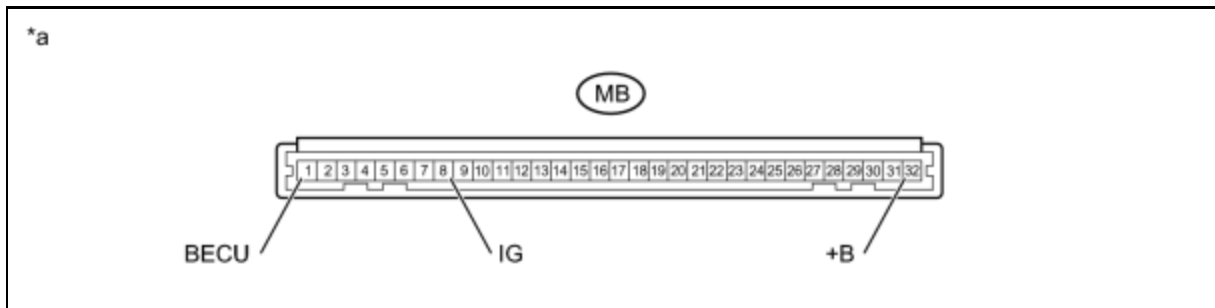
*a	Component without harness connected (Instrument Panel Junction Block Assembly)	*b	Front view of wire harness connector (to Instrument Panel Junction Block Assembly)
----	---	----	---

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D6-1 (GND) - Body ground	Cable disconnected from negative (-) battery terminal	Below 1 Ω
MB-11 (GND) - Body ground	Cable disconnected from negative (-) battery terminal	Below 1 Ω

(c) Connect the cable to the negative (-) battery terminal.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	---	---	---

(d) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
MB-1 (BECU) - Body ground	Ignition switch off	11 to 14 V
MB-8 (IG) - Body ground	Ignition switch ON	11 to 14 V
MB-32 (+B) - Body ground	Ignition switch off	11 to 14 V

NG ▶ REPAIR OR REPLACE HARNESS OR
CONNECTOR (POWER SOURCE CIRCUIT)

OK ▶ REPLACE MAIN BODY ECU (NETWORK
GATEWAY ECU)



Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001V9P06AX
Title: NETWORKING: CAN COMMUNICATION SYSTEM: Open in CAN Main Bus Line (2013 FR-S)		

[Open in CAN Main Bus Line](#)

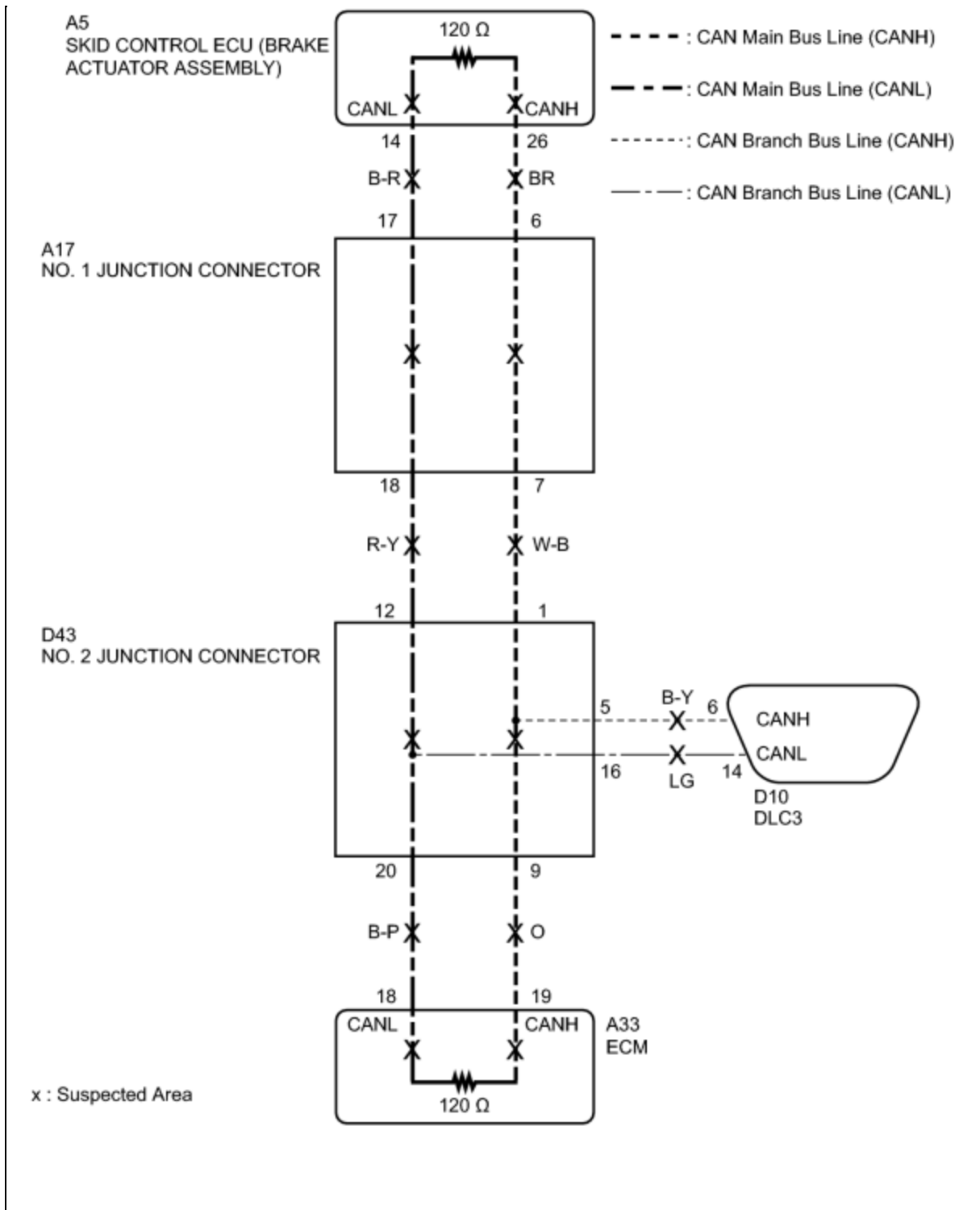
DESCRIPTION

There may be an open circuit one of the V bus main lines and/or a DLC3 branch line when the resistance between terminals 6 (CANH) and 14 (CANL) of the DLC3 is 64 Ω or higher.

SYMPTOM	TROUBLE AREA
Resistance between terminals 6 (CANH) and 14 (CANL) of DLC3 is 64 Ω or higher.	<ul style="list-style-type: none"> • DLC3 branch line or connector • CAN main bus line or connector • ECM • Skid control ECU (brake actuator assembly) • CAN No. 1 junction connector • CAN No. 2 junction connector

This malfunction is not related to the lines of a CAN main bus branch or to ECUs or sensor connected a CAN main bus branch.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output **INFO** .

- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.
- DTC check procedure: Turn the ignition switch to ON, wait at least 60 seconds,
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed **INFO** .

HINT:

- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or wire harness while performing the inspection below may help determine the cause of the malfunction.

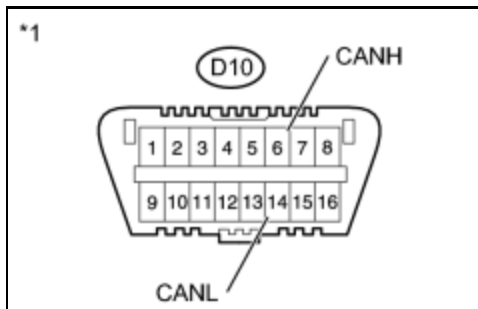
PROCEDURE

1. CHECK FOR OPEN IN CAN BUS LINES (DLC3 BRANCH LINE)

(a) Disconnect the cable from the negative (-) battery terminal.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D10-6 (CANH) - D10-14 (CANL)	Cable disconnected from negative (-) battery terminal	114 to 126 Ω

Text in Illustration

*1	DLC3
----	------

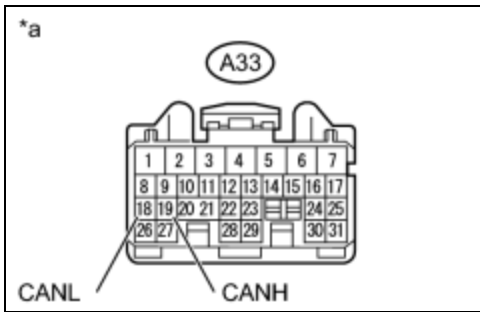
NOTICE:

When the measured value is 127 Ω or higher and a CAN communication system DTC is output, there may be a fault besides disconnection of the DLC3 branch line. For that reason, troubleshooting should be performed again from How to Proceed with Troubleshooting after repairing the trouble area **INFO .**

REPAIR OR REPLACE CAN BRANCH LINE
NG ► **CONNECTED TO DLC3**

OK
 ▼

2. CHECK FOR OPEN IN CAN BUS LINES (ECM)



(a) Disconnect the A33 ECM connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A33-19 (CANH) - A33-18 (CANL)	Cable disconnected from negative (-) battery terminal	114 to 126 Ω

Text in Illustration

*a	Front view of wire harness connector (to ECM)
----	---

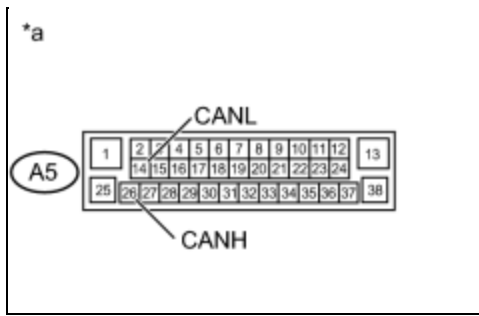
NG ► CHECK FOR OPEN IN CAN BUS LINES (SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY))

OK ► REPLACE ECM

3. CHECK FOR OPEN IN CAN BUS LINES (SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY))

(a) Reconnect the A33 ECM connector.

(b) Disconnect the A5 skid control ECU (brake actuator assembly) connector.



(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-26 (CANH) - A5-14 (CANL)	Cable disconnected from negative (-) battery terminal	114 to 126 Ω

Text in Illustration

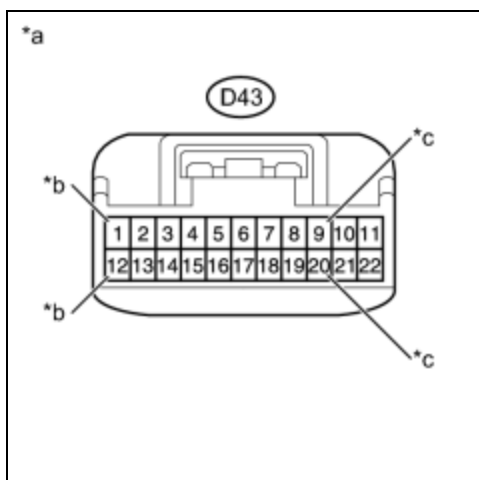
*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
----	--

NG ► CHECK FOR OPEN IN CAN BUS LINES (CAN NO. 2 J/C)

OK ► REPLACE SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY)

4. CHECK FOR OPEN IN CAN BUS LINES (CAN NO. 2 J/C)

(a) Reconnect the A5 skid control ECU (brake actuator assembly) connector.



(b) Disconnect the wire harness connector from the D43 CAN No. 2 junction connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	CONNECTED TO
D43-1 - D43-12	Cable disconnected from negative (-) battery terminal	114 to 126 Ω	CAN No. 1 junction connector
D43-9 - D43-20	Cable disconnected from negative (-) battery terminal	114 to 126 Ω	ECM

Text in Illustration

*a	Front view of wire harness connector (to CAN No. 2 Junction Connector)
*b	to CAN No. 1 Junction Connector
*c	to ECM

Result:

RESULT	PROCEED TO
OK	A
NG (CAN No. 1 junction connector main line)	B
NG (ECM main line)	C

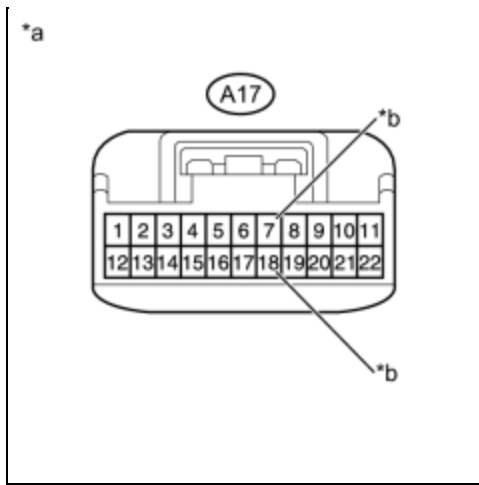
B ► CHECK FOR OPEN IN CAN BUS LINES (CAN NO. 2 J/C - CAN NO. 1 J/C)

C ► REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 1 J/C - ECM)

A ► REPLACE CAN NO. 2 JUNCTION CONNECTOR

5.	CHECK FOR OPEN IN CAN BUS LINES (CAN NO. 2 J/C - CAN NO. 1 J/C)
-----------	--

(a) Reconnect the wire harness connector to the D43 CAN No. 2 junction connector.



(b) Disconnect the wire harness connector from the A17 CAN No. 1 junction connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A17-7 - A17-18	Cable disconnected from negative (-) battery terminal	114 to 126 Ω

Text in Illustration

*a	Front view of wire harness connector (to CAN No. 1 Junction Connector)
*b	to CAN No. 2 Junction Connector

NG ► **REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 1 J/C - CAN NO. 2 J/C)**

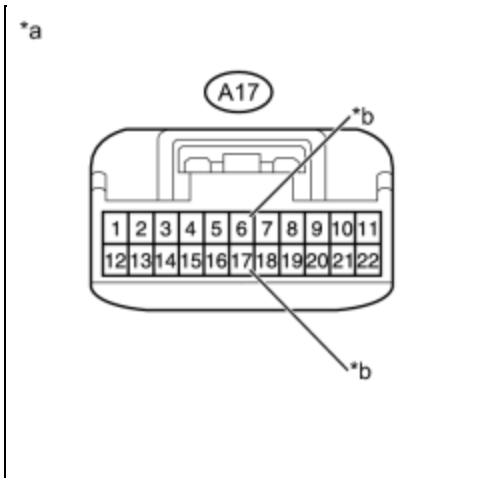
OK
▼

6.	CHECK FOR OPEN IN CAN BUS LINES (CAN NO. 1 J/C - SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY))
-----------	---

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION



A17-6 - A17-17	Cable disconnected from negative (-) battery terminal	114 to 126 Ω

Text in Illustration

*a	Front view of wire harness connector (to CAN No. 1 Junction Connector)
*b	to Skid Control ECU (Brake Actuator Assembly)

REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN NO. 1 J/C - SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY))

OK ▶ **REPLACE CAN NO. 1 JUNCTION CONNECTOR**

Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001ZUR06GX
Title: NETWORKING: CAN COMMUNICATION SYSTEM: Open in One Side of CAN Branch Line (2013 FR-S)		

[Open in One Side of CAN Branch Line](#)

DESCRIPTION

If an ECU or sensor is not displayed on the CAN Bus Check screen of the Techstream and some ECUs and sensors repeatedly appear and disappear from the screen when the CAN main bus lines are normal (there is no open, short, short to +B or short to GND in the main bus lines), there may be an open circuit in either of one pair of CAN branch lines.

HINT:

If some ECUs and sensors repeatedly appear and disappear from the CAN Bus Check screen, communication between the normal ECUs (sensors) and the Techstream may be affected by the incomplete signals that are output from the ECU that has an open circuit in either of its CAN branch lines. In this case, the CAN branch lines for the ECUs and sensors that repeatedly appear and disappear from the screen are normal and the ECU that is not displayed on the screen may be the main cause of the problem (this ECU may have an open circuit in either of its CAN branch lines).


SYMPTOM	TROUBLE AREA
<p>2 or more ECUs and/or sensors do not appear on the Techstream "CAN Bus Check" screen.</p>	<p>One side of CAN branch line is open, or output signals are incomplete.</p> <ul style="list-style-type: none"> • Short in CAN main bus line • Short in CAN branch line • Main body ECU (network gateway ECU) • Combination meter assembly • ECM • TCM* • Skid control ECU (brake actuator assembly) • Steering angle sensor (spiral cable sub-assembly) • Power steering ECU assembly • Air bag ECU assembly

*: for Automatic Transmission System

INSPECTION PROCEDURE

NOTICE:

- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using [How to Proceed with Troubleshooting when CAN communication system related DTCs are output](#) INFO.
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.



- DTC check procedure: Turn the ignition switch to ON, wait at least 60 seconds,
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed  .

HINT:

Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or wire harness while performing the inspection below may help determine the cause of the malfunction.

PROCEDURE

1.	CHECK FOR OPEN IN ONE SIDE OF V BUS BRANCH LINE
-----------	--

- (a) Based on the vehicle equipment and specifications, confirm the systems that use CAN communication  .
- (b) Using the Techstream, select and perform the CAN bus check  .
- (c) Observe the screen for approximately 2 minutes to check the ECUs and sensors that are not displayed on the screen and also those that repeatedly appear and disappear from the screen.
- (d) Check the applicable communication stop mode for the ECU or sensor that is not displayed on the screen.

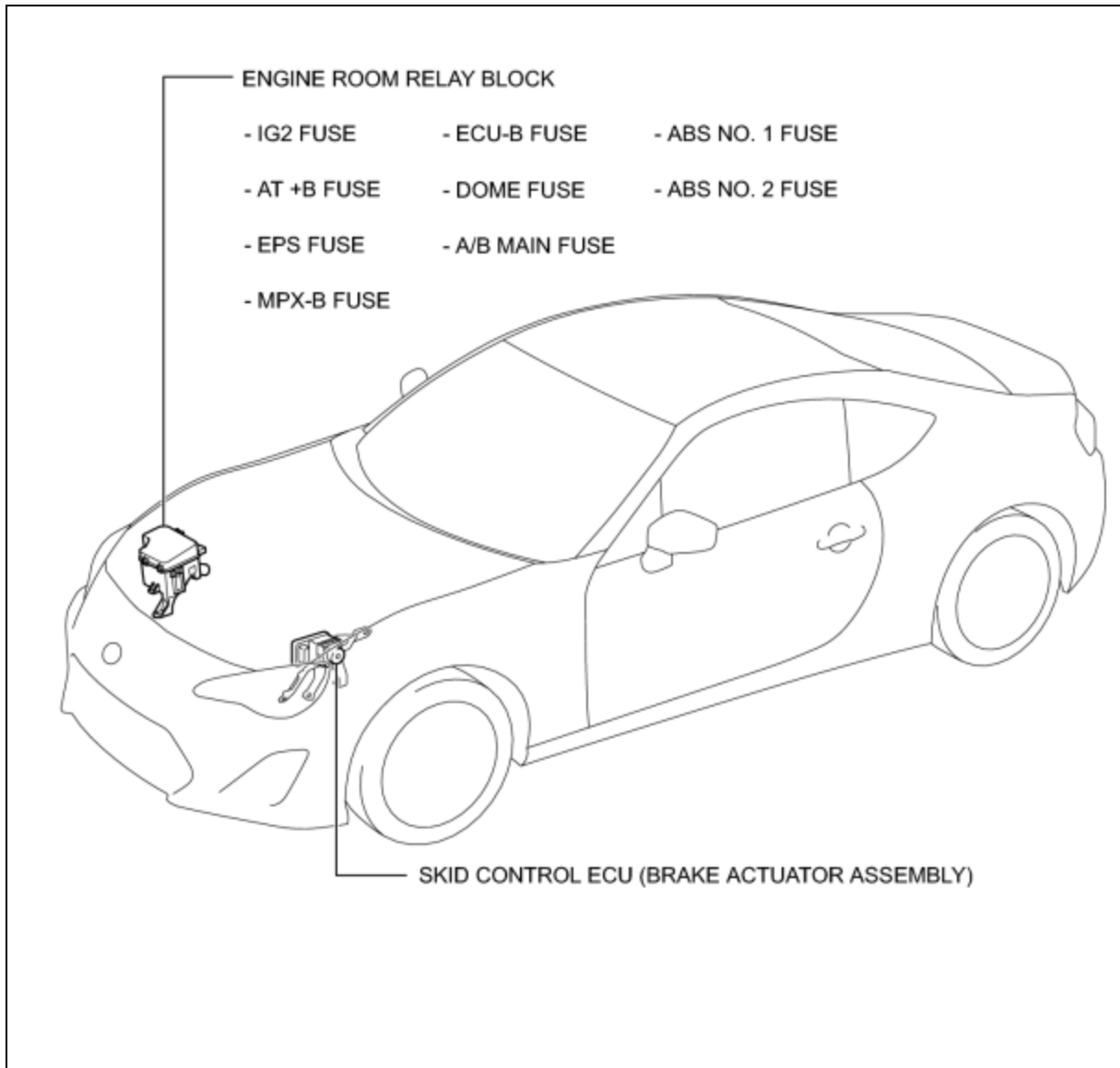
NEXT  **GO TO CORRESPONDING
COMMUNICATION STOP MODE**



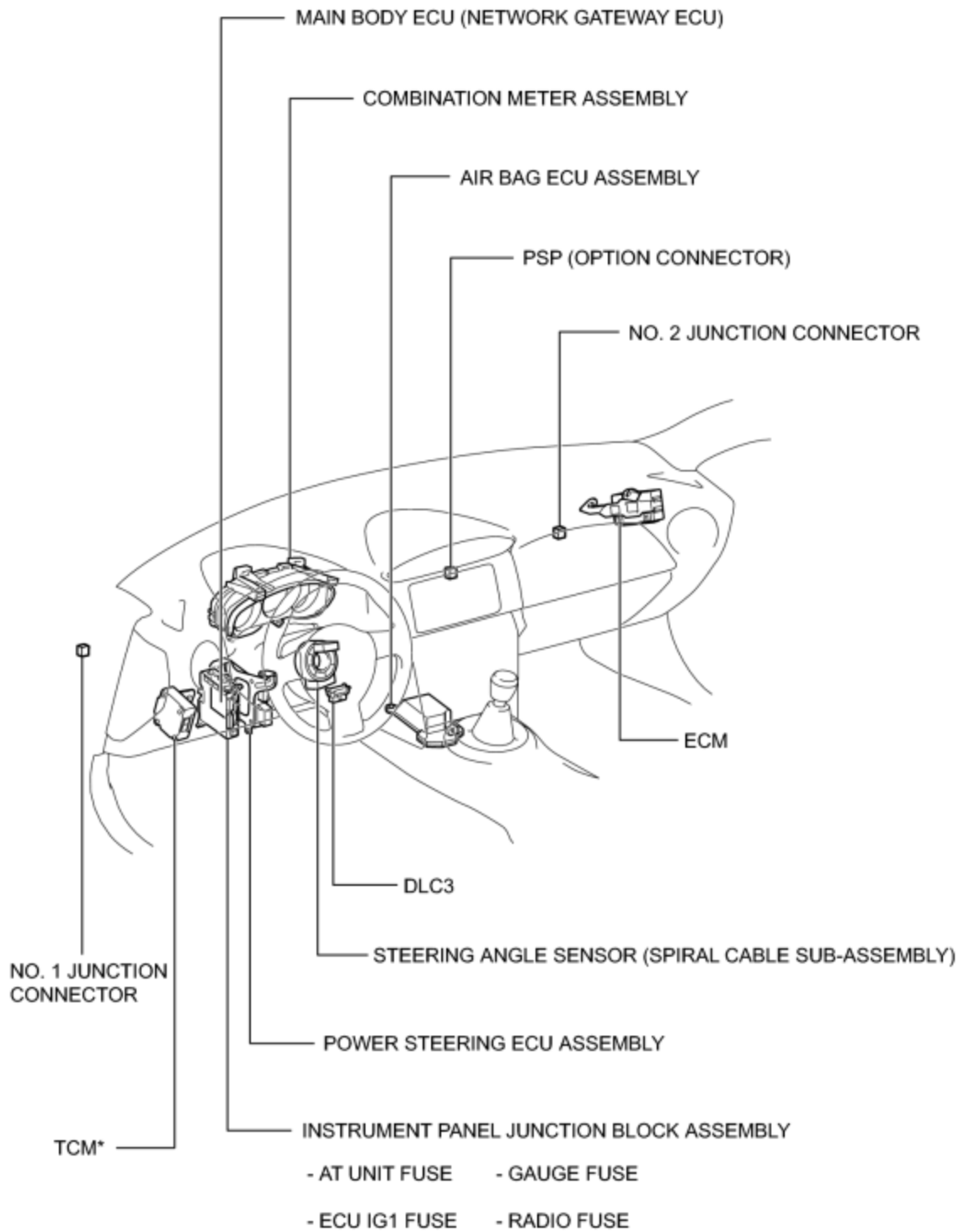
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000440W00BX
Title: NETWORKING: CAN COMMUNICATION SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



ILLUSTRATION



* : for Automatic Transmission System



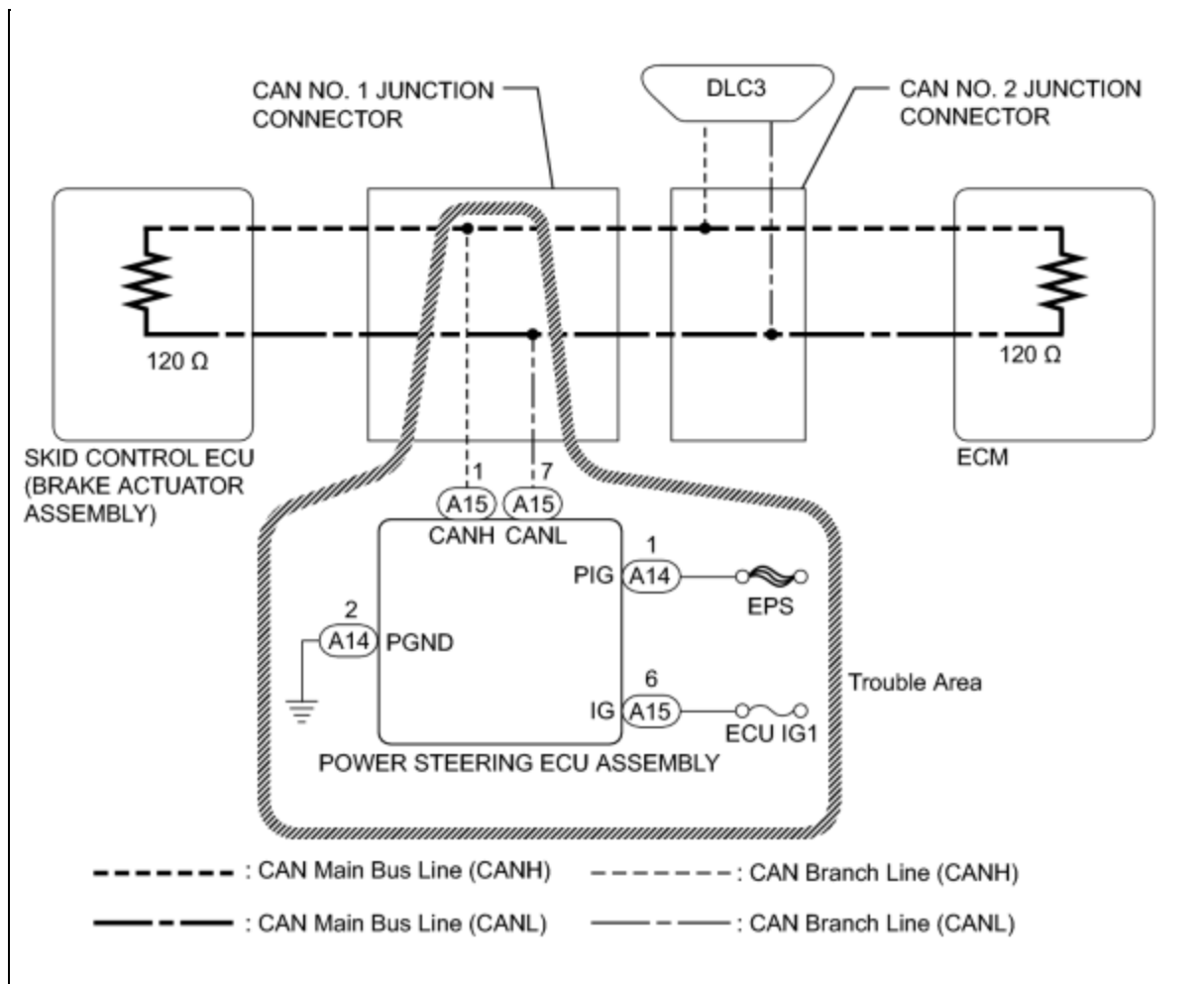
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001RT004DX
Title: NETWORKING: CAN COMMUNICATION SYSTEM: Power Steering ECU Communication Stop Mode (2013 FR-S)		

[Power Steering ECU Communication Stop Mode](#)

DESCRIPTION

DETECTION ITEM	SYMPTOM	TROUBLE AREA
<p>Power Steering ECU Communication Stop Mode</p>	<p>Either condition is met:</p> <ul style="list-style-type: none"> • "Power Steering (EPS)" is not displayed on the "CAN Bus Check" screen of the Techstream INFO • Communication system DTCs (DTCs that start with U) that are output correspond to "Power Steering ECU Communication Stop Mode" in "DTC Combination Table" INFO 	<ul style="list-style-type: none"> • Power steering ECU assembly branch line or connector • Power source circuit of power steering ECU assembly • Power steering ECU assembly ground circuit • Power steering ECU assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output **INFO**.
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.
- DTC check procedure: Turn the ignition switch to ON and wait at least 10 seconds.
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed **INFO**.

HINT:

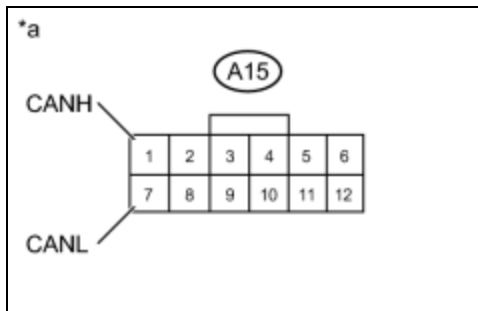
- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or

wire harness while performing the inspection below may help determine the cause of the malfunction.

PROCEDURE

1.	CHECK FOR OPEN IN CAN BUS LINES (POWER STEERING ECU ASSEMBLY BRANCH LINE)
-----------	--

(a) Disconnect the cable from the negative (-) battery terminal.



(b) Disconnect the A14 and A15 power steering ECU assembly connectors.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A15-1 (CANH) - A15-7 (CANL)	Cable disconnected from negative (-) battery terminal	57 to 63 Ω

Text in Illustration

*a	Front view of wire harness connector (to Power Steering ECU Assembly)
----	---

NG **REPAIR OR REPLACE CAN BRANCH LINE OR CONNECTOR (POWER STEERING ECU ASSEMBLY)**

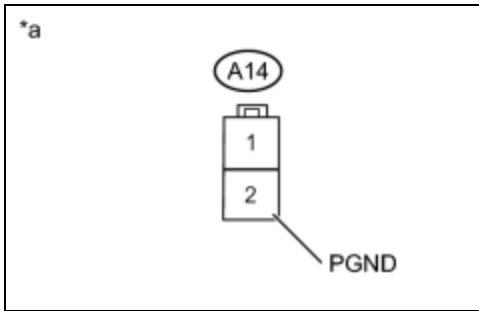
OK



2.	CHECK HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT)
-----------	---

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

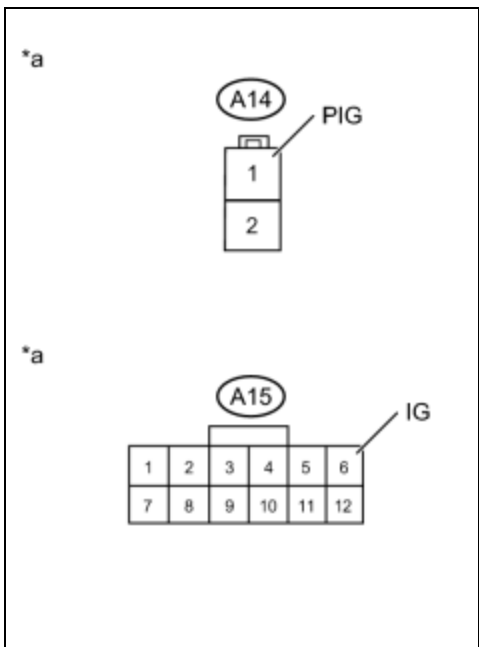


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A14-2 (PGND) - Body ground	Cable disconnected from negative (-) battery terminal	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Power Steering ECU Assembly)
----	---

(b) Connect the cable to the negative (-) battery terminal.



(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A14-1 (PIG) - Body ground	Ignition switch off	11 to 14 V
A15-6 (IG) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Power Steering ECU Assembly)
----	---

**REPAIR OR REPLACE HARNESS OR
NG**

OK **REPLACE POWER STEERING ECU ASSEMBLY**

Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WI50CRX
Title: NETWORKING: CAN COMMUNICATION SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

1. CAN COMMUNICATION SYSTEM TROUBLESHOOTING

- (a) Because the order of diagnosis is important to allow a correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output **INFO** .

2. PRECAUTIONS FOR STEERING SYSTEM HANDLING

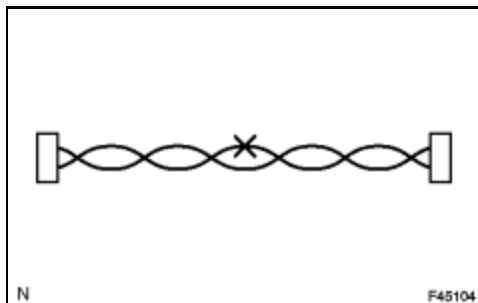
- (a) Be careful when replacing parts. Incorrect replacement could affect the performance of the steering system and result in hazardous driving.

3. PRECAUTIONS FOR SRS AIRBAG SYSTEM HANDLING

- (a) This vehicle is equipped with a Supplemental Restraint System (SRS) which includes parts such as airbags for the driver and the front passenger. Failure to carry out service operations in the correct sequence could cause unexpected SRS deployment during servicing and may cause a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read Precaution for SRS **INFO** .

4. BUS LINE REPAIR

- (a) After repairing a bus line with solder, wrap the repaired part with electrical tape.



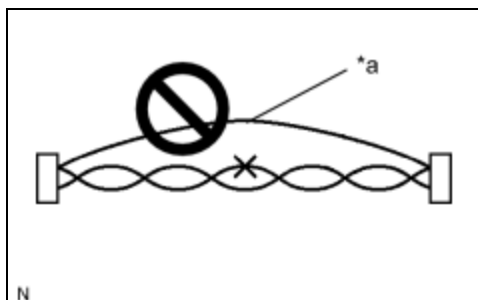
NOTICE:

- The CANL bus line and CANH bus line must be installed together at all times.
- When installing, make sure that these lines are twisted, because CAN bus lines are likely to be influenced by electrical noise if the bus lines are not twisted.
- Leave approximately 80 mm (3.150 in.) loose in the twisted wires around the connector.
- When repairing the CAN bus lines, do not change the length of the lines. (Make sure that the length of the CANH bus line and CANL bus line are the same.)

- (b) Do not use bypass wiring between connectors.

Text in Illustration

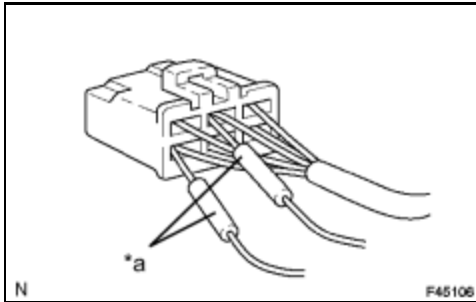
*a	Bypass Wire
----	-------------



NOTICE:

- The ability of the twisted bus lines to resist interference will be lost if bypass wiring is used.
- Do not use a twisted pair of wires for bypass wiring.

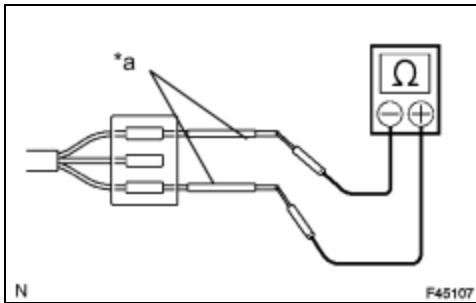
5. CONNECTOR HANDLING



- (a) When checking resistance with a tester, insert the tester probes from the backside (harness side) of the connector.

Text in Illustration

*a	Tester Probe
----	--------------



- (b) Use service wires to check the connector if it is impossible to check continuity from the rear of the connector.

Text in Illustration

*a	Service Wire
----	--------------

6. PRECAUTIONS FOR INSPECTING OR REPLACING CAN JUNCTION CONNECTOR

- (a) If the CAN junction connector is removed from the vehicle for inspection or replacement, make sure to install the CAN junction connector and all wire harnesses to their original locations with tape and the clamps.

Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WI80AVX
Title: NETWORKING: CAN COMMUNICATION SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.
- Because the order of diagnosis is important to allow a correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output [INFO](#) .

Result List of How to Proceed with Troubleshooting

SYMPTOM	SUSPECTED AREA	SEE PAGE
The result of "How to Proceed with Troubleshooting" is "Open in CAN Main Bus Line".	Open in CAN Main Bus Line (Includes DLC3 branch lines and terminating resistors)	INFO
The result of "How to Proceed with Troubleshooting" is "Short in CAN Bus Lines".	Short in CAN Bus Lines	INFO
The result of "How to Proceed with Troubleshooting" is "Short to +B in CAN Bus Line".	Short to +B in CAN Bus Line	INFO
The result of "How to Proceed with Troubleshooting" is "Short to GND in CAN Bus Line".	Short to GND in CAN Bus Line	INFO
The result of "How to Proceed with Troubleshooting" is "Open in One Side of CAN Branch Line".	Open in One Side of CAN Branch Line	INFO

HINT:

Refer to How to Proceed with Troubleshooting for the V Bus Check procedure.

Communication Stop Mode Table

The suspected communication stop area can be determined based on the ECU or sensor that was not displayed in CAN Bus Check and by referring to the table below.

SYMPTOM	SUSPECTED AREA	SEE PAGE
"Skid Control (ABS/VSC/TRAC)" is not displayed on the Techstream.	Skid Control ECU Communication Stop Mode	INFO
"Power Steering (EPS)" is not displayed on the Techstream.	Power Steering ECU Communication Stop Mode	INFO
"Spiral cable (Steering Angle Sensor)" is not displayed on the Techstream.	Steering Angle Sensor Communication Stop Mode	INFO

"ECM (Engine)" is not displayed on the Techstream.	ECM Communication Stop Mode	INFO
"TCM" is not displayed on the Techstream.	Transmission Control ECU Communication Stop Mode	INFO
"Main Body" is not displayed on the Techstream.	Main Body ECU Communication Stop Mode	INFO
"Combination Meter" is not displayed on the Techstream.	Combination Meter ECU Communication Stop Mode	INFO
"Airbag" is not displayed on the Techstream.	Center Airbag Sensor Communication Stop Mode	INFO

DTC Combination Table

SYMPTOM	SUSPECTED AREA	SEE PAGE
Although CAN communication (V bus) is currently normal, ECUs connected to the V bus store CAN communication DTCs.	The probable part for which communication is interrupted can be determined using DTC Combination Table and comparing the DTCs output from ECUs connected to the CAN communication system	INFO

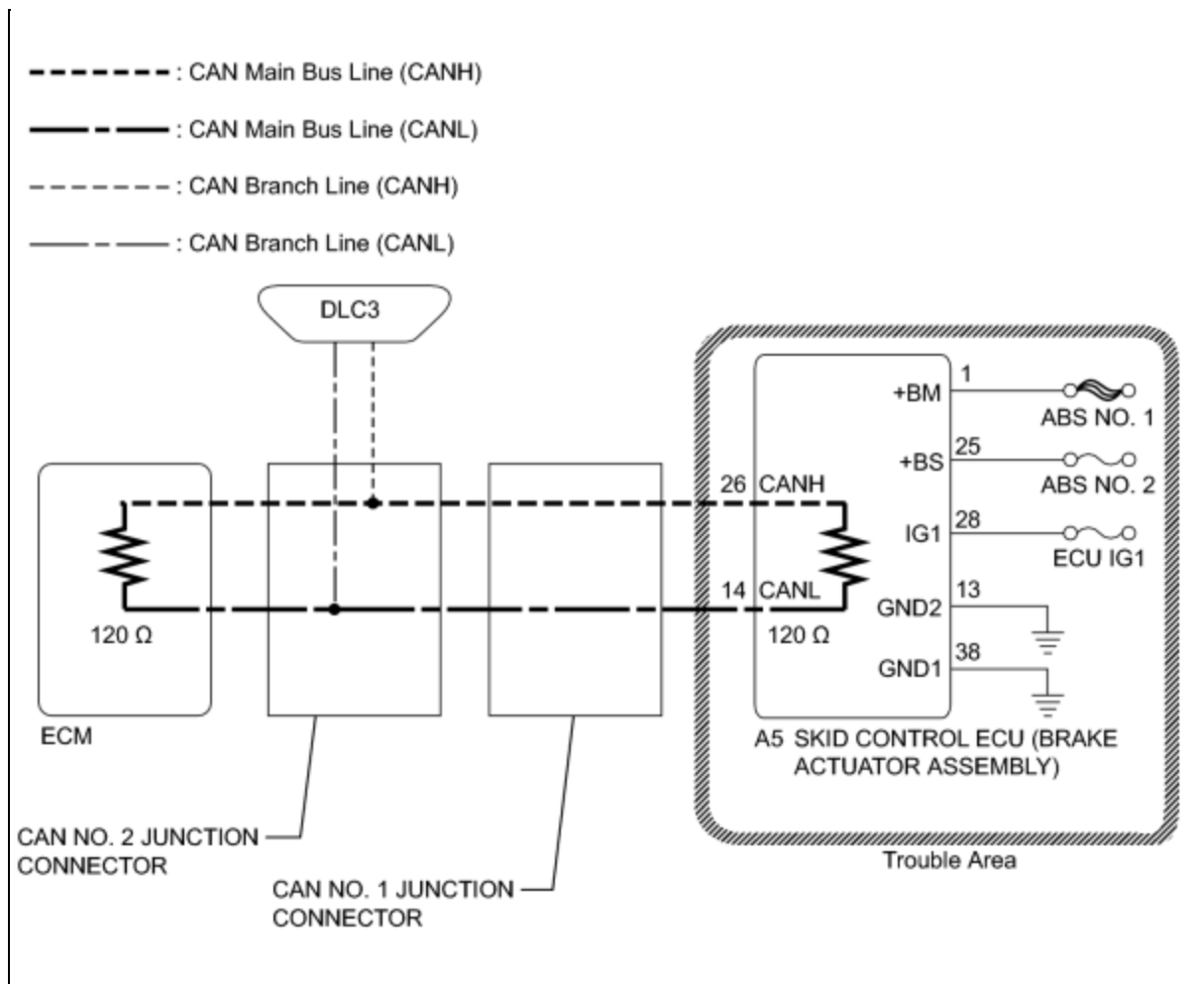
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001V2C056X
Title: NETWORKING: CAN COMMUNICATION SYSTEM: Skid Control ECU Communication Stop Mode (2013 FR-S)		

[Skid Control ECU Communication Stop Mode](#)

DESCRIPTION

DETECTION ITEM	SYMPTOM	TROUBLE AREA
<p>Skid Control ECU Communication Stop Mode</p>	<p>Either condition is met:</p> <ul style="list-style-type: none"> • "Skid Control (ABS/VSC/TRAC)" is not displayed on the "CAN Bus Check" screen of the Techstream INFO • Communication system DTCs (DTCs that start with U) that are output correspond to "Skid Control ECU Communication Stop Mode" in "DTC Combination Table" INFO 	<ul style="list-style-type: none"> • Skid control ECU (brake actuator assembly) main line or connector • Power source circuit of skid control ECU (brake actuator assembly) • Skid control ECU (brake actuator assembly) ground circuit • Skid control ECU (brake actuator assembly)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output **INFO**.
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.
- DTC check procedure: Turn the ignition switch to ON, wait at least 60 seconds,.
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed **INFO**.

HINT:

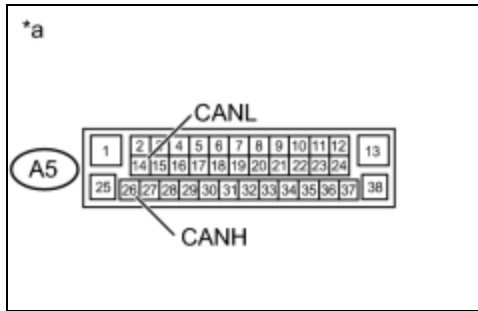
- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or

wire harness while performing the inspection below may help determine the cause of the malfunction.

PROCEDURE

1.	CHECK FOR OPEN IN CAN BUS LINES (SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY) MAIN LINE)
-----------	---

(a) Disconnect the cable from the negative (-) battery terminal.



(b) Disconnect the A5 skid control ECU (brake actuator assembly) connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-26 (CANH) - A5-14 (CANL)	Cable disconnected from negative (-) battery terminal	114 to 126 Ω

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
----	--

NG ▶ **REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY) MAIN LINE)**

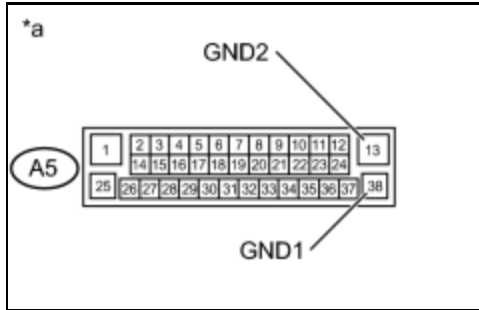
OK



2.	CHECK FOR OPEN IN CAN BUS LINES (POWER SOURCE CIRCUIT)
-----------	---

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-13 (GND2) - Body ground	Cable disconnected from negative (-) battery terminal	Below 1 Ω
A5-38 (GND1) - Body ground	Cable disconnected from negative (-) battery terminal	Below 1 Ω

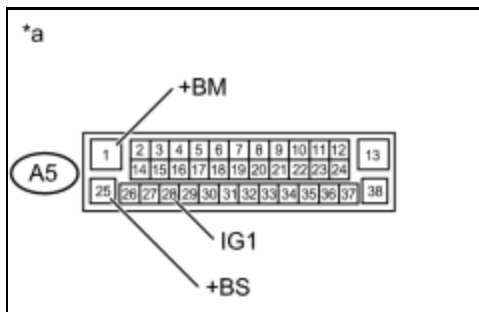
Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
----	--

(b) Connect the cable to the negative (-) battery terminal.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A5-1 (+BM) - Body ground	Ignition switch off	11 to 14 V
A5-25 (+BS) - Body ground	Ignition switch off	11 to 14 V
A5-28 (IG1) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
----	--

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)

OK ► REPLACE SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY)

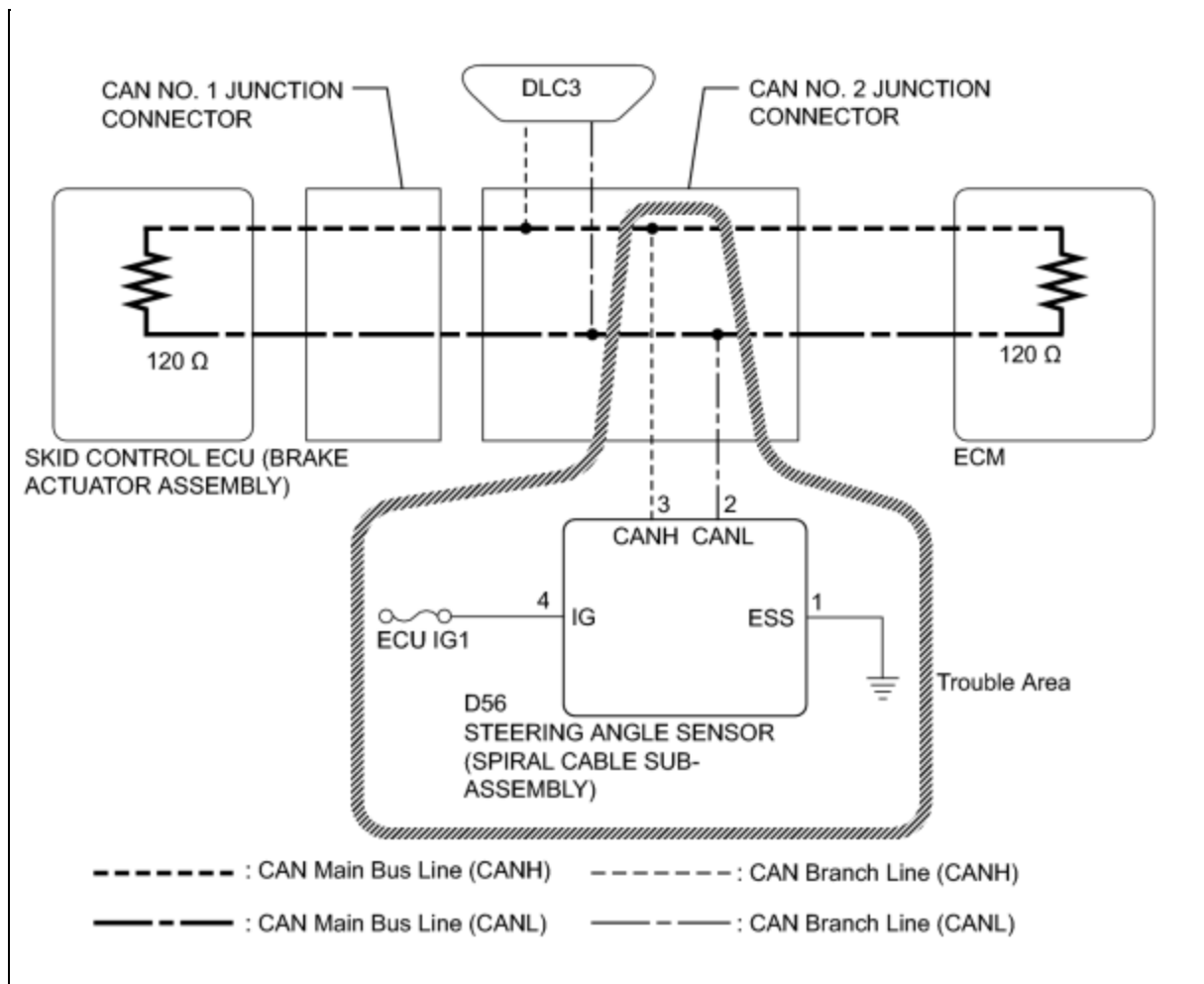
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WIH07PX
Title: NETWORKING: CAN COMMUNICATION SYSTEM: Steering Angle Sensor Communication Stop Mode (2013 FR-S)		

Steering Angle Sensor Communication Stop Mode

DESCRIPTION

DETECTION ITEM	SYMPTOM	TROUBLE AREA
Steering Angle Sensor Communication Stop Mode	<p>Either condition is met:</p> <ul style="list-style-type: none"> "Spiral cable (Steering Angle Sensor)" is not displayed on the "CAN Bus Check" screen of the Techstream INFO Communication system DTCs (DTCs that start with U) that are output correspond to "Steering Angle Sensor Communication Stop Mode" in "DTC Combination Table" INFO 	<ul style="list-style-type: none"> Steering angle sensor (spiral cable sub-assembly) branch line or connector Power source circuit of steering angle sensor (spiral cable sub-assembly) Steering angle sensor (spiral cable sub-assembly) ground circuit Steering angle sensor (spiral cable sub-assembly)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output **INFO**.
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.
- DTC check procedure: Turn the ignition switch to ON, wait at least 10 seconds,
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed **INFO**.

HINT:

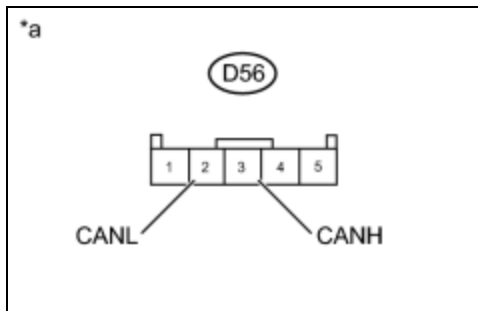
- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or

wire harness while performing the inspection below may help determine the cause of the malfunction.

PROCEDURE

1.	CHECK FOR OPEN IN CAN BUS LINES (STEERING ANGLE SENSOR (SPIRAL CABLE SUB-ASSEMBLY) BRANCH WIRE)
-----------	--

(a) Disconnect the cable from the negative (-) battery terminal.



(b) Disconnect the D56 steering angle sensor (spiral cable sub-assembly) connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D56-3 (CANH) - D56-2 (CANL)	Cable disconnected from negative (-) battery terminal	57 to 63 Ω

Text in Illustration

*a	Front view of wire harness connector (to Steering Angle Sensor (Spiral Cable Sub-assembly))
----	--

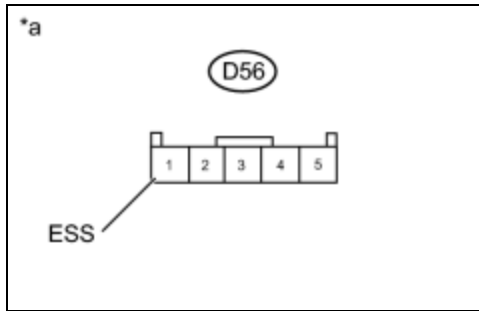
NG ▶ **REPAIR OR REPLACE CAN BRANCH LINE OR CONNECTOR (SPIRAL CABLE WITH SENSOR SUB-ASSEMBLY)**

OK
▼

2.	CHECK HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT)
-----------	---

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D56-1 (ESS) - Body ground	Cable disconnected from negative (-) battery terminal	Below 1 Ω

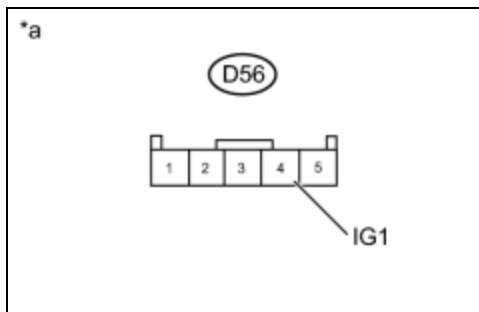
Text in Illustration

*a	Front view of wire harness connector (to Steering Angle Sensor (Spiral Cable Sub-assembly))
----	---

(b) Connect the cable to the negative (-) battery terminal.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D56-4 (IG1) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Steering Angle Sensor (Spiral Cable Sub-assembly))
----	---

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)

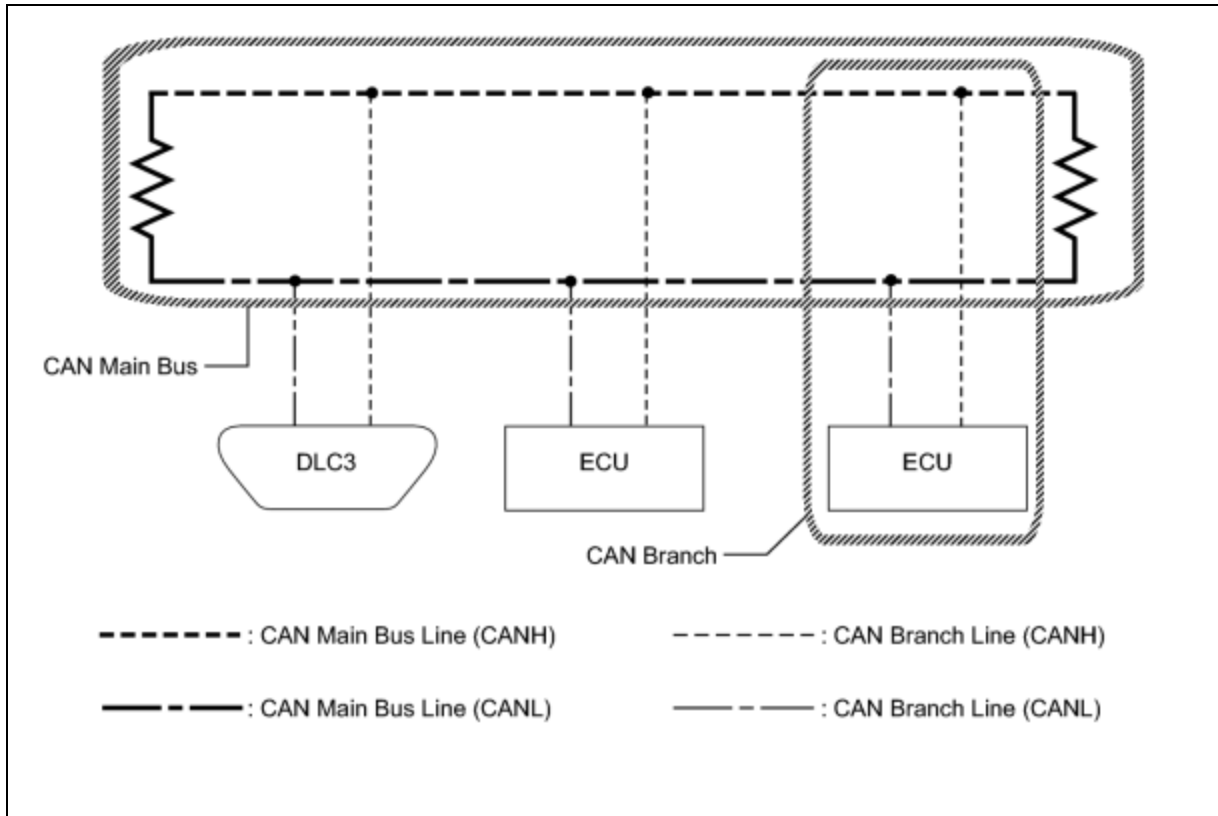
OK ► REPLACE STEERING ANGLE SENSOR (SPIRAL CABLE SUB-ASSEMBLY)

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000YDW0B4X
Title: NETWORKING: CAN COMMUNICATION SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

SYSTEM DESCRIPTION

1. BRIEF DESCRIPTION

- (a) The Controller Area Network (CAN) is a serial data communication system for real time application. It is a vehicle multiplex communication system which has a high communication speed and the ability to detect malfunctions.



- (b) Using the CANH and CANL bus lines as a pair, CAN communication is performed using a voltage differential. (A base voltage is applied to the pair of lines and a voltage differential is created when communicating.)
- (c) Many ECUs or sensors installed on the vehicle operate by sharing information and communicating with each other.
- (d) The CAN has two resistors of 120 Ω which are necessary to enable communication.
- (e) Control system CAN is composed of 1 bus.

2. DEFINITION OF TERMS

- (a) Main bus
- (1) The main bus is a wire harness between the two terminating resistors on the bus. This is the main bus in the CAN communication system.
- (b) Branch
- (1) The branch is a wire harness which diverges from the main bus to an ECU or sensor.
- (c) Terminating resistors

- (1) Two resistors of 120 Ω are installed in parallel across the ends of the CAN main bus lines. They are called terminating resistors. These resistors allow the changes of the voltage differential between the CAN bus lines to be accurately judged. To allow proper function of CAN communication, it is necessary to have both terminating resistors installed. Since the two resistors are installed in parallel, this results in a measurement of approximately 60 Ω .

3. ECUS OR SENSORS WHICH COMMUNICATE THROUGH CAN COMMUNICATION SYSTEM

(a) V Bus

- (1) Main body ECU (network gateway ECU)
- (2) Combination meter assembly
- (3) ECM
- (4) TCM*
- (5) Skid control ECU (brake actuator assembly)
- (6) Steering angle sensor (spiral cable sub-assembly)
- (7) Power steering ECU assembly
- (8) Air bag ECU assembly

* : for Automatic Transmission System

4. CIRCUIT DESCRIPTION

- (a) The V bus has termination circuits with two resistors of 120 Ω .

5. TROUBLESHOOTING REMARKS

- (a) DTCs for the CAN communication system can be checked using the Techstream. The DLC3 is connected to the CAN communication system, but no DTCs exist regarding problems in the DLC3 or the DLC3 branch lines. If there is any trouble in the DLC3 or the DLC3 branch lines, ECUs on the CAN cannot output DTCs to the Techstream.
- (b) Troubles in the CAN V bus (communication lines) can be checked by measuring the resistance between the terminals of the DLC3. However, an open circuit in a branch line other than the DLC3 branch lines cannot be checked from the DLC3 (except branch line of the DLC3).

NOTICE:

Do not insert the tester probes directly into the DLC3. Be sure to use service wires.

6. DIAGNOSTIC TROUBLE CODES FOR CAN COMMUNICATION SYSTEM

HINT:

See **Diagnosis System**  .

7. HOW TO DISTINGUISH CONNECTOR OF CAN JUNCTION CONNECTOR

- (a) In the CAN communication system, the shape of the connectors connected to the CAN junction connector which has an earth terminal is the same. The connectors connected to the CAN junction connector can be distinguished by the colors of the bus lines and the connecting side of the junction connector.

HINT:

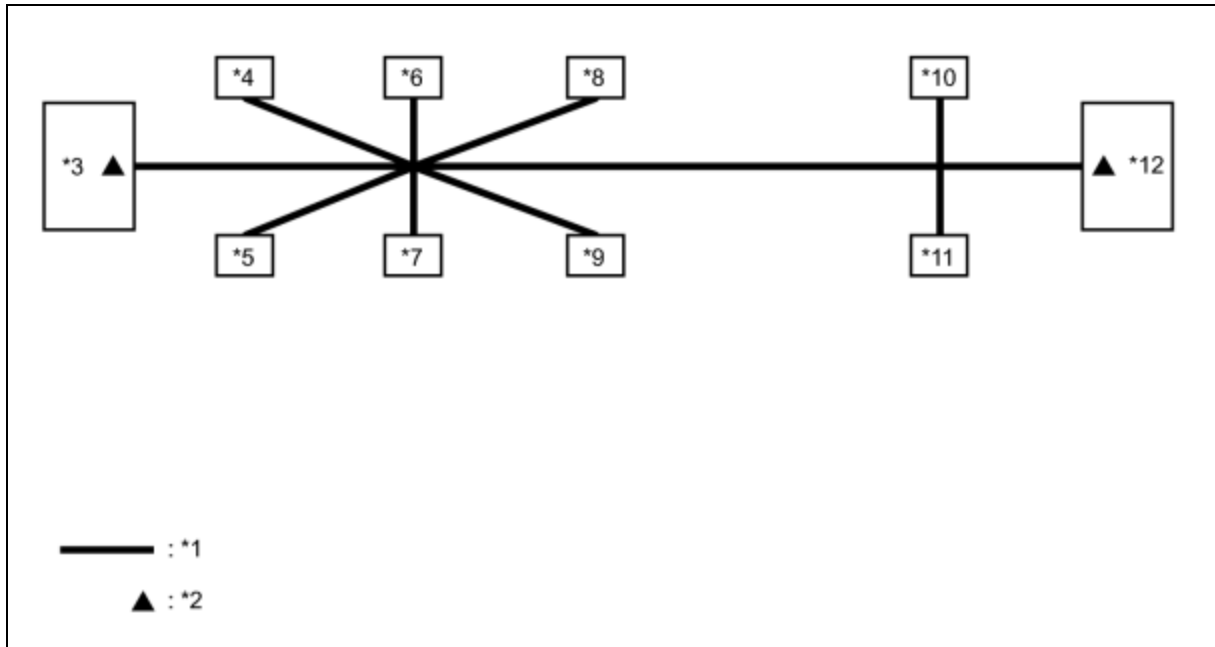
See **Terminals of ECU for bus line color or the shape of connecting surface**  .

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002DX504TX
Title: NETWORKING: CAN COMMUNICATION SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM

1. OVERALL CAN BUS DIAGRAM

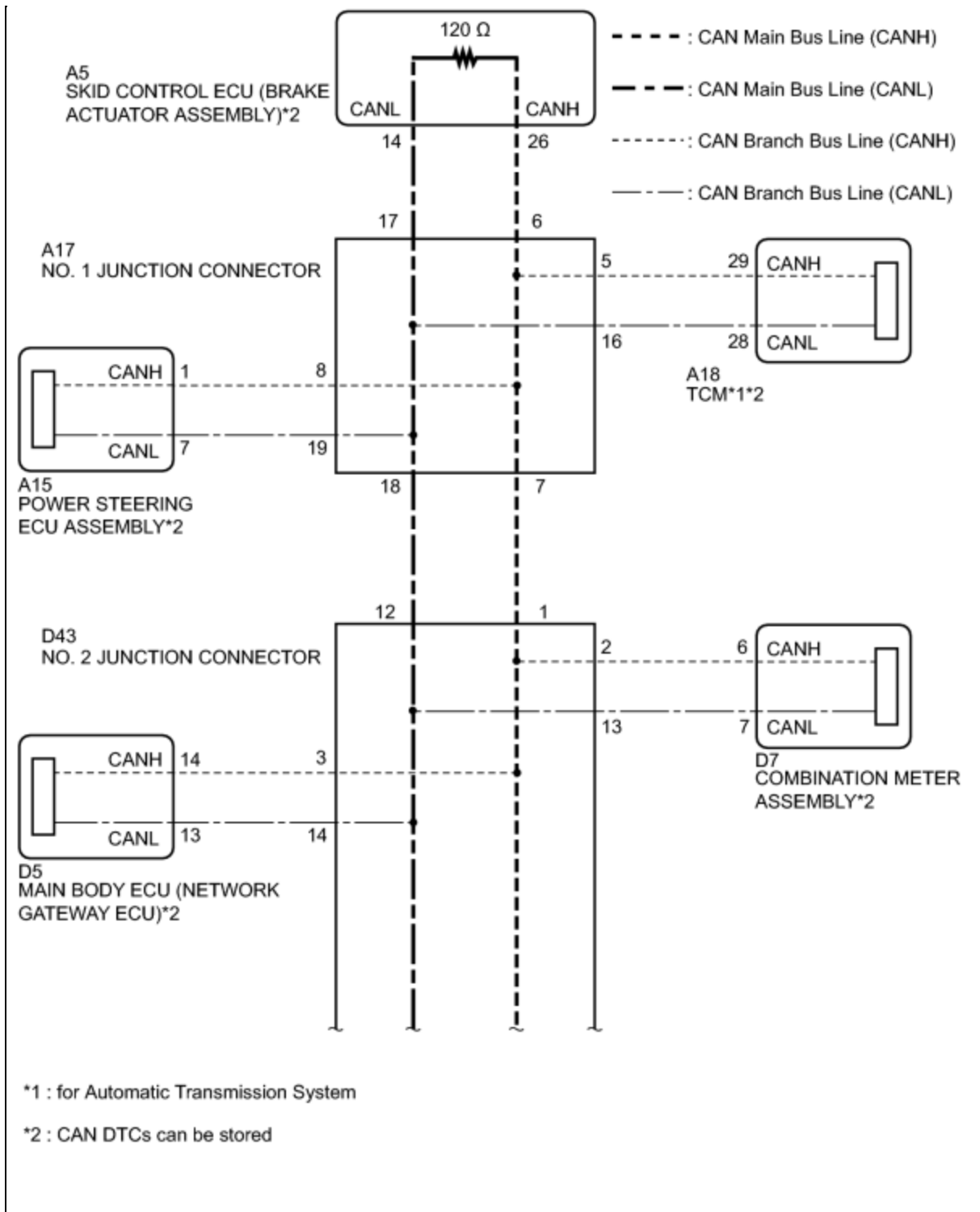
(a) Control system CAN is composed of 1 bus.

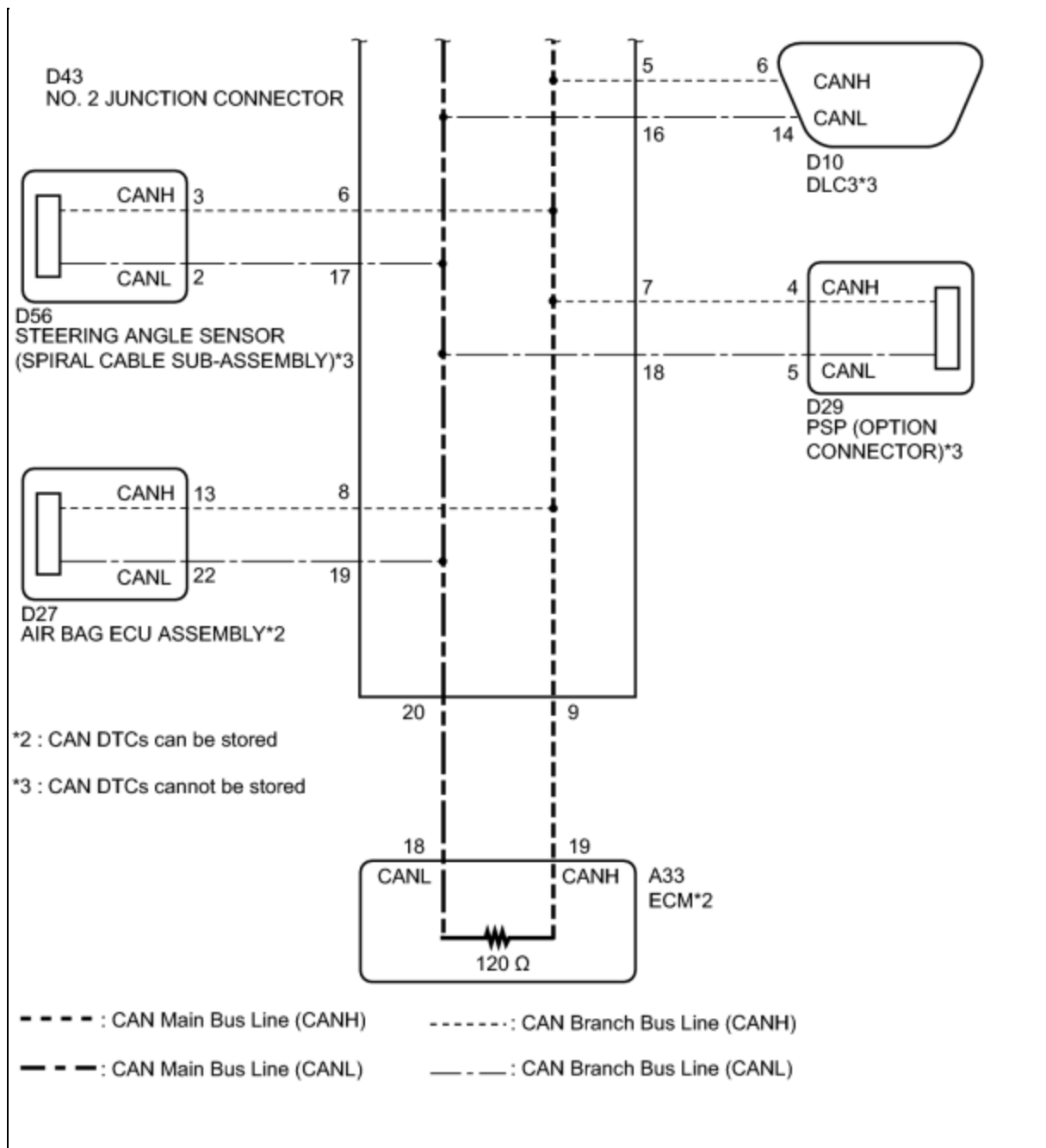


Text in Illustration

*1	V Bus	*2	V Bus Terminating Resistor
*3	ECM (for V Bus)	*4	Combination Meter Assembly (for V Bus)
*5	Main Body ECU (Network Gateway ECU) (for V Bus)	*6	DLC3 (for V Bus)
*7	Steering Angle Sensor (Spiral Cable Sub-assembly) (for V Bus)	*8	PSP (Option Connector) (for V Bus)
*9	Air Bag ECU Assembly (for V Bus)	*10	TCM (for V Bus)
*11	Power Steering ECU Assembly (for V Bus)	*12	Skid Control ECU (Brake Actuator Assembly) (for V Bus)

2. V BUS





HINT:

The CAN communication system connects to other networks via ECUs that function as a gateway

INFO

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XVK0AOX
Title: NETWORKING: CAN COMMUNICATION SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

NOTICE:

- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.
- Turn the ignition switch off before measuring the resistances between CAN main bus lines and between CAN branch lines.
- Turn the ignition switch off before inspecting CAN bus lines for a ground short.
- Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches or the doors. If any doors need to be opened in order to check connectors, open the doors and leave them open.
- This section describes the standard values for all CAN related components.

HINT:

- Operating the ignition switch, any other switches or a door triggers the related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or wire harness while performing the inspection below may help determine the cause of the malfunction.

* : for Automatic Transmission System

* : for Automatic Transmission System

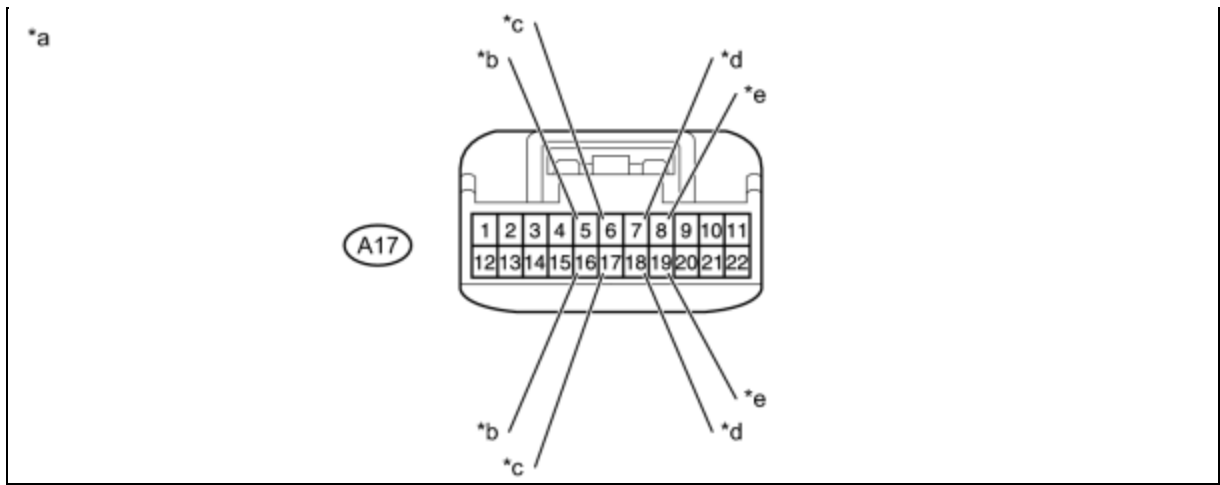
1. CAN NO. 1 JUNCTION CONNECTOR

(a) Check the CAN No. 1 junction connector.

HINT:

The following tables contain information about the items and buses connected via junction connectors. The junction connector may be used for multiple separate buses. In this case, the name of the bus will be shown below the name of the item that terminals are connected to. The bus name will be shown in brackets (example: (for V bus)).

(1) Connection diagram



Text in Illustration

*a	Front view of wire harness connector (to CAN No. 1 Junction Connector)	*b	to TCM (for V bus)*
*c	to Skid Control ECU (Brake Actuator Assembly) (for V bus)	*d	to CAN No. 2 Junction Connector (for V bus)
*e	to Power Steering ECU Assembly (for V bus)	-	-

(2) Check the connection diagram of the components which are connected to the CAN No. 1 junction connector.

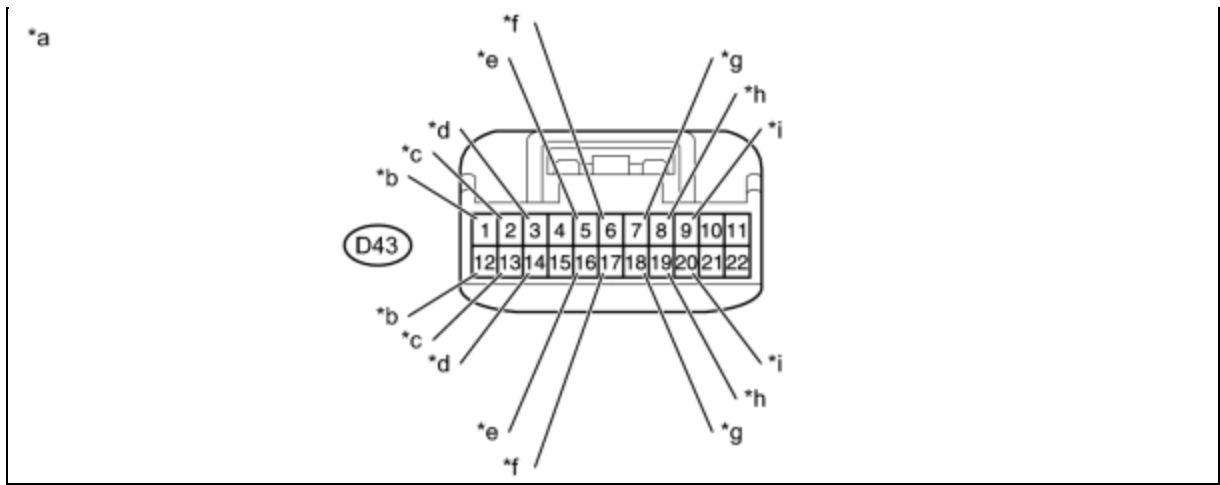
TERMINAL NO.	WIRING COLOR	CONNECTED TO
A17-5	B-W	TCM (for V bus)*
A17-16	L	
A17-6	BR	Skid Control ECU (Brake Actuator Assembly) (for V bus)
A17-17	B-R	
A17-7	W-B	CAN No. 2 Junction Connector (for V bus)
A17-18	R-Y	
A17-8	B	Power Steering ECU Assembly (for V bus)
A17-19	W	

* : for Automatic Transmission System

2. CAN NO. 2 JUNCTION CONNECTOR

(a) Check the CAN No. 2 junction connector.

(1) Connection diagram



Text in Illustration

*a	Front view of wire harness connector (to CAN No. 2 Junction Connector)	*b	to CAN No. 1 Junction Connector (for V bus)
*c	to Combination Meter Assembly (for V bus)	*d	to Main Body ECU (Network Gateway ECU) (for V bus)
*e	to DLC3 (for V bus)	*f	to Steering Angle Sensor (Spiral Cable Sub-assembly) (for V bus)
*g	to PSP (Option Connector) (for V bus)	*h	to Air Bag ECU Assembly (for V bus)
*i	to ECM (for V bus)	-	-

(2) Check the connection diagram of the components which are connected to the CAN No. 2 junction connector.

TERMINAL NO.	WIRING COLOR	CONNECTED TO
D43-1	W-B	CAN No. 1 Junction Connector (for V bus)
D43-12	R-Y	
D43-2	BR	Combination Meter Assembly (for V bus)
D43-13	BR-W	
D43-3	P	Main Body ECU (Network Gateway ECU) (for V bus)
D43-14	LG	
D43-5	B-Y	DLC3 (for V bus)
D43-16	LG	
D43-6	G-W	Steering Angle Sensor (Spiral Cable Sub-assembly) (for V bus)
D43-17	G	
D43-7	P	PSP (Option Connector) (for V bus)
D43-18	L	
D43-8	P-L	Air Bag ECU Assembly (for V bus)
D43-19	R-W	

D43-9	O	ECM
D43-20	B-P	(for V bus)

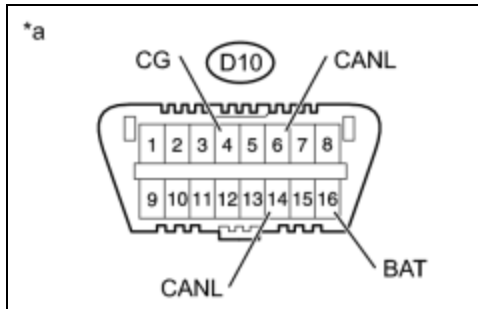
3. DLC3

(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

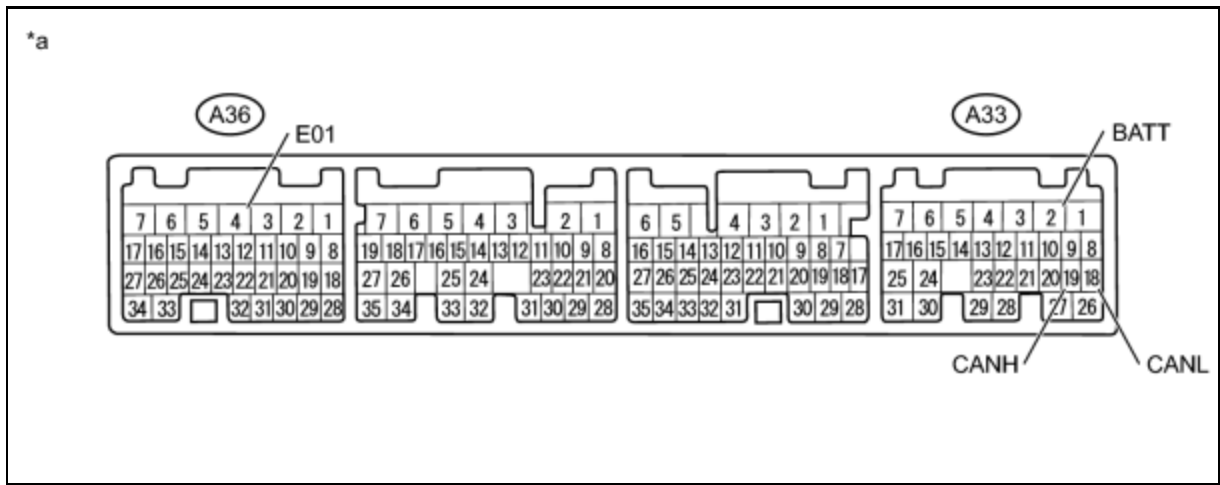
*a	DLC3
----	------

Standard Resistance:



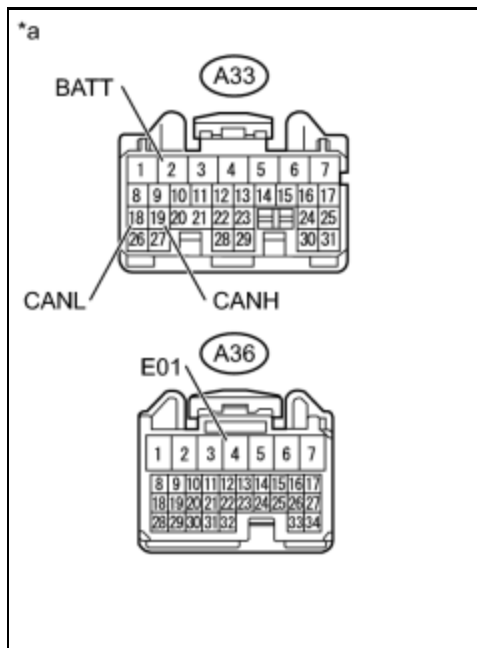
TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
D10-6 (CANH) - D10-14 (CANL)	B-Y - LG	HIGH-level CAN bus line - LOW-level CAN bus line	Cable disconnected from negative (-) battery terminal	57 to 63 Ω
D10-6 (CANH) - D10-4 (CG)	B-Y - B-Y	HIGH-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
D10-14 (CANL) - D10-4 (CG)	LG - B-Y	LOW-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
D10-6 (CANH) - D10-16 (BAT)	B-Y - W-B	HIGH-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 k Ω or higher
D10-14 (CANL) - D10-16 (BAT)	LG - W-B	LOW-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 k Ω or higher

4. ECM



Text in Illustration

*a	Component without harness connected (ECM)	-	-
----	---	---	---



(a) Disconnect the A33 and A36 ECM connectors.

Text in Illustration

*a	Front view of wire harness connector (to ECM)
----	---

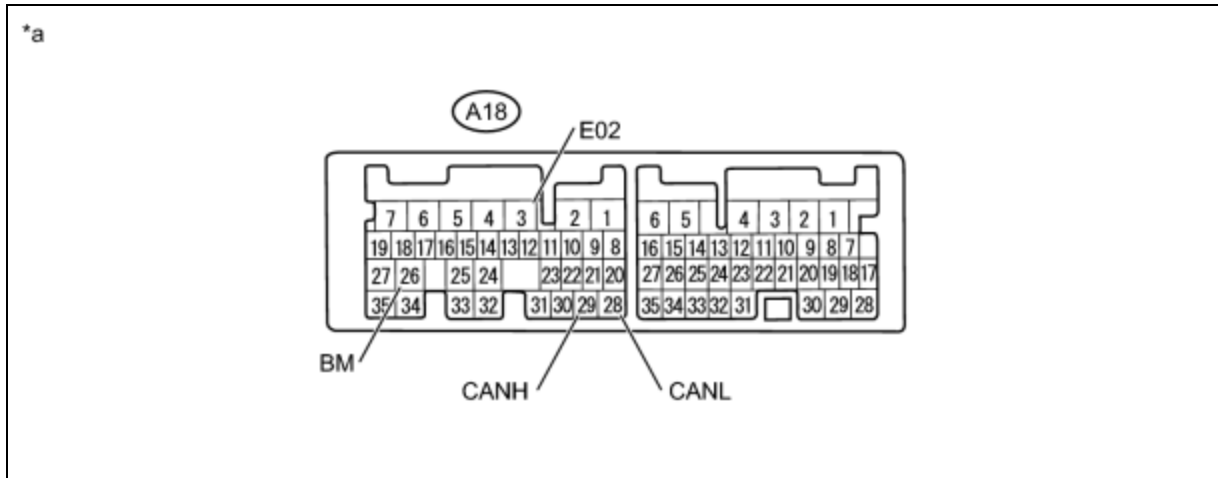
(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A33-19 (CANH) - A33-18 (CANL)	O - B-P	HIGH-level CAN bus line - LOW-level CAN bus line	Cable disconnected from negative (-) battery terminal	114 to 126 Ω
A33-19 (CANH) - A36-4 (E01)	O - B-L	HIGH-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
A33-18 (CANL) - A36-4 (E01)	B-P - B-L	LOW-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher

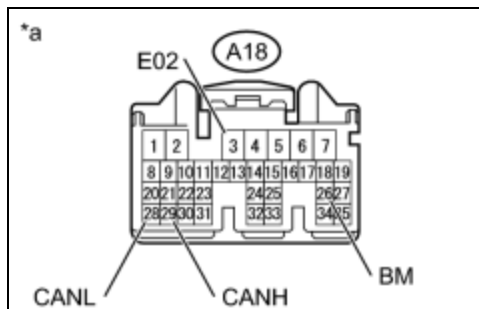
A33-19 (CANH) - A33-2 (BATT)	O - W	HIGH-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 k Ω or higher
A33-18 (CANL) - A33-2 (BATT)	B-P - W	LOW-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 k Ω or higher

5. TCM (for Automatic Transmission System)



Text in Illustration

*a	Component without harness connected (TCM)	-	-
----	--	---	---



(a) Disconnect the A18 TCM connector.

Text in Illustration

*a	Front view of wire harness connector (to TCM)
----	--

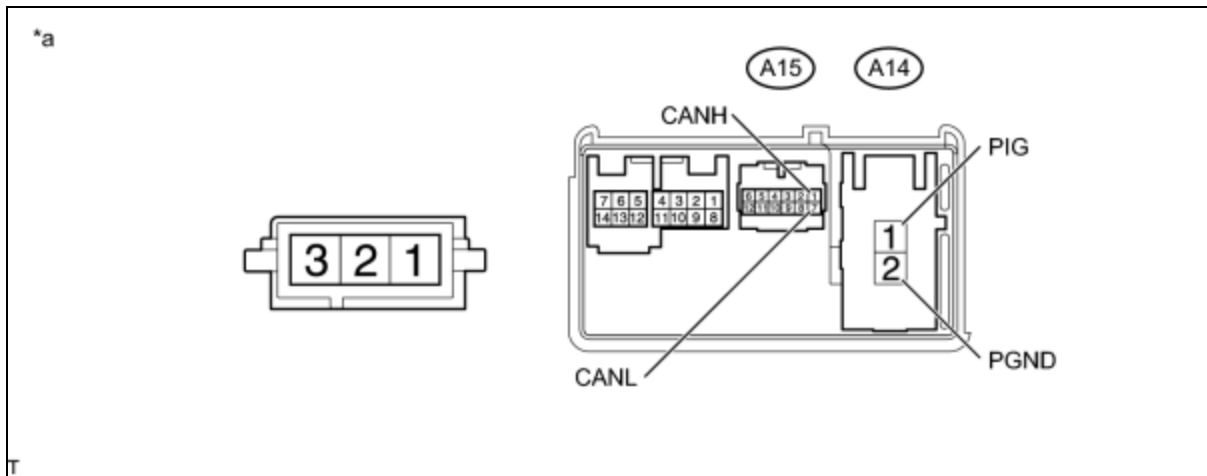
(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A18-29 (CANH) - A18-28 (CANL)	B-W - L	HIGH-level CAN bus line - LOW-level CAN bus line	Cable disconnected from negative (-) battery terminal	57 to 63 Ω
A18-29 (CANH) - A18-3 (E02)	B-W - B-Y	HIGH-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
A18-28 (CANL) - A18-3 (E02)	L - B-Y	LOW-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
A18-29 (CANH) - A18-26 (BM)	B-W - Y-R	HIGH-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 k Ω or higher

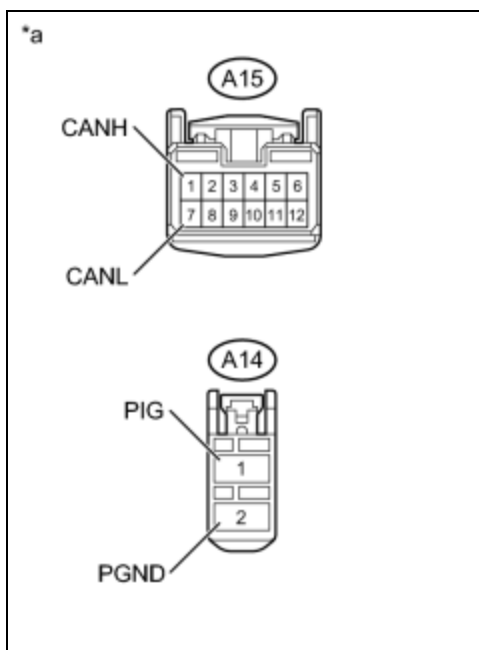
A18-28 (CANL) - A18-26 (BM)	L - Y-R	LOW-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher
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6. POWER STEERING ECU ASSEMBLY



Text in Illustration

*a	Component without harness connected (Power Steering ECU Assembly)	-	-
----	--	---	---



(a) Disconnect the A14 and A15 power steering ECU assembly connectors.

Text in Illustration

*a	Front view of wire harness connector (to Power Steering ECU Assembly)
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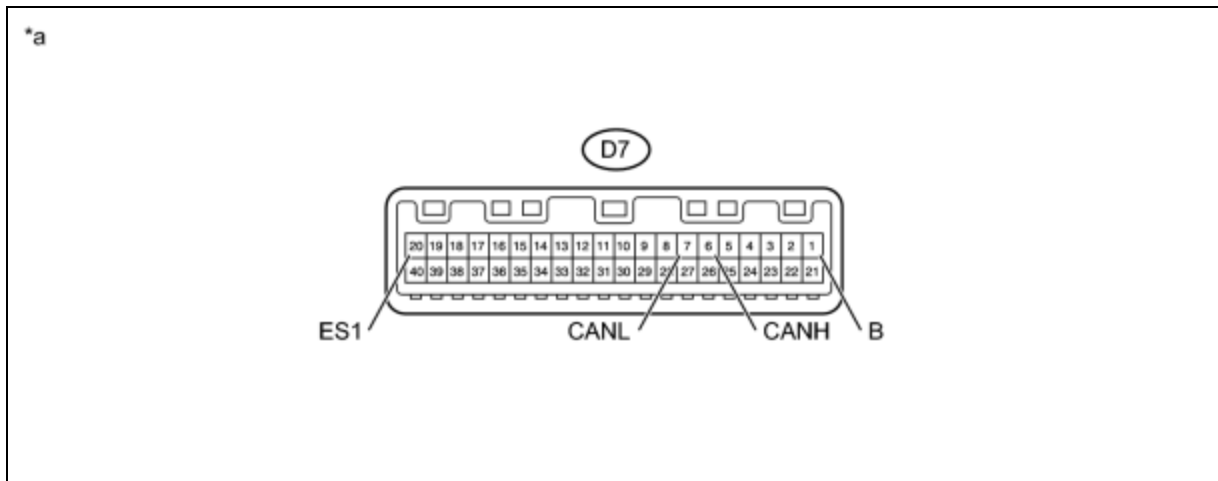
(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A15-1 (CANH) -	B - W	HIGH-level CAN bus line -	Cable disconnected from	57 to 63 Ω

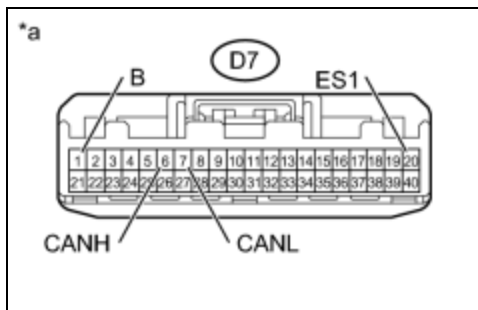
A15-7 (CANL)		LOW-level CAN bus line	negative (-) battery terminal	
A15-1 (CANH) - A14-2 (PGND)	B - B	HIGH-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
A15-7 (CANL) - A14-2 (PGND)	W - B	LOW-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
A15-1 (CANH) - A14-1 (PIG)	B - W	HIGH-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 k Ω or higher
A15-7 (CANL) - A14-1 (PIG)	W - W	LOW-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 k Ω or higher

7. COMBINATION METER ASSEMBLY



Text in Illustration

*a	Component without harness connected (Combination Meter Assembly)	-	-
----	---	---	---



(a) Disconnect the D7 combination meter assembly connector.

Text in Illustration

*a	Front view of wire harness connector (to Combination Meter Assembly)
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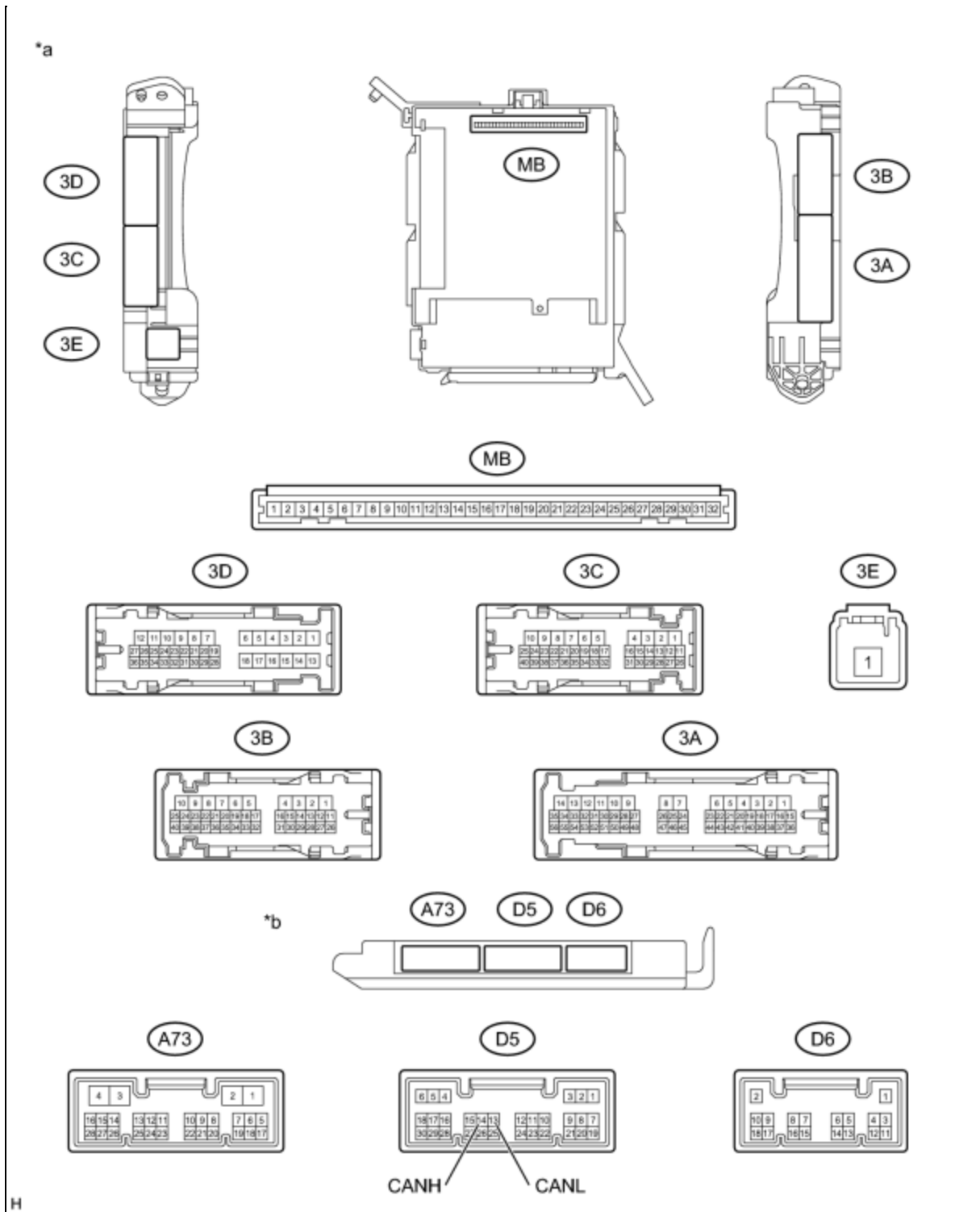
(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
D7-6 (CANH) - D7-7 (CANL)	BR - BR- W	HIGH-level CAN bus line - LOW-level CAN bus line	Cable disconnected from negative (-) battery terminal	57 to 63 Ω

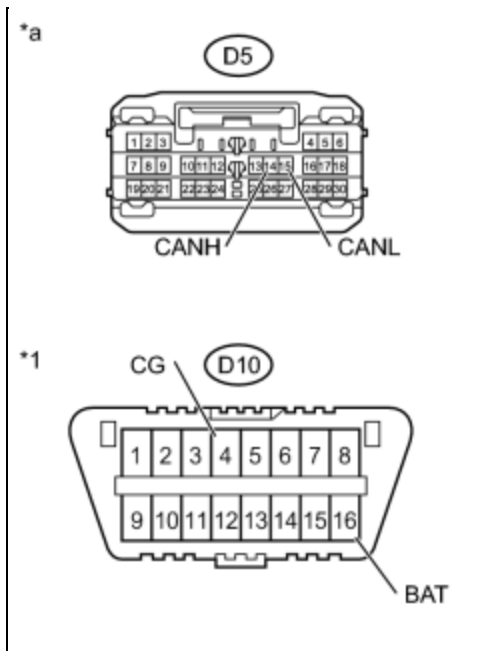
D7-6 (CANH) - D7-20 (ES1)	BR - B-Y	HIGH-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
D7-7 (CANL) - D7-20 (ES1)	BR-W - B-Y	LOW-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
D7-6 (CANH) - D7-1 (B	BR - R- W	HIGH-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 k Ω or higher
D7-7 (CANL) - D7-1 (B	BR-W - R-W	LOW-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 k Ω or higher

8. INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY AND MAIN BODY ECU (NETWORK GATEWAY ECU)



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	*b	Component without harness connected (Main Body ECU (Network Gateway ECU))
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(a) Disconnect the D5 main body ECU (network gateway ECU) connector.

Text in Illustration

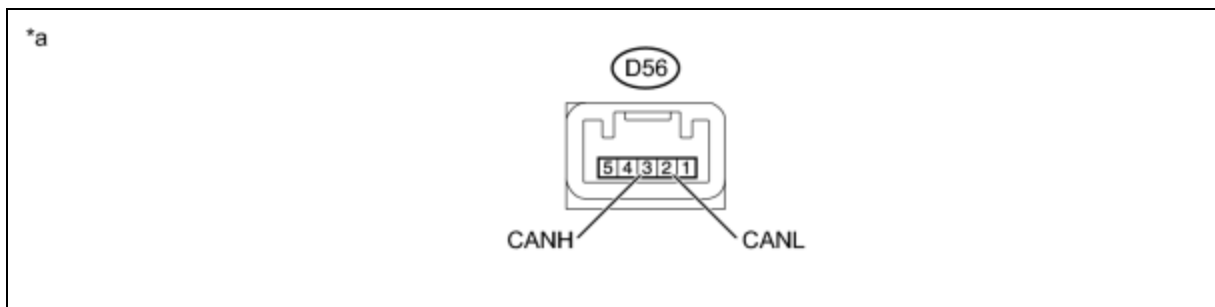
*1	DLC3
*a	Front view of wire harness connector (to Main Body ECU (Network Gateway ECU))

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

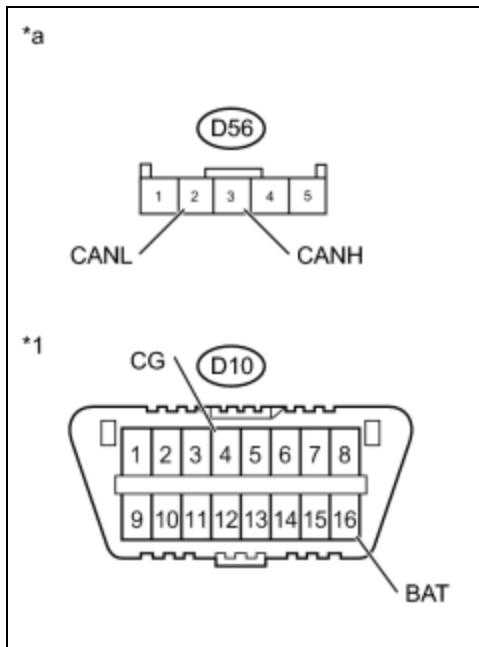
TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
D5-14 (CANH) - D5-13 (CANL)	P - LG	HIGH-level CAN bus line - LOW-level CAN bus line	Cable disconnected from negative (-) battery terminal	57 to 63 Ω
D5-14 (CANH) - D10-4 (CG)	P - B-Y	HIGH-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
D5-13 (CANL) - D10-4 (CG)	LG - B-Y	LOW-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
D5-14 (CANH) - D10-16 (BAT)	P - W-B	HIGH-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher
D5-13 (CANL) - D10-16 (BAT)	LG - W-B	LOW-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher

9. STEERING ANGLE SENSOR (SPIRAL CABLE SUB-ASSEMBLY)



Text in Illustration

	Component without harness connected		
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(a) Disconnect the D56 steering angle sensor (spiral cable sub-assembly) connector.

Text in Illustration

*1	DLC3
*a	Front view of wire harness connector (to Steering Angle Sensor (Spiral Cable Sub-assembly))

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
D56-3 (CANH) - D56-2 (CANL)	G-W - G	HIGH-level CAN bus line - LOW-level CAN bus line	Cable disconnected from negative (-) battery terminal	57 to 63 Ω
D56-3 (CANH) - D10-4 (CG)	G-W - B-Y	HIGH-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
D56-2 (CANL) - D10-4 (CG)	G - B-Y	LOW-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
D56-3 (CANH) - D10-16 (BAT)	G-W - W-B	HIGH-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher
D56-2 (CANL) - D10-16 (BAT)	G - W-B	LOW-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher

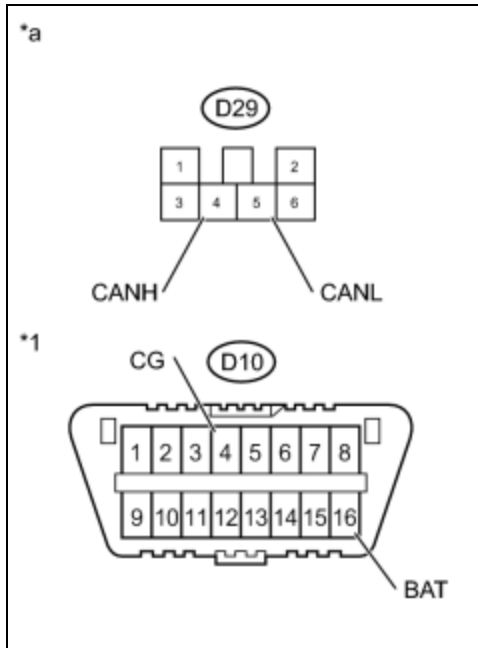
10. PSP (OPTION CONNECTOR)

Text in Illustration

*1	DLC3
*a	Front view of wire harness connector (to PSP (Option Connector))

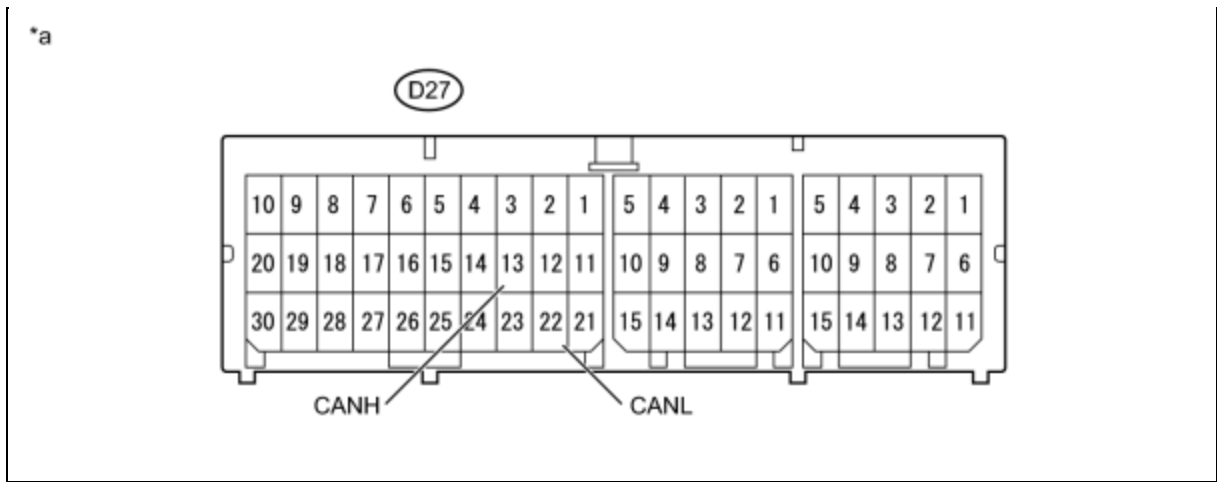
(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



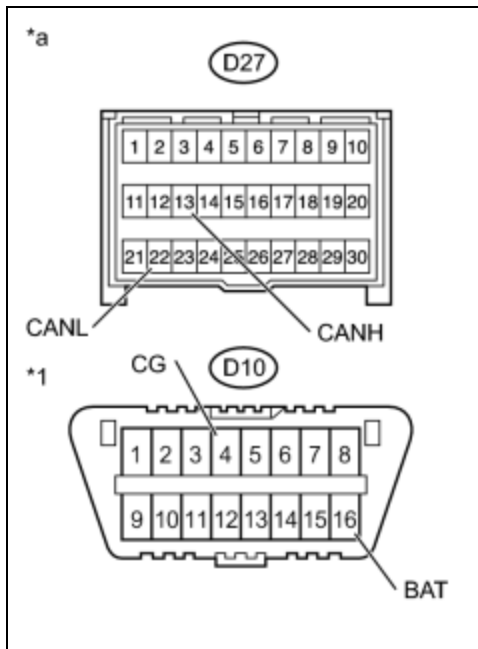
TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
D29-4 (CANH) - D29-5 (CANL)	P - L	HIGH-level CAN bus line - LOW-level CAN bus line	Cable disconnected from negative (-) battery terminal	57 to 63 Ω
D29-4 (CANH) - D10-4 (CG)	P - B-Y	HIGH-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
D29-5 (CANL) - D10-4 (CG)	L - B-Y	LOW-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
D29-4 (CANH) - D10-16 (BAT)	P - W-B	HIGH-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 k Ω or higher
D29-5 (CANL) - D10-16 (BAT)	L - W-B	LOW-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 k Ω or higher

11. AIR BAG ECU ASSEMBLY



Text in Illustration

*a	Component without harness connected (Air Bag ECU Assembly)	-	-
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(a) Disconnect the D27 air bag ECU assembly connector.

Text in Illustration

*1	DLC3
*a	Front view of wire harness connector (to Air Bag ECU Assembly)

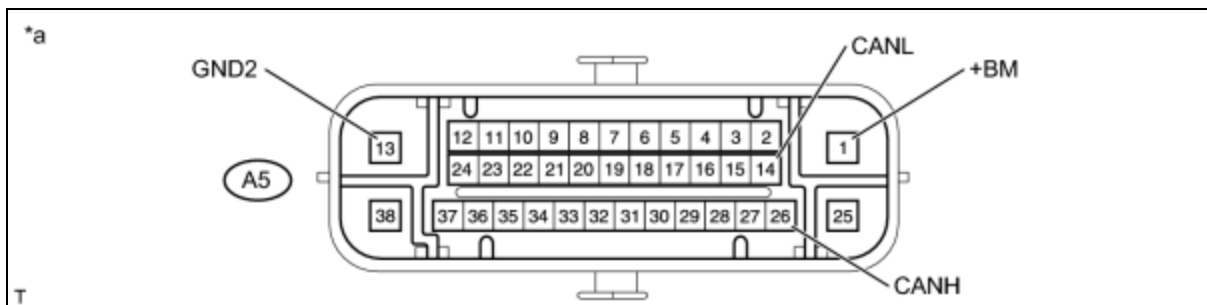
(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
D27-13 (CANH) - D27-22 (CANL)	P-L - R- W	HIGH-level CAN bus line - LOW-level CAN bus line	Cable disconnected from negative (-) battery terminal	57 to 63 Ω
D27-13 (CANH) - D10-4 (CG)	P-L - B- Y	HIGH-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
D27-22 (CANL) - D10-4 (CG)	R-W - B-Y	LOW-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
D27-13 (CANH) -	P-L -	HIGH-level CAN bus line -	Cable disconnected from	6 k Ω or

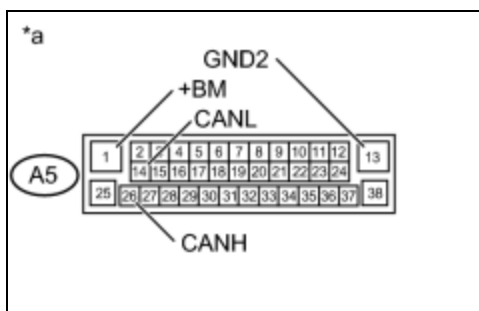
D10-16 (BAT)	W-B	Battery positive (+)	negative (-) battery terminal	higher
D27-22 (CANL) - D10-16 (BAT)	R-W - W-B	LOW-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher

12. SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY)



Text in Illustration

*a	Component without harness connected (Skid Control ECU (Brake Actuator Assembly))	-	-
----	---	---	---



(a) Disconnect the A5 skid control ECU (brake actuator assembly) connector.

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))
----	---

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A5-26 (CANH) - A5-14 (CANL)	BR - B- R	HIGH-level CAN bus line - LOW-level CAN bus line	Cable disconnected from negative (-) battery terminal	114 to 126 Ω
A5-26 (CANH) - A5-13 (GND2)	BR - B	HIGH-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
A5-14 (CANL) - A5-13 (GND2)	B-R - B	LOW-level CAN bus line - Ground	Cable disconnected from negative (-) battery terminal	200 Ω or higher
A5-26 (CANH) - A5-1 (+BM)	BR - W	HIGH-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher
A5-14 (CAN_L) - A5-1 (+BM)	B-R - W	LOW-level CAN bus line - Battery positive (+)	Cable disconnected from negative (-) battery terminal	6 kΩ or higher

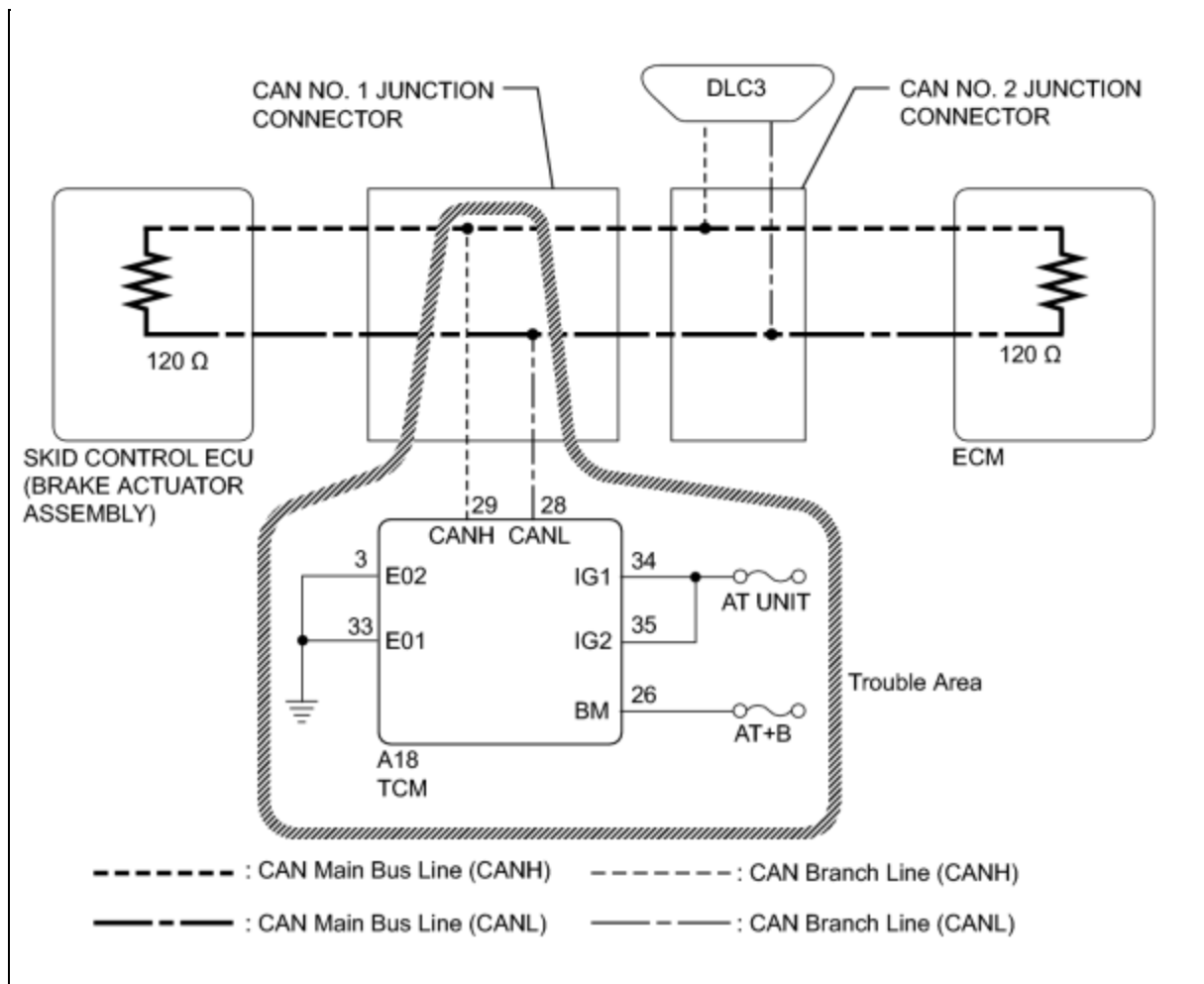
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WIP0B7X
Title: NETWORKING: CAN COMMUNICATION SYSTEM: Transmission Control ECU Communication Stop Mode (2013 FR-S)		

[Transmission Control ECU Communication Stop Mode](#)

DESCRIPTION

DETECTION ITEM	SYMPTOM	TROUBLE AREA
Transmission Control ECU Communication Stop Mode	<p>Either condition is met:</p> <ul style="list-style-type: none"> • "TCM" is not displayed on the "CAN Bus Check" screen of the Techstream INFO • Communication system DTCs (DTCs that start with U) that are output correspond to "Transmission Control ECU Communication Stop Mode" in "DTC Combination Table" INFO 	<ul style="list-style-type: none"> • TCM branch line or connector • Power source circuit of TCM • Transmission control ECU assembly ground circuit • TCM

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Before measuring the resistance of the CAN bus, turn the ignition switch off and leave the vehicle for 1 minute or more without operating the key, switches or opening or closing the doors. After that, disconnect the cable from the negative (-) battery terminal and leave the vehicle for 1 minute or more before measuring the resistance.
- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.
- Because the order of diagnosis is important to allow correct diagnosis, make sure to begin troubleshooting using How to Proceed with Troubleshooting when CAN communication system related DTCs are output **INFO**.
- After performing repairs, perform the DTC check procedure and confirm that the DTCs are not output again.
- DTC check procedure: Turn the ignition switch to ON and wait at least 10 seconds.
- After the repair, perform CAN Bus Check and check that all the ECUs and sensors connected to the CAN communication system are displayed **INFO**.

HINT:

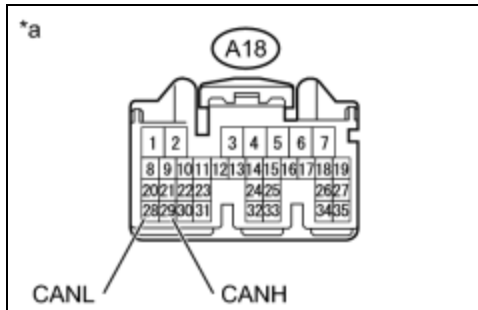
- Operating the ignition switch, any other switches or a door triggers related ECU and sensor communication on the CAN. This communication will cause the resistance value to change.
- Even after DTCs are cleared, if a DTC is stored again after driving the vehicle for a while, the malfunction may be occurring due to vibration of the vehicle. In such a case, wiggling the ECUs or

wire harness while performing the inspection below may help determine the cause of the malfunction.

PROCEDURE

1. CHECK FOR OPEN IN CAN BUS LINES (TCM BRANCH LINE)

(a) Disconnect the cable from the negative (-) battery terminal.



(b) Disconnect the A18 TCM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-29 (CANH) - A18-28 (CANL)	Cable disconnected from negative (-) battery terminal	57 to 63 Ω

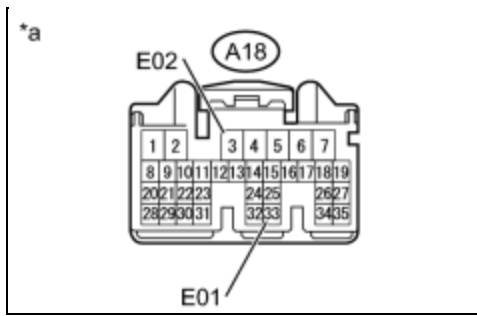
Text in Illustration

*a	Front view of wire harness connector (to TCM)
----	---

NG REPAIR OR REPLACE CAN BRANCH LINE OR CONNECTOR (TCM)

OK
▼

2. CHECK HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT)



(a) Measure the resistance according to the value(s) in the table below.

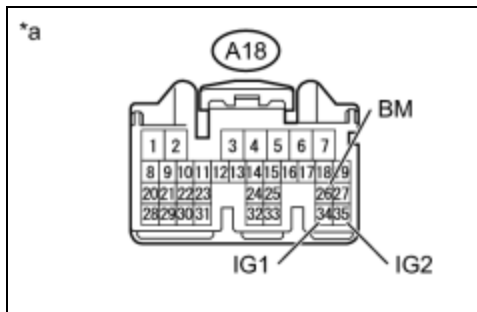
Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-3 (E02) - Body ground	Cable disconnected from negative (-) battery terminal	Below 1 Ω
A18-33 (E01) - Body ground	Cable disconnected from negative (-) battery terminal	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to TCM)
----	---

(b) Connect the cable to the negative (-) battery terminal.



(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A18-26 (BM) - Body ground	Ignition switch off	11 to 14 V
A18-34 (IG1) - Body ground	Ignition switch ON	11 to 14 V
A18-35 (IG2) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to TCM)
----	---

NG ▶ REPAIR OR REPLACE HARNESS OR
CONNECTOR (POWER SOURCE CIRCUIT)

OK ▶ REPLACE TCM



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002S8B02AX
Title: NETWORKING: LIN COMMUNICATION SYSTEM: B2321,B2325: Lost Communication with Driver Door Power Window ECU (2013 FR-S)		

DTC	B2321	Lost Communication with Driver Door Power Window ECU
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DTC	B2325	LIN Communication Bus Malfunction
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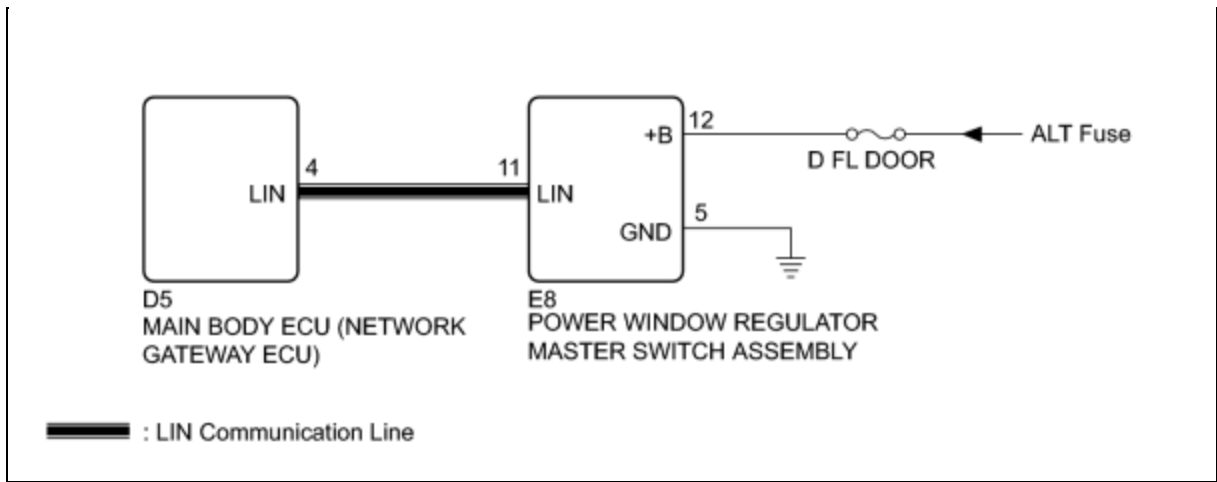
DESCRIPTION

B2321 is stored when the communication between the power window regulator master switch assembly and the main body ECU (network gateway computer) stops for 10 seconds or more.

The main body ECU (network gateway computer) monitors communication between all the ECUs connected to the door LIN bus. When the main body ECU (network gateway computer) detects errors in communication with all the ECUs connected to the door LIN bus at 2.6-second intervals and 3 times in a row, DTC B2325 will be stored.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B2321	Lost communication between the multiplex network master switch assembly and the main body ECU (network gateway computer).	<ul style="list-style-type: none"> • Power window regulator master switch assembly • Main body ECU (network gateway ECU) • Harness or connector
B2325	The main body ECU (network gateway computer) detects errors in door LIN bus communication lines at 2.6-second intervals and 3 times in a row.	<ul style="list-style-type: none"> • Power window regulator master switch assembly • Main body ECU (network gateway ECU) • Harness or connector

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- When using the Techstream with the ignition switch off to troubleshoot:

Connect the Techstream to the vehicle and turn a courtesy light switch on and off at 1.5 second intervals until communication between the Techstream and vehicle begins.

- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

When communication between the power window regulator master switch assembly and the main body ECU (network gateway ECU) stops, DTC B2325 is also stored.

PROCEDURE

1.	CLEAR DTC
-----------	------------------

(a) Clear the DTCs INFO.

NEXT



2.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs INFO.

Result

RESULT	PROCEED TO
DTC B2321 or B2325 is output	A
DTC B2321 or B235 is not output	B

A

3.	CHECK HARNESS AND CONNECTOR (MAIN BODY ECU (NETWORK GATEWAY ECU) - POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY)
-----------	--

- (a) Disconnect the D5 main body ECU (network gateway ECU) connector.
- (b) Disconnect the E8 power window regulator master switch assembly connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D5-4 (LIN) - E8-11 (LIN)	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D5-4 (LIN) or E8-11 (LIN) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

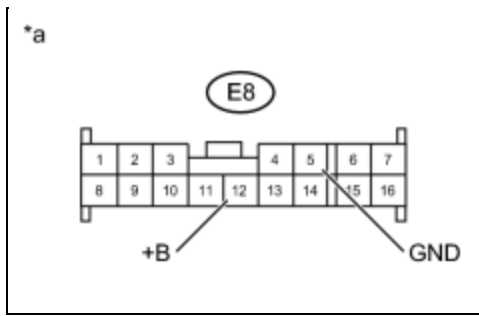
OK

4.	CHECK HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT)
-----------	---

- (a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E8-5 (GND) - Body ground	Always	Below 1 Ω



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E8-12 (+B) - Body ground	Always	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Power Window Regulator Master Switch Assembly)
----	--

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)**

OK



5. REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY

(a) Temporarily replace the power window regulator master switch assembly with a new or normally functioning one **INFO** .

NEXT



6. CLEAR DTC

(a) Clear the DTCs **INFO** .

NEXT



7. CHECK FOR DTC

(a) Check for DTCs **INFO** .

OK:

DTC B2321 or B2325 is not output.

NG ▶ **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

OK ▶ **END (POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY WAS DEFECTIVE)**



Last Modified: 3-27-2012	6.4 S	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003YZK012X
Title: NETWORKING: LIN COMMUNICATION SYSTEM: DIAGNOSTIC TROUBLE CODE CHART (2013 FR-S)		

[DIAGNOSTIC TROUBLE CODE CHART](#)

DTC CODE	DETECTION ITEM	SEE PAGE
B2321	Lost Communication with Driver Door Power Window ECU	INFO
B2325	LIN Communication Bus Malfunction	INFO

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002S8D021X
Title: NETWORKING: LIN COMMUNICATION SYSTEM: DTC CHECK / CLEAR (2013 FR-S)		

DTC CHECK / CLEAR

1. CHECK DTC

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / (desired system) / DTC.
- (e) Read the DTCs.

2. CLEAR DTC

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / (desired system) / DTC.
- (e) Clear the DTCs.

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XHI066X
Title: NETWORKING: LIN COMMUNICATION SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedure to troubleshoot the LIN communication system.
- *: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	CUSTOMER PROBLEM ANALYSIS
-----------	----------------------------------

- When troubleshooting, confirm that the problem symptoms have been accurately identified. Preconceptions should be discarded in order to make an accurate judgment. To clearly understand what the problem symptoms are, it is extremely important to ask the customer about the problem and the conditions at the time when the malfunction occurred.
- Gather as much information as possible for reference. Past problems that seem unrelated may also help in some cases.
- The following 5 items are important points in problem analysis:

What	Vehicle model, system name
When	Date, time, occurrence frequency
Where	Road conditions
Under what conditions?	Driving conditions, weather conditions
How did it happen?	Problem symptoms

NEXT



3.	INSPECT BATTERY VOLTAGE
-----------	--------------------------------

(a) Measure the battery voltage with the ignition switch off.

Standard Voltage:


11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding to the next step.

NEXT



4.	CHECK COMMUNICATION FUNCTION OF LIN COMMUNICATION SYSTEM*
----	---

(a) Using the Techstream, inspect the LIN communication function to ensure there are no malfunctions in the communication system  .

Result:


RESULT	PROCEED TO
DTC is not output	A
DTC is output	B

B  **GO TO DIAGNOSTIC TROUBLE CODE CHART**

A



5.	OVERALL ANALYSIS AND TROUBLESHOOTING*
----	---------------------------------------

(a) Terminals of ECU  .

NEXT



6.	REPAIR OR REPLACE
----	-------------------

NEXT



7.	CONFIRMATION TEST
----	-------------------

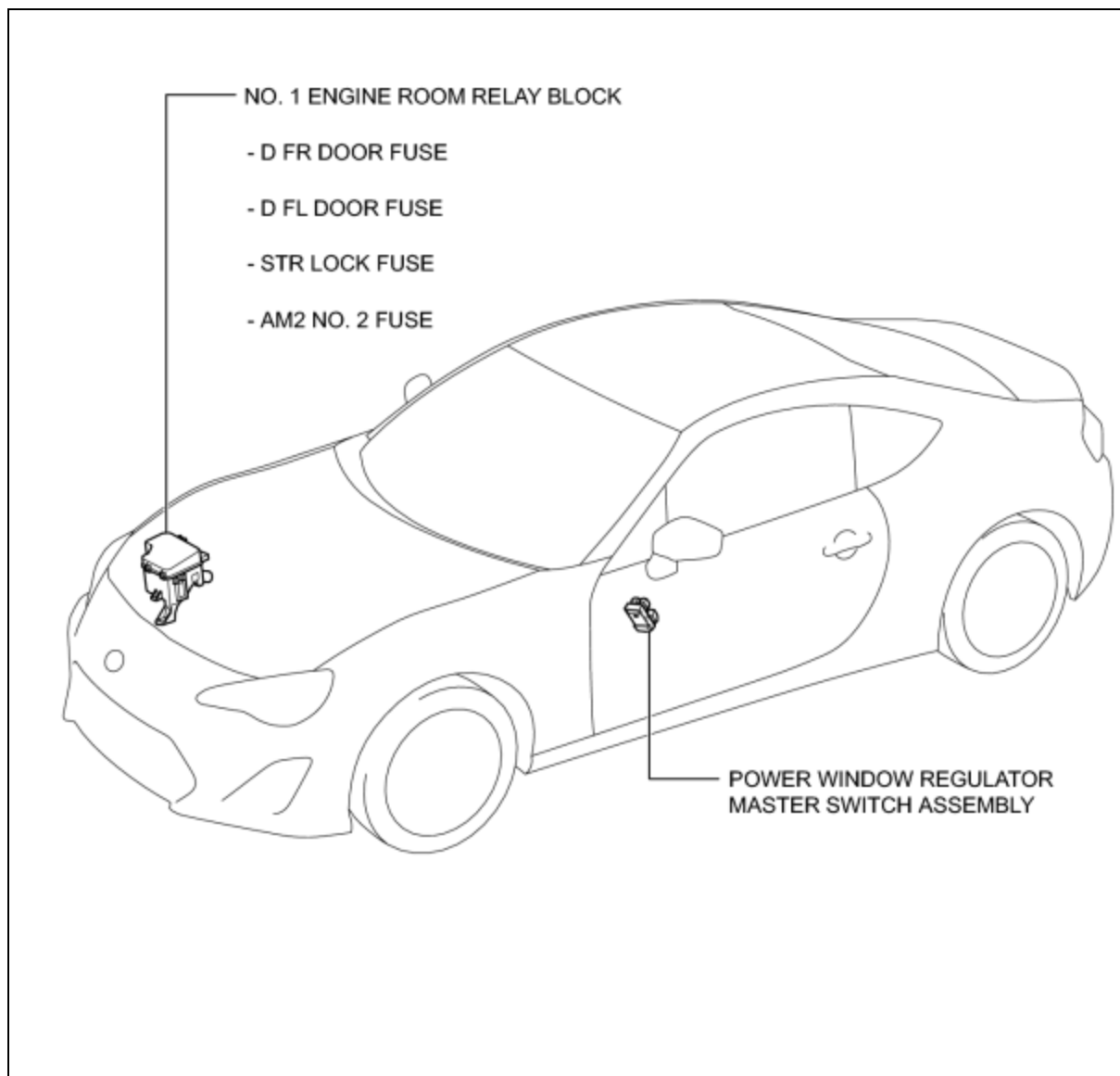
NEXT  **END**



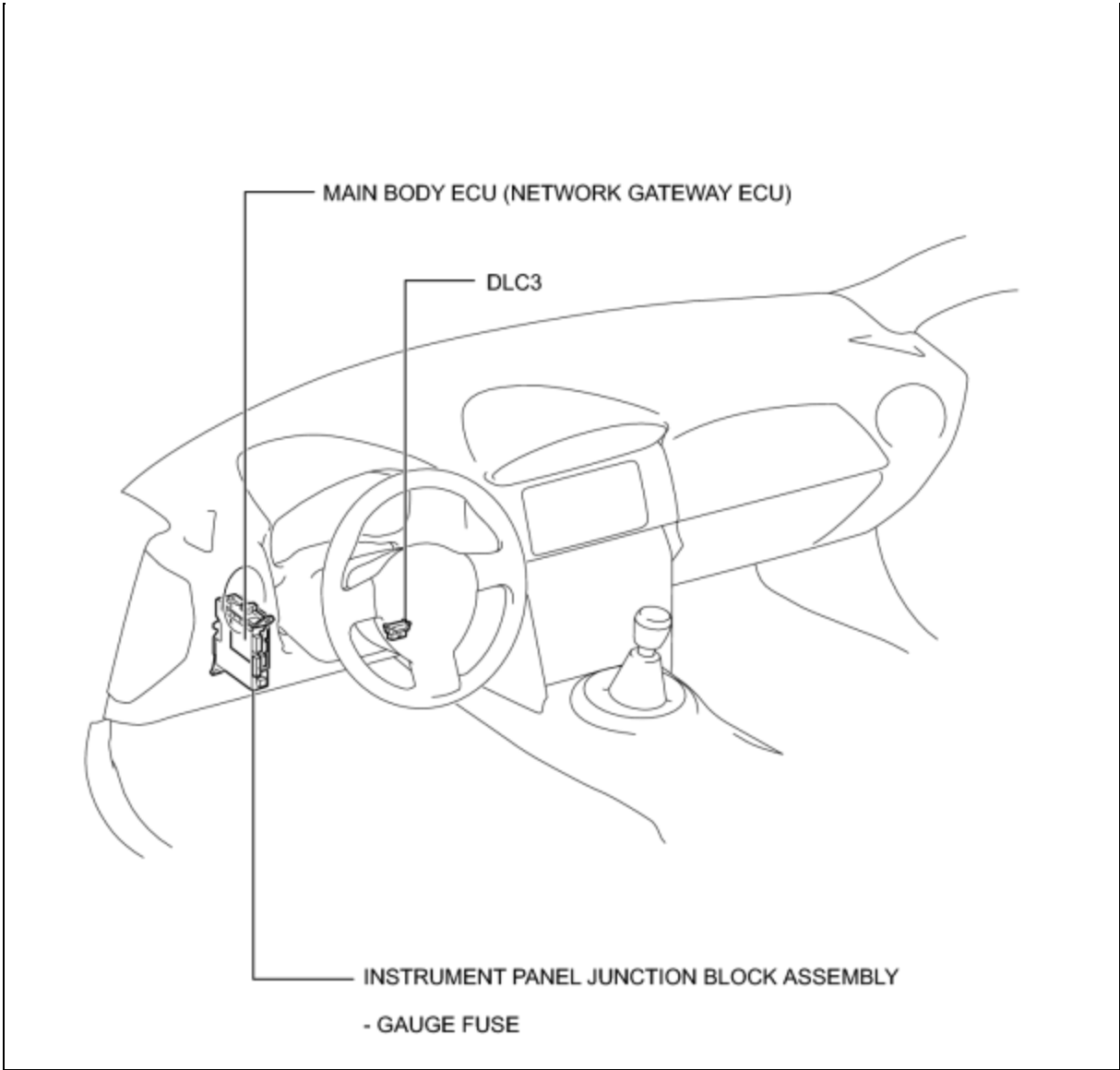
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XHK044X
Title: NETWORKING: LIN COMMUNICATION SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION




ILLUSTRATION



Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XHH05AX
Title: NETWORKING: LIN COMMUNICATION SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the battery terminal. Therefore, make sure to read the disconnecting the cable from the battery terminal notice before proceeding with work  .

1. PRECAUTIONS WHEN USING TECHSTREAM

- (a) When using the Techstream to troubleshoot with the ignition switch off:

Connect the Techstream to the DLC3, and turn the courtesy light switch on and off at 1.5-second intervals until communication between the Techstream and vehicle begins.

- (b) After all DTCs are cleared, check if the trouble occurs again 6 seconds after the ignition switch to ON.



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XHQ04KX
Title: NETWORKING: LIN COMMUNICATION SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

SYSTEM DESCRIPTION

1. LIN COMMUNICATION SYSTEM DESCRIPTION

The LIN communication system is used for the communication between the components in the tables below. If the communication cannot be performed through the LIN communication because of an open in the communication lines or other reasons, the master control ECU of the relevant system will store a DTC. Refer to the table below about the communication bus lines and connected components.

HINT:

- Each component has a fail-safe function which activates to maintain the minimum performance of the system and protect the system.
- In the following table, "o" indicates that the function applies, and "-" indicates that it does not.

Door Bus Lines

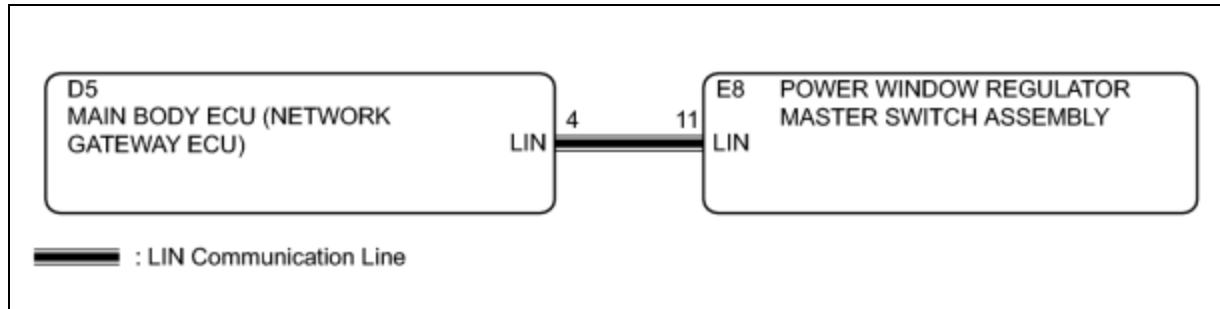
COMPONENT	MASTER CONTROL	LIN COMMUNICATION DTC OUTPUT FUNCTION
Main Body ECU (Network Gateway ECU)	o	o
Power Window Regulator Master Switch Assembly	-	-



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XHT04LX
Title: NETWORKING: LIN COMMUNICATION SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM

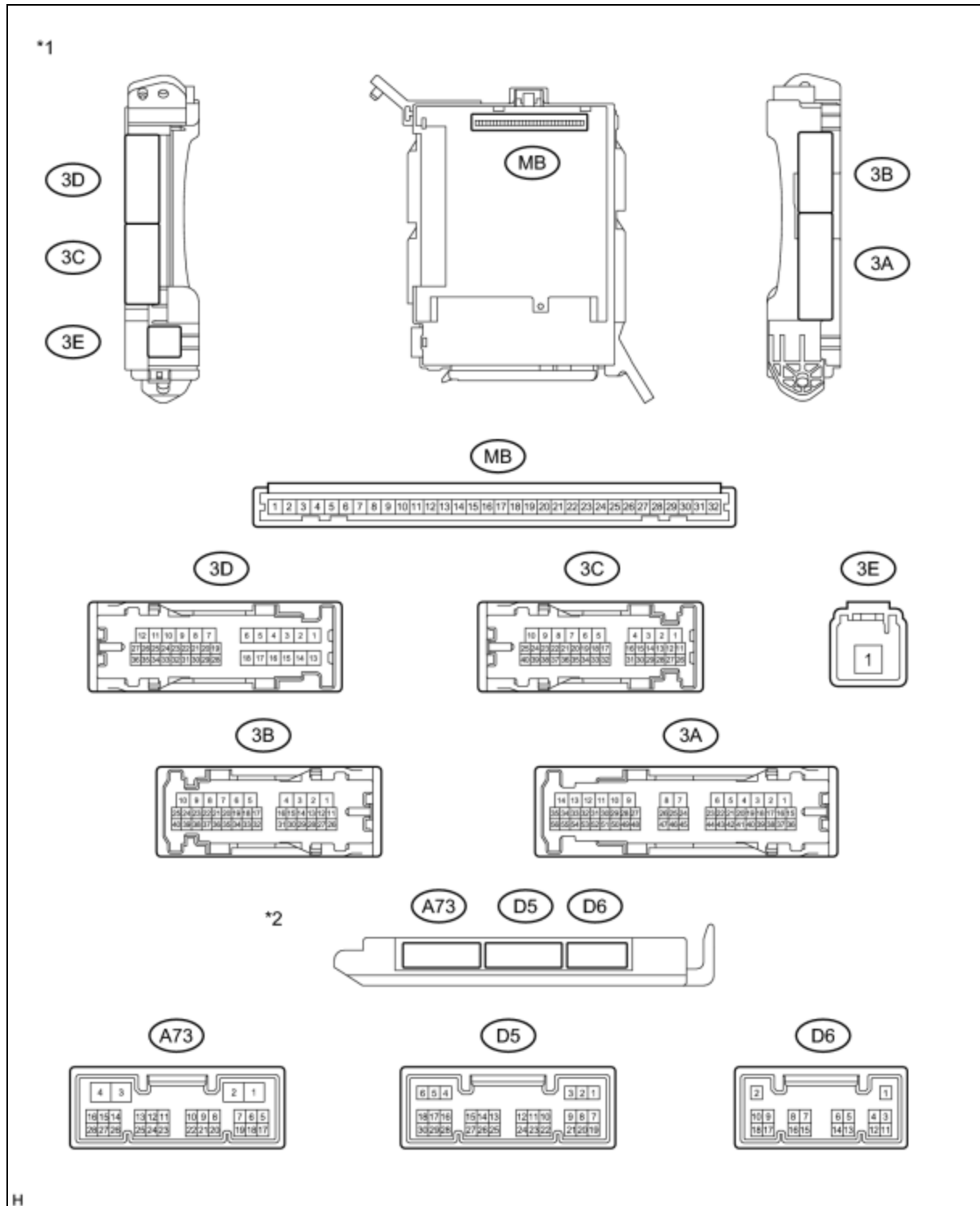
1. DOOR BUS LINES




Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XHL04RX
Title: NETWORKING: LIN COMMUNICATION SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. CHECK INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY AND MAIN BODY ECU (NETWORK GATEWAY ECU)



*1	Instrument Panel Junction Block Assembly	*2	Main Body ECU (Network Gateway ECU)
----	--	----	-------------------------------------

- (a) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly  .
- (b) Measure the voltage and resistance according to the value(s) in the table below.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	SWITCH CONDITION	SPECIFIED CONDITION
MB-1 (BECU) - Body ground	None - Body ground	Battery power supply	Always	11 to 14 V
MB-8 (IG) - Body ground	None - Body ground	Battery power supply	Ignition switch ON	11 to 14 V
MB-11 (GND) - Body ground	None - Body ground	Ground	Always	Below 1 Ω
MB-32 (+B) - Body ground	None - Body ground	Battery power supply	Always	11 to 14 V

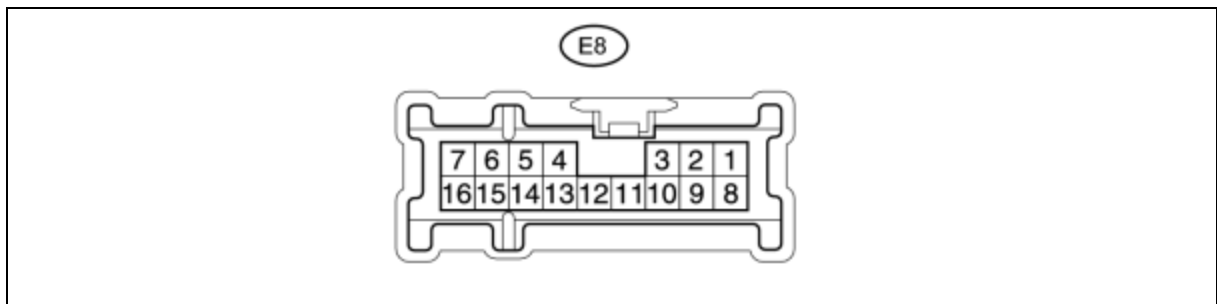
If the result is not as specified, there may be a malfunction in the wire harness.

- (c) Install the main body ECU (network gateway ECU) onto the instrument panel junction block assembly.
- (d) Measure the pulses according to the value(s) in the table below.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	SWITCH CONDITION	SPECIFIED CONDITION
D5-4 (LIN) - D6-1 (GND)	LG - B	LIN Communication line	Ignition switch ON	Pulse generation

If the result is not as specified, the main body ECU (network gateway ECU) or instrument panel junction block assembly may have a malfunction.

2. CHECK POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY



- (a) Disconnect the E8 power window regulator master switch assembly connector.
- (b) Measure the voltage and resistance according to the value(s) in the table below.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
E8-5 (GND) - Body				

ground	B - Body ground	Ground	Always	Below 1 Ω
E8-12 (+B) - Body ground	SB - Body ground	Battery power supply	Always	11 to 14 V

If the result is not as specified, there may be a malfunction in the wire harness.



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002MQ300VX
Title: POWER DISTRIBUTION: ELECTRIC POWER CONTROL SYSTEM: B1010: BIU System Error (2013 FR-S)		

DTC	B1010	BIU System Error
------------	--------------	-------------------------

DESCRIPTION


B1010 is stored when there is an internal malfunction in the Main body ECU (network gateway ECU).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1010	Main body ECU (network gateway ECU) internal error	<ul style="list-style-type: none"> Main body ECU (network gateway ECU)

INSPECTION PROCEDURE

PROCEDURE


1.	CLEAR DTC
-----------	------------------

(a) Clear the DTCs .

NEXT



2.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs .

Result

RESULT	PROCEED TO
DTC B1010 is output	A
DTC is not output	B

B  **USE SIMULATION METHOD TO CHECK**

A  **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002MQ300WX
Title: POWER DISTRIBUTION: ELECTRIC POWER CONTROL SYSTEM: B1011: Battery Power Supply Control Circuit (2013 FR-S)		

DTC	B1011	Battery Power Supply Control Circuit
------------	--------------	---

DESCRIPTION

B1011 is stored when a malfunction is detected in the BMPX circuit.

HINT:

In some cases, none of the functions of the main body ECU (network gateway ECU) may function when B1012 is stored together with B1011.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1011	When BMPX voltage is 8.3 V or less, or 16.7 V or more (BMPX circuit malfunction)	<ul style="list-style-type: none"> • Main body ECU (network gateway ECU) • Instrument panel junction block assembly • Harness or connector

WIRING DIAGRAM

INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CLEAR DTC
-----------	------------------

(a) Clear the DTCs INFO.

NEXT



2.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs INFO.

Result

RESULT	PROCEED TO
DTC B1011 is output	A
DTC is not output	B

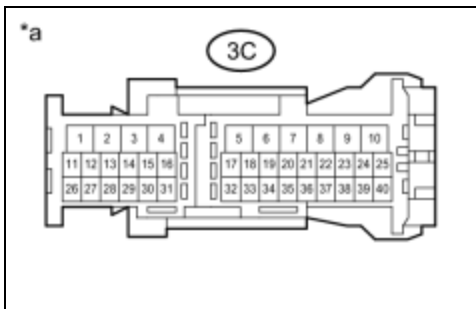
A
▼

3. CHECK HARNESS AND CONNECTOR (BMPX VOLTAGE)

(a) Disconnect the 3C instrument panel junction block assembly connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage :



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3C-19 - Body ground	Always	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Instrument Panel Junction Block Assembly)
----	---

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

4. CHECK HARNESS AND CONNECTOR (ECU GROUND)

(a) Disconnect the D6 and A73 main body ECU (network gateway ECU) connector.

(b) Disconnect the 3B instrument panel junction block assembly connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance :

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D6-1 (GND) - Body ground	Always	Below 1 Ω
A73-4 (GND) - Body ground	Always	Below 1 Ω

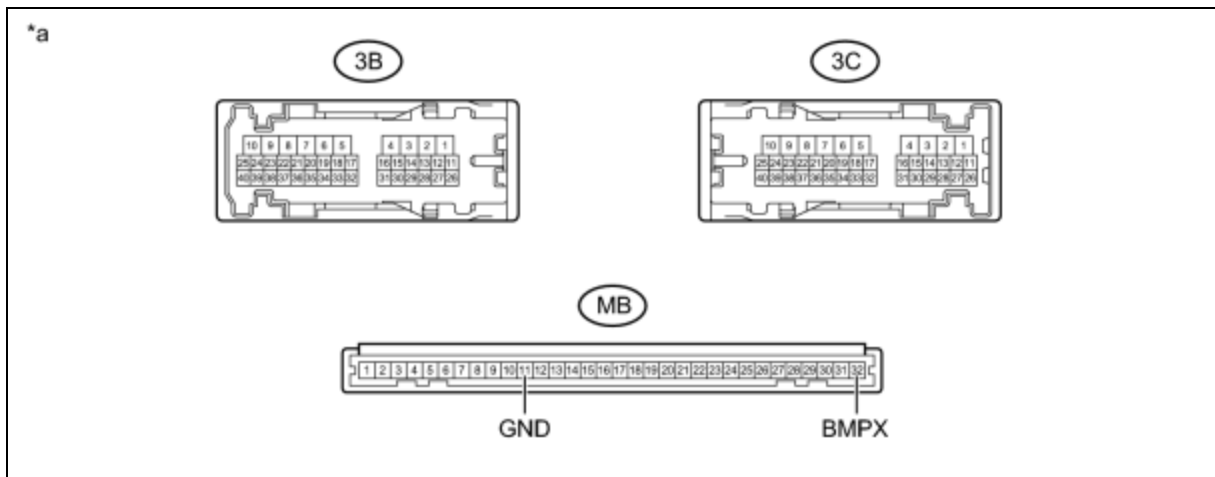
NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK



5. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

- (a) Remove the instrument panel junction block assembly **INFO** .
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	---	---	---

- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance :

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3C-19 - MB-32 (BMPX)	Always	Below 1 Ω
3B-18 - MB-11 (GND)	Always	Below 1 Ω

NG ► REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

REPLACE MAIN BODY ECU (NETWORK

OK  GATEWAY ECU)



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002MQ300XX
Title: POWER DISTRIBUTION: ELECTRIC POWER CONTROL SYSTEM: B1012: Battery Power Supply Back Up Circuit (2013 FR-S)		

DTC	B1012	Battery Power Supply Back Up Circuit
------------	--------------	---

DESCRIPTION

B1012 is stored when a malfunction is detected in the BECU circuit.

HINT:

In some cases, none of the functions of the main body ECU (network gateway ECU) may function when B1011 is stored together with B1012.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1012	When BECU voltage is 8.3 V or less, or 16.7 V or more (BECU circuit malfunction)	<ul style="list-style-type: none"> • Main body ECU (network gateway ECU) • Instrument panel junction block assembly • Harness or connector

WIRING DIAGRAM

INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CLEAR DTC
-----------	------------------

(a) Clear the DTCs INFO.

NEXT



2.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs INFO.

Result

RESULT	PROCEED TO
DTC B1012 is output	A
DTC is not output	B

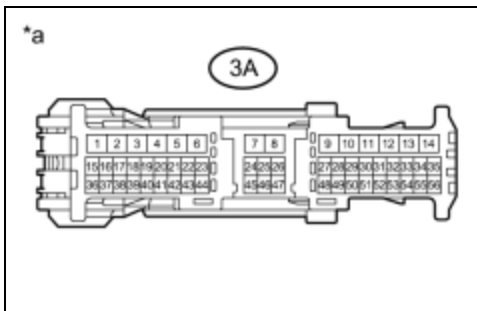
A
▼

3. CHECK HARNESS AND CONNECTOR (BECU VOLTAGE)

(a) Disconnect the 3A instrument panel junction block assembly connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3A-27 - Body ground	Always	11 to 14 V

Text in Illustration

*a Front view of wire harness connector (to Instrument Panel Junction Block Assembly)

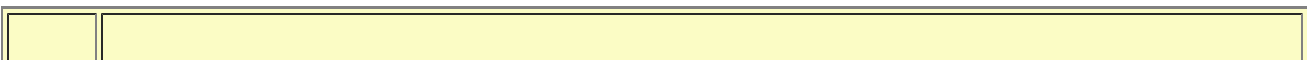
NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

4. CHECK HARNESS AND CONNECTOR (ECU GROUND) INFO

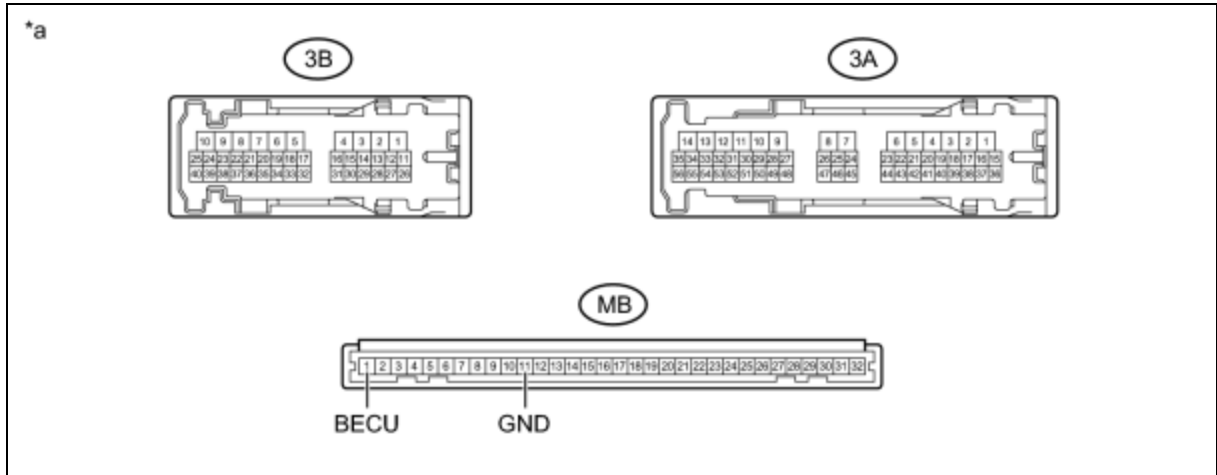
NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼



5. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

- (a) Remove the instrument panel junction block assembly **INFO**.
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	---	---	---

- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3A-27 - MB-1 (BECU)	Always	Below 1 Ω
3B-18 - MB-11 (GND)	Always	Below 1 Ω

NG ▶ REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

OK ▶ REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002MQ300YX
Title: POWER DISTRIBUTION: ELECTRIC POWER CONTROL SYSTEM: B1013: IG Power Supply Circuit (2013 FR-S)		

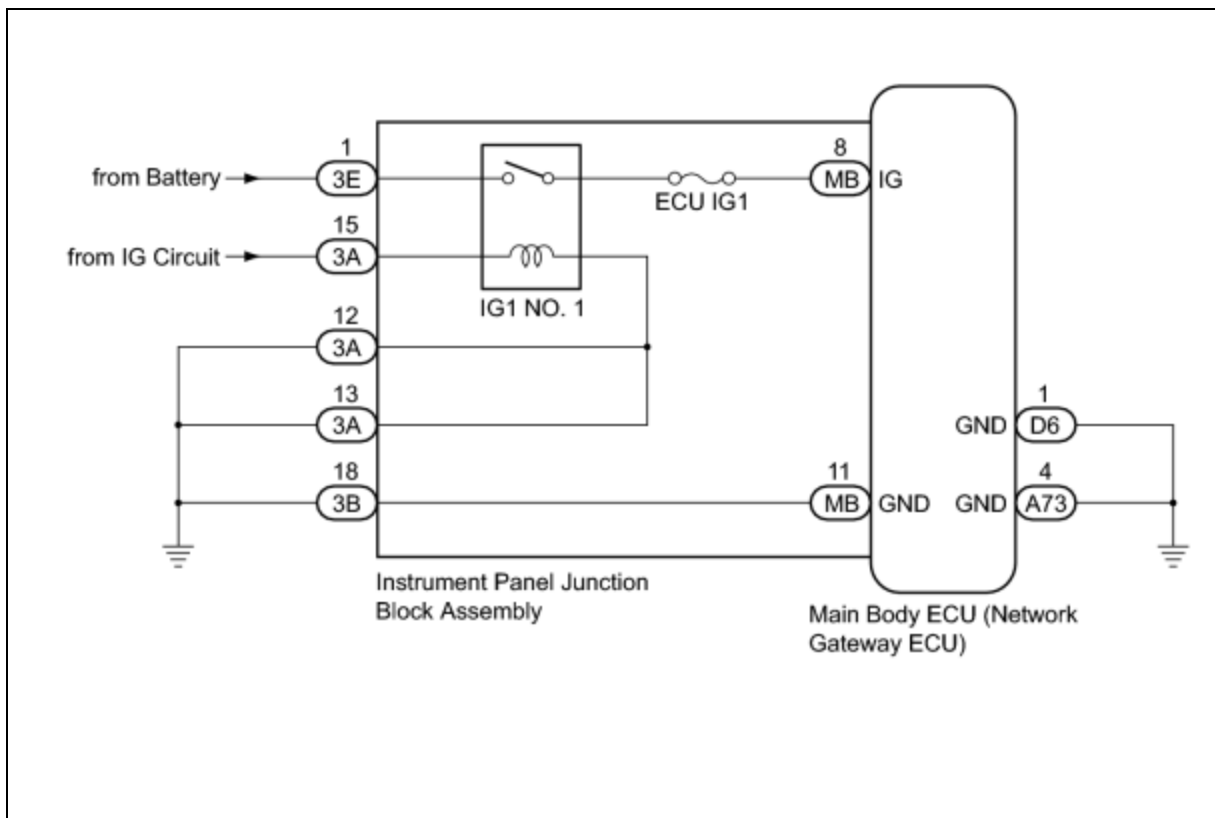
DTC	B1013	IG Power Supply Circuit
------------	--------------	--------------------------------

DESCRIPTION

B1013 is stored when a malfunction is detected in the IG circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1013	When IG voltage is 8.3 V or less, or 16.7 V or more (IG circuit malfunction)	<ul style="list-style-type: none"> • Main body ECU (network gateway ECU) • Instrument panel junction block assembly • Harness or connector

WIRING DIAGRAM




INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE


1.	CLEAR DTC
-----------	------------------

(a) Clear the DTCs .

NEXT



2.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs .

Result

RESULT	PROCEED TO
DTC B1013 is output	A
DTC is not output	B

B  **USE SIMULATION METHOD TO CHECK**

A



3.	CHECK HARNESS AND CONNECTOR (VOLTAGE)
-----------	--

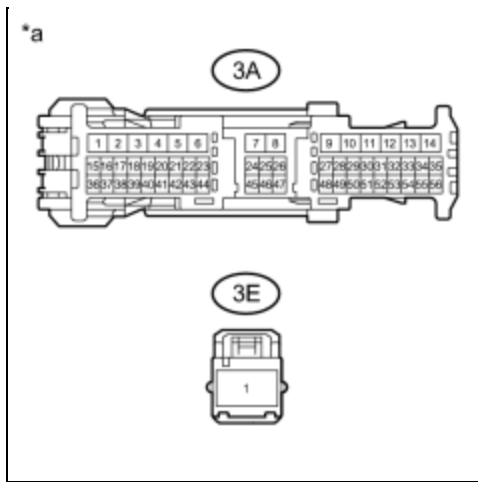
(a) Disconnect the 3A and 3E instrument panel junction block assembly connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3A-15 - Body ground	Ignition switch ON	11 to 14 V
3E-1 - Body ground	Always	11 to 14 V

Text in Illustration



*a Front view of wire harness connector
(to Instrument Panel Junction Block Assembly)

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

4. CHECK HARNESS AND CONNECTOR (GROUND)

- (a) Disconnect the D6 and A73 main body ECU (network gateway ECU) connector.
- (b) Disconnect the 3A and 3B instrument panel junction block assembly connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance :

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D6-1 (GND) - Body ground	Always	Below 1 Ω
A73-4 (GND) - Body ground	Always	Below 1 Ω
3A-12 - Body ground	Always	Below 1 Ω
3A-13 - Body ground	Always	Below 1 Ω
3B-18 - Body ground	Always	Below 1 Ω

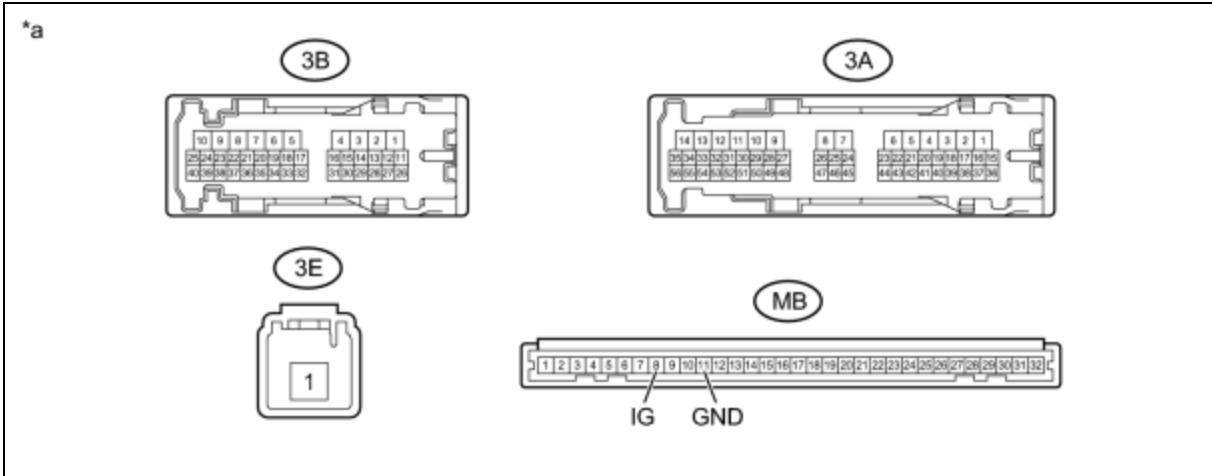
NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK



5.	INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY
-----------	---

- (a) Remove the instrument panel junction block assembly INFO.
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	---	---	---

- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3E-1 - MB-8 (IG)	No battery voltage is applied across terminals 3A-15 and 3A-12	10 kΩ or higher
3E-1 - MB-8 (IG)	Battery voltage is applied across terminals 3A-15 and 3A-12	Below 1 Ω
3B-18 - MB-11 (GND)	Always	Below 1 Ω

NG ▶ REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

OK ▶ REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002MQ300ZX
Title: POWER DISTRIBUTION: ELECTRIC POWER CONTROL SYSTEM: B1014: ACC Power Supply Circuit (2013 FR-S)		

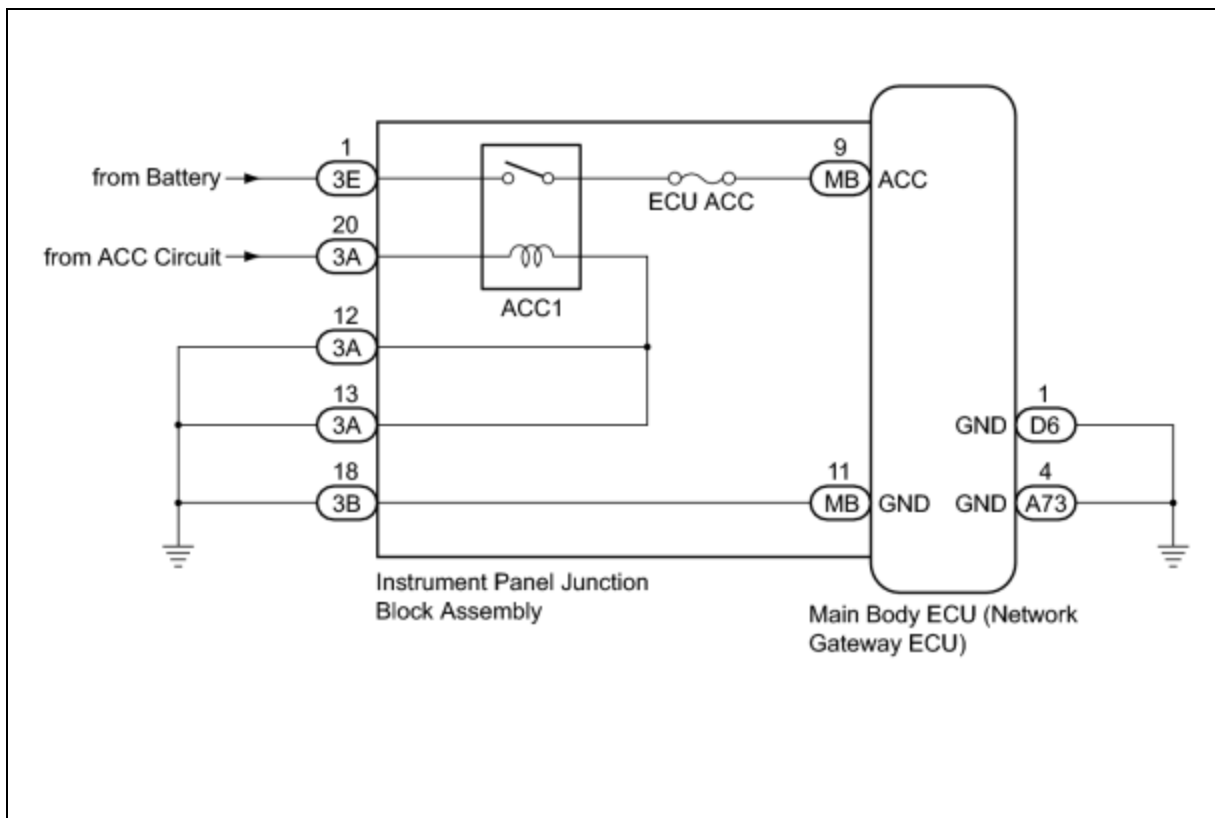
DTC	B1014	ACC Power Supply Circuit
------------	--------------	---------------------------------

DESCRIPTION

B1014 is stored when a malfunction is detected in the ACC circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1014	When ACC voltage is 8.3 V or less, or 16.7 V or more (ACC circuit malfunction)	<ul style="list-style-type: none"> • Main body ECU (network gateway ECU) • Instrument panel junction block assembly • Harness or connector

WIRING DIAGRAM




INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE


1.	CLEAR DTC
-----------	------------------

(a) Clear the DTCs .

NEXT



2.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs .

Result

RESULT	PROCEED TO
DTC B1014 is output	A
DTC is not output	B

B  **USE SIMULATION METHOD TO CHECK**

A



3.	CHECK HARNESS AND CONNECTOR (VOLTAGE)
-----------	--

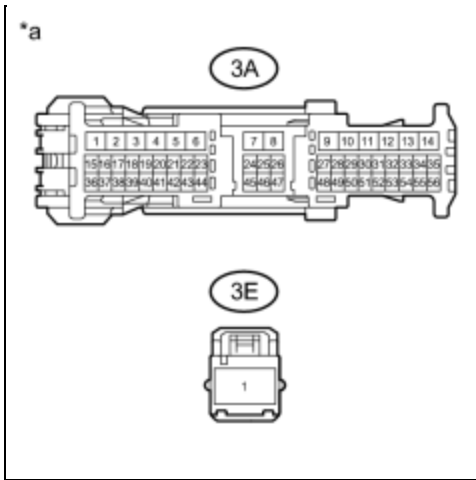
(a) Disconnect the 3A and 3E instrument panel junction block assembly connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3A-20 - Body ground	Ignition switch ACC	11 to 14 V
3E-1 - Body ground	Always	11 to 14 V

Text in Illustration



*a Front view of wire harness connector
(to Instrument Panel Junction Block Assembly)

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

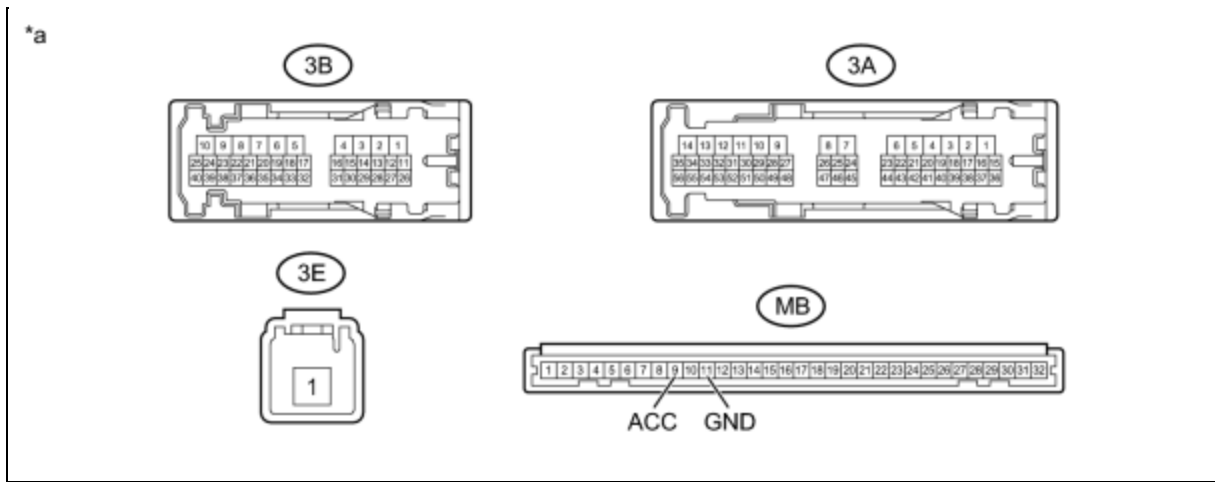
4. CHECK HARNESS AND CONNECTOR (GROUND) [INFO](#)

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

5. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

- (a) Remove the instrument panel junction block assembly [INFO](#) .
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	---	---	---

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3E-1 - MB-9 (ACC)	No battery voltage is applied across terminals 3A-20 and 3A-12	10 k Ω or higher
3E-1 - MB-9 (ACC)	Battery voltage is applied across terminals 3A-20 and 3A-12	Below 1 Ω
3B-18 - MB-11 (GND)	Always	Below 1 Ω

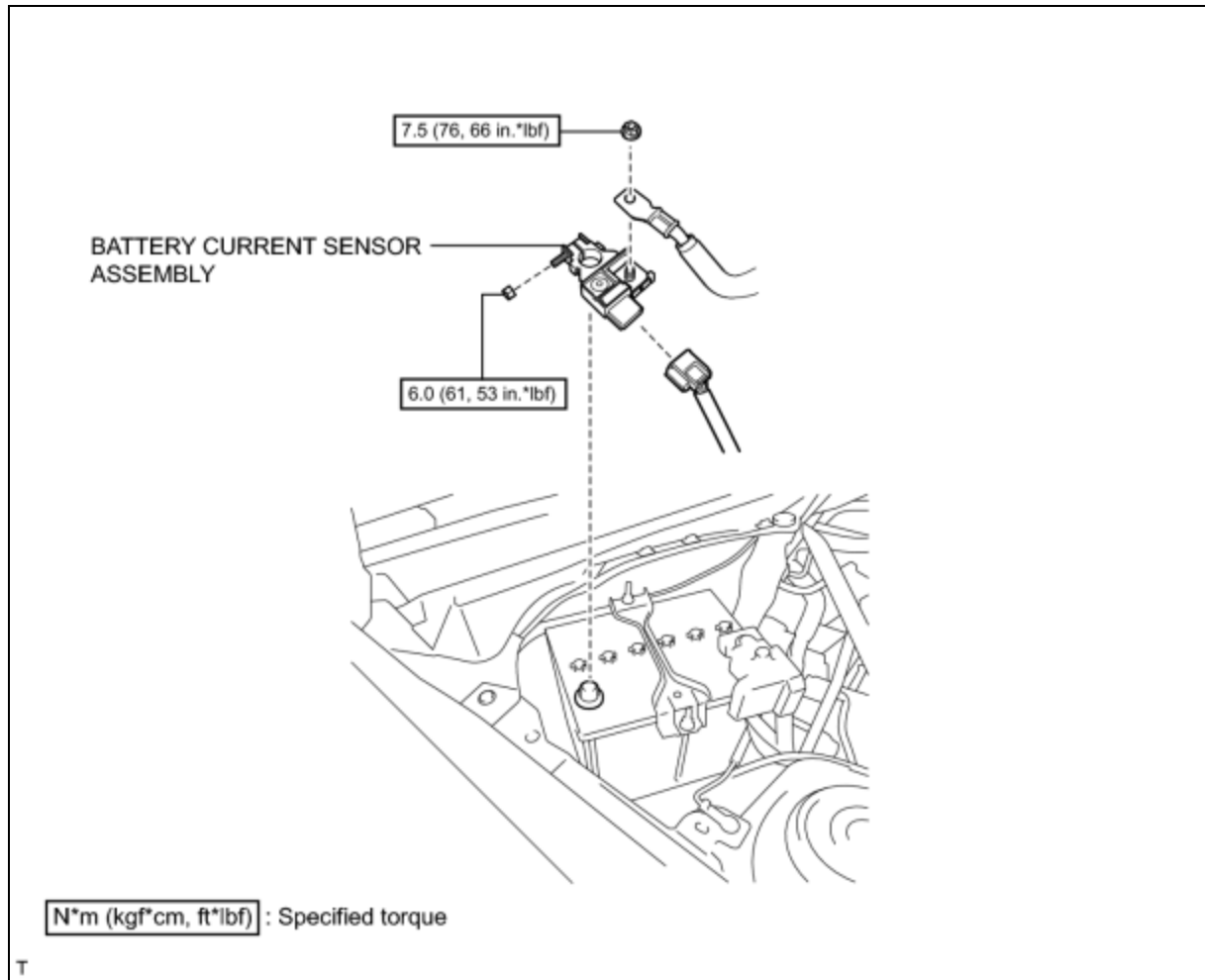
NG ▶ REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

OK ▶ REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003QMR00BX
Title: POWER DISTRIBUTION: BATTERY CURRENT SENSOR: COMPONENTS (2013 FR-S)		

COMPONENTS

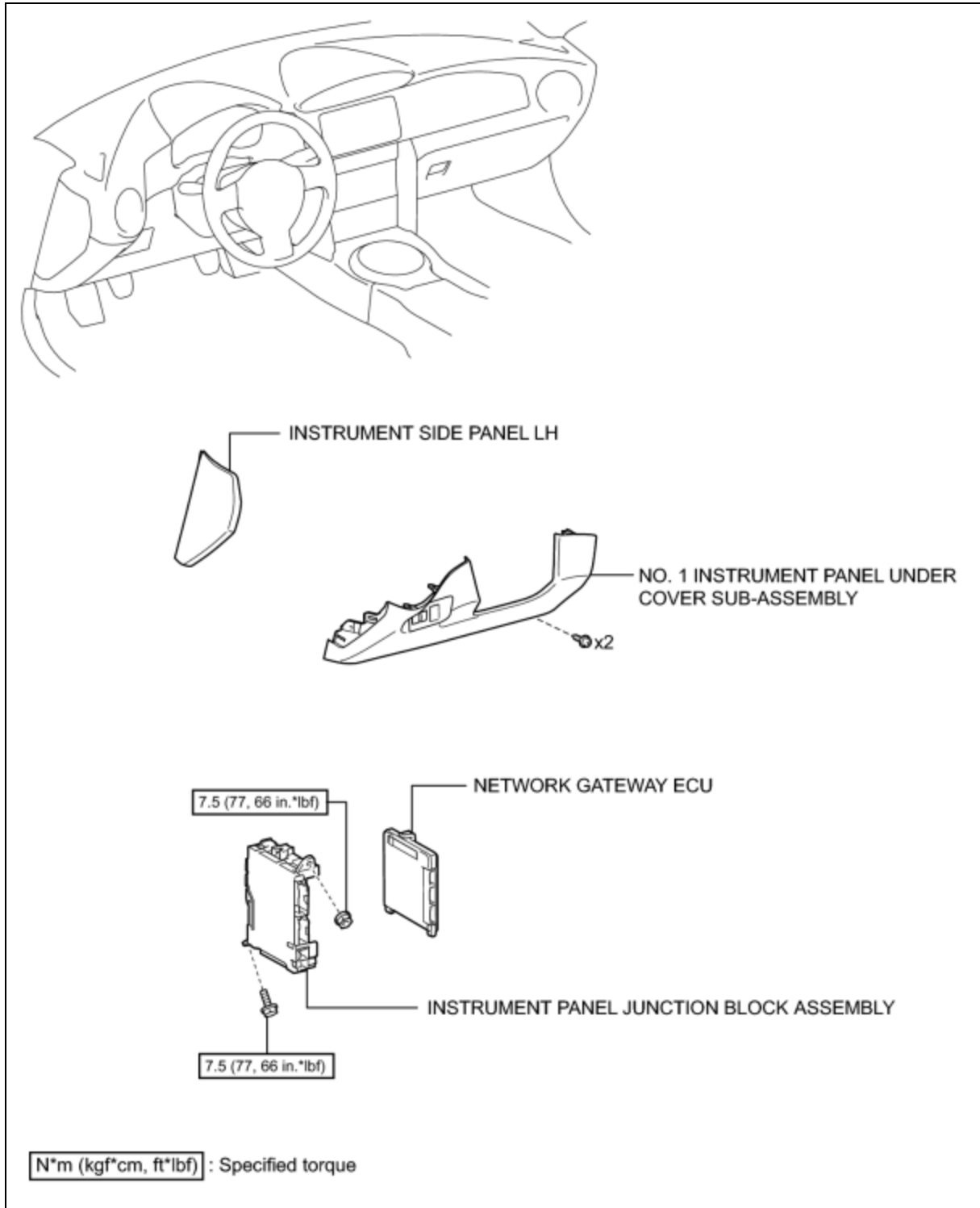
ILLUSTRATION



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003TOD00CX
Title: POWER DISTRIBUTION: MAIN BODY ECU: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000CCZ0BNX
Title: POWER DISTRIBUTION: ELECTRIC POWER CONTROL SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Data List.
- (e) Read the Data List according to the display on the Techstream.

Main Body (Main Body ECU (Network Gateway ECU))

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Battery Power Supply Control Voltage	<ul style="list-style-type: none"> • Battery power supply control voltage/ • Min.: 0 V, Max.: 21.4 V 	11 to 14 V	-
Battery Power Supply Back Up Voltage	<ul style="list-style-type: none"> • Battery power supply back up voltage/ • Min.: 0 V, Max.: 21.4 V 	11 to 14 V	-
IG Power Supply Voltage	<ul style="list-style-type: none"> • IG power supply voltage/ • Min.: 0 V, Max.: 21.4 V 	11 to 14 V	-
ACC Voltage	<ul style="list-style-type: none"> • ACC voltage/ • Min.: 0 V, Max.: 21.4 V 	11 to 14 V	-

Last Modified: 3-27-2012	6.4 S	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MXP02LX
Title: POWER DISTRIBUTION: ELECTRIC POWER CONTROL SYSTEM: DIAGNOSTIC TROUBLE CODE CHART (2013 FR-S)		

DIAGNOSTIC TROUBLE CODE CHART

DTC CODE	DETECTION ITEM	SEE PAGE
B1010	BIU System Error	INFO
B1011	Battery Power Supply Control Circuit	INFO
B1012	Battery Power Supply Back Up Circuit	INFO
B1013	IG Power Supply Circuit	INFO
B1014	ACC Power Supply Circuit	INFO

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PDK0XLX
Title: POWER DISTRIBUTION: ELECTRIC POWER CONTROL SYSTEM: DTC CHECK / CLEAR (2013 FR-S)		

DTC CHECK / CLEAR

1. CHECK DTC

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Trouble Codes.
- (e) Check for DTCs.

2. CLEAR DTC

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Trouble Codes.
- (e) Clear the DTCs.



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PKJOE8X
Title: POWER DISTRIBUTION: ELECTRIC POWER CONTROL SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

*: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	INSPECT BATTERY VOLTAGE
-----------	--------------------------------

Standard voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT



3.	CHECK COMMUNICATION FUNCTION OF CAN COMMUNICATION SYSTEM*
-----------	--

(a) Use the Techstream to check if the CAN communication system is functioning normally

INFO

Result




RESULT	PROCEED TO
CAN DTC is not output	A
CAN DTC is output	B

B **Go to CAN COMMUNICATION SYSTEM**

A



4. CHECK FOR DTC*

- (a) Check for DTCs  .
- (b) Clear the DTCs  .
- (c) Recheck for DTCs  .



Result

RESULT	PROCEED TO
DTC output does not reoccur	A
DTC output reoccurs	B

B  Go to step 6

A


5. OVERALL ANALYSIS AND TROUBLESHOOTING*

- (a) Terminals of ECU  .
- (b) Data List / Active Test  .

NEXT


6. REPAIR OR REPLACE

NEXT


7. CONFIRMATION TEST

NEXT  **END**

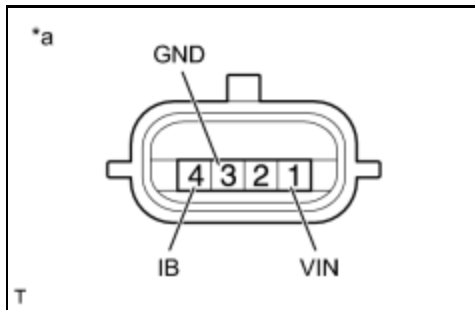




Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003QRB00BX
Title: POWER DISTRIBUTION: BATTERY CURRENT SENSOR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT BATTERY CURRENT SENSOR ASSEMBLY



(a) Check the resistance of the battery current sensor assembly.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (VIN) - 3 (GND)	Always	3 to 10 k Ω
1 (VIN) - 4 (IB)	Always	Below 0.5 k Ω
3 (GND) - 4 (IB)	Always	3 to 10 k Ω

If the result is not as specified, replace the battery current sensor assembly.

Text in illustration

*a	Component without harness connected (Battery Current Sensor Assembly)
----	--

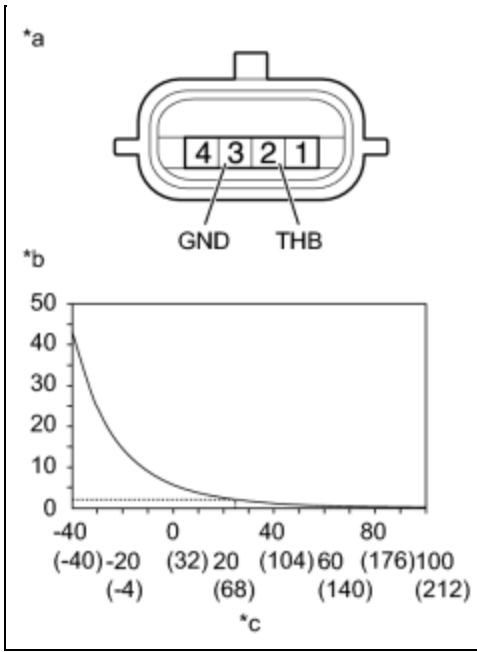
(b) Check the resistance of the battery current sensor assembly.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
2 (THB) - 3 (GND)	20°C (68°F) to 30°C (86°F)	1.5 to 2.6 k Ω

If the result is not as specified, replace the battery current sensor assembly.



Text in illustration

*a	Component without harness connected (Battery Current Sensor Assembly)
*b	[kΩ]
*c	[°C (°F)]

HINT:

The "Condition" indicates the temperature in the vicinity of the sensor, not of the actual sensor itself.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003QM00BX
Title: POWER DISTRIBUTION: BATTERY CURRENT SENSOR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL BATTERY CURRENT SENSOR ASSEMBLY

(a) Install the battery current sensor assembly.

(b) Tighten the nut.

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

(c) Connect the engine wire with the nut.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

(d) Connect the connector.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003TOC00EX
Title: POWER DISTRIBUTION: MAIN BODY ECU: INSTALLATION (2013 FR-S)		

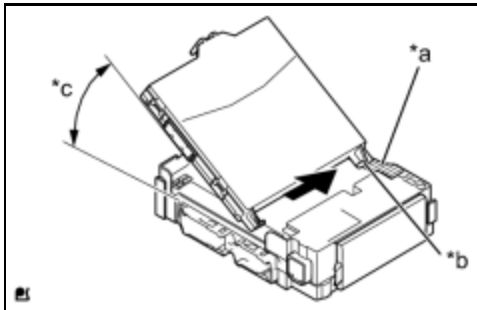
INSTALLATION

1. INSTALL NETWORK GATEWAY ECU

NOTICE:

- Prevent foreign matter from being mixed into the engagement, connector or terminal.
- Do not touch the network gateway ECU connector terminals.

(a) Make the network gateway ECU guide to contact the housing side wall.

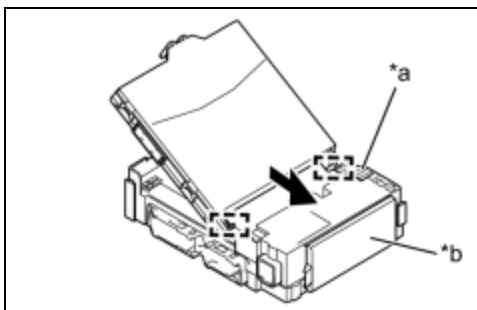


HINT:

The angle between the junction block and the network gateway ECU guide should be 20° or more.

Text in illustration

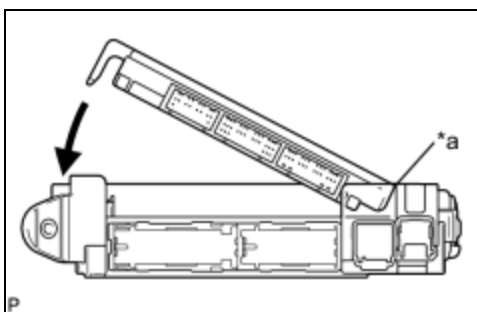
*a	Housing Side Wall
*b	Guide
*c	20° or more



(b) While aligning the guide with the housing side wall, slide the network gateway ECU toward the fuse area of the instrument panel junction block assembly and engage the 2 guides.

Text in illustration

*a	Hosing Side Wall
*b	Fuse Area



(c) Slide the network gateway ECU until it contacts the A surface.

(d) Rotate the network gateway ECU while holding it against the instrument panel junction block assembly surface (axis of rotation).

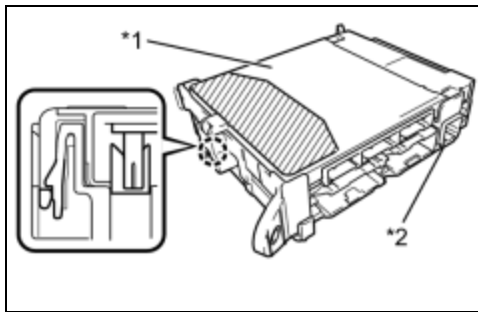
NOTICE:

- Slide the network gateway ECU gently.
- Do not apply strong impact to the side of the network gateway ECU.

Text in illustration

*a	A surface
----	-----------

(e) Rotate the network gateway ECU until it engages with the lock to install it.




NOTICE:

- When pressing the network gateway ECU, press the push area as shown in the illustration.
- A lock sound will be heard when the network gateway ECU is engaged.
- Do not hit or weight the network gateway ECU when it engages with the instrument panel junction block assembly.

HINT:

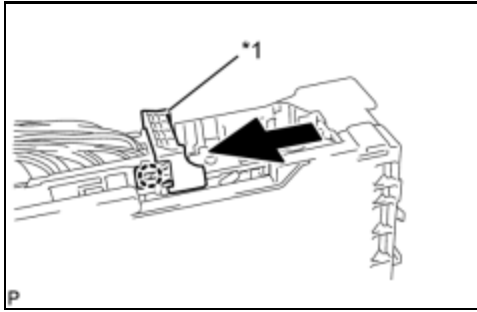
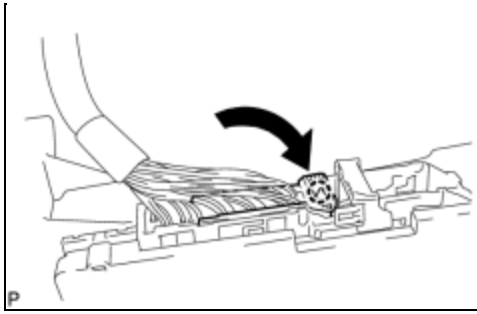
If a lock sound is not heard, visually check the lock engagement. Check that the height of the network gateway ECU and instrument panel junction block assembly match.

Text in illustration

*1	Network Gateway ECU
*2	Instrument Panel Junction Block Assembly
	Push Area

2. INSTALL INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

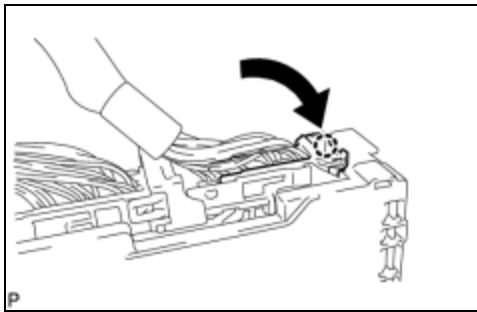
(a) Connect the connector as shown in the illustration.



(b) Slide the lever as indicated by the arrow shown in the illustration.

Text in illustration

*1	Lever
----	-------



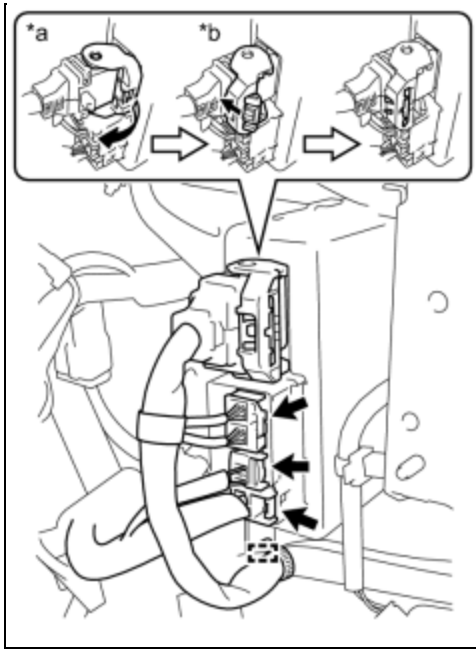
(c) Connect the connector indicated as shown in the illustration.

(d) Install the instrument panel junction block assembly with the bolt and the nut.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

(e) Connect 6 connectors to the instrument panel junction block assembly.

(f) Connect the 3 connectors to the power steering ECU assembly.



(g) Connect the connector to the power steering ECU assembly.

(1) As shown in the illustration, return the lock lever to its original position to connect the connector and securely push in the lock of the lock lever.

(h) Engage the clamp.

Text in illustration

*a	Return the lock lever
*b	Push the lock

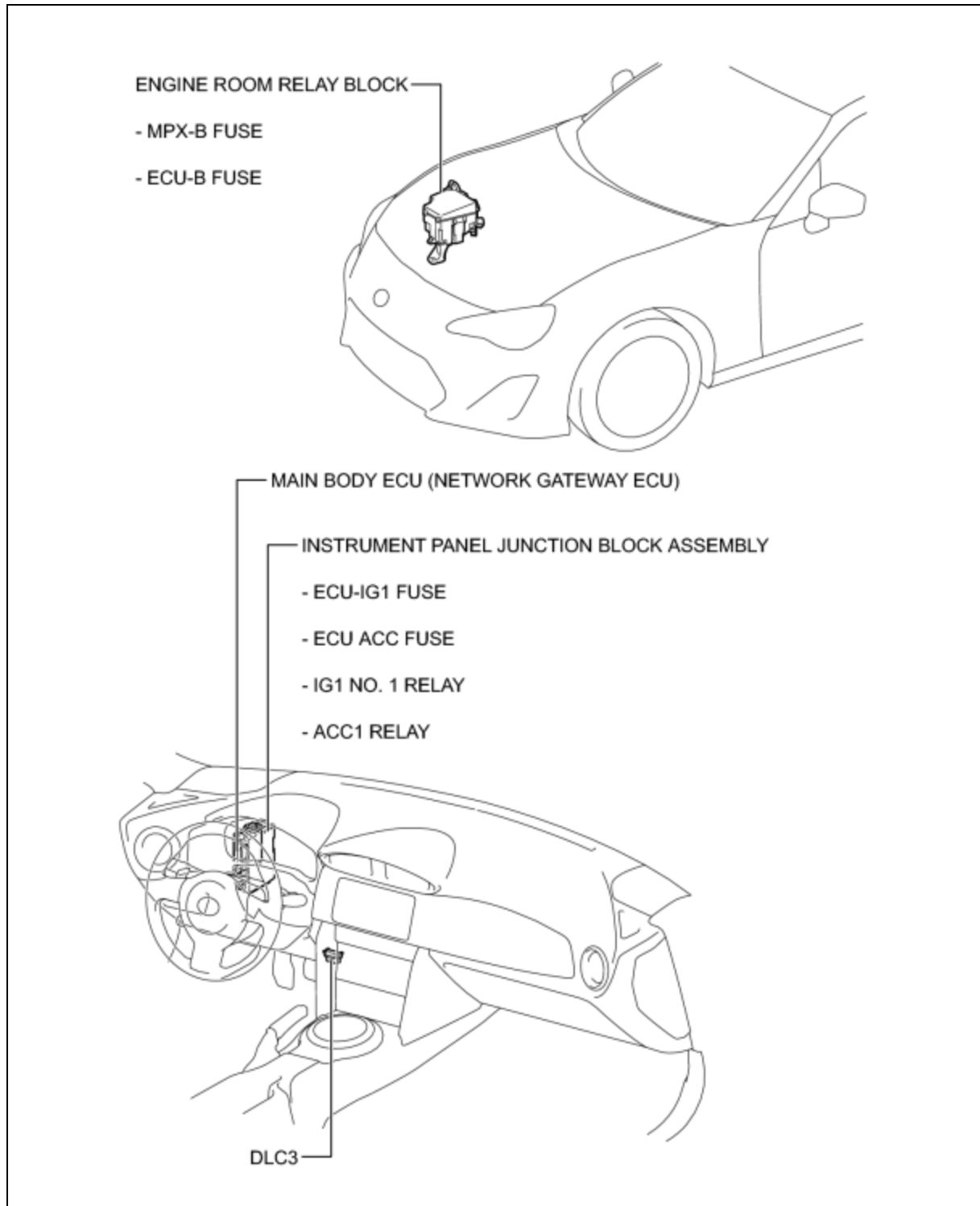
3. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)

4. INSTALL INSTRUMENT SIDE PANEL LH [INFO](#)

Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003HIV000X
Title: POWER DISTRIBUTION: ELECTRIC POWER CONTROL SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003QMS00BX
Title: POWER DISTRIBUTION: BATTERY CURRENT SENSOR: REMOVAL (2013 FR-S)		

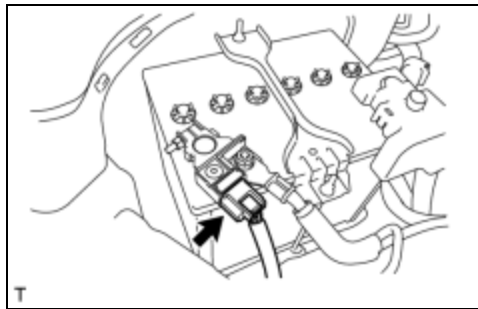
REMOVAL

1. PRECAUTION

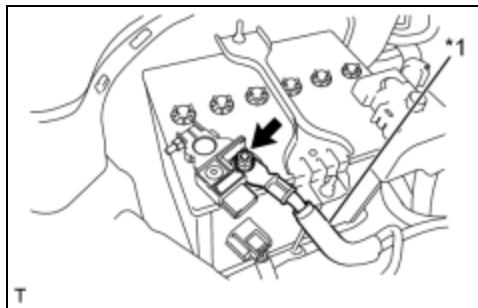
HINT:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the battery terminal. Therefore, make sure to read the disconnecting the cable from the battery terminal notice before proceeding with work [INFO](#) .

2. REMOVE BATTERY CURRENT SENSOR ASSEMBLY



(a) Disconnect the connector.



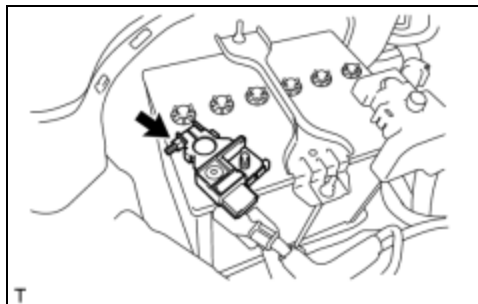
(b) Remove the nut and disconnect the engine wire.

NOTICE:

Since this operation may damage the molding, make sure to fully open the driver and passenger side door windows.

Text in illustration

*1	Engine Wire
----	-------------



(c) Loosen the nut and remove the battery current sensor assembly.



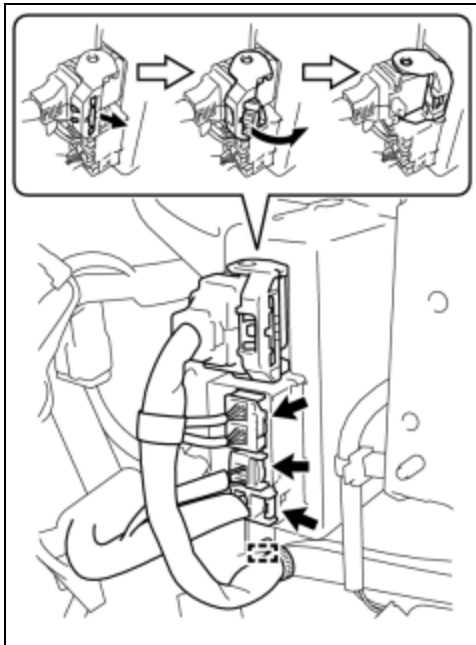
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003TOE00EX
Title: POWER DISTRIBUTION: MAIN BODY ECU: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE INSTRUMENT SIDE PANEL LH INFO

2. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY INFO

3. REMOVE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY



(a) Disengage the clamp.

(b) Disconnect the connector from the power steering ECU assembly.

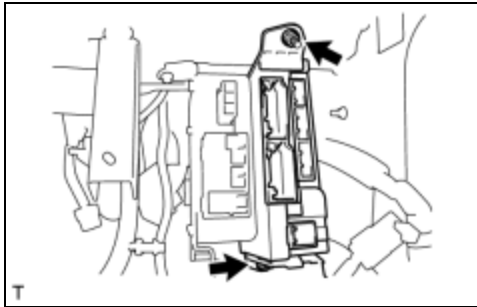
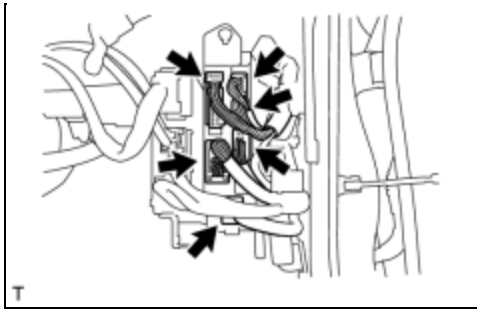
(1) As shown in the illustration, pull out the lock of the lock lever and turn the lock lever to disconnect the connector.

Text in illustration

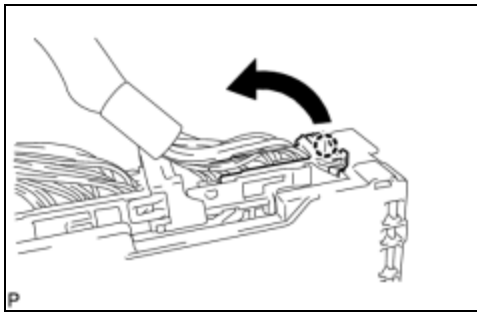
*a	Pull out the lock
*b	Turn the lock lever

(c) Disconnect the 3 connectors from the power steering ECU.

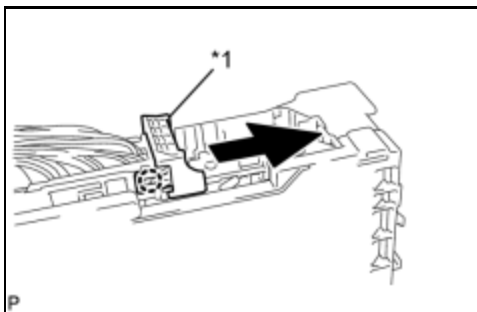
(d) Disconnect the 6 front side connectors from the instrument panel junction block assembly indicated as shown in the illustration.



(e) Remove the bolt, nut and the instrument panel junction block assembly.



(f) Disconnect the connector indicated as shown in the illustration.

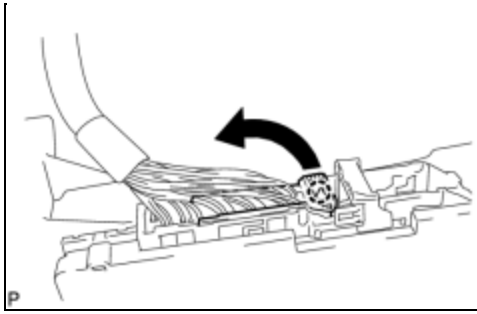


(g) Disengage the claw and slide the lever to the upward.

Text in illustration

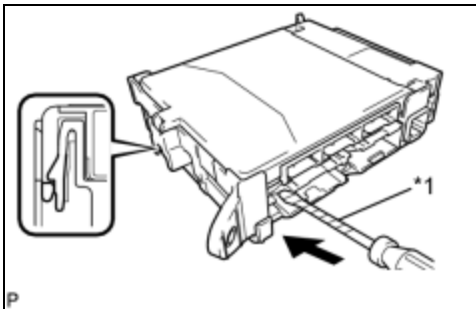
*1	Lever
----	-------

(h) Disconnect the connector indicated as shown in the illustration.



(i) Remove the instrument panel junction block assembly.

4. REMOVE NETWORK GATEWAY ECU



- (a) Press the claw of the instrument panel junction block assembly side as shown in the illustration to release the lock.
- (b) With the instrument panel junction block assembly side, insert the screwdriver with its tip wrapped in protective tape between the network gateway ECU and the instrument panel junction block assembly.

NOTICE:

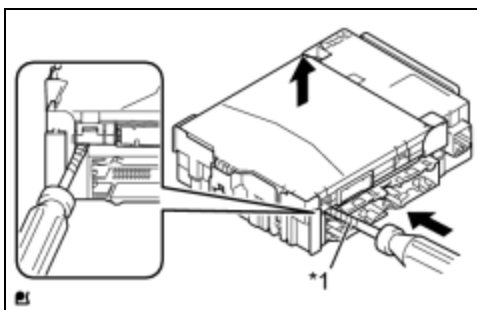
Use a blade screwdriver with a diameter of 5.0 to 6.3 mm (0.197 to 0.248 in.), and with a length of 90mm (3.543 in.) or more.

Text in illustration

*1	Protective Tape
----	-----------------

- (c) Using the screwdriver with its tip wrapped with protective tape, carefully raise the network gateway ECU until the connector becomes disengaged.

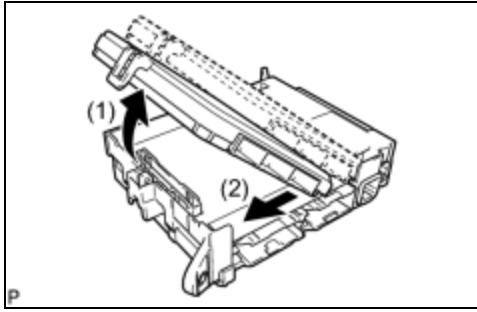
Text in illustration



*1	Protective Tape
----	-----------------

NOTICE:

- Do not twist the screwdriver to raise the network gateway ECU.
- If any terminals of the connectors, locking parts or cases are deformed or damaged, replace the instrument panel junction block assembly or the network gateway ECU.



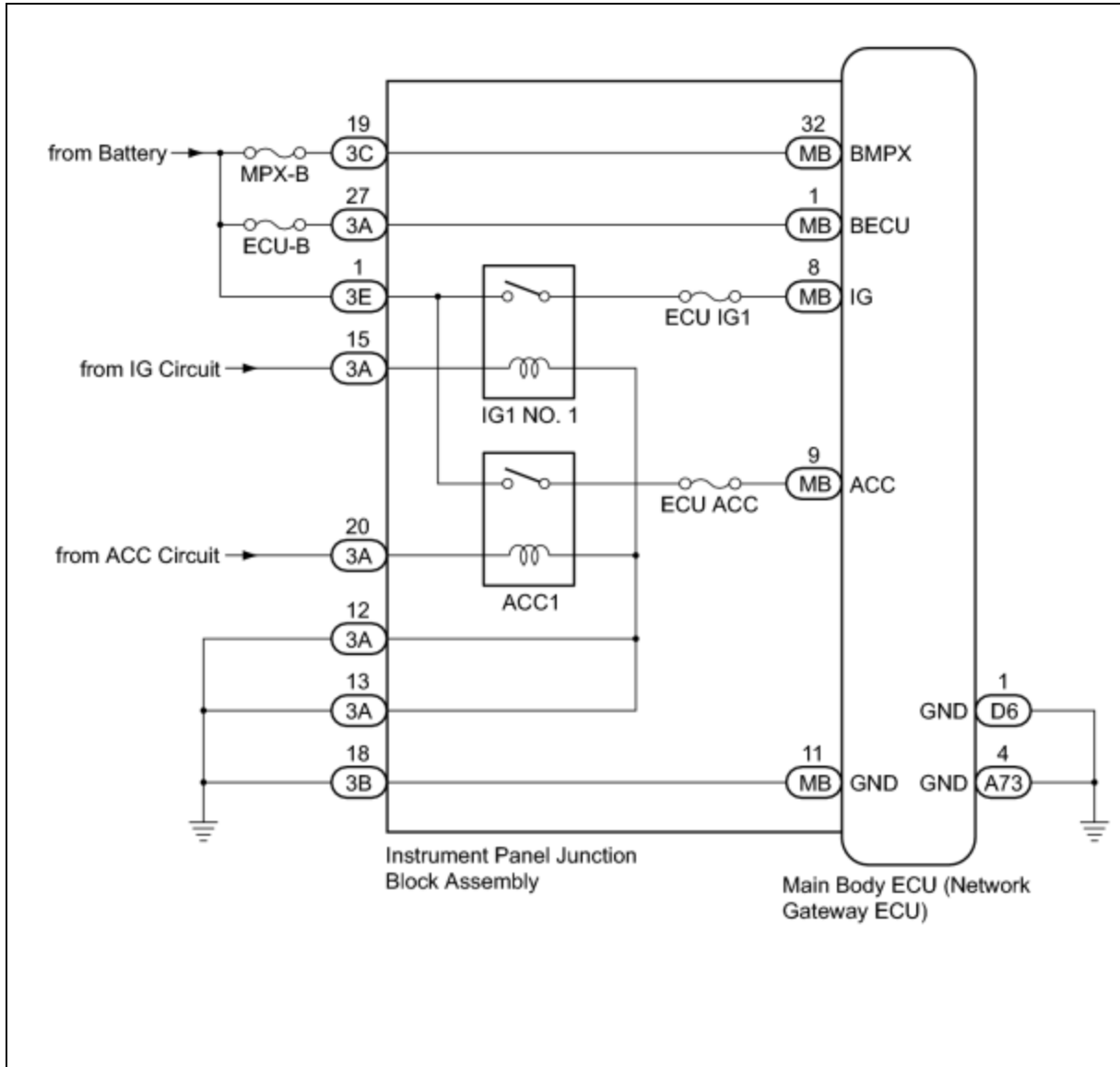
(d) Raise the network gateway ECU as shown by arrow 1, and then pull it out as shown by arrow 2 in the illustration.

NOTICE:

Do not touch the network gateway ECU connector terminals.

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003HIX016X
Title: POWER DISTRIBUTION: ELECTRIC POWER CONTROL SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

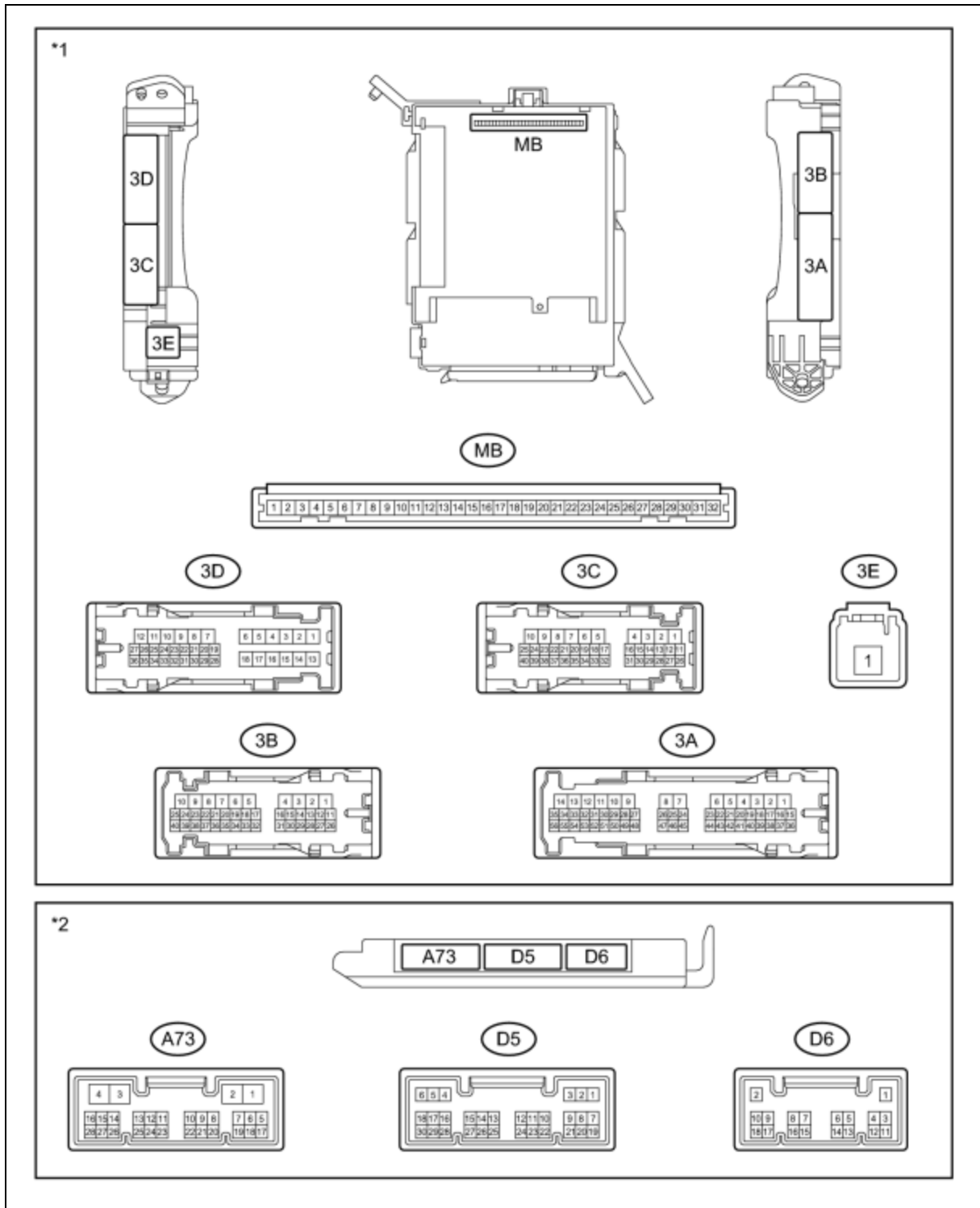
SYSTEM DIAGRAM



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001H7X00KX
Title: POWER DISTRIBUTION: ELECTRIC POWER CONTROL SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. CHECK INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY AND MAIN BODY ECU (NETWORK GATEWAY ECU)



Text in Illustration

*1	Instrument Panel Junction Block Assembly	*2	Main Body ECU (Network Gateway ECU)
----	--	----	-------------------------------------

(a) Measure the voltage and resistance according to the value(s) in the table below.

HINT:

With the connectors connected, inspect from the rear side of the connectors.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
3A-15 - Body ground	W - Body ground	IG power supply	Ignition switch ON	11 to 14V
3A-20 - Body ground	SB - Body ground	ACC power supply	Ignition switch ON	11 to 14V
3A-27 - Body ground	G-R - Body ground	Battery power supply	Always	11 to 14V
3C-19 - Body ground	L-R - Body ground	Battery power supply	Always	11 to 14V
3E-1 - Body ground	B-R - Body ground	Battery power supply	Always	11 to 14V
3A-12 - Body ground	B - Body ground	Ground	Always	Below 1 Ω
3A-13 - Body ground	B - Body ground	Ground	Always	Below 1 Ω
3B-18 - Body ground	B-Y - Body ground	Ground	Always	Below 1 Ω
D6-1 (GND) - Body ground	B - Body ground	Ground	Always	Below 1 Ω
A73-4 (GND) - Body ground	B-Y - Body ground	Ground	Always	Below 1 Ω

(b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.

(c) Measure the voltage and resistance according to the value(s) in the table below.

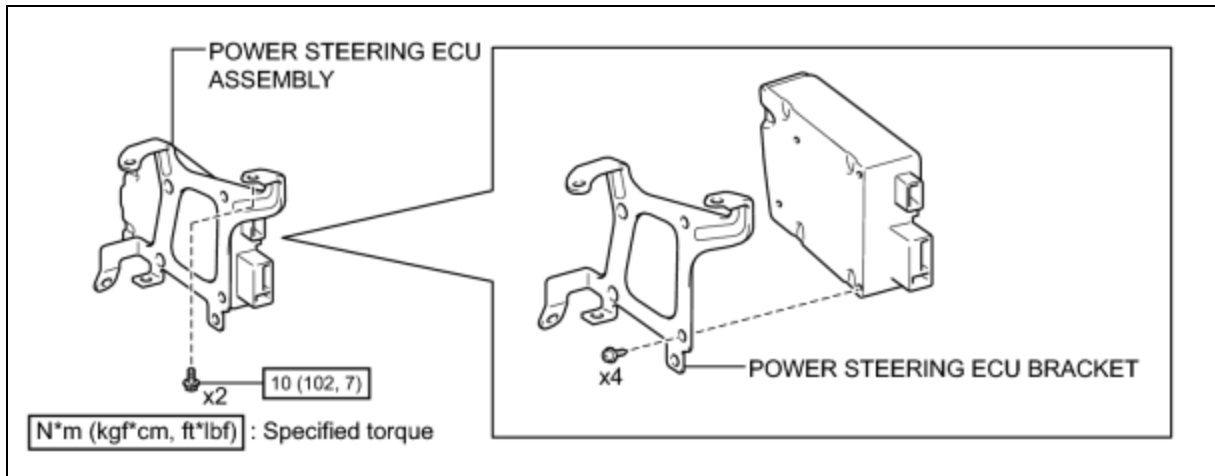
TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
MB-1 (BECU) - Body ground	None - Body ground	Battery power supply back up voltage	Always	11 to 14V
MB-8 (IG) - Body ground	None - Body ground	IG power supply	Ignition switch ON	11 to 14V
MB-9 (ACC) - Body ground	None - Body ground	ACC power supply	Ignition switch ACC	11 to 14V
MB-32 (BMPX) - Body ground	None - Body ground	Battery power supply control voltage	Always	11 to 14V
MB-11 (GND) - Body ground	None - Body ground	Ground	Always	Below 1 Ω



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XN502YX
Title: POWER ASSIST SYSTEMS: POWER STEERING ECU: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XN404SX
Title: POWER ASSIST SYSTEMS: POWER STEERING ECU: INSTALLATION (2013 FR-S)		

INSTALLATION

1. PRECAUTION

CAUTION:

Be sure to read Precaution thoroughly before servicing  .

2. INSTALL POWER STEERING ECU BRACKET

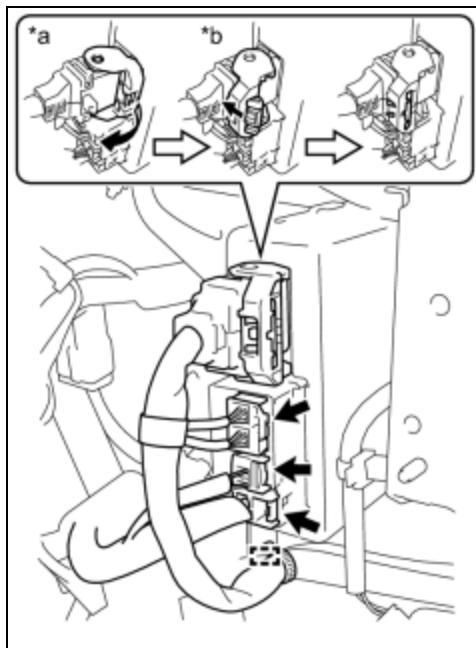
- (a) Install the power steering ECU bracket with 4 screws.

3. INSTALL POWER STEERING ECU ASSEMBLY

- (a) Install the power steering ECU assembly with the 2 bolts.

Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

- (b) Engage the clamp.
(c) Connect the 3 connectors to the power steering ECU assembly.



- (d) Connect the connector to the power steering ECU assembly.

- (1) As shown in the illustration, return the lock lever to its original position to connect the connector and securely push in the lock of the lock lever.

Text in Illustration

*a	Return the lock lever
*b	Push the lock

- (e) Engage the clamp.

4. INSTALL INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY



5. INITIALIZE ROTATION ANGLE SENSOR AND CALIBRATE TORQUE SENSOR ZERO POINT



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XN604SX
Title: POWER ASSIST SYSTEMS: POWER STEERING ECU: REMOVAL (2013 FR-S)		

REMOVAL

1. PRECAUTION

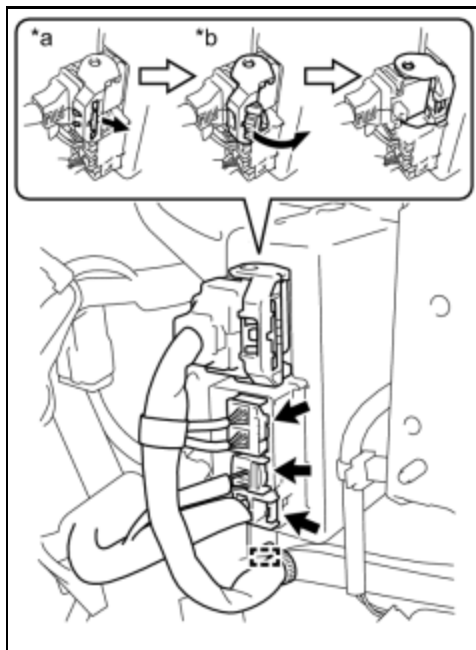
CAUTION:

Be sure to read Precaution thoroughly before servicing INFO.

2. REMOVE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

INFO

3. REMOVE POWER STEERING ECU ASSEMBLY



(a) Disengage the clamp.

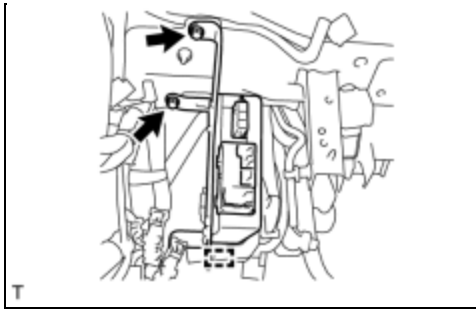
(b) Disconnect the connector from the power steering ECU assembly.

(1) As shown in the illustration, pull out the lock of the lock lever and turn the lock lever to disconnect the connector.

Text in Illustration

*a	Pull out the lock
*b	Turn the lock lever

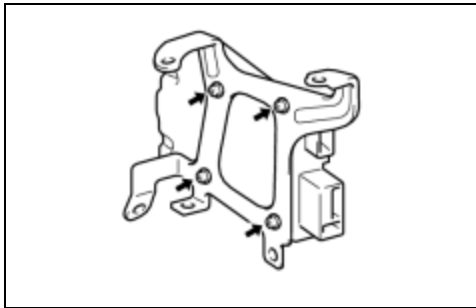
(c) Disconnect the 3 connectors from the power steering ECU assembly.



(d) Disengage the clamp.

(e) Remove the 2 bolts and power steering ECU assembly.

4. REMOVE POWER STEERING ECU BRACKET



(a) Remove the 4 screws and power steering ECU bracket.

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000277F040X
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: C1511-C1514,C1517: Torque Sensor Circuit Malfunction (2013 FR-S)		

DTC	C1511	Torque Sensor Circuit Malfunction
------------	--------------	--

DTC	C1512	Torque Sensor Circuit Malfunction
------------	--------------	--

DTC	C1513	Torque Sensor Circuit Malfunction
------------	--------------	--

DTC	C1514	Torque Sensor Power Supply Abnormal
------------	--------------	--

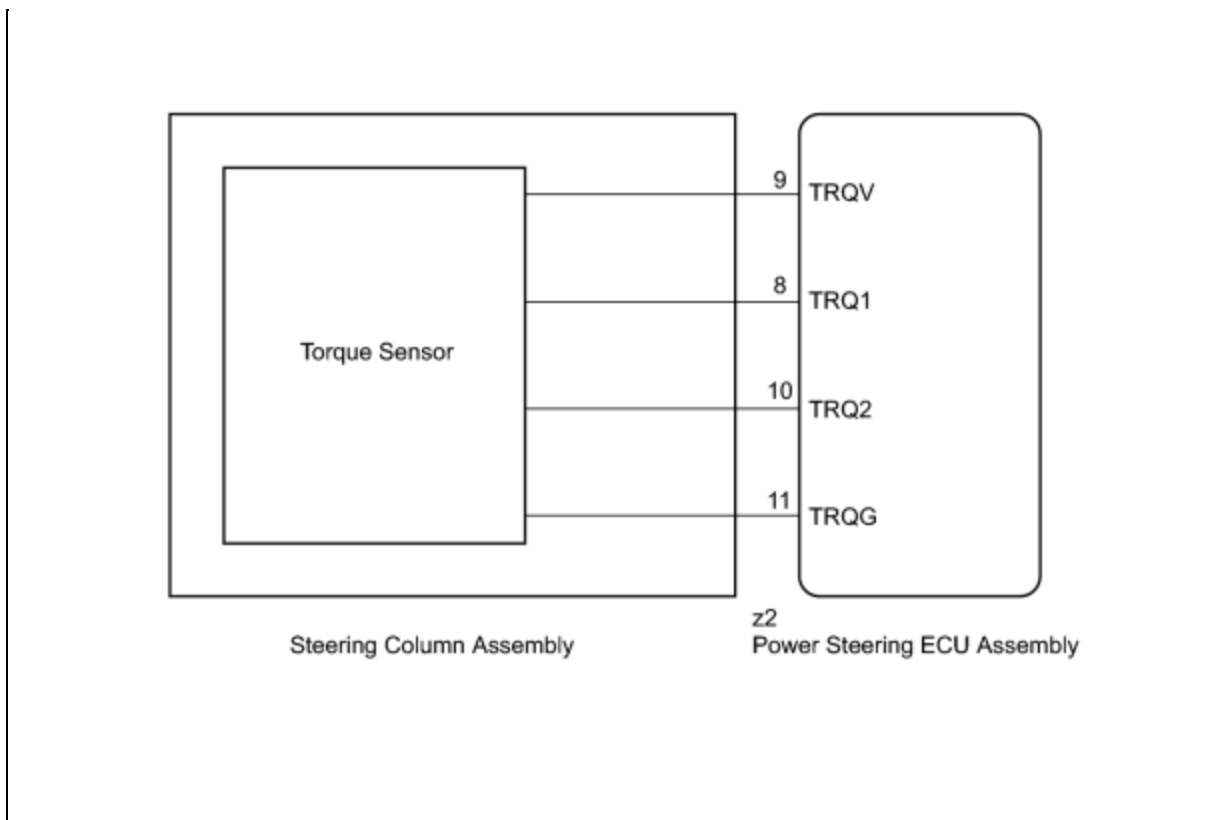
DTC	C1517	Torque Hold Abnormal
------------	--------------	-----------------------------

DESCRIPTION

The torque sensor converts the rotation torque input to the steering wheel into an electrical signal and sends it to the power steering ECU assembly. Based on this signal, the ECU detects steering effort.


DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
C1511	A torque sensor (TRQ1) signal error or stop	<ul style="list-style-type: none"> Steering column assembly (torque sensor) Power steering ECU assembly
C1512	A torque sensor (TRQ2) signal error or stop	
C1513	The deviation between torque sensor TRQ1 and TRQ2 exceeds a specified value.	
C1514	A torque sensor power supply voltage error	
C1517	Temporary control due to a malfunction related to the torque sensor continues for long time.	

WIRING DIAGRAM



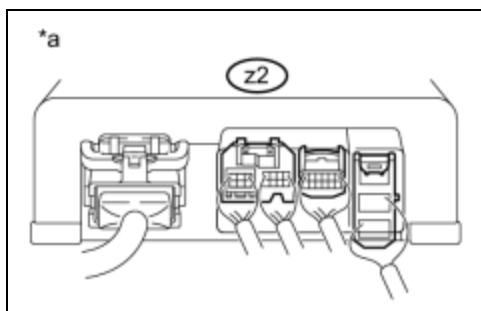
INSPECTION PROCEDURE

NOTICE:

If the power steering ECU assembly or steering column assembly is replaced, perform rotation angle sensor initialization and torque sensor zero point calibration  .

PROCEDURE

- | | |
|----|---|
| 1. | CHECK CONNECTOR CONNECTION CONDITION (TORQUE SENSOR - POWER STEERING ECU ASSEMBLY) |
|----|---|



(a) Check the connection condition of the z2 torque sensor connector.

OK:

Torque sensor connector is securely connected to the power steering ECU assembly.

Text in Illustration

*a	Component with harness connected (Power Steering ECU Assembly)
----	--

OK



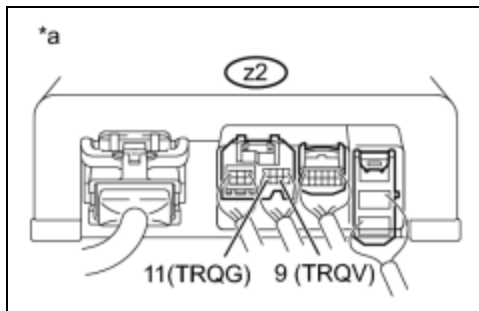
2. CHECK POWER STEERING ECU ASSEMBLY (TRQV VOLTAGE)

(a) Turn the ignition switch off.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:



TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
z2-9 (TRQV) - z2-11 (TRQG)	Ignition switch ON	4.5 to 5.5 V

HINT:

When the value is within the specified range, record the value.

Text in Illustration

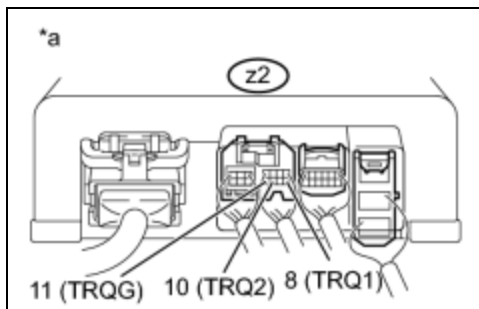
*a	Component with harness connected (Power Steering ECU Assembly)
----	--

NG ▶ REPLACE POWER STEERING ECU ASSEMBLY

OK



3. CHECK POWER STEERING ECU ASSEMBLY (TRQ1, TRQ2 VOLTAGE)



(a) Start the engine.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
z2-8 (TRQ1) - z2-11 (TRQG)	Engine running, steering wheel not turned (without load)	2.3 to 2.7 V
	Engine running, steering wheel turned to right with vehicle stopped	2.3 to 3.8 V
	Engine running, steering wheel turned to left with vehicle stopped	1.2 to 2.7 V
z2-10 (TRQ2) - z2-11 (TRQG)	Engine running, steering wheel not turned (without load)	2.3 to 2.7 V
	Engine running, steering wheel turned to right with vehicle stopped	1.2 to 2.7 V
	Engine running, steering wheel turned to left with vehicle stopped	2.3 to 3.8 V

(c) Calculate the difference between the value recorded when measuring the voltage at terminal TRQV in the previous step, and the sum of the output of torque sensor 1 and torque sensor 2.

OK:

0.3 V or less (Absolute value)

Text in Illustration

*a	Component with harness connected (Power Steering ECU Assembly)
----	---

NG ► REPLACE STEERING COLUMN ASSEMBLY

OK ► REPLACE POWER STEERING ECU ASSEMBLY

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000277G03MX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: C1515,C1525: Torque Sensor Zero Point Adjustment Undone (2013 FR-S)		

DTC	C1515	Torque Sensor Zero Point Adjustment Undone
------------	--------------	---

DTC	C1525	Rotation Angle Sensor Initialization Undone
------------	--------------	--


DESCRIPTION

These DTCs do not indicate a malfunction. The power steering ECU assembly stores these DTCs when it determines that the rotation angle sensor value initialization and torque sensor zero point calibration have not been performed.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
C1515	Torque sensor zero point calibration has not been performed.	There is no malfunction if this DTC is not output again after performing torque sensor zero point calibration.
C1525	Rotation angle sensor value initialization has not been performed.	There is no malfunction if this DTC is not output again after performing rotation angle sensor value initialization.


INSPECTION PROCEDURE

NOTICE:

If the power steering ECU assembly or steering column assembly is replaced, perform rotation angle sensor initialization and torque sensor zero point calibration  .

PROCEDURE

1.	INITIALIZE ROTATION ANGLE SENSOR AND CALIBRATE TORQUE SENSOR ZERO POINT
-----------	--

(a) Initialize the rotation angle sensor and calibrate the torque sensor zero point  .

NEXT



2.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs  .

NOTICE:

If DTC C1515 or C1525 is output even though the rotation angle sensor value initialization and torque sensor zero point calibration have been performed, check the procedure again, and perform calibration and initialization 3 times.

Result

CONDITION	PROCEED TO
DTC C1515 or C1525 is still output after performing rotation angle sensor initialization and torque sensor zero point calibration 3 times.	A
DTC C1515 or C1525 is not output.	B

B  **END**

A




3.	REPLACE POWER STEERING ECU ASSEMBLY
-----------	--

(a) Replace the power steering ECU assembly  .

NEXT



4.	INITIALIZE ROTATION ANGLE SENSOR AND CALIBRATE TORQUE SENSOR ZERO POINT
-----------	--

(a) Initialize the rotation angle sensor and calibrate the torque sensor zero point  .

NEXT



5.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs  .

NOTICE:

If DTC C1515 or C1525 is output even though the rotation angle sensor value initialization and torque sensor zero point calibration have been performed, check the procedure again, and perform calibration and initialization 3 times.

Result

CONDITION	PROCEED TO
DTC C1515 or C1525 is still output after performing rotation angle sensor initialization and torque sensor zero point calibration 3 times.	A
DTC C1515 or C1525 is not output.	B

B ► END

A ► REPLACE STEERING COLUMN ASSEMBLY



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000027BY03IX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: C1516,C1526: Torque Sensor Zero Point Adjustment Incomplete (2013 FR-S)		

DTC	C1516	Torque Sensor Zero Point Adjustment Incomplete
------------	--------------	---

DTC	C1526	Rotation Angle Sensor Initialization Incomplete
------------	--------------	--


DESCRIPTION

These DTCs do not indicate a malfunction. The power steering ECU assembly stores these DTCs when it determines that the rotation angle sensor value initialization and torque sensor zero point calibration are incomplete.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
C1516	Torque sensor zero point calibration is incomplete due to the steering wheel being touched during calibration.	There is no malfunction if this DTC is not output again after clearing the DTC and torque sensor calibration value, and performing zero point calibration.
C1526	Rotation angle sensor value initialization is incomplete due to the steering wheel being touched during calibration.	There is no malfunction if this DTC is not output again after clearing the DTC and torque sensor calibration value, and performing rotation angle sensor value initialization.

INSPECTION PROCEDURE

NOTICE:

If the power steering ECU assembly or steering column assembly is replaced, perform rotation angle sensor initialization and torque sensor zero point calibration  .

PROCEDURE


1.	CLEAR DTC
-----------	------------------

(a) Clear the DTC(s)  .

NEXT



2.	INITIALIZE ROTATION ANGLE SENSOR AND CALIBRATE TORQUE SENSOR ZERO POINT
-----------	--

(a) Initialize the rotation angle sensor and calibrate the torque sensor zero point  .

NEXT



3.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs  .

NOTICE:

If DTC C1516 or C1526 is output even though the rotation angle sensor value initialization and torque sensor zero point calibration have been performed, check the procedure again, and perform the calibration and initialization 3 times.

Result


CONDITION	PROCEED TO
DTC C1516 or C1526 is still output after performing rotation angle sensor initialization and torque sensor zero point calibration 3 times.	A
DTC C1516 or C1526 is not output.	B

B  **END**

A



4.	REPLACE POWER STEERING ECU ASSEMBLY
-----------	--

(a) Replace the power steering ECU assembly  .

NEXT




5.	CLEAR DTC
-----------	------------------

(a) Clear the DTC(s)  .

NEXT




6.	INITIALIZE ROTATION ANGLE SENSOR AND CALIBRATE TORQUE SENSOR ZERO POINT
-----------	--

(a) Initialize the rotation angle sensor and calibrate the torque sensor zero point  .

NEXT



7.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs  .

NOTICE:

If DTC C1516 or C1526 is output even though the rotation angle sensor value initialization and torque sensor zero point calibration have been performed, check the procedure again, and perform calibration and initialization 3 times.

Result

CONDITION	PROCEED TO
DTC C1516 or C1526 is still output after performing rotation angle sensor initialization and torque sensor zero point calibration 3 times.	A
DTC C1516 or C1526 is not output.	B

B  **END**

A  **REPLACE STEERING COLUMN ASSEMBLY**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000027BZ030X
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: C1521,C1531-C1534,C1554: Motor Circuit Malfunction (2013 FR-S)		

DTC	C1521	Motor Circuit Malfunction
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DTC	C1531	ECU Malfunction
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DTC	C1532	ECU Malfunction
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DTC	C1533	ECU Malfunction
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DTC	C1534	ECU Malfunction
------------	--------------	------------------------

DTC	C1554	Power Supply Relay Failure
------------	--------------	-----------------------------------


DESCRIPTION

If the power steering ECU assembly stores these DTCs, it will shut off the power supply relay circuit (built into the power steering ECU assembly) and stop power assist. However, power assist continues if DTC C1533 or C1534 is stored.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
C1521	Motor overcurrent	Power steering ECU assembly
C1531	An ECU internal malfunction (CPU malfunction)	
C1532	An ECU internal malfunction (peripheral circuit malfunction)	
C1533	An ECU internal malfunction (substrate temperature sensor malfunction)	
C1534	An ECU internal malfunction (EEPROM error)	
C1554	A power supply relay circuit malfunction	

INSPECTION PROCEDURE


NOTICE:

If the power steering ECU assembly is replaced with a new one, perform rotation angle sensor initialization and torque sensor zero point calibration  .

PROCEDURE

1.	CHECK FOR DTC
-----------	----------------------

(a) Clear the DTC(s)  .

(b) Check for DTCs  .

Result

RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B

B  **REPLACE POWER STEERING ECU ASSEMBLY**

A  **USE SIMULATION METHOD TO CHECK**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000277N03JX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: C1522-C1555: Motor Circuit Malfunction (2013 FR-S)		

DTC	C1522	Motor Circuit Malfunction
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DTC	C1523	Motor Circuit Malfunction
------------	--------------	----------------------------------

DTC	C1524	Motor Circuit Malfunction
------------	--------------	----------------------------------

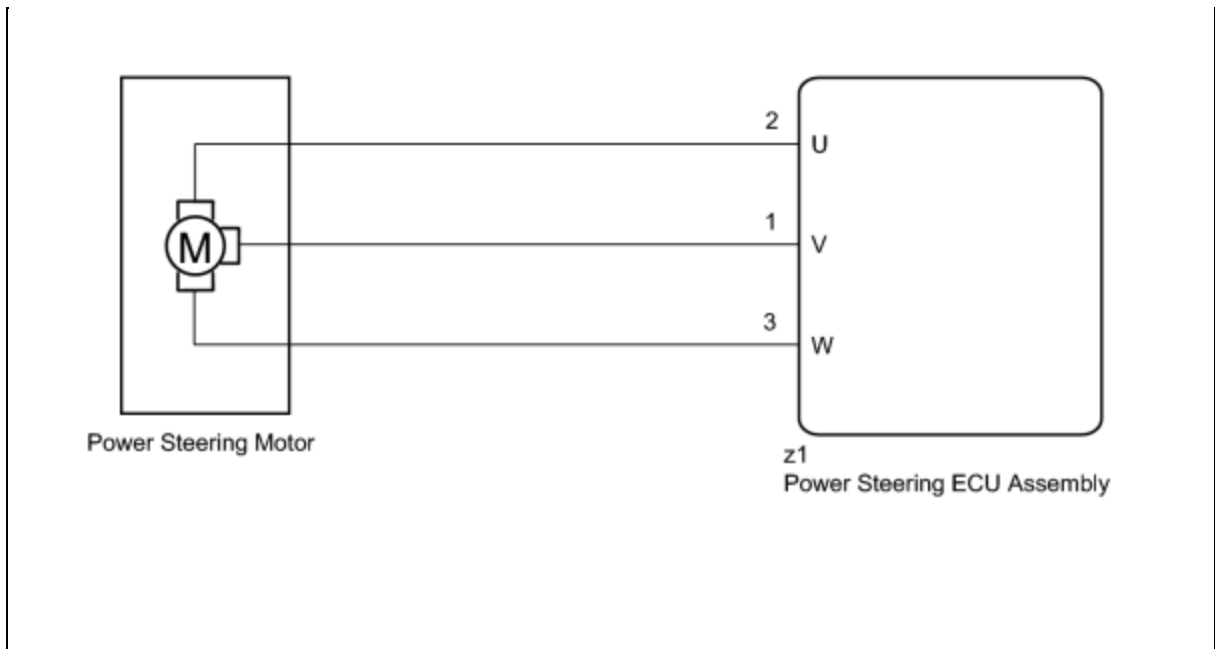
DTC	C1555	Motor Relay Welding Failure
------------	--------------	------------------------------------

DESCRIPTION

The power steering ECU assembly supplies the current to the power steering motor through the motor circuit.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
C1522	A motor current sensor malfunction	<ul style="list-style-type: none"> Steering column assembly Power steering ECU assembly
C1523	An excessively large current deviation	
C1524	A short or open in the motor circuit or abnormal voltage or current in the motor circuit	
C1555	A motor relay malfunction	

WIRING DIAGRAM



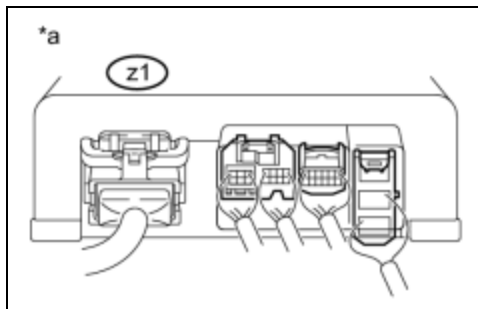
INSPECTION PROCEDURE

NOTICE:

If the power steering ECU assembly or steering column assembly is replaced, perform rotation angle sensor initialization and torque sensor zero point calibration INFO .

PROCEDURE

1.	CHECK CONNECTOR CONNECTION CONDITION (POWER STEERING MOTOR - POWER STEERING ECU ASSEMBLY)
----	--



(a) Check the connection condition of the z1 power steering motor connector.

OK:

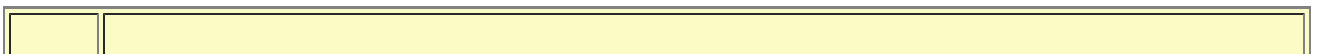
Power steering motor connector is securely connected and locked to the power steering ECU assembly.

Text in Illustration

*a	Component with harness connected (Power Steering ECU Assembly)
----	--

NG ▶ **CONNECT CONNECTOR SECURELY**

OK



2. READ VALUE USING TECHSTREAM (MOTOR VOLTAGE)

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Start the engine.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Chassis / EMPS / Data List.
- (f) Select the items "Motor Terminal Volt(U)", "Motor Terminal Volt(V)" and "Motor Terminal Volt(W)" in the Data List and read the value displayed on the Techstream.

EMPS

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Motor Terminal Volt(U)	Motor terminal voltage (U phase)/ Min.: 0.000 V Max.: 98.000 V	Value changes between 4 and 35 V	The engine is running and the steering wheel is being turned.
Motor Terminal Volt(V)	Motor terminal voltage (V phase)/ Min.: 0.000 V Max.: 98.000 V	Value changes between 4 and 35 V	The engine is running and the steering wheel is being turned.
Motor Terminal Volt(W)	Motor terminal voltage (W phase)/ Min.: 0.000 V Max.: 98.000 V	Value changes between 4 and 35 V	The engine is running and the steering wheel is being turned.

Result

RESULT	PROCEED TO
During steering operation, value changes between 4 and 35 V.	A
During steering operation, voltage is not generated or voltage outside specified range is generated.	B

B ▶ REPLACE STEERING COLUMN ASSEMBLY

A ▶ REPLACE POWER STEERING ECU ASSEMBLY



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000277O03JX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: C1528: Motor Rotation Angle Sensor Malfunction (2013 FR-S)		

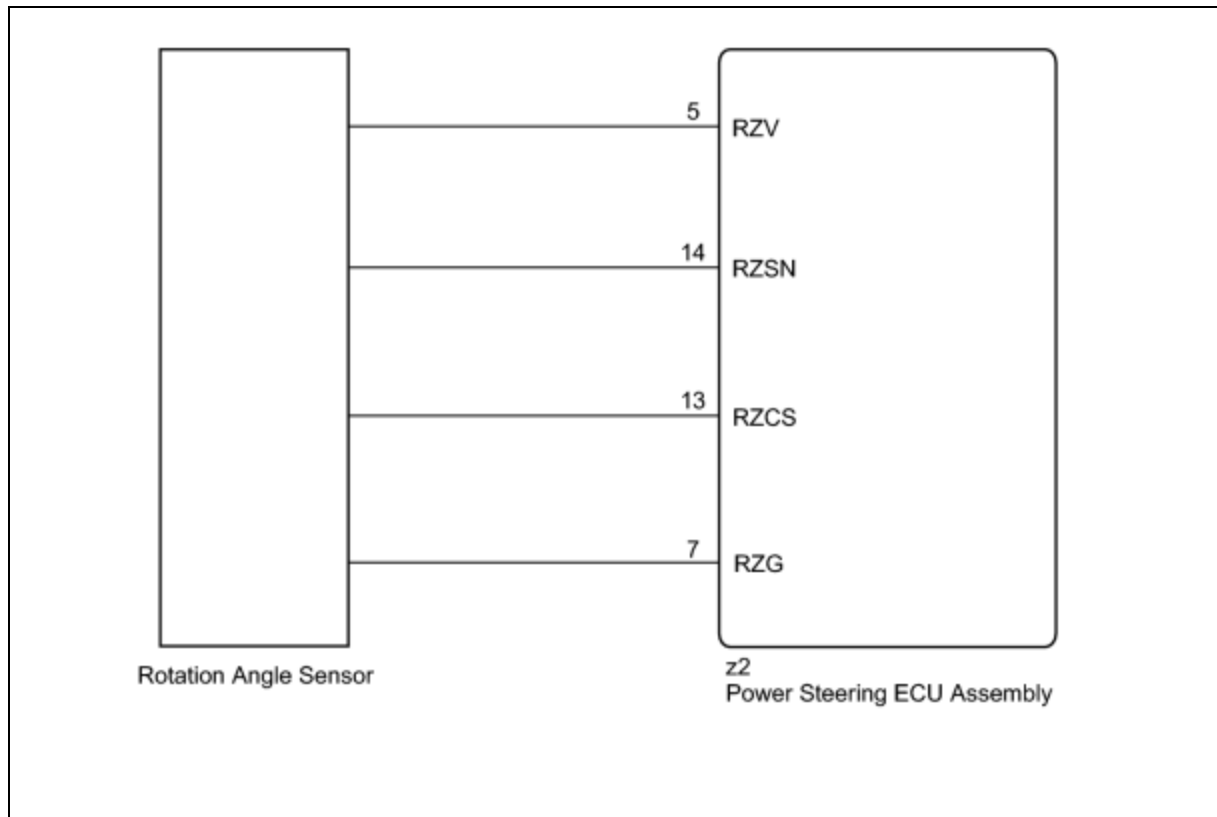
DTC	C1528	Motor Rotation Angle Sensor Malfunction
------------	--------------	--

DESCRIPTION

The rotation angle sensor detects the motor rotation angle and sends this information to the power steering ECU assembly.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
C1528	A rotation angle sensor malfunction	<ul style="list-style-type: none"> • Rotation angle sensor (built into steering column assembly) • Power steering ECU assembly

WIRING DIAGRAM



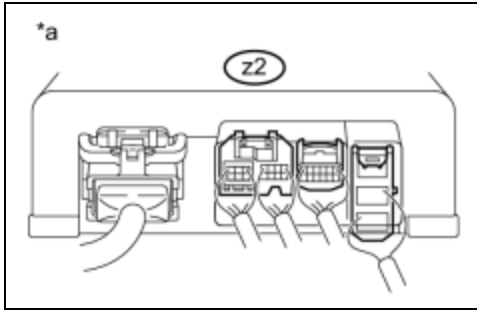
INSPECTION PROCEDURE

NOTICE:

If the power steering ECU assembly or steering column assembly is replaced, perform rotation

PROCEDURE

1. CHECK CONNECTOR CONNECTION CONDITION (ROTATION ANGLE SENSOR - POWER STEERING ECU ASSEMBLY)



(a) Check the connection condition of the z2 rotation angle sensor connector.

OK:

Rotation angle sensor connector is securely connected to the power steering ECU assembly.

Text in Illustration

*a	Component with harness connected (Power Steering ECU Assembly)
----	--

NG ▶ **CONNECT CONNECTOR SECURELY**

OK



2. READ VALUE USING TECHSTREAM (MOTOR ROTATION ANGLE)

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Start the engine.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Chassis / EMPS / Data List.

EMPS

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Motor Rotation Angle	Motor rotation angle/ Min.: 0.000 deg Max.: 360.000 deg	Motor rotation angle value changes from 0 to 360°	The engine is running and the steering wheel is being turned.

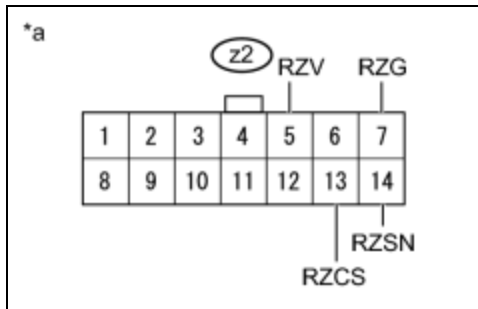
OK:

During steering operation, motor rotation angle value changes from 0 to 360°.

NG ► CHECK STEERING COLUMN ASSEMBLY

OK ► REPLACE POWER STEERING ECU ASSEMBLY

3. CHECK STEERING COLUMN ASSEMBLY



(a) Disconnect the z2 rotation angle sensor connector from the power steering ECU assembly.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
z2-14 (RZSN) - z2-7 (RZG)	At 23°C (73°F)	75.2 to 112.8 Ω
z2-5 (RZV) - z2-7 (RZG)	At 23°C (73°F)	27.6 to 41.4 Ω
z2-13 (RZCS) - z2-7 (RZG)	At 23°C (73°F)	73.6 to 110.4 Ω

Text in Illustration

*a	Front view of wire harness connector (to Rotation Angle Sensor)
----	--

NG ► REPLACE STEERING COLUMN ASSEMBLY

OK ► REPLACE POWER STEERING ECU ASSEMBLY

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000027C005LX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: C1541: Vehicle Speed Signal Malfunction (2013 FR-S)		

DTC	C1541	Vehicle Speed Signal Malfunction
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DESCRIPTION

The power steering ECU assembly receives vehicle speed signals from the skid control ECU via CAN communication. The power steering ECU assembly provides appropriate assisting force in accordance with the vehicle speed, based on the signals.

If the power steering ECU assembly stores this DTC, it adjusts the amount of power assist to the amount provided for a speed of 100 km/h (62 mph) and continues the system control.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
C1541	The vehicle speed signals malfunction	<ul style="list-style-type: none"> • Speed sensor circuit • Skid control ECU • CAN communication system • Power steering ECU assembly


INSPECTION PROCEDURE

NOTICE:

If the power steering ECU assembly is replaced with a new one, perform rotation angle sensor initialization and torque sensor zero point calibration  .

PROCEDURE

1.	CHECK OTHER DTC OUTPUT (CAN COMMUNICATION SYSTEM)
-----------	--

(a) Check if DTC U0416 is output  .

Result

RESULT	PROCEED TO
DTC U0416 is not output.	A
DTC U0416 is output.	B

HINT:


DTC U0416 indicates a skid control ECU communication malfunction in the power steering system.

B  **GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING)**

A



2.	CHECK OTHER DTC OUTPUT (BRAKE CONTROL SYSTEM)
-----------	--

(a) Using the Techstream, check for DTCs and confirm that there are no problems in the brake control system  .

Result

RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B

B ▶ **GO TO VEHICLE STABILITY CONTROL SYSTEM
(DIAGNOSTIC TROUBLE CODE CHART)**

A ▶ **REPLACE POWER STEERING ECU ASSEMBLY**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000277I03TX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: C1551: IG Power Supply Voltage Malfunction (2013 FR-S)		

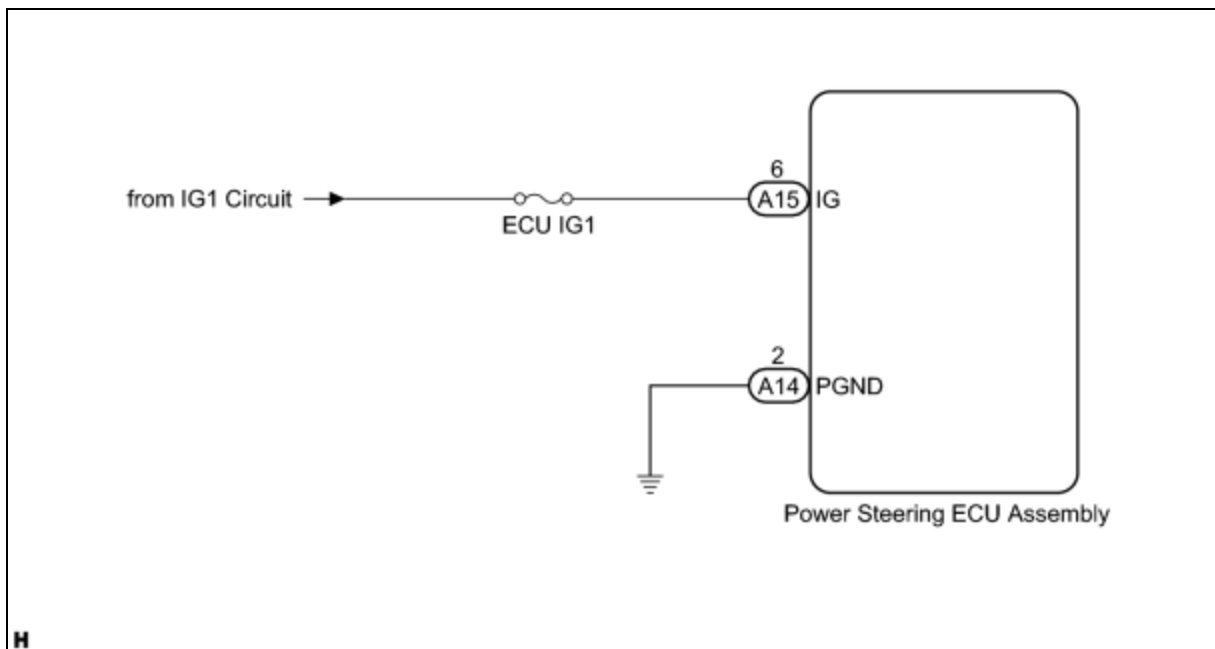
DTC	C1551	IG Power Supply Voltage Malfunction
------------	--------------	--

DESCRIPTION

The power steering ECU assembly determines whether the ignition switch status is ON or off through the IG power supply circuit.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
C1551	An IG power supply circuit malfunction inside the ECU	<ul style="list-style-type: none"> • ECU IG1 fuse • IG power supply circuit • Power steering ECU assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- If the power steering ECU assembly is replaced with a new one, perform rotation angle sensor initialization and torque sensor zero point calibration INFO.
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	READ VALUE USING TECHSTREAM (IG POWER SUPPLY)
-----------	--

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Chassis / EMPS / Data List.

EMPS

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
IG Power Supply	ECU power source voltage/ Min.: 0.0000 V Max.: 20.1531 V	9 to 16 V	The ignition switch is ON.

OK:

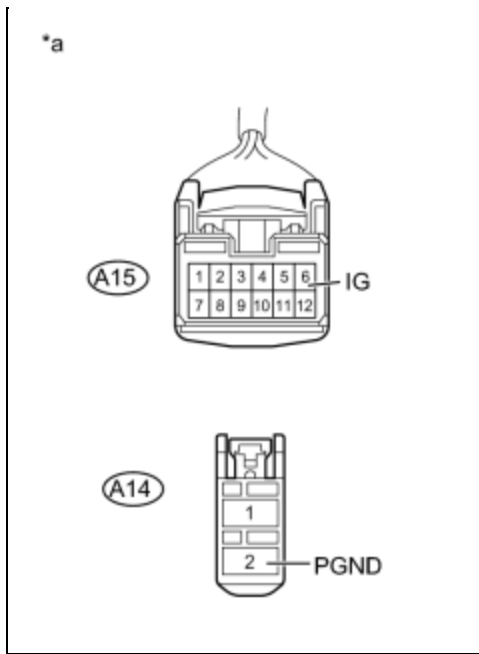
The normal condition value is displayed the Techstream.

NG ► **CHECK HARNESS AND CONNECTOR (POWER STEERING ECU ASSEMBLY - BATTERY/BODY GROUND)**

OK ► **REPLACE POWER STEERING ECU ASSEMBLY**

2.	CHECK HARNESS AND CONNECTOR (POWER STEERING ECU ASSEMBLY - BATTERY/BODY GROUND)
-----------	--

- (a) Disconnect the A14 and A15 power steering ECU assembly connectors.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
A15-6 (IG) - Body ground	Ignition switch ON	9 to 16 V

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A14-2 (PGND) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Power Steering ECU Assembly)
----	--

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ► REPLACE POWER STEERING ECU ASSEMBLY

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000277J03TX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: C1552: PIG Power Supply Voltage Malfunction (2013 FR-S)		

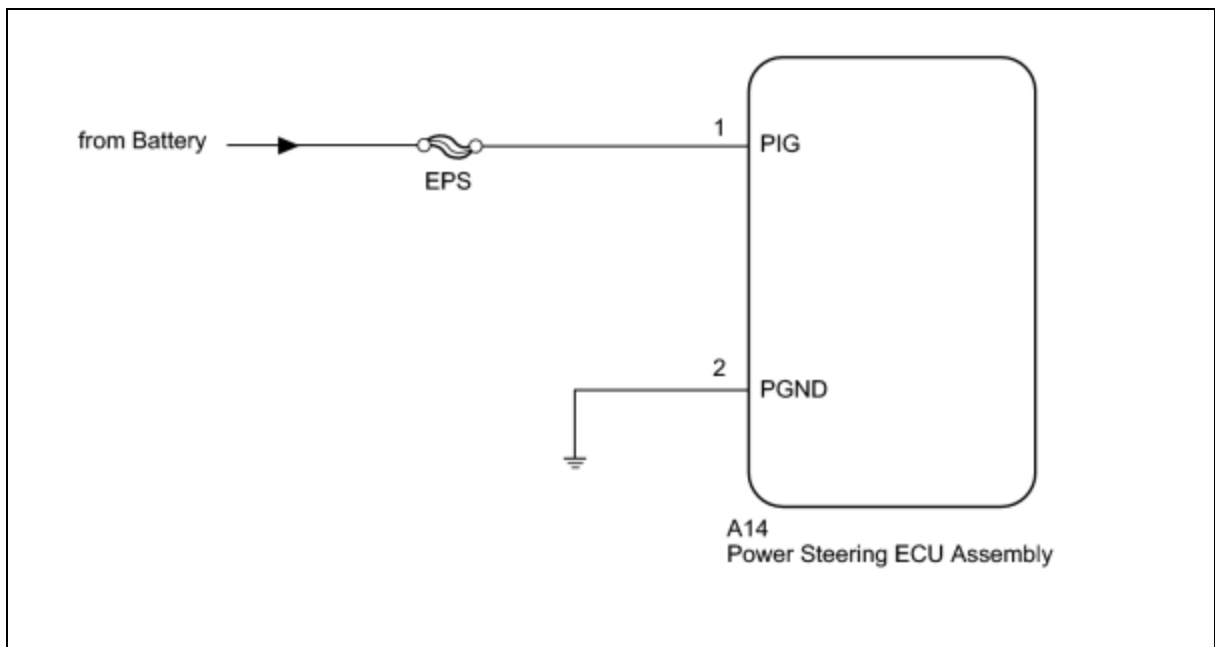
DTC	C1552	PIG Power Supply Voltage Malfunction
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DESCRIPTION

When a problem occurs in the power steering system, the power supply relay circuit is shut off to stop the power assist.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
C1552	A PIG power supply circuit malfunction inside the ECU	<ul style="list-style-type: none"> • EPS fuse • PIG power supply circuit • Power steering ECU assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- If the power steering ECU assembly is replaced with a new one, perform rotation angle sensor initialization and torque sensor zero point calibration INFO.
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. READ VALUE USING TECHSTREAM (PIG POWER SUPPLY)

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Start the engine.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Chassis / EMPS / Data List.

EMPS

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
PIG Power Supply	Power source voltage to active motor/ Min.: 0.0000 V Max.: 20.1531 V	9 to 16 V	The engine is running and power steering is operating.

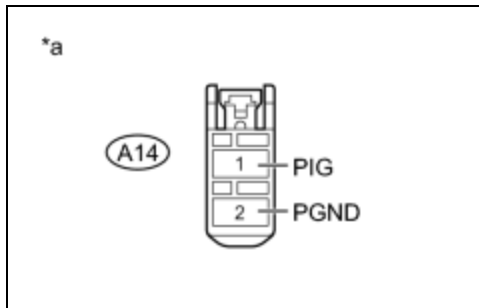
OK:

The normal condition value is displayed the Techstream.

NG ► **CHECK HARNESS AND CONNECTOR (POWER STEERING ECU ASSEMBLY - BATTERY/BODY GROUND)**

OK ► **REPLACE POWER STEERING ECU ASSEMBLY**

2. CHECK HARNESS AND CONNECTOR (POWER STEERING ECU ASSEMBLY - BATTERY/BODY GROUND)



(a) Disconnect the A14 power steering ECU assembly connector .

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A14-1 (PIG) - Body ground	Always	9 to 16 V

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A14-2 (PGND) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Power Steering ECU Assembly)
----	--

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **REPLACE POWER STEERING ECU ASSEMBLY**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000277L090X
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: C1581: Assist Map Number Un-Writing (2013 FR-S)		

DTC	C1581	Assist Map Number Un-Writing
------------	--------------	-------------------------------------

DESCRIPTION

The power steering ECU assembly stores this DTC when it determines that the assist map is not written in the ECU.

HINT:

The assist map is data written in the power steering ECU assembly to control the degree of power assist. The assist map is selected based on the vehicle's specified communication data.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
C1581	The assist map is not written in the power steering ECU assembly.	<ul style="list-style-type: none"> • assist map not written • CAN communication system • ECM • Power steering ECU assembly


INSPECTION PROCEDURE

NOTICE:

If the power steering ECU assembly is replaced with a new one, perform rotation angle sensor initialization and torque sensor zero point calibration  .

PROCEDURE

1.	INITIALIZE ROTATION ANGLE SENSOR AND CALIBRATE TORQUE SENSOR ZERO POINT
-----------	--

(a) Initialize the rotation angle sensor and calibrate the torque sensor zero point  .


HINT:

The assist map is automatically written during the rotation angle sensor initialization and torque sensor zero point calibration.

NEXT



2. CHECK FOR DTC

(a) Check for DTCs  .

OK:

DTC C1581 is not output.


HINT:

DTC C1581 is cleared after the assist map is written.

NG ► **CHECK FOR DTC (CAN COMMUNICATION SYSTEM)**

OK ► **END**

3. CHECK FOR DTC (CAN COMMUNICATION SYSTEM)

(a) Using the Techstream, check for DTCs and confirm that there are no problems in the CAN communication system  .

OK:

DTC is not output.

NG ► **GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING)**

OK

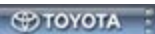


4. CHECK ECM

(a) Check if an ECM that complies with the vehicle specifications is installed.

NG ► **REPLACE ECM**

OK ► **REPLACE POWER STEERING ECU ASSEMBLY**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003TY8001X
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: C1582: Assist Map Number Mismatch (2013 FR-S)		

DTC	C1582	Assist Map Number Mismatch
------------	--------------	-----------------------------------

DESCRIPTION

If an incorrect power steering ECU assembly or ECM or skid control ECU is installed, DTC C1582 is stored as the vehicle specification and data do not match.

HINT:

The assist map is data written in the power steering ECU assembly to control the degree of assistance. The assist map is selected based on the vehicle's specified communication data.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
C1582	Data that does not match the vehicle specification is received through CAN communication.	<ul style="list-style-type: none"> • CAN communication system • ECM (wrong assembly) • Skid control ECU (wrong assembly) • Power steering ECU assembly (wrong assembly)


INSPECTION PROCEDURE

NOTICE:

If the power steering ECU assembly is replaced with a new one, perform rotation angle sensor initialization and torque sensor zero point calibration  .

PROCEDURE

1.	CHECK FOR DTC (CAN COMMUNICATION SYSTEM)
-----------	---

(a) Using the Techstream, check for DTCs and confirm that there are no problems in the CAN communication system  .

OK:

DTC is not output.

NG  **GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING)**

OK



2.	CHECK ECM
-----------	------------------

(a) Check if an ECM that complies with the vehicle specifications is installed.

NG ▶ **REPLACE ECM**

OK



3.	CHECK SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY)
-----------	---

(a) Check if a skid control ECU (brake actuator assembly) that complies with the vehicle specifications is installed.

NG ▶ **REPLACE SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY)**

OK ▶ **REPLACE POWER STEERING ECU ASSEMBLY**

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000275304ZX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: CALIBRATION (2013 FR-S)		

CALIBRATION

1. ROTATION ANGLE SENSOR INITIALIZATION AND TORQUE SENSOR ZERO POINT CALIBRATION

NOTICE:

Initialize the rotation angle sensor and calibrate the torque sensor zero point if any of the following conditions occur:

- The power steering ECU is replaced.
- The steering column assembly is replaced.
- Steering effort differs between turning left and right.

HINT:

When rotation angle sensor initialization and torque sensor zero point calibration are performed, the assist map writing, the rotation angle sensor value initialization and the torque sensor zero point calibration are performed at the same time.

- (a) Inspection before calibration
- (1) Turn the ignition switch off.
 - (2) Connect the Techstream to the DLC3.
 - (3) Turn the ignition switch to ON.
 - (4) Turn the Techstream on.
 - (5) Enter the following menus: Chassis / EMPS / Data List.
 - (6) Check the values by referring to the table below.

EMPS

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
IG Power Supply	ECU power source voltage/ Min.: 0 V Max.: 20.1531 V	9 to 16 V	The ignition switch is ON.

Standard voltage:
10 V or more

NOTICE:

If the IG power supply voltage is 9 V or less, calibration cannot be performed. In this case, charge or replace the battery, and then perform calibration.

- (b) Rotation angle sensor initialization and torque sensor zero point calibration

NOTICE:

- If DTC C1516 (Torque Sensor Zero Point Adjustment Incomplete) is stored, the torque sensor zero point cannot be calibrated. Clear the DTC before starting calibration.
- If DTC C1526 (Rotation Angle Sensor Initialization Incomplete) is stored, the rotation angle sensor cannot be initialized. Clear the DTC before starting initialization.

- (1) Turn the ignition switch off.

- (2) Connect the Techstream to the DLC3.
- (3) Turn the ignition switch to ON.
- (4) Turn the Techstream on.
- (5) Enter the following menus: Chassis / EMPS / Utility / Torque Sensor Adjustment.
- (6) According to the display on the Techstream, perform calibration.

NOTICE:

- Set the steering wheel to the center point and align the front tires straight ahead.
- Do not turn the steering wheel sharply.
- Do not touch the steering wheel during the rotation angle sensor initialization and torque sensor zero point calibration (for 3 seconds).



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000275203PX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Chassis / EMPS / Data List.
- (f) According to the display on the Techstream, read the Data List.

EMPS

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Meter Vehicle Velocity	Vehicle speed from skid control ECU/ Min.: 0.0 km/h (0.0 mph) Max.: 300.0 km/h (186.4 mph)	0 km/h (0 mph)	The vehicle is stopped.
		No significant fluctuation	The vehicle is driven at a constant speed.
Engine Revolution	Engine speed/ Min.: 0 rpm Max.: 12800 rpm	No significant fluctuation	The engine is running at a constant speed.
Motor Actual Current	Amount of current to motor/ Min.: -327.68 A Max.: 327.67 A	Value changes in proportion to steering effort	The engine is running and the steering wheel is being turned.
Command Value Current	Demanded amount of current to motor/ Min.: -327.68 A Max.: 327.67 A	Value changes in proportion to steering effort	The engine is running and the steering wheel is being turned.
Steering Angle Velocity	Steering angle speed/ Min.: -32768 deg/s Max.: 32767 deg/s	Value changes in proportion to steering effort	The engine is running and the steering wheel is being turned.
	ECU substrate		

Thermistor Temperature	temperature/ Min.: -50.0°C (-58.0°F) Max.: 150.0°C (302.0°F)	-	The ignition switch is ON.
PIG Power Supply	Power source voltage to active motor/ Min.: 0.0000 V Max.: 20.1531 V	9 to 16 V	The engine is running and power steering is operating.
IG Power Supply	ECU power source voltage/ Min.: 0.0000 V Max.: 20.1531 V	9 to 16 V	The ignition switch is ON.
Steering Wheel Torque	Steering wheel torque/ Min.: -7.00 Nm Max.: 7.00 Nm	Value changes in proportion to steering effort	The engine is running and the steering wheel is being turned.
Motor Rotation Angle	Motor rotation angle/ Min.: 0.000 deg Max.: 360.000 deg	Motor rotation angle value changes from 0 to 360°	The engine is running and the steering wheel is being turned.
Command Val Current 2	Demanded amount of current to motor/ Min.: -327.68 A Max.: 327.67 A	Value changes in proportion to steering effort	The engine is running and the steering wheel is being turned.
PIG2 Voltage	Coil rear pressurization voltage/ Min.: 0.000 V Max.: 98.000 V	Approximately 27 V	The engine is running and the steering wheel is not being turned.
		Value changes between 16 and 35 V	The engine is running and the steering wheel is being turned.
Motor Voltage	Motor power supply voltage/ Min.: 0.000 V Max.: 98.000 V	Approximately 27 V	The engine is running and the steering wheel is not being turned.
		Value changes between 4 and 35 V	The engine is running and the steering wheel is being turned.
Motor Terminal Volt(U)	Motor terminal voltage (U phase)/ Min.: 0.000 V Max.: 98.000 V	Value changes between 4 and 35 V	The engine is running and the steering wheel is being turned.
Motor Terminal Volt(V)	Motor terminal voltage (V phase)/ Min.: 0.000 V Max.: 98.000 V	Value changes between 4 and 35 V	The engine is running and the steering wheel is being turned.
Motor Terminal Volt(W)	Motor terminal voltage (W phase)/ Min.: 0.000 V Max.: 98.000 V	Value changes between 4 and 35 V	The engine is running and the steering wheel is being turned.
		2.3 to 2.7 V	The engine is running and the steering wheel is not turned (without load).
	Torque sensor 1 output		The engine is running and the steering

Torque Sensor 1 Output	voltage/ Min.: 0.0000 V Max.: 5.0000 V	2.3 to 3.8 V	wheel is turned to the right when the vehicle is stopped.
		1.2 to 2.7 V	The engine is running and the steering wheel is turned to the left when the vehicle is stopped.
Torque Sensor 2 Output	Torque sensor 2 output voltage/ Min.: 0.0000 V Max.: 5.0000 V	2.3 to 2.7 V	The engine is running and the steering wheel is not turned (without load).
		1.2 to 2.7 V	The engine is running and the steering wheel is turned to the right when the vehicle is stopped.
		2.3 to 3.8 V	The engine is running and the steering wheel is turned to the left when the vehicle is stopped.
TRQ1 Zero Point Value	Torque sensor 1 zero point voltage/ Min.: 0.0000 V Max.: 5.0000 V	Values differ depending on vehicle	The engine is running and the steering wheel is not being turned.
TRQ2 Zero Point Value	Torque sensor 2 zero point voltage/ Min.: 0.0000 V Max.: 5.0000 V	Values differ depending on vehicle	The engine is running and the steering wheel is not being turned.
IG ON/OFF Times	Number of times ignition switch turned to ON/off after fail detection/ Min.: 0 times Max.: 65535 times	-	This value indicates the number of times the ignition switch is turned to ON and off after the latest DTC detection.
Motor Overheat Record	Continuous overheat prevention control record/ Unrec or Rec	Unrec	-
Motor Lo Power Record	PIG power supply voltage drop record/ Unrec or Rec	Unrec	-
Eng Rev Inter Record	Record of engine speed interruption/ Unrec or Rec	Unrec	-
Spd Sig Invalid Record	Record of vehicle speed signal invalid/ Unrec or Rec	Unrec	-
Battery Voltage Lo Record	Battery voltage reduction history/ Min.: 0 times, Max.: 65535 times	0 to 65535	-
The Number of DTCs	Number of stored DTCs when freeze frame data stored/ Min.: 0	0 to 255	-

Max.: 255



TOYOTA

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000274Z04YX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: DIAGNOSIS SYSTEM (2013 FR-S)		

DIAGNOSIS SYSTEM

1. CHECK DLC3

- (a) Check the DLC3 INFO.

2. FUNCTION OF EPS WARNING LIGHT

- (a) When a malfunction is detected in the power steering system, the EPS warning light in the combination meter comes on to inform the driver of the malfunction.

HINT:



When power assist is stopped or reduced, the EPS warning light comes on.

Power assist is stopped:

- When a malfunction occurs in the power steering system (including lost CAN communication, etc.)
- When the engine stalls (not a malfunction)
- During the period after the ignition switch is turned to ON until the engine is started (not a malfunction)

Power assist is reduced:

- When a malfunction occurs in the power steering system (including lost CAN communication, etc.)
- When the battery voltage decreases (not a malfunction)

Last Modified: 3-27-2012	6.4 S	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000274U04GX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: DIAGNOSTIC TROUBLE CODE CHART (2013 FR-S)		

DIAGNOSTIC TROUBLE CODE CHART

HINT:

If a trouble code is output during the DTC check, inspect the trouble areas listed for that code. For details of the code, refer to the "See page" below.

Power Steering System

DTC CODE	DETECTION ITEM	RETURN-TO-NORMAL CONDITION	EPS WARNING LIGHT	SEE PAGE
C1511	Torque Sensor Circuit Malfunction	Ignition switch ON again	*1	INFO
C1512	Torque Sensor Circuit Malfunction	Ignition switch ON again	*1	INFO
C1513	Torque Sensor Circuit Malfunction	Ignition switch ON again	*1	INFO
C1514	Torque Sensor Power Supply Abnormal	Ignition switch ON again	*1	INFO
C1515	Torque Sensor Zero Point Adjustment Undone	Zero Point calibration completes	*1	INFO
C1516	Torque Sensor Zero Point Adjustment Incomplete	Clear DTC	*1	INFO
C1517	Torque Hold Abnormal	Ignition switch ON again	*1	INFO
C1521	Motor Circuit Malfunction	Ignition switch ON again	*1	INFO
C1522	Motor Circuit Malfunction	Ignition switch ON again	*1	INFO
C1523	Motor Circuit Malfunction	Ignition switch ON again	*1	INFO
C1524	Motor Circuit Malfunction	Ignition switch ON again	*1	INFO
C1525	Rotation Angle Sensor Initialization Undone	Rotation Angle Sensor calibration completes	*1	INFO
C1526	Rotation Angle Sensor Initialization Incomplete	Clear DTC	*1	INFO
C1528	Motor Rotation Angle Sensor Malfunction	Ignition switch ON again	*1	INFO
C1531	ECU Malfunction	Ignition switch ON again	*1	INFO
C1532	ECU Malfunction	Ignition switch ON again	*1	INFO
C1533	ECU Malfunction	After normal confirmation	*2	INFO
C1534	ECU Malfunction	Ignition switch ON again	*1	INFO
C1541	Vehicle Speed Signal Malfunction	After normal confirmation	*1	INFO
C1551	IG Power Supply Voltage Malfunction	After normal confirmation	*1	INFO
C1552	PIG Power Supply Voltage Malfunction	After normal confirmation	*1	INFO

C1554	Power Supply Relay Failure	Ignition switch ON again	*1	INFO
C1555	Motor Relay Welding Failure	Ignition switch ON again	*1	INFO
C1581	Assist Map Number Un-Writing	Assist Map write	*1	INFO
C1582	Assist Map Number Mismatch	After normal confirmation	*2	INFO
U0100	Lost Communication with ECM / PCM "A"	After normal confirmation	*1	INFO
U0122	Lost Communication with Vehicle Dynamics Control Module	After normal confirmation	*1	INFO
U0416	Invalid Data Received from Vehicle Dynamics Control Module	Ignition switch ON again	*1	INFO

*1: Warning light comes on

*2: Warning light turns off

Last Modified: 3-27-2012	6.4 S	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000274U04GX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: DIAGNOSTIC TROUBLE CODE CHART (2013 FR-S)		

DIAGNOSTIC TROUBLE CODE CHART

HINT:

If a trouble code is output during the DTC check, inspect the trouble areas listed for that code. For details of the code, refer to the "See page" below.

Power Steering System

DTC CODE	DETECTION ITEM	RETURN-TO-NORMAL CONDITION	EPS WARNING LIGHT	SEE PAGE
C1511	Torque Sensor Circuit Malfunction	Ignition switch ON again	*1	INFO
C1512	Torque Sensor Circuit Malfunction	Ignition switch ON again	*1	INFO
C1513	Torque Sensor Circuit Malfunction	Ignition switch ON again	*1	INFO
C1514	Torque Sensor Power Supply Abnormal	Ignition switch ON again	*1	INFO
C1515	Torque Sensor Zero Point Adjustment Undone	Zero Point calibration completes	*1	INFO
C1516	Torque Sensor Zero Point Adjustment Incomplete	Clear DTC	*1	INFO
C1517	Torque Hold Abnormal	Ignition switch ON again	*1	INFO
C1521	Motor Circuit Malfunction	Ignition switch ON again	*1	INFO
C1522	Motor Circuit Malfunction	Ignition switch ON again	*1	INFO
C1523	Motor Circuit Malfunction	Ignition switch ON again	*1	INFO
C1524	Motor Circuit Malfunction	Ignition switch ON again	*1	INFO
C1525	Rotation Angle Sensor Initialization Undone	Rotation Angle Sensor calibration completes	*1	INFO
C1526	Rotation Angle Sensor Initialization Incomplete	Clear DTC	*1	INFO
C1528	Motor Rotation Angle Sensor Malfunction	Ignition switch ON again	*1	INFO
C1531	ECU Malfunction	Ignition switch ON again	*1	INFO
C1532	ECU Malfunction	Ignition switch ON again	*1	INFO
C1533	ECU Malfunction	After normal confirmation	*2	INFO
C1534	ECU Malfunction	Ignition switch ON again	*1	INFO
C1541	Vehicle Speed Signal Malfunction	After normal confirmation	*1	INFO
C1551	IG Power Supply Voltage Malfunction	After normal confirmation	*1	INFO
C1552	PIG Power Supply Voltage Malfunction	After normal confirmation	*1	INFO

C1554	Power Supply Relay Failure	Ignition switch ON again	*1	INFO
C1555	Motor Relay Welding Failure	Ignition switch ON again	*1	INFO
C1581	Assist Map Number Un-Writing	Assist Map write	*1	INFO
C1582	Assist Map Number Mismatch	After normal confirmation	*2	INFO
U0100	Lost Communication with ECM / PCM "A"	After normal confirmation	*1	INFO
U0122	Lost Communication with Vehicle Dynamics Control Module	After normal confirmation	*1	INFO
U0416	Invalid Data Received from Vehicle Dynamics Control Module	Ignition switch ON again	*1	INFO


*1: Warning light comes on

*2: Warning light turns off

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002750059X
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: DTC CHECK / CLEAR (2013 FR-S)		

DTC CHECK / CLEAR

1. CHECK DTC

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Chassis / EMPS / Trouble Codes.
- (f) Read the DTCs following the display on the Techstream.
- (g) Refer to Diagnostic Trouble Code Chart for DTC information  .

2. CLEAR DTC

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Chassis / EMPS / Trouble Codes.
- (f) Clear the DTCs by following the display on the Techstream.
- (g) Turn the ignition switch off.
- (h) Disconnect the Techstream from the DLC3.

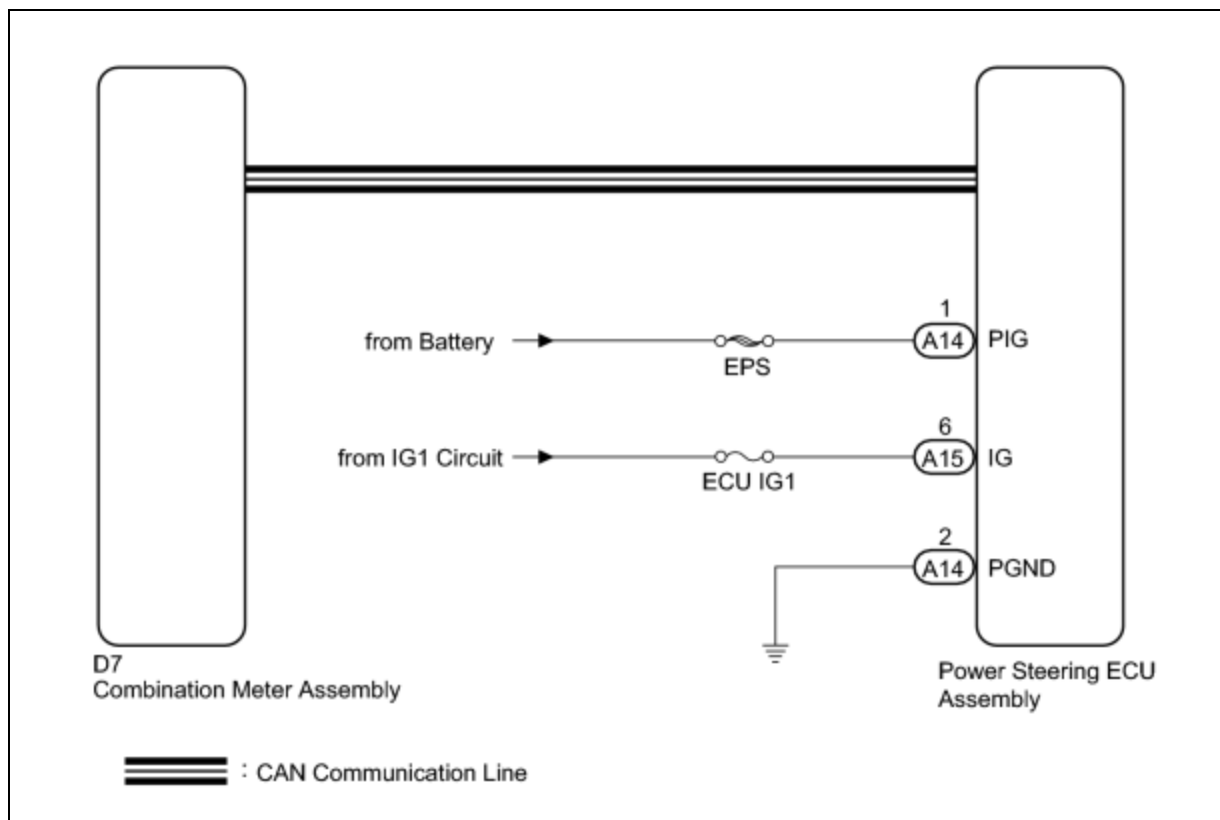
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000277E04GX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: EPS Warning Light Circuit (2013 FR-S)		

EPS Warning Light Circuit

DESCRIPTION

If the power steering ECU assembly detects a malfunction, the EPS warning light comes on. At this time, the power steering ECU assembly stores a DTC in its memory.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- If the power steering ECU assembly is replaced with a new one, perform rotation angle sensor initialization and torque sensor zero point calibration [INFO](#) .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

When the power supply voltage to the power steering ECU assembly (terminals IG and PIG) drops, required steering effort increases and the EPS warning light turns on.

PROCEDURE

1. CHECK HARNESS AND CONNECTOR

- (a) Turn the ignition switch to ON.
- (b) Check the indication condition of the EPS warning light by wiggling the power steering ECU assembly connector and wire harness up and down, and right and left.

OK:

EPS warning light indication condition does not change.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK



2. CHECK FOR DTC (CAN COMMUNICATION SYSTEM)

- (a) Check for DTCs INFO.

OK:

DTC is not output.

NG ▶ GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING)

OK



3. READ VALUE USING TECHSTREAM (IG POWER SUPPLY)

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Chassis / EMPS / Data List.

EMPS

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
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IG Power Supply	ECU power source voltage/ Min.: 0.0000 V Max.: 20.1531 V	9 to 16 V	The ignition switch is ON.
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OK:

The normal condition value is displayed the Techstream.

NG ► **CHECK HARNESS AND CONNECTOR (POWER STEERING ECU ASSEMBLY - BATTERY/BODY GROUND)**

OK



4.	READ VALUE USING TECHSTREAM (PIG POWER SUPPLY)
-----------	---

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Start the engine.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Chassis / EMPS / Data List.

EMPS

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
PIG Power Supply	Power source voltage to active motor/ Min.: 0.0000 V Max.: 20.1531 V	9 to 16 V	The engine is running and power steering is operating.

OK:

The normal condition value is displayed the Techstream.

NG ► **CHECK HARNESS AND CONNECTOR (POWER STEERING ECU ASSEMBLY - BATTERY/BODY GROUND)**

OK



5.	PERFORM ACTIVE TEST USING TECHSTREAM (METER / GAUGE SYSTEM)
-----------	--

(a) Perform the Active Test of the combination meter using the Techstream INFO.

Combination Meter

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Indicat. EPS	EPS warning light	OFF/ON	Vehicle is stopped and engine is idling

(b) Check that the EPS warning light operates in accordance with the Active Test.

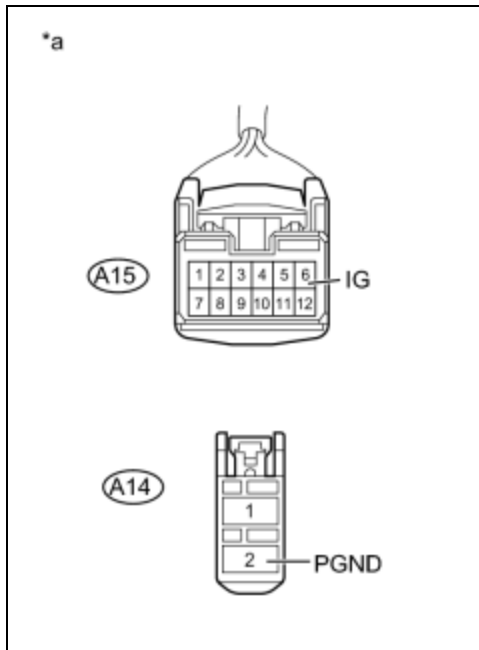
HINT:

Reconnect the connectors and restore the vehicle to its previous condition before checking the combination meter.

NG ▶ REPLACE COMBINATION METER ASSEMBLY

OK ▶ REPLACE POWER STEERING ECU ASSEMBLY

6.	CHECK HARNESS AND CONNECTOR (POWER STEERING ECU ASSEMBLY - BATTERY/BODY GROUND)
-----------	--



(a) Disconnect the A14 and A15 power steering ECU assembly connectors.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
A15-6 (IG) - Body ground	Ignition switch ON	9 to 16 V

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A14-2 (PGND) - Body ground	Always	Below 1 Ω

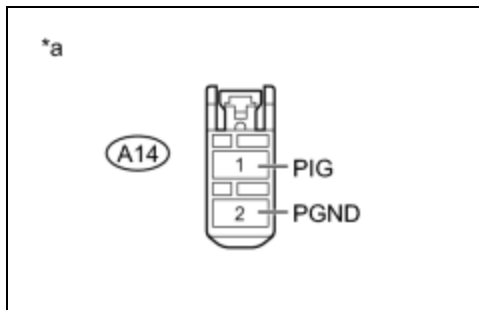
Text in Illustration

*a	Front view of wire harness connector (to Power Steering ECU Assembly)
----	--

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ REPLACE POWER STEERING ECU ASSEMBLY

7.	CHECK HARNESS AND CONNECTOR (POWER STEERING ECU ASSEMBLY - BATTERY/BODY GROUND)
-----------	--



(a) Disconnect the A14 power steering ECU assembly connector .

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A14-1 (PIG) - Body ground	Always	9 to 16 V

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A14-2 (PGND) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector
----	--------------------------------------

(to Power Steering ECU Assembly)

NG ▶ REPAIR OR REPLACE HARNESS OR
CONNECTOR

OK ▶ REPLACE POWER STEERING ECU ASSEMBLY



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000275402ZX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: FAIL-SAFE CHART (2013 FR-S)		

FAIL-SAFE CHART

If a problem occurs in the power steering system, the EPS warning light comes on in the combination meter and the power steering assist is stopped, locked at a particular point, or decreased simultaneously to protect the system.

Power Steering System

DTC CODE	DETECTION CONDITION	FAIL-SAFE OPERATION
C1511	Torque sensor malfunction	Power assist stops.
C1512		
C1513		
C1514		
C1515		
C1516		
C1517		
C1521	Motor circuit malfunction	
C1522		
C1523		
C1524		
C1525	Motor rotation angle sensor malfunction	
C1526		
C1528		
C1531	ECU malfunction	Assist force is restricted.
C1532		
C1533		
C1534		
C1541	Skid control malfunction	The amount of power assist is locked at the 100 km/h (62 mph) level of power assist.
C1551	IG power supply voltage error	Power assist stops.
C1552	PIG power supply voltage error	
C1554	Power supply relay malfunction	
C1555	Motor relay malfunction	
C1581	Assist map not written in power steering ECU	Control is performed using the default settings.
C1582	Assist map mismatch in power	Control is performed using the current assist map.

	steering ECU	
U0100	ECM communication error	Power assist continues as normal*1.
		Power assist stops*2.
U0122	Skid control ECU communication error	The amount of power assist is locked at the 100 km/h (62 mph) level of power assist.
U0416		

HINT:

- *1: When the DTC is stored while the engine is running.
- *2: When the DTC is stored before the engine is started.
- The amount of power assist may be decreased to prevent the motor and ECUs from overheating if the steering wheel is continuously turned when the vehicle is either stopped or driven at a low speed, or if the steering wheel is kept at either full lock position for a long time. In such cases, the amount of power assist returns to normal if the steering wheel is not turned for approximately 10 minutes with the engine idling.
- If the battery is not sufficiently charged or the voltage decreases temporarily, the amount of power assist is reduced and the EPS warning light comes on. In such cases, the amount of power assist returns normal when the battery voltage recovers.



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000275504RX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: FREEZE FRAME DATA (2013 FR-S)		

FREEZE FRAME DATA

1. FREEZE FRAME DATA

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Chassis / EMPS / Trouble Codes.
- (f) According to the display on the Techstream, select the freeze frame data.

EMPS

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Meter Vehicle Velocity	Vehicle speed from skid control ECU/ Min.: 0.0 km/h (0.0 mph) Max.: 300.0 km/h (186.4 mph)	0 km/h (0 mph)	The vehicle is stopped.
		No significant fluctuation	The vehicle is driven at a constant speed.
Engine Revolution	Engine speed/ Min.: 0 rpm Max.: 12800 rpm	No significant fluctuation	The engine is running at a constant speed.
Motor Actual Current	Amount of current to motor/ Min.: -327.68 A Max.: 327.67 A	Value changes in proportion to steering effort	The engine is running and the steering wheel is being turned.
Command Value Current	Demanded amount of current to motor/ Min.: -327.68 A Max.: 327.67 A	Value changes in proportion to steering effort	The engine is running and the steering wheel is being turned.
Steering Angle Velocity	Steering angle speed/ Min.: -32768 deg/s Max.: 32767 deg/s	Value changes in proportion to steering effort	The engine is running and the steering wheel is being turned.
Thermistor Temperature	ECU substrate temperature/ Min.: -50.0°C (-58.0°F) Max.: 150.0°C	-	The ignition switch is ON.

	(302.0°F)		
PIG Power Supply	Power source voltage to active motor/ Min.: 0.0000 V Max.: 20.1531 V	9 to 16 V	The engine is running and power steering is operating.
IG Power Supply	ECU power source voltage/ Min.: 0.0000 V Max.: 20.1531 V	9 to 16 V	The ignition switch is ON.
Steering Wheel Torque	Steering wheel torque/ Min.: -7.00 Nm Max.: 7.00 Nm	Value changes in proportion to steering effort	The engine is running and the steering wheel is being turned.
Motor Rotation Angle	Motor rotation angle/ Min.: 0.000 deg Max.: 360.000 deg	Motor rotation angle value changes from 0 to 360 deg	The engine is running and the steering wheel is being turned.
Command Val Current 2	Demanded amount of current to motor/ Min.: -327.68 A Max.: 327.67 A	Value changes in proportion to steering effort	The engine is running and the steering wheel is being turned.
PIG2 Voltage	Coil rear pressurization voltage/ Min.: 0.000 V Max.: 98.000 V	Approximately 27 V	The engine is running and the steering wheel is not being turned.
		Value changes between 16 and 35 V	The engine is running and the steering wheel is being turned.
Motor Voltage	Motor power supply voltage/ Min.: 0.000 V Max.: 98.000 V	Approximately 27 V	The engine is running and the steering wheel is not being turned.
		Value changes between 4 and 35 V	The engine is running and the steering wheel is being turned.
Motor Terminal Volt(U)	Motor terminal voltage (U phase)/ Min.: 0.000 V Max.: 98.000 V	Value changes between 4 and 35 V	The engine is running and the steering wheel is being turned.
Motor Terminal Volt(V)	Motor terminal voltage (V phase)/ Min.: 0.000 V Max.: 98.000 V	Value changes between 4 and 35 V	The engine is running and the steering wheel is being turned.
Motor Terminal Volt(W)	Motor terminal voltage (W phase)/ Min.: 0.000 V Max.: 98.000 V	Value changes between 4 and 35 V	The engine is running and the steering wheel is being turned.

Torque Sensor 1 Output	Torque sensor 1 output voltage/ Min.: 0.0000 V Max.: 5.0000 V	2.3 to 2.7 V	The engine is running and the steering wheel is not turned (without load).
		2.3 to 3.8 V	The engine is running and the steering wheel is turned to the right when the vehicle is stopped.
		1.2 to 2.7 V	The engine is running and the steering wheel is turned to the left when the vehicle is stopped.
Torque Sensor 2 Output	Torque sensor 2 output voltage/ Min.: 0.0000 V Max.: 5.0000 V	2.3 to 2.7 V	The engine is running and the steering wheel is not turned (without load).
		1.2 to 2.7 V	The engine is running and the steering wheel is turned to the right when the vehicle is stopped.
		2.3 to 3.8 V	The engine is running and the steering wheel is turned to the left when the vehicle is stopped.
TRQ1 Zero Point Value	Torque sensor 1 zero point voltage/ Min.: 0.0000 V Max.: 5.0000 V	Values differ depending on vehicle	The engine is running and the steering wheel is not being turned.
TRQ2 Zero Point Value	Torque sensor 2 zero point voltage/ Min.: 0.0000 V Max.: 5.0000 V	Values differ depending on vehicle	The engine is running and the steering wheel is not being turned.



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000274T05UX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:


*: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	CUSTOMER PROBLEM ANALYSIS
-----------	----------------------------------

(a) Confirm problem symptoms  .

NEXT




3.	INSPECT BATTERY VOLTAGE*
-----------	---------------------------------

(a) Measure the voltage of the battery.

Standard voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding to the next step.

(b) Using the Techstream, inspect battery voltage reduction history "Battery Voltage Lo Record" in the Data List  .

NEXT



4.	CHECK DTC AND FREEZE FRAME DATA*
-----------	---

(a) Check and record DTCs and freeze frame data.

NEXT



5.	CLEAR DTC AND FREEZE FRAME DATA*
-----------	---

(a) Clear the DTCs and freeze frame data.

NEXT



6.	PROBLEM SYMPTOM CONFIRMATION
-----------	-------------------------------------

Result

RESULT	PROCEED TO
Symptom does not occur.	A
Symptom occurs.	B

B Go to step 8

A



7.	SYMPTOM SIMULATION
-----------	---------------------------

(a) Perform symptom simulation .

NEXT



8.	CHECK CAN COMMUNICATION SYSTEM*
-----------	--

(a) Check for DTCs .

Result

RESULT	PROCEED TO
--------	------------

CAN communication system DTC is not output.	A
CAN communication system DTC is output.	B

HINT:


- If any CAN communication system DTCs are output, perform troubleshooting for the CAN communication system first.
- If communication to the power steering ECU cannot be established through the Techstream, inspect terminals CANH and CANL of the DLC3 and power steering ECU, and the IG circuit of the power steering ECU.

B ▶ **PROCEED TO CAN COMMUNICATION SYSTEM
(HOW TO PROCEED WITH
TROUBLESHOOTING)**

A



9.	CHECK FOR DTC*
-----------	-----------------------

(a) Check for DTCs  .

HINT:

Refer to Diagnostic Trouble Code Chart when any DTCs are output  .

Result


RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B

B ▶ **Go to step 11**

A



10.	PROBLEM SYMPTOMS TABLE
------------	-------------------------------

(a) Refer to Problem Symptoms Table  .

NEXT



11.	CIRCUIT INSPECTION
-----	--------------------

NEXT



12.	IDENTIFICATION OF PROBLEM
-----	---------------------------

NEXT



13.	REPAIR OR REPLACE
-----	-------------------

NEXT



14.	CONFIRMATION TEST
-----	-------------------

NEXT  **END**

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WF605FX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. CHECK STEERING EFFORT (TORQUE)


NOTICE:

Some of these service operations may affect the SRS airbags. Read the precautionary notices concerning the SRS airbag system before servicing.

- (a) Stop the vehicle on a level, paved surface and align the wheels straight ahead.
- (b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Remove the steering pad  .
- (d) Connect the cable to the negative (-) battery terminal.
- (e) Using a torque wrench, check that the steering wheel set nut is properly tightened.

Torque: 39 N·m (398 kgf·cm, 29ft·lbf)

- (f) Turn the ignition switch to ON so that the power steering is ready to operate.
- (g) Turn the steering wheel 90 degrees to the right and check the steering effort (torque) while continuing to turn it further in the same direction.


Standard steering effort (Reference):

6.0 N*m (61 kgf*cm, 53 in.*lbf) or less

- (h) Align the front wheels facing straight ahead.
- (i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

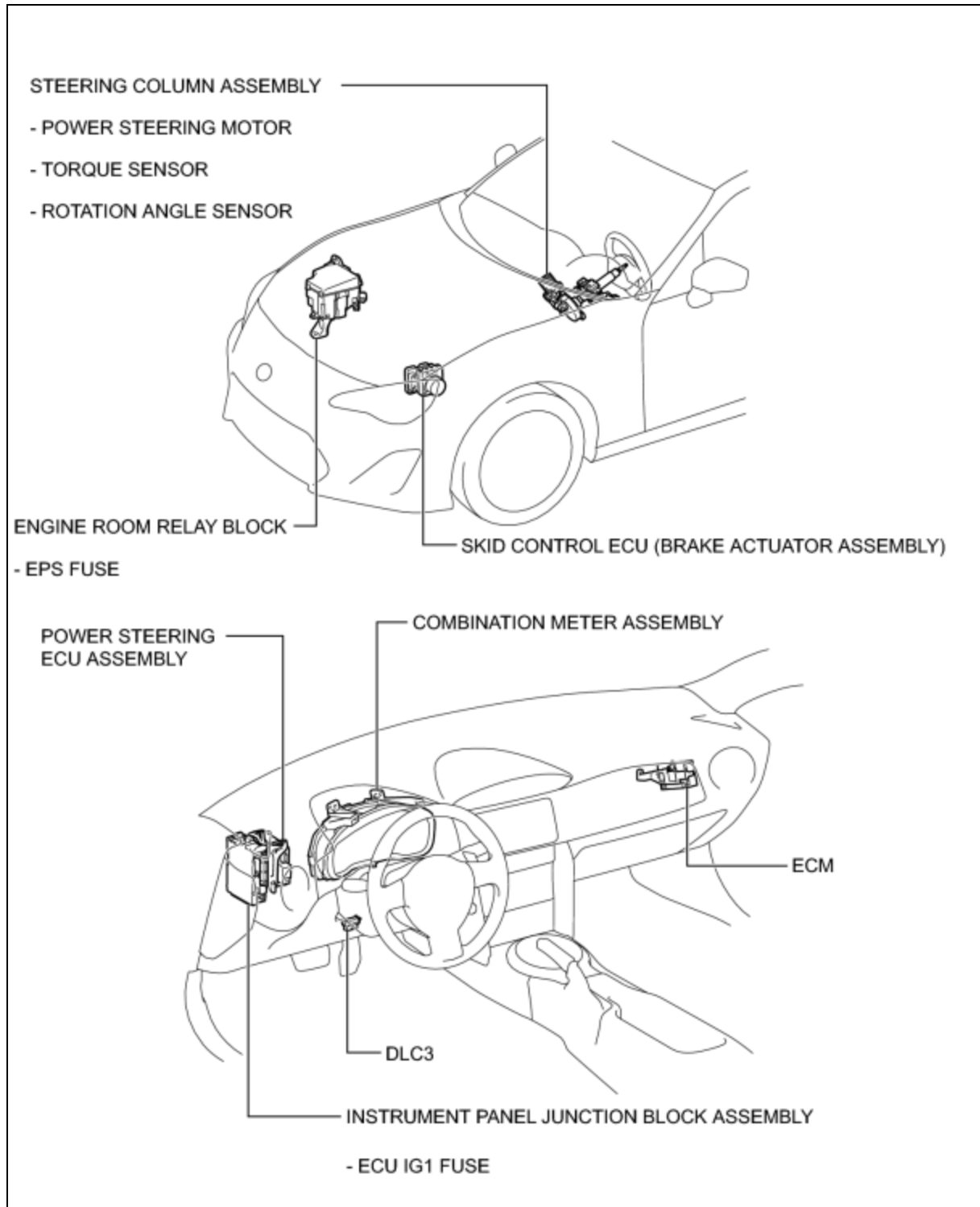
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (j) Install the steering pad  .
- (k) Connect the cable to the negative (-) battery terminal.

Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000274V02QX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION




Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000274S03XX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

1. HANDLING PRECAUTIONS FOR SRS AIRBAG SYSTEM

- (a) The vehicle is equipped with a Supplemental Restraint System (SRS). Failure to carry out service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing. This may cause a serious accident.


Before servicing (including inspection, replacement, removal and installation of parts), be sure to read the precautionary notices for Supplemental Restraint System .

2. PRECAUTIONS FOR REMOVAL, INSTALLATION AND REPLACEMENT OF ELECTRONIC MOTOR POWER STEERING COMPONENTS

- (a) Be sure to align the front wheels straight ahead when removing and installing the power steering link assembly.
- (b) If disconnecting the steering intermediate shaft and pinion shaft of the power steering link assembly, be sure to place matchmarks before starting the operation.
- (c) If replacing the power steering ECU assembly, always replace it with a new one (if the power steering ECU assembly is not replaced with a new one, DTCs may be stored).

NOTICE:

Do not use the power steering ECU assembly from another vehicle (display model, etc.).

- (d) After replacing the steering column assembly or power steering ECU assembly, write the assist map, initialize the rotation angle sensor and calibrate the torque sensor zero point .

3. HANDLING PRECAUTION

- (a) When handling electronic parts:
- Avoid any impact to electronic parts such as ECUs and relays. Replace electronic parts with new ones if dropped or subjected to a severe blow.
 - Do not expose any electronic parts to high temperatures or humidity.
 - Do not touch the connector terminals in order to prevent deformation or malfunctions due to static electricity.
- (b) When handling the steering column assembly:
- Avoid any impact to the steering column assembly, especially to the motor and torque sensor. Replace them with new ones if dropped or subjected to a severe blow.
 - Do not pull the wire harness when moving the steering column assembly.
- (c) When disconnecting the connectors related to the power steering system, turn the ignition switch to ON, center the steering wheel, turn the ignition switch off, disconnect the negative (-) battery terminal, and then disconnect the connectors.

4. PRECAUTIONS FOR CAN COMMUNICATION

- (a) Perform troubleshooting for the communication line problems when DTCs of the CAN communication system are output. Be sure to start troubleshooting the power steering system after confirming that the CAN communication system is normal.
- (b) Since the CAN communication line has a specific length and route, it cannot be repaired temporarily with a bypass wire, etc.
-



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020NO01EX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Power Steering System

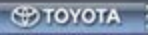
SYMPTOM	SUSPECTED AREA	SEE PAGE
Steering is heavy.	Front tires (Improperly inflated, unevenly worn)	INFO
	Front wheel alignment (Incorrect)	INFO
	Front suspension (Lower ball joint)	INFO
	Rack and pinion power steering gear assembly	INFO
	Steering column assembly	INFO
	Torque sensor (Built into steering column assembly)	-
	Power steering motor (Built into steering column assembly)	-
	Speed sensor	INFO
	Skid control ECU	INFO
	Battery and power source system	INFO
	Power steering ECU power supply voltage and relay	INFO
	Power steering ECU assembly	INFO
		Calibration of rotation angle sensor output and torque sensor
Front tires (Improperly inflated, unevenly worn)		INFO
Front wheel alignment (Incorrect)		INFO
Front suspension (Lower ball		

Steering effort differs between right and left or is uneven.	joint)	INFO
	Rack and pinion power steering gear assembly	INFO
	Torque sensor (Built into steering column assembly)	-
	Steering column assembly	INFO
	Power steering motor (Built into steering column assembly)	-
	Power steering ECU assembly	INFO
While driving, steering effort does not change in accordance with vehicle speed or the steering wheel does not return properly.	Front suspension (Lower ball joint)	INFO
	Speed sensor	INFO
	Skid control ECU	INFO
	Torque sensor (Built into steering column assembly)	-
	Power steering motor (Built into steering column assembly)	-
	Rack and pinion power steering gear assembly	INFO
	Power steering ECU assembly	INFO
A knocking (or cranking) sound occurs when turning the steering wheel while power steering operating.	Front suspension (Lower ball joint)	INFO
	Steering intermediate shaft	-
	Rack and pinion power steering gear assembly	INFO
Noise occurs when turning the steering wheel during low speed driving.	Power steering motor (Built into steering column assembly)	-
	Rack and pinion power steering gear assembly	INFO
	Steering column assembly	INFO
	Steering sensor	-
	Power steering ECU assembly	INFO
High-pitched sounds (squeaking) occur when turning the steering wheel slowly with the vehicle stopped.	Rack and pinion power steering gear assembly	INFO
	Power steering motor (Built into steering column assembly)	-
The steering wheel vibrates and noise occurs when turning the steering wheel from lock to lock.	Rack and pinion power steering gear assembly	INFO
	Power steering motor (Built into steering column assembly)	-
	Steering column assembly	INFO

EPS warning light remains on.

EPS warning light circuit

INFO



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000274Y02YX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

SYSTEM DESCRIPTION

1. DESCRIPTION

- The power steering system generates torque through the operation of the motor and reduction gear installed on the column shaft in order to assist steering effort.
- The power steering ECU determines directions and the amount of assisting power in accordance with vehicle speed signals and signals from the torque sensor built into the steering column assembly. As a result, the power steering ECU adjusts the steering effort so that it is lighter during low speed driving and heavier during high speed driving.
- When there is a power supply voltage drop that may result in an increase in required steering effort, the power steering system has a function that warns the driver by illuminating the EPS warning light.

(a) Power steering ECU:

The power steering ECU calculates assisting power based on steering torque signals from the torque sensor and vehicle speed signals from the skid control ECU.

(b) Torque sensor:

The torque sensor detects the steering effort generated when the steering wheel is turned and converts it to an electrical signal.

(c) Power steering motor:

The power steering motor is activated by the current from the power steering ECU and generates torque to assist the steering effort.

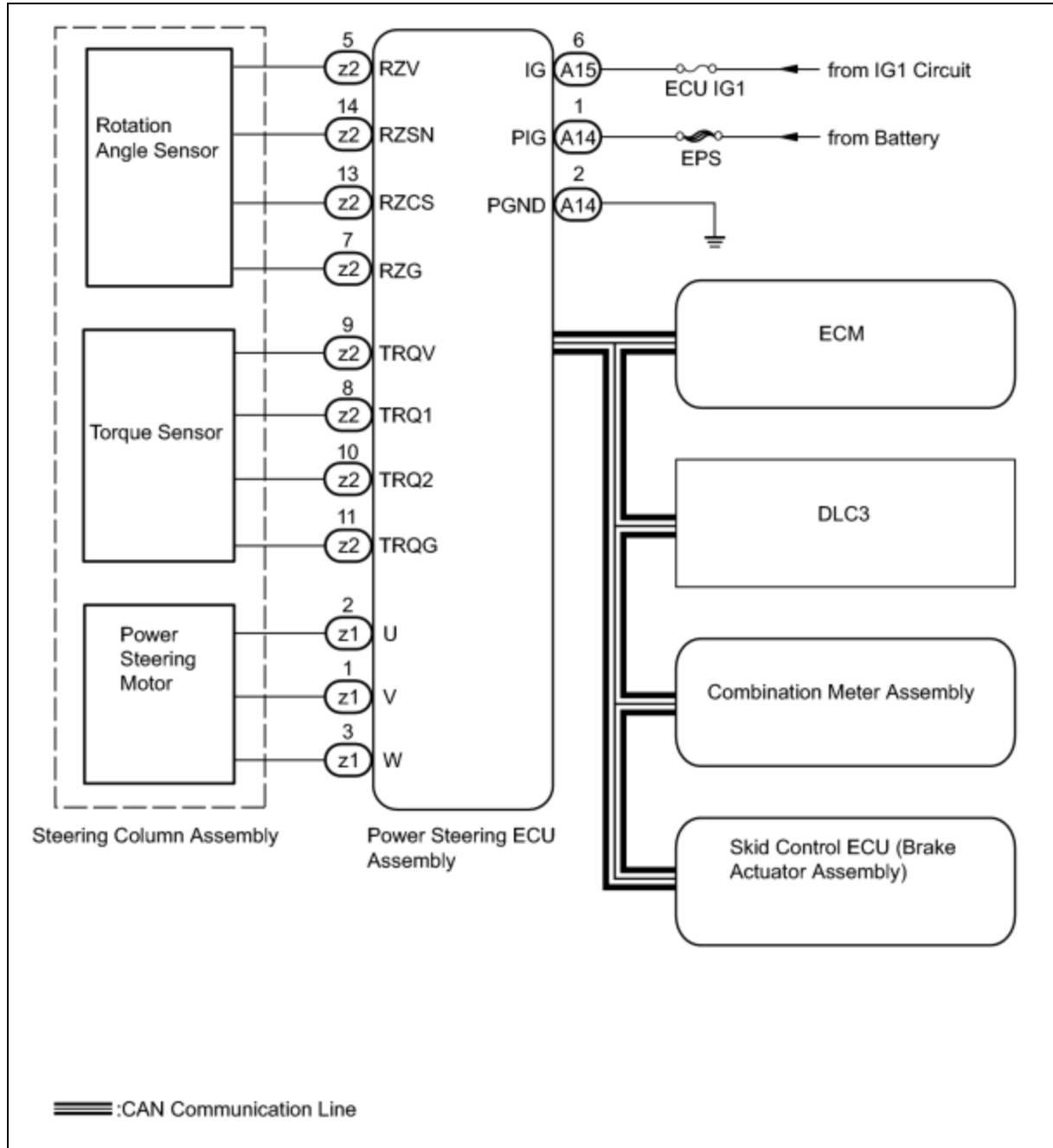
(d) Motor rotation angle sensor:

The motor rotation angle sensor consists of the resolver sensor, which excels in reliability and durability. The rotation angle sensor detects the rotation angle of the motor and outputs it to the power steering ECU. As a result, it ensures efficient EPS control.



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000275102ZX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

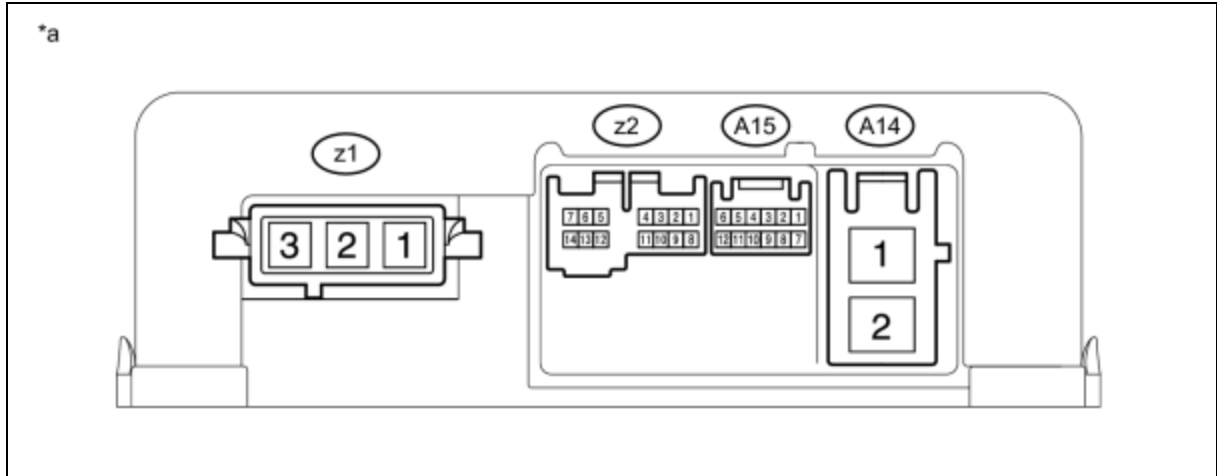
SYSTEM DIAGRAM



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000274W02YX
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. CHECK POWER STEERING ECU



Text in Illustration

*a	Component without harness connected (Power Steering ECU Assembly)	-	-
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HINT:

As connector z1 uses a lock lever, each terminal cannot be checked while the connector is still connected to the power steering ECU.

TERMINAL NO. (SYMBOL)	TERMINAL DESCRIPTION
z1-1 (V)	V phase motor output
z1-2 (U)	U phase motor output
z1-3 (W)	W phase motor output

(a) Measure the voltage and resistance according to the value(s) in the table below.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A14-1 (PIG) - A14-2 (PGND)	W - B	Motor power supply	Always	9 to 16 V
A14-2 (PGND) - Body ground	B - Body ground	Power ground	Always	Below 1 Ω
A15-1 (CANH) - A15-7 (CANL)	B - W	CAN communication line	Ignition switch off	57 to 63 Ω

A15-6 (IG) - A14-2 (PGND)	G-W - B	IG power supply	Ignition switch ON	9 to 16 V
z2-5 (RZV) - A14-2 (PGND)	R - B	Rotation angle sensor excitation output signal	Engine running, steering wheel being turned	0.68 to 4.42 V
z2-7 (RZG) - A14-2 (PGND)	B - B	Rotation angle sensor excitation circuit ground	Always	Below 1 Ω
z2-13 (RZCS) - A14-2 (PGND)	L - B	Rotation angle sensor COS aspect input signal	Engine running, steering wheel being turned	0.68 to 4.42 V
z2-14 (RZSN) - A14-2 (PGND)	Y - B	Rotation angle sensor SIN aspect input signal	Engine running, steering wheel being turned	0.68 to 4.42 V
z2-8 (TRQ1) - z2-11 (TRQG)	W - B	Torque sensor signal 1	Engine running, steering wheel not turned (without load)	2.3 to 2.7 V
			Engine running, steering wheel turned to right with vehicle stopped	2.3 to 3.8 V
			Engine running, steering wheel turned to left with vehicle stopped	1.2 to 2.7 V
z2-9 (TRQV) - z2-11 (TRQG)	R - B	Torque sensor power supply	Ignition switch ON	4.5 to 5.5 V
z2-10 (TRQ2) - z2-11 (TRQG)	Y - B	Torque sensor signal 2	Engine running, steering wheel not turned (without load)	2.3 to 2.7 V
			Engine running, steering wheel turned to right with vehicle stopped	1.2 to 2.7 V
			Engine running, steering wheel turned to left with vehicle stopped	2.3 to 3.8 V
z2-11 (TRQG) - Body ground	B - Body ground	Torque sensor ground	Always	Below 1 Ω

If the result is not as specified, the ECU may have a malfunction.



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000277M064X
Title: POWER ASSIST SYSTEMS: POWER STEERING SYSTEM: U0100,U0122,U0416: Lost Communication with ECM / PCM "A" (2013 FR-S)		

DTC	U0100	Lost Communication with ECM / PCM "A"
------------	--------------	--

DTC	U0122	Lost Communication with Vehicle Dynamics Control Module
------------	--------------	--

DTC	U0416	Invalid Data Received from Vehicle Dynamics Control Module
------------	--------------	---

DESCRIPTION

The power steering ECU assembly receives signals from the ECM and skid control ECU (brake actuator assembly) via the CAN communication system.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
U0100	Lost communication with the ECM/PCM "A"	<ul style="list-style-type: none"> • CAN communication system • ECM
U0122	Lost communication with the brake system control module	<ul style="list-style-type: none"> • CAN communication system • Skid control ECU (Brake actuator assembly)
U0416	The brake system control module signal malfunction	

INSPECTION PROCEDURE

PROCEDURE

1.	CHECK FOR DTC (CAN COMMUNICATION SYSTEM)
-----------	---

(a) Clear the DTC(s)  .

(b) Check for DTCs  .

OK:

DTC is not output.

NG  **GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING)**

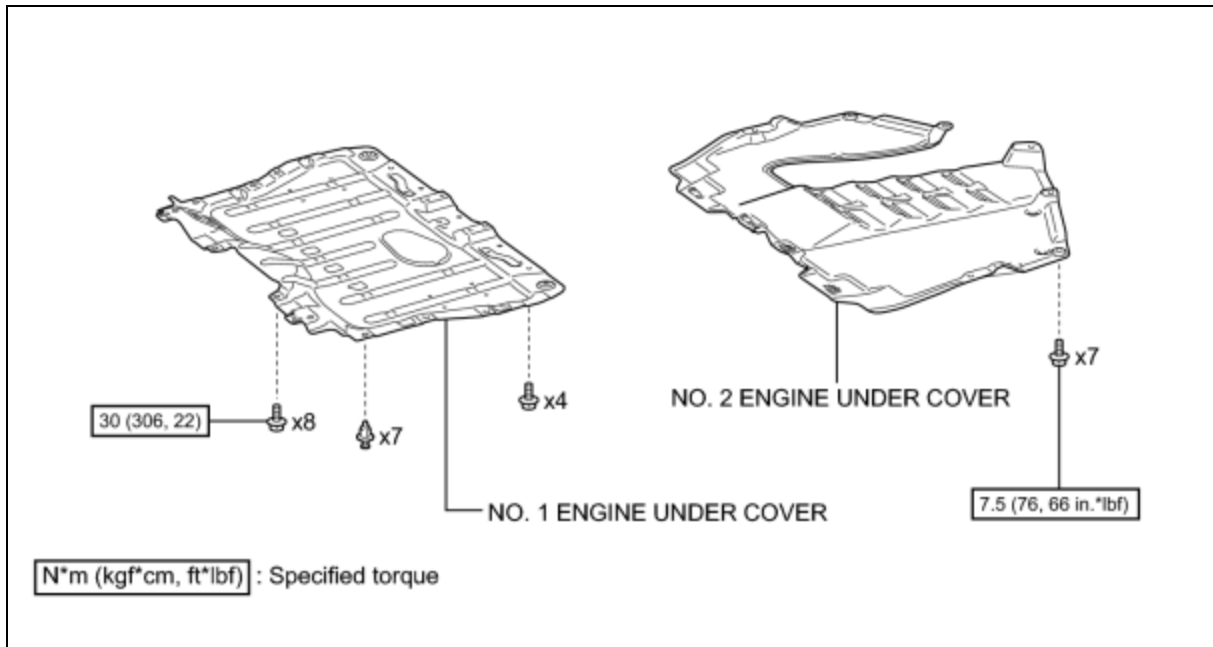
OK  **USE SIMULATION METHOD TO CHECK**



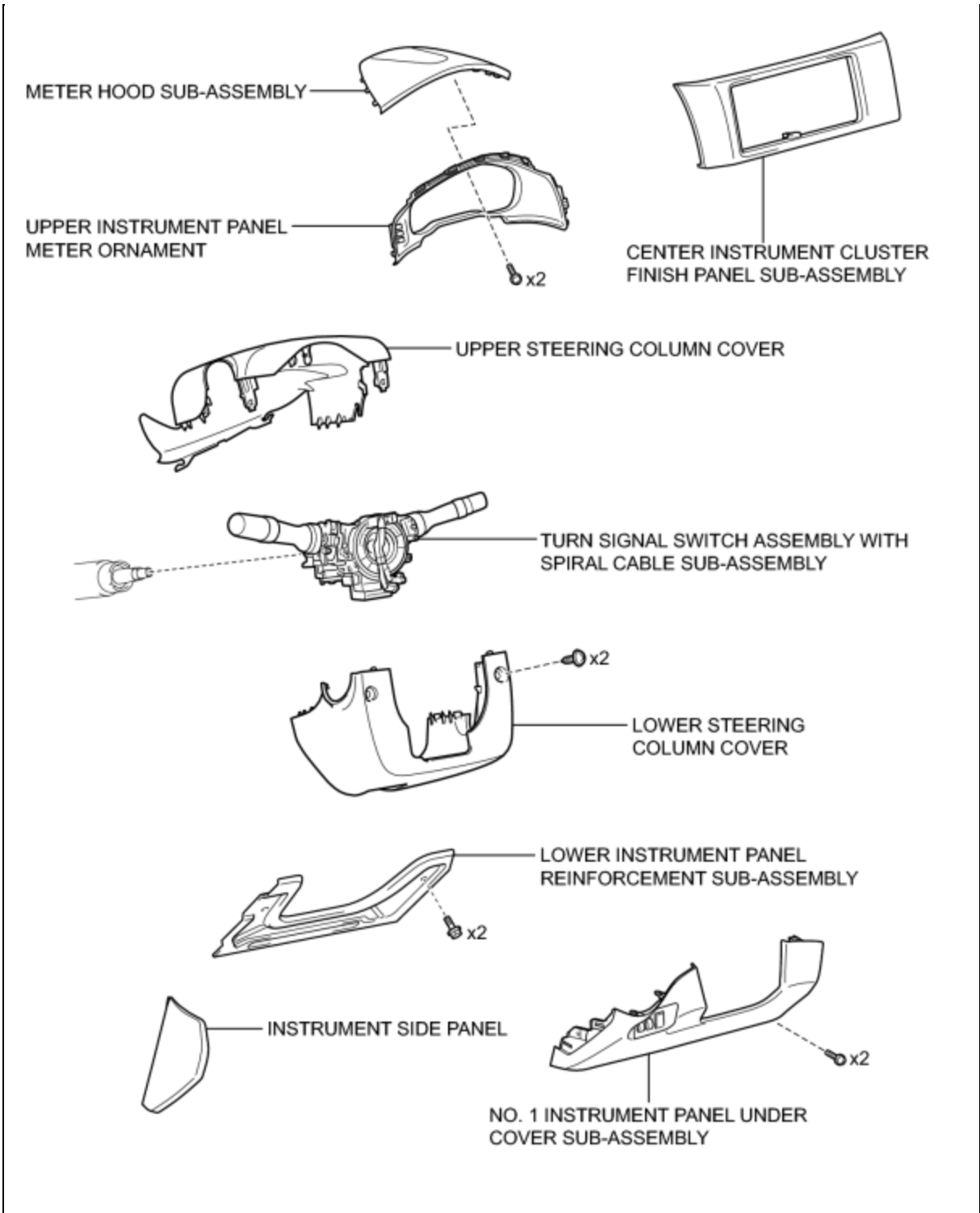
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002TEU01VX
Title: STEERING COLUMN: STEERING COLUMN ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION

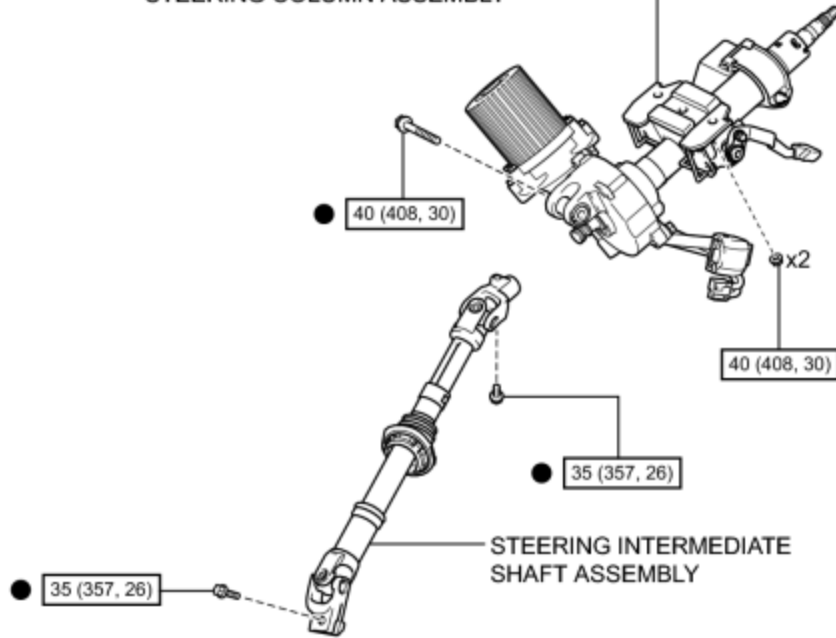


ILLUSTRATION

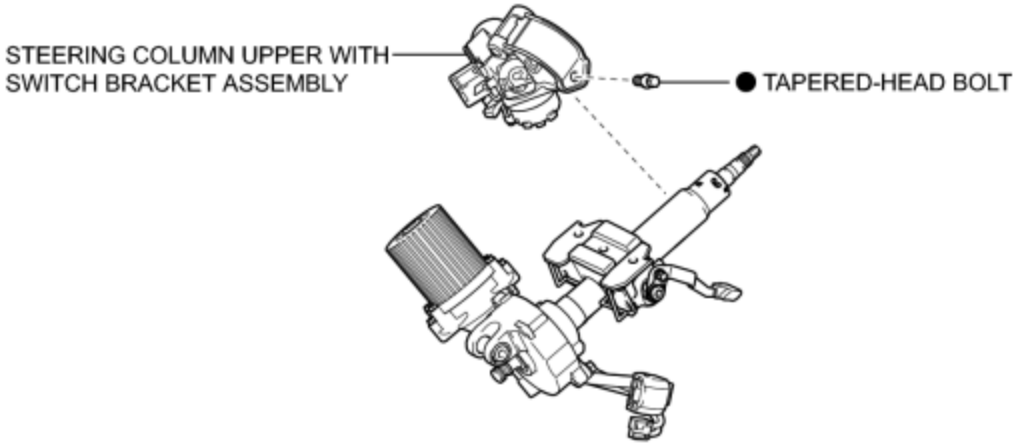
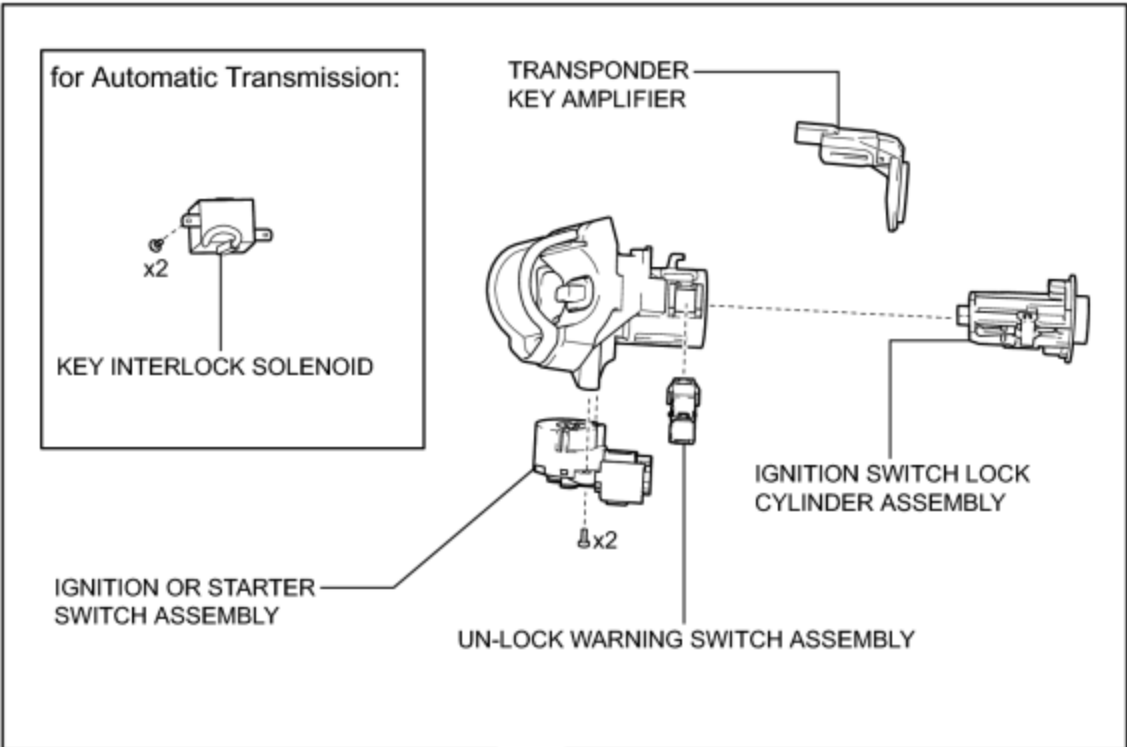


ILLUSTRATION

STEERING COLUMN ASSEMBLY



ILLUSTRATION



● Non-reusable part

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WAE05WX
Title: STEERING COLUMN: STEERING COLUMN ASSEMBLY: DISASSEMBLY (2013 FR-S)		

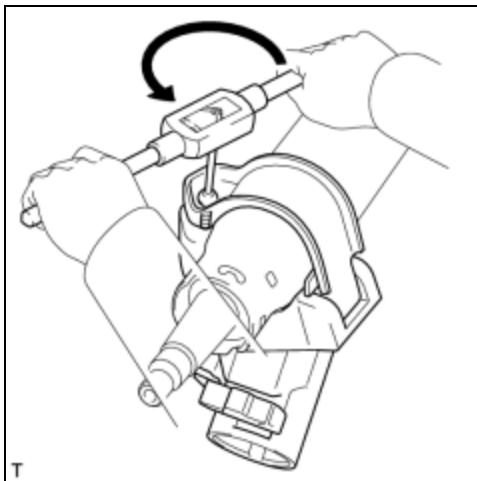
DISASSEMBLY

NOTICE:

- When using a vise, do not overtighten it.
- Do not drop the steering column assembly, strike it with tools or subject it to impacts.
- If the steering column assembly is subjected to an impact, replace it with a new one.
- Do not pull the wire harness of the steering column assembly.
- Do not allow any moisture to come into contact with the steering column assembly.
- Do not loosen any bolts not mentioned in the procedure.

1. REMOVE STEERING COLUMN UPPER WITH SWITCH BRACKET ASSEMBLY

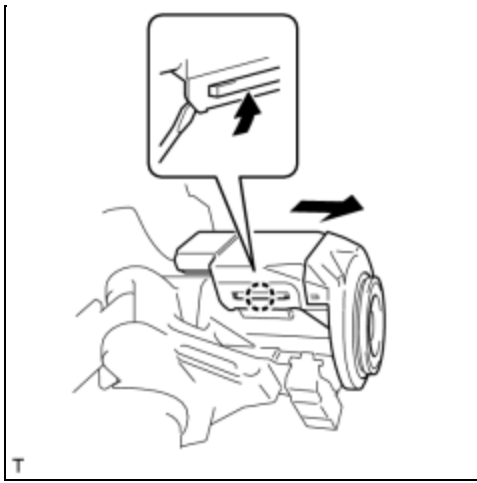
- Using a center punch, mark the center of the 2 tapered-head bolts.
- Using a 3 to 4 mm (0.118 to 0.157 in.) diameter drill bit, drill a hole in each tapered-head bolt.



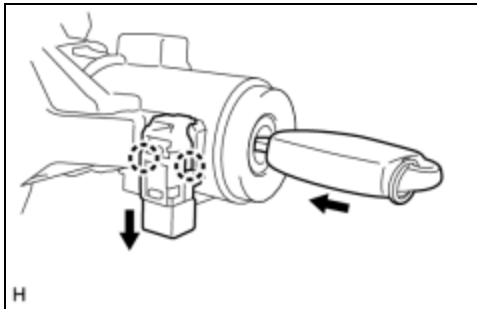
- Using a screw extractor, remove each tapered-head bolt, and then remove the steering column upper with switch bracket assembly from the steering column assembly.

2. REMOVE TRANSPONDER KEY AMPLIFIER

- Slide the transponder key amplifier, disengage the 2 claws and then remove the transponder key amplifier as shown in the illustration.



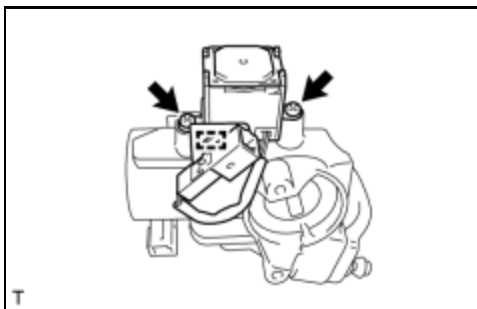
3. REMOVE UN-LOCK WARNING SWITCH ASSEMBLY



(a) Insert the key.

(b) Disengage the 2 claws and slide the unlock warning switch assembly to remove it as shown in the illustration.

4. REMOVE KEY INTERLOCK SOLENOID (for Automatic Transmission)

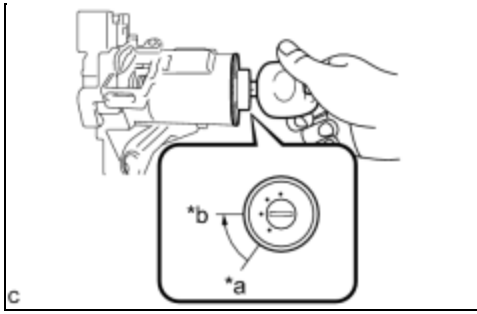


(a) Remove the 2 screws and the key interlock solenoid from the steering column upper bracket assembly.

(b) Disengage the clamp.

5. REMOVE IGNITION SWITCH LOCK CYLINDER ASSEMBLY

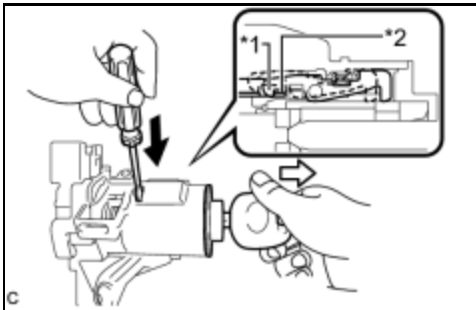
(a) Turn the ignition switch lock cylinder assembly to the ACC position.





Text in Illustration

*a	LOCK
*b	ACC

(b) Insert a screwdriver into the hole of the steering column upper bracket assembly as shown in the illustration. Pull the ignition switch lock cylinder assembly until its claw contacts the stopper of the steering column upper bracket assembly.



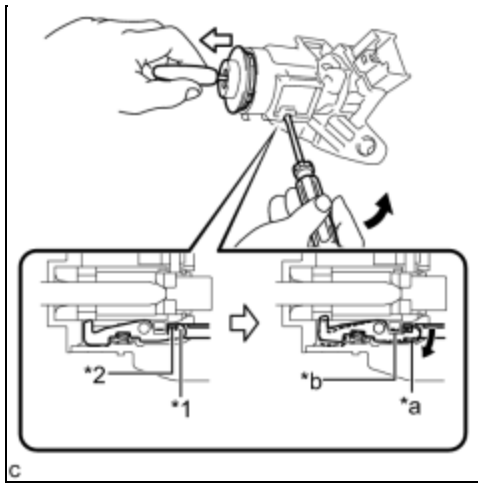
Text in Illustration

*1	Claw
*2	Stopper
	Push
	Pull



NOTICE:

Make sure to pull the ignition switch lock cylinder assembly until its claw contacts the stopper of the steering column upper bracket assembly. Failure to do so will affect later work operations.

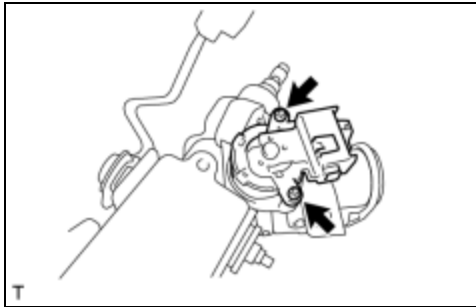
(c) Insert a screwdriver into the hole of the steering column upper bracket assembly. Tilt the screwdriver as shown in the illustration to disengage the claw of the ignition switch lock cylinder assembly, and pull out the ignition switch lock cylinder assembly from the steering column upper bracket assembly.



Text in Illustration

*1	Claw
*2	Stopper
*a	Claw disengaged
*b	Driver Insertion Hole
	Tilt
	Pull out

6. REMOVE IGNITION OR STARTER SWITCH ASSEMBLY



- (a) Remove the 2 screws and the ignition or starter switch assembly from the steering column upper bracket assembly.



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001NM101CX
Title: STEERING COLUMN: STEERING COLUMN ASSEMBLY: INSPECTION (2013 FR-S)		

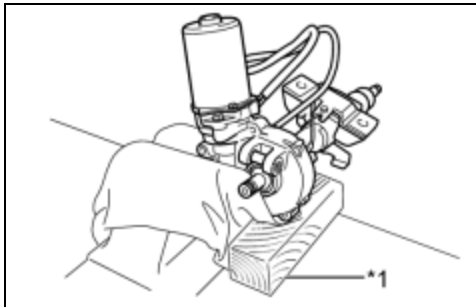
INSPECTION

NOTICE:

When using a vise, do not overtighten it.

1. INSPECT PRELOAD

- (a) Secure the steering column assembly in a vise using aluminum plates and wooden block as shown in the illustration.



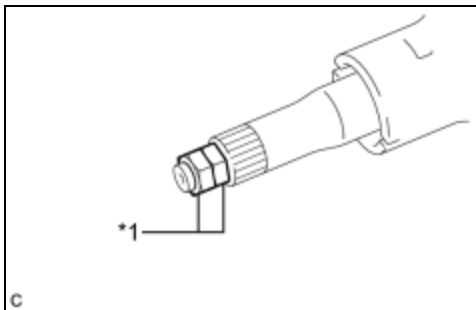
Text in Illustration

*1	Wooden Block
----	--------------

NOTICE:

- Do not overtighten the vise, as the steering column assembly may become deformed.
- Support the steering column assembly with a wooden block or similar item to ensure that it does not fall.

- (b) Install the 2 service nuts to the steering main shaft.



Text in Illustration

*1	Service Nut
----	-------------

Recommended service nut:

Thread diameter

12.0 mm (0.472 in.)

Thread pitch

1.25 mm (0.0492 in.)

- (c) Tighten the 2 service nuts each other to lock them.

NOTICE:

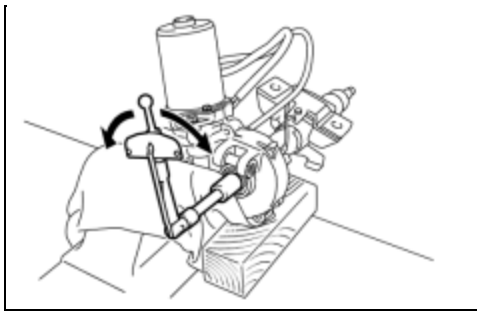
Do not apply excess torque to the service nuts by using a tool such as an impact wrench.

HINT:

These nuts are installed to turn the steering main shaft. They should be removed after inspecting the steering main shaft rotating torque.

- (d) Using a torque wrench, turn the main shaft and measure the preload.

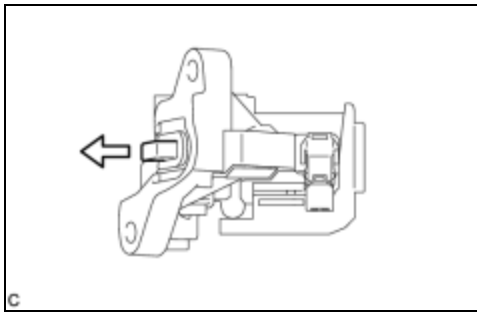
Preload:



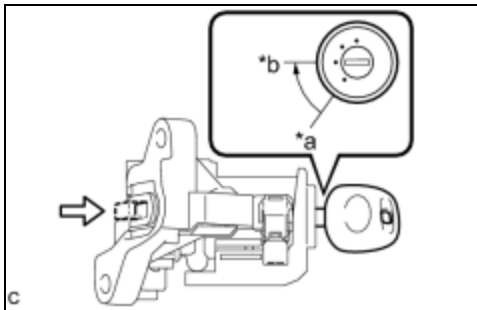
1.6 to 2.1 N*m (16.3 to 21.4 kgf*cm, 14.2 to 18.6 in.*lbf)

If the preload is not as specified, replace the steering column assembly with a new one.

2. INSPECT STEERING LOCK OPERATION



(a) Check that the steering lock mechanism is activated when the key is removed.



(b) Check that the steering lock mechanism is deactivated when the key is inserted and turned to the ACC position.

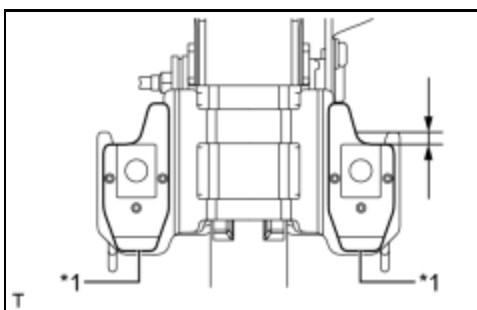
Text in Illustration

*a	LOCK
*b	ACC

HINT:

If there is any abnormality, replace the ignition switch lock cylinder assembly or steering column upper bracket assembly.

3. INSPECT STEERING COLUMN ASSEMBLY



(a) Check that the 2 capsules are securely installed to the steering column assembly as shown in the illustration.

OK:

5.0 mm (0.1969 in.) or more

Text in Illustration

*1	Capsule
----	---------

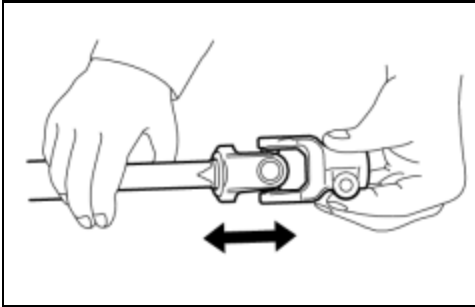
If the capsules are not positioned as specified, replace the steering column assembly with a new one.

(b) Check the 2 capsules for deformation and damage.

If either of the capsules is deformed, loose, missing or damaged, replace the steering column assembly with a new one.

4. INSPECT STEERING INTERMEDIATE SHAFT ASSEMBLY

(a) Check for play



(1) Check that there is no play at the universal joint.

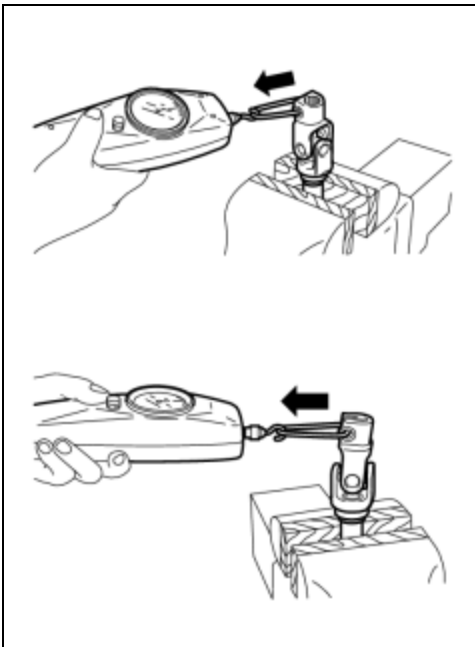
OK:

No play

HINT:

If the result is not as specified, replace the steering intermediate shaft assembly with a new one.

(b) Turning torque



(1) Hold the steering intermediate shaft assembly in a vise with the yoke on the rack and pinion power steering gear assembly side facing upward.

(2) Using a push and pull gauge, measure the turning torque in the both directions.

Torque:

6.6 N*m (66 kgf*cm, 58 in.*lbf) or less

HINT:

If the result is not as specified, replace the steering intermediate shaft assembly with a new one.

(3) Hold the steering intermediate shaft assembly in a vise with the yoke on the steering column assembly side facing upward.

(4) Using a push and pull gauge, measure the turning torque in the both directions.

Torque:

6.0 N*m (61 kgf*cm, 53 in.*lbf) or less

HINT:

If the result is not as specified, replace the steering intermediate shaft assembly with a new one.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WAB094X
Title: STEERING COLUMN: STEERING COLUMN ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSPECT STEERING COLUMN ASSEMBLY INFO

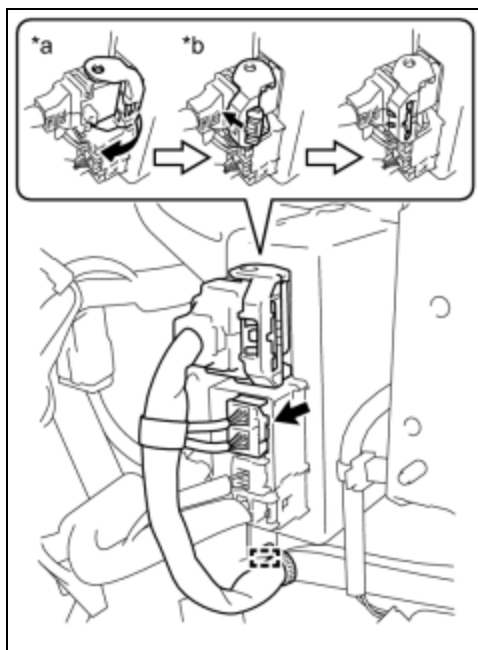
2. INSTALL STEERING COLUMN ASSEMBLY

- (a) Install the steering column assembly with the 2 nuts and new bolt.

Torque: 40 N·m (408 kgf·cm, 30ft·lbf)

NOTICE:

When installing the steering column assembly, be careful that the wire harness does not interfere with or is not pinched between other parts.



- (b) Engage the clamp.

- (c) Connect the 2 connectors to the power steering ECU.

(1) As shown in the illustration, return the lock lever to its original position to connect the connector and securely push in the lock of the lock lever.

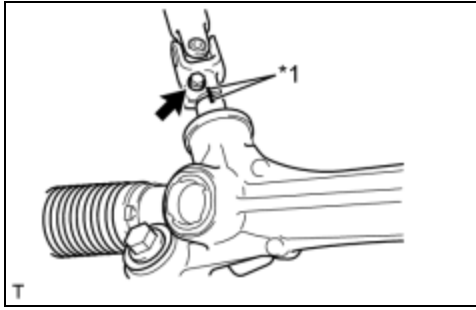
- (d) Connect the each connector and engage the wire harness clamps to the steering column assembly.

Text in Illustration

*a	Return the lock lever
*b	Push in the lock

3. INSTALL STEERING INTERMEDIATE SHAFT ASSEMBLY

- (a) Pass the steering intermediate shaft assembly through the hole in the body from the inside of the cabin.



- (b) Connect the steering intermediate shaft assembly to the rack and pinion power steering gear assembly.

Text in Illustration

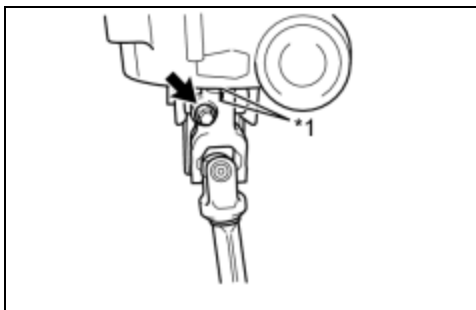
*1	Matchmark
----	-----------

NOTICE:

Align the matchmarks on the steering intermediate shaft assembly and the rack and pinion power steering gear assembly.

- (c) Install the new bolt.

Torque: 35 N·m (357 kgf·cm, 26ft·lbf)



- (d) Install the steering intermediate shaft assembly to the steering column assembly.

Text in Illustration

*1	Matchmark
----	-----------

NOTICE:

Align the matchmarks on the steering intermediate shaft assembly and the steering column assembly.

- (e) Install the new bolt.

Torque: 35 N·m (357 kgf·cm, 26ft·lbf)

- (f) Engage the 4 claws and install the dust seal.

4. INSTALL TURN SIGNAL SWITCH ASSEMBLY WITH SPIRAL CABLE SUB-ASSEMBLY

NOTICE:

- Do not replace the spiral cable with the battery connected and turn the ignition switch to ON.
- Do not rotate the spiral cable without the steering wheel with the battery connected and turn the ignition switch to ON.
- Ensure that the steering wheel is installed and aligned straight when inspecting the steering sensor.

- (a) With the clamp loosened, install the turn signal switch assembly with spiral cable sub-assembly to the steering column assembly.
- (b) Engage the claw on the turn signal switch assembly with spiral cable sub-assembly to the steering column assembly and tighten the clamp.
- (c) Connect the each connector to the turn signal switch assembly with spiral cable sub-assembly.

5. INSTALL UPPER STEERING COLUMN COVER

- (a) Engage the 2 claws to install the upper steering column cover.

6. INSTALL LOWER STEERING COLUMN COVER

- (a) Engage the 6 claws to install the lower steering column cover.
- (b) Install the 2 screws.

7. INSTALL UPPER INSTRUMENT PANEL METER ORNAMENT **INFO**

8. INSTALL METER HOOD SUB-ASSEMBLY **INFO**

9. INSTALL CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY **INFO**

10. TURN FRONT WHEELS TO FACE STRAIGHT AHEAD

11. INSPECT AND ADJUST SPIRAL CABLE WITH SENSOR SUB-ASSEMBLY **INFO**

12. INSPECT STEERING WHEEL CENTER POINT

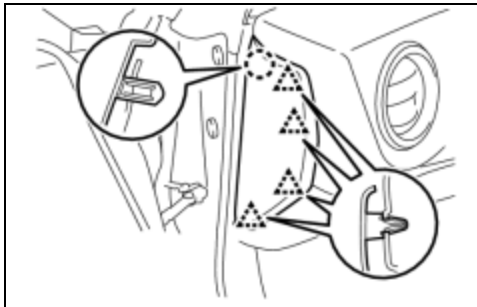
13. INSTALL STEERING WHEEL ASSEMBLY

INFO

14. INSTALL LOWER INSTRUMENT PANEL REINFORCEMENT SUB-ASSEMBLY **INFO**

15. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY **INFO**

16. INSTALL INSTRUMENT SIDE PANEL



(a) Engage the 4 clips and claw to install the instrument side panel.

17. INSTALL NO. 1 ENGINE UNDER COVER **INFO**

18. INSTALL NO. 2 ENGINE UNDER COVER **INFO**

19. INSTALL FRONT WHEEL LH

Torque: 120 N·m (1220 kgf·cm, 89ft·lbf)

20. PERFORM MEMORIZATION

HINT:

Perform VSC sensor neutral memorization **INFO** .

21. INITIALIZE ROTATION ANGLE SENSOR AND CALIBRATE TORQUE SENSOR ZERO POINT

INFO

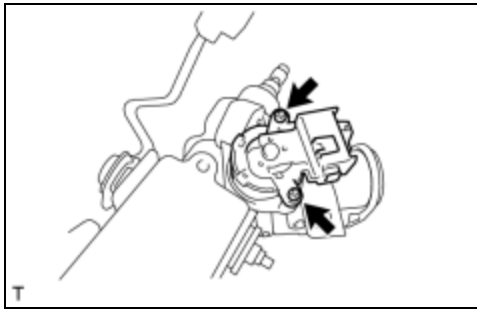
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WAF05WX
Title: STEERING COLUMN: STEERING COLUMN ASSEMBLY: REASSEMBLY (2013 FR-S)		

REASSEMBLY

NOTICE:

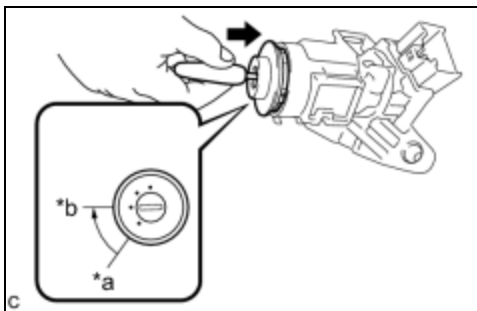
- When using a vise, do not overtighten it.
- Do not drop the steering column assembly, strike it with tools or subject it to impacts.
- If the steering column assembly is subjected to an impact, replace it with a new one.
- Do not pull the wire harness of the steering column assembly.
- Do not allow any moisture to come into contact with the steering column sub-assembly.
- Do not loosen any bolts not mentioned in the procedure.

1. INSTALL IGNITION OR STARTER SWITCH ASSEMBLY



- (a) Install the ignition or starter switch assembly with the 2 screws to the steering column upper bracket assembly.

2. INSTALL IGNITION SWITCH LOCK CYLINDER ASSEMBLY



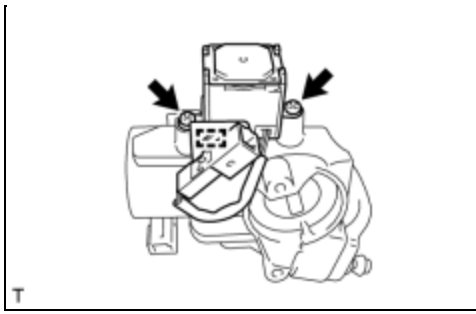
- (a) Make sure that the ignition switch lock cylinder assembly is in the ACC position.

Text in Illustration

*a	LOCK
*b	ACC

- (b) Install the ignition switch lock cylinder assembly to the steering column upper bracket assembly.
(c) Make sure that the ignition switch lock cylinder assembly is securely installed.

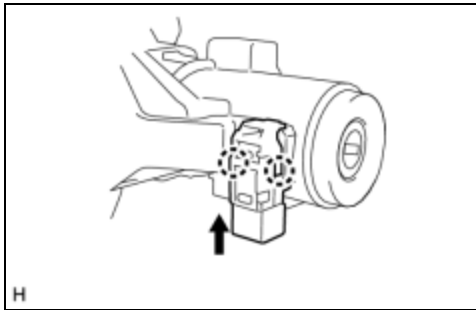
3. INSTALL KEY INTERLOCK SOLENOID (for Automatic Transmission)



(a) Engage the clamp.

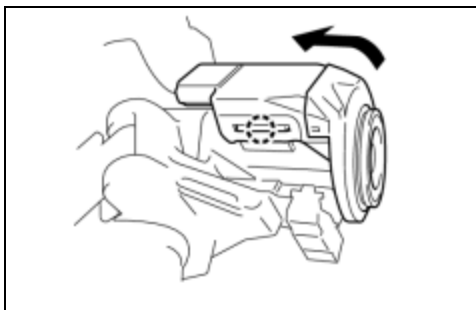
(b) Install the 2 screws and the key interlock solenoid to the steering column upper bracket assembly.

4. INSTALL UN-LOCK WARNING SWITCH ASSEMBLY



(a) Slide the unlock warning switch assembly and engage the 2 claws to install the unlock warning switch assembly to the steering column upper bracket assembly as shown in the illustration.

5. INSTALL TRANSPONDER KEY AMPLIFIER



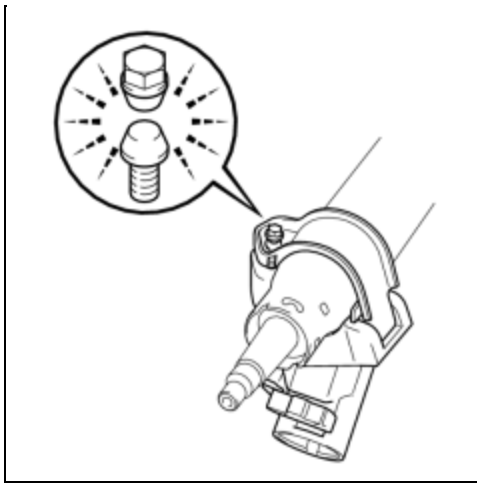
(a) Align the transponder key amplifier with the steering column upper bracket assembly. Tilt the transponder key amplifier slightly and slide it into position.

(b) Push the transponder key amplifier, and engage the 2 claws to install the transponder key amplifier to the steering column upper bracket assembly.

6. INSPECT STEERING LOCK OPERATION INFO

7. INSTALL STEERING COLUMN UPPER WITH SWITCH BRACKET ASSEMBLY

(a) Secure the steering column assembly in a vise.



(b) Temporarily install the steering column upper with switch bracket assembly to the steering column assembly with new tapered-head bolt.

(c) Tighten the tapered-head bolt until the bolt head break off.



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Model Year: 2013	Model: FR-S	Doc ID: RM000000WAD090X
Title: STEERING COLUMN: STEERING COLUMN ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

CAUTION:

Some of these service operations affect the SRS airbag system. Read the precautionary notices concerning the SRS airbag system before servicing the steering column. [INFO](#)

1. PRECAUTION

[INFO](#)

2. TURN FRONT WHEELS TO FACE STRAIGHT AHEAD

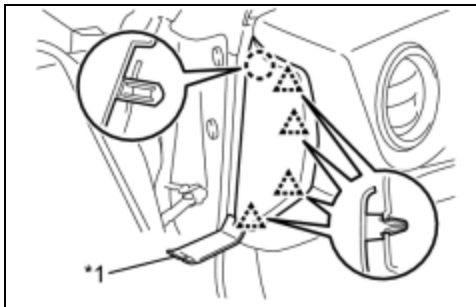
3. REMOVE NO. 1 ENGINE UNDER COVER [INFO](#)

4. REMOVE NO. 2 ENGINE UNDER COVER [INFO](#)

5. REMOVE STEERING WHEEL ASSEMBLY

[INFO](#)

6. REMOVE INSTRUMENT SIDE PANEL



(a) Using a moulding remover, disengage the claw and 4 clips and remove the instrument side panel.

Text in Illustration

*1	Moulding Remover
----	------------------

7. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)

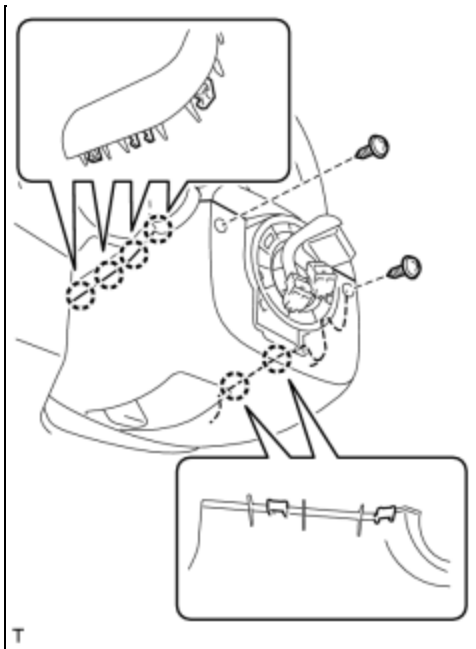
8. REMOVE LOWER INSTRUMENT PANEL REINFORCEMENT SUB-ASSEMBLY [INFO](#)

9. REMOVE CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY [INFO](#)

10. REMOVE METER HOOD SUB-ASSEMBLY [INFO](#)

11. REMOVE UPPER INSTRUMENT PANEL METER ORNAMENT [INFO](#)

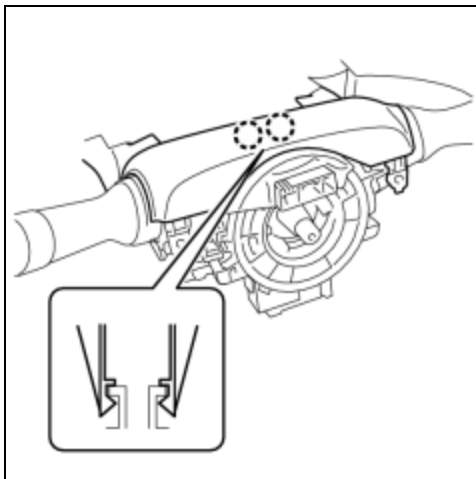
12. REMOVE LOWER STEERING COLUMN COVER



(a) Remove the 2 screws.

(b) Disengage the 6 claws and remove the lower steering column cover.

13. REMOVE UPPER STEERING COLUMN COVER



(a) Disengage the 2 claws to remove the upper steering column cover.

14. REMOVE TURN SIGNAL SWITCH ASSEMBLY WITH SPIRAL CABLE SUB-ASSEMBLY

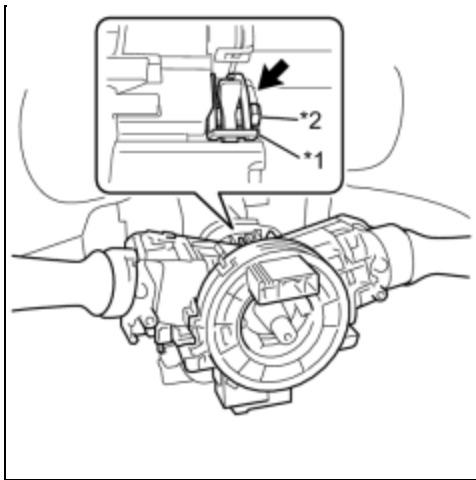
(a) Disconnect the each connector from the turn signal switch assembly with spiral cable sub-assembly.

(b) Using pliers, loosen the clamp.

(c) With the clamp loosened, use a screwdriver to disengage the claw, and remove the turn signal switch assembly with spiral cable sub-assembly from the steering column assembly.

Text in Illustration

*1	Clamp
----	-------

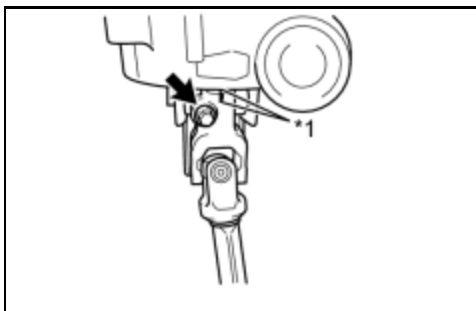


*2	Claw

NOTICE:

- Do not replace the spiral cable with the battery connected and turn the ignition switch to ON.
- Do not rotate the spiral cable with the battery connected and turn the ignition switch to ON.
- Ensure that the steering wheel is installed and aligned straight when inspecting the steering sensor.

15. REMOVE STEERING INTERMEDIATE SHAFT ASSEMBLY

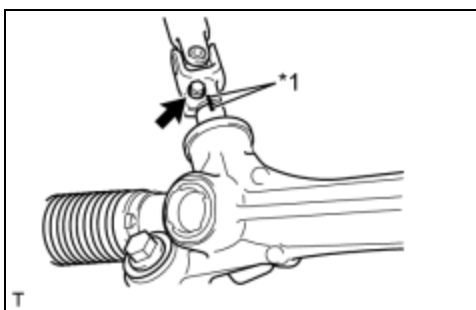


- (a) Put matchmarks on the steering intermediate shaft assembly and the steering column assembly.

Text in Illustration

*1	Matchmark
----	-----------

- (b) Remove the bolt and separate the steering intermediate shaft assembly from the steering column assembly.



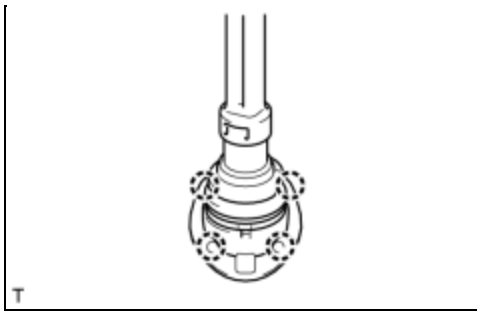
- (c) Put matchmarks on the steering intermediate shaft assembly and the rack and pinion power steering gear assembly.

Text in Illustration

*1	Matchmark
----	-----------

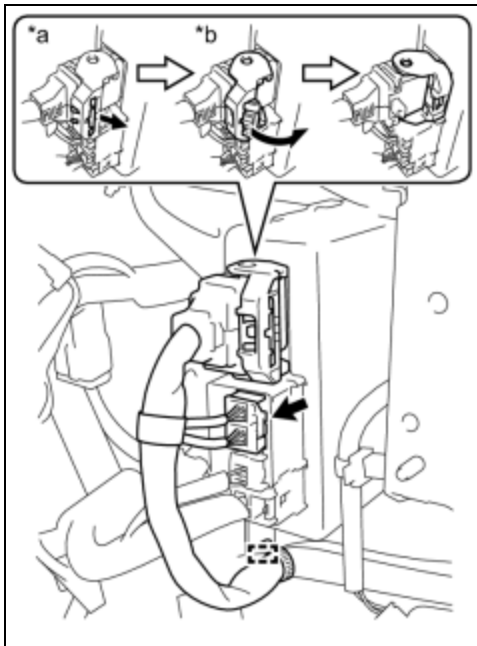
- (d) Remove the bolt and separate the steering intermediate shaft assembly from the rack and pinion power steering gear assembly.

- (e) Disengage the 4 claws from the exterior of the vehicle



cabin, and remove the steering intermediate shaft assembly.

16. REMOVE STEERING COLUMN ASSEMBLY



(a) Disconnect the 2 connectors from the power steering ECU.

(1) As shown illustration, pull out the lock of the lock lever and turn the lock lever to disconnect the connector.

Text in Illustration

*a	Pull out the lock
*b	Turn the lock lever

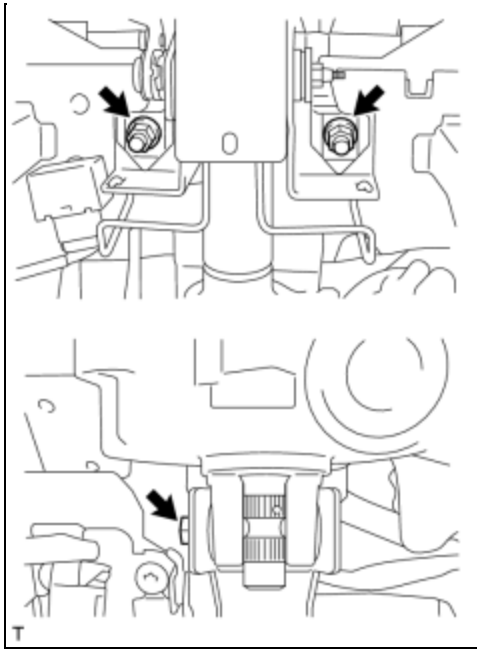
(b) Disengage the clamp.

(c) Disconnect the each connector and disengage the wire harness clamps from the steering column assembly.

(d) Remove the bolt and 2 nuts to remove the steering column assembly.

HINT:

When pulling the bolts out, lifting the motor section of the steering column assembly and tilting the steering column assembly will make it easier to remove the bolts.

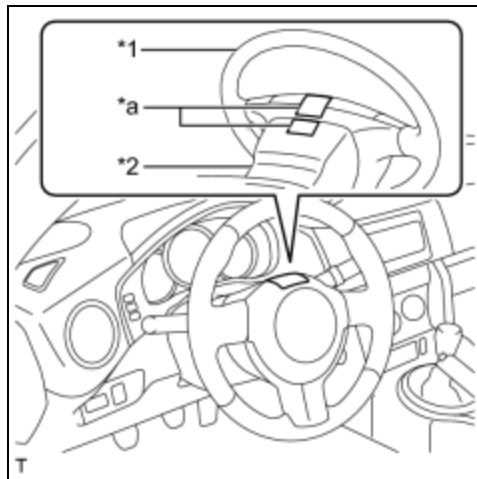


Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001R4405BX
Title: STEERING COLUMN: STEERING SYSTEM: ADJUSTMENT (2013 FR-S)		

ADJUSTMENT

1. STEERING WHEEL OFF CENTER ADJUSTMENT PROCEDURE

- (a) Inspect steering wheel off center.
- (1) Turn the steering wheel to the center position.

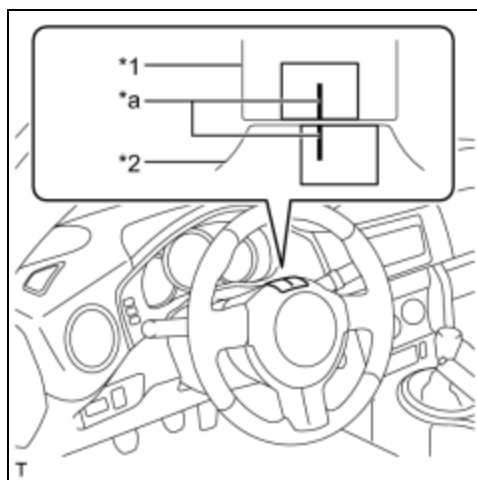


- (2) Apply masking tape to the top center of the steering wheel and upper steering column cover.

Text in Illustration

*1	Steering Wheel
*2	Upper Steering Column Cover
*a	Masking Tape

- (3) Drive the vehicle in a straight line for 100 m (328 ft.) at a constant speed of 56 km/h (35 mph), while holding the steering wheel to maintain the course.



- (4) Draw a line on the masking tape as shown in the illustration.

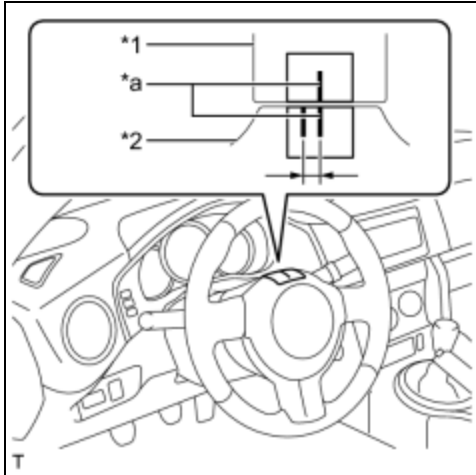
Text in Illustration

*1	Upper Steering Column Cover
*2	Steering Wheel
*a	Marked Line

- (5) Turn the steering wheel to the center position.

HINT:

Look at the upper surface of the steering wheel, steering spoke and SRS airbag line to find the center position.



(6) Draw a new line on the masking tape on the steering wheel as shown in the illustration.

Text in Illustration

*1	Upper Steering Column Cover
*2	Steering Wheel
*a	Marked Line

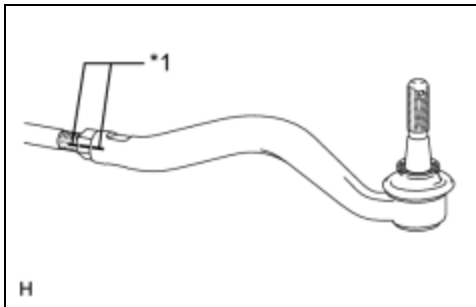
(7) Measure the distance between the 2 lines on the masking tape on the steering wheel.

(8) Convert the measured distance to steering angle.

HINT:

- Measured distance 1 mm (0.0394 in.) = Steering angle of approximately 1 degree.
- Make a note of the steering angle.

(b) Adjust the steering angle.



(1) Put matchmarks on both sides of the tie rod assembly and steering rack end sub-assembly respectively.

Text in Illustration

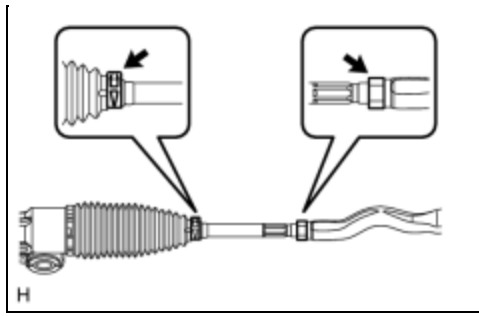
*1	Matchmark
----	-----------

(2) Using a paper gauge, measure the distance from the RH and LH tie rod ends to the rack end screws.

HINT:

- Measure both RH and LH sides.
- Make a note of the measured values.

(3) Remove the steering rack boot clips from both sides of



the rack boots.

(4) Loosen the RH and LH lock nuts.

(5) Turn the RH and LH rack ends by the same amount (but in different directions) according to the steering angle.

HINT:

One 360 degree turn of rack end (1.5 mm (0.0591 in.) horizontal movement) equals to 12 degrees of steering angle.

(6) Tighten the RH and LH lock nuts to the specified torque.

Torque: 85 N·m (869 kgf·cm, 63ft·lbf)

NOTICE:

Make sure that the difference in length between the RH and LH tie rod ends and rack end screws is within 1.5 mm (0.0591 in.).

(7) Install the RH and LH boot clips.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WB705QX
Title: STEERING COLUMN: STEERING SYSTEM: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT STEERING WHEEL FREE PLAY

- (a) Stop the vehicle and position the front wheels straight ahead.
- (b) Gently turn the steering wheel right and left, and check steering wheel free play.

Maximum free play:

30 mm (1.18 in.)

HINT:

If the free play exceeds the maximum, check the steering system [INFO](#) .



Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WB506OX
Title: STEERING COLUMN: STEERING SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

1. HANDLING PRECAUTIONS FOR STEERING SYSTEM

- (a) Care must be taken when replacing parts. Incorrect replacement may affect the performance of the steering system and result in a driving hazard.

2. HANDLING PRECAUTIONS FOR SRS AIRBAG SYSTEM

- (a) This vehicle is equipped with a Supplemental Restraint System (SRS). Failure to carry out service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing. This may cause a serious accident. Before servicing (including inspection, replacement, removal, and installation of parts), be sure to read the precautionary notices for Supplemental Restraint System **INFO** .

3. HANDLING PRECAUTIONS FOR STEERING COLUMN (When handling the steering column assembly)

- (a) Avoid any impact to the steering column assembly, especially to the torque sensor. Replace the steering column assembly with a new one if it is dropped or subjected to any severe impacts.
- (b) Do not pull the wire harness when moving the steering column assembly.
- (c) When the steering column assembly has been replaced, perform the rotation angle sensor initialization and torque sensor zero point calibration **INFO** .
- (d) When the steering column assembly has been replaced, perform the VSC sensor neutral memorization **INFO** .
- (e) Do not release the tilt lever when the steering column assembly is not installed on the vehicle.

4. HANDLING PRECAUTIONS FOR STEERING COLUMN (When disconnecting or reconnecting the connectors)

- (a) Before disconnecting the connectors related to the power steering system, turn the ignition switch to ON, center the steering wheel, turn the ignition switch off, and then disconnect the connectors.
- (b) Before reconnecting the connectors related to the power steering system, ensure that the ignition switch is off. Then center the steering wheel and turn the ignition switch to ON.

NOTICE:

Do not turn the ignition switch to ON when the steering wheel is not centered.

- (c) If the above operations are not carried out properly, the steering center point (zero point) will deviate, which may lead to a difference in steering effort between turning right and left. If there is a difference in steering effort between turning right and left, perform the rotation angle sensor initialization and torque sensor zero point calibration **INFO** .

5. HANDLING PRECAUTION FOR SPIRAL CABLE

- (a) Do not replace the spiral cable with the battery connected and turn the ignition switch to ON.
- (b) Do not rotate the spiral cable without the steering wheel with the battery connected and turn the ignition switch to ON.
- (c) Ensure that the steering wheel is installed and aligned straight when inspecting the steering sensor.
- (d) Be sure that the spiral cable with sensor sub-assembly is in the center position during installation and when removing and installing the steering wheel **INFO** .

CAUTION:

If the steering wheel is turned without the spiral cable installed in the neutral position, the cable may break.



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WB606VX
Title: STEERING COLUMN: STEERING SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Steering System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Heavy steering	Front tires (Improperly inflated, unevenly worn)	INFO
	Front wheel alignment (Incorrect)	INFO
	Steering system joints (Worn)	-
	Steering column	INFO
	Torque sensor (Built into steering column assembly)	-
	Power steering motor (Built into steering column assembly)	-
	Speed sensor	INFO
	Battery and power source system	-
	Power steering ECU power source voltage and relay	INFO
	Rack and pinion power steering gear assembly	INFO
	Power steering ECU	INFO
	Skid control ECU (Brake actuator assembly)	-
Poor return	Front tires (Improperly inflated, unevenly worn)	INFO
	Front wheel alignment (Incorrect)	INFO
	Steering column assembly	INFO
	Rack and pinion power steering gear assembly	INFO

	Power steering ECU	INFO
Excessive free play	Steering system joints (Worn)	-
	Front suspension (Lower ball joint)	INFO
	Intermediate shaft, universal joint, sliding yoke (Worn)	-
	Front axle hub (Hub bearing)	INFO
	Rack and pinion power steering gear assembly	INFO
A knocking (or clunking) sound occurs when turning the steering wheel back and forth while power steering is operating.	Front suspension (Lower ball joint)	INFO
	Steering intermediate shaft	-
	Power steering ECU	INFO
Friction occurs when turning the steering wheel during low-speed driving.	Steering column assembly	INFO
	Power steering motor (Built into steering column assembly)	-
A high-pitched sound (squeaking) occurs when turning the steering wheel slowly with the vehicle stopped.	Steering column assembly	INFO
	Power steering motor (Built into steering column assembly)	-
Steering wheel vibrates and noise occurs when turning the steering wheel with the vehicle stopped.	Steering column assembly	INFO
	Power steering motor (Built into steering column assembly)	-



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WB606VX
Title: STEERING COLUMN: STEERING SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Steering System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Heavy steering	Front tires (Improperly inflated, unevenly worn)	INFO
	Front wheel alignment (Incorrect)	INFO
	Steering system joints (Worn)	-
	Steering column	INFO
	Torque sensor (Built into steering column assembly)	-
	Power steering motor (Built into steering column assembly)	-
	Speed sensor	INFO
	Battery and power source system	-
	Power steering ECU power source voltage and relay	INFO
	Rack and pinion power steering gear assembly	INFO
	Power steering ECU	INFO
	Skid control ECU (Brake actuator assembly)	-
Poor return	Front tires (Improperly inflated, unevenly worn)	INFO
	Front wheel alignment (Incorrect)	INFO
	Steering column assembly	INFO
	Rack and pinion power steering gear assembly	INFO

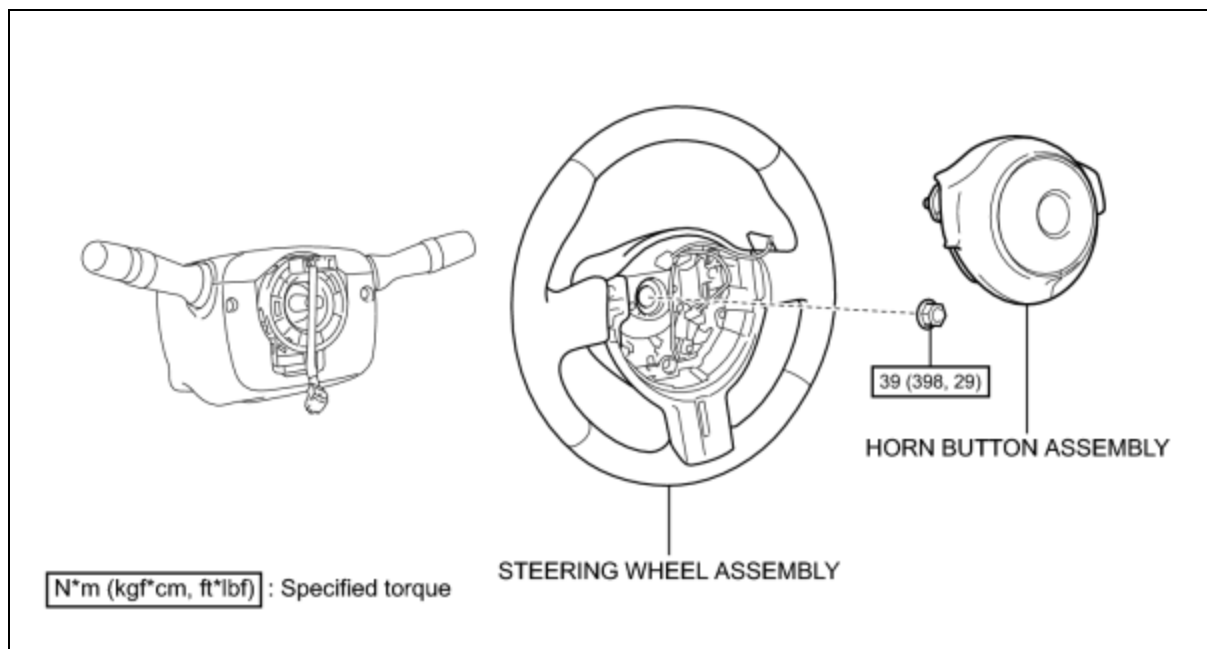
	Power steering ECU	INFO
Excessive free play	Steering system joints (Worn)	-
	Front suspension (Lower ball joint)	INFO
	Intermediate shaft, universal joint, sliding yoke (Worn)	-
	Front axle hub (Hub bearing)	INFO
	Rack and pinion power steering gear assembly	INFO
A knocking (or clunking) sound occurs when turning the steering wheel back and forth while power steering is operating.	Front suspension (Lower ball joint)	INFO
	Steering intermediate shaft	-
	Power steering ECU	INFO
Friction occurs when turning the steering wheel during low-speed driving.	Steering column assembly	INFO
	Power steering motor (Built into steering column assembly)	-
A high-pitched sound (squeaking) occurs when turning the steering wheel slowly with the vehicle stopped.	Steering column assembly	INFO
	Power steering motor (Built into steering column assembly)	-
Steering wheel vibrates and noise occurs when turning the steering wheel with the vehicle stopped.	Steering column assembly	INFO
	Power steering motor (Built into steering column assembly)	-



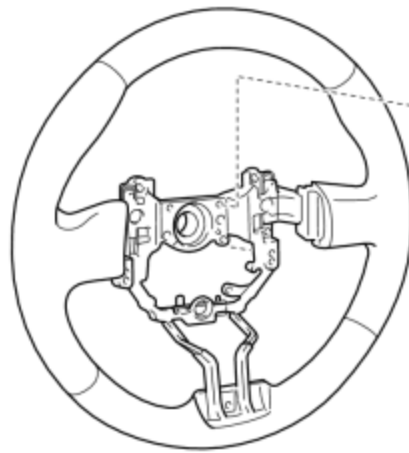
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000033RS06RX
Title: STEERING COLUMN: STEERING WHEEL: COMPONENTS (2013 FR-S)		

COMPONENTS

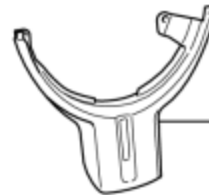
ILLUSTRATION



ILLUSTRATION

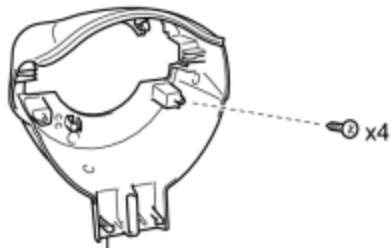


STEERING SHAKE DAMPER



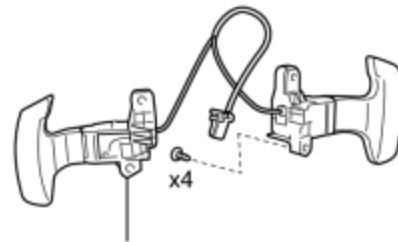
NO. 1 STEERING WHEEL ORNAMENT

w/o Cruise Control System:



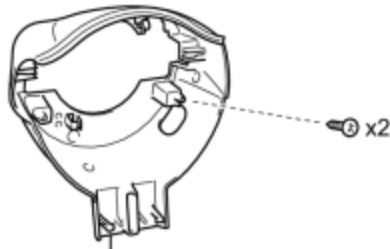
LOWER STEERING WHEEL BOSS COVER

for Automatic Transmission:

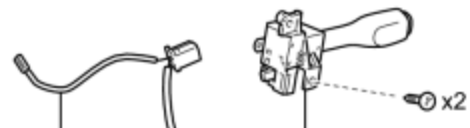


SHIFT PADDLE SWITCH (TRANSMISSION SHIFT SWITCH ASSEMBLY)

w/ Cruise Control System:



LOWER STEERING WHEEL BOSS COVER



CRUISE CONTROL MAIN SWITCH WIRE

CRUISE CONTROL MAIN SWITCH ASSEMBLY



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000033RR08CX
Title: STEERING COLUMN: STEERING WHEEL: INSTALLATION (2013 FR-S)		

INSTALLATION

NOTICE:

- Do not replace the spiral cable with the battery connected and the ignition switch ON.
- Do not rotate the spiral cable without the steering wheel with the battery connected and the ignition switch ON.
- Ensure that the steering wheel is installed and aligned straight when inspecting the steering sensor.

1. INSTALL NO. 1 STEERING WHEEL ORNAMENT

(a) Engage the 2 claws and guide to install the No. 1 steering wheel ornament.

2. INSTALL LOWER STEERING WHEEL BOSS COVER (w/ Cruise Control System) INFO

3. INSTALL LOWER STEERING WHEEL BOSS COVER (w/o Cruise Control System)

(a) Engage the 2 claws and install the lower steering wheel boss cover.

(b) Install the 2 screws.

4. INSTALL STEERING SHAKE DAMPER

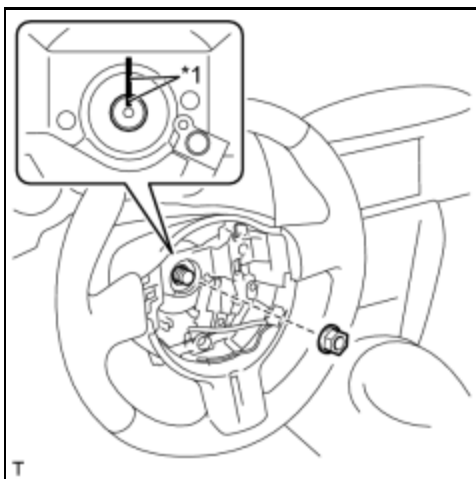
(a) Install the steering shake damper with 2 screws to steering wheel assembly.

5. INSTALL SHIFT PADDLE SWITCH (TRANSMISSION SHIFT SWITCH ASSEMBLY) (for Automatic Transmission) INFO

6. ALIGN FRONT WHEELS FACING STRAIGHT AHEAD

7. INSPECT AND ADJUST SPIRAL CABLE WITH SENSOR SUB-ASSEMBLY INFO

8. INSTALL STEERING WHEEL ASSEMBLY



(a) Install the steering wheel assembly aligning the matchmarks on the steering wheel assembly and steering main shaft.

Text in Illustration

*1	Matchmark
----	-----------

(b) Install the steering wheel assembly set nut.

Torque: 39 N·m (398 kgf·cm, 29ft·lbf)

(c) Connect the connectors to the spiral cable sub-assembly and steering wheel assembly.

9. CHECK STEERING WHEEL CENTER POINT

10. INSTALL HORN BUTTON ASSEMBLY [INFO](#)

11. INSPECT HORN BUTTON ASSEMBLY [INFO](#)

12. PERFORM DIAGNOSTIC SYSTEM CHECK

[INFO](#)

13. INSPECT SRS WARNING LIGHT

[INFO](#)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000033RT088X
Title: STEERING COLUMN: STEERING WHEEL: REMOVAL (2013 FR-S)		

REMOVAL

NOTICE:

- Do not replace the spiral cable with the battery connected and the ignition switch ON.
- Do not rotate the spiral cable without the steering wheel with the battery connected and the ignition switch ON.
- Ensure that the steering wheel is installed and aligned straight when inspecting the steering sensor.

1. PRECAUTION

CAUTION:

Be sure to read Precaution thoroughly before servicing INFO.

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

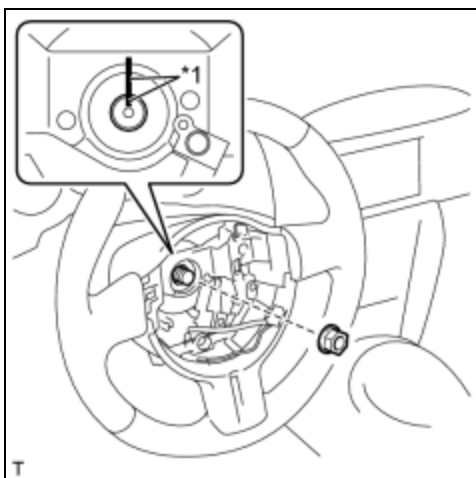
NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

3. ALIGN FRONT WHEELS FACING STRAIGHT AHEAD

4. REMOVE HORN BUTTON ASSEMBLY INFO

5. REMOVE STEERING WHEEL ASSEMBLY



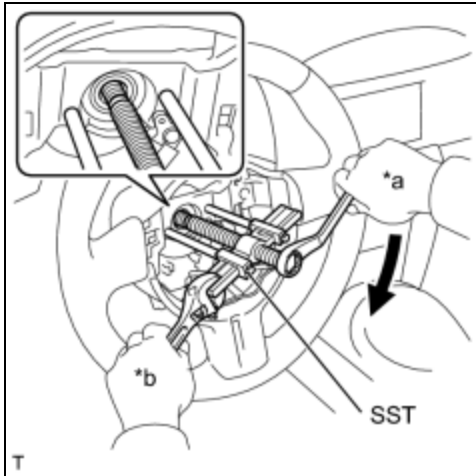
(a) Remove the steering wheel assembly set nut.

Text in Illustration

*1	Matchmark
----	-----------

- (b) Put matchmarks on the steering wheel assembly and steering main shaft.
- (c) Disconnect the connectors from the spiral cable sub-assembly and steering wheel assembly.

(d) Using SST, remove the steering wheel assembly.



Text in Illustration

*a	Turn
*b	Hold

SST: 09950-50013

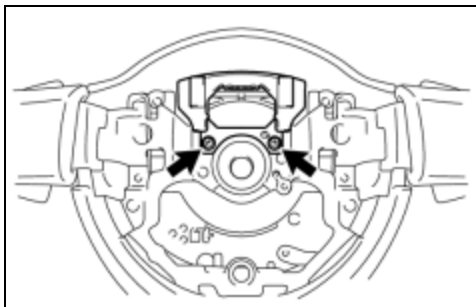
- 09951-05010
- 09952-05010
- 09953-05020
- 09954-05031

NOTICE:

Apply a small amount of grease to the threads and tip of SST (09953-05020) before use.

6. REMOVE SHIFT PADDLE SWITCH (TRANSMISSION SHIFT SWITCH ASSEMBLY) (for Automatic Transmission) INFO

7. REMOVE STEERING SHAKE DAMPER

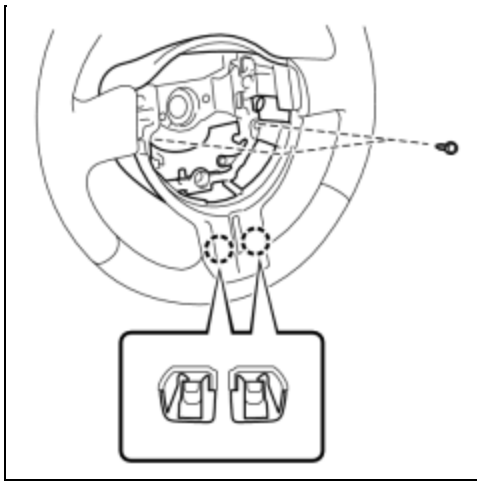


- (a) Remove the 2 screws and steering shake damper from steering wheel assembly.

8. REMOVE LOWER STEERING WHEEL BOSS COVER (w/ Cruise Control System) INFO

9. REMOVE LOWER STEERING WHEEL BOSS COVER (w/o Cruise Control System)

- (a) Remove the 2 screws.

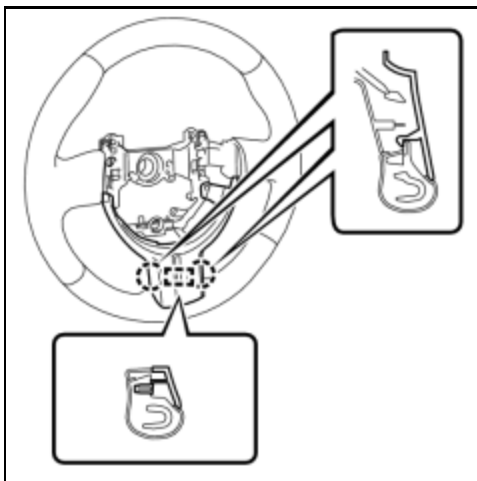


(b) Disengage the 2 claws and remove the lower steering wheel boss cover.

10. REMOVE CRUISE CONTROL MAIN SWITCH ASSEMBLY (w/ Cruise Control System)

INFO

11. REMOVE NO. 1 STEERING WHEEL ORNAMENT

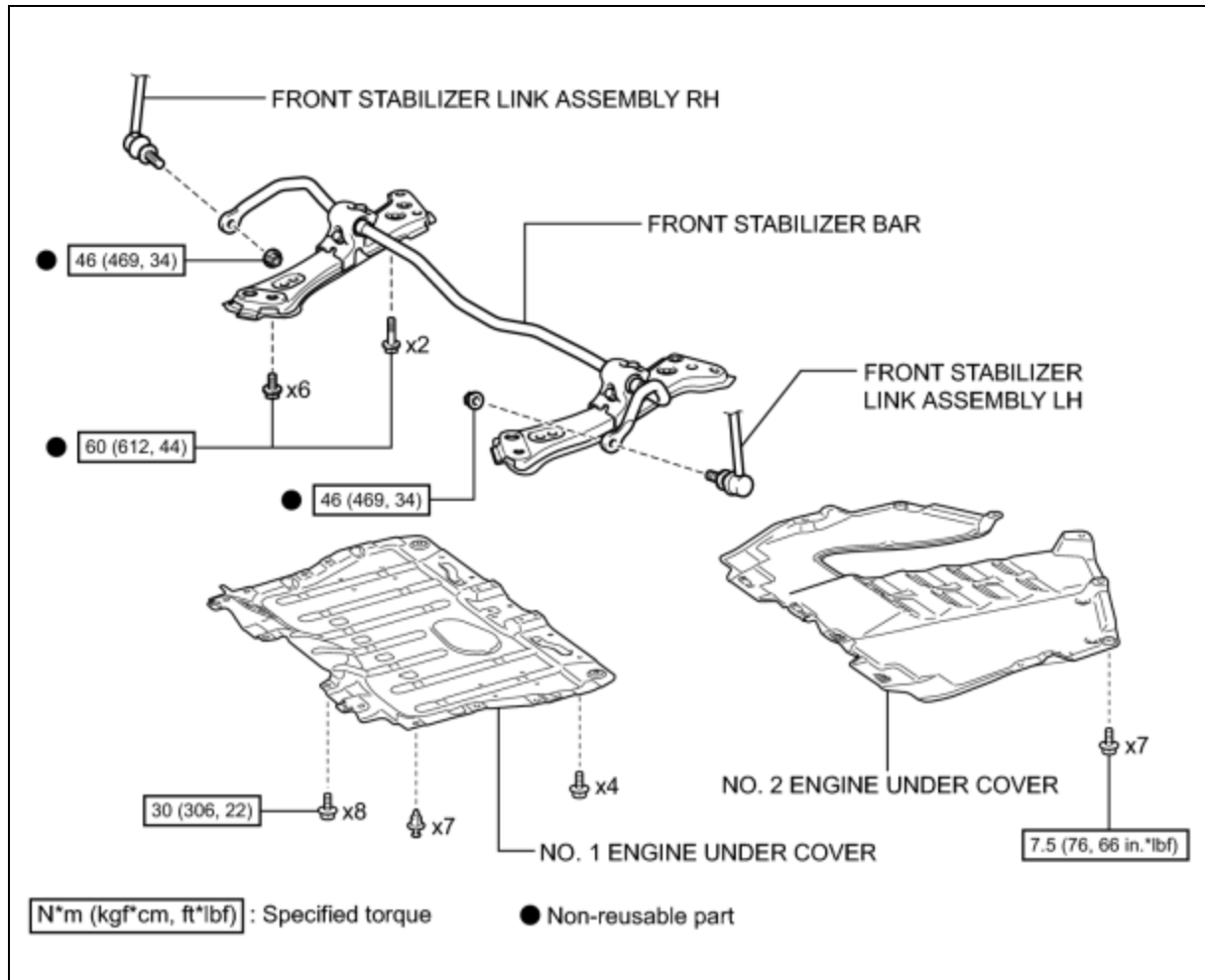


(a) Disengage the 2 claws and guide to remove the No. 1 steering wheel ornament.

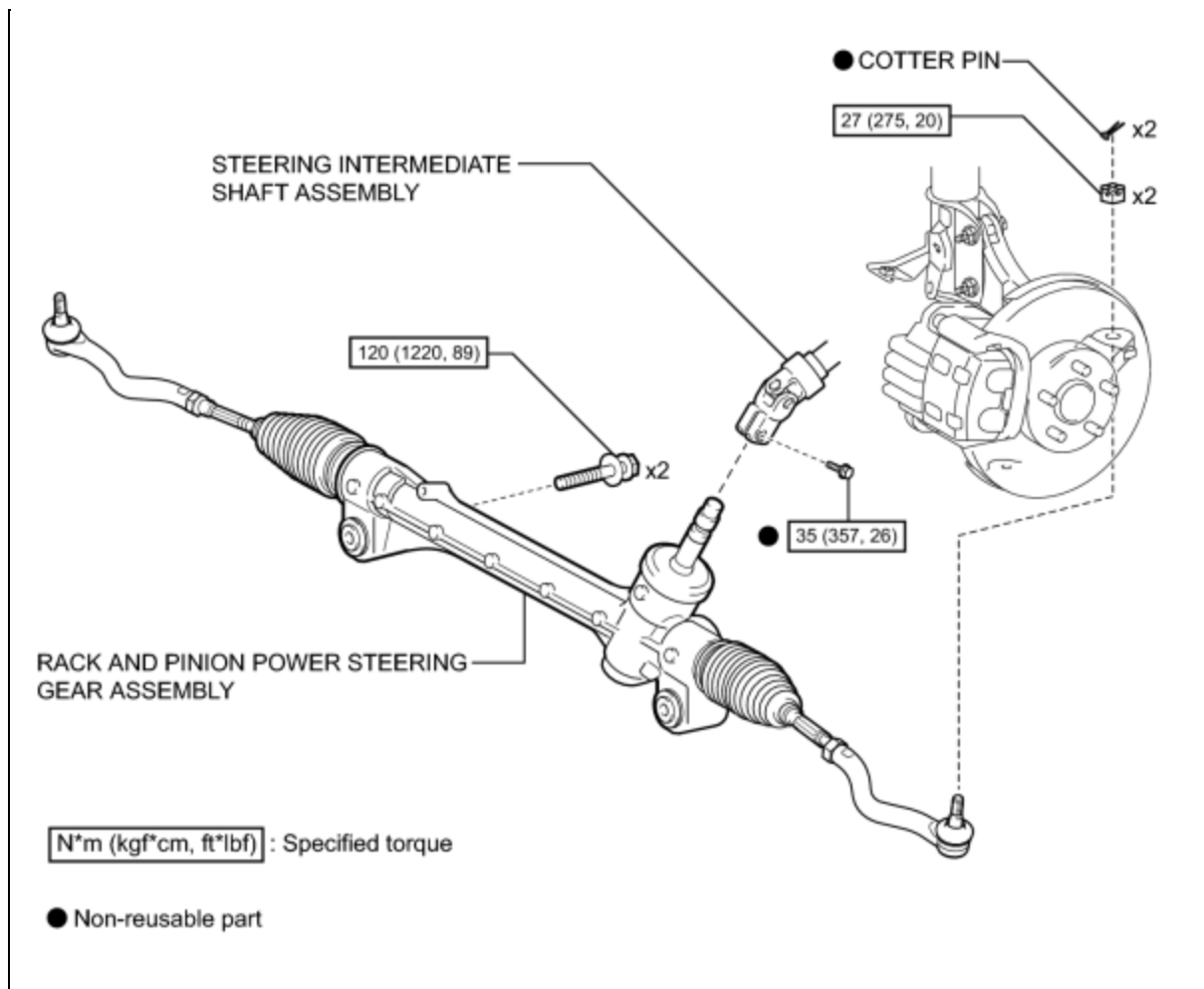
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002TET014X
Title: STEERING GEAR / LINKAGE: STEERING GEAR: COMPONENTS (2013 FR-S)		

COMPONENTS

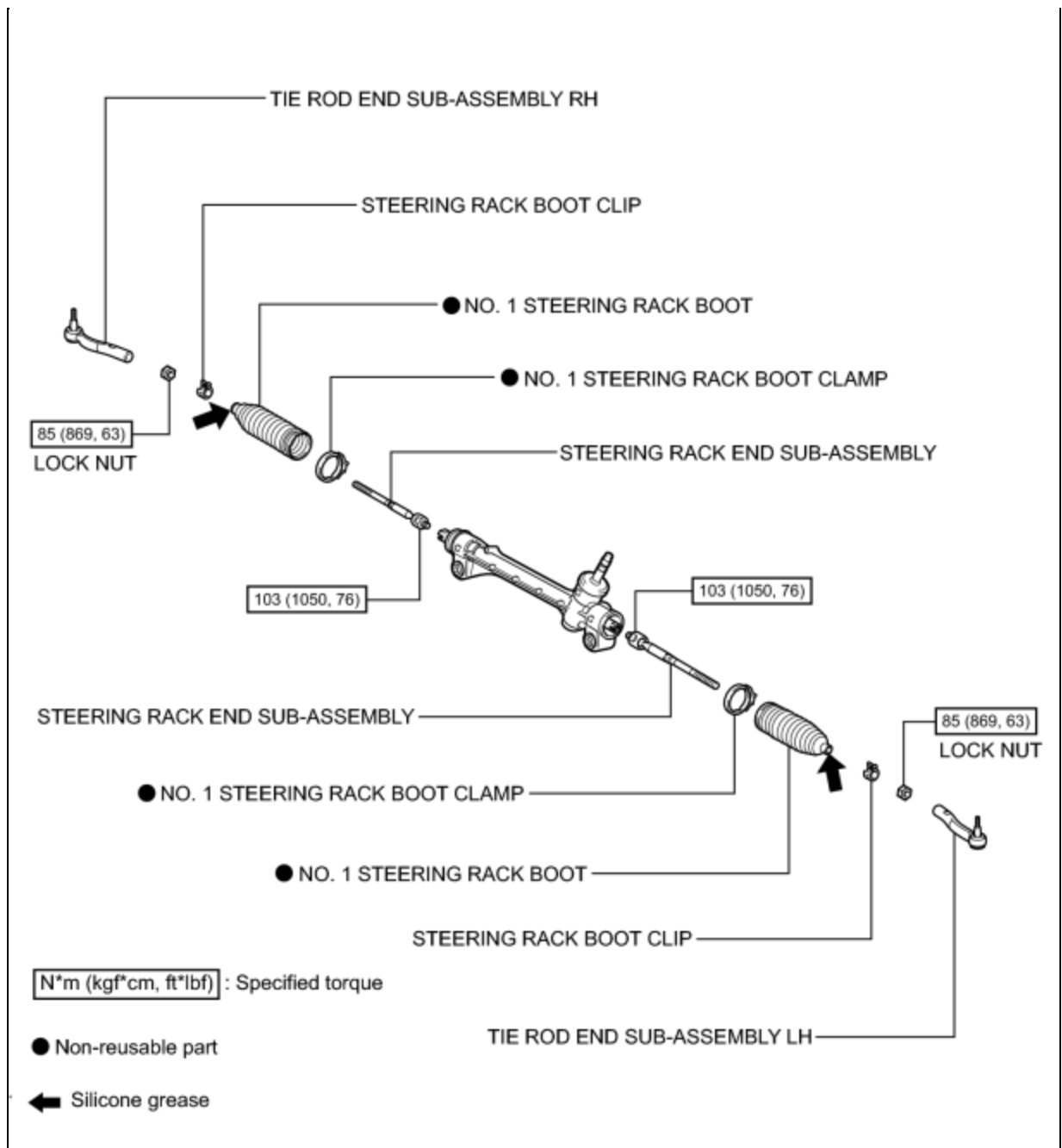
ILLUSTRATION



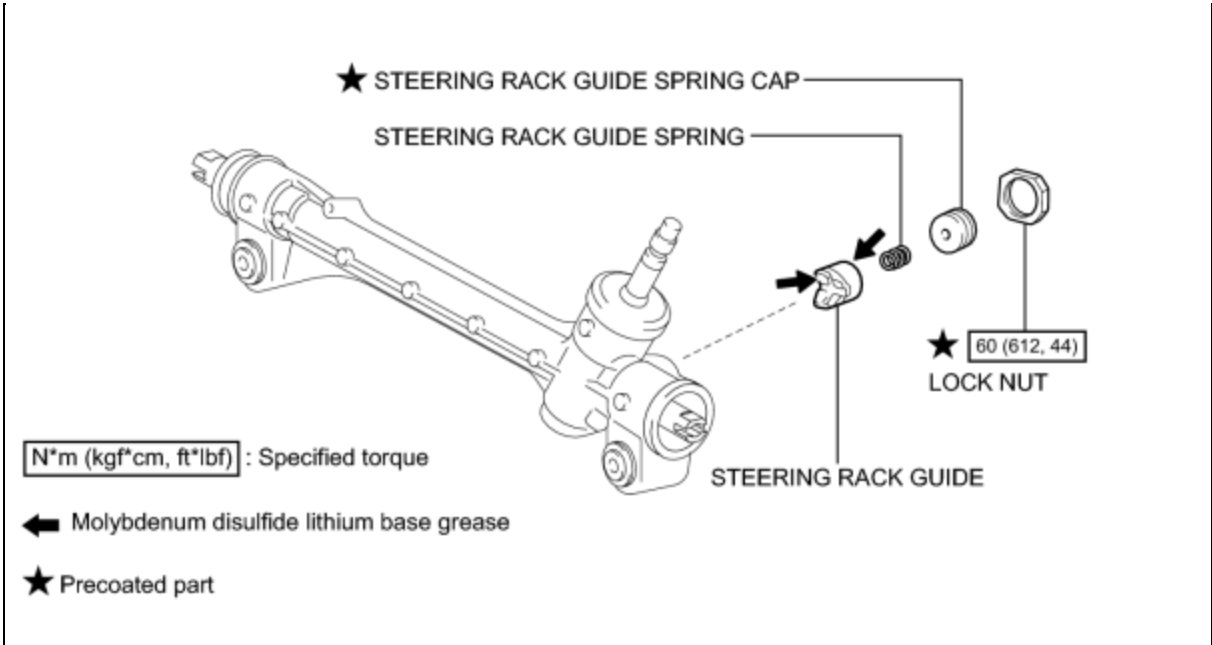
ILLUSTRATION



ILLUSTRATION



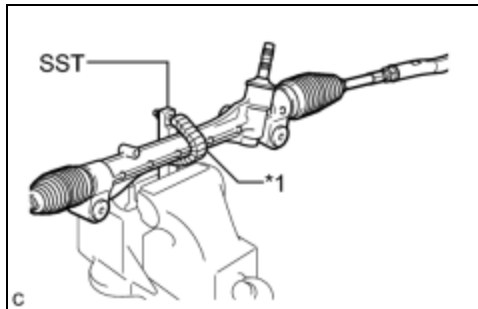
ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000045EQ000X
Title: STEERING GEAR / LINKAGE: STEERING GEAR: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. SECURE RACK AND PINION POWER STEERING GEAR ASSEMBLY



- (a) Using SST, secure the rack and pinion power steering gear assembly in a vise.

SST: 09612-00012

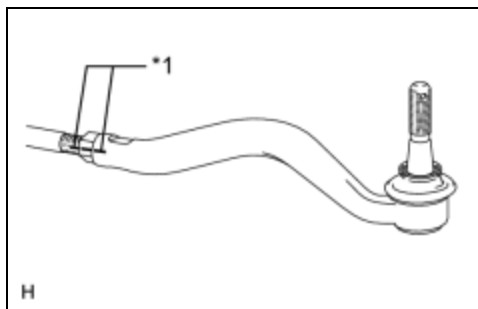
Text in Illustration

*1	Protective Tape
----	-----------------

HINT:

Tape SST before use.

2. REMOVE TIE ROD END SUB-ASSEMBLY LH



- (a) Put matchmarks on the tie rod end sub-assembly LH and the steering rack end sub-assembly.

Text in Illustration

*1	Matchmark
----	-----------

- (b) Remove the tie rod end sub-assembly LH and lock nut.

3. REMOVE TIE ROD END SUB-ASSEMBLY RH

HINT:

Use the same procedure as for the LH side.

4. REMOVE STEERING RACK BOOT CLIP

HINT:

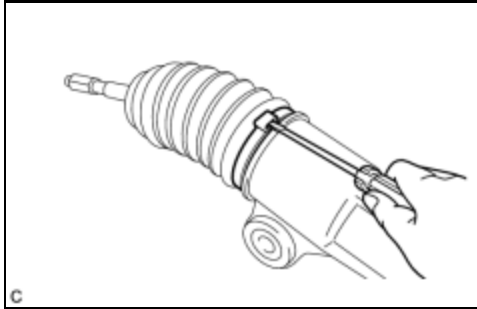
Use the same procedure for both the LH side and RH side.

- (a) Using pliers, remove the steering rack boot clip.

5. REMOVE NO. 1 STEERING RACK BOOT CLAMP

HINT:

Use the same procedure for both the LH side and RH side.



(a) Using a screwdriver, remove the No. 1 steering rack boot clamp.

NOTICE:

Be careful not to damage the No. 1 steering rack boot.

6. REMOVE NO. 1 STEERING RACK BOOT

NOTICE:

If the No. 1 steering rack boot is fissured, damaged or deteriorated, replace it with a new one.

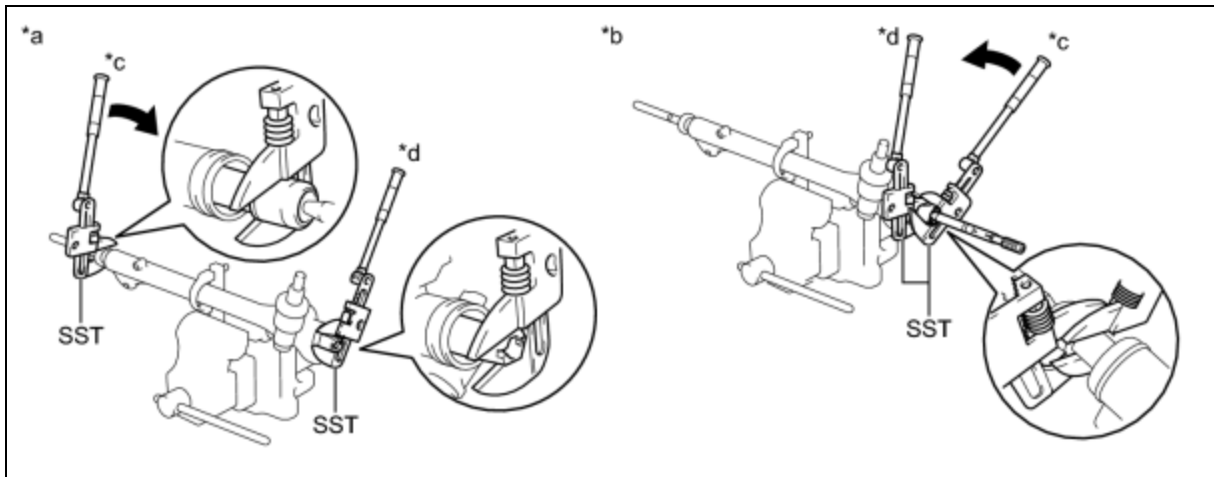
HINT:

Use the same procedure for both the LH side and RH side.

7. REMOVE STEERING RACK END SUB-ASSEMBLY

(a) Using SST, remove the steering rack end sub-assembly.

SST: 09922-10010



Text in Illustration

*a	LH Side	*b	RH Side
*c	Turn	*d	Hold

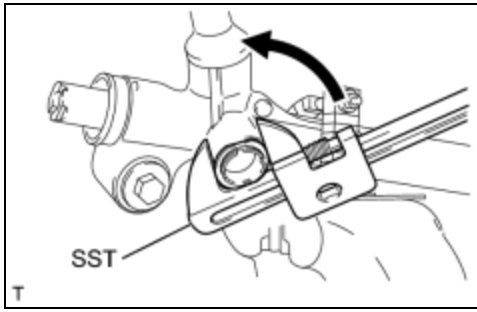
NOTICE:

Turn SST in the direction as shown in the illustration.

NOTICE:

Turn SST in the direction as shown in the illustration.

8. REMOVE STEERING RACK GUIDE

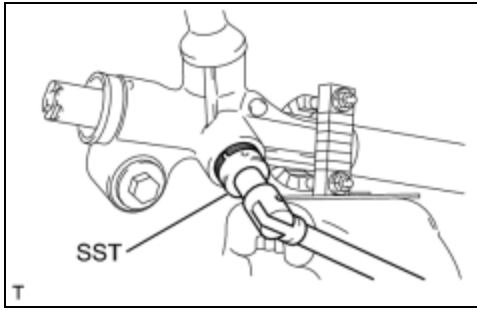


(a) Using SST, remove the lock nut.

SST: 09922-10010

NOTICE:

Turn SST in the direction as shown in the illustration.



(b) Using SST, remove the steering rack guide spring cap.

SST: 09631-10021

(c) Remove the steering rack guide and the steering rack guide spring.

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Model Year: 2013	Model: FR-S	Doc ID: RM000001S2N02GX
Title: STEERING GEAR / LINKAGE: STEERING GEAR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT TIE ROD END SUB-ASSEMBLY

- (a) Secure the tie rod assembly in a vise.

NOTICE:

Do not overtighten the vise.

- (b) Turn the ball joint back and forth.

OK:

There is no unusual resistance or play while turning.

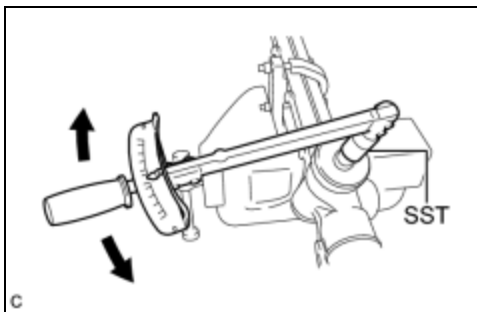
HINT:

- If the result is not as specified, remove the tie rod end sub-assembly with a new one.
- If the dust seal is fissured, damaged or deteriorated, replace it with a new one.

2. INSPECT TOTAL PRELOAD

NOTICE:

Inspect the total preload in a no-load condition by removing the tie rod assembly RH and LH, and steering rack boots.



- (a) Install SST to the pinion shaft and turn it left and right 5 times or more.

SST: 09616-00011

- (b) Set a torque wrench to SST and turn the pinion shaft continuously at a rate of 4 to 6 seconds per turn to inspect the total preload of the steering gear assembly.

Standard Preload:

0.9 to 1.6 N*m (9.2 to 16.3 kgf*cm, 8.0 to 14.2 in.*lbf)

NOTICE:

Inspect the total preload around the steering rack center position.

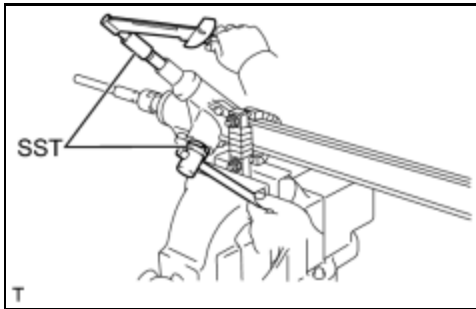
HINT:

If the total preload is not within the specified range, adjust the total preload.

3. ADJUST TOTAL PRELOAD

- (a) Temporarily install the rack ends sub-assembly RH and LH.

- (b) Install the steering rack guide and steering rack guide spring to the steering rack housing.
- (c) Apply the three bond to the screw part of steering rack guide spring cap and steering rack housing.
- (d) Temporarily install the steering rack guide spring cap.



- (e) Using SST, tighten the steering rack guide spring cap so that the rotational torque of the pinion shaft reaches the standard value.

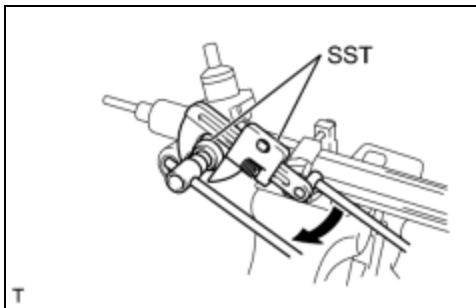
SST: 09631-10021

SST: 09616-00011

Torque: Preload (turning):

0.9 to 1.6 N*m (9.2 to 16.3 kgf*cm, 8.0 to 14.2 in.*lbf)

- (f) Apply the three bond to the screw part of lock nut.



- (g) Using SST, hold the steering rack guide spring cap and tighten the lock nut.

SST: 09631-10021

SST: 09922-10010

Torque: 60 N·m (612 kgf·cm, 44ft·lbf)

NOTICE:

- Use the formula to calculate special torque values for situations where SST is combined with a torque wrench
- Turn SST in the direction as shown in the illustration.

- (h) Set a torque wrench to SST and turn the pinion shaft continuously at a rate of 4 to 6 seconds per turn to inspect the total preload of the steering gear assembly.

SST: 09616-00011

Standard Preload:

0.9 to 1.6 N*m (9.2 to 16.3 kgf*cm, 8.0to 14.2 in.*lbf)

NOTICE:

Inspect the total preload around the steering rack center position.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001S2M03AX
Title: STEERING GEAR / LINKAGE: STEERING GEAR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL RACK AND PINION POWER STEERING GEAR ASSEMBLY

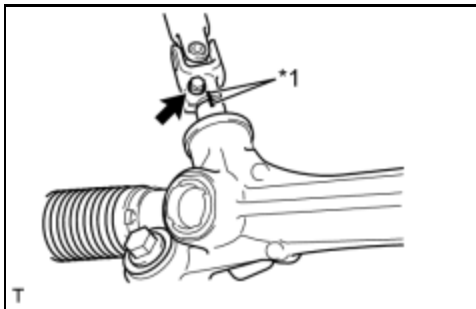
- (a) Install the rack and pinion power steering gear assembly with the 2 bolts.

Torque: 120 N·m (1220 kgf·cm, 89ft·lbf)

HINT:

Confirm that the rack is positioned in neutral.

2. CONNECT STEERING INTERMEDIATE SHAFT ASSEMBLY



- (a) Align the matchmarks and install the steering intermediate shaft to the rack and pinion power steering gear assembly.

Text in Illustration

* 1	Matchmark
-----	-----------

- (b) Install the new bolt.

Torque: 35 N·m (357 kgf·cm, 26ft·lbf)

3. CONNECT TIE ROD END SUB-ASSEMBLY LH

- (a) Connect the tie rod end sub-assembly LH to the steering knuckle with the nut.

Torque: 27 N·m (275 kgf·cm, 20ft·lbf)

- (b) Install a new cotter pin.

NOTICE:

Further tighten the nut up to 60° if the holes for the cotter pin are not aligned.

4. CONNECT TIE ROD END SUB-ASSEMBLY RH

HINT:

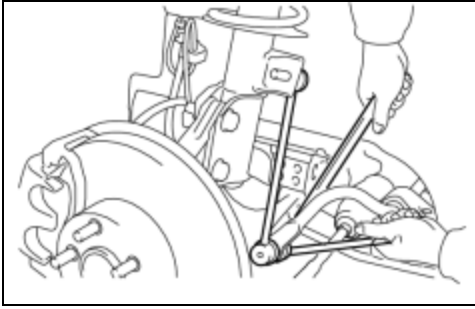
Use the same procedure as for the LH side.

5. INSTALL FRONT STABILIZER BAR

- (a) Install the front stabilizer bar together with the rear body mounting cushion sub-assembly LH and RH to the front suspension cross member with the new 8 bolts.

Torque: 60 N·m (612 kgf·cm, 44ft·lbf)

6. CONNECT FRONT STABILIZER LINK ASSEMBLY LH



- (a) Connect the front stabilizer link assembly LH to the front stabilizer bar with the nut.

Torque: 46 N·m (469 kgf·cm, 34ft·lbf)

If the ball joint turns together with the nut, use a hexagon wrench to hold the stud bolt.

7. CONNECT FRONT STABILIZER LINK ASSEMBLY RH

HINT:

Use the same procedure as for the LH side.

8. INSTALL NO. 2 ENGINE UNDER COVER INFO

9. INSTALL NO. 1 ENGINE UNDER COVER INFO

10. INSTALL FRONT WHEELS

Torque: 120 N·m (1220 kgf·cm, 89ft·lbf)

11. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT

INFO

12. INSPECT STEERING WHEEL CENTER POINT

13. PERFORM MEMORIZATION

HINT:

Perform VSC sensor neutral memorization INFO .

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000045ER000X
Title: STEERING GEAR / LINKAGE: STEERING GEAR: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL STEERING RACK GUIDE

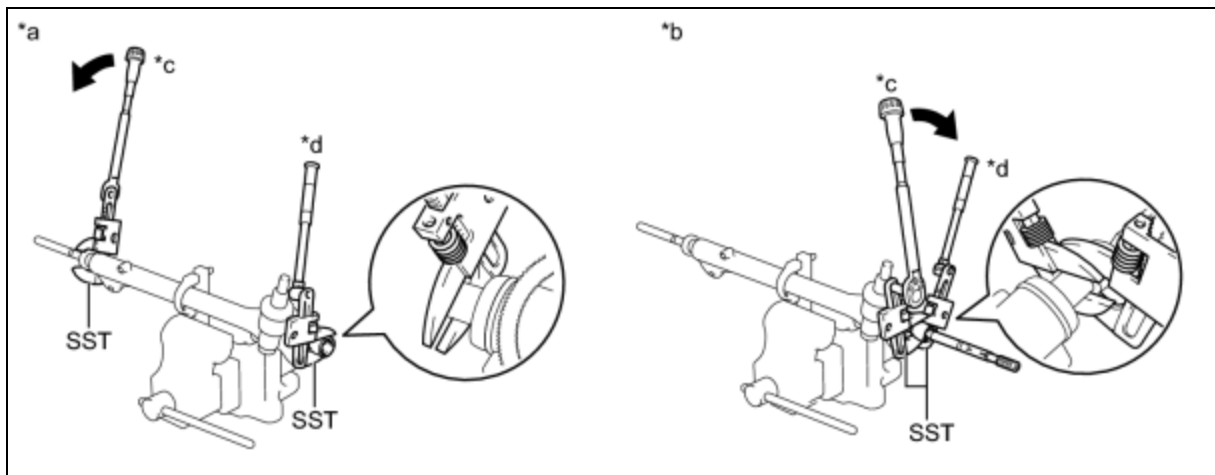
- Apply grease to the steering rack guide spring and the contact surface of the rack guide.
- Install the rack guide and the steering rack guide spring.
- Apply three bond to 2 or 3 threads of the steering rack guide spring cap.
- Temporarily install the steering rack guide spring cap.

2. ADJUST TOTAL PRELOAD INFO

3. INSTALL STEERING RACK END SUB-ASSEMBLY

- Using SST, install the steering rack end sub-assembly.

SST: 09922-10010



Text in Illustration

*a	LH Side	*b	RH Side
*c	Turn	*d	Hold

HINT:

Using SST, hold the steering rack and install the steering rack end sub-assembly.

Torque: 103 N·m (1050 kgf·cm, 76ft·lbf)

NOTICE:

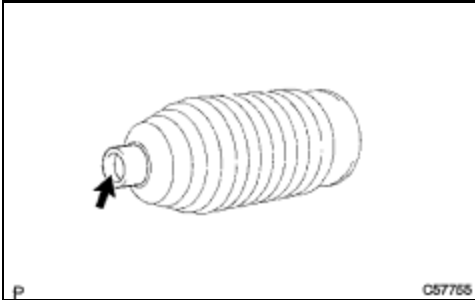
- Use the formula to calculate special torque values for situations where SST is combined with a torque wrench INFO.
- Turn SST in the direction as shown in the illustration.
- Fix the steering rack firmly in place.

4. INSTALL NO. 1 STEERING RACK BOOT

HINT:

Use the same procedure for both the LH side and RH side.

- (a) Wipe the old grease off of the No. 1 steering rack boot and rack end mating groove.



- (b) Apply silicone grease to the inside of the small opening of a new No. 1 steering rack boot.

- (c) Install the No. 1 steering rack boot to the groove on the rack housing.

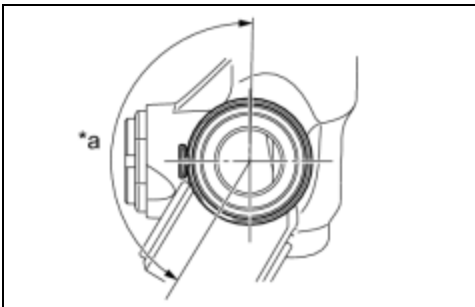
NOTICE:

- Be careful not to damage or twist the boot.
- Make sure that the boot is free of rust and foreign matter.

5. INSTALL NO. 1 STEERING RACK BOOT CLAMP

HINT:

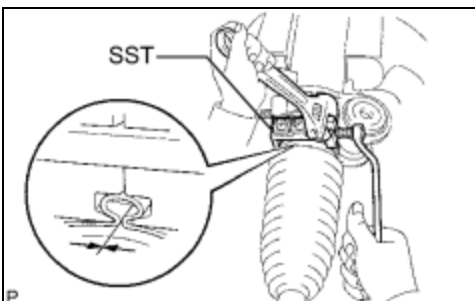
Use the same procedure for both the LH side and RH side.



- (a) Install the new No. 1 steering rack boot clamp to the No. 1 steering rack boot in such a way that the staked part of the clamp is positioned within the range, as shown in the illustration.

Text in Illustration

*a	150°
----	------



- (b) Using SST, tighten a new No. 1 steering rack boot clamp as shown in the illustration.

SST: 09521-24010

Clearance:

2.0 mm (0.079 in.) or less

NOTICE:

- Be careful not to damage the No. 1 steering rack boot.
- If the No. 1 steering rack boot is fissured, damaged or deteriorated, replace it with a new one.

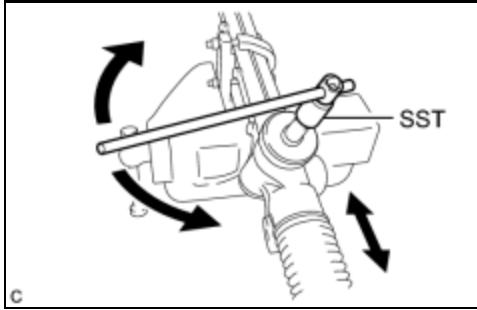
6. INSTALL STEERING RACK BOOT CLIP

HINT:

Use the same procedure for both the LH side and RH side.

- (a) Using pliers, install the steering rack boot clip.

7. INSPECT RACK AND PINION POWER STEERING GEAR ASSEMBLY



- (a) Using SST, rotate the pinion shaft to see if both the left and the right steering rack boots expand and contract smoothly.

SST: 09616-00011

NOTICE:

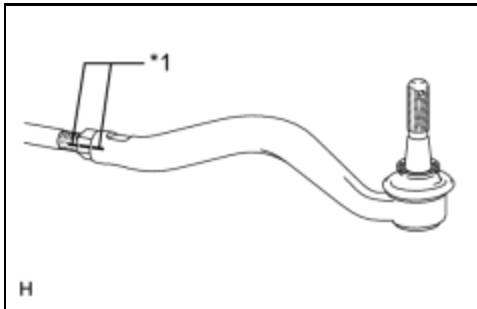
Set the pinion shaft at the neutral position after the inspection.

HINT:

If the operation cannot be done as specified, use a new steering rack boot clamp and reinstall the steering rack boots.

8. INSTALL TIE ROD END SUB-ASSEMBLY LH

- (a) Temporarily tighten the lock nut and tie rod end sub-assembly LH to the steering rack end sub-assembly until the matchmarks are aligned.



Text in Illustration

*1	Matchmark
----	-----------

HINT:

After adjusting the front wheel alignment, securely tighten the lock nut.

Temporarily tighten - Torque: 5.0 N·m (51 kgf·cm, 44in·lbf)

Securely tighten - Torque: 85 N·m (869 kgf·cm, 63ft·lbf)

9. INSTALL TIE ROD END SUB-ASSEMBLY RH

HINT:

Use the procedure as for the LH side.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001S2P03AX
Title: STEERING GEAR / LINKAGE: STEERING GEAR: REMOVAL (2013 FR-S)		

REMOVAL

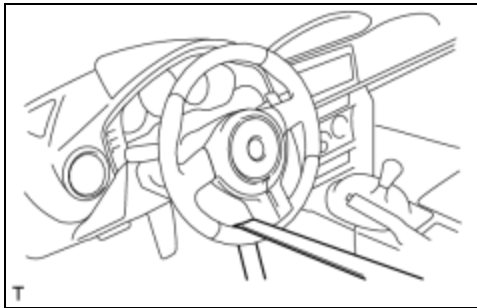
NOTICE:

- Be sure to align the front wheels straight ahead when removing and installing the steering gear assembly.
- When disconnecting the steering intermediate shaft assembly and the pinion shaft of the steering gear assembly, be sure to place matchmarks before servicing.

1. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

2. REMOVE FRONT WHEELS

3. SECURE STEERING WHEEL ASSEMBLY



- (a) Secure the steering wheel assembly with the seat belt in order to prevent rotation.

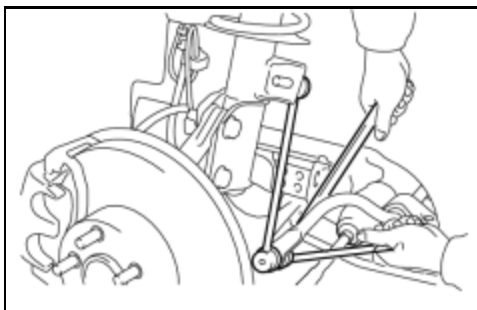
HINT:

This operation is useful to prevent damage to the spiral cable.

4. REMOVE NO. 1 ENGINE UNDER COVER INFO

5. REMOVE NO. 2 ENGINE UNDER COVER INFO

6. DISCONNECT FRONT STABILIZER LINK ASSEMBLY LH



- (a) Remove the nut and front stabilizer link assembly LH from the front stabilizer bar.

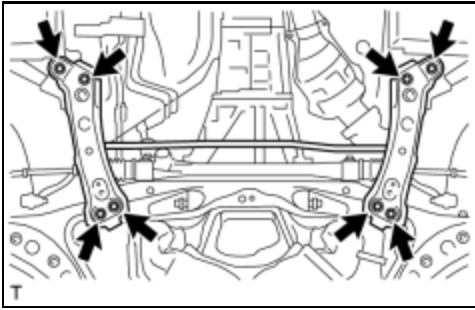
If the ball joint turns together with the nut, use a hexagon wrench to hold the stud bolt.

7. DISCONNECT FRONT STABILIZER LINK ASSEMBLY RH

HINT:

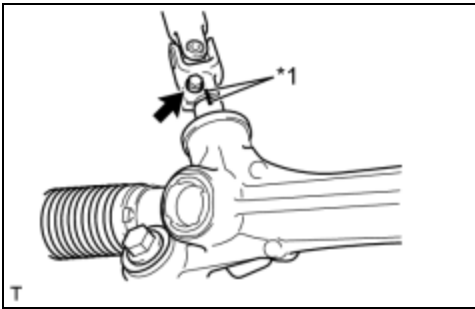
Use the same procedure as for the LH side.

8. REMOVE FRONT STABILIZER BAR



- (a) Remove the 8 bolts, and remove the front stabilizer bar together with the rear body mounting cushion sub-assembly LH and RH from the front suspension cross member.

9. SEPARATE STEERING INTERMEDIATE SHAFT ASSEMBLY



- (a) Put matchmarks on the steering intermediate shaft assembly and rack and pinion power steering gear assembly.

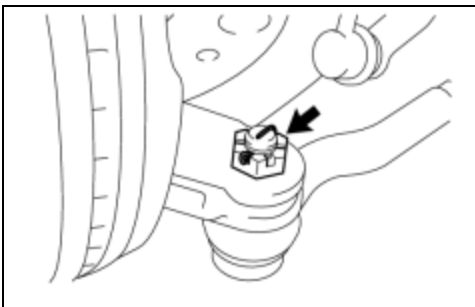
Text in Illustration

*1	Matchmark
----	-----------

- (b) Remove the bolt.

- (c) Disconnect the steering intermediate shaft assembly from the rack and pinion power steering gear assembly.

10. DISCONNECT TIE ROD END SUB-ASSEMBLY LH

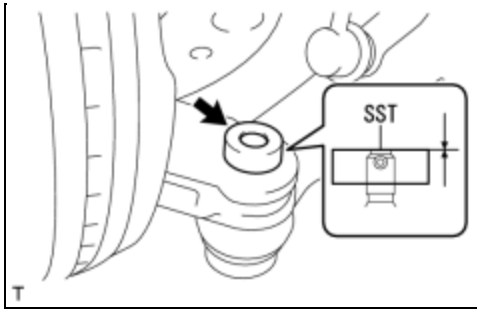


- (a) Remove the cotter pin and nut.

- (b) Install SST to the tie rod end sub-assembly LH.

SST: 09960-20010

09961-02060



NOTICE:

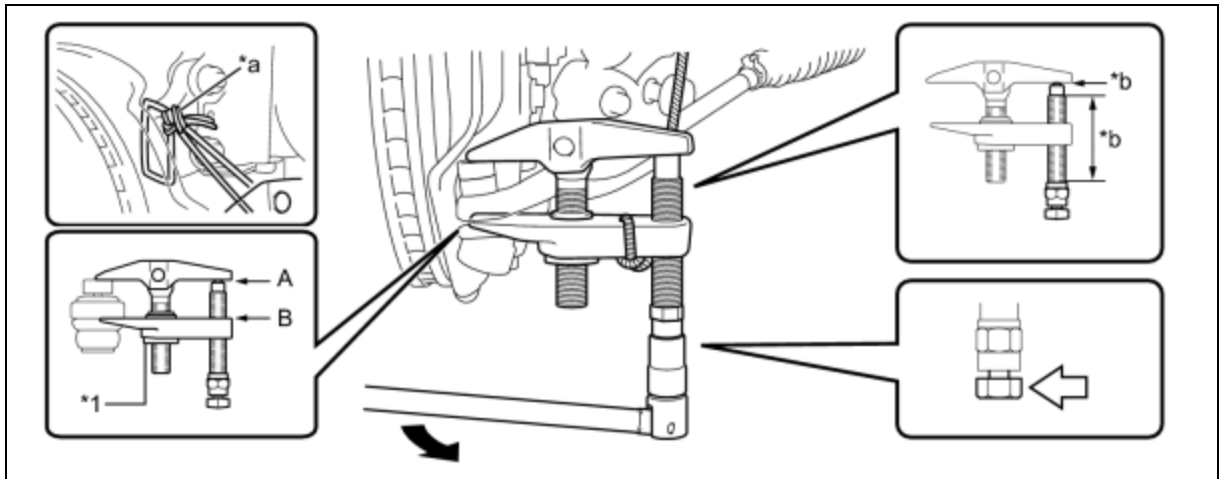
Make sure that the lower ends of the tie rod end sub-assembly LH and SST are aligned.

(c) Secure SST using a string.


NOTICE:

Be sure to tighten the string firmly to secure SST to the steering knuckle to prevent SST from falling off.

(d) Using SST, separate the tie rod end sub-assembly LH from the steering knuckle.



Text in Illustration

*1	Center Nut	-	-
*a	String	*b	Grease Application Area
	Place the wrench here.	-	-

SST: 09960-20010

09961-02010

CAUTION:

Apply grease to the bolt threads and the tip of SST.

NOTICE:

- Install SST with the center nut so that A and B shown in the illustration are parallel. Otherwise, the dust cover may be damaged.
- Be sure to place the wrench on the part indicated in the illustration.
- Do not damage the front disc brake dust cover.

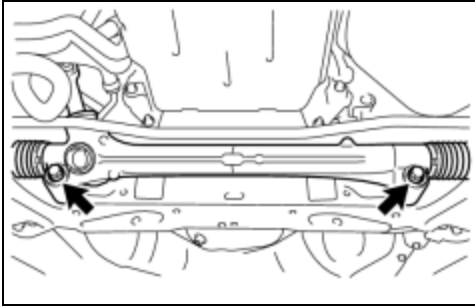
- Do not damage the ball joint dust cover.
- Do not damage the steering knuckle.

11. DISCONNECT TIE ROD END SUB-ASSEMBLY RH

HINT:

Use the same procedure as for the LH side.

12. REMOVE RACK AND PINION POWER STEERING GEAR ASSEMBLY



- (a) Remove the 2 bolts and rack and pinion power steering gear assembly.

Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001BCN021X
Title: ALIGNMENT / HANDLING DIAGNOSIS: FRONT WHEEL ALIGNMENT: ADJUSTMENT (2013 FR-S)		

ADJUSTMENT

NOTICE:

If the wheel alignment has been adjusted, and if suspension or underbody components have been removed/installed or replaced, be sure to perform the following initialization procedure in order for the system to function normally:

Perform zero point calibration of the yaw rate and acceleration sensor and test mode inspection

INFO

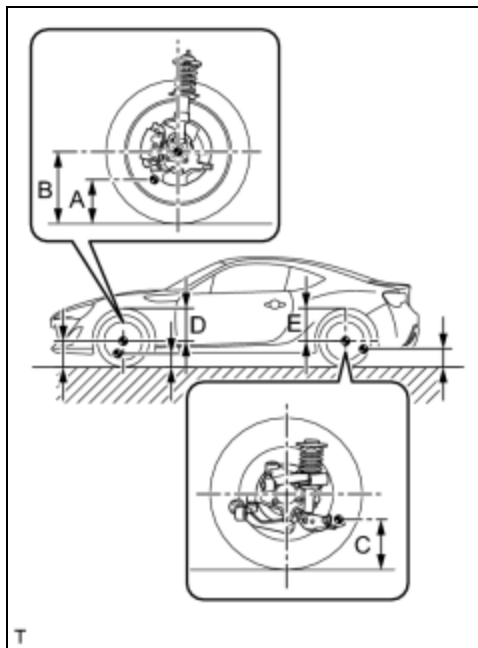
1. INSPECT TIRES **INFO**

2. MEASURE VEHICLE HEIGHT

- (a) Bounce the vehicle up and down at the corners to stabilize the suspension before inspecting the vehicle height.

Vehicle Height (Unloaded Vehicle)

TIRE SIZE	FRONT B - A	REAR C	FRONT D	REAR E
215/45 R17	146 mm (5.75 in.)	225 mm (8.86 in.)	375 mm (14.76 in.)	372 mm (14.65 in.)
P215/45 R17	146 mm (5.75 in.)	225 mm (8.86 in.)	375 mm (14.76 in.)	372 mm (14.65 in.)



NOTICE:

- Perform the inspection while the vehicle is empty (with a spare tire, jack and tools on board, but with the fuel tank filled with fuel).
- The standard value shown here is a value that is used for adjusting the wheel alignment and does not indicate the height of an actual vehicle.

Measuring points:

A

Ground clearance of front lower suspension arm set front bolt center

B

Ground clearance of front wheel center

C

Ground clearance of lower control arm set bolt center

D

Front wheel arch height of front wheel center

E

Rear wheel arch height of rear wheel center

3. INSPECT CAMBER, CASTER AND STEERING AXIS INCLINATION

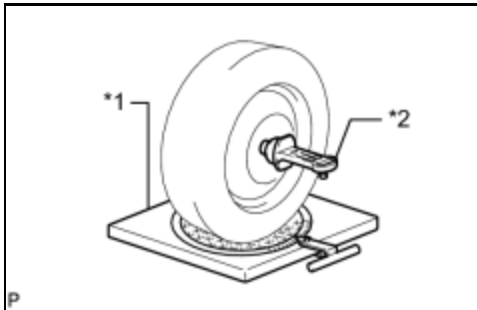
NOTICE:

Perform the inspection while the vehicle is empty (without a spare tire, jack or tools on board, but with the fuel tank filled with fuel).

- (a) Put the front wheel on the center of the alignment tester.

Text in Illustration

*1	Alignment tester
*2	Camber-Caster-Steering Axis Inclination Gauge



- (b) Remove the wheel cap.
- (c) Set the camber-caster-steering axis inclination gauge at the center of the axle hub or drive shaft.
- (d) Inspect the camber, caster and steering axis inclination.

Standard Dimension (Unloaded Vehicle):

CAMBER	CASTER (REFERENCE)	STEERING AXIS INCLINATION (REFERENCE)
0 +/- 45' (0 +/- 0.75°)	5°54' (5.90°)	15°31' (15.52°)

NOTICE:

- Perform the inspection while the vehicle is empty (with a spare tire, jack and tools on board, but with the fuel tank filled with fuel).
 - The tolerance for the difference between the left and right wheels is 45' (0.75°) or less for both the camber.
- (e) Remove the camber-caster-steering axis inclination gauge and attachment.
 - (f) Install the wheel cap.

If the caster and steering axis inclination are not within the specified values after the camber has been correctly adjusted, recheck the suspension parts for damage and wear.

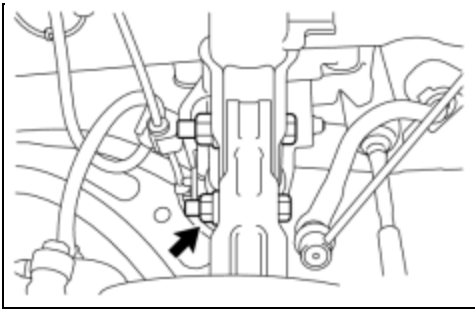
4. ADJUST CAMBER

NOTICE:

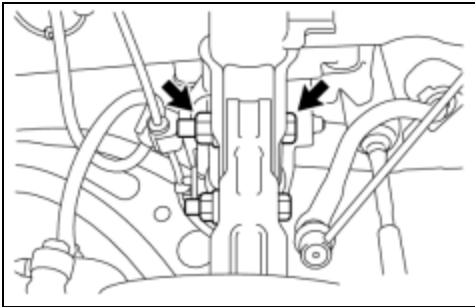
Inspect toe-in after the camber has been adjusted.

- (a) Remove the front wheel.

- (b) Loosen the lower mounting bolt and nut of the front



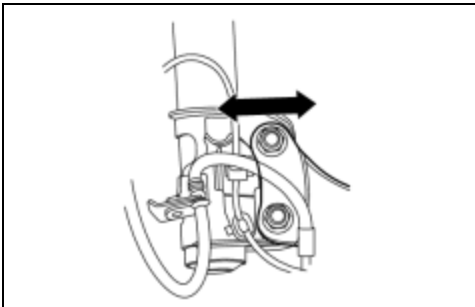
shock absorber assembly and steering knuckle.



- (c) Replace the upper mounting bolt of the front shock absorber assembly and steering knuckle with a service bolt. (Part No.: SU003-02818)

NOTICE:

Insert the bolt from the rear side of the vehicle.



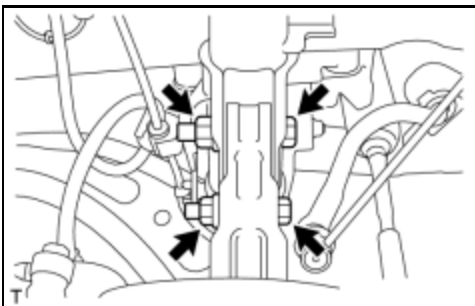
- (d) Pivot the lower mounting bolt to move the front shock absorber assembly and steering knuckle, and use the play between the bolt and bolt holds of the steering knuckle and front shock absorber assembly to adjust the camber.

NOTICE:

Left-right tolerance for camber is to be $0^{\circ}45'$ (0.75°) or less.

HINT:

The range that can be adjusted by replacing bolts is $0^{\circ} \pm 45'$ ($0^{\circ} \pm 0.75^{\circ}$).



- (e) Tighten the 2 bolts and 2 new nuts.

Torque: 155 N·m (1581 kgf·cm, 114ft·lbf)

- (f) Install the front wheel.

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

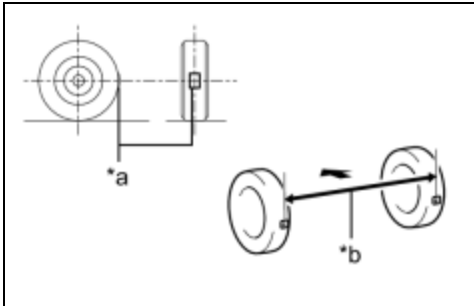
- (g) Lower the vehicle and bounce it up and down several times to stabilize the front suspension.

- (h) Check the camber.


- (i) Check the toe-in.

5. INSPECT TOE-IN

- (a) Bounce the vehicle up and down at the corners to stabilize the suspension.
- (b) Release the parking brake and move the shift lever to the neutral position (for manual transmission).
- (c) Release the parking brake and move the shift lever to N (for Automatic transmission).
- (d) Push the vehicle straight ahead approximately 5 m (16.4 ft.). (Step A)
- (e) Put tread center marks on the rearmost points of the front wheels and measure the distance between the marks (dimension B).



Text in Illustration

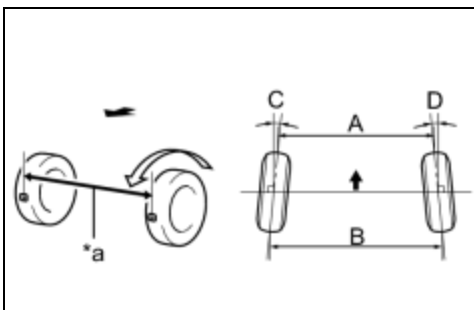
*a	Tread Center Mark
*b	Dimension B
	Front of the Vehicle

- (f) Slowly push the vehicle straight ahead to cause the front wheels to rotate 180°. Use the front tire valve as a reference point.

HINT:

Do not allow the wheels to rotate more than 180°. If the wheels rotate more than 180°, perform the procedure from Step A again.

- (g) Measure the distance between the tread center marks on the front side of the wheels (dimension A).



Text in Illustration

*a	Dimension A
----	-------------



Front of the Vehicle

Standard Dimension (Unloaded Vehicle):

SPECIFIED CONDITION
C + D: 0°00' +/- 0°11' (0.00° +/- 0.19°)
B - A: 0 +/- 3.0 mm (0 +/- 0.1181 in.)

HINT:

Measure "B - A" only when "C + D" cannot be measured.

If the toe-in is not within the specified value, adjust it at the rack ends.

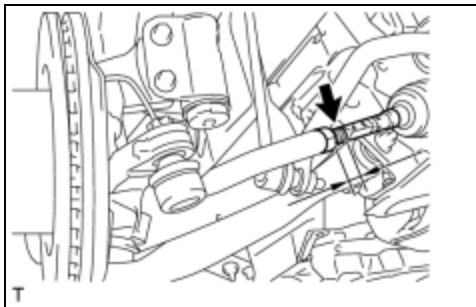
6. ADJUST TOE-IN

- (a) Measure the thread lengths of the right and left rack ends.

Standard:

Difference in thread length of 2.0 mm (0.0787 in.) or less

- (b) Remove the rack boot set clips.
- (c) Loosen the tie rod end lock nuts.
- (d) Adjust the rack ends if the difference in thread length between the right and left rack ends is not within the specified range.
- (1) If the toe-in measurement is greater than the specified range (too much toe-out), extend the shorter rack end so that the length difference is within the specified range.
- (2) If the toe-in measurement is less than the specified range (too much toe-in), shorten the longer rack end so that the length difference is within the specified range.
- (3) Measure the toe-in.
- (e) Turn the right and left rack ends by an equal amount to adjust the toe-in.
- (f) Make sure that the thread lengths of the right and left rack ends are the same.
- (g) Tighten the tie rod end lock nuts.
- Torque: 85 N·m (867 kgf·cm, 63ft·lbf)**
- (h) Place the steering rack boots on the seats and install the steering rack boot clips.

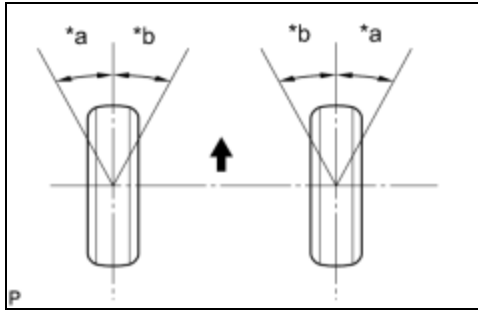


HINT:


Make sure that the steering rack boots are not twisted.

7. INSPECT WHEEL ANGLE

(a) Put tread center marks on the rearmost points of a turning radius gauge.



Text in Illustration

*a	Inside
*b	Outside
	Front of the Vehicle

(b) Turn the steering wheel fully to the left and right and measure the turning angle.

HINT:

Inspect while the vehicle is unloaded.

Wheel Turning Angle (Unloaded Vehicle):

INSIDE WHEEL (REFERENCE)	OUTSIDE WHEEL (REFERENCE)
36°54' (43.90°)	31°12' (31.20°)

8. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

9. VSC SENSOR NEUTRAL MEMORIZATION

NFC

Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WXS028X
Title: ALIGNMENT / HANDLING DIAGNOSIS: REAR WHEEL ALIGNMENT: ADJUSTMENT (2013 FR-S)		

ADJUSTMENT

NOTICE:

If the wheel alignment has been adjusted, and if suspension or underbody components have been removed/installed or replaced, be sure to perform the following initialization procedure in order for the system to function normally:

Perform zero point calibration of the yaw rate and acceleration sensor and test mode inspection

INFO

1. INSPECT TIRES **INFO**

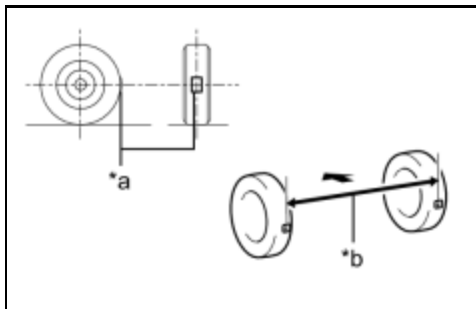
2. MEASURE VEHICLE HEIGHT **INFO**

3. INSPECT TOE-IN


NOTICE:

Inspect while the vehicle is unloaded.

- Bounce the vehicle up and down at the corners to stabilize the suspension.
- Release the parking brake and move the shift lever to N.
- Push the vehicle straight ahead approximately 5 m (16.4 ft.). (Step B)
- Put tread center marks on the rearmost points of the rear wheels and measure the distance between the marks (dimension B).



Text in Illustration

*a	Tread Center Mark
*b	Dimension B
	Front of the Vehicle

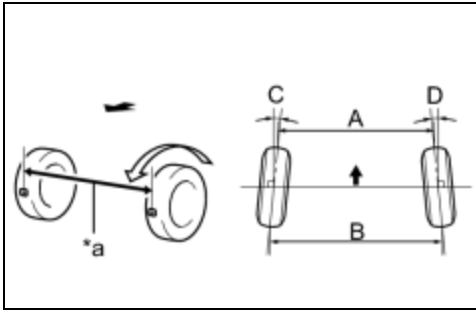
- Slowly push the vehicle straight ahead to cause the rear wheels to rotate 180°. Use the rear tire valve as a reference point.

HINT:


Do not allow the wheels to rotate more than 180°. If the wheels rotate more than 180°, perform the

procedure from Step B again.

- (f) Measure the distance between the tread center marks on the front of the rear wheels (dimension A).



Text in Illustration

*a	Dimension A
	Front of the Vehicle

Toe-in (Unloaded Vehicle):

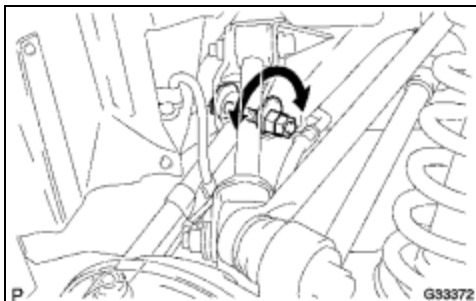
SPECIFIED CONDITION
$C + D: 0^{\circ}10' \pm 0^{\circ}15' (0.16^{\circ} \pm 0.24^{\circ})$
$B - A: 2.0 \pm 3.0 \text{ mm} (0.0787 \pm 0.1181 \text{ in.})$

HINT:

Measure "B - A" only when "C + D" cannot be measured.

If the toe-in is not within the specified range, adjust it at the toe control link sub-assembly.

4. ADJUST TOE-IN



- (a) Loosen the toe adjust cam nut.

- (b) Turn the adjust cams by an equal amount to adjust the toe-in.

Toe-in (Unloaded Vehicle):

SPECIFIED CONDITION
$C + D: 0^{\circ}10' \pm 0^{\circ}15' (0.16^{\circ} \pm 0.24^{\circ})$

HINT:

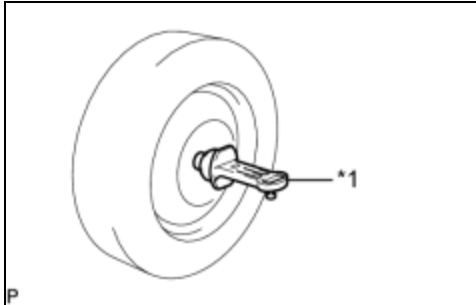
- Try to adjust the toe-in to the center value.
- The toe-in will change by approximately 1.3 mm (0.051 in.) for each gradation of the cam.

(c) Tighten the toe adjust cam nut.

Torque: 100 N·m (1020 kgf·cm, 74ft·lbf)

5. INSPECT CAMBER

(a) Remove the center wheel ornament.



(b) Install a camber-caster-kingpin gauge at the center of the axle hub or drive shaft.

Text in Illustration

*1	Camber-caster-kingpin Gauge
----	-----------------------------

(c) Inspect the camber.

Camber (Unloaded Vehicle):

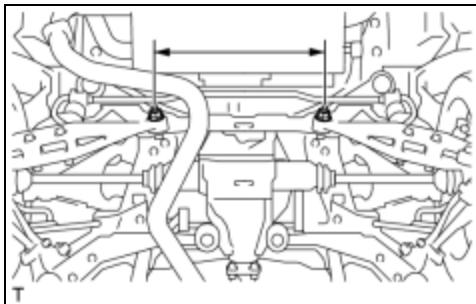
CAMBER INCLINATION	RIGHT-LEFT DIFFERENCE
-1°12' +/- 45' (-1.20° +/- 0.75°)	45' (0.75°) or less

If the measured value is not within the specified range, inspect the suspension parts for damage and wear. Replace parts as necessary because camber cannot be properly adjusted with any damaged or worn parts.

(d) Remove the camber-caster-kingpin gauge.

(e) Install the center wheel ornament.

6. INSPECT REAR SUSPENSION



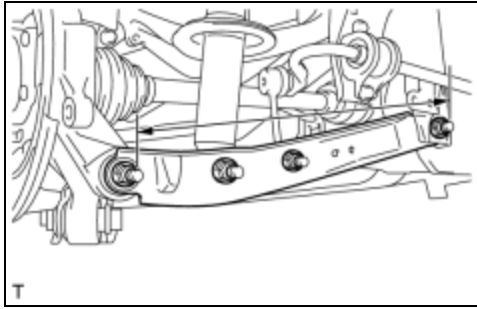
(a) Inspect the rear suspension member.

- (1) Measure the distance between the centers of the 2 installation bolts of the rear No. 2 suspension arm assembly LH and RH

Standard distance:

442.8 to 448.8 mm (17.43 to 17.67 in.)

If the distance is not within the specified range, replace the rear suspension member.



(b) Inspect the rear No. 2 suspension arm assembly.

- (1) Measure the distance between the centers of the 2 installation bolts of the rear No. 2 suspension arm assembly.

Standard distance:

447.9 to 451.9 mm (17.63 to 17.79 in.)

If the distance is not within the specified range, replace the rear No. 2 suspension arm assembly.

(c) Inspect and adjust the toe-in and camber.

- (1) Inspect the toe-in and camber.

Inspect the toe-in and camber. If the values are not within the specified ranges, adjust the installation bolt holding the rear suspension member to the vehicle body, or the bolt holding the upper control arm and rear suspension arm so that the values fall within the specified ranges.

7. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

8. VSC SENSOR NEUTRAL MEMORIZATION

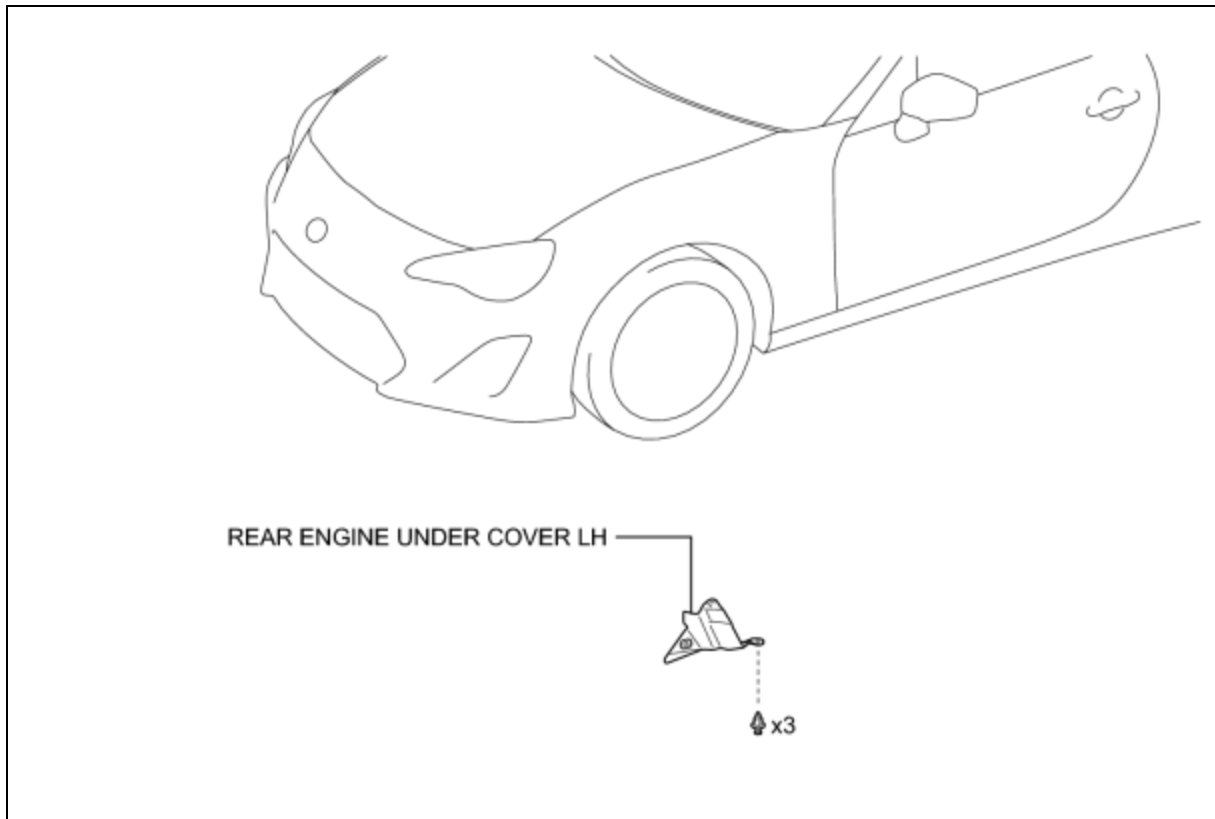
INFO



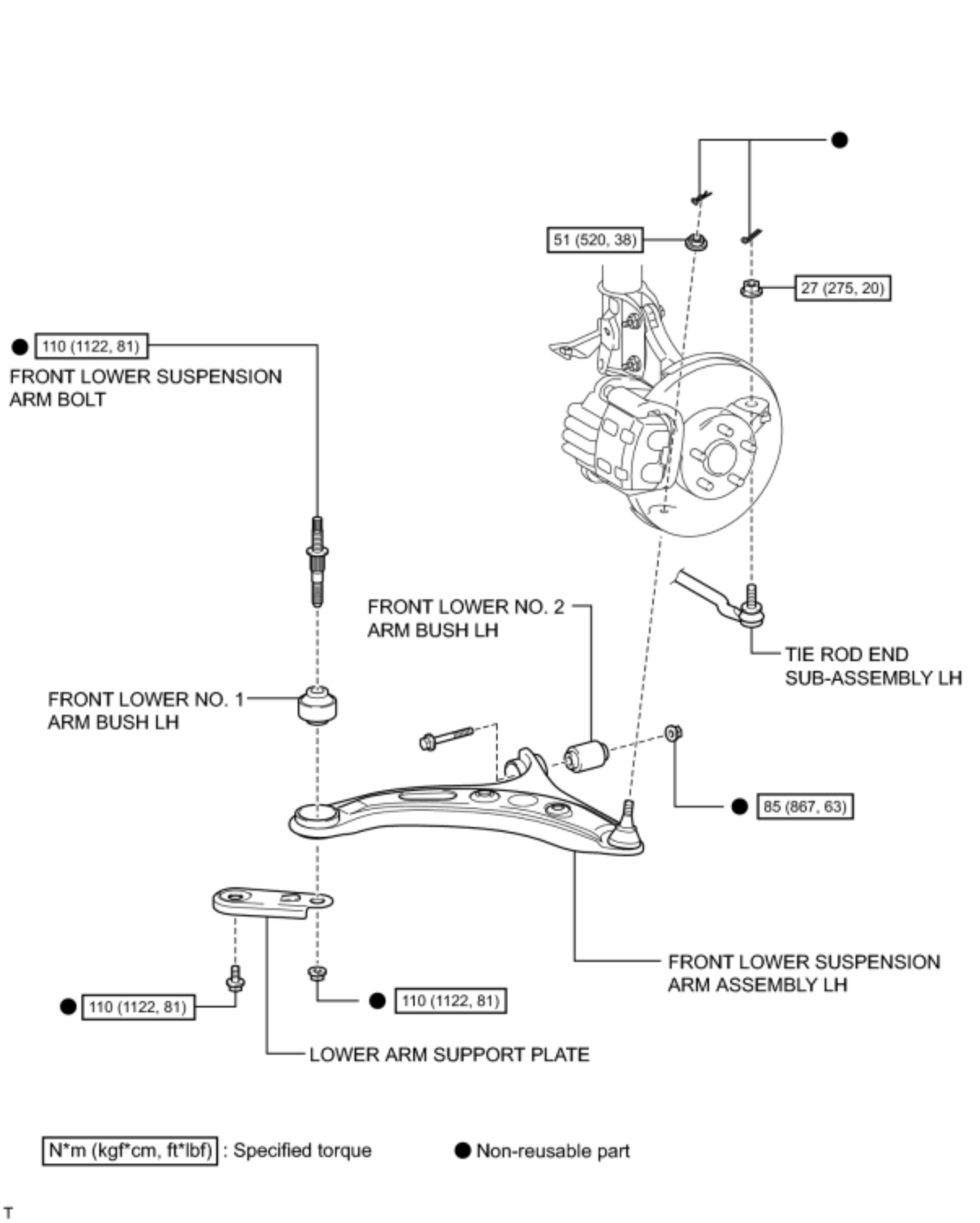
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004EOJ000X
Title: FRONT SUSPENSION: FRONT LOWER SUSPENSION ARM: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



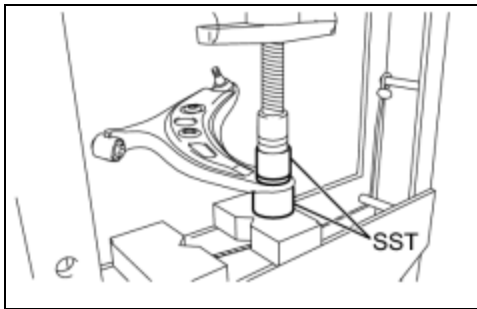
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058PR000X
Title: FRONT SUSPENSION: FRONT LOWER SUSPENSION ARM: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

HINT:

- The procedure listed below is for the LH side.
- Use the same procedure for the RH side and LH side.

1. REMOVE FRONT LOWER NO. 1 ARM BUSH LH

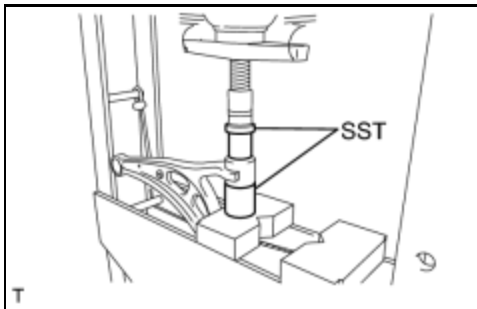


(a) Using SST and a press, front lower No. 1 arm bush LH.

SST: 09716-18020

SST: 09716-18030

2. REMOVE FRONT LOWER NO. 2 ARM BUSH LH



(a) Using SST, front lower No. 2 arm bush LH.

SST: 09710-18040

09711-01010

09711-01020

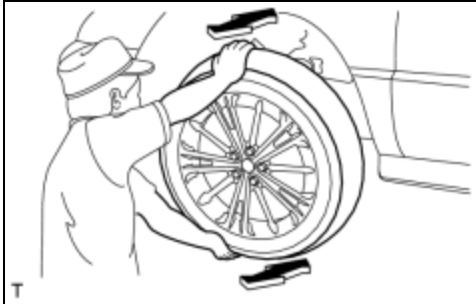
09711-01030

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058V1000X
Title: FRONT SUSPENSION: FRONT LOWER SUSPENSION ARM: INSPECTION (2013 FR-S)		

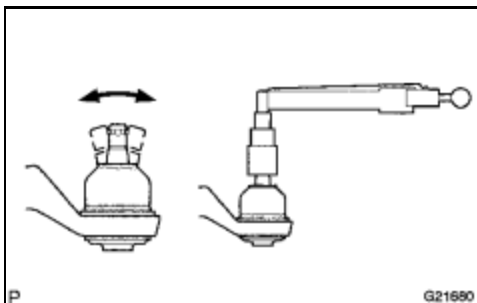
INSPECTION

1. INSPECT FRONT LOWER SUSPENSION ARM ASSEMBLY LH

- (a) Inspect the state of rotation of the ball joint.



- (1) With the brake pedal depressed, attempt to move the top and bottom of the front tire in the axial direction, and confirm that there is no play.
- (2) If there is any play, replace the front lower suspension arm assembly LH.
- (3) With the brake pedal released, attempt to move the top and bottom of the front tire in the axial direction, and confirm that there is no play.
- (4) If there is any play, replace the front axle hub.
- (5) Install the nut to the front lower suspension arm assembly LH stud.



- (6) Turn the stud back and forth.

Standard:

There is no unusual resistance or play.

- (7) If there is any unusual resistance or play, replace the front lower suspension arm assembly LH with a new one.
- (b) Inspect the dust cover.
- (1) Check that the dust cover is not cracked and that there is no grease on it.
 - (2) If the dust cover is cracked or there is grease on it, replace the front lower suspension arm assembly LH with a new one.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004EGK01DX
Title: FRONT SUSPENSION: FRONT LOWER SUSPENSION ARM: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- The procedure listed below is for the LH side.
- Use the same procedure for the RH side and LH side.

1. INSTALL FRONT LOWER SUSPENSION ARM BOLT

- (a) Using SST, install the new front lower suspension arm bolt.

SST: 09726-18010

Torque: 110 N·m (1122 kgf·cm, 81ft·lbf)

2. TEMPORARILY TIGHTEN FRONT LOWER SUSPENSION ARM ASSEMBLY LH

- (a) Temporarily tighten the front lower suspension arm assembly LH with the bolt and new nut.

NOTICE:

Insert the bolt from the front of the vehicle.

3. INSTALL STEERING KNUCKLE LH

- (a) Install the front lower arm suspension arm assembly LH with the nut to the steering knuckle LH.

Torque: 51 N·m (520 kgf·cm, 38ft·lbf)

- (b) Install new clip.

4. INSTALL TIE ROD END SUB-ASSEMBLY LH INFO

5. INSTALL LOWER ARM SUPPORT PLATE

- (a) Install the lower arm support plate with the new bolt and new nut.

Torque: 110 N·m (1122 kgf·cm, 81ft·lbf)

6. INSTALL FRONT WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

7. STABILIZE SUSPENSION INFO

8. FULLY TIGHTEN FRONT LOWER SUSPENSION ARM ASSEMBLY LH

- (a) Fully tighten the nut on the rear of front lower suspension arm assembly LH.

Torque: 85 N·m (867 kgf·cm, 63ft·lbf)

9. INSTALL REAR ENGINE UNDER COVER LH

- (a) Install the rear engine under cover LH with the 3 clips.

10. INSPECT STEERING WHEEL CENTER POINT

11. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT

INFO

12. VSC SENSOR NEUTRAL MEMORIZATION

INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058PS000X
Title: FRONT SUSPENSION: FRONT LOWER SUSPENSION ARM: REASSEMBLY (2013 FR-S)		

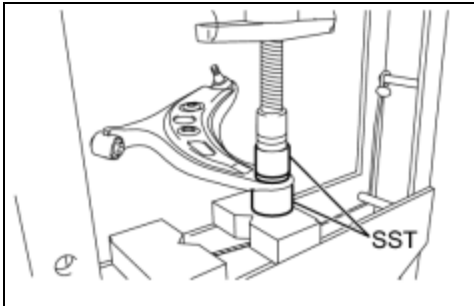
REASSEMBLY

HINT:

- The procedure listed below is for the LH side.
- Use the same procedure for the RH side and LH side.

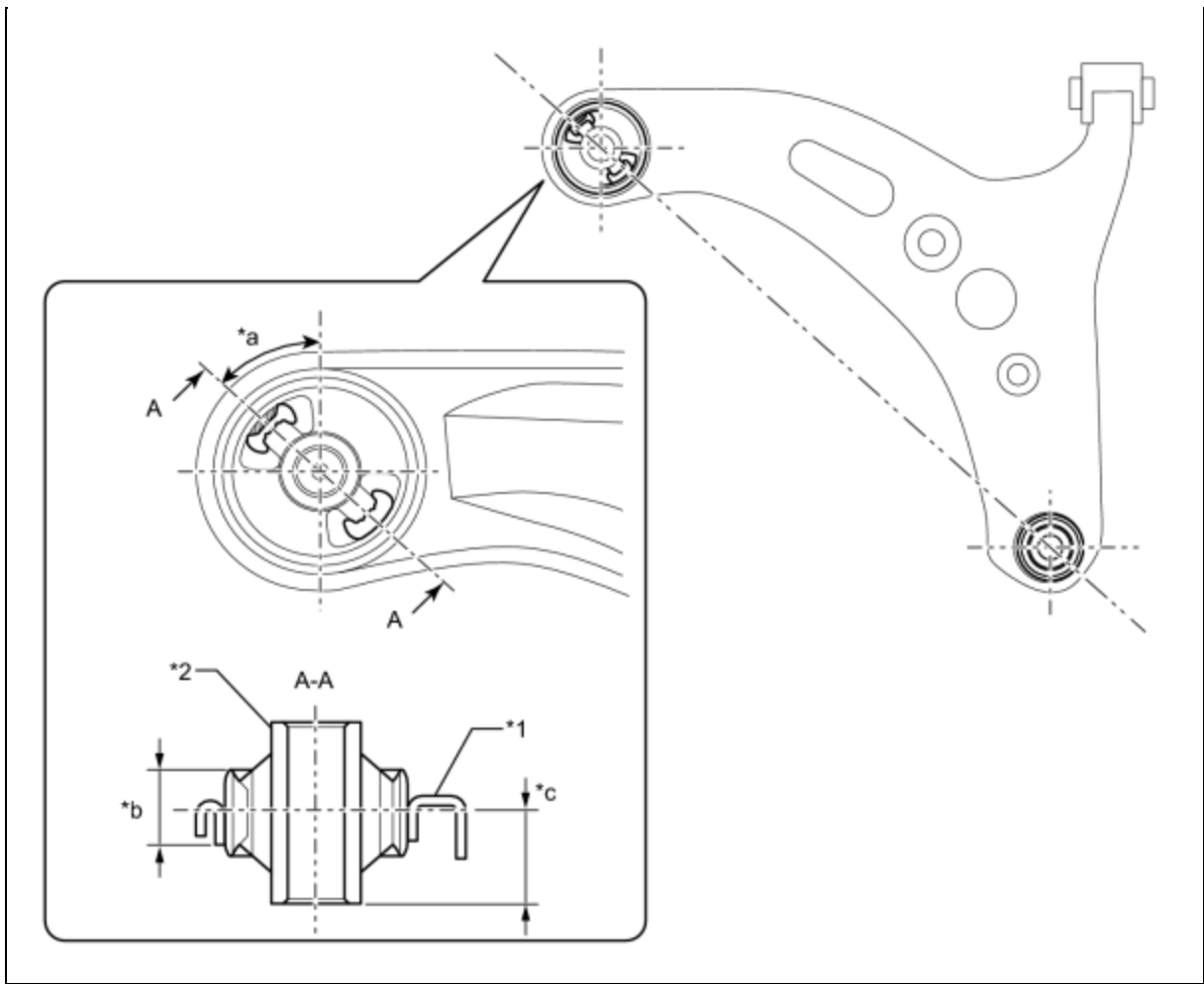
1. INSTALL FRONT LOWER NO. 1 ARM BUSH LH

- (a) Using SST, install the front lower No. 1 arm bushing LH to the front lower suspension arm assembly LH so that the fitting dimensions come within the specifications shown in the illustration.



SST: 09716-18020

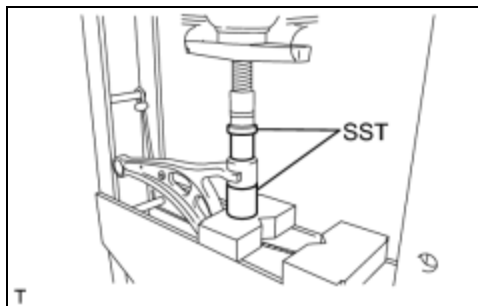
SST: 09716-18030



Text in Illustration

*1	Front Lower Suspension Arm Assembly LH	*2	Front Lower No. 2 Arm Bush LH
*a	44 to 50°	*b	25.0 to 26.0 mm (0.984 to 1.023 in.)
*c	26.5 to 27.5 mm (1.043 to 1.083 in.)	-	-

2. INSTALL FRONT LOWER NO. 2 ARM BUSH LH



(a) Using SST, install the front lower No. 2 arm bush LH to the front lower suspension arm assembly LH.

SST: 09710-18040

09711-01010

09711-01020

09711-01030

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004EGK01EX
Title: FRONT SUSPENSION: FRONT LOWER SUSPENSION ARM: REMOVAL (2013 FR-S)		

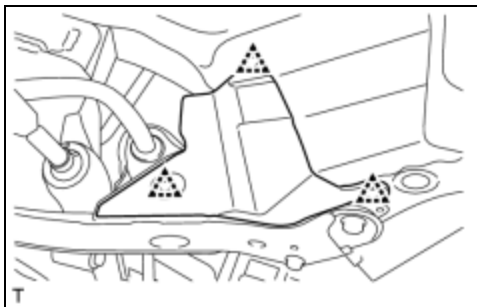
REMOVAL

HINT:

- The procedure listed below is for the LH side.
- Use the same procedure for the RH side and LH side.

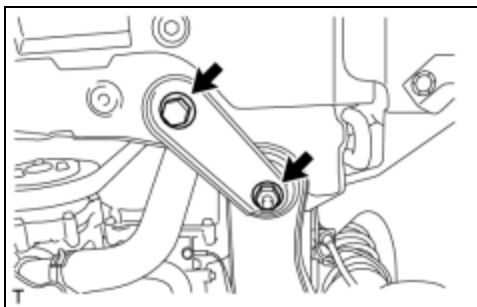
1. REMOVE FRONT WHEEL

2. REMOVE REAR ENGINE UNDER COVER LH



(a) Remove the 3 clips and rear engine under cover LH.

3. REMOVE LOWER ARM SUPPORT PLATE



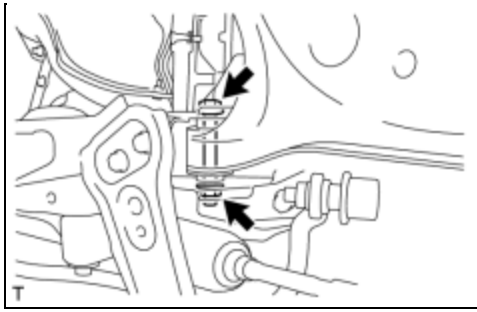
(a) Remove the bolt, nut and lower arm support plate.

4. SEPARATE TIE ROD END SUB-ASSEMBLY LH INFO

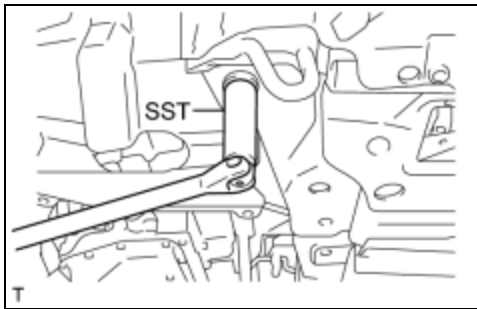
5. SEPARATE STEERING KNUCKLE LH INFO

6. REMOVE FRONT LOWER SUSPENSION ARM ASSEMBLY LH

(a) Remove the bolt, nut and front lower suspension arm assembly LH from the front cross member sub-assembly.



7. REMOVE FRONT LOWER SUSPENSION ARM BOLT



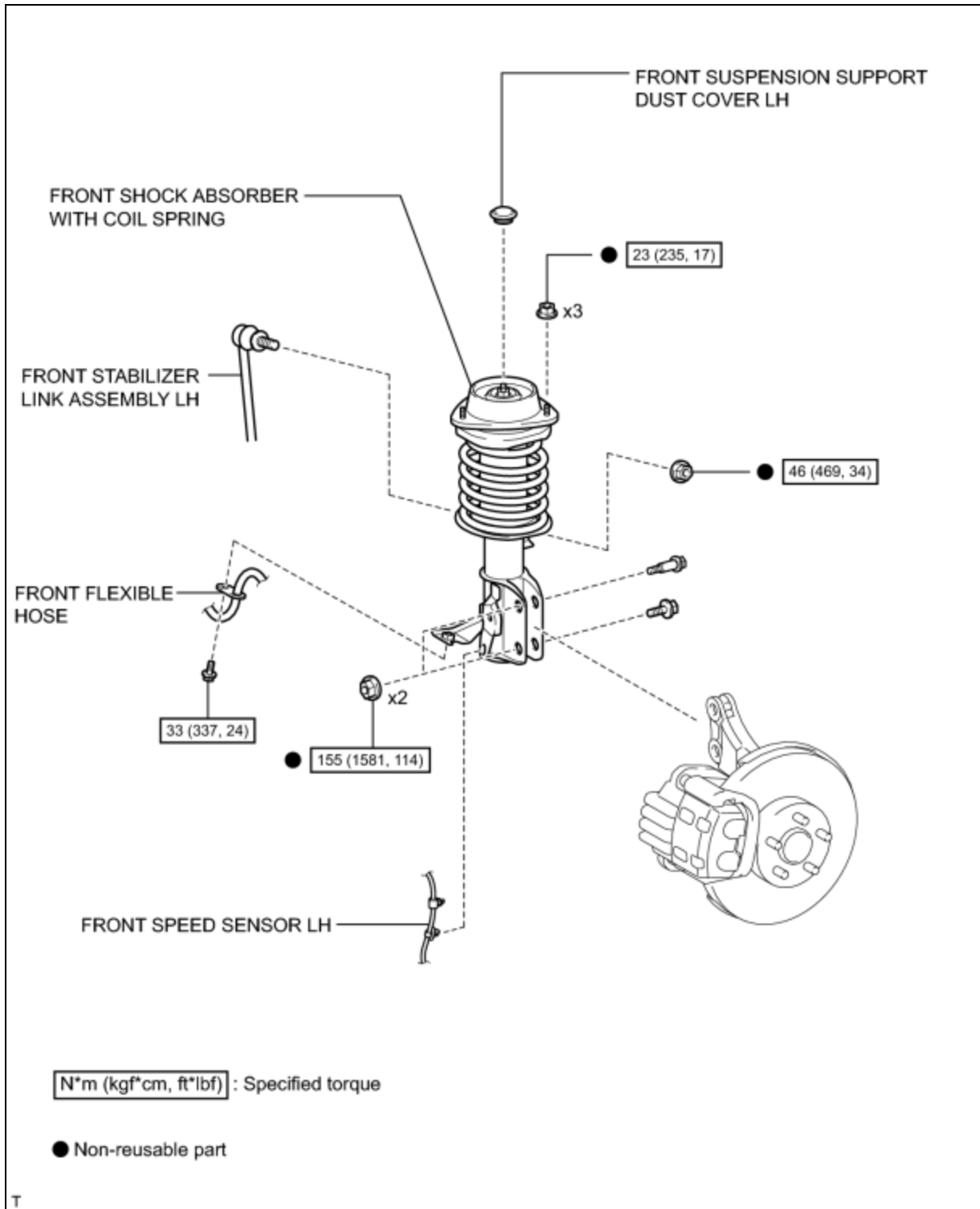
(a) Using SST, remove the front lower suspension arm bolt.

SST: 09726-18010

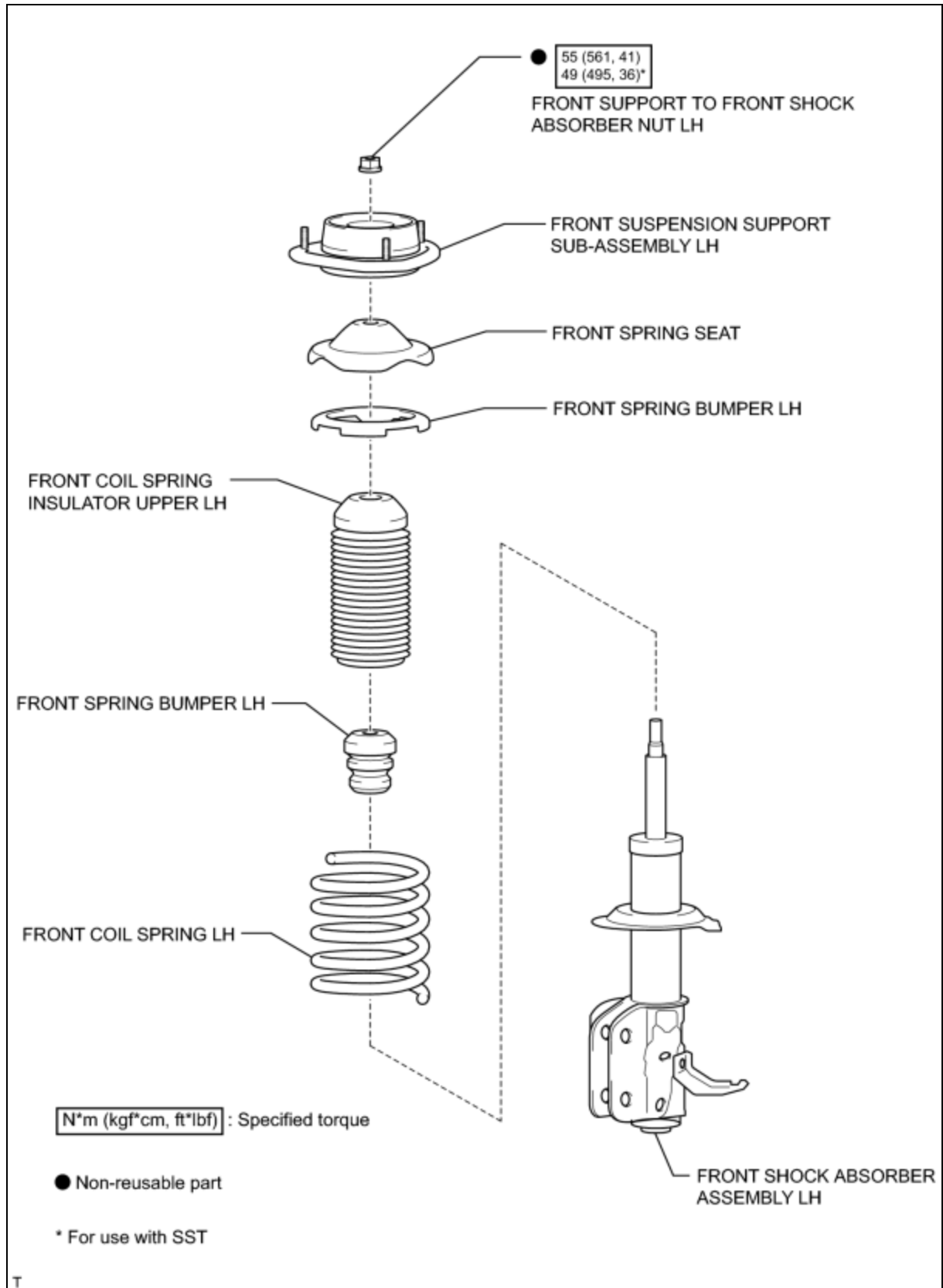
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011DE02HX
Title: FRONT SUSPENSION: FRONT SHOCK ABSORBER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



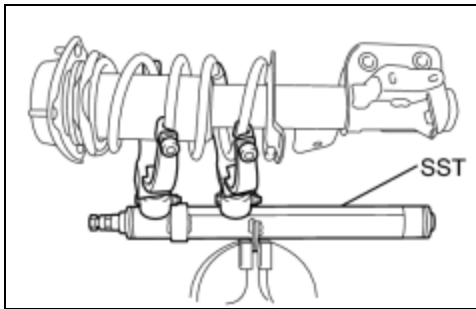
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058PO000X
Title: FRONT SUSPENSION: FRONT SHOCK ABSORBER: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

HINT:

- The procedure listed below is for the LH side.
- Use the same procedure for the RH side and LH side.

1. REMOVE FRONT SUPPORT TO FRONT SHOCK ABSORBER NUT LH



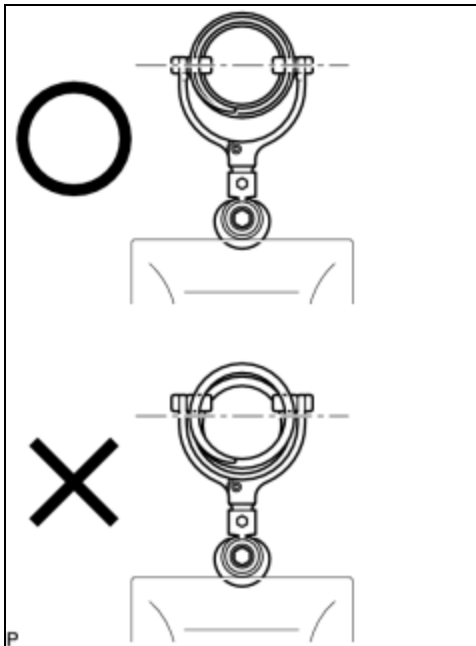
(a) Secure the SST in a vise.

SST: 09727-30021

09727-00010

09727-00021

09727-00031



(b) Attach the arm of SST to the diameter of the front coil spring LH.

CAUTION:

- Make sure that the front coil spring LH is installed so that the distance between the upper and lower hooks of SST is at the maximum.
- Make sure that the claws on the hooks are securely engaged.

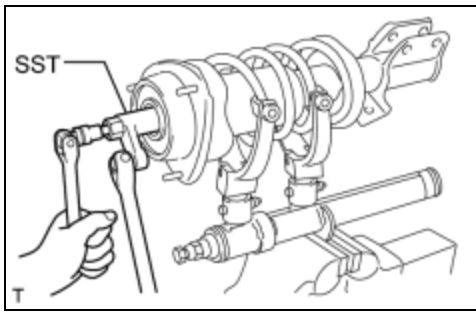
(c) Using SST, compress the front coil spring LH.

CAUTION:

- If the front coil spring LH bends during the compression, immediately stop the compression and reinstall SST.
- Do not compress the spring until the front coil spring LH contact each other.

- Do not use an impact wrench.

(d) Using a long socket hexagon wrench 6mm, fix the shock absorber rod.



(e) Confirm that the front coil spring LH becomes free and remove the lock nut.

SST: 09729-97202

CAUTION:

Do not remove the lock nut when the front coil spring LH is not free.

NOTICE:

- Be careful not to damage or deform the threaded section.
- Fully insert a long socket hexagon wrench 6mm.

2. REMOVE FRONT SUSPENSION SUPPORT SUB-ASSEMBLY LH

(a) Remove the front suspension support sub-assembly LH.

3. REMOVE FRONT SPRING SEAT

(a) Remove the front spring seat.

4. REMOVE FRONT SPRING BUMPER LH

(a) Remove the front spring bumper.

5. REMOVE FRONT COIL SPRING INSULATOR UPPER LH

(a) Remove the front coil spring upper insulator LH.

6. REMOVE FRONT SPRING BUMPER LH

(a) Remove the front spring bumper LH.

7. REMOVE FRONT COIL SPRING LH

(a) Release the SST and remove the front coil spring LH.

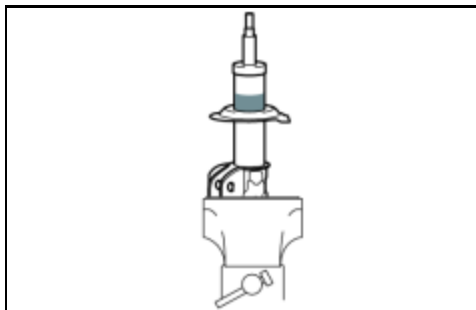


Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011DB021X
Title: FRONT SUSPENSION: FRONT SHOCK ABSORBER: DISPOSAL (2013 FR-S)		


DISPOSAL

1. DISPOSE OF FRONT SHOCK ABSORBER ASSEMBLY LH

- (a) Affix the front shock absorber assembly LH perpendicularly.
- (b) Push the piston rod down approximately 70 mm (2.756 in.) by hand.
- (c) Using a metal saw or the like, slowly cut a hole in the location shown in the illustration and let the gas out.



Text in Illustration

	Area to cut a hole
---	--------------------

NOTICE:

- Wear protective glasses.
- Since the discharging gas may cause chips to scatter, cover the metal saw with a piece of cloth when making the hole.

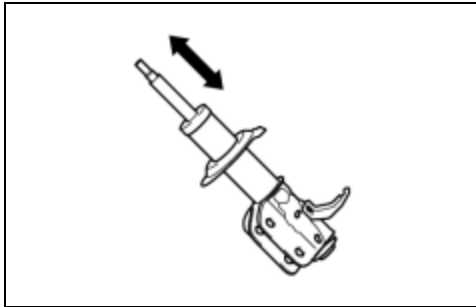
HINT:

The gas is colorless, odorless and non-poisonous.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011DD02JX
Title: FRONT SUSPENSION: FRONT SHOCK ABSORBER: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT FRONT SHOCK ABSORBER ASSEMBLY LH



- (a) Compress and extend the shock absorber rod 4 or more times.

Standard:

There is no abnormal resistance or sound and operation resistance is normal.

If there is any abnormality, replace the front shock absorber assembly with a new one.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011DC03FX
Title: FRONT SUSPENSION: FRONT SHOCK ABSORBER: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- The procedure listed below is for the LH side.
- Use the same procedure for the RH side and LH side.

1. INSTALL FRONT SHOCK ABSORBER WITH COIL SPRING

- (a) Install the front shock absorber with coil spring (upper side) with the 3 new nuts.

Torque: 23 N·m (235 kgf·cm, 17ft·lbf)

- (b) Install the front shock absorber with coil spring (lower side) to the steering knuckle and insert the 2 bolts and 2 new nuts.

NOTICE:

Insert the bolt from the rear of the vehicle.

Torque: 155 N·m (1581 kgf·cm, 114ft·lbf)

NOTICE:

While keeping the bolts from rotating, tighten the nuts.

2. INSTALL FRONT STABILIZER LINK ASSEMBLY LH

- (a) Install the front stabilizer link assembly to the front shock absorber assembly with a new nut.

- (b) Using a socket hexagon wrench 6 mm, fix the stud bolt and install the front stabilizer link assembly LH with a new nut.

Torque: 46 N·m (469 kgf·cm, 34ft·lbf)

3. INSTALL FRONT FLEXIBLE HOSE

- (a) Install the front flexible hose to the front shock absorber assembly with the bolt.

Torque: 33 N·m (337 kgf·cm, 24ft·lbf)

4. INSTALL FRONT SUSPENSION SUPPORT DUST COVER LH

- (a) Install the front suspension support dust cover LH to the front shock absorber with coil spring.

5. INSTALL FRONT SPEED SENSOR LH

- (a) Install the front speed sensor LH to the front shock absorber assembly with the 2 clamps.

NOTICE:

Do not twist the front speed sensor when installing it.

6. INSTALL FRONT WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

7. STABILIZE SUSPENSION

- (a) Lower the vehicle and bounce it up and down several times to stabilize the front suspension.

8. INSPECT STEERING WHEEL CENTER POINT

9. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT

INFO

10. VSC SENSOR NEUTRAL MEMORIZATION

INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058PP000X
Title: FRONT SUSPENSION: FRONT SHOCK ABSORBER: REASSEMBLY (2013 FR-S)		

REASSEMBLY

HINT:

- The procedure listed below is for the LH side.
- Use the same procedure for the RH side and LH side.

1. INSTALL FRONT SPRING BUMPER LH

- (a) Install the front spring bumper LH to the front shock absorber assembly LH.

2. INSTALL FRONT COIL SPRING INSULATOR UPPER LH

- (a) Install the front coil spring insulator upper LH to the front shock absorber assembly LH.

3. INSTALL FRONT COIL SPRING LH

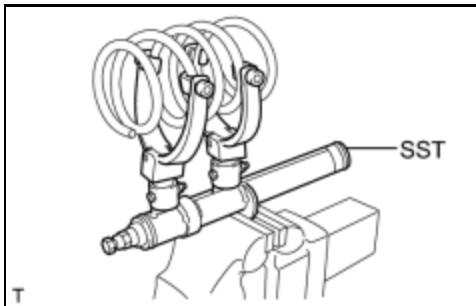
- (a) Secure the SST in a vise.

SST: 09727-30021

09727-00010

09727-00021

09727-00031

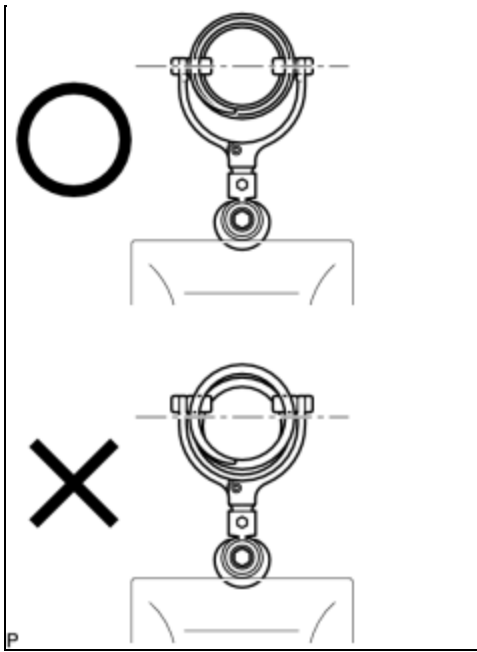


- (b) Install SST to the front coil spring LH with the hooks spread as far apart as possible from each other.

- (c) Attach the arm of SST to the diameter of the coil spring.

CAUTION:

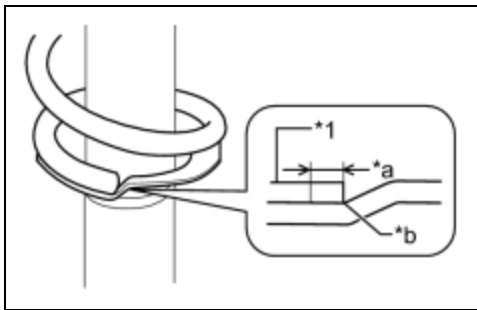
- Make sure that the front coil spring LH is installed so that the distance between the upper and lower hooks of SST is at the maximum.
- Make sure that the claws on the hooks are securely engaged.



(d) Using SST, compress the front coil spring LH.

CAUTION:

- If the front coil spring LH bends during the compression, immediately stop the compression and reinstall SST.
- Do not compress the spring until the coil springs contact each other.
- Do not use an impact wrench.



(e) Install the front coil spring LH so that the lower end of the spring and lower side spring seat stopper are aligned.

Text in Illustration

*1	Front Coil Spring LH
*a	0 to 10 mm (0 to 0.397 in.)
*b	Spring seat stopper

4. INSTALL FRONT SPRING BUMPER LH

(a) Install the front spring bumper LH to the front shock absorber assembly LH.

5. INSTALL FRONT SPRING SEAT

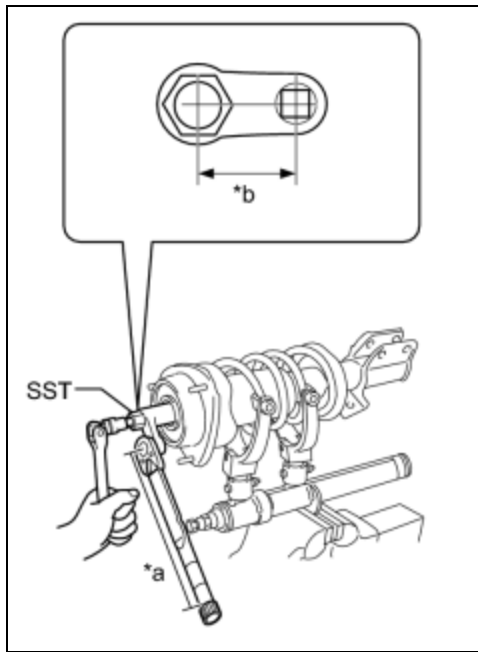
(a) Install the front spring seat to the front shock absorber assembly LH.

6. INSTALL FRONT SUSPENSION SUPPORT SUB-ASSEMBLY LH

(a) Install the front suspension support sub-assembly LH to the front shock absorber assembly LH.

7. INSTALL FRONT SUPPORT TO FRONT SHOCK ABSORBER NUT LH

(a) Long socket hexagon wrench 6, fix the shock absorber rod.



(b) Using SST, install a new front support to front shock absorber nut LH to the front shock absorber assembly LH.

SST: 09729-97202

Text in Illustration

*a	Fulcrum Length
*b	40 mm (1.575 in.)

without SST - Torque: 55 N·m (561 kgf·cm, 41ft·lbf)

with SST - Torque: 49 N·m (495 kgf·cm, 36ft·lbf)

NOTICE:

- Use a torque wrench with a fulcrum length of 300 mm (11.81 in.)
- Be careful not to damage or deform the threaded section.
- Securely set the long socket hexagon wrench 6.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011DF02NX
Title: FRONT SUSPENSION: FRONT SHOCK ABSORBER: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

- The procedure listed below is for the LH side.
- Use the same procedure for the RH side and LH side.

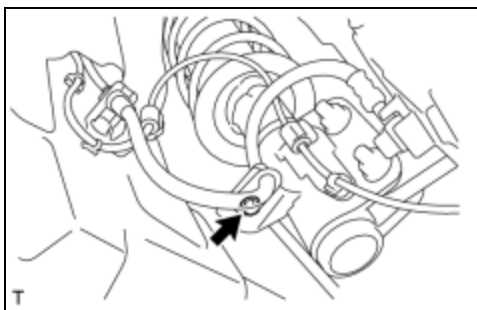
1. REMOVE FRONT WHEEL

2. SEPARATE FRONT SPEED SENSOR LH



- (a) Remove the 2 clamps and separate the front speed sensor LH from the front shock absorber with coil spring.

3. SEPARATE FRONT FLEXIBLE HOSE

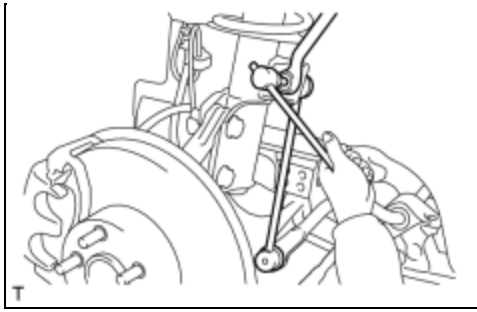


- (a) Remove the bolt and separate the front flexible hose from the front shock absorber with coil spring.

4. SEPARATE FRONT STABILIZER LINK ASSEMBLY LH

- (a) Remove the nut and separate the front stabilizer link assembly LH from the front shock absorber with coil spring.

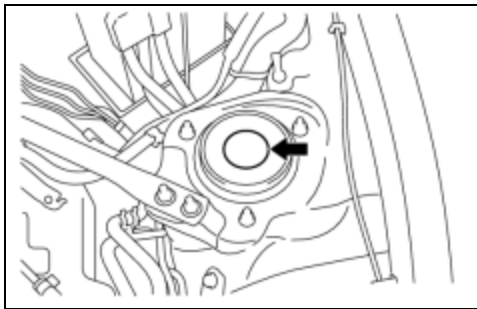
If the ball joint turns together with the nut, use a hexagon wrench to hold the stud bolt.



5. REMOVE FRONT SUSPENSION SUPPORT DUST COVER LH

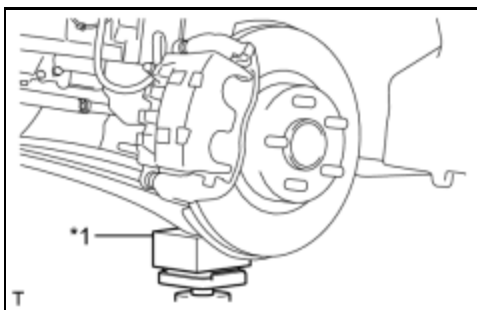
HINT:

If it is necessary to disassemble the front shock absorber with coil spring, remove the front suspension support dust cover LH.



(a) Remove the front suspension support dust cover LH.

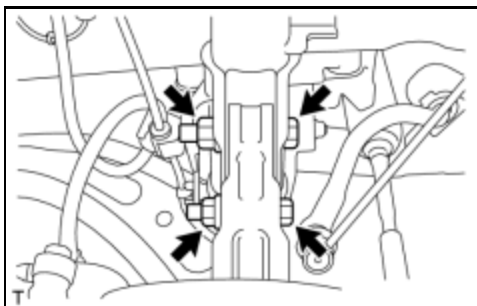
6. REMOVE FRONT SHOCK ABSORBER WITH COIL SPRING



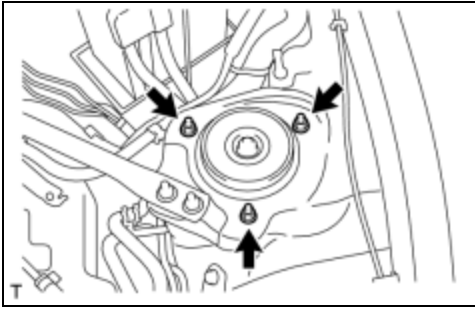
(a) Support the front axle using a jack and wooden block.

Text in Illustration

*1	Wooden Block
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(b) Remove the 2 bolts and 2 nuts, and separate the front shock absorber with coil spring (lower side) from the steering knuckle.



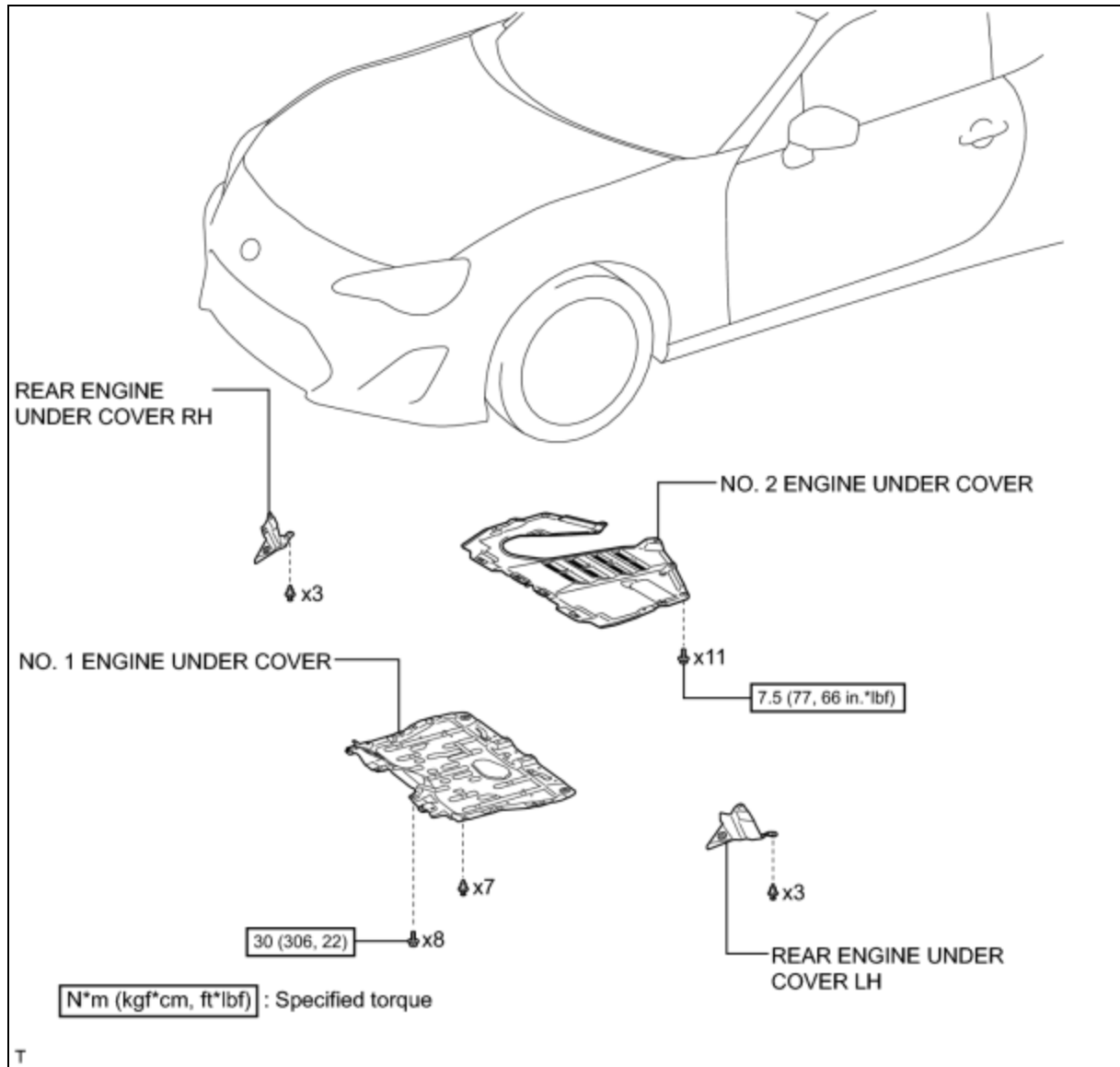
(c) Remove the 3 nuts from the front upper coil spring insulator LH.

(d) Remove the front shock absorber with coil spring.

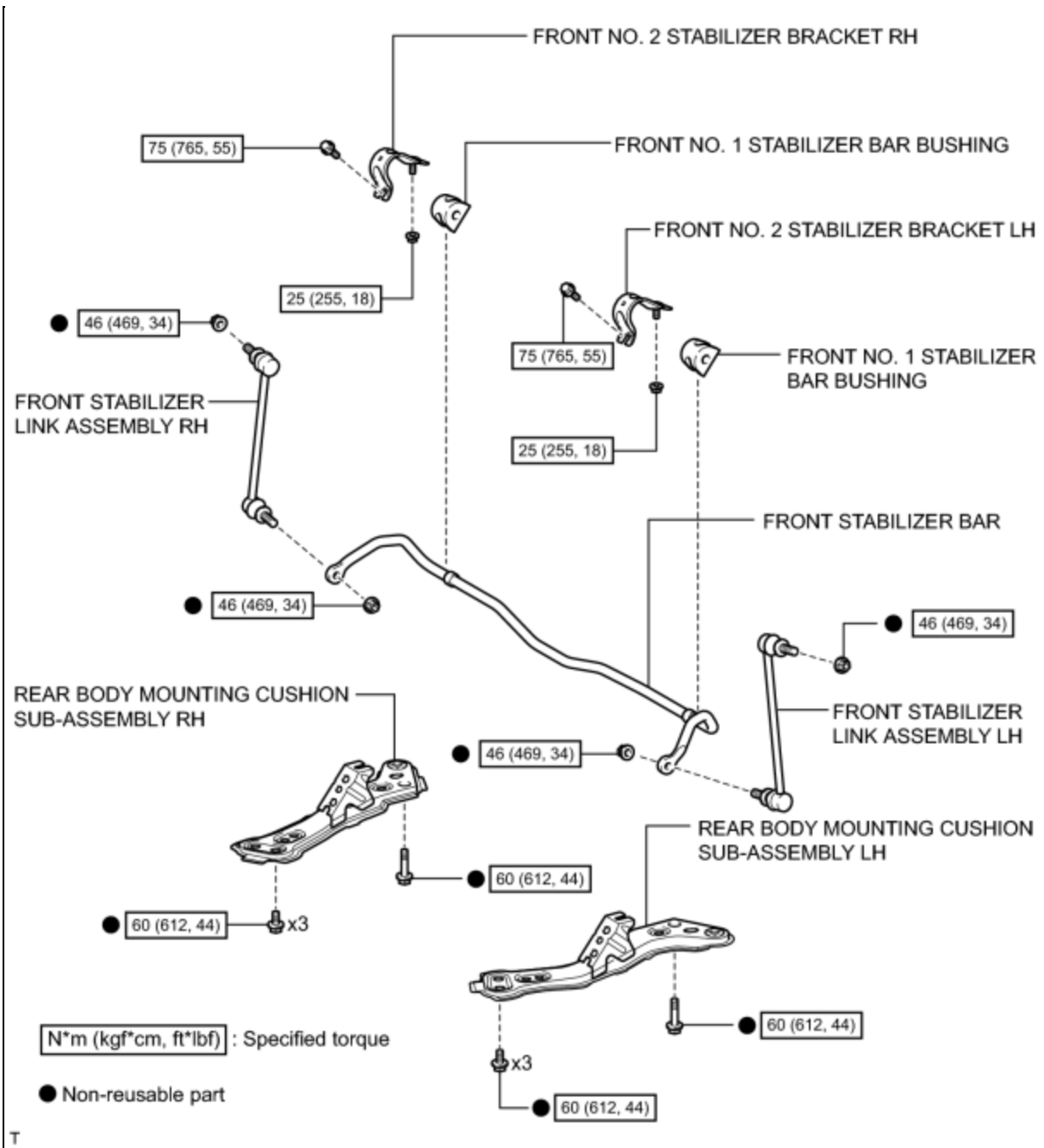
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001116031X
Title: FRONT SUSPENSION: FRONT STABILIZER BAR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION

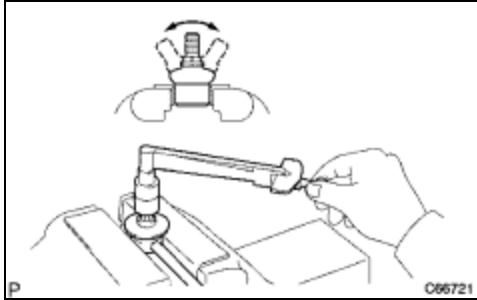


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Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011DO051X
Title: FRONT SUSPENSION: FRONT STABILIZER BAR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT FRONT STABILIZER LINK ASSEMBLY



(a) Inspect the ball joint.

- (1) Secure the front stabilizer link assembly in a vise using aluminum plates.
- (2) Install the nut to the front stabilizer link assembly stud.
- (3) Turn the stud back and forth.

Standard:

There is no unusual resistance or play.

- (4) If there is any unusual resistance or play, replace the front stabilizer link assembly with a new one.

(b) Inspect the dust cover.

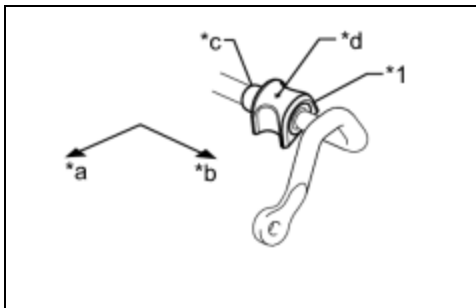
- (1) Check that the dust cover is not cracked and that there is no grease on it.
- (2) If the dust cover is cracked or there is grease on it, replace the front stabilizer link assembly with a new one.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011DN03YX
Title: FRONT SUSPENSION: FRONT STABILIZER BAR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL FRONT NO. 1 STABILIZER BAR BUSHING (for LH Side)

- (a) Install the front No. 1 stabilizer bar bushing so that it is positioned closer to the outside of the vehicle than the front stabilizer bar stopper ring.



NOTICE:

Install the front No. 1 stabilizer bar bushing so that the arrow mark is facing towards the front of the vehicle.

Text in Illustration

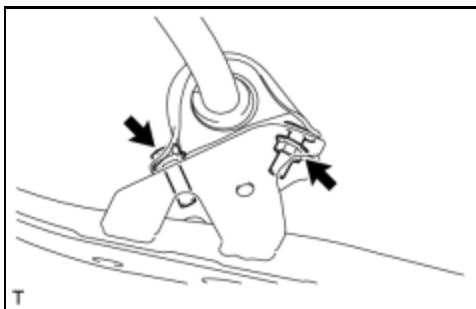
*a	Front of the Vehicle
*b	Outside of the Vehicle
*c	Stopper Ring
*d	Arrow
*1	Front No. 1 Stabilizer Bar Bushing

2. INSTALL FRONT NO. 1 STABILIZER BAR BUSHING (for RH Side)

HINT:

Perform the same procedure as the LH side.

3. INSTALL FRONT NO. 2 STABILIZER BRACKET LH



- (a) Install the front No. 2 stabilizer bracket LH to the rear body mounting cushion sub-assembly with the bolt and nut.

Bolt - Torque: 75 N·m (765 kgf·cm, 55ft·lbf)

Nut - Torque: 25 N·m (255 kgf·cm, 18ft·lbf)

4. INSTALL FRONT NO. 2 STABILIZER BRACKET RH

HINT:

Perform the same procedure as the LH side.

5. INSTALL REAR BODY MOUNTING CUSHION SUB-ASSEMBLY LH

- (a) Install the rear body mounting cushion sub-assembly LH and front stabilizer bar with the 4 new bolts.

Torque: 60 N·m (612 kgf·cm, 44ft·lbf)

6. INSTALL REAR BODY MOUNTING CUSHION SUB-ASSEMBLY RH

HINT:

Perform the same procedure as the LH side.

7. INSTALL FRONT STABILIZER LINK ASSEMBLY LH

- (a) Using a hexagon wrench 6 mm, fix the stud bolt, and install the front stabilizer link assembly LH to the front stabilizer bar with a new nut.

Torque: 46 N·m (469 kgf·cm, 34ft·lbf)

- (b) Using a hexagon wrench 6 mm, fix the stud bolt, and install the front stabilizer link assembly LH to the front shock absorber with coil spring with a new nut.

Torque: 46 N·m (469 kgf·cm, 34ft·lbf)

8. INSTALL FRONT STABILIZER LINK ASSEMBLY RH

HINT:

Perform the same procedure as the LH side.

9. INSTALL REAR ENGINE UNDER COVER LH INFO

10. INSTALL REAR ENGINE UNDER COVER RH

HINT:

Perform the same procedure as the LH side.

11. INSTALL NO. 2 ENGINE UNDER COVER INFO

12. INSTALL NO. 1 ENGINE UNDER COVER INFO

13. INSTALL FRONT WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

14. STABILIZE SUSPENSION INFO

15. INSPECT STEERING WHEEL CENTER POINT

16. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT

INFO

17. VSC SENSOR NEUTRAL MEMORIZATION

INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011DP03YX
Title: FRONT SUSPENSION: FRONT STABILIZER BAR: REMOVAL (2013 FR-S)		

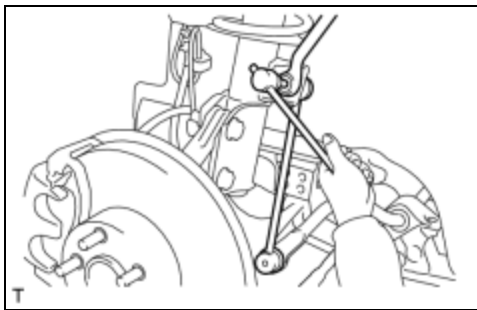
REMOVAL

1. REMOVE FRONT WHEEL
2. REMOVE NO. 1 ENGINE UNDER COVER [INFO](#)
3. REMOVE NO. 2 ENGINE UNDER COVER [INFO](#)
4. REMOVE REAR ENGINE UNDER COVER LH [INFO](#)
5. REMOVE REAR ENGINE UNDER COVER RH

HINT:

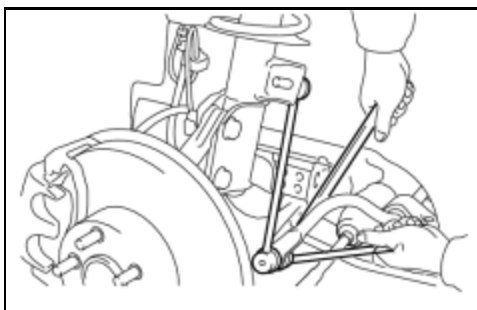
Perform the same procedure as the LH side.

6. REMOVE FRONT STABILIZER LINK ASSEMBLY LH



- (a) Using a socket hexagon 6 mm, fix the stud bolt, and remove the nut.

- (b) Remove the front stabilizer link assembly LH from the front shock absorber with coil spring.



- (c) Using a socket hexagon 6 mm, fix the stud bolt, and remove the nut.

- (d) Remove the front stabilizer link assembly LH from the front stabilizer bar.

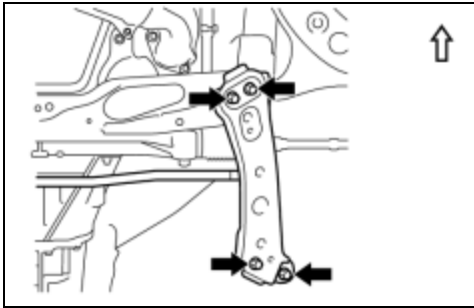
7. REMOVE FRONT STABILIZER LINK ASSEMBLY RH

HINT:



Perform the same procedure as the LH side.

8. REMOVE REAR BODY MOUNTING CUSHION SUB-ASSEMBLY LH

- (a) Remove the 4 bolts, and remove the front stabilizer bar and the body mounting cushion sub-assembly LH together.



Text in Illustration

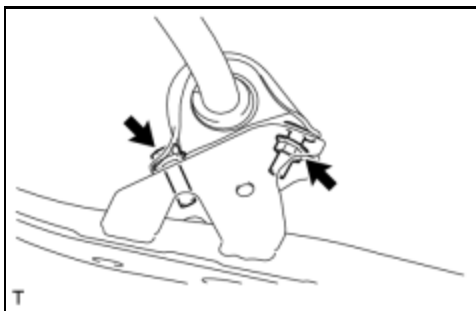
	Bolt
	Vehicle for front side

9. REMOVE REAR BODY MOUNTING CUSHION SUB-ASSEMBLY RH

HINT:

Perform the same procedure as the LH side.

10. REMOVE FRONT NO. 2 STABILIZER BRACKET LH



- (a) Remove the bolt, nut and front No. 2 stabilizer bracket LH from the rear body mounting cushion sub-assembly.

11. REMOVE FRONT NO. 2 STABILIZER BRACKET RH

HINT:

Perform the same procedure as the LH side.

12. REMOVE FRONT STABILIZER BAR

- (a) Remove the front stabilizer bar from the rear body mounting cushion sub-assembly.

13. REMOVE FRONT NO. 1 STABILIZER BAR BUSHING (for LH Side)

(a) Remove the front No. 1 stabilizer bar bushing from the front stabilizer bar.

14. REMOVE FRONT NO. 1 STABILIZER BAR BUSHING (for RH Side)

HINT:

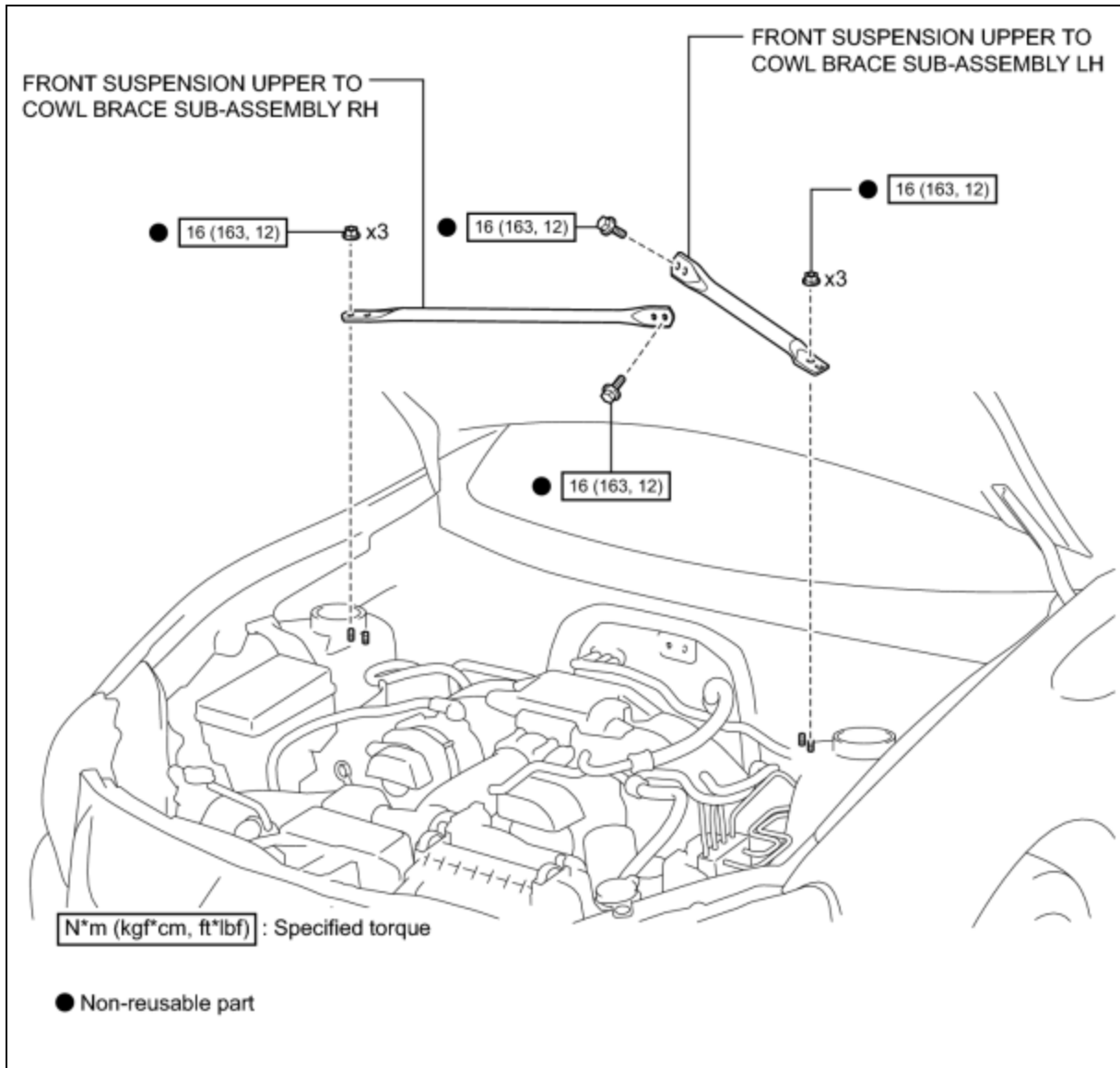
Perform the same procedure as the LH side.



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058PU000X
Title: FRONT SUSPENSION: FRONT STRUT BAR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058PT000X
Title: FRONT SUSPENSION: FRONT STRUT BAR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL FRONT SUSPENSION UPPER TO COWL BRACE SUB-ASSEMBLY LH

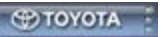
(a) Install the front suspension upper to cowl brace sub-assembly with the new bolt and 3 new nuts.

Torque: 16 N·m (163 kgf·cm, 12ft·lbf)

2. INSTALL FRONT SUSPENSION UPPER TO COWL BRACE SUB-ASSEMBLY RH

HINT:

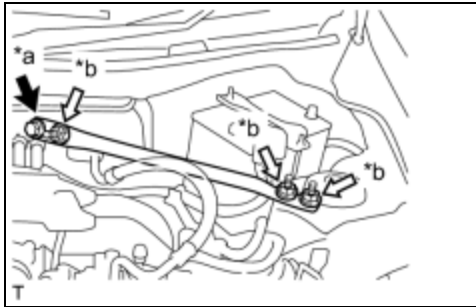
Use the same procedure for the RH side as for the LH side.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058PV000X
Title: FRONT SUSPENSION: FRONT STRUT BAR: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE FRONT SUSPENSION UPPER TO COWL BRACE SUB-ASSEMBLY LH



- (a) Remove the bolt, 3 nuts and the front suspension upper to cowl brace sub-assembly LH

Text in Illustration

*a	Bolt
*b	Nut

2. REMOVE FRONT SUSPENSION UPPER TO COWL BRACE SUB-ASSEMBLY RH

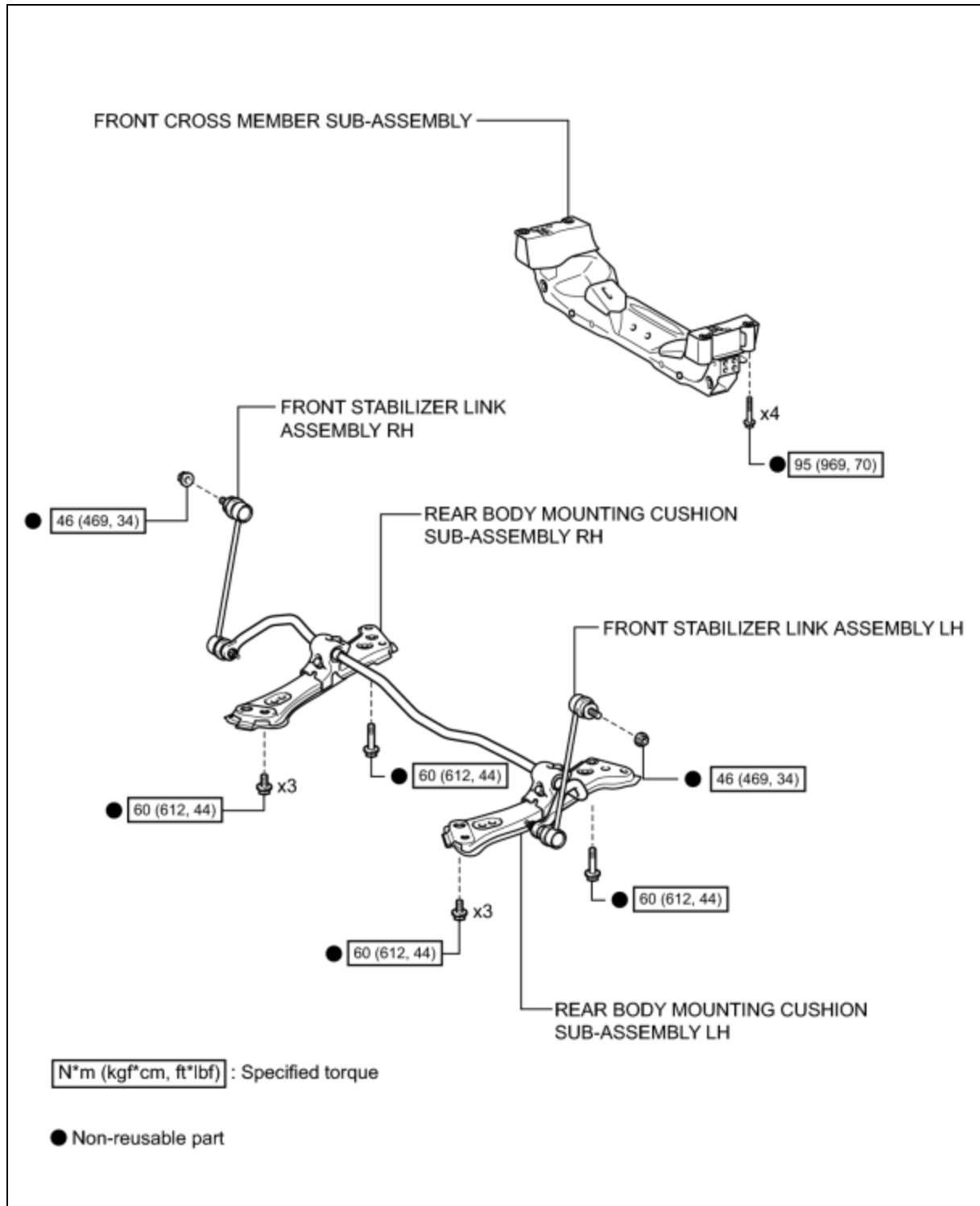
HINT:

Use the same procedure for the RH side as for the LH side.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000035CJ01DX
Title: FRONT SUSPENSION: FRONT SUSPENSION MEMBER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION

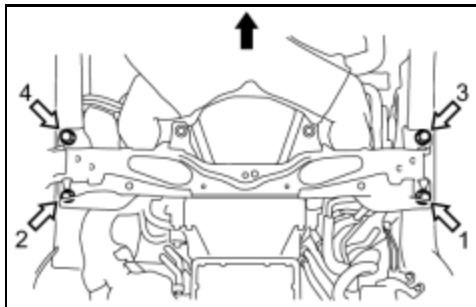


Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000034GK010X
Title: FRONT SUSPENSION: FRONT SUSPENSION MEMBER: INSTALLATION (2013 FR-S)		



INSTALLATION

1. INSTALL FRONT CROSS MEMBER SUB-ASSEMBLY

- (a) Tighten 4 new bolts in the order shown in the illustration, and temporarily install the front cross member sub-assembly.



Text in Illustration

	Front of vehicle
	Bolt

- (b) Tighten the 4 bolts.

Torque: 95 N·m (969 kgf·cm, 70ft·lbf)

2. ADJUST SHIFT LEVER POSITION (for Automatic Transmission)

NOTICE:

If the front cross member sub-assembly mounting bolts are loosened even if only slightly, check adjustment with the shift lever INFO.

3. INSTALL RACK AND PINION POWER STEERING GEAR ASSEMBLY

INFO

4. INSTALL REAR BODY MOUNTING CUSHION SUB-ASSEMBLY LH INFO

5. INSTALL REAR BODY MOUNTING CUSHION SUB-ASSEMBLY RH

HINT:

Perform the same procedure as the LH side.

6. INSTALL FRONT STABILIZER LINK ASSEMBLY LH INFO

7. INSTALL FRONT STABILIZER LINK ASSEMBLY RH

HINT:

Perform the same procedure as the LH side.

8. INSTALL FRONT LOWER SUSPENSION ARM ASSEMBLY LH

INFO

9. INSTALL FRONT LOWER SUSPENSION ARM ASSEMBLY RH

HINT:

Perform the same procedure as the LH side.

10. INSTALL ENGINE ASSEMBLY

INFO

11. INSPECT STEERING WHEEL CENTER POINT

12. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT

INFO

13. VSC SENSOR NEUTRAL MEMORIZATION

INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000034GL010X
Title: FRONT SUSPENSION: FRONT SUSPENSION MEMBER: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE ENGINE ASSEMBLY

INFO

2. REMOVE FRONT LOWER SUSPENSION ARM ASSEMBLY LH

INFO

3. REMOVE FRONT LOWER SUSPENSION ARM ASSEMBLY RH

HINT:

Perform the same procedure as the LH side.

4. SEPARATE FRONT STABILIZER LINK ASSEMBLY LH

INFO

5. SEPARATE FRONT STABILIZER LINK ASSEMBLY RH

HINT:

Perform the same procedure as the LH side.

6. REMOVE REAR BODY MOUNTING CUSHION SUB-ASSEMBLY LH

INFO

7. REMOVE REAR BODY MOUNTING CUSHION SUB-ASSEMBLY RH

HINT:

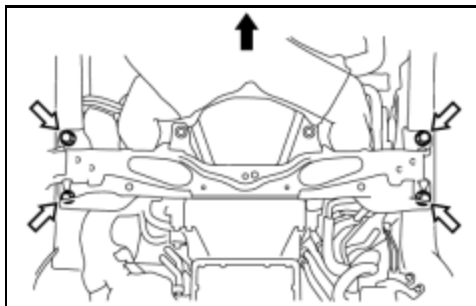
Perform the same procedure as the LH side.

8. REMOVE RACK AND PINION POWER STEERING GEAR ASSEMBLY



INFO

9. REMOVE FRONT CROSS MEMBER SUB-ASSEMBLY

- (a) Remove the 4 bolts and front cross member sub-assembly.



Text in Illustration

	Vehicle of front side
	Bolt

Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003CRU02CX
Title: FRONT SUSPENSION: FRONT SUSPENSION SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

Front Suspension System

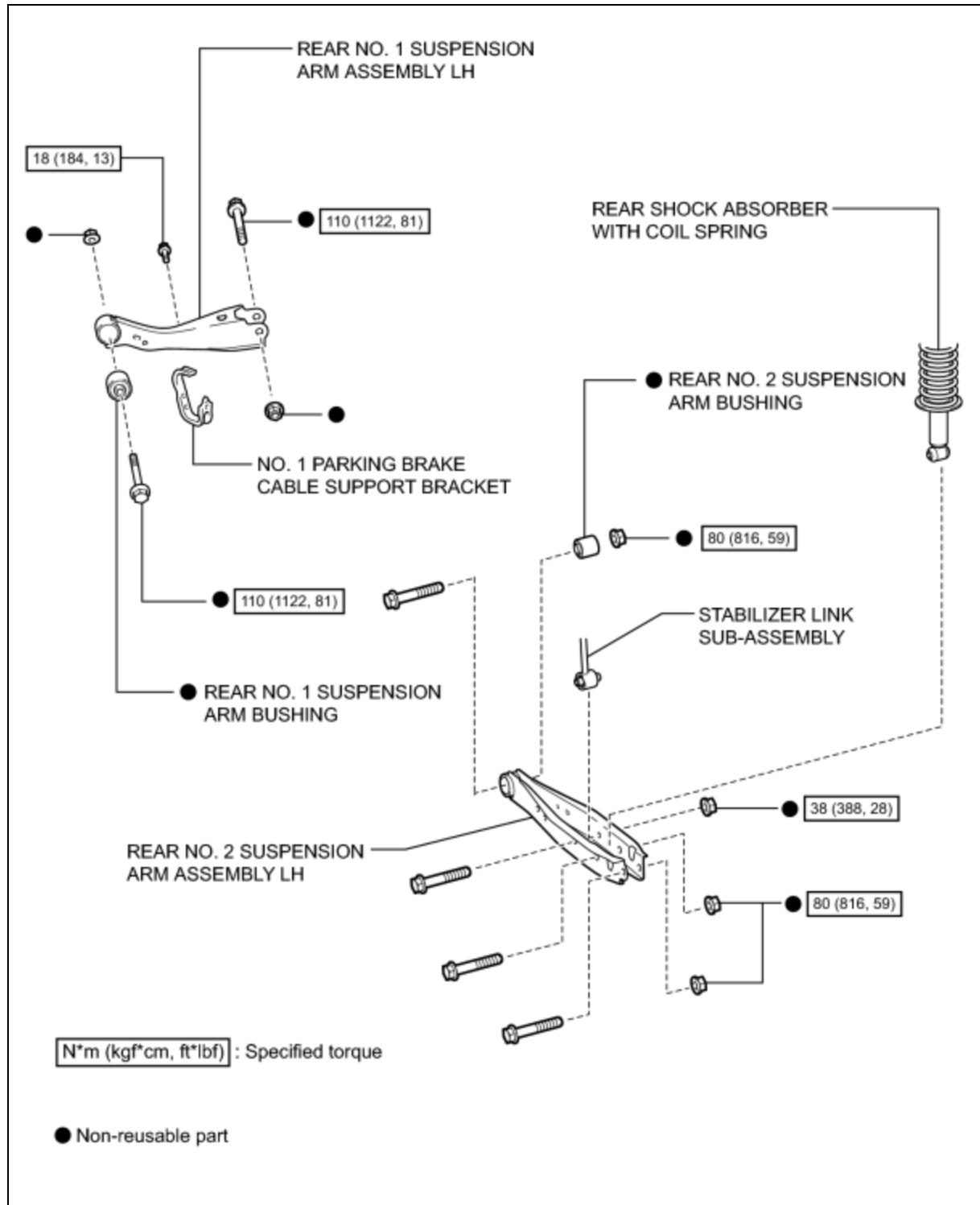
SYMPTOM	SUSPECTED AREA	SEE PAGE
Vehicle pulls to one side while driving	Tire (worn or improperly inflated)	INFO
	Front wheel alignment (incorrect)	INFO
	Rear wheel alignment (incorrect)	INFO
	Front hub bearing (worn)	INFO
	Front shock absorber (worn)	INFO
	Rear shock absorber (worn)	INFO
Bottoming	Vehicle (overloaded)	-
	Front shock absorber (worn)	INFO
	Rear shock absorber (worn)	INFO
Sways/pitches	Tire (worn or improperly inflated)	INFO
	Front shock absorber (worn)	INFO
	Rear shock absorber (worn)	INFO
Wheel shimmy	Tire (worn or improperly inflated)	INFO
	Wheel (out of balance)	INFO
	Front wheel alignment (incorrect)	INFO
	Front lower suspension arm (worn)	INFO
	Front shock absorber (worn)	INFO
	Front hub bearing (worn)	INFO
Abnormal tire wear	Tire (worn or improperly inflated)	INFO
	Wheel (out of balance)	INFO
	Front wheel alignment (incorrect)	INFO
	Rear wheel alignment (incorrect)	INFO



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IFT00EX
Title: REAR SUSPENSION: REAR LOWER ARM: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058XF000X
Title: REAR SUSPENSION: REAR LOWER ARM: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

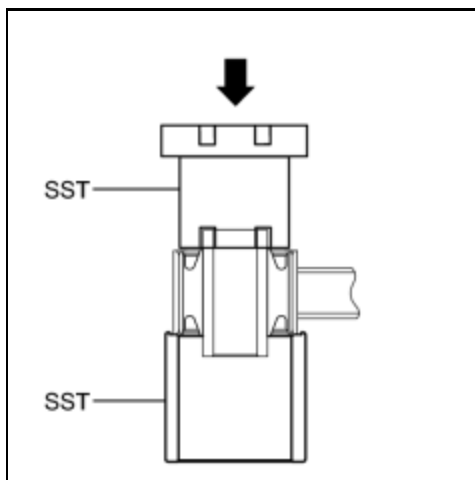
HINT:

- The procedure listed below is for the LH side.
- Use the same procedure for the RH and LH sides.

1. REMOVE REAR NO. 1 SUSPENSION ARM BUSHING

- (a) Using SST, remove the rear No. 1 suspension arm bushing from the rear No. 1 suspension arm assembly LH.

SST: 09710-18030



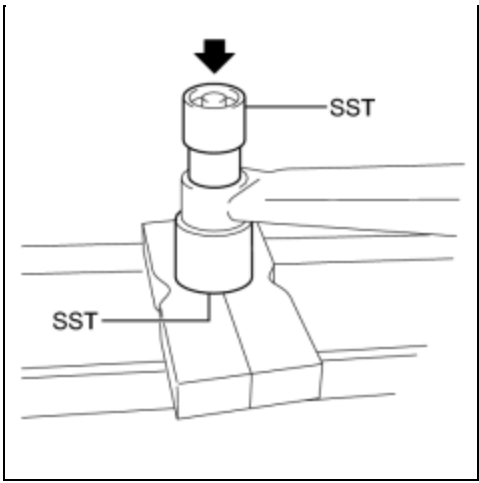
Text in Illustration

	Pressing direction
---	--------------------

2. REMOVE REAR NO. 2 SUSPENSION ARM BUSHING

- (a) Using SST, remove the rear No. 2 suspension arm bushing from the rear No. 2 suspension arm assembly LH.

SST: 09710-18020



Text in Illustration

	Pressing direction
---	--------------------

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IFS00EX
Title: REAR SUSPENSION: REAR LOWER ARM: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- The procedure listed below is for the LH side.
- Use the same procedure for the RH and LH sides.

1. TEMPORARILY INSTALL REAR NO. 2 SUSPENSION ARM ASSEMBLY LH

- (a) Temporarily install the rear No. 2 suspension arm assembly to the rear suspension member with the bolt and new nut.

NOTICE:

Insert the bolt from the front side of the vehicle.

- (b) Temporarily install the rear No. 2 suspension arm assembly to the axle carrier with the bolt and new nut.

NOTICE:

Insert the bolt from the front side of the vehicle.

2. TEMPORARILY INSTALL REAR SHOCK ABSORBER WITH COIL SPRING

- (a) Temporarily install the rear shock absorber with coil spring to the rear No. 2 suspension arm assembly LH with the bolt and new nut.

HINT:

The bolt may be inserted from either direction.

3. INSTALL STABILIZER LINK SUB-ASSEMBLY (for LH Side) INFO

4. TEMPORARILY INSTALL REAR NO. 1 SUSPENSION ARM ASSEMBLY LH

- (a) Temporarily install the rear No. 1 suspension arm assembly LH to the axle carrier with the new bolt and new nut.

NOTICE:

Insert the bolt from inside the vehicle.

- (b) Temporarily install the rear No. 1 suspension arm assembly LH to the rear suspension member with the new bolt and new nut.

NOTICE:

Insert the bolt from outside the vehicle.

5. STABILIZE SUSPENSION INFO

6. FULLY TIGHTEN REAR NO. 2 SUSPENSION ARM ASSEMBLY LH INFO

7. FULLY TIGHTEN REAR NO. 1 SUSPENSION ARM ASSEMBLY LH

- (a) Fully tighten the 2 bolt and 2 nut of the rear No. 1 suspension arm assembly LH.

Torque: 110 N·m (1122 kgf·cm, 81ft·lbf)

8. INSTALL NO. 1 PARKING BRAKE CABLE SUPPORT BRACKET

(a) Install the No. 1 parking brake cable support bracket with the bolt.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

9. INSTALL REAR WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

10. INSPECT AND ADJUST REAR WHEEL ALIGNMENT

INFO

11. VSC SENSOR NEUTRAL MEMORIZATION

INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058XG000X
Title: REAR SUSPENSION: REAR LOWER ARM: REASSEMBLY (2013 FR-S)		

REASSEMBLY

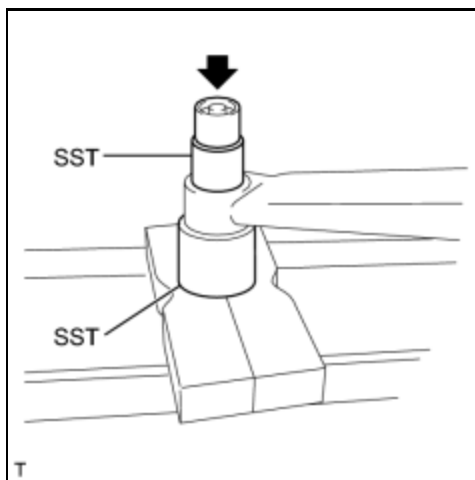
HINT:

- The procedure listed below is for the LH side.
- Use the same procedure for the RH and LH sides.


1. INSTALL REAR NO. 2 SUSPENSION ARM BUSHING

- (a) Using SST and a press, install a new rear No. 2 suspension arm bushing to the rear No. 2 suspension arm assembly LH.

SST: 09710-18020



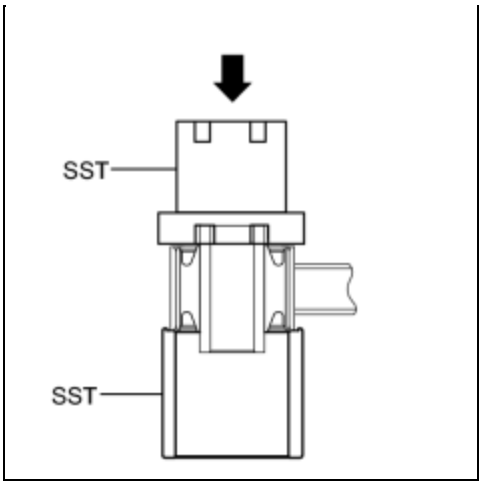
Text in Illustration

	Pressing direction
---	--------------------

2. INSTALL REAR NO. 1 SUSPENSION ARM BUSHING

- (a) Using SST and a press, install a new rear No. 1 suspension arm bushing to the rear No. 1 suspension arm assembly LH.

SST: 09710-18030



Text in Illustration

	Pressing direction
---	--------------------

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IFU00EX
Title: REAR SUSPENSION: REAR LOWER ARM: REMOVAL (2013 FR-S)		

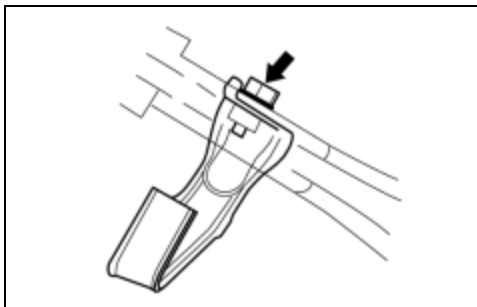
REMOVAL

HINT:

- The procedure listed below is for the LH side.
- Use the same procedure for the RH and LH sides.

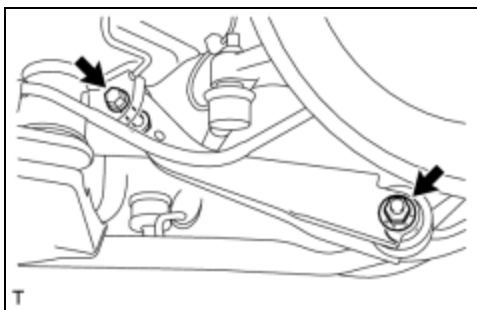
1. REMOVE REAR WHEEL

2. REMOVE NO. 1 PARKING BRAKE CABLE SUPPORT BRACKET



- (a) Remove the bolt and No.1 parking brake cable support bracket.

3. REMOVE REAR NO. 1 SUSPENSION ARM ASSEMBLY LH



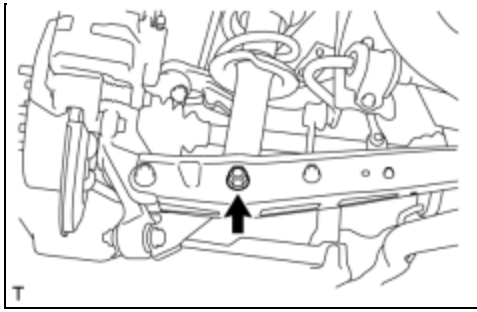
- (a) Remove the 2 bolts, 2 nuts and the rear No. 1 suspension arm assembly LH.

4. SEPARATE STABILIZER LINK SUB-ASSEMBLY (for LH Side)

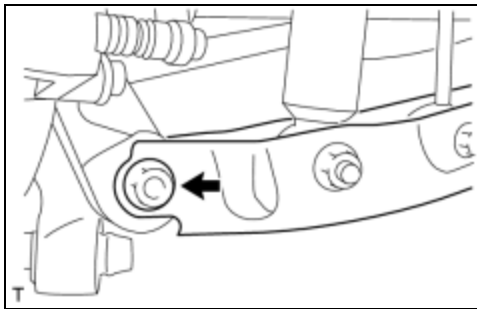
INFO

5. SEPARATE REAR SHOCK ABSORBER WITH COIL SPRING

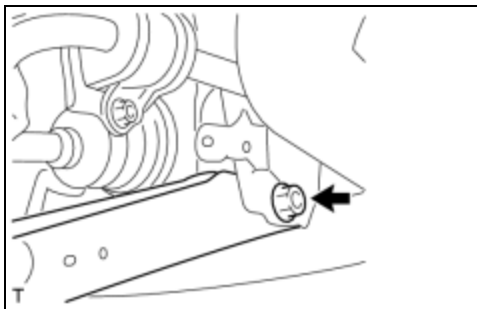
- (a) Remove the bolt, nut and separate the rear shock absorber with coil spring from the rear No. 2 suspension arm assembly.



6. REMOVE REAR NO. 2 SUSPENSION ARM ASSEMBLY LH



- (a) Remove the nut and bolt on the axle carrier side, and then separate the rear No. 2 suspension arm assembly LH.

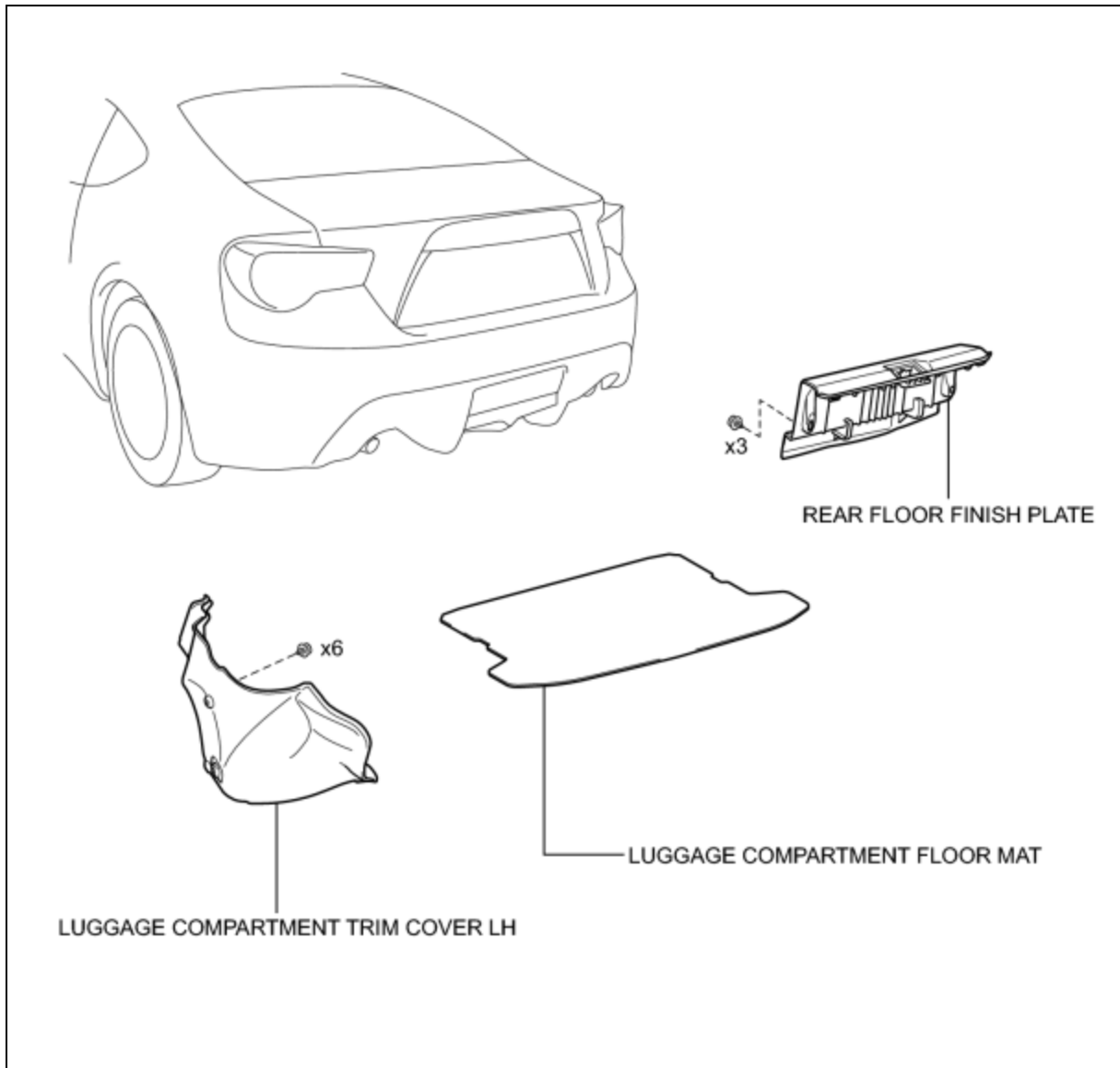


- (b) Remove the bolt and nut on the rear suspension member side, and then remove the rear No. 2 suspension arm assembly LH.

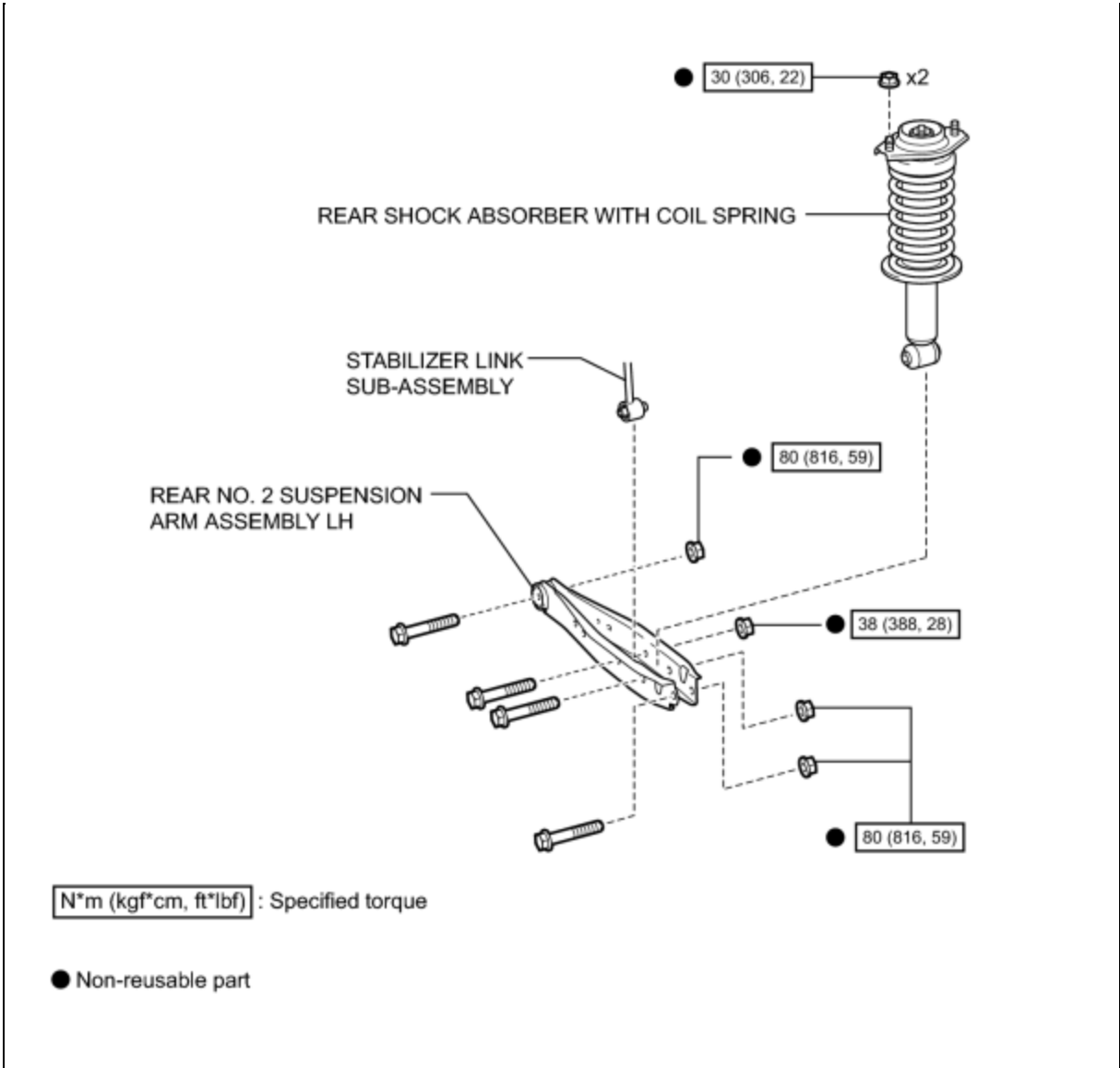
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IG500DX
Title: REAR SUSPENSION: REAR SHOCK ABSORBER: COMPONENTS (2013 FR-S)		

COMPONENTS

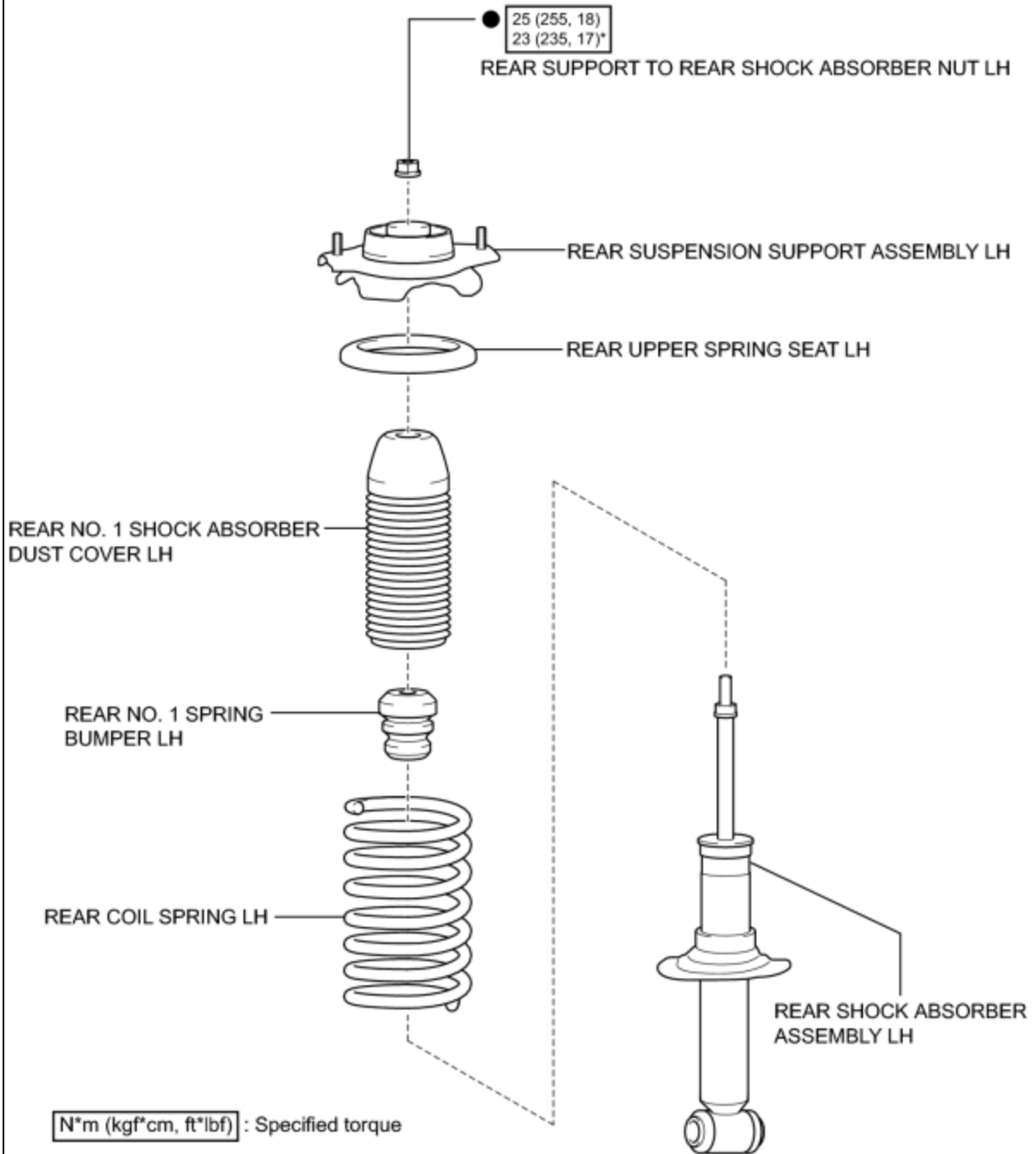
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION



● Non-reusable part

*For use with SST

T

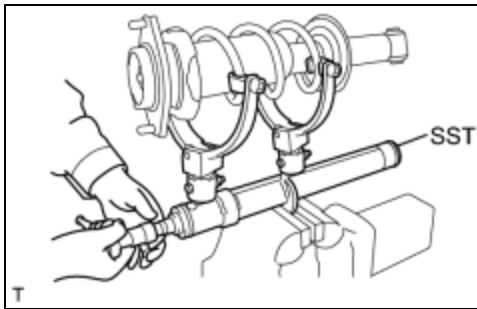
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058XC000X
Title: REAR SUSPENSION: REAR SHOCK ABSORBER: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. REMOVE REAR SUPPORT TO REAR SHOCK ABSORBER NUT LH



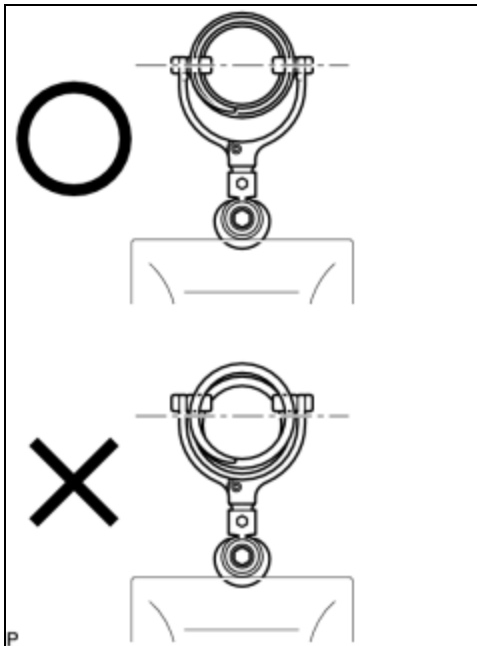
(a) Secure the SST in a vise.

SST: 09727-30021

09727-00010

09727-00021

09727-00031



(b) Set the arm hooks of SST on the middle line on the spring outer circumference.

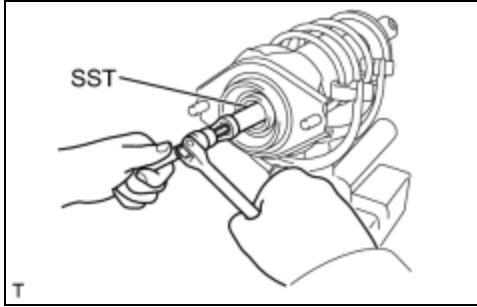
CAUTION:

- Install SST to the rear coil spring LH so that the distance between the upper and lower hooks is as wide as possible within the installation area.
- Check that the claws of the hooks are attached securely.

(c) Using SST, compress the rear coil spring LH.

CAUTION:

- During the work, if the rear coil spring LH is arched, immediately stop the work and reset SST.
- Do not compress the spring until each coil contacts each other.
- Do not use an impact wrench.



- (d) After the rear coil spring LH becomes free of load, install SST to the rear support to rear shock absorber nut LH. And then, using a long socket hexagon 5 mm, hold the piston rod of the rear shock absorber assembly and remove the rear support to rear shock absorber nut LH.

SST: 09729-18010

CAUTION:

When the rear coil spring LH is still applied with load, do not remove the rear support to rear shock absorber nut LH.

NOTICE:

- Be careful not to damage or deform the threads.
- Securely set the long socket hexagon 5 mm.

2. REMOVE REAR SUSPENSION SUPPORT ASSEMBLY LH

- (a) Remove the rear suspension support assembly LH from rear shock absorber assembly LH.

3. REMOVE REAR UPPER SPRING SEAT LH

- (a) Remove the rear upper spring seat LH from the rear suspension support assembly LH.

4. REMOVE REAR COIL SPRING LH

- (a) Remove the rear coil spring from the rear shock absorber assembly LH. Release the SST and remove the rear coil spring.

CAUTION:

Do not use an impact wrench. It will damage.

5. REMOVE REAR NO. 1 SHOCK ABSORBER DUST COVER LH

- (a) Remove the rear No. 1 shock absorber dust cover LH from the rear shock absorber assembly LH.

6. REMOVE REAR NO. 1 SPRING BUMPER LH

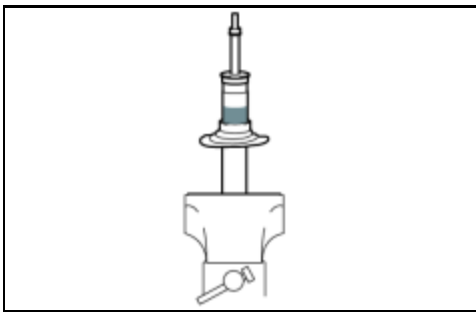
- (a) Remove the rear No. 1 spring bumper LH from the rear shock absorber assembly LH.

Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IG300DX
Title: REAR SUSPENSION: REAR SHOCK ABSORBER: DISPOSAL (2013 FR-S)		


DISPOSAL

1. DISPOSE OF REAR SHOCK ABSORBER ASSEMBLY LH

- (a) Hold the rear shock absorber assembly LH perpendicularly.
- (b) Push down the piston rod about 60 mm (2.362 in.) by hand.
- (c) Using a metal saw or the like, slowly cut a hole in the location shown in the illustration and let the gas out.



Text in Illustration

	Area to cut a hole
---	--------------------

NOTICE:

- Wear protective glasses.
- Since the discharging gas may cause chips to scatter, cover the metal saw with a piece of cloth when making the hole.

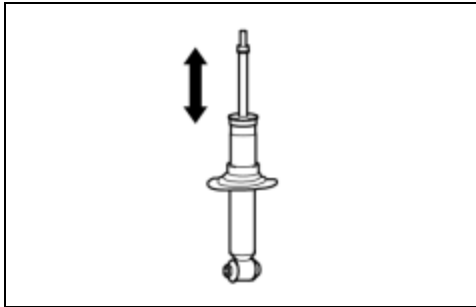
HINT:

The gas is colorless, odorless and harmless.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058XB000X
Title: REAR SUSPENSION: REAR SHOCK ABSORBER: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT REAR SHOCK ABSORBER ASSEMBLY LH



(a) Check of the rear shock absorber assembly LH

- (1) Compress and extend the shock absorber rod and check the conditions.

Standard:

Compress and extend the shock absorber rod at a constant speed, and check that the operating load is even at all strokes and that there is no abnormal resistance or abnormal sound during the operation.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IG400DX
Title: REAR SUSPENSION: REAR SHOCK ABSORBER: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- The procedure listed below is for the LH side.
- Use the same procedure for the RH and LH sides.

1. INSTALL REAR SHOCK ABSORBER WITH COIL SPRING

- Mount the rear shock absorber with coil spring on the vehicle.
- Install rear shock absorber with coil spring with the 2 new nuts.

Torque: 30 N·m (306 kgf·cm, 22ft·lbf)

2. TEMPORARILY INSTALL REAR NO. 2 SUSPENSION ARM ASSEMBLY LH

- Replace the mounting nuts of the rear No. 2 suspension arm assembly LH and rear suspension member sub-assembly with new nut and then temporarily tighten them.
- Temporarily install the rear No. 2 suspension arm assembly LH to the rear axle carrier sub-assembly LH with the bolt and new nut.

NOTICE:

Insert the bolt from the front of the vehicle.

- Temporarily install the rear shock absorber with coil spring with the bolt and new nut.

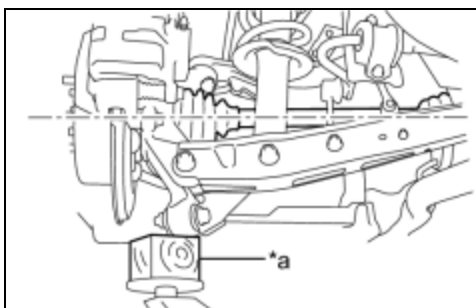
HINT:

The bolt may be inserted from either direction.

3. TEMPORARILY INSTALL STABILIZER LINK SUB-ASSEMBLY (for LH Side)

- Temporarily install the rear stabilizer link sub-assembly to the rear No. 2 suspension arm assembly LH with the bolt and new nut.

4. STABILIZE SUSPENSION



- Jack up the axle carrier, with a wooden block placed between the jack and axle carrier, to apply load to the suspension so that the rear drive shaft assembly becomes level.

Text in Illustration

*a	Wooden Block
----	--------------

5. FULLY TIGHTEN REAR NO. 2 SUSPENSION ARM ASSEMBLY LH

- Fully tighten the nut on the rear axle carrier sub-assembly LH side.

Torque: 80 N·m (816 kgf·cm, 59ft·lbf)

- (b) Fully tighten the nut holding the rear shock absorber.

Torque: 80 N·m (816 kgf·cm, 59ft·lbf)

- (c) Fully tighten the nut on the rear suspension member sub-assembly side.

Torque: 80 N·m (816 kgf·cm, 59ft·lbf)

6. FULLY TIGHTEN STABILIZER LINK SUB-ASSEMBLY

- (a) Fully tighten the nut rear stabilizer link sub-assembly side.

Torque: 38 N·m (388 kgf·cm, 28ft·lbf)

7. INSTALL REAR WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

8. INSTALL LUGGAGE COMPARTMENT TRIM COVER LH INFO

9. INSTALL REAR FLOOR FINISH PLATE INFO

10. INSTALL LUGGAGE COMPARTMENT FLOOR MAT

11. INSPECT AND ADJUST REAR WHEEL ALIGNMENT

INFO

12. VSC SENSOR NEUTRAL MEMORIZATION

INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058XD000X
Title: REAR SUSPENSION: REAR SHOCK ABSORBER: REASSEMBLY (2013 FR-S)		

REASSEMBLY

HINT:

- The procedure listed below is for the LH side.
- Use the same procedure for the RH and LH sides.

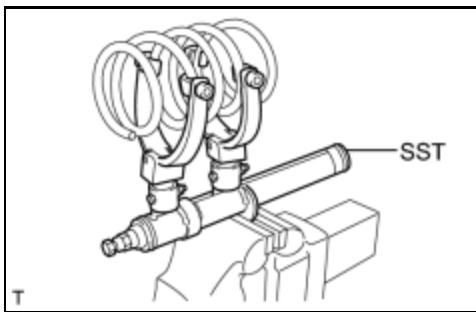
1. INSTALL REAR NO. 1 SPRING BUMPER LH

- (a) Install the rear No. 1 spring bumper LH to the rear shock absorber assembly LH.

2. INSTALL REAR NO. 1 SHOCK ABSORBER DUST COVER LH

- (a) Install the rear No. 1 shock absorber dust cover LH to the rear shock absorber assembly LH.

3. INSTALL REAR COIL SPRING LH



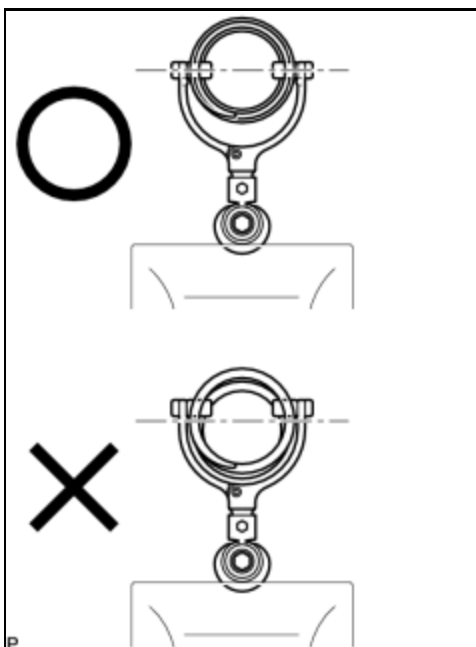
- (a) Secure the SST in a vise.

SST: 09727-30021

09727-00010

09727-00021

09727-00031



- (b) Set the arm hooks of SST on the middle line on the spring outer circumference.

CAUTION:

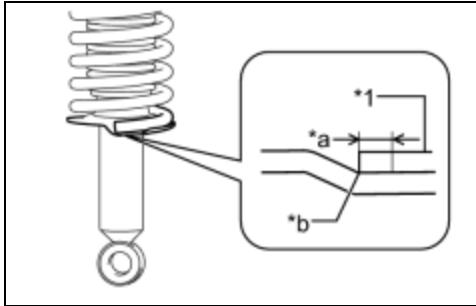
- Install SST to the rear coil spring LH so that the distance between the upper and lower hooks is as wide as possible within the installation area.
- Check that the claws of the hooks are attached securely.

(c) Using SST, compress the rear coil spring LH.

CAUTION:

- During the work, if the rear coil spring LH is arched, immediately stop the work and reset SST.
- Do not compress the spring until each coil contacts each other.
- Do not use an impact wrench.

(d) Install the rear coil spring LH with the lower end of the coil spring and the stopper of the spring seat fit.



HINT:

Fit the lower end of the rear coil spring LH into the gap of the absorber lower seat.

Text in Illustration

*1	Rear Coil Spring LH
*a	0 to 10 mm (0 to 0.394 in.)
*b	Stopper of spring seat

4. INSTALL REAR UPPER SPRING SEAT LH

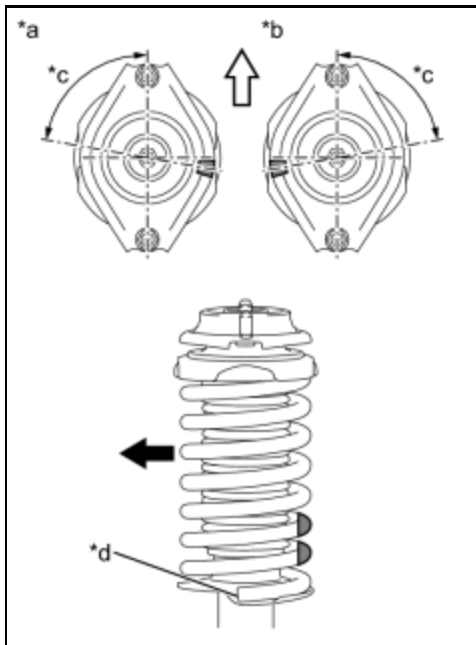
(a) Install the rear upper spring seat LH to the rear coil spring LH.

5. INSTALL REAR SUSPENSION SUPPORT ASSEMBLY LH



(a) Install the rear suspension support assembly LH to the rear shock absorber assembly LH.

6. INSTALL REAR SUPPORT TO REAR SHOCK ABSORBER NUT LH

(a) Temporarily tighten a new rear support to rear shock absorber nut LH to the rear shock absorber assembly LH.



Text in Illustration

*a	for LH side
*b	for RH side
*c	75 to 85°
*d	Lower End
	Outside of the Vehicle
	Front of the Vehicle

(b) Adjust the rear suspension support assembly LH to the installation position of the shock absorber so that the studs are positioned as shown in the illustration.

NOTICE:

Make sure that the left coil spring end faces toward the front of the vehicle and the right spring end faces toward the rear.

(c) Release SST and remove it from the rear coil spring LH.

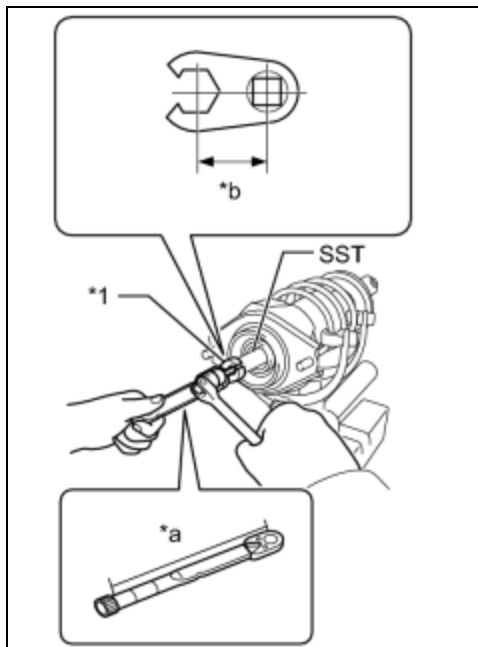
CAUTION:

Do not use an impact wrench

NOTICE:

Remove SST after confirming the position of the suspension support assembly.

(d) Install SST to the rear support to rear shock absorber nut LH. And then, using a long socket hexagon 5 mm, hold the piston rod of the rear shock absorber assembly LH, and tighten the rear support to rear shock absorber nut LH using a union nut wrench 14 mm.



Text in Illustration

*1	Union nut wrench 14 mm
*a	Fulcrum length
*b	25 mm (0.984 in.)

SST: 09729-18010

without SST - Torque: 25 N·m (255 kgf·cm, 18ft·lbf)

with SST - Torque: 23 N·m (235 kgf·cm, 17ft·lbf)

NOTICE:

- Use a torque wrench with a fulcrum length of 300 mm (11.81 in.)
- Be careful not to damage or deform the threads.
- Securely set the long socket hexagon 5 mm.

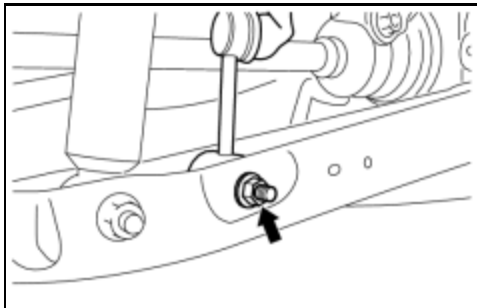
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IG600DX
Title: REAR SUSPENSION: REAR SHOCK ABSORBER: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

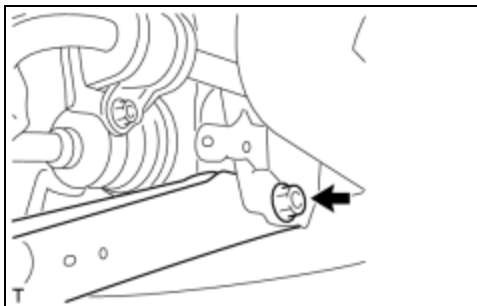
- The procedure listed below is for the LH side.
- Use the same procedure for the RH and LH sides.

1. REMOVE LUGGAGE COMPARTMENT FLOOR MAT
2. REMOVE REAR FLOOR FINISH PLATE [INFO](#)
3. REMOVE LUGGAGE COMPARTMENT TRIM COVER INNER LH [INFO](#)
4. REMOVE REAR WHEEL
5. SEPARATE STABILIZER LINK SUB-ASSEMBLY (for LH Side)



- (a) Remove the bolt, nut and separate the rear stabilizer link sub-assembly from the rear No. 2 suspension arm assembly LH.

6. SEPARATE REAR NO. 2 SUSPENSION ARM ASSEMBLY LH

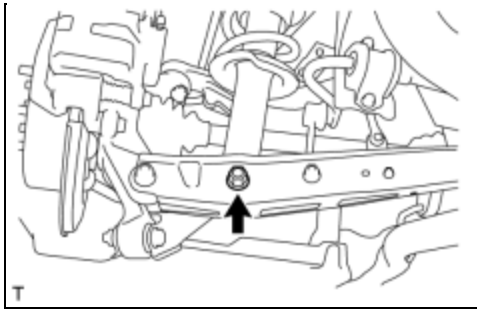


- (a) Loosen the nut on the rear suspension member side.

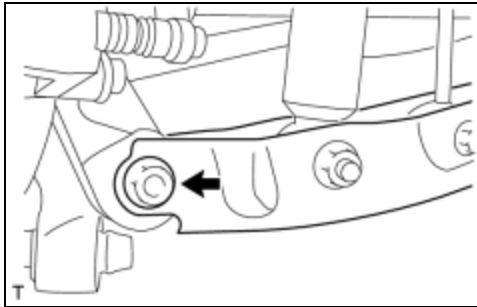
NOTICE:

Do not remove the nut.

- (b) Remove the bolt, nut and separate the rear shock absorber with coil spring from the rear No. 2 suspension

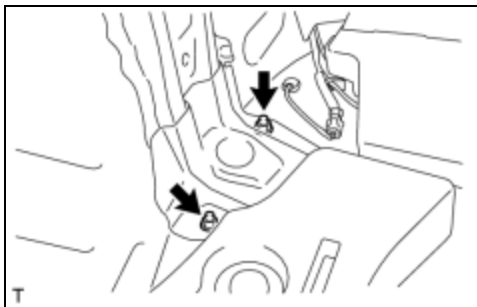


arm assembly LH.



- (c) Remove the bolt, nut and separate the rear axle carrier sub-assembly LH from the rear No. 2 suspension arm assembly LH.

7. REMOVE REAR SHOCK ABSORBER WITH COIL SPRING



- (a) Remove the 2 nuts and rear shock absorber with coil spring.

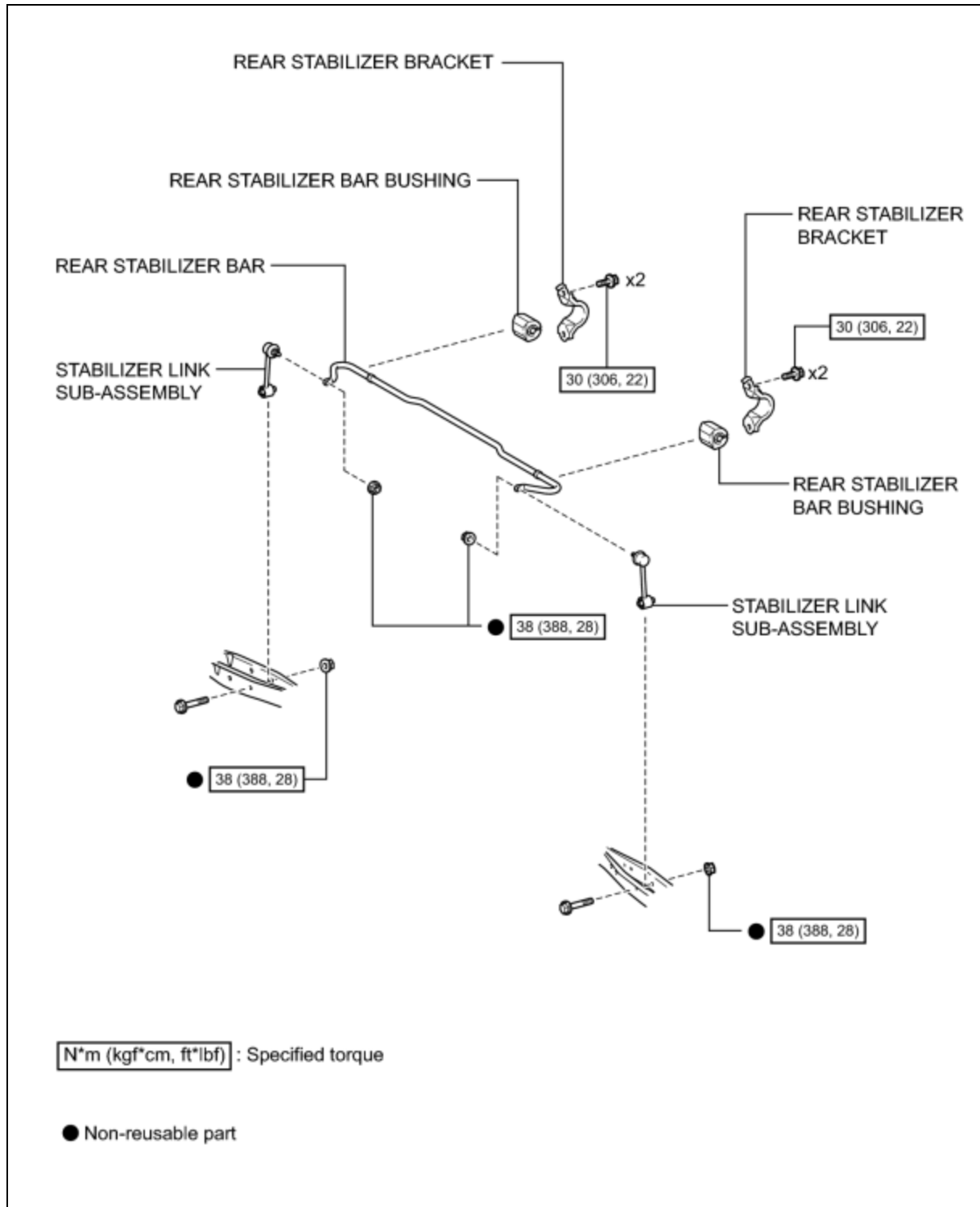
NOTICE:

Hold the rear shock absorber with coil spring to prevent it from falling accidentally.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000031FZ00FX
Title: REAR SUSPENSION: REAR STABILIZER BAR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



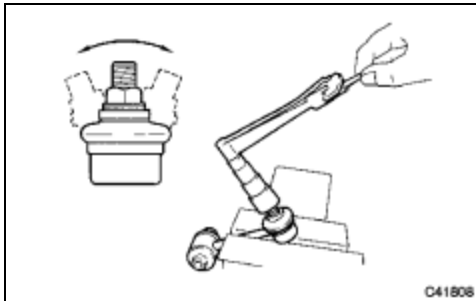
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058XJ000X
Title: REAR SUSPENSION: REAR STABILIZER BAR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT STABILIZER LINK SUB-ASSEMBLY

(a) Inspect the state of rotation of the ball joint.

(1) Temporarily install the attaching nut to the stud of the rear stabilizer link assembly.



(2) Turn the stud back and forth.

Standard:

There is no unusual resistance or play.

(3) If there is unusual resistance or play, replace the rear stabilizer link assembly with a new one.

(b) Inspect the dust cover.

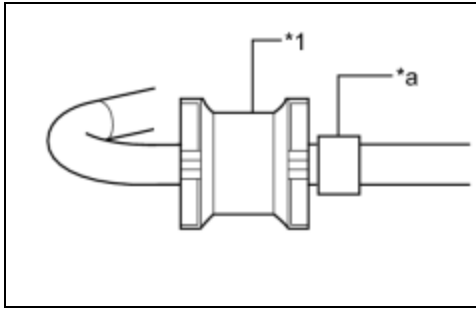
(1) Check that the dust cover is not cracked and that there is no grease on it.

(2) If the dust cover is fissured or grease is leaked, replace the rear stabilizer link assembly with a new one.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000031FY00FX
Title: REAR SUSPENSION: REAR STABILIZER BAR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL REAR STABILIZER BAR BUSHING (for LH Side)



- (a) Install the rear stabilizer bar bushing to the outside of the stopper ring on the rear stabilizer bar as shown in the illustration.

Text in Illustration

*1	Rear Stabilizer Bar Bushing
*a	Stopper Ring

2. INSTALL REAR STABILIZER BAR BUSHING (for RH Side)

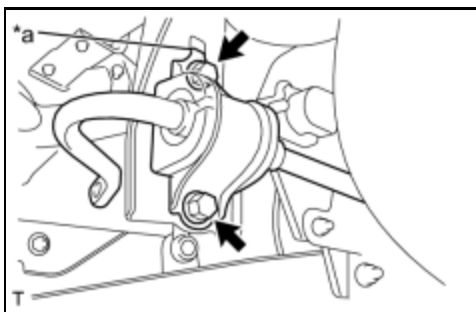
HINT:

Use the same procedure described for the LH side.

3. INSTALL REAR STABILIZER BAR

- (a) Install the rear stabilizer bar to the rear suspension member.

4. INSTALL REAR STABILIZER BRACKET (for LH Side)



- (a) Install the rear stabilizer bracket with the 2 bolts.

Text in Illustration

*a	Crow
----	------

Torque: 30 N·m (306 kgf·cm, 22ft·lbf)

NOTICE:

Install the rear stabilizer bracket with its claw facing upper.

5. INSTALL REAR STABILIZER BRACKET (for RH Side)

HINT:

Use the same procedure described for the LH side.

6. INSTALL STABILIZER LINK SUB-ASSEMBLY (for LH Side)

- (a) Install the rear stabilizer link sub-assembly to the rear stabilizer bar
 (b) Using a socket hexagon 5 mm, hold the stud bolt and tighten the nut.

Torque: 38 N·m (388 kgf·cm, 28ft·lbf)

- (c) Temporarily install the rear stabilizer link sub-assembly to the rear No. 2 suspension arm assembly LH with the bolt and a new nut.

7. INSTALL STABILIZER LINK SUB-ASSEMBLY (for RH Side)

HINT:

Use the same procedure described for the LH side.

8. INSTALL REAR WHEELS

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

9. STABILIZE SUSPENSION

10. FULLY TIGHTEN STABILIZER LINK SUB-ASSEMBLY (for LH Side)

- (a) Install the rear stabilizer link sub-assembly to the rear No. 2 suspension arm assembly LH with the bolt and nut.

Torque: 38 N·m (388 kgf·cm, 28ft·lbf)

11. FULLY TIGHTEN STABILIZER LINK SUB-ASSEMBLY (for RH Side)

HINT:

Use the same procedure described for the LH side.

12. INSPECT AND ADJUST REAR WHEEL ALIGNMENT

INFO

13. VSC SENSOR NEUTRAL MEMORIZATION

INFO

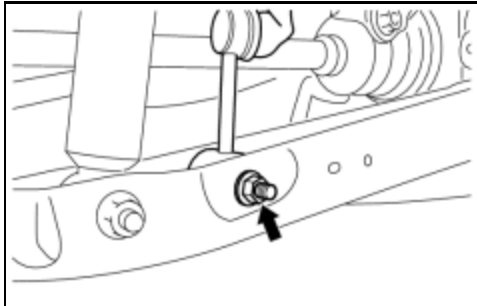


Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IG000FX
Title: REAR SUSPENSION: REAR STABILIZER BAR: REMOVAL (2013 FR-S)		

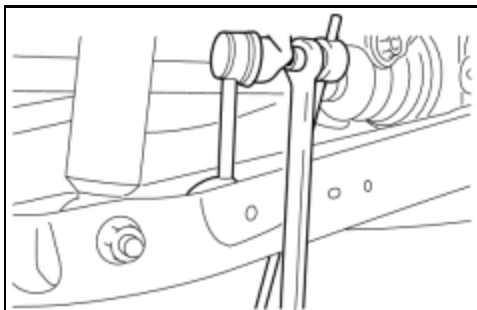
REMOVAL

1. REMOVE REAR WHEELS

2. REMOVE STABILIZER LINK SUB-ASSEMBLY (for LH Side)



- (a) Remove the bolt, nut and separate the stabilizer link sub-assembly from the rear No. 2 suspension arm assembly LH.



- (b) Using a socket hexagon 5 mm, hold the stud bolt and remove the nut and stabilizer link sub-assembly from the rear stabilizer bar.

HINT:

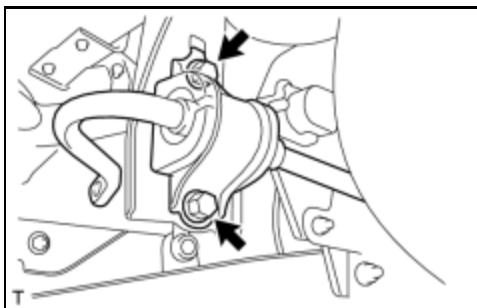
Using a socket hexagon wrench 5 mm to hold the stud.

3. REMOVE STABILIZER LINK SUB-ASSEMBLY (for RH Side)

HINT:

Use the same procedure described for the LH side.

4. REMOVE REAR STABILIZER BRACKET (for LH Side)



- (a) Remove the 2 bolts and rear stabilizer bracket.

5. REMOVE REAR STABILIZER BRACKET (for RH Side)

HINT:

Use the same procedure described for the LH side.

6. REMOVE REAR STABILIZER BAR

- (a) Remove the 2 rear stabilizer bushings and the rear stabilizer bar.

7. REMOVE REAR STABILIZER BAR BUSHING (for LH Side)

- (a) Remove the rear stabilizer bar bushing from the rear stabilizer bar.

8. REMOVE REAR STABILIZER BAR BUSHING (for RH Side)

HINT:

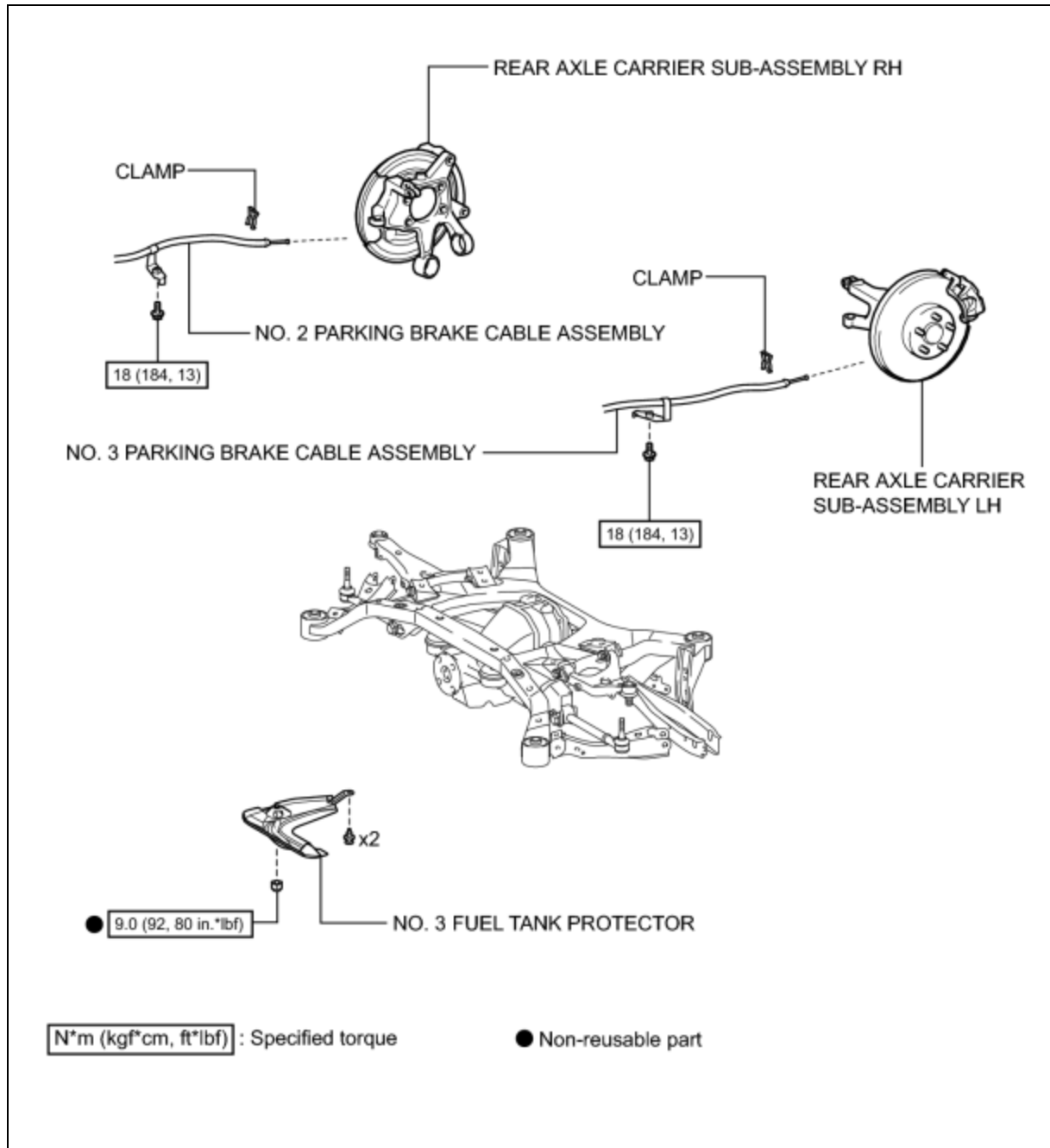
Use the same procedure described for the LH side.



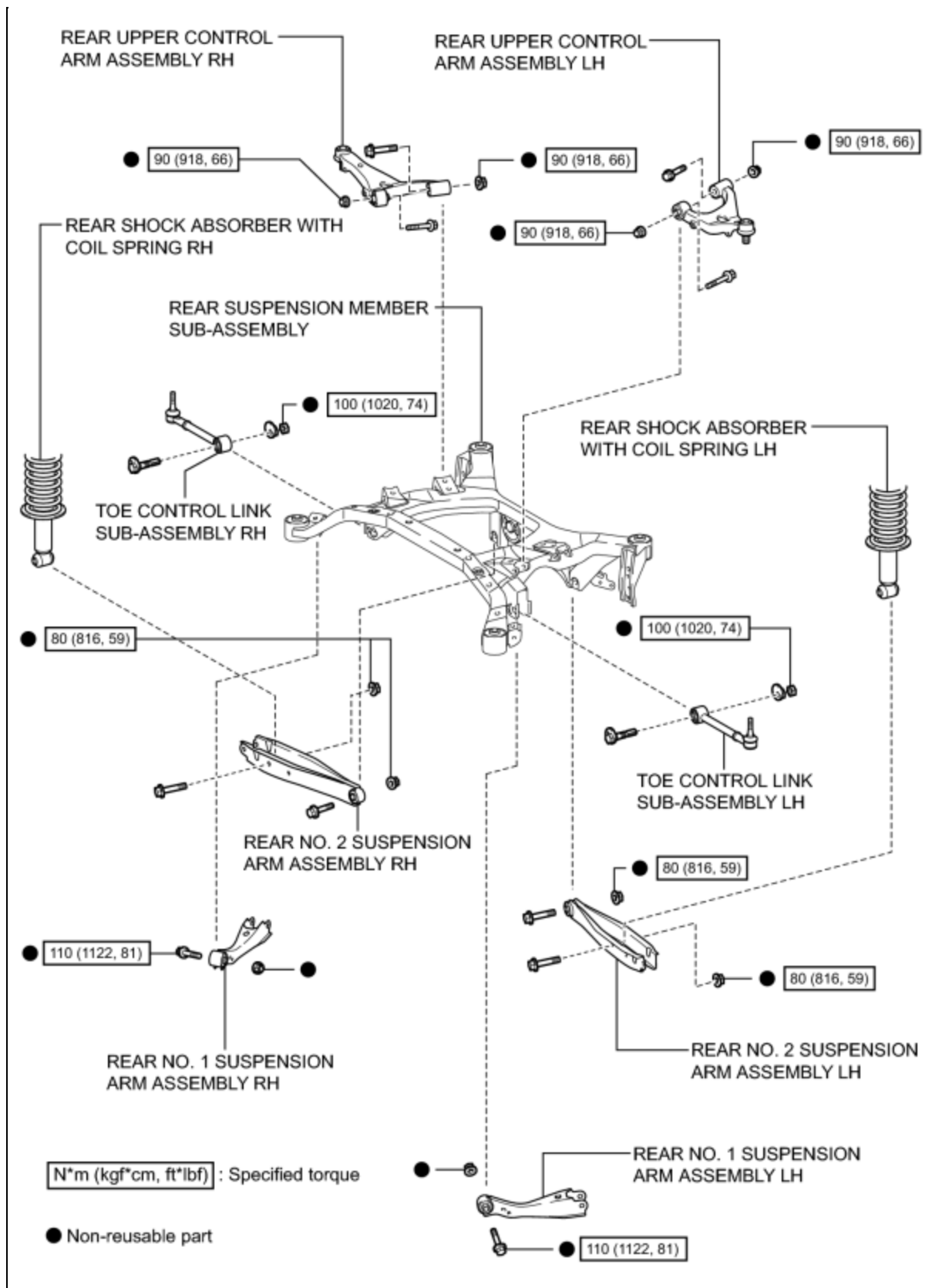
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000031FQ00DX
Title: REAR SUSPENSION: REAR SUSPENSION MEMBER: COMPONENTS (2013 FR-S)		

COMPONENTS

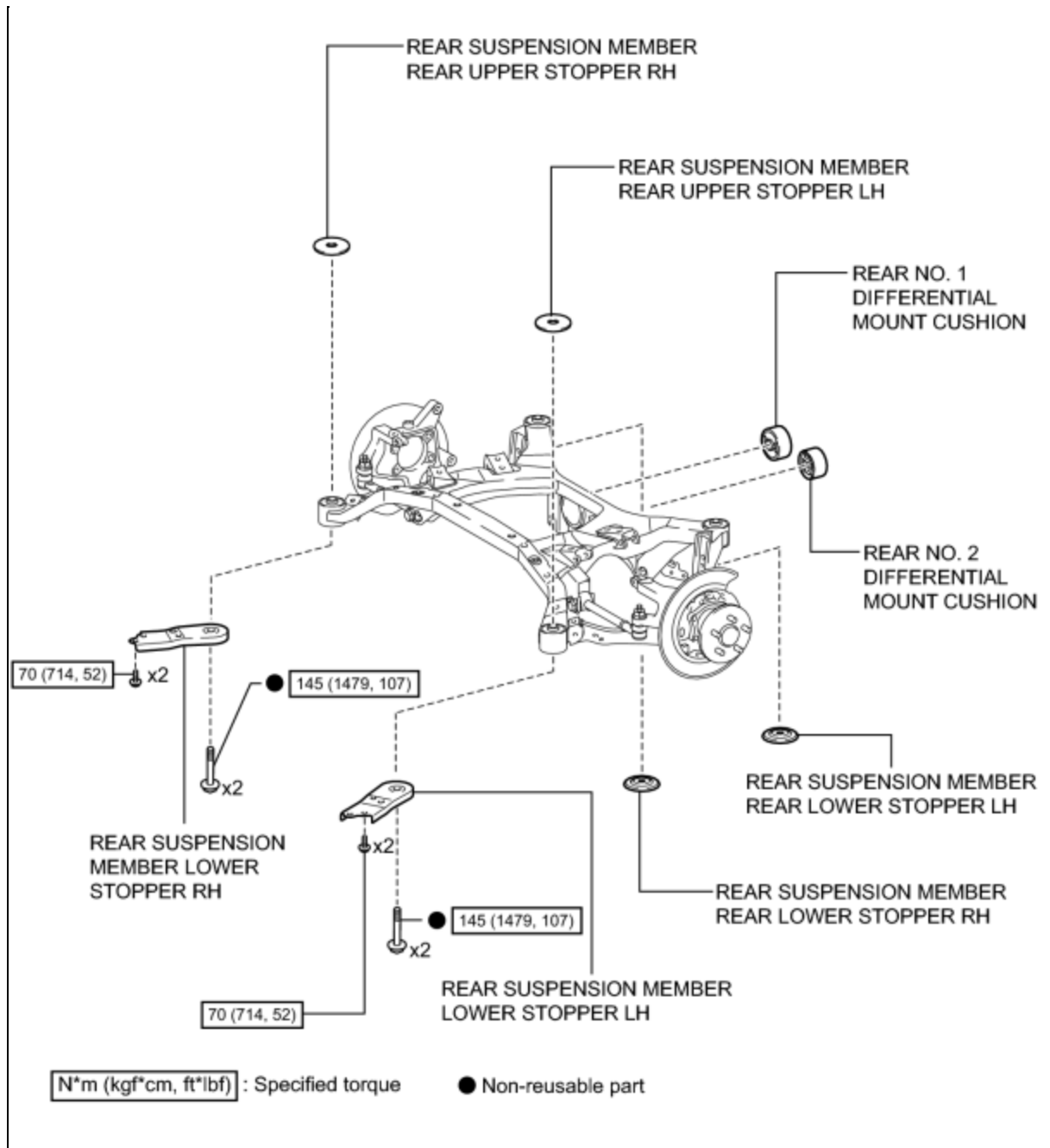
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IFP00JX
Title: REAR SUSPENSION: REAR SUSPENSION MEMBER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL REAR NO. 1 DIFFERENTIAL MOUNT CUSHION

[INFO](#)

2. INSTALL REAR NO. 2 DIFFERENTIAL MOUNT CUSHION

[INFO](#)

3. TEMPORARILY INSTALL REAR UPPER CONTROL ARM ASSEMBLY LH

[INFO](#)

4. TEMPORARILY INSTALL REAR UPPER CONTROL ARM ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

5. INSTALL REAR SUSPENSION MEMBER SUB-ASSEMBLY

- (a) Support the rear suspension member sub-assembly with an engine lifter using 4 attachments or equivalent tools.

NOTICE:

- Make sure to secure the rear suspension member sub-assembly to prevent it from dropping.
- Use the attachments to keep the rear suspension member sub-assembly level.

- (b) Raise the rear suspension member sub-assembly until there is no clearance between the rear suspension member sub-assembly and the vehicle body.

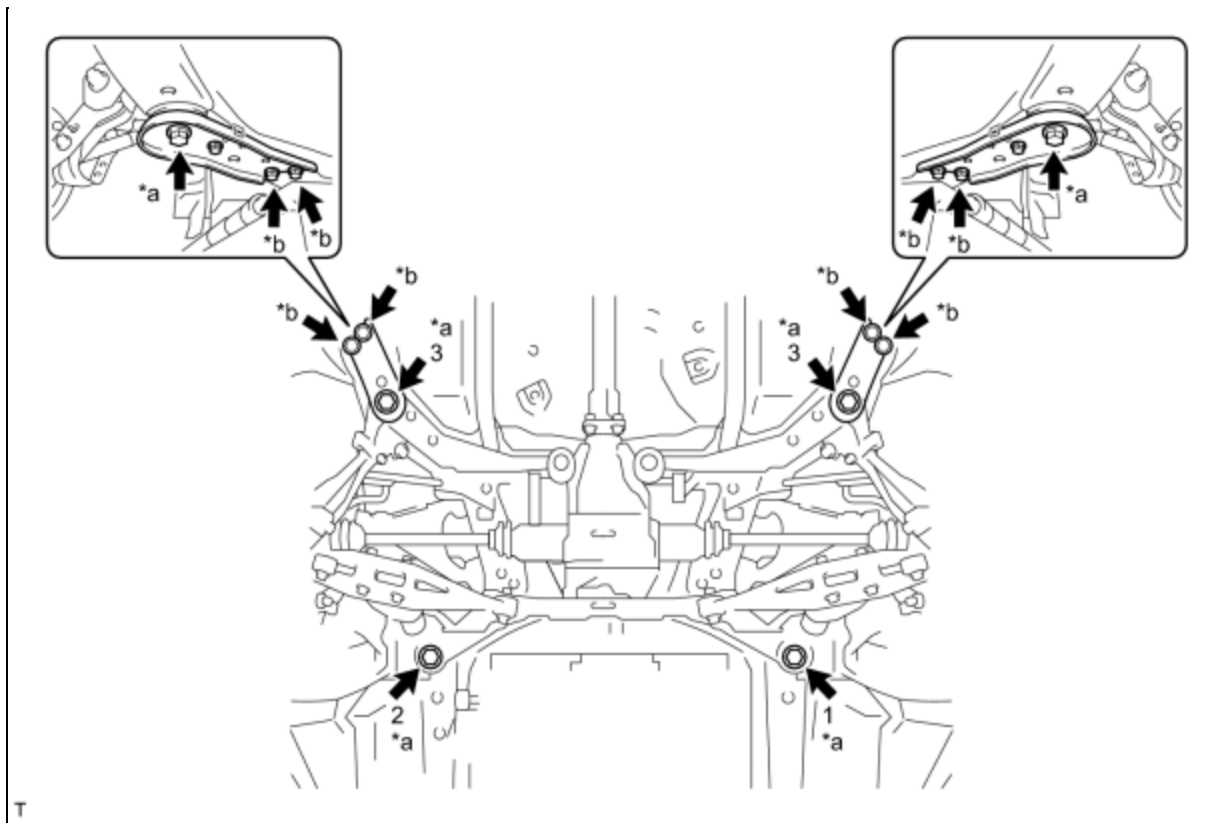
NOTICE:

When raising the rear suspension member sub-assembly, be careful not to damage the vehicle body or other components installed on the vehicle.

- (c) While supporting the rear suspension member sub-assembly with a high transmission jack, using the 4 bolts B and 4 new bolts A, install the suspension member sub-assembly, front support rear LH, front support rear RH, rear support upper and rear support lower all together.

NOTICE:

After temporarily tightening the bolts A in the order shown in the illustration, tighten them securely.



Text in Illustration

*a	Bolt A (New bolt)	*b	Bolt B
----	-------------------	----	--------

Torque: 145 N·m (1479 kgf·cm, 107ft·lbf) (Bolt A)

Torque: 70 N·m (714 kgf·cm, 52ft·lbf) (Bolt B)

6. TEMPORARILY INSTALL TOE CONTROL LINK SUB-ASSEMBLY LH

- (a) Install the toe control link sub-assembly LH and insert the toe adjust cam from the front of the vehicle. Then, install the No. 2 toe adjust plate and temporarily install a new nut.

NOTICE:

Align the matchmarks on the rear suspension member and rear No. 2 suspension toe adjust plate.

7. TEMPORARILY INSTALL TOE CONTROL LINK SUB-ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

8. TEMPORARILY INSTALL REAR NO. 2 SUSPENSION ARM ASSEMBLY LH

- (a) Temporarily install the rear No. 2 suspension arm assembly LH to the rear suspension member with the bolt and a new nut.

NOTICE:

Insert the bolt from inside the vehicle.

9. TEMPORARILY INSTALL REAR NO. 2 SUSPENSION ARM ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

10. TEMPORARILY INSTALL REAR SHOCK ABSORBER WITH COIL SPRING LH

- (a) Temporarily install the rear shock absorber assembly to the rear No. 2 suspension arm with the bolt and a new nut.

HINT:

The bolt may be inserted from either direction.

11. TEMPORARILY INSTALL REAR SHOCK ABSORBER WITH COIL SPRING RH

HINT:

Use the same procedure described for the LH side.

12. TEMPORARILY INSTALL REAR NO. 1 SUSPENSION ARM ASSEMBLY LH

- (a) Temporarily install the rear No. 1 suspension arm assembly LH to the rear suspension member with the new bolt and new nut.

NOTICE:

Insert the bolt from outside the vehicle.

13. TEMPORARILY INSTALL REAR NO. 1 SUSPENSION ARM ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

14. INSTALL REAR STABILIZER BAR

INFO

15. TEMPORARILY TIGHTEN STABILIZER LINK SUB-ASSEMBLY (for LH Side)

INFO

16. TEMPORARILY TIGHTEN STABILIZER LINK SUB-ASSEMBLY (for RH Side)

HINT:

Use the same procedure described for the LH side.

17. INSTALL PARKING BRAKE CABLE SUPPORT BRACKET (for LH Side)

- (a) Install the parking brake cable support bracket with the bolt.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

18. INSTALL PARKING BRAKE CABLE SUPPORT BRACKET (for RH Side)

HINT:

Use the same procedure described for the LH side.

19. INSTALL NO. 3 FUEL TANK PROTECTOR

INFO

20. INSTALL NO. 3 PARKING BRAKE CABLE ASSEMBLY

- (a) Install the No. 3 parking brake cable assembly to the axle carrier with the clamp.
- (b) Install the No. 3 parking brake cable assembly to the rear suspension member lower stopper LH with the bolt.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

21. INSTALL NO. 2 PARKING BRAKE CABLE ASSEMBLY

HINT:

Use the same procedure described for the LH side.

22. INSTALL REAR AXLE CARRIER SUB-ASSEMBLY LH

INFO

23. INSTALL REAR AXLE CARRIER SUB-ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

24. INSTALL REAR DRIVE SHAFT ASSEMBLY LH

INFO

25. INSTALL REAR DRIVE SHAFT ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

26. INSTALL REAR DIFFERENTIAL CARRIER ASSEMBLY

INFO

27. INSTALL PROPELLER WITH CENTER BEARING SHAFT ASSEMBLY

INFO

28. INSTALL EXHAUST TAIL PIPE ASSEMBLY

INFO

29. STABILIZE SUSPENSION **INFO**

30. FULLY TIGHTEN REAR UPPER CONTROL ARM ASSEMBLY LH **INFO**

31. FULLY TIGHTEN REAR UPPER CONTROL ARM ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

32. FULLY TIGHTEN TOE CONTROL LINK SUB-ASSEMBLY LH **INFO**

33. FULLY TIGHTEN TOE CONTROL LINK SUB-ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

34. TEMPORARILY INSTALL REAR NO. 2 SUSPENSION ARM ASSEMBLY LH

(a) Fully tighten the nut holding the rear shock absorber.

Torque: 80 N·m (816 kgf·cm, 59ft·lbf)

(b) Fully tighten the nut on the rear suspension member sub-assembly side.

Torque: 80 N·m (816 kgf·cm, 59ft·lbf)

35. TEMPORARILY INSTALL REAR NO. 2 SUSPENSION ARM ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

36. FULLY TIGHTEN STABILIZER LINK SUB-ASSEMBLY (for LH Side) INFO

37. FULLY TIGHTEN STABILIZER LINK SUB-ASSEMBLY (for RH Side)

HINT:

Use the same procedure described for the LH side.

38. FULLY TIGHTEN REAR NO. 1 SUSPENSION ARM ASSEMBLY LH

- (a) Fully tighten the bolt on the rear suspension member side of the rear No. 1 suspension arm assembly LH.

Torque: 110 N·m (1122 kgf·cm, 81ft·lbf)

39. FULLY TIGHTEN REAR NO. 1 SUSPENSION ARM ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

40. INSTALL REAR WHEELS

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

41. INSPECT AND ADJUST REAR WHEEL ALIGNMENT

INFO

42. VSC SENSOR NEUTRAL MEMORIZATION

INFO

43. CHECK FOR SPEED SENSOR SIGNAL

INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IFR00JX
Title: REAR SUSPENSION: REAR SUSPENSION MEMBER: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE REAR WHEELS
2. REMOVE PROPELLER WITH CENTER BEARING SHAFT ASSEMBLY

INFO

3. REMOVE EXHAUST TAIL PIPE ASSEMBLY

INFO

4. REMOVE REAR DIFFERENTIAL CARRIER ASSEMBLY

INFO

5. REMOVE REAR DRIVE SHAFT ASSEMBLY LH

INFO

6. REMOVE REAR DRIVE SHAFT ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

7. REMOVE REAR AXLE CARRIER SUB-ASSEMBLY LH

INFO

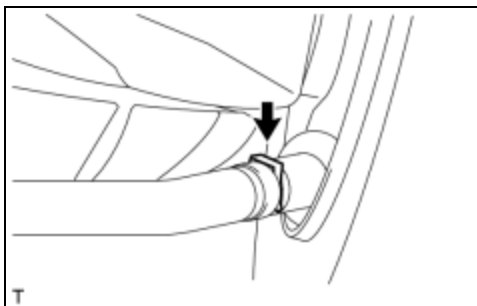
8. REMOVE REAR AXLE CARRIER SUB-ASSEMBLY RH

HINT:

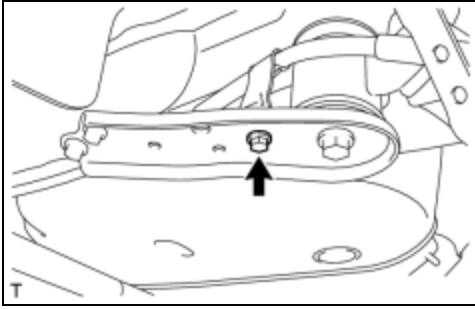
Use the same procedure described for the LH side.

9. REMOVE NO. 3 FUEL TANK PROTECTOR INFO

10. SEPARATE NO. 3 PARKING BRAKE CABLE ASSEMBLY



- (a) Remove the clamp and separate the No. 3 parking brake cable assembly.



- (b) Remove the bolt and separate the No. 3 parking brake cable assembly from rear suspension member lower stopper LH.

11. SEPARATE NO. 2 PARKING BRAKE CABLE ASSEMBLY

HINT:

Use the same procedure described for the LH side.

12. REMOVE PARKING BRAKE CABLE SUPPORT BRACKET (for LH Side) INFO

13. REMOVE PARKING BRAKE CABLE SUPPORT BRACKET (for RH Side)

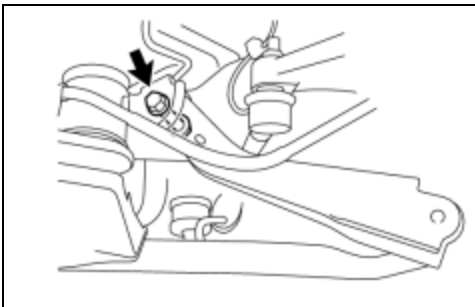
HINT:

Use the same procedure described for the LH side.

14. REMOVE REAR STABILIZER BAR

INFO

15. REMOVE REAR NO. 1 SUSPENSION ARM ASSEMBLY LH



- (a) Remove the bolt, nut and rear No. 1 suspension arm assembly LH.

16. REMOVE REAR NO. 1 SUSPENSION ARM ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

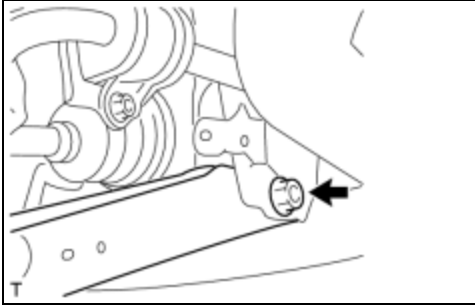
17. SEPARATE REAR SHOCK ABSORBER WITH COIL SPRING LH INFO

18. SEPARATE REAR SHOCK ABSORBER WITH COIL SPRING RH

HINT:

Use the same procedure described for the LH side.

19. SEPARATE REAR NO. 2 SUSPENSION ARM ASSEMBLY LH



- (a) Remove the bolt, nut and rear No. 2 suspension arm assembly LH from the rear suspension member sub-assembly.

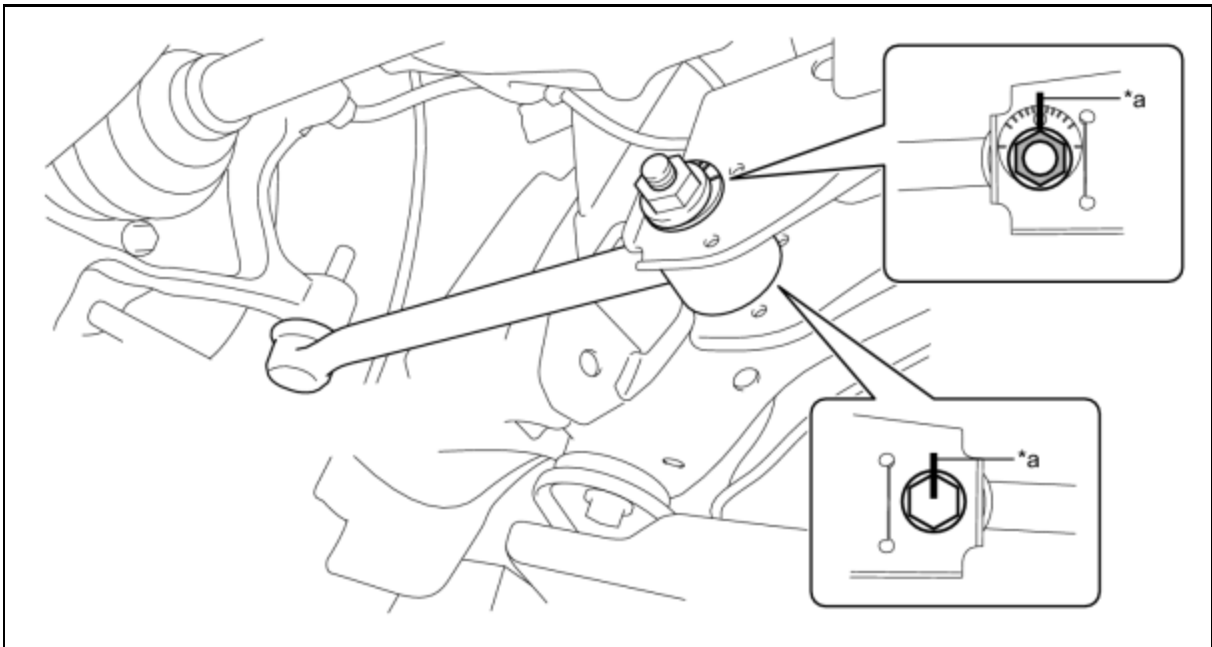
20. SEPARATE REAR NO. 2 SUSPENSION ARM ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

21. REMOVE TOE CONTROL LINK SUB-ASSEMBLY LH

- (a) Put matchmarks on the rear No. 2 suspension toe adjust plate and rear suspension member.



Text in Illustration

*a	Matchmark	-	-
----	-----------	---	---

- (b) Remove the nut, rear suspension toe adjust cam, rear No. 2 suspension toe adjust plate and toe control link sub-assembly LH.

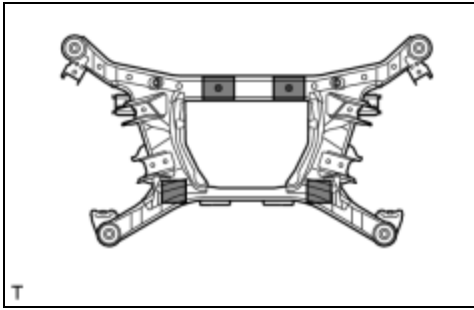
22. REMOVE TOE CONTROL LINK SUB-ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

23. REMOVE REAR SUSPENSION MEMBER SUB-ASSEMBLY

- (a) Support the rear suspension member sub-assembly with an engine lifter using 4 attachments or equivalent tools as shown in the illustration.



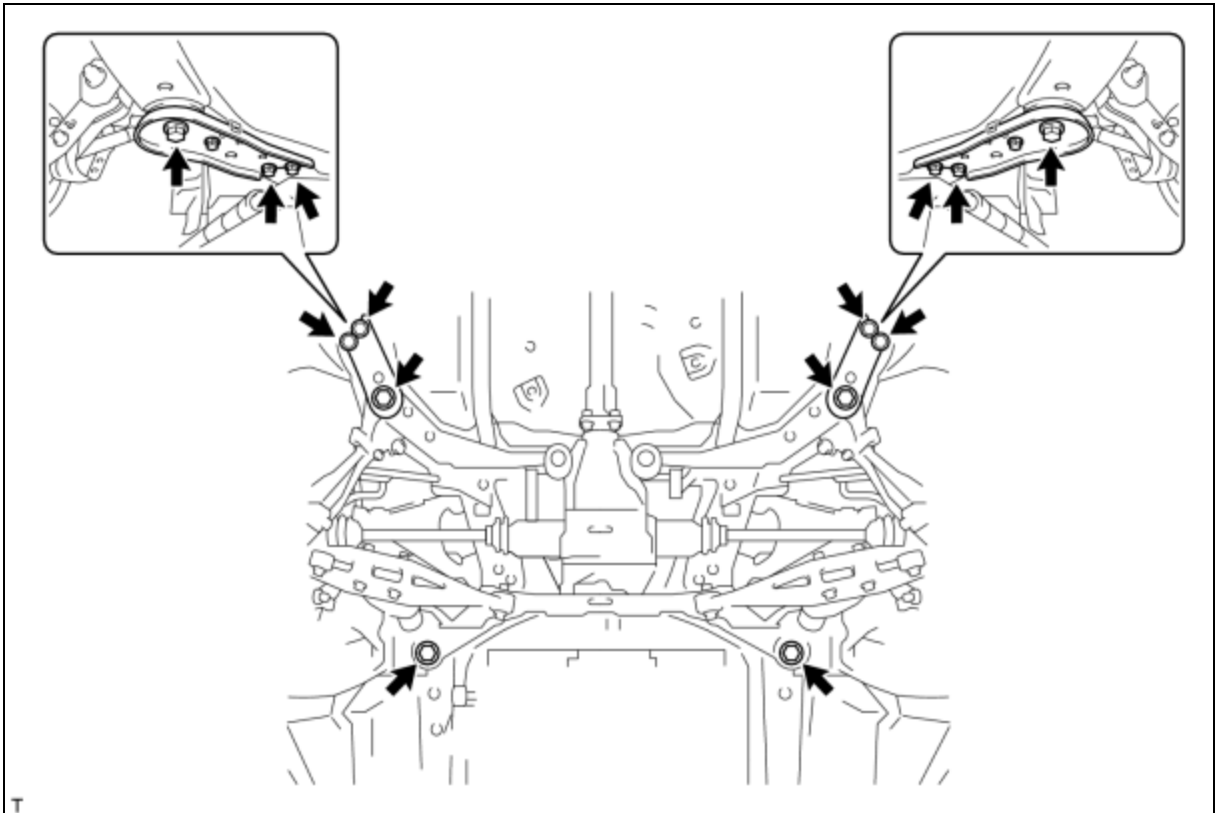
Text in Illustration

	Attachment Placement Location
---	-------------------------------

NOTICE:

- Make sure to secure the rear suspension member sub-assembly to prevent it from dropping.
- Use the attachments to keep the rear suspension member sub-assembly level.

- (b) Remove the 8 bolts, 2 rear lower suspension member stoppers, 2 differential support member stoppers and 2 rear suspension member lower stoppers from the rear suspension member.



- (c) Slowly lower the rear suspension member sub-assembly.

NOTICE:

When lowering the rear suspension member sub-assembly, be careful not to damage the vehicle body or other components installed on the vehicle.

24. REMOVE REAR UPPER CONTROL ARM ASSEMBLY LH 

25. REMOVE REAR UPPER CONTROL ARM ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

26. REMOVE REAR NO. 1 DIFFERENTIAL MOUNT CUSHION 

27. REMOVE REAR NO. 2 DIFFERENTIAL MOUNT CUSHION 



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IG200DX
Title: REAR SUSPENSION: REAR SUSPENSION SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

Rear Suspension System

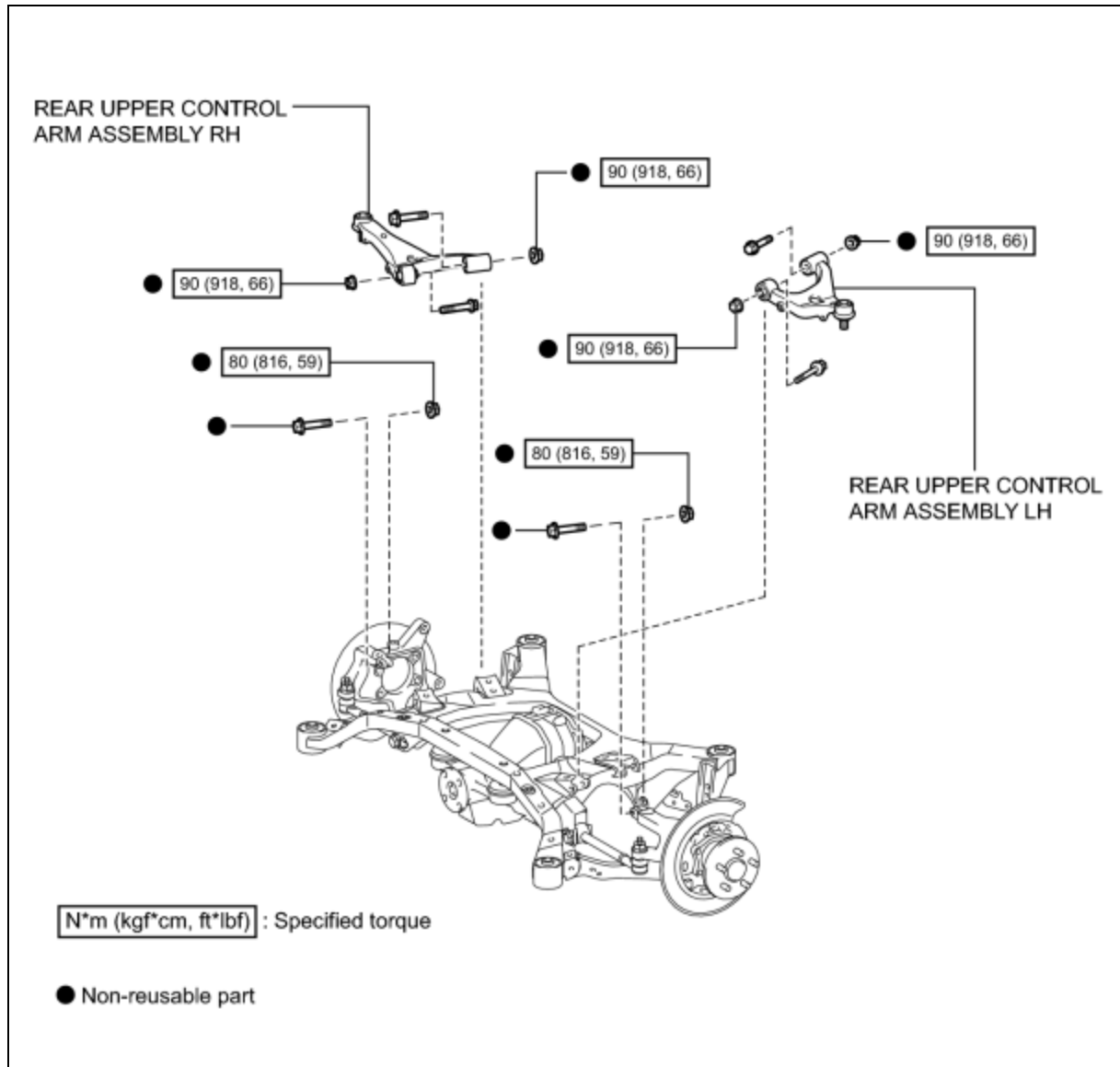
SYMPTOM	SUSPECTED AREA	SEE PAGE
Vehicle tilts	Tire (worn or improperly inflated)	INFO
	Rear wheel alignment (incorrect)	INFO
	Rear hub bearing (worn)	INFO
	Rear shock absorber with coil spring (worn)	INFO
Bottoming	Vehicle (overloaded)	-
	Rear shock absorber with coil spring (worn)	INFO
Wheel shimmy	Tire (worn or improperly inflated)	INFO
	Rear stabilizer bar (worn)	INFO
	Rear shock absorber with coil spring (worn)	INFO
Abnormal tire wear	Tire (worn or improperly inflated)	INFO
	Wheel (out of balance)	INFO
	Rear wheel alignment (incorrect)	INFO
	Toe control link sub-assembly (worn)	INFO
	Rear No. 1 suspension arm assembly (worn)	INFO
	Rear No. 2 suspension arm assembly (worn)	INFO
	Rear upper control arm assembly (worn)	INFO
	Rear shock absorber with coil spring (worn)	INFO
	Rear hub bearing (worn)	INFO
Vehicle sways	Tire (worn or improperly inflated)	INFO
	Wheel (out of balance)	INFO
	Rear wheel alignment (incorrect)	INFO



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IFN00FX
Title: REAR SUSPENSION: REAR UPPER ARM: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058XE000X
Title: REAR SUSPENSION: REAR UPPER ARM: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT REAR UPPER CONTROL ARM ASSEMBLY LH

(a) Inspect the ball joint of upper control arm assembly.

(1) Turn the stud back and forth.

Standard:

There is no unusual resistance or play.

(2) If there is any unusual resistance or play, replace the upper control arm assembly LH with a new one.

(b) Inspect the dust cover of upper control arm assembly.

(1) Check that the dust cover is not cracked and that there is no grease on it.

(2) If the dust cover is fissured or grease is leaked, replace the upper control arm assembly LH with a new one.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000031FM00DX
Title: REAR SUSPENSION: REAR UPPER ARM: INSTALLATION (2013 FR-S)		

INSTALLATION

1. TEMPORARILY INSTALL REAR UPPER CONTROL ARM ASSEMBLY LH

- (a) Temporarily install the rear upper control arm assembly LH to the rear suspension member sub-assembly with the 2 bolts and 2 new nuts.

NOTICE:

- Insert the bolt from the rear side of the vehicle for the front side of the installation position.
- Insert the bolt from the front side of the vehicle for the rear side of the installation position.

- (b) Temporarily install the rear upper control arm assembly LH to the axle carrier with the new bolt and a new nut.

NOTICE:

Insert the bolt from the front side of the vehicle.

2. TEMPORARILY INSTALL REAR UPPER CONTROL ARM ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

3. INSTALL REAR SUSPENSION MEMBER SUB-ASSEMBLY

INFO

4. STABILIZE SUSPENSION

INFO

5. FULLY TIGHTEN REAR UPPER CONTROL ARM ASSEMBLY LH

- (a) Fully tighten the nut on the axle carrier side of the upper control arm assembly LH.

Torque: 80 N·m (816 kgf·cm, 59ft·lbf)

- (b) Fully tighten the 2 nuts on the suspension member side of the upper control arm assembly LH.

Torque: 90 N·m (918 kgf·cm, 66ft·lbf)

6. FULLY TIGHTEN REAR UPPER CONTROL ARM ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

7. INSPECT AND ADJUST REAR WHEEL ALIGNMENT

INFO

8. VSC SENSOR NEUTRAL MEMORIZATION

INFO



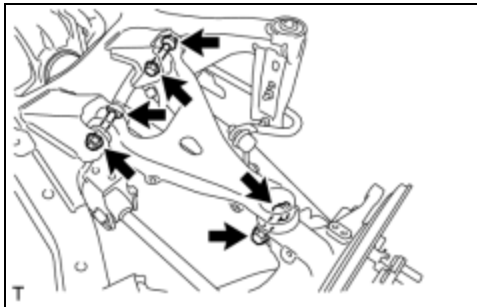
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000031FO00FX
Title: REAR SUSPENSION: REAR UPPER ARM: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE REAR SUSPENSION MEMBER SUB-ASSEMBLY

INFO

2. REMOVE REAR UPPER CONTROL ARM ASSEMBLY LH



- (a) Remove the 3 bolts, 3 nuts, and then remove the rear upper control arm assembly LH from the rear suspension member sub-assembly.

3. REMOVE REAR UPPER CONTROL ARM ASSEMBLY RH

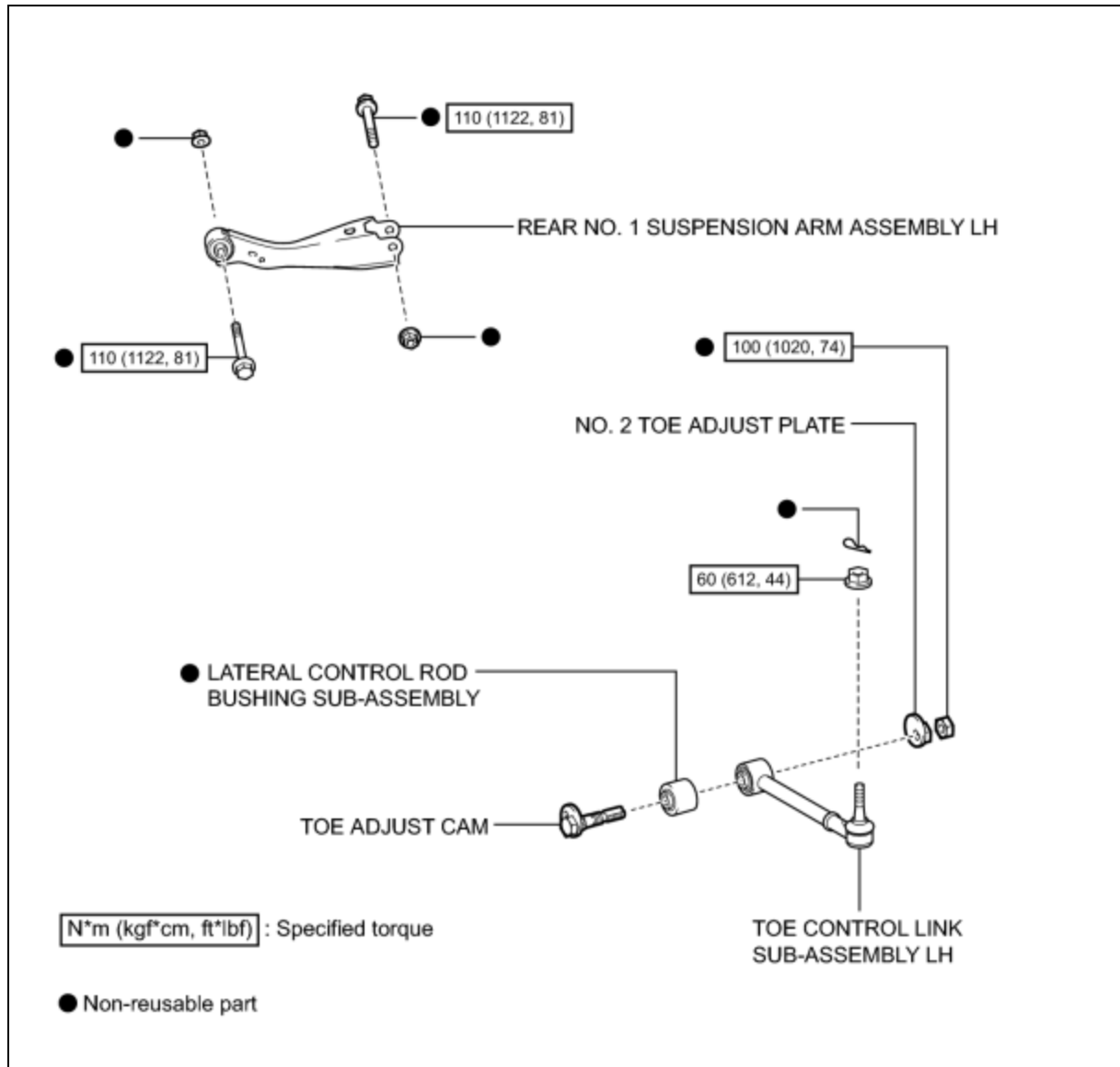
HINT:

Perform the same procedure as for the LH side.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000031FW00EX
Title: REAR SUSPENSION: TOE CONTROL LINK: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



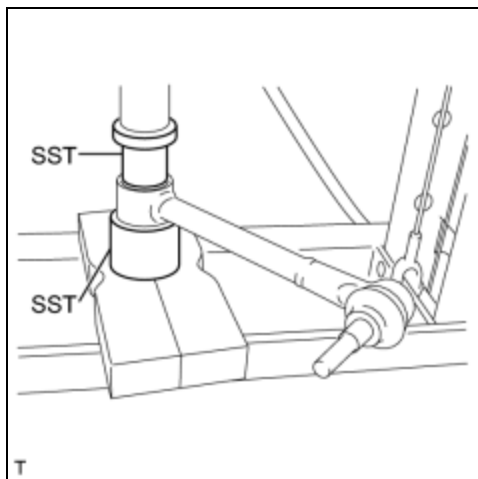
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058XH000X
Title: REAR SUSPENSION: TOE CONTROL LINK: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. REMOVE LATERAL CONTROL ROD BUSHING SUB-ASSEMBLY



(a) Using SST, lateral control rod bushing sub-assembly from the toe control link sub-assembly LH.

SST: 09710-18010



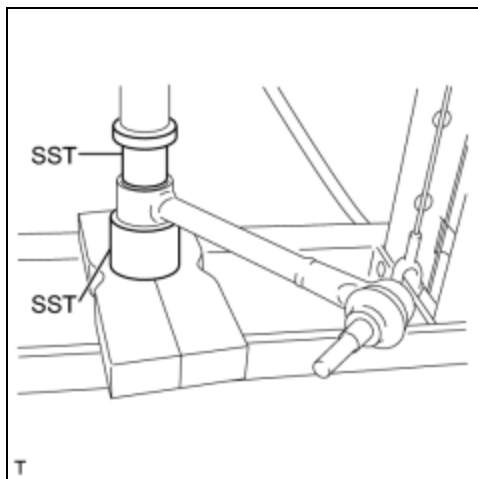
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058XH000X
Title: REAR SUSPENSION: TOE CONTROL LINK: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. REMOVE LATERAL CONTROL ROD BUSHING SUB-ASSEMBLY



(a) Using SST, lateral control rod bushing sub-assembly from the toe control link sub-assembly LH.

SST: 09710-18010

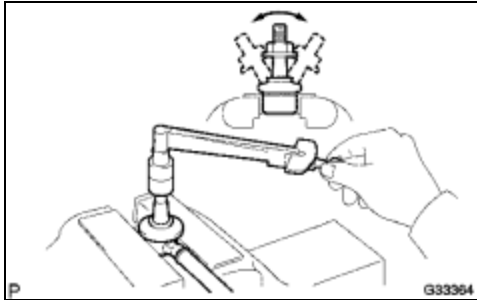


Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058YI000X
Title: REAR SUSPENSION: TOE CONTROL LINK: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT TOE CONTROL LINK SUB-ASSEMBLY LH

(a) Inspect the ball joint.



(1) Temporarily install the attaching nut to the stud of the toe control link sub-assembly LH.

(2) Turn the stud back and forth.

Standard:

There is no unusual resistance or play.

(3) If there is unusual resistance or play, replace the toe control link sub-assembly LH with a new one.

(b) Inspect the dust cover.

(1) Check that the dust cover is not cracked and that there is no grease on it.

(2) If the dust cover is fissured or grease is leaked, replace the toe control link sub-assembly LH with a new one.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000031FV00FX
Title: REAR SUSPENSION: TOE CONTROL LINK: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- The procedure listed below is for the LH side.
- Use the same procedure for the RH and LH sides.

1. TEMPORARILY INSTALL TOE CONTROL LINK SUB-ASSEMBLY LH

- (a) Install the toe control link sub-assembly LH and insert the toe adjust cam from the front of the vehicle. Then, install the rear No. 2 suspension toe adjust plate and temporarily install the new nut.

NOTICE:

Align the matchmarks on the rear suspension member and the rear No. 2 suspension toe adjust plate.

- (b) Install the rear suspension toe control link sub-assembly LH to the rear axle carrier side with a nut.

Torque: 60 N·m (612 kgf·cm, 44ft·lbf)

- (c) Install the new snap pin.

2. TEMPORARILY INSTALL REAR NO. 1 SUSPENSION ARM ASSEMBLY LH INFO

3. STABILIZE SUSPENSION INFO

4. FULLY TIGHTEN TOE CONTROL LINK SUB-ASSEMBLY LH

- (a) Fully tighten the nut on the rear suspension member side.

Torque: 100 N·m (1020 kgf·cm, 74ft·lbf)

NOTICE:

Check that the matchmarks on the rear suspension member and the rear No. 2 suspension toe adjust plate are aligned.

5. FULLY TIGHTEN REAR NO. 1 SUSPENSION ARM ASSEMBLY LH INFO

6. INSTALL REAR WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

7. INSPECT AND ADJUST REAR WHEEL ALIGNMENT

INFO

8. VSC SENSOR NEUTRAL MEMORIZATION

INFO

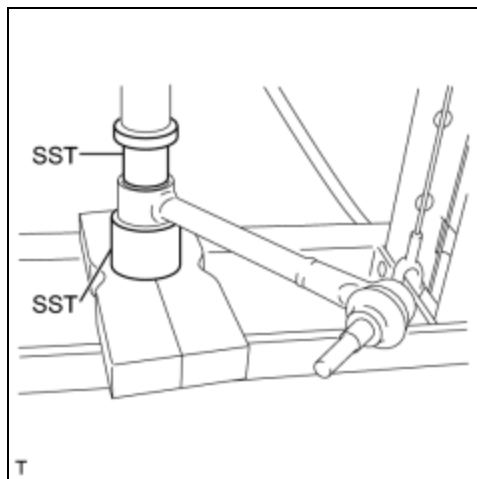
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000058XI000X
Title: REAR SUSPENSION: TOE CONTROL LINK: REASSEMBLY (2013 FR-S)		

REASSEMBLY

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. INSTALL LATERAL CONTROL ROD BUSHING SUB-ASSEMBLY



- (a) Using SST, install a new lateral control rod bushing sub-assembly to the toe control link sub-assembly LH.

SST: 09710-18010



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003IFX00EX
Title: REAR SUSPENSION: TOE CONTROL LINK: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

- The procedure listed below is for the LH side.
- Use the same procedure for the RH and LH sides.

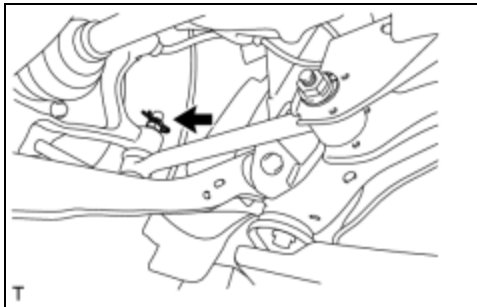
1. REMOVE REAR WHEEL

2. REMOVE REAR NO. 1 SUSPENSION ARM ASSEMBLY LH

INFO

3. REMOVE TOE CONTROL LINK SUB-ASSEMBLY LH

- (a) Remove the snap pin.



- (b) Remove the nut on the rear axle carrier side.

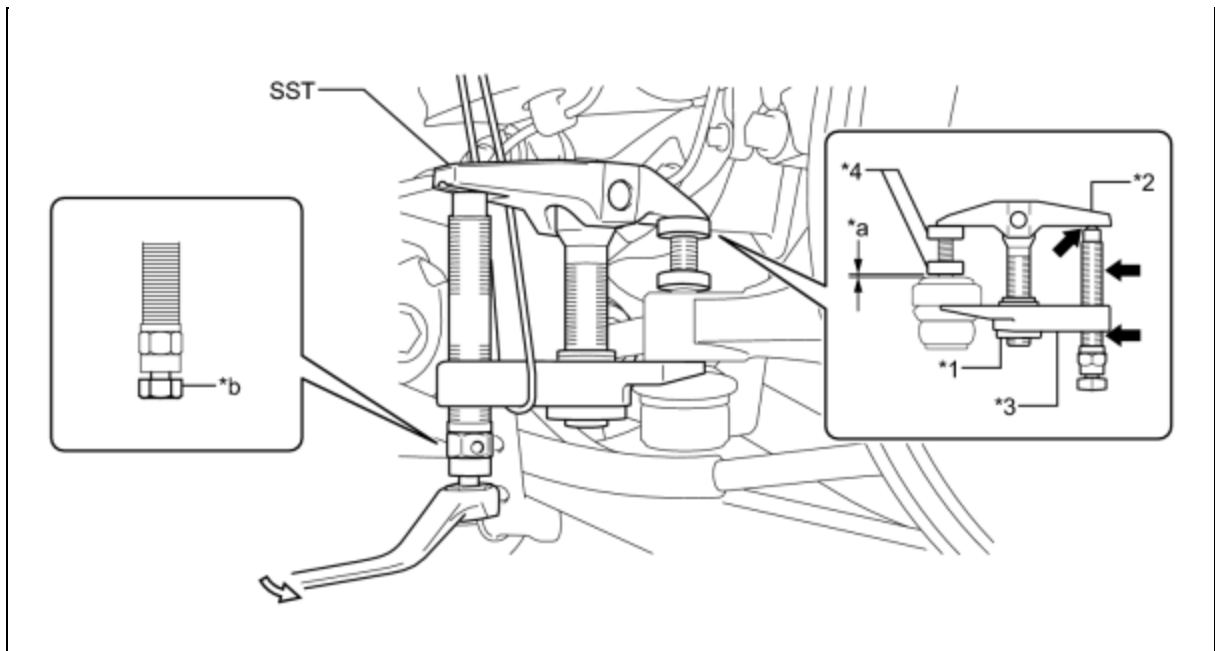
- (c) Install SST (2 pieces of spacer B) to the threaded section of the toe control link sub-assembly LH.

SST: 09960-20010



09961-02060

09961-02010

- (d) Using SST (ball joint puller), separate the toe control link sub-assembly LH from the rear axle carrier LH.



Text in Illustration

*1	Nut	*2	Body
*3	Claw	*4	SST (Spacer B)
*a	1 mm (0.039 in.)	*b	Place wrench here
	Molybdenum grease		Turning direction

SST: 09960-20010

09961-02060

09961-02010

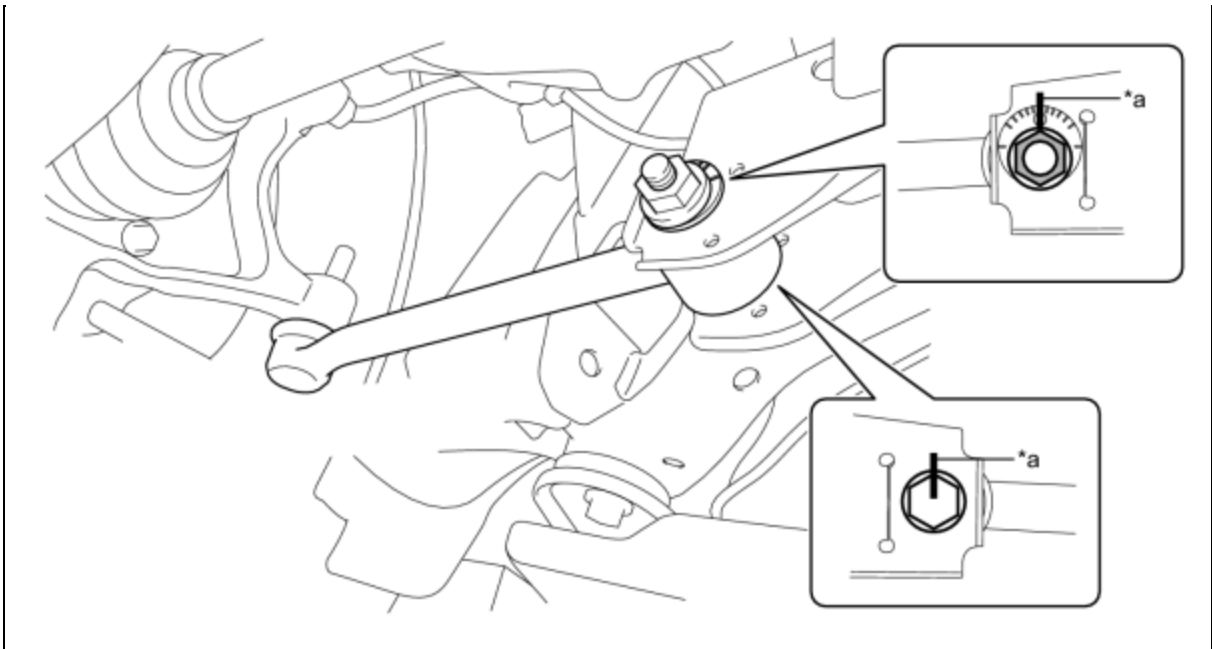
CAUTION:

Before working, apply molybdenum grease to the bolt threads and bolt tip of SST.

NOTICE:

- As the dust cover may be damaged, adjust SST with the center nut so that the body and claw are parallel.
- Make sure to tie the string of SST to the vehicle to prevent SST from dropping.
- Do not damage the dust cover on the toe control link sub-assembly.
- Do not damage the toe control link sub-assembly.
- Do not damage the parking brake plate sub-assembly.
- Do not damage the rear axle carrier.

(e) Put matchmarks on the rear No. 2 suspension toe adjust plate and the rear suspension member.



Text in Illustration

*a	Matchmark	-	-
----	-----------	---	---

- (f) Remove the nut, toe adjust cam, rear No. 2 suspension toe adjust plate and the toe control link sub-assembly.

Last Modified: 3-27-2012	6.4 F	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003P8Q040X
Title: TIRE / WHEEL: TIRE AND WHEEL SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

1. DIAGNOSIS OF TIRE VIBRATION

1.	TIGHTEN WHEEL NUTS
----	--------------------

NEXT



2.	INSPECT TIRES INFO
----	------------------------------------

NG Go to step 3

OK Go to step 4

3.	REPAIR OR REPLACE TIRE(S)
----	---------------------------

NEXT



4.	INSPECT AND/OR ADJUST WHEEL BALANCE INFO
----	--

NEXT



5.	INSPECT FRONT AXLE HUB BEARING LOOSENESS AND AXLE HUB RUNOUT INFO
----	---

NG Go to step 6

OK Go to step 7

6.	REPAIR FRONT AXLE HUB BEARING LOOSENESS AND AXLE HUB RUNOUT INFO
----	--

NEXT



7.	INSPECT REAR AXLE HUB BEARING LOOSENESS AND AXLE HUB RUNOUT INFO
----	--

NG ▶ Go to step 8

OK ▶ Go to step 9

8.	REPAIR REAR AXLE HUB BEARING LOOSENESS AND AXLE HUB RUNOUT INFO
----	---

NEXT



9.	PERFORM ROAD TEST
----	-------------------

NEXT



10.	RETURN VEHICLE TO CUSTOMER
-----	----------------------------

2. DIAGNOSIS OF IRREGULAR TIRE WEAR

1.	INSPECT TIRES INFO
----	------------------------------------

NEXT



2.	REPAIR OR REPLACE TIRE(S)
----	---------------------------

NEXT



3. INSPECT AND/OR ADJUST FRONT WHEEL ALIGNMENT [INFO](#)

NEXT



4. INSPECT AND/OR ADJUST REAR WHEEL ALIGNMENT [INFO](#)

NEXT



5. PERFORM ROAD TEST

NEXT



6. RETURN VEHICLE TO CUSTOMER



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000015KU04JX
Title: TIRE / WHEEL: TIRE AND WHEEL SYSTEM: INSPECTION (2013 FR-S)		

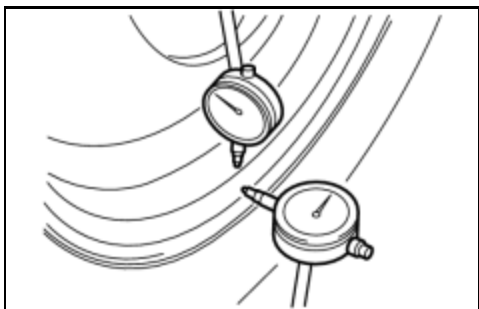
INSPECTION

1. INSPECT TIRES

(a) Check the tires for wear and proper inflation pressure.

Cold Tire Inflation Pressure:

TIRE SIZE	FRONT KPA (KGF/CM ² , PSI)	REAR KPA (KGF/CM ² , PSI)
215/45R17 87W	240 (2.4, 35)	240 (2.4, 35)
P215/45R17 87V	240 (2.4, 35)	240 (2.4, 35)
T135/80D 16 101M	420 (4.2, 60)	420 (4.2, 60)



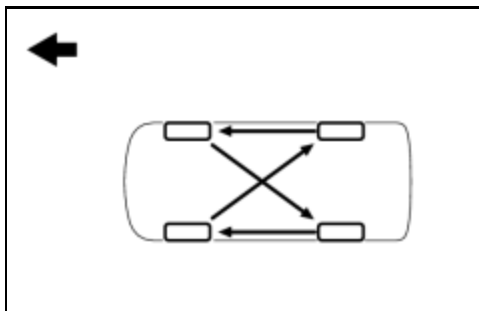
(b) Using a dial indicator, check the runout of the wheel.

Maximum wheel runout


Steel wheel	2.0 mm (0.0787 in.) (Vertical and lateral)
Aluminum wheel	1.0 mm (0.0394 in.) (Vertical and lateral)

2. ROTATE TIRES

(a) Rotate the tires as shown in the illustration.



Text in Illustration

	Front of the Vehicle
---	----------------------

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

3. INSPECT WHEEL BALANCE

- (a) Check and perform off-car balancing.
- (b) If required, perform on-car balancing.

Imbalance after adjustment:
10.0 g (0.0220 lb) or less

4. INSPECT FRONT AXLE HUB BEARING LOOSENESS

INFO

5. INSPECT REAR AXLE HUB BEARING LOOSENESS

INFO

6. INSPECT FRONT AXLE HUB RUNOUT

INFO

7. INSPECT REAR AXLE HUB RUNOUT

INFO



Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000021ML018X
Title: TIRE / WHEEL: TIRE REPAIR SEAL: DISPOSAL (2013 FR-S)		

DISPOSAL

1. DISPOSE OF TIRE REPAIR SEAL

HINT:

Confirm the expiration date on the side of the repair seal bottle.

(a) Dispose of the retrieved seal by consigning disposal to a waste the disposal firm.

NOTICE:

- The valve and valve core cannot be reused.
- Do not reuse items such as cloths that were used to wipe off seal or gloves soiled with the seal.
Dispose of such items as burnable waste.

(b) Dispose of the bottle used for retrieving the seal as plastic waste.



Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000021MM018X
Title: TIRE / WHEEL: TIRE REPAIR SEAL: RECOVERY (2013 FR-S)		

RECOVERY

1. RECOVERY OF TIRE REPAIR SEAL

NOTICE:

- Try not to spill the tire repair seal in the tire during servicing.
- Wipe off any spilt seal with a cloth or the equivalent.

(a) Using a tire changer, remove the tire from the wheel by following the same procedures as for a regular tire change.

NOTICE:

Do not raise the tire rapidly as the seal may spill out.

(b) Retrieve the tire repair seal from the removed tire.

HINT:

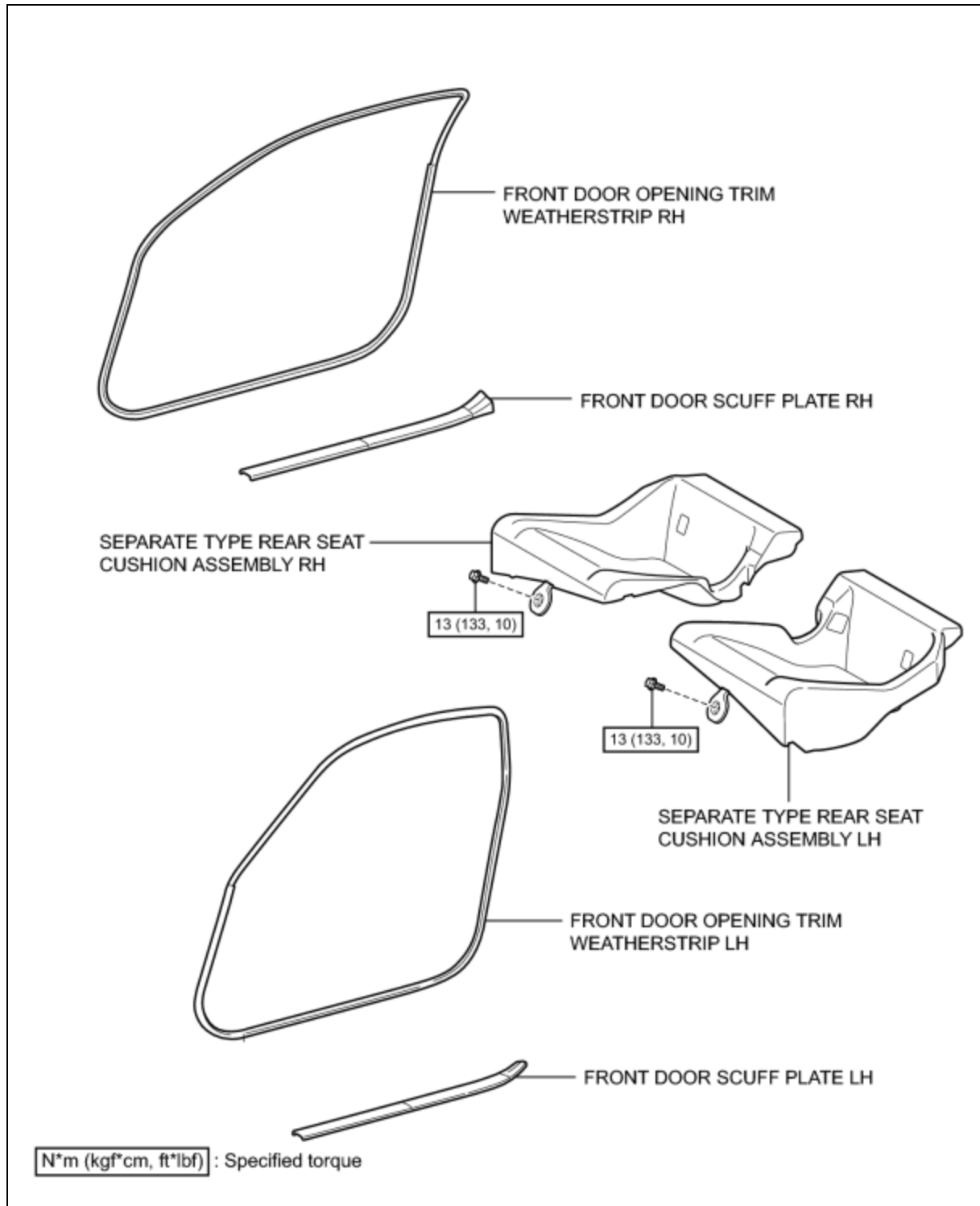
Using a cloth or the equivalent, wipe off any seal spilt on the tire, the wheel, the tire changer and the floor.



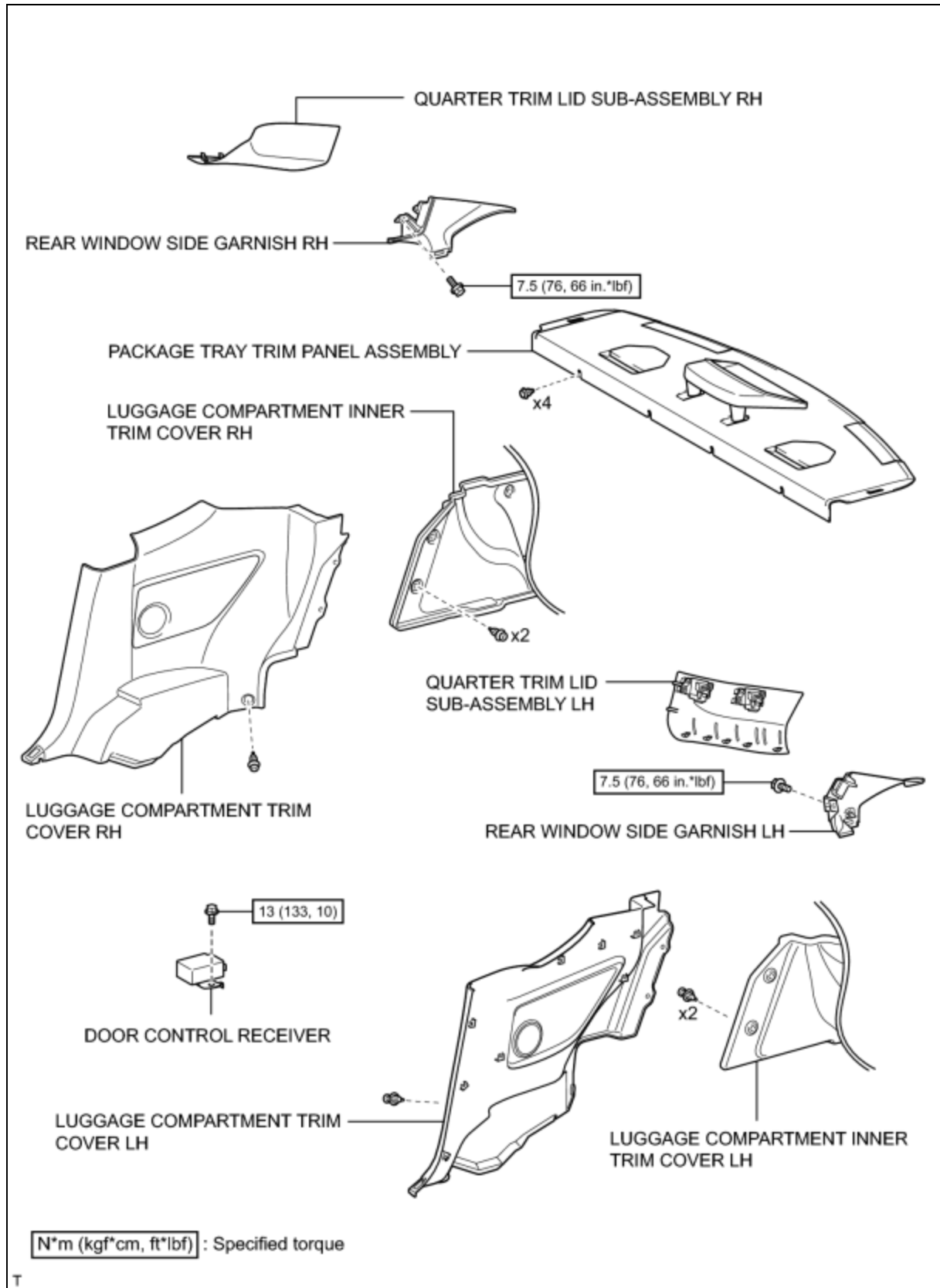
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003ZWC008X
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING RECEIVER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002PLM029X
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING RECEIVER: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

The tire pressure warning receiver is integrated in the door control receiver.

1. INSTALL DOOR CONTROL RECEIVER

NOTICE:

- Do not drop the door control receiver or apply impact on it.
- When replacing or inspecting the door control receiver, do not change the wiring route or the length of the harness around the receiver.

(a) Engage the guide and install the door control receiver.

(b) Install the bolt.

Torque: 13 N·m (133 kgf·cm, 10ft·lbf)

(c) Connect the connector.

2. INSTALL PACKAGE TRAY TRIM PANEL ASSEMBLY INFO

3. INSTALL REAR WINDOW SIDE GARNISH LH INFO

4. INSTALL REAR WINDOW SIDE GARNISH RH

HINT:

Use the same procedure described for the LH side.

5. INSTALL QUARTER TRIM LID SUB-ASSEMBLY LH INFO

6. INSTALL QUARTER TRIM LID SUB-ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

7. INSTALL LUGGAGE COMPARTMENT TRIM COVER LH INFO

8. INSTALL LUGGAGE COMPARTMENT TRIM COVER RH

HINT:

Use the same procedure described for the LH side.

9. CONNECT LUGGAGE COMPARTMENT TRIM INNER COVER LH INFO

10. CONNECT LUGGAGE COMPARTMENT TRIM INNER COVER RH

HINT:

Use the same procedure described for the LH side.

11. INSTALL FRONT DOOR SCUFF PLATE LH INFO

12. INSTALL FRONT DOOR SCUFF PLATE RH

HINT:

Use the same procedure described for the LH side.

13. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP LH INFO

14. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP RH

HINT:

Use the same procedure described for the LH side.

15. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY LH INFO

16. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002PLO022X
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING RECEIVER: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

The tire pressure warning receiver is integrated in the door control receiver.

1. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY LH INFO
2. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

3. REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP LH INFO
4. REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP RH

HINT:

Use the same procedure described for the LH side.

5. REMOVE FRONT DOOR SCUFF PLATE LH INFO
6. REMOVE FRONT DOOR SCUFF PLATE RH

HINT:

Use the same procedure described for the LH side.

7. SEPARATE LUGGAGE COMPARTMENT INNER TRIM COVER LH INFO
8. SEPARATE LUGGAGE COMPARTMENT INNER TRIM COVER RH

HINT:

Use the same procedure described for the LH side.

9. REMOVE LUGGAGE COMPARTMENT TRIM COVER LH INFO
10. REMOVE LUGGAGE COMPARTMENT TRIM COVER RH

HINT:

Use the same procedure described for the LH side.

11. REMOVE QUARTER TRIM LID SUB-ASSEMBLY LH INFO
12. REMOVE QUARTER TRIM LID SUB-ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

13. REMOVE REAR WINDOW SIDE GARNISH LH INFO

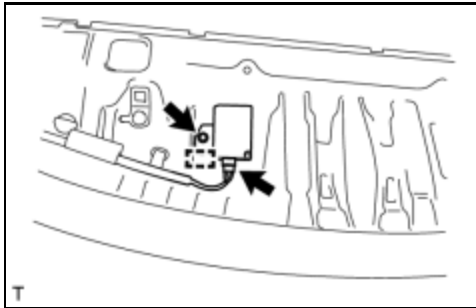
14. REMOVE REAR WINDOW SIDE GARNISH RH

HINT:

Use the same procedure described for the LH side.

15. REMOVE PACKAGE TRAY TRIM PANEL ASSEMBLY INFO

16. REMOVE DOOR CONTROL RECEIVER



(a) Disconnect the connector.

(b) Remove the bolt.

(c) Disengage the guide and remove the door control receiver.

NOTICE:

- Do not drop the door control receiver or apply impact on it.
- When replacing or inspecting the door control receiver, do not change the wiring route or the length of the harness around the receiver.

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001NN303HX
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: B1247: Tire Pressure Monitor Receiver Communication Stop (2013 FR-S)		

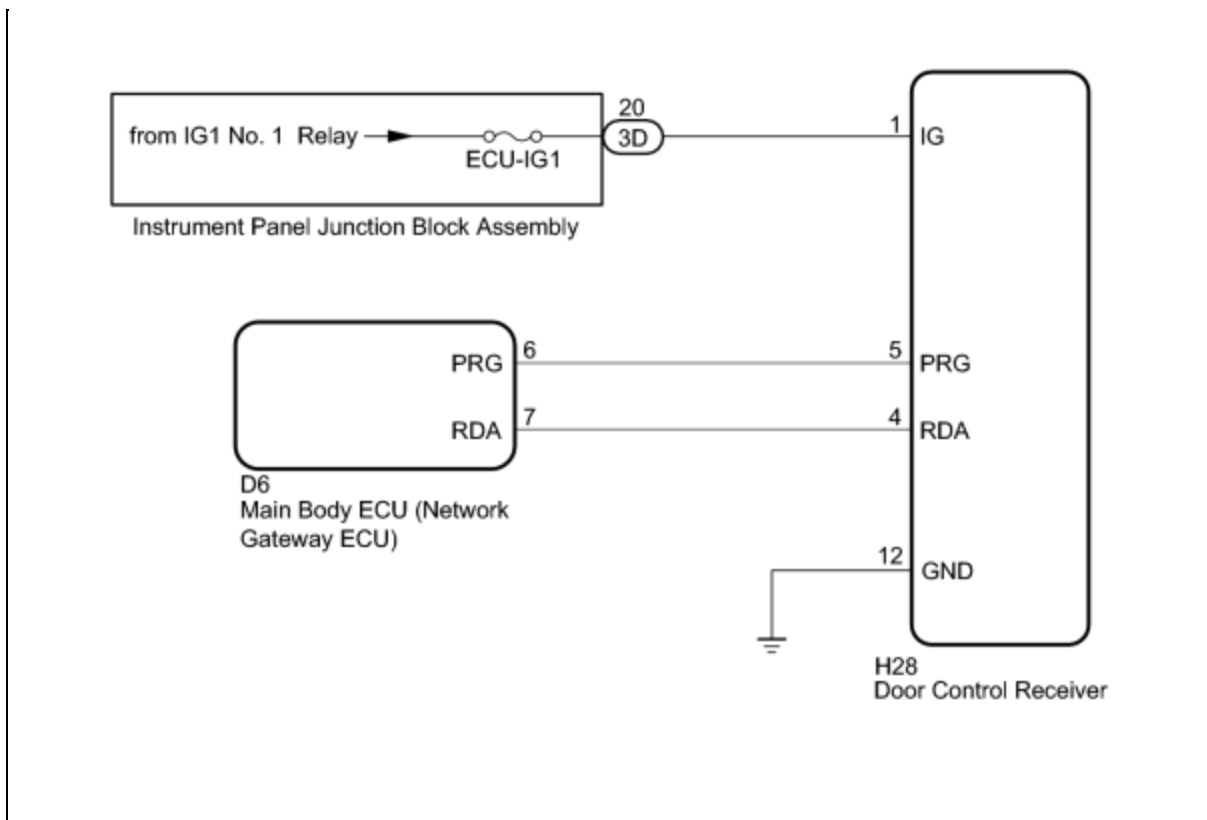
DTC	B1247	Tire Pressure Monitor Receiver Communication Stop
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DESCRIPTION

The main body ECU (network gateway ECU) and door control receiver are connected using 2 direct lines that they use to communicate with each other.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1247	In diagnostic mode, an applicable RDA signal cannot be received within 10 seconds after a PRG signal is sent from the main body ECU (network gateway ECU).	<ul style="list-style-type: none"> • Door control receiver • Wire harness or connector • Main body ECU (network gateway ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- When replacing the door control receiver, read the IDs stored in the old ECU using the Techstream and write them down before removal.
- It is necessary to perform registration **INFO** of the transmitter IDs into the tire pressure warning ECU after the ECU has been replaced.
- When replacing the door control receiver on vehicles, be sure to perform Registration of Recognition Code to register the transmitter IDs after ECU replacement **INFO**.

HINT:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CHECK HARNESS AND CONNECTOR (MAIN BODY ECU (NETWORK GATEWAY ECU) - DOOR CONTROL RECEIVER)
----	--

(a) Disconnect the H28 door control receiver connector and the D6 main body ECU (network gateway ECU) connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION

H28-4 (RDA) - D6-7	Always	Below 1 Ω
H28-5 (PRG) - D6-6	Always	Below 1 Ω
D6-7 (RDA) - Body ground	Always	10 k Ω or higher
D6-6 (PRG) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

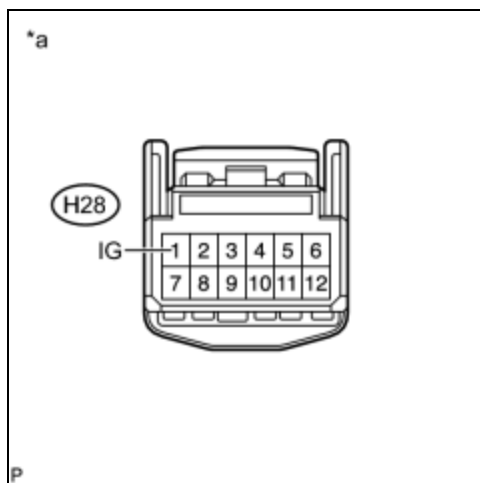
OK


2.	CHECK HARNESS AND CONNECTOR (POWER SOURCE OF DOOR CONTROL RECEIVER)
-----------	--

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H28-12 (GND) - Body ground	Always	Below 1 Ω



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H28-1 (IG) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration


*a	Front view of wire harness connector (to Door Control Receiver)
----	---

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK




3. REPLACE DOOR CONTROL RECEIVER

(a) Replace the door control receiver  .

NEXT




4. CHECK DTC OUTPUT (B1247)

(a) Clear the DTCs  .


(b) Turn the ignition switch off.

(c) Turn the ignition switch to ON.

(d) Check for DTCs  .

OK:

DTC B1247 is not output.

NG  **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

OK  **END**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002DZD073X
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: C2111-C2114: Transmitter ID1 Operation Stop (2013 FR-S)		

DTC	C2111	Transmitter ID1 Operation Stop
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DTC	C2112	Transmitter ID2 Operation Stop
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DTC	C2113	Transmitter ID3 Operation Stop
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DTC	C2114	Transmitter ID4 Operation Stop
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DESCRIPTION

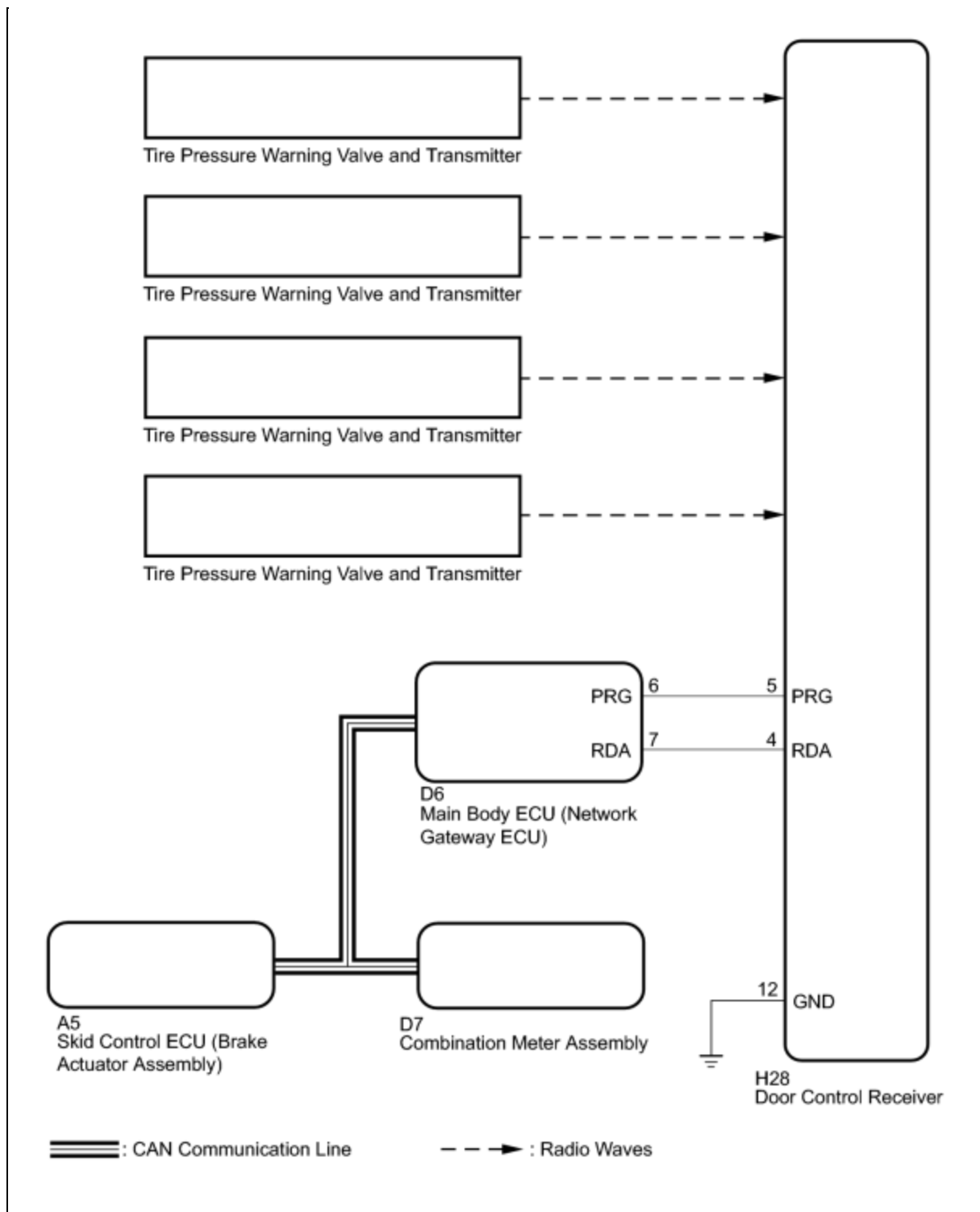
The tire pressure warning valve and transmitters that are installed in the tire and wheel assemblies measure the tire pressures. The measured values are transmitted to the door control receiver in the vehicle as radio waves. The ECU compares the measured air pressure values with the air pressure threshold. When the measured air pressure value is less than this threshold, the warning light in the combination meter assembly illuminates. The door control receiver stores a DTC when the tire pressure warning valve and transmitter stops transmitting signals. The signals can be forcibly transmitted by releasing the tire pressure rapidly. The stored DTC is cleared when signal transmission resumes.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C2111 C2112 C2113 C2114	Tire pressure warning valve and transmitters stop transmitting signals	<ul style="list-style-type: none"> • Tire pressure warning valve and transmitter • Door control receiver

HINT:

It is necessary to perform the following procedure to identify the tire pressure warning valve and transmitter that is malfunctioning because it cannot be identified by the output DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1. PERFORM FORCED TRANSMISSION OF TRANSMITTER ID OF ALL WHEELS

- (a) Set the tire pressure to the specified value INFO.
- (b) Turn the ignition switch off.

- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch to ON.
- (e) Turn the Techstream on.
- (f) Enter the following menus: Chassis / Tire Pressure Monitor / Data List.
- (g) Check the values by referring to the table below.

Tire Pressure Monitor

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
ID1 Tire Inflation Pressure	ID1 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID2 Tire Inflation Pressure	ID2 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID3 Tire Inflation Pressure	ID3 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID4 Tire Inflation Pressure	ID4 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi),	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*

Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)		
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HINT:

*: It may take a few minutes until the values are displayed. If the values are not displayed after a few minutes, perform troubleshooting according to the inspection procedure for DTCs C2121 to C2124

INFO .

(h) Rapidly reduce the tire pressure for each wheel at least 40 kPa (0.4 kgf/cm² , 5.8 psi) within 30 seconds.

(1) Check that each tire pressure data displayed on the Techstream has changed.

OK:

Each tire pressure data displayed on the Techstream will change to the value of the tire pressure.

NOTICE:

- It may take a few minutes to display the updated tire pressure data.
- When the "ID Tire Inflation Pressure" data has not changed, reset the tire pressure to the appropriate specified value and rotate the tire 90 to 270 degrees. Then rapidly release the tire pressure and recheck the data.

(2) After confirming that all of the tire pressure data displayed on the Techstream has changed, set the tire pressure to the appropriate specified values.

HINT:

If the tire pressure data displayed on the Techstream has not changed after rechecking, inspect for another problem INFO .

NG ► GO TO TRANSMITTER AND RECEIVER
INSPECTION PROCEDURE

OK ► END



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000ZUQ089X
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: C2121-C2124,C2181-C2184: No Signal from Transmitter ID1 (2013 FR-S)		

DTC	C2121	No Signal from Transmitter ID1
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DTC	C2122	No Signal from Transmitter ID2
------------	--------------	---------------------------------------

DTC	C2123	No Signal from Transmitter ID3
------------	--------------	---------------------------------------

DTC	C2124	No Signal from Transmitter ID4
------------	--------------	---------------------------------------

DTC	C2181	Transmitter ID1 not Received (Test Mode DTC)
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DTC	C2182	Transmitter ID2 not Received (Test Mode DTC)
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DTC	C2183	Transmitter ID3 not Received (Test Mode DTC)
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DTC	C2184	Transmitter ID4 not Received (Test Mode DTC)
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DESCRIPTION

The tire pressure warning valve and transmitters that are installed in the tire and wheel assemblies measure the tire pressures. The measured values are transmitted to the door control receiver in the vehicle as radio waves. The ECU compares the measured air pressure values with the air pressure threshold. When the measured air pressure value is less than this threshold, the warning light in the combination meter assembly illuminates.

The tire pressure warning valve and transmitters constantly send radio waves to the door control receiver.

Under the conditions below, the door control receiver is unable to receive the signals from the tire pressure warning valve and transmitters, and a DTC is stored.

- Facilities or devices that use similar radio frequencies are located in the vicinity of the vehicle.
- Devices using similar radio frequencies are used in the vehicle.
- The ID of a tire pressure warning valve and transmitter is mistyped during registration.
- A tire, wheel and/or transmitter from a different vehicle is installed.

HINT:

When no transmitter ID is received from a tire pressure warning valve and transmitter for a total of 20 minutes while the vehicle speed is more than 37 km/h (23 mph), or no transmitter ID is received from all the tire pressure warning valve and transmitters for a total of 20 minutes, these DTCs are set.

DTCs from C2121 to C2124 can only be cleared by using the Techstream. DTCs from C2181 to C2184 can be cleared when the tire pressure warning valve and transmitter sends a forced transmission signal or test mode ends. DTCs from C2181 to C2184 are output only in test mode.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C2121 C2122 C2123 C2124	Following condition (a) or (b) is met: (a) When all conditions below are met: <ul style="list-style-type: none"> • Tire pressure warning valve and transmitter is not in stop mode. • Any transmitter ID is not received from tire pressure warning valve and transmitters. • For 20 minutes or more, vehicle speed is more than 37 km/h (23 mph) or no vehicle speed signal is received. (b) When both conditions below are met: <ul style="list-style-type: none"> • Tire pressure warning valve and transmitter is not in stop mode. • No transmitter ID is received from tire pressure warning valve and transmitters for 20 minutes or more. 	<ul style="list-style-type: none"> • Tire pressure warning valve and transmitter • Door control receiver
C2181 C2182 C2183 C2184	Test mode procedure is performed.	<ul style="list-style-type: none"> • Tire pressure warning valve and transmitter • Door control receiver

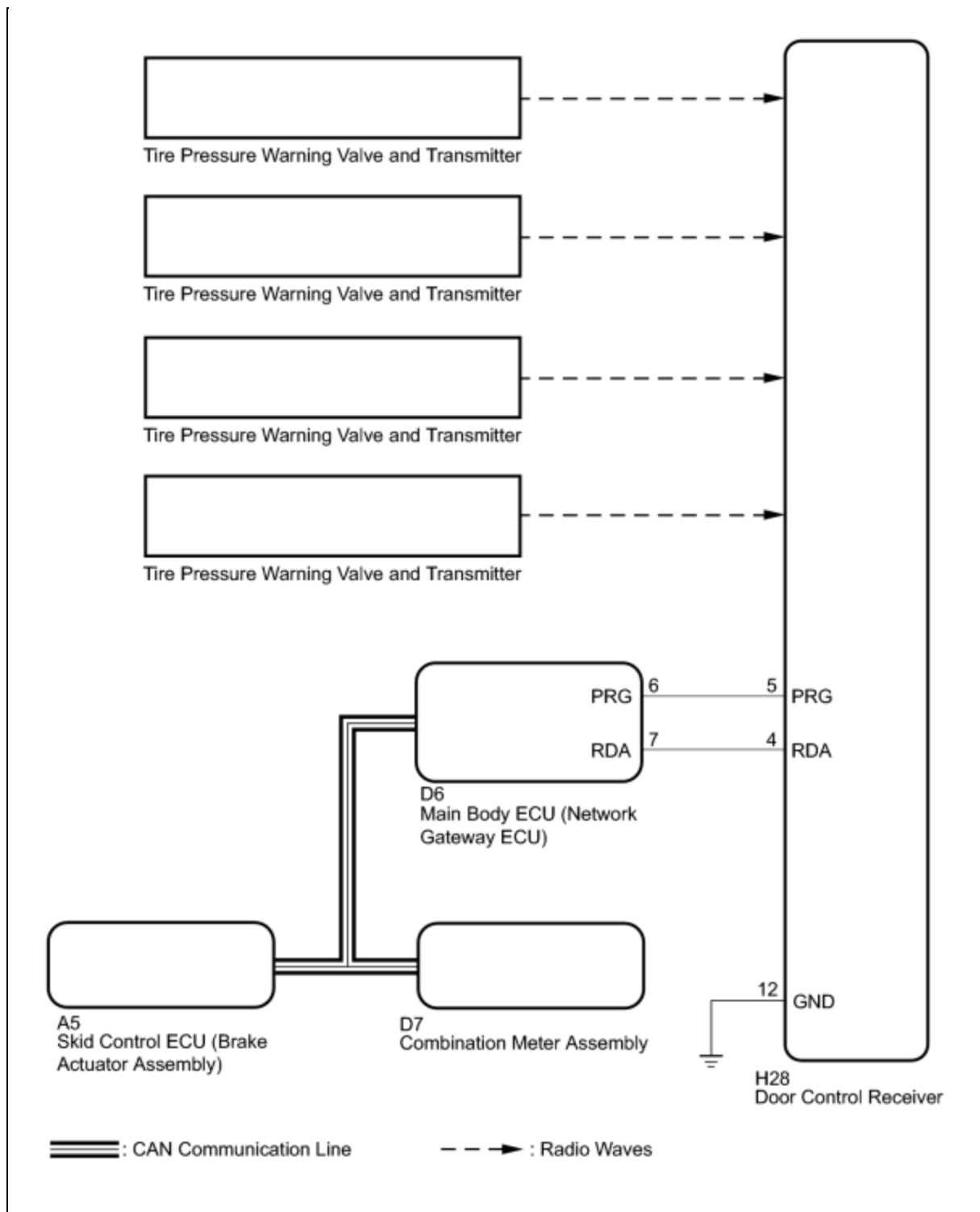
NOTICE:

When DTCs C2121 to C2124 are set, DTC C2179 may be set simultaneously. In such cases, troubleshoot DTCs C2121 to C2124 first, then troubleshoot DTC C2179.

HINT:

It is necessary to perform the following procedure to identify the tire pressure warning valve and transmitter that is malfunctioning because it cannot be identified by the output DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- When replacing the door control receiver, read the IDs stored in the old ECU using the Techstream and write them down before removal.
- It is necessary to perform registration **INFO** of the transmitter IDs into the tire pressure warning ECU after the ECU has been replaced.
- When replacing the door control receiver on vehicles, be sure to perform Registration of Recognition Code to register the transmitter IDs after ECU replacement **INFO** .

PROCEDURE

1. CHECK FREQUENCY RECEIVING CONDITION

(a) Check that the vehicle is not located in an area such as described below:

- (1) Facilities or devices that use similar radio frequencies are located in the vicinity of the vehicle.

HINT:

If the vehicle is located in an area such as the one described above, the tire pressure warning light may come on only in a particular area.

- (2) Devices using similar radio frequencies are used in the vehicle.

OK:

Facilities, or devices that use similar radio frequencies are not located in the vicinity of the vehicle.

HINT:


Radio transmissions may be interrupted due to the surroundings or devices installed by the user.

NG  **CHECK IF ANY DEVICE IS INSTALLED BY USER**

OK



2. IDENTIFY TRANSMITTER CORRESPONDING TO DTC

- (a) Set the tire pressure to the specified values  .
- (b) Turn the ignition switch off.
- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch to ON.
- (e) Turn the Techstream on.
- (f) Enter the following menus: Chassis / Tire Pressure Monitor / Data List.
- (g) Check the values by referring to the table below.

Tire Pressure Monitor

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	ID1 tire inflation pressure/		

ID1 Tire Inflation Pressure	min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID2 Tire Inflation Pressure	ID2 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID3 Tire Inflation Pressure	ID3 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID4 Tire Inflation Pressure	ID4 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*

HINT:

*: It may take a few minutes until the values are displayed.

(h) Rapidly reduce the tire pressure for each wheel at least 40 kPa (0.4 kg/cm² , 5.8 psi) within 30 seconds.

(i) Check the Data List.

NOTICE:

- It may take a few minutes to display the updated tire pressure data.
- When the "ID Tire Inflation Pressure" data has not changed, reset the tire pressure to the

appropriate specified value and rotate the tire 90 to 270 degrees. Then rapidly release the tire pressure and recheck the data.

- Record the transmitter ID of which "ID Tire Inflation Pressure" data corresponds to each tire.

(j) After confirming that the "ID Tire Inflation Pressure" data for one tire (ID1 to ID4) has changed, repeat this procedure one by one. Identify the transmitter that corresponds to the DTC.

Result:

RESULT	PROCEED TO
One or more of transmitters abnormal	A
All normal	B

B  **END**

A



3.	CHECK TRANSMITTER ID
-----------	-----------------------------

- Turn the ignition switch off.
- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Chassis / Tire Pressure Monitor / Data List.
- Check the values by referring to the table below.

Tire Pressure Monitor

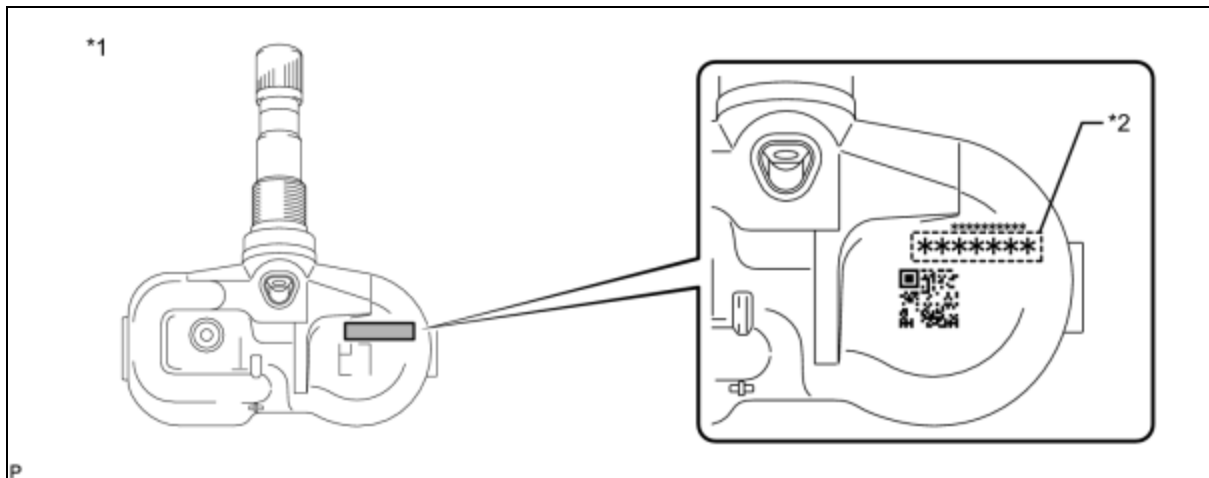
TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Registered ID1 code	Registered ID1 code/ min.: 0 max.: FFFFFFFF*	ID No. registered for transmitter ID1 displayed	-
Registered ID2 code	Registered ID2 code/ min.: 0 max.: FFFFFFFF*	ID No. registered for transmitter ID2 displayed	-
Registered ID3 code	Registered ID3 code/ min.: 0 max.: FFFFFFFF*	ID No. registered for transmitter ID3 displayed	-
Registered ID4	Registered ID4 code/	ID No. registered for transmitter ID4	

code	min.: 0 max.: FFFFFFF*	displayed	-
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HINT:

*: Displayed only when the ID No. is not registered.

(g) Check the ID number on the identified transmitter by removing it from the tire and wheel.



Text in Illustration

*1	Tire pressure warning valve and transmitter	*2	Transmitter ID (7-digit number)
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(h) Confirm that the ID number on the transmitter and recorded transmitter ID match.

Result:


RESULT	PROCEED TO
Match	A
Do not match	B

B REGISTRATION OF TRANSMITTER ID

A



4.	REPLACE TIRE PRESSURE WARNING VALVE AND TRANSMITTER
-----------	--

(a) Replace the tire pressure warning valve and transmitter  .

NEXT



5. REGISTRATION OF TRANSMITTER ID

(a) Perform registration  .

NEXT



6. CONFIRM TIRE INFLATION PRESSURE (DATA LIST)

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Chassis / Tire Pressure Monitor / Data List.
- (f) Check the values by referring to the table below.

Tire Pressure Monitor

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
ID1 Tire Inflation Pressure	ID1 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID2 Tire Inflation Pressure	ID2 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
	ID3 tire inflation pressure / min.: Absolute pressure / 50 kPa		

ID3 Tire Inflation Pressure	(0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID4 Tire Inflation Pressure	ID4 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*

HINT:

- *: It may take a few minutes until the values are displayed.
- When no "ID Tire Inflation Pressure" data has changed, reset the tire pressure to the appropriate specified value and rotate the tire 90 to 270 degrees. Then rapidly release the tire pressure and recheck the data.

Result:

RESULT	PROCEED TO
Tire pressure values are not displayed.	A
All tire pressure readings are equal to specified values.	B

B ► END

A ► REPLACE DOOR CONTROL RECEIVER

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003407071X
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: C2126: Transmitter ID not Received in Main Mode (2013 FR-S)		

DTC	C2126	Transmitter ID not Received in Main Mode
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DESCRIPTION

After all IDs are registered, DTC C2126 is set in the door control receiver and the tire pressure warning light blinks for 1 minute and then illuminates.

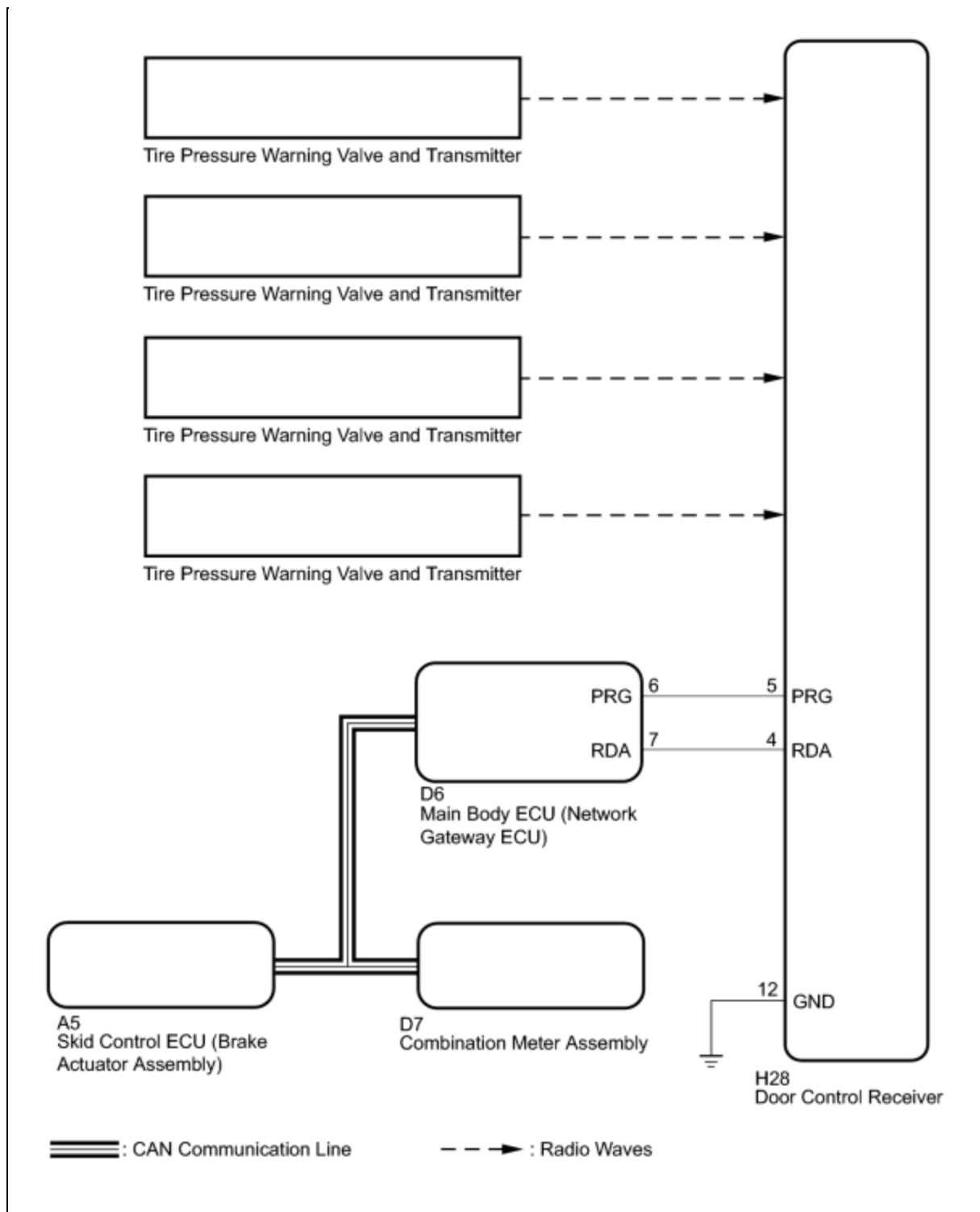
When the door control receiver successfully receives radio waves from all the transmitters whose IDs are stored in the ECU, DTC C2126 is cleared and the tire pressure warning light goes off.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C2126	After ID registration is completed, ECU does not receive radio waves from transmitters whose IDs are stored in ECU.	<ul style="list-style-type: none"> • ID registration failure • Tire pressure warning valve and transmitter • Door control receiver

HINT:

The purpose of this DTC is to help prevent delivering a vehicle that has incorrectly registered IDs. After all IDs are registered, DTC C2126 is detected and the tire pressure warning light blinks for 1 minute and then illuminates. If the tire pressure warning light does not turn off after a little while, IDs may be incorrectly registered.

WIRING DIAGRAM




INSPECTION PROCEDURE

NOTICE:

- When replacing the door control receiver, read the IDs stored in the old ECU using the Techstream and write them down before removal.
- It is necessary to perform registration **INFO** of the transmitter IDs into the tire pressure warning ECU after the ECU has been replaced.
- When replacing the door control receiver on vehicles, be sure to perform Registration of Recognition Code to register the transmitter IDs after ECU replacement **INFO** .

PROCEDURE

1.	IDENTIFY TRANSMITTER NOT RECEIVED
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- (a) Set the tire pressure to the specified values  .
- (b) Turn the ignition switch off.
- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch to ON.
- (e) Turn the Techstream on.
- (f) Enter the following menus: Chassis / Tire Pressure Monitor / Data List.
- (g) Check the values by referring to the table below.

Tire Pressure Monitor

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
ID1 Tire Inflation Pressure	ID1 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID2 Tire Inflation Pressure	ID2 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID3 Tire Inflation Pressure	ID3 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*

ID4 Tire Inflation Pressure	ID4 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
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HINT:

*: It may take a few minutes until the values are displayed.

(h) Rapidly reduce the tire pressure for each wheel at least 40 kPa (0.4 kgf/cm², 5.8 psi) within 30 seconds.

(i) Check the Data List.

NOTICE:

- It may take a few minutes to display the updated tire pressure data.
- When the "ID Tire Inflation Pressure" data has not changed, reset the tire pressure to the appropriate specified value and rotate the tire 90 to 270 degrees. Then rapidly release the tire pressure and recheck the data.
- Record the "ID Tire Inflation Pressure" data transmitter ID that corresponds to each tire.

(j) After confirming that the "ID Tire Inflation Pressure" data for one tire (ID1 to ID4) has changed, repeat this procedure one by one. Identify the transmitter not received.

Result:

CONDITION	PROCEED TO
One or more of transmitters abnormal	A
All normal	B

B  **END**

A


2.	CHECK TRANSMITTER ID
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(a) Turn the ignition switch off.

(b) Connect the Techstream to the DLC3.

(c) Turn the ignition switch to ON.

(d) Turn the Techstream on.

(e) Enter the following menus: Chassis / Tire Pressure Monitor / Data List.

(f) Check the values by referring to the table below.

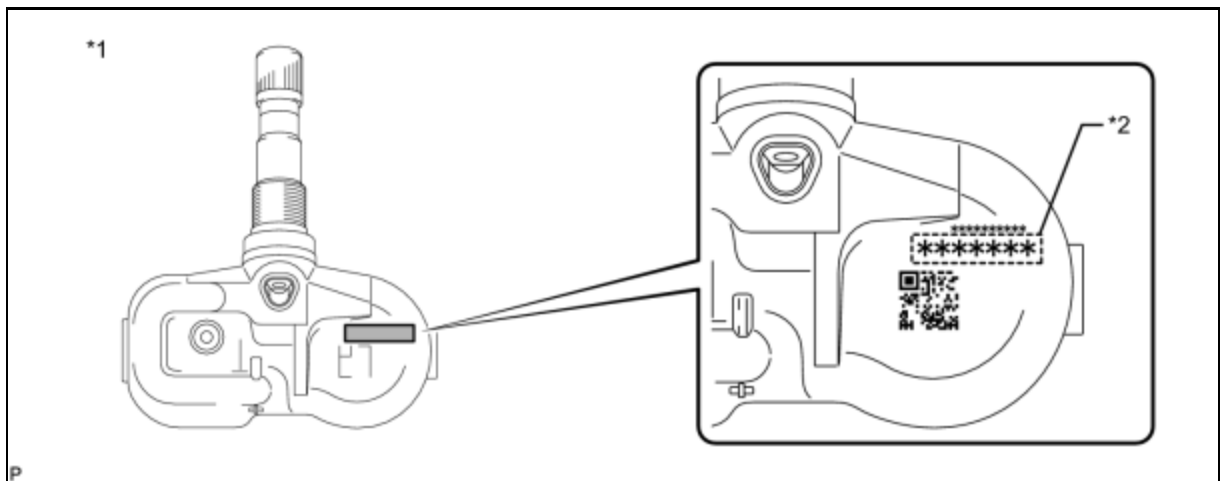
Tire Pressure Monitor

TESTER DISPLAY	MEASUREMENT ITEM/DISPLAY	NORMAL CONDITION	DIAGNOSTIC NOTE
Registered ID1 Code	Registered ID1 code/ min.: 0 max.: FFFFFFFF*	ID No. registered for transmitter ID1 displayed	-
Registered ID2 Code	Registered ID2 code/ min.: 0 max.: FFFFFFFF*	ID No. registered for transmitter ID2 displayed	-
Registered ID3 Code	Registered ID3 code/ min.: 0 max.: FFFFFFFF*	ID No. registered for transmitter ID3 displayed	-
Registered ID4 Code	Registered ID4 code/ min.: 0 max.: FFFFFFFF*	ID No. registered for transmitter ID4 displayed	-

HINT:

*: Displayed only when the ID No. is not registered.

(g) Check the ID number on the identified transmitter by removing it from the tire and wheel.



Text in Illustration

*1	Tire pressure warning valve and transmitter	*2	Transmitter ID (7-digit number)
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(h) Confirm that the ID number on the transmitter and recorded transmitter ID match.

Result:

RESULT	PROCEED TO

Match	A
Do not match	B

B ► REGISTRATION OF TRANSMITTER ID

A



3. REPLACE TIRE PRESSURE WARNING VALVE AND TRANSMITTER

(a) Replace the tire pressure warning valve and transmitter  .

NEXT



4. REGISTRATION OF TRANSMITTER ID

(a) Perform registration  .

NEXT



5. CONFIRM TIRE INFLATION PRESSURE (DATA LIST)

- (a) Turn the ignition switch off.
- (b) Connect Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Chassis / Tire Pressure Monitor / Data List.
- (f) Check the values by referring to the table below.

Tire Pressure Monitor

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	ID1 tire inflation pressure/ min.: Absolute pressure / 50 kPa		

ID1 Tire Inflation Pressure	(0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID2 Tire Inflation Pressure	ID2 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID3 Tire Inflation Pressure	ID3 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID4 Tire Inflation Pressure	ID4 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*

HINT:

- *: It may take a few minutes until the values are displayed.
- When no "ID Tire Inflation Pressure" data has changed, reset the tire pressure to the appropriate specified value and rotate the tire 90 to 270 degrees. Then rapidly release the tire pressure and recheck the data.

Result:

RESULT	PROCEED TO
Tire pressure values are not displayed.	A
All tire pressure readings are equal to specified values.	B

B ▶ END

A ▶ REPLACE DOOR CONTROL RECEIVER



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XN408JX
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: C2141-C2144: Transmitter ID1 Error (2013 FR-S)		

DTC	C2141	Transmitter ID1 Error
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DTC	C2142	Transmitter ID2 Error
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DTC	C2143	Transmitter ID3 Error
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DTC	C2144	Transmitter ID4 Error
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DESCRIPTION

The tire pressure warning valve and transmitters that are installed in the tire and wheel assemblies measure the tire pressures. The measured values are transmitted to the door control receiver in the vehicle as radio waves. The ECU compares the measured air pressure values with the air pressure threshold. When the measured air pressure value is less than this threshold, the warning light in the combination meter assembly illuminates.

When the internal circuit of a tire pressure warning valve and transmitter is malfunctioning, one of these DTCs is output.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C2141	If an "ERROR" signal is received 3 times consecutively, the tire pressure warning valve and transmitter will be judged as defective and a DTC will be output.	<ul style="list-style-type: none"> • Tire pressure warning valve and transmitter • Door control receiver
C2142	This will happen in situations where the inflation pressure is outside the	
C2143	range -50 to 380 kPa (-0.5 to 3.9 kgf/cm ² , -7 to 55 psi), the	
C2144	temperature inside the tire is outside the specified range -40 to 120°C (-40 to 248°F), or an error occurs in the tire pressure warning valve and transmitter or the surrounding area.	

HINT:

It is necessary to perform the following procedure to identify the tire pressure warning valve and transmitter that is malfunctioning because it cannot be identified by the output DTC.

INSPECTION PROCEDURE

NOTICE:

- When replacing the door control receiver, read the IDs stored in the old ECU using the Techstream and write them down before removal.

- It is necessary to perform registration **INFO** of the transmitter IDs into the tire pressure warning ECU after the ECU has been replaced.
- When replacing the door control receiver on vehicles, be sure to perform Registration of Recognition Code to register the transmitter IDs after ECU replacement **INFO** .

PROCEDURE

1.	IDENTIFY TRANSMITTER CORRESPONDING TO DTC
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- (a) Set the tire pressure to the specified value **INFO** .
- (b) Turn the ignition switch off.
- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch to ON.
- (e) Turn the Techstream on.
- (f) Enter the following menus: Chassis / Tire Pressure Monitor / Data List.
- (g) Display the "ID Tire Inflation Pressure" data for each wheel using the Techstream.
- (h) Rapidly reduce the tire pressure for each wheel at least 40 kPa (0.4 kg/cm² , 5.8 psi) within 30 seconds. If "ID Tire Inflation Pressure" displayed on the Techstream (ID1 to ID4) does not change, the tire pressure warning valve and transmitter corresponding to the unchanged "ID Tire Inflation Pressure" data was the cause of the output DTC.

HINT:

- Identify the malfunctioning tire pressure warning valve and transmitter by repeatedly decreasing the tire pressure for each tire.
- Record which "ID Tire Inflation Pressure" data (ID1 to ID4) corresponds to each tire.

Tire Pressure Monitor

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
ID1 Tire Inflation Pressure	ID1 tire inflation pressure/ min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID2 Tire Inflation	ID2 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi)	Actual tire inflation	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*

Pressure	max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	pressure	² , -7 psi) is displayed for relative pressure, data has not been received.*
ID3 Tire Inflation Pressure	ID3 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID4 Tire Inflation Pressure	ID4 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*

HINT:

*: It may take a few minutes until the values are displayed. If the values are not displayed after a few minutes, perform troubleshooting according to the inspection procedure for DTCs C2121 to C2124



(i) Check the Data List.

Result:

RESULT	DETECTION CONDITION
One of "ID Tire Inflation Pressure" data (ID1 to ID4) changed.	Normal
"ID Tire Inflation Pressure" data did not change.	Transmitter corresponding to DTC

NOTICE:

- It may take a few minutes to display the updated tire pressure data.
- When the "ID Tire Inflation Pressure" data has not changed, reset the tire pressure to the appropriate specified value and rotate the tire 90 to 270 degrees. Then rapidly release the tire pressure and recheck the data.
- Record the transmitter IDs and positions of transmitters that are normal.

(j) When the "ID Tire inflation Pressure" data (ID1 to ID4) has changed, repeat this procedure to identify the tire pressure warning valve and transmitter that corresponds to the DTC.

(k) When all of the "ID Tire Inflation Pressure" data (ID1 to ID4) has changed, identify the malfunctioning tire pressure warning valve and transmitter using the recorded ID numbers and output DTCs.

NEXT



2.	REPLACE TIRE PRESSURE WARNING VALVE AND TRANSMITTER
-----------	--

(a) Replace the identified tire pressure warning valve and transmitter with a new one INFO .

HINT:

- Before installing a new tire pressure warning valve and transmitter, read and write down its transmitter ID.
- The IDs for the tire pressure warning valve and transmitters which are not replaced should be checked using the Techstream and recorded.

NEXT



3.	REGISTRATION OF TRANSMITTER ID
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(a) Register the transmitter ID for all wheels INFO .

NEXT



4.	CONFIRM TIRE INFLATION PRESSURE (DATA LIST)
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- Turn the ignition switch off.
- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Chassis / Tire Pressure Monitor / Data List.
- Check the values by referring to the table below.

Tire Pressure Monitor

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	ID1 tire inflation pressure/ min.: Absolute pressure / 50 kPa		

ID1 Tire Inflation Pressure	(0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID2 Tire Inflation Pressure	ID2 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID3 Tire Inflation Pressure	ID3 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID4 Tire Inflation Pressure	ID4 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*

HINT:

- *: It may take a few minutes until the values are displayed.
- When no "ID Tire Inflation Pressure" data has changed, reset the tire pressure to the appropriate specified value and rotate the tire 90 to 270 degrees. Then rapidly release the tire pressure and recheck the data.

Result:

RESULT	PROCEED TO
Tire pressure values are not displayed.	A
All tire pressure readings are equal to specified values.	B

B ▶ END

A ▶ REPLACE DOOR CONTROL RECEIVER



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002DZY05VX
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: C2171: Transmitter ID not Registered (2013 FR-S)		

DTC	C2171	Transmitter ID not Registered
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DESCRIPTION

The IDs of each tire pressure warning valve and transmitter are registered to the door control receiver.

When the ECU detects that a transmitter ID code is not registered in the ECU, a DTC is stored.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C2171	Transmitter ID code is not registered. (When an ID code is unregistered for 3 minutes or more)	Door control receiver

INSPECTION PROCEDURE

NOTICE:

- When replacing the door control receiver, read the IDs stored in the old ECU using the Techstream and write them down before removal.
- It is necessary to perform registration **INFO** of the transmitter IDs into the tire pressure warning ECU after the ECU has been replaced.
- When replacing the door control receiver on vehicles, be sure to perform Registration of Recognition Code to register the transmitter IDs after ECU replacement **INFO** .

PROCEDURE

1.	CONFIRM REGISTRATION CONDITION (REGISTERED ID CODES)
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- Turn the ignition switch off.
- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Chassis / Tire Pressure Monitor / Data List.
- Check the values by referring to the table below.

Tire Pressure Monitor

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Registered ID1	Registered ID1 code/	ID No. registered for transmitter ID1	

code	min.: 0 max.: FFFFFFFF*	displayed	-
Registered ID2 code	Registered ID2 code/ min.: 0 max.: FFFFFFFF*	ID No. registered for transmitter ID2 displayed	-
Registered ID3 code	Registered ID3 code/ min.: 0 max.: FFFFFFFF*	ID No. registered for transmitter ID3 displayed	-
Registered ID4 code	Registered ID4 code/ min.: 0 max.: FFFFFFFF*	ID No. registered for transmitter ID4 displayed	-

HINT:

*: **Displayed only when the ID No. is not registered.**


OK:

The registered transmitter ID codes are displayed on the Techstream.

NG ► **PERFORM REGISTRATION (TRANSMITTER ID)**

OK ► **REPLACE DOOR CONTROL RECEIVER**

2.	PERFORM REGISTRATION (TRANSMITTER ID)
-----------	--

(a) Register the transmitter IDs for all the wheels  .

NEXT



3.	CONFIRM TIRE INFLATION PRESSURE (DATA LIST)
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(a) Turn the ignition switch off.

(b) Connect the Techstream to the DLC3.

(c) Turn the ignition switch to ON.

(d) Turn the Techstream on.

(e) Enter the following menus: Chassis / Tire Pressure Monitor / Data List.

(f) Check the values by referring to the table below.

Tire Pressure Monitor

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
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ID1 Tire Inflation Pressure	ID1 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID2 Tire Inflation Pressure	ID2 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID3 Tire Inflation Pressure	ID3 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID4 Tire Inflation Pressure	ID4 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*

HINT:

- *: It may take a few minutes until the values are displayed.
- When no "ID Tire Inflation Pressure" data has changed, reset the tire pressure to the appropriate specified value and rotate the tire 90 to 270 degrees. Then rapidly release the tire pressure and recheck the data.

Result:

RESULT	PROCEED TO
--------	------------

All tire pressure readings are equal to specified values.	A
Tire pressure values are not displayed.	B

B ▶ REPLACE DOOR CONTROL RECEIVER

A ▶ END



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000026PN07UX
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: C2176: Receiver Error (2013 FR-S)		

DTC	C2176	Receiver Error
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DESCRIPTION

The signals are transmitted to the door control receiver in the vehicle as radio waves.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C2176	Malfunction in the door control receiver internal circuit	Door control receiver

INSPECTION PROCEDURE

NOTICE:

- When replacing the door control receiver, read the IDs stored in the old ECU using the Techstream and write them down before removal.
- It is necessary to perform registration **INFO** of the transmitter IDs into the tire pressure warning ECU after the ECU has been replaced.
- When replacing the door control receiver on vehicles, be sure to perform Registration of Recognition Code to register the transmitter IDs after ECU replacement **INFO** .

PROCEDURE

1.	CHECK DTC OUTPUT (C2176)
-----------	---------------------------------

- (a) Clear the DTCs **INFO** .
- (b) Turn the ignition switch off.
- (c) Turn the ignition switch to ON and check for DTCs **INFO** .
- OK:
DTC C2176 is not output.

NG ► **REPLACE DOOR CONTROL RECEIVER**

OK ► **END**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000Z8107LX
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: C2177: Initialization not Completed (2013 FR-S)		

DTC	C2177	Initialization not Completed
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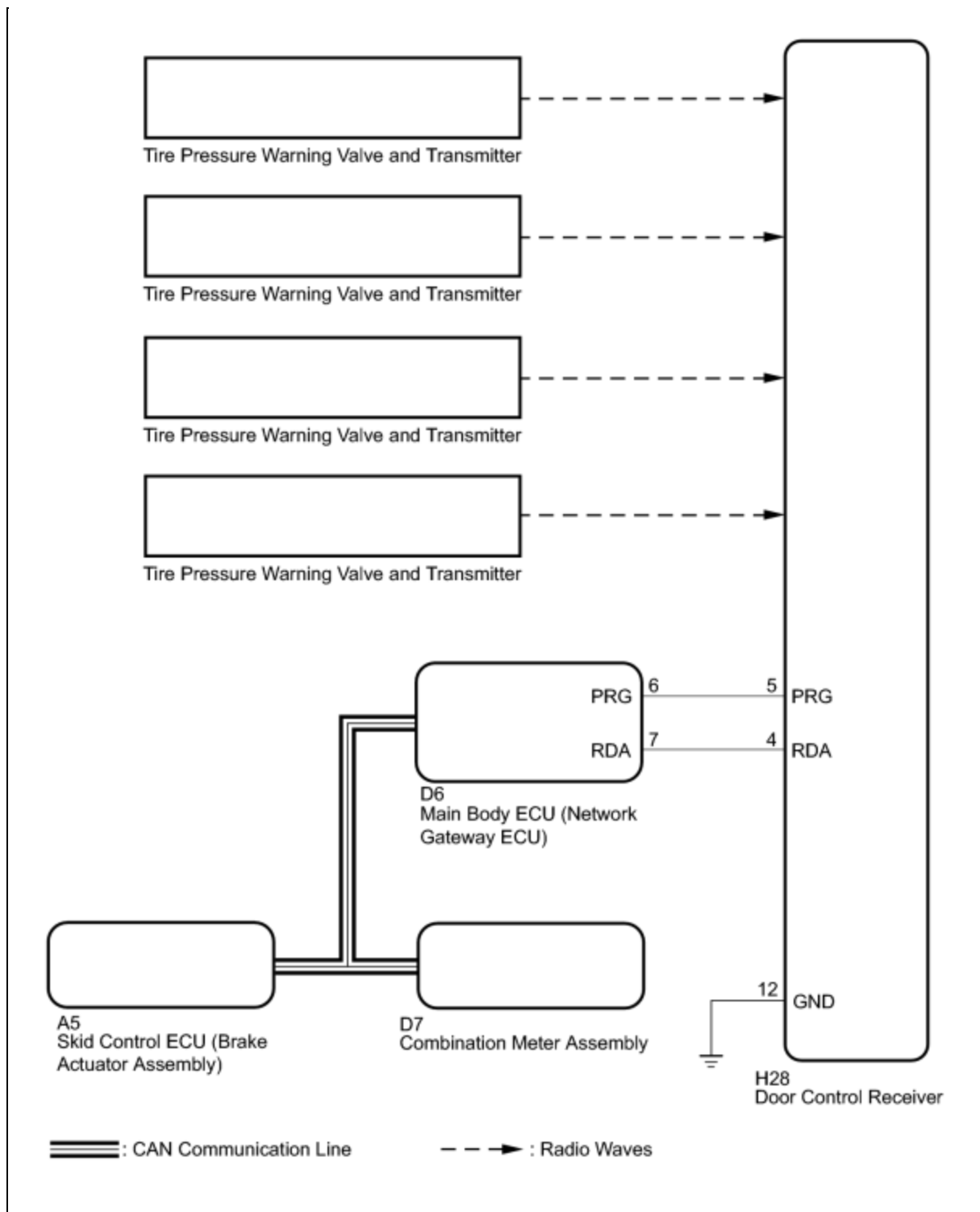
DESCRIPTION

Initialization is necessary if one of the following occurs:

- The door control receiver is replaced.
- A tire pressure warning valve and transmitter is replaced.
- Tires with a different tire standard pressure are installed.
- The tires are rotated.
- A new vehicle is delivered.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C2177	<p>All conditions below are met:</p> <ul style="list-style-type: none"> • During initialization • Tire pressure warning valve and transmitter is not in stop mode • Signal is not received from tire pressure warning valve and transmitter for 20 minutes or more • Vehicle speed is more than 37 km/h (23 mph) for a total of 20 minutes 	<ul style="list-style-type: none"> • Tire pressure warning valve and transmitter • Wire harness or connector • Door control receiver

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- When replacing the door control receiver, read the IDs stored in the old ECU using the Techstream and write them down before removal.
- It is necessary to perform registration **INFO** of the transmitter IDs into the tire pressure warning ECU after the ECU has been replaced.
- When replacing the door control receiver on vehicles, be sure to perform Registration of Recognition Code to register the transmitter IDs after ECU replacement **INFO** .

PROCEDURE

1. CHECK FREQUENCY RECEIVING CONDITION

(a) Check that the vehicle is not located in an area such as described below:

- (1) Facilities or devices that use similar radio frequencies are located in the vicinity of the vehicle.

HINT:

If the vehicle is located in an area such as the one described above, the tire pressure warning light may come on after blinking 1 minute only in a particular area due to interfering radio frequencies.

- (2) Devices using similar radio frequencies are used in the vehicle.

OK:

Facilities, or devices that use similar radio frequencies are not located in the vicinity of the vehicle.

HINT:

Radio transmissions may be interrupted due to the surroundings, or devices installed by the user.

NG  **CHECK IF ANY DEVICE IS INSTALLED BY USER**

OK



2. CONFIRM TIRE INFLATION PRESSURE (DATA LIST)

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Chassis / Tire Pressure Monitor / Data List.
- (f) Check the values by referring to the table below.

Tire Pressure Monitor

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	ID1 tire inflation pressure/ min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative		

ID1 Tire Inflation Pressure	pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID2 Tire Inflation Pressure	ID2 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID3 Tire Inflation Pressure	ID3 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*
ID4 Tire Inflation Pressure	ID4 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*

HINT:

- *: It may take a few minutes until the values are displayed.
- When no "ID Tire Inflation Pressure" data has changed, reset the tire pressure to the appropriate specified value and rotate the tire 90 to 270 degrees. Then rapidly release the tire pressure and recheck the data.

Result:

RESULT	PROCEED TO
All tire pressure readings are equal to specified values.	A
Tire pressure values are not displayed.	B

B ▶ GO TO DTC C2121 TO C2124

A ▶ END



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003B9X02AX
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: C2179: Tire Pressure Monitor ECU Communication Stop (2013 FR-S)		

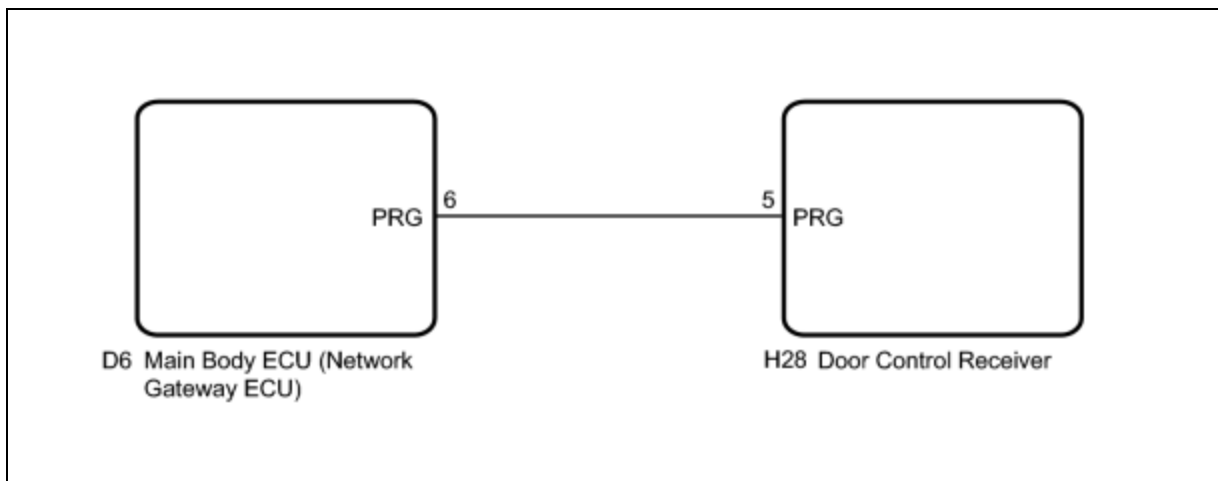
DTC	C2179	Tire Pressure Monitor ECU Communication Stop
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DESCRIPTION

The main body ECU (network gateway ECU) sends signals to the door control receiver via a direct line.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
C2179	Communication between the main body ECU (network gateway ECU) and door control receiver is interrupted for 10 seconds or more.	<ul style="list-style-type: none"> • Main body ECU (network gateway ECU) • Wire harness or connector • Door control receiver

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- When replacing the door control receiver, read the IDs stored in the old ECU using the Techstream and write them down before removal.
- It is necessary to perform registration **WFO** of the transmitter IDs into the tire pressure warning ECU after the ECU has been replaced.
- When replacing the door control receiver on vehicles, be sure to perform Registration of Recognition Code to register the transmitter IDs after ECU replacement **WFO**.

PROCEDURE

1.	CHECK HARNESS AND CONNECTOR (DOOR CONTROL RECEIVER - MAIN BODY ECU (NETWORK GATEWAY ECU))
----	--

(a) Disconnect the H28 door control receiver connector and the D6 main body ECU (network gateway ECU) connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H28-5 (PRG) - D6-6 (PRG)	Always	Below 1 Ω
H28-5 (PRG) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



2.	REPLACE DOOR CONTROL RECEIVER
----	--------------------------------------

(a) Replace the door control receiver  .

NEXT



3.	CHECK DTC OUTPUT
----	-------------------------

(a) Clear the DTCs  .

(b) Turn the ignition switch off.

(c) Turn the ignition switch to ON.

(d) Check for DTCs  .

OK:

DTC C2179 is not output.

NG  **REPLACE MAIN BODY ECU (NETWORK**

GATEWAY ECU)

OK ► END



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XMY07AX
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

DATA LIST / ACTIVE TEST

1. READ DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Chassis / Tire Pressure Monitor / Data List.
- (f) According to the display on the Techstream, read the Data List.

Tire Pressure Monitor

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Mode Status	Tire pressure warning system mode/ NORMAL or TEST	NORMAL: Normal mode TEST: Test mode	-
Main Tire	Number of main tire ID to be registered/ 4 or 5	4 to 5 displayed	-
Initialization Switch*3	Tire pressure warning reset switch/ ON, OFF	ON: Switch on OFF: Switch off	-
Vehicle Speed	Vehicle speed reading/ min.: 0 km/h (0 mph), max.: 255 km/h (158 mph)	Actual vehicle speed	Speed indicated on the combination meter assembly
Registered ID1 Code	Registered ID1 code/ min.: 0, max.: FFFFFFF*1	ID No. registered for transmitter ID1	-

		displayed	
Registered ID2 Code	Registered ID2 code/ min.: 0, max.: FFFFFFFF*1	ID No. registered for transmitter ID2 displayed	-
Registered ID3 Code	Registered ID3 code/ min.: 0, max.: FFFFFFFF*1	ID No. registered for transmitter ID3 displayed	-
Registered ID4 Code	Registered ID4 code/ min.: 0, max.: FFFFFFFF*1	ID No. registered for transmitter ID4 displayed	-
Registered ID5 Code*3	Registered ID5 code/ min.: 0, max.: FFFFFFFF*1	ID No. registered for transmitter ID5 displayed	-
ID1 Temperature in Tire	ID1 temperature in tire/ min.: -40°C (-40°F), max.: 120°C (248°F)	Actual tire temperature	If -40°C (-40°F) is displayed, data has not been received.
ID2 Temperature in Tire	ID2 temperature in tire/ min.: -40°C (-40°F), max.: 120°C (248°F)	Actual tire temperature	If -40°C (-40°F) is displayed, data has not been received.
ID3 Temperature in Tire	ID3 temperature in tire/ min.: -40°C (-40°F), max.: 120°C (248°F)	Actual tire temperature	If -40°C (-40°F) is displayed, data has not been received.
ID4 Temperature in Tire	ID4 temperature in tire/ min.: -40°C (-40°F), max.: 120°C (248°F)	Actual tire temperature	If -40°C (-40°F) is displayed, data has not been received.
ID5 Temperature in Tire*3	ID5 temperature in tire/ min.: -40°C (-40°F), max.: 120°C (248°F)	Actual tire temperature	If -40°C (-40°F) is displayed, data has not been received.
ID1 Battery Voltage	ID1 battery voltage/OVER or LESS	OVER	-
ID2 Battery Voltage	ID2 battery voltage/OVER or LESS	OVER	-
ID3 Battery Voltage	ID3 battery voltage/OVER or LESS	OVER	-
ID4 Battery Voltage	ID4 battery voltage/OVER or LESS	OVER	-

ID5 Battery Voltage*3	ID5 battery voltage/OVER or LESS	OVER	-
Initialization Switch Info*3	Tire pressure warning reset switch setting information/WITH or WITHOUT	WITHOUT	-
ID1 Tire Inflation Pressure	ID1 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*2
ID2 Tire Inflation Pressure	ID2 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*2
ID3 Tire Inflation Pressure	ID3 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*2
ID4 Tire Inflation Pressure	ID4 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Actual tire inflation pressure	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5 kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*2
ID5 Tire	ID5 tire inflation pressure / min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-	Actual tire	If 50 kPa (0.5 kgf/cm ² , 7 psi) is displayed for absolute pressure or -50 kPa (-0.5

Inflation Pressure*3	0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	inflation pressure	kgf/cm ² , -7 psi) is displayed for relative pressure, data has not been received.*2
ID1 Initial Threshold of Low-pressure	ID1 initial threshold of low-pressure/ min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Tire pressure after initialization	-
ID2 Initial Threshold of Low-pressure	ID2 initial threshold of low-pressure/ min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Tire pressure after initialization	-
ID3 Initial Threshold of Low-pressure	ID3 initial threshold of low-pressure/ min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Tire pressure after initialization	-
ID4 Initial Threshold of Low-pressure	ID4 initial threshold of low-pressure/ min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Tire pressure after initialization	-
	ID5 initial threshold of low-		

ID5 Initial Threshold of Low-pressure*3	pressure/ min.: Absolute pressure / 50 kPa (0.5 kgf/cm ² , 7 psi), Relative pressure / -50 kPa (-0.5 kgf/cm ² , -7 psi) max.: Absolute pressure / 480 kPa (4.9 kgf/cm ² , 70 psi), Relative pressure / 380 kPa (3.9 kgf/cm ² , 55 psi)	Tire pressure after initialization	-
Number of Trouble Code	Number of DTCs recorded/min.: 0, max.: 255	Min.: 0, Max.: -	-

HINT:

*1: Displayed only when the ID No. is not registered.

*2: It may take a few minutes until the values are displayed. If the values are not displayed after a few minutes, perform troubleshooting according to the inspection procedure for DTCs C2121 to C2124



*3: This item is displayed on the Techstream, however, it is not used for this vehicle.

2. PERFORM ACTIVE TEST

Using the Techstream to perform Active Tests allows the relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in trouble shooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Body Electrical / Combination Meter / Active Test.
- (f) Check the operation by referring to the table below.

Combination Meter

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Indicat. Tire Pressure Warning System	Tire pressure warning light	Tire pressure warning light OFF or ON	Confirm that the vehicle is stopped, engine idling



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XMW081X
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: DIAGNOSIS SYSTEM (2013 FR-S)		

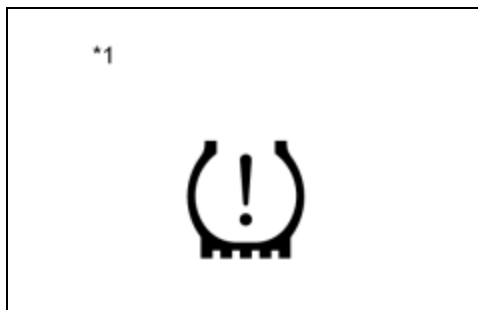
DIAGNOSIS SYSTEM

1. CHECK WARNING LIGHT

NOTICE:

- When there is a problem with the tire pressure warning system, the tire pressure warning light blinks at 0.5 second intervals, and illuminates after 1 minute.
- When the malfunction has been corrected, the tire pressure warning light does not illuminate.
- When the tire pressure warning light illuminates, immediately check the tire pressures of the tire and adjust it to the specified value(s).
- After the ignition switch is turned to ON, the tire pressure warning light illuminates for 3 seconds and then goes off. If the warning light does not illuminate for 3 seconds, proceed to the troubleshooting for the tire pressure warning light circuit INFO.

(a) Turn the ignition switch to ON.



(b) Check that the tire pressure warning light illuminates for 3 seconds.

Text in Illustration

*1	Tire Pressure Warning Light
----	-----------------------------

2. WHAT TO CONSIDER WHEN TIRE PRESSURE WARNING LIGHT ILLUMINATES

- (a) When the tire pressure warning light does not go off, or when it illuminates during driving, check the tire pressure. If the tire pressure warning light illuminates within several hours after adjusting the tire pressure, the tire may have a slow air leak.
- (b) The system is disabled in the following conditions (when the condition becomes normal, the system will work properly).
- (1) When all of the tires and wheels that have the tire pressure warning valve and transmitters registered with the door control receiver have not been installed.
 - (2) When all of the transmitter ID codes are not registered with the door control receiver.
 - (3) When the tire pressure is abnormally high (absolute pressure: 480 kPa (4.9 kgf/cm² , 70 psi) or more; relative pressure: 380 kPa (3.9 kgf/cm² , 55 psi) or more).
 - (4) When the tire pressure warning valve and transmitter battery is depleted.
- (c) The system may become disabled in the following conditions (when the condition becomes normal, the system will work properly).
- (1) When electric devices or facilities using similar radio frequencies are nearby.
 - (2) When a wireless device or other equipment operating at a similar frequency is in use in the

vehicle.

- (3) When a window tint that affects radio wave signals is installed.
- (4) When there is a lot of snow or ice on the vehicle, in particular, around the wheels or wheel housing.
- (5) When non-genuine wheels are used.
- (6) When tire chains are used.
- (7) When aftermarket tire repair sealant is used.

CAUTION:

After use of tire repair sealant, replacement of the tire pressure warning valve and transmitter is required to ensure normal system operation. (Normal system operation cannot be ensured by only repairing or replacing the tire.)

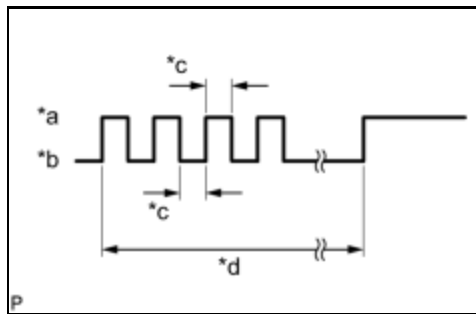
3. TIRE PRESSURE WARNING LIGHT AND INDICATOR CHART

HINT:

The table below indicates the state of the tire pressure warning light after the ignition switch is turned to ON.

	IMMEDIATELY AFTER TURNING THE IGNITION SWITCH TO ON	ALWAYS			
		WARNING LIGHT OUTPUT PATTERN			
	ILLUMINATES FOR 3 SEC.	GOES OFF	ILLUMINATES	BLINKS*1	BLINKS*2
Normal	○	○	-	-	-
Low tire pressure	○	-	○	-	-
System failure	○	-	-	○	-
Test mode (signal check mode)	○	-	-	-	○
ECU connector poorly connected	-	-	-	○	-

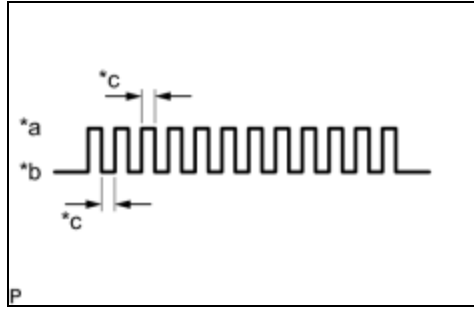
*1: Illuminates and goes off repeatedly at 0.5 second intervals, and illuminates after 1 minute.



Text in Illustration

*a	ON
*b	OFF
*c	0.5 sec.
*d	1 minute

*2: Illuminates and goes off repeatedly at 0.125 second intervals.



Text in Illustration

*a	ON
*b	OFF
*c	0.125 sec.

4. Normal mode DTCs

- (a) DTCs are stored in the door control receiver and output by the blinking of tire pressure warning light or by using the Techstream [INFO](#) .

5. Test mode (signal check mode) DTCs

- (a) By switching from normal mode into test mode (input signal check), you can inspect the door control receiver, each tire pressure warning valve and transmitter [INFO](#) .

6. FAIL-SAFE FUNCTION

- (a) When a system malfunction occurs in the tire pressure warning system, the tire pressure warning light illuminates after blinking for 1 minute to inform the driver of the system failure.
- (b) The result of this diagnosis code is stored in the door control receiver.

Last Modified: 3-27-2012	6.4 S	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XMR06UX
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: DIAGNOSTIC TROUBLE CODE CHART (2013 FR-S)		

DIAGNOSTIC TROUBLE CODE CHART

HINT:

If a trouble code is displayed during the DTC check, inspect the circuit listed for that code. For details of each code, refer to the relevant page listed under respective "DTC Code" in the DTC chart.

Door Control Receiver

DTC CODE	DETECTION ITEM	SEE PAGE
C2111	Transmitter ID1 Operation Stop	INFO
C2112	Transmitter ID2 Operation Stop	INFO
C2113	Transmitter ID3 Operation Stop	INFO
C2114	Transmitter ID4 Operation Stop	INFO
C2121	No Signal from Transmitter ID1	INFO
C2122	No Signal from Transmitter ID2	INFO
C2123	No Signal from Transmitter ID3	INFO
C2124	No Signal from Transmitter ID4	INFO
C2126	Transmitter ID not Received in Main Mode	INFO
C2141	Transmitter ID1 Error	INFO
C2142	Transmitter ID2 Error	INFO
C2143	Transmitter ID3 Error	INFO
C2144	Transmitter ID4 Error	INFO
C2171	Transmitter ID not Registered	INFO
C2176	Receiver Error	INFO
C2177	Initialization not Completed	INFO
C2179	Tire Pressure Monitor ECU Communication Stop	INFO
C2181	Transmitter ID1 not Received (Test Mode DTC)	INFO
C2182	Transmitter ID2 not Received (Test Mode DTC)	INFO
C2183	Transmitter ID3 not Received (Test Mode DTC)	INFO
C2184	Transmitter ID4 not Received (Test Mode DTC)	INFO

Main Body ECU (Network Gateway ECU)

DTC CODE	DETECTION ITEM	SEE PAGE

B1247

Tire Pressure Monitor Receiver Communication Stop

INFO



TOYOTA

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XMX081X
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: DTC CHECK / CLEAR (2013 FR-S)		

DTC CHECK / CLEAR

1. CHECK DTC (for DOOR CONTROL RECEIVER)

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Chassis / Tire Pressure Monitor / Trouble Codes.
- (f) Read the DTCs.

2. CHECK DTC (for MAIN BODY ECU (NETWORK GATEWAY ECU))

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Body Electrical / Main Body / Trouble Codes.
- (f) Read the DTCs.

3. CLEAR DTC (for DOOR CONTROL RECEIVER)

HINT:

After repairing the malfunctions, clear the DTCs.

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Chassis / Tire Pressure Monitor / Trouble Codes.
- (f) Clear DTCs following the prompts on the Techstream screen.

HINT:

Refer to the Techstream operator's manual for further details.

4. CLEAR DTC (for MAIN BODY ECU (NETWORK GATEWAY ECU))

HINT:

After repairing the malfunctions, clear the DTCs.

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.

(d) Turn the Techstream on.

(e) Enter the following menus: Body Electrical / Main Body / Trouble Codes.

(f) Clear DTCs following the prompts on the Techstream screen.

HINT:

Refer to the Techstream operator's manual for further details.



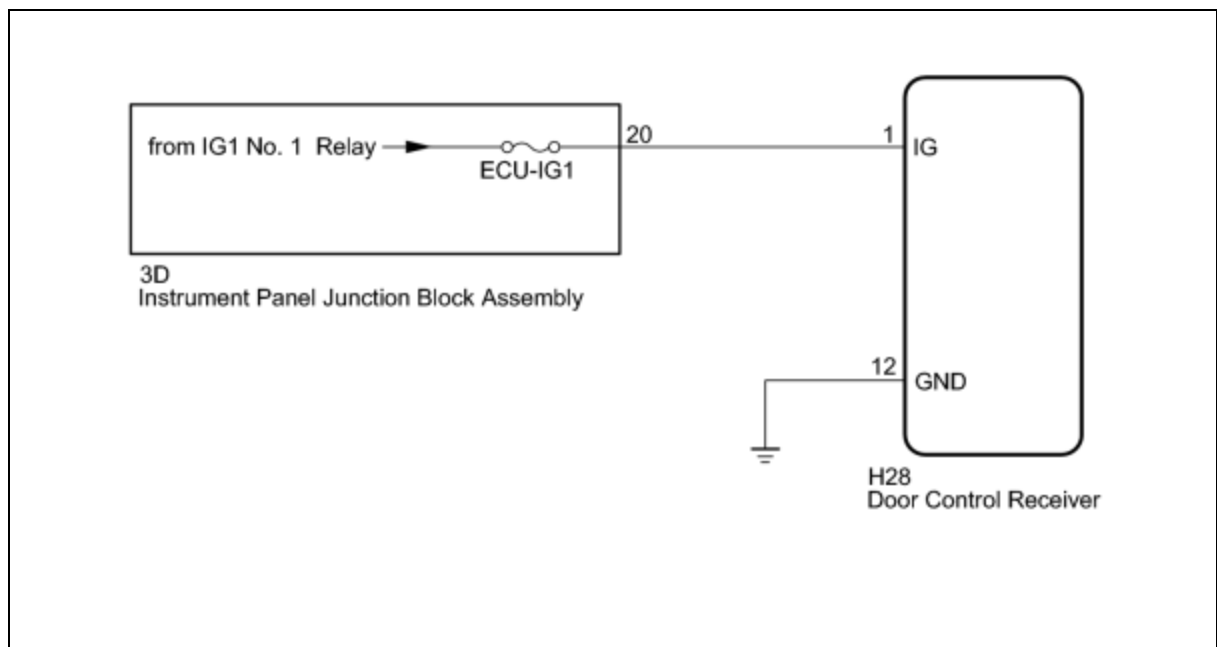
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XN206LX
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: ECU Power Source Circuit (2013 FR-S)		

[ECU Power Source Circuit](#)

DESCRIPTION

This is the power source for the door control receiver.

WIRING DIAGRAM



INSPECTION PROCEDURE

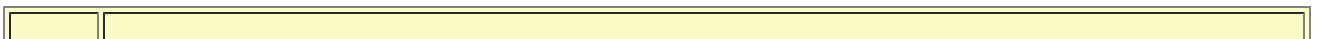
NOTICE:

- When replacing the door control receiver, read the IDs stored in the old ECU using the Techstream and write them down before removal.
- It is necessary to perform registration **INFO** of the transmitter IDs into the door control receiver after the ECU has been replaced.
- When replacing the door control receiver on vehicles, be sure to perform Registration of Recognition Code to register the transmitter IDs after ECU replacement **INFO** .

HINT:

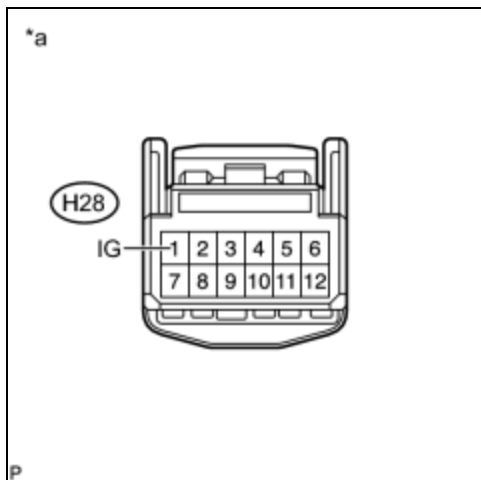
Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE



1. CHECK HARNESS AND CONNECTOR (DOOR CONTROL RECEIVER - BATTERY AND BODY GROUND)

(a) Disconnect the H28 door control receiver connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
H28-1 (IG) - Body ground	Ignition switch ON	11 to 14 V
	Ignition switch off	Below 1 V

Text in Illustration

*a	Front view of wire harness connector (to Door Control Receiver)
----	---

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H28-12 (GND) - Body ground	Always	Below 1 Ω

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ REPLACE DOOR CONTROL RECEIVER

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XMQ071X
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedure to troubleshoot the tire pressure warning system.
- Make sure that the wireless door lock control system has exited diagnostic mode before performing the following procedure.
- *: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	CUSTOMER PROBLEM ANALYSIS
-----------	----------------------------------

- (a) Interview the customer to confirm the trouble.

HINT:

It is important to collect as much specific information as possible from the customer to allow for a quick repair.

NEXT



3.	ADJUST TIRE PRESSURE*
-----------	------------------------------

- (a) Turn the ignition switch off.
- (b) Set the all tire pressure to the specified value INFO .
- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch to ON.
- (e) Enter the following menus: Chassis / Tire Pressure Monitor / Data List.
- (f) Read the "ID Tire Inflation Pressure" values.
- (g) Check the Data List INFO .

HINT:

- It takes a few minutes to display the updated tire pressure data.
- If the problem is that the tire pressure decreases, wait until all of the tire pressure data is received by the ECU. If the data is received, the tire pressure warning light will go off.

Result:

CONDITION	PROCEED TO
Tire pressure warning light remains on	A
Tire pressure warning light goes off	B

B ► GO TO STEP 11

A



4.	CHECK ECU CONNECTED TO CAN BUS*
-----------	--

(a) Check the ECUs connected to the CAN bus  .

Result:


RESULT	PROCEED TO
No malfunction appears	A
Malfunction appears	B

B ► Go to CAN COMMUNICATION SYSTEM

A



5.	CHECK FOR DTC (CAN COMMUNICATION SYSTEM)*
-----------	--

(a) Check for DTCs  .

Result:


RESULT	PROCEED TO
CAN system DTC is not output	A
CAN system DTC is output	B

B  **Go to CAN COMMUNICATION SYSTEM**

A



6.	CHECK FOR DTC*
-----------	-----------------------

(a) Check for DTCs  .

Result:

RESULT	PROCEED TO
DTC is output	A
DTC is not output	B

B  **GO TO STEP 8**

A



7.	DTC CHART
-----------	------------------

(a) Refer to Diagnostic Trouble Code Chart  .

NEXT  **GO TO STEP 10**

8.	PROBLEM SYMPTOMS TABLE
-----------	-------------------------------

(a) Refer to Problem Symptoms Table  .

NEXT



9.	CIRCUIT INSPECTION*
-----------	----------------------------

(a) Refer to Electronic Circuit Inspection Procedure  .

NEXT



10.	REPAIR OR REPLACE
------------	--------------------------

(a) Repair or replace parts based on the diagnosis result.

NEXT



11.	CONFIRMATION TEST*
------------	---------------------------

(a) Check the Data List to confirm that the tire inflation pressure has been received  .

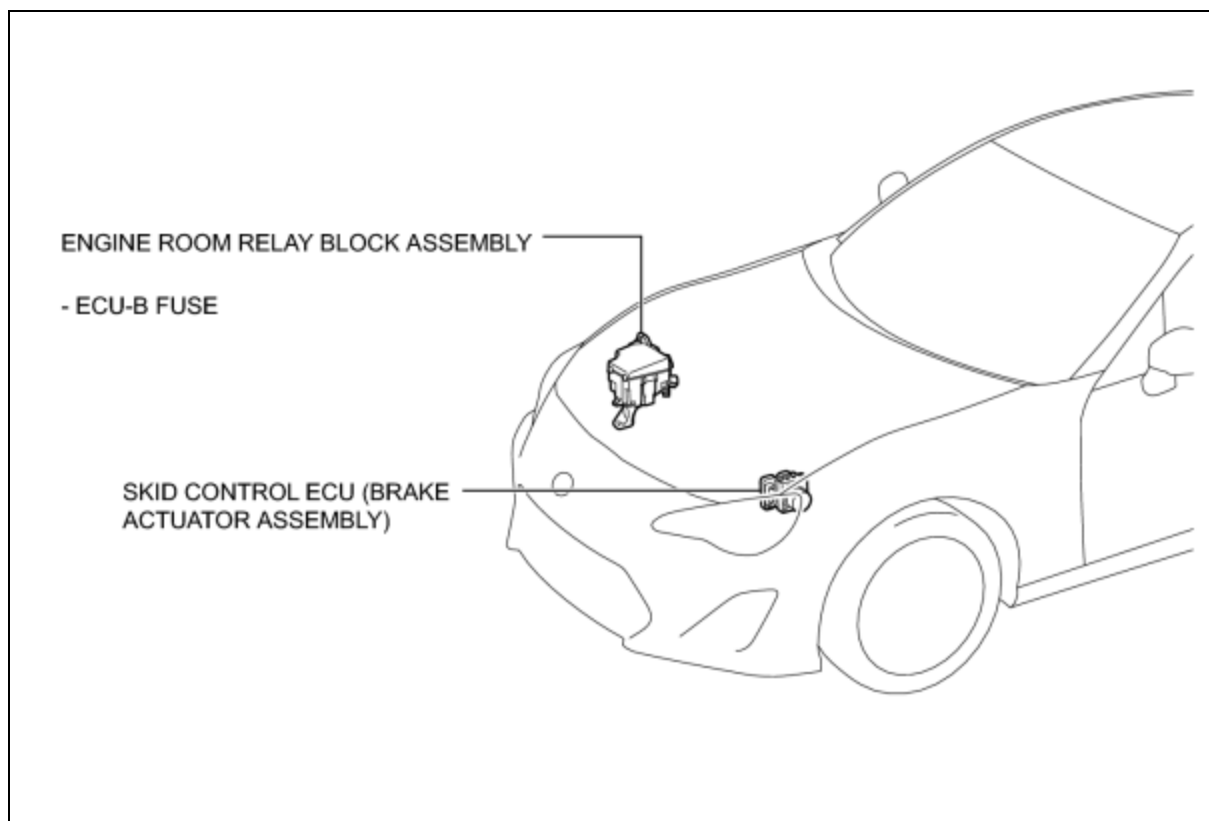
NEXT  **END**



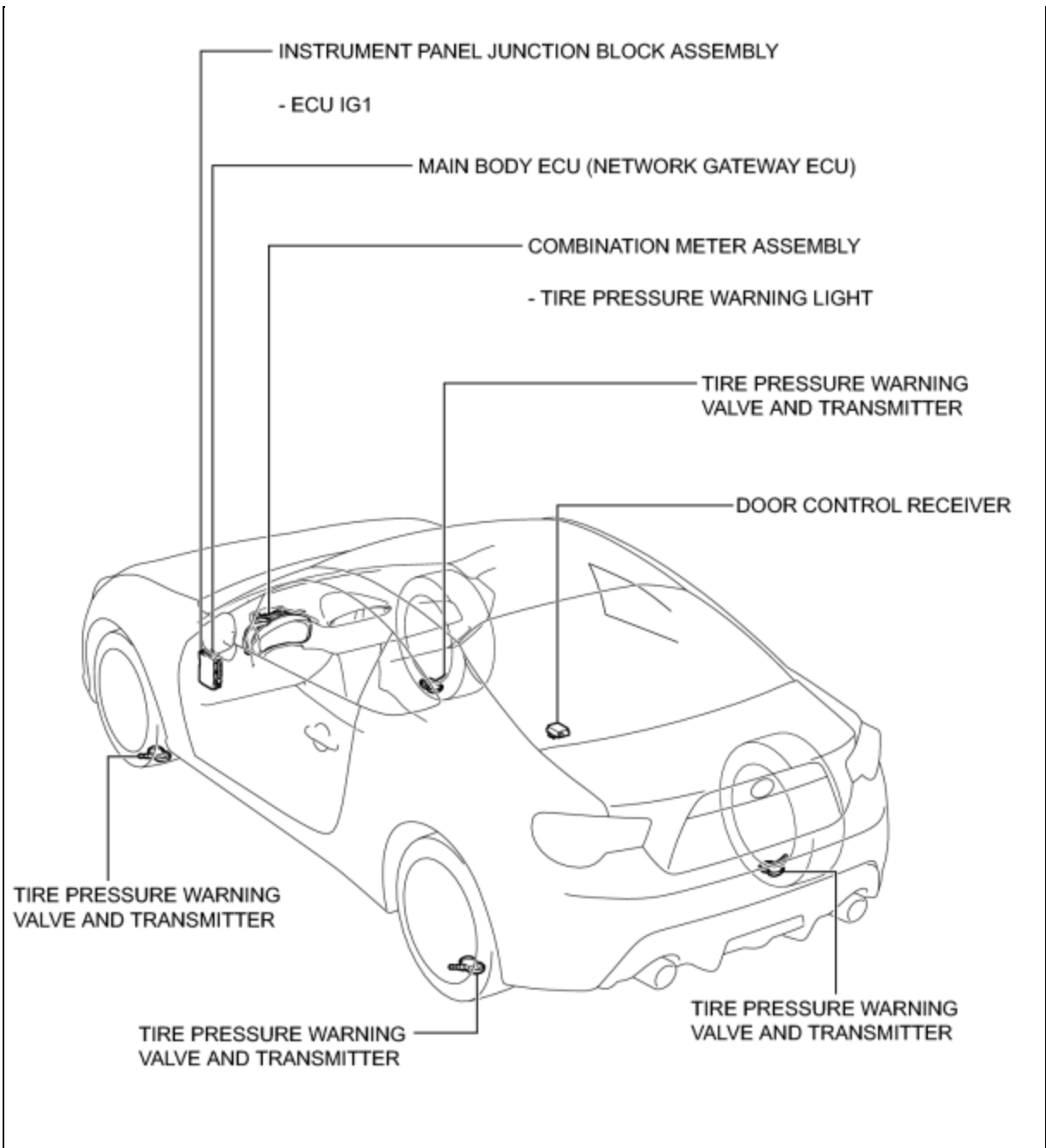
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XML063X
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XMK07SX
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

1. TIRE PRESSURE WARNING SYSTEM PRECAUTION

- (a) It is necessary for the tire pressures to be adjusted periodically because tire pressure decreases naturally over time.
- (b) In winter, tire pressure may decrease due to low ambient temperatures (tire pressure decreases by approximately 10 kPa (0.1 kgf/cm², 1.5 psi) for every 10°C (50°F) drop in the ambient temperature). Therefore, the tire pressure warning system is more likely to indicate a warning if the tire pressures are not adjusted appropriately. If the daily temperature variation is large, add enough so that the tire pressures are suitable under cold conditions. As a result, unnecessary tire pressure warning operation should decrease.
- (c) Depending on the tire type, the system may not function properly even if the specified wheels are used.
- (d) To prevent damage to the tire pressure warning valve and transmitter, make sure that the tire pressure warning valve and transmitter does not interfere with the tire bead when installing or removing a tire.
- (e) To prevent damage to the tire pressure warning valve and transmitter, before disengaging the tire bead or removing the tire from the wheel, drop the tire pressure warning valve and transmitter into the wheel.
- (f) Always use a new grommet, washer and nut when installing a tire pressure warning valve and transmitter, to ensure the sealing performance.
- (g) When one or more tire pressure warning valve and transmitters or the door control receiver is replaced, the transmitter IDs for all of the tire pressure warning valve and transmitters must be re-registered. Before registering the transmitter ID of the new tire pressure warning valve and transmitter, check the Data List and record all of the transmitter IDs that are already registered.
- (h) Use only a specified cap. If an unspecified cap is used, it may seize to the tire pressure warning valve and transmitter.
- (i) The system is disabled in the following conditions (when the condition becomes normal, the system will work properly).
 - (1) When all of the tires and wheels that have the tire pressure warning valve and transmitters registered with the door control receiver have not been installed.
 - (2) When all of the transmitter ID codes are not registered with the door control receiver.
 - (3) When the tire pressure is abnormally high (absolute pressure: 480 kPa (4.9 kgf/cm², 70 psi) or more; relative pressure: 380 kPa (3.9 kgf/cm², 55 psi) or more).
 - (4) When the tire pressure warning valve and transmitter battery is depleted.
- (j) The system may become disabled in the following conditions (when the condition becomes normal, the system will work properly).
 - (1) When electric devices or facilities using similar radio frequencies are nearby.
 - (2) When a wireless device or other equipment operating at a similar frequency is in use in the vehicle.
 - (3) When a window tint that affects radio wave signals is installed.
 - (4) When there is a lot of snow or ice on the vehicle, in particular, around the wheels or wheel

housing.

- (5) When non-genuine wheels are used.
- (6) When tire chains are used.
- (7) When aftermarket tire repair sealant is used.

CAUTION:

After use of tire repair sealant, replacement of the tire pressure warning valve and transmitter is required to ensure normal system operation. (Normal system operation cannot be ensured by only repairing or replacing the tire.)



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Model Year: 2013	Model: FR-S	Doc ID: RM000000XMT07BX
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Tire Pressure Warning System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Tire pressure warning light does not illuminate despite tire pressure decreasing	Check Data List (ID Tire Inflation Pressure)	INFO
	ID code check (Registration)	INFO
Tire pressure warning light remains illuminated (Goes off during initial check)	Tire pressure warning light circuit	INFO
Tire pressure warning light remains illuminated (Illuminates during initial check)	Check Data List (ID Tire Inflation Pressure)	INFO
	Tire pressure adjustment	INFO
	ID code check (Registration)	INFO

Last Modified: 3-27-2012	6.4 M	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XN108GX
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: REGISTRATION (2013 FR-S)		

REGISTRATION

1. BEFORE REGISTRATION

NOTICE:

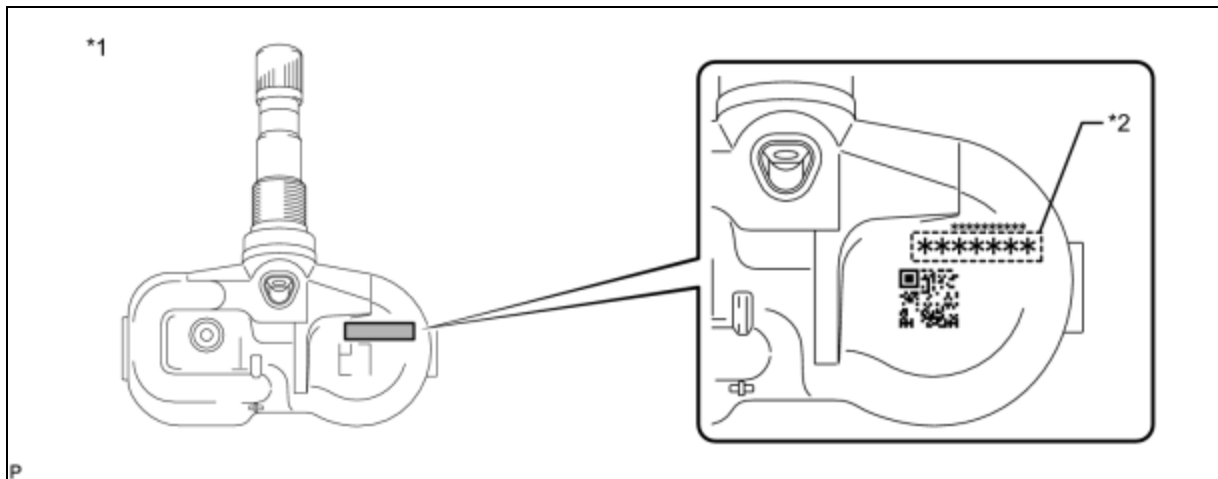
The transmitter ID is written on the tire pressure warning valve and transmitter. It is not possible to read the transmitter ID after installing the tire onto the wheel. Therefore, make a note of the transmitter ID before installing the tire.

(a) In case of door control receiver replacement:

- (1) Read the registered transmitter IDs that are stored in the old ECU using the Techstream and note them down.
- (2) If reading the stored transmitter IDs is impossible due to malfunctions of components such as the door control receiver, remove the tires from the wheels and check the IDs located on the tire pressure warning valve and transmitters.

(b) In case of tire pressure warning valve and transmitter replacement:

- (1) Take a note of the 7 digit number (transmitter ID) written on the tire pressure warning valve and transmitter.



Text in Illustration

*1	Tire Pressure Warning Valve and Transmitter	*2	Transmitter ID (7 Digit Number)
----	---	----	---------------------------------

2. REGISTER TRANSMITTER ID (USING THE TECHSTREAM)

HINT:


- The previously registered IDs will be cleared from memory when the registration is completed.
- If the ID registration step is not completed within 300 seconds, ID registration will be canceled.

- (a) Set the air pressure of all tires to the specified value(s) [INFO](#) .
- (b) Turn the ignition switch off.
- (c) Connect the Techstream to the DLC3.

- (d) Turn the ignition switch to ON and the Techstream on.
- (e) Enter the following menus: Chassis / Tire Pressure Monitor / Utility / ID Registration.
- (f) Perform the procedure displayed on the Techstream.

3. CONFIRMATION OF TRANSMITTER ID REGISTRATION

NOTICE:

- It may take up to a few minutes to update the tire pressure data. If the values are not displayed after a few minutes, perform troubleshooting according to the inspection procedure for DTCs C2121 to C2124  .
- If the IDs have not been registered, DTC C2171 is stored in the door control receiver after 3 minutes or more.
- If normal pressure values are displayed, the IDs have been registered correctly.
- If the tire pressure values are not displayed after a few minutes, the IDs may be incorrect or the system may have a malfunction.
- After all IDs are registered, DTC C2126 is stored in the door control receiver and the tire pressure warning light blinks for 1 minute and then illuminates. When the door control receiver successfully receives signals from all the transmitters whose IDs are stored in the ECU, DTC C2126 is cleared and the tire pressure warning light goes off.

- (a) Enter the following menus: Chassis / Tire Pressure Monitor / Data List.
- (b) Read the "ID Tire Inflation Pressure" values.
- (c) Confirm that the tire pressure data of all tires (except the spare tire) is displayed on the Techstream screen.

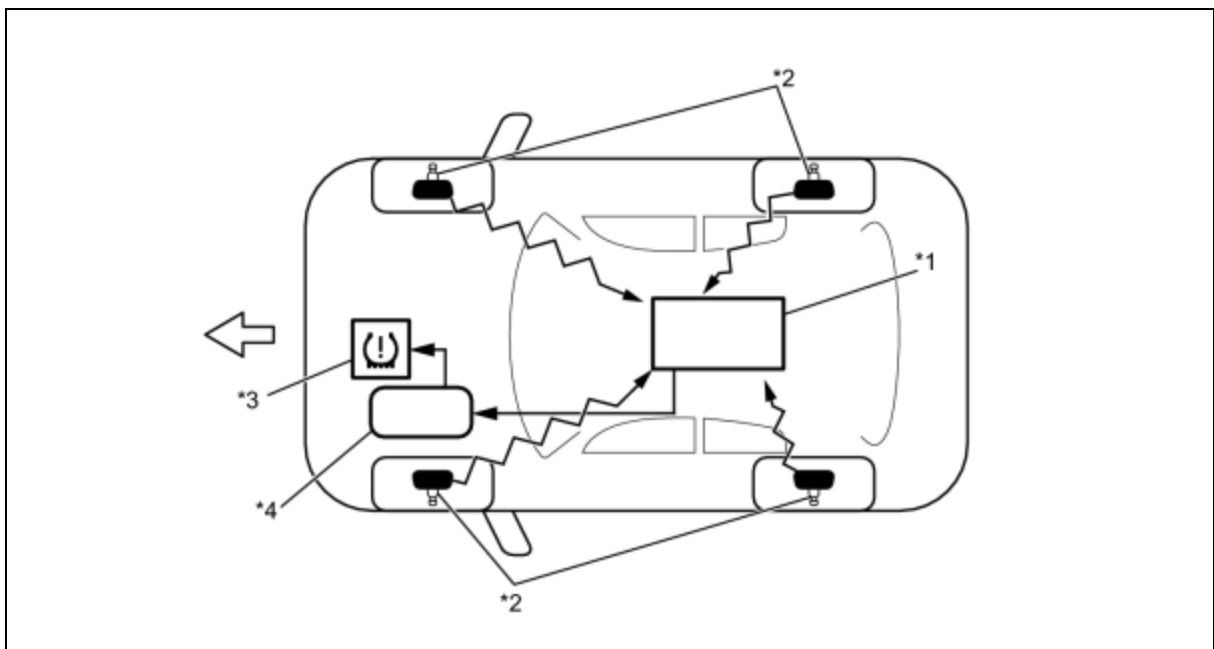


Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XMM081X
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		


SYSTEM DESCRIPTION

1. DESCRIPTION OF SYSTEM

- (a) When the tire pressure warning system detects that the tire pressure of a tire becomes lower than the threshold, it will inform the driver using a warning light.
- (b) The door control receiver receives the transmitter ID, temperature and tire pressure information from the tire pressure warning valve and transmitters shown in the following illustration. This information is used to determine when the pressure in one of the tires has dropped.



Text in Illustration

*1	Door Control Receiver	*2	Tire Pressure Warning Valve and Transmitter
*3	Combination Meter Assembly - Tire Pressure Warning Light	*4	Main Body ECU (Network Gateway ECU)
	Front	-	-

2. DESCRIPTION OF REGISTRATION

- (a) When tires and wheels are replaced, always ensure that each transmitter ID is correctly registered.
- (b) When one or more tire pressure warning valve and transmitters or the door control receiver is replaced, the transmitter IDs for all of the tire pressure warning valve and transmitters must be re-registered. Before registering the transmitter ID of the new tire pressure warning valve and

transmitter, check the Data List and record all of the transmitter IDs that are already registered.

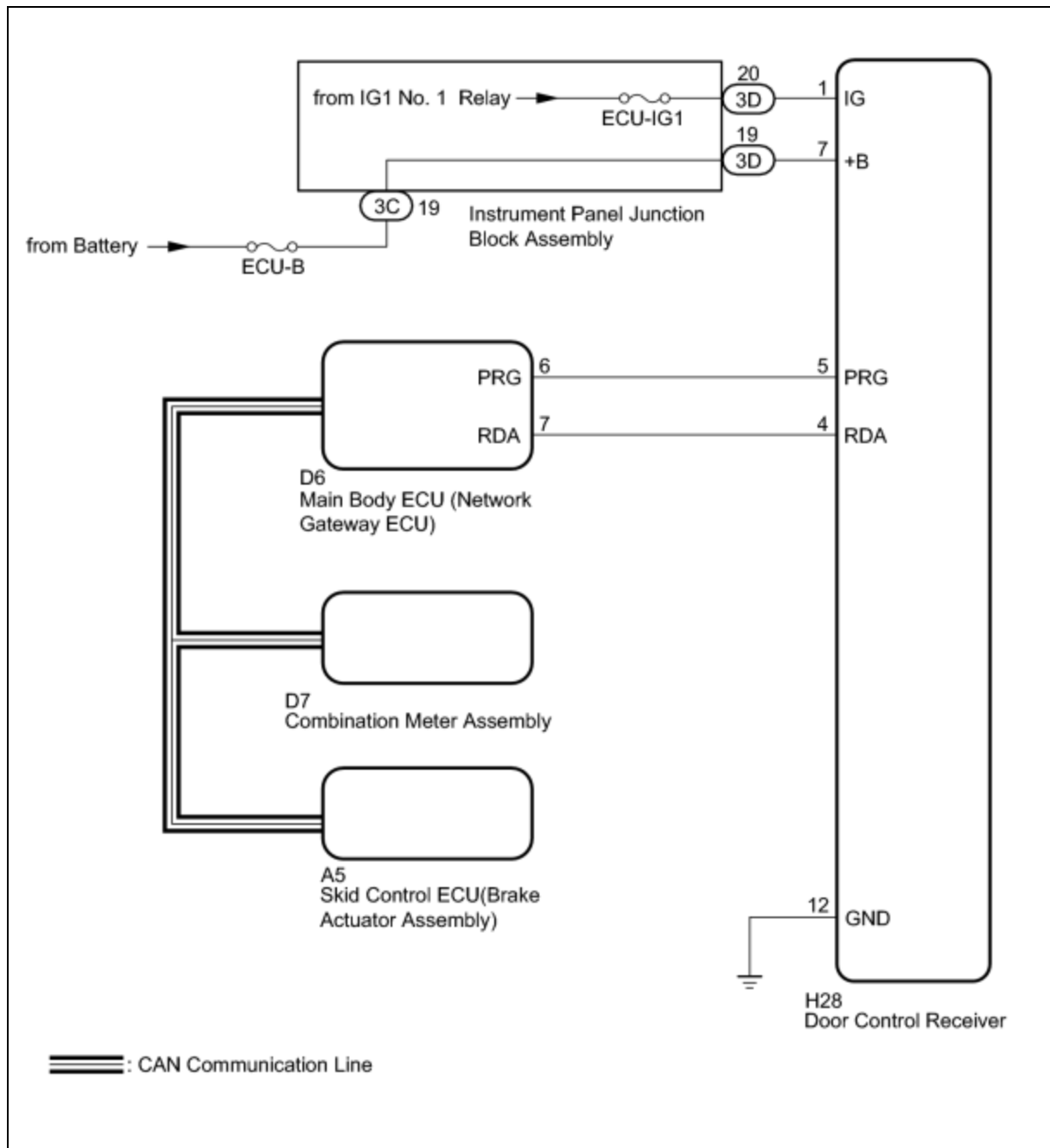
3. FUNCTION OF MAIN COMPONENTS

COMPONENT	FUNCTION
Door Control Receiver	<ul style="list-style-type: none"> • Receives the data from the tire pressure warning valve and transmitter and monitors the tire pressure. • When the door control receiver detects a drop in the tire pressure, a system malfunction, or initialization mode, it outputs the respective signal to the combination meter assembly. • When the door control receiver detects a problem with the vehicle speed signal, it uses changes in the signal strength from the tire pressure warning valve and transmitter as a judgment standard. If the ECU detects any changes in the signal strength from the tire pressure warning valve and transmitter, it determines that the vehicle is being driven.
Tire Pressure Warning Valve and Transmitter	<p>Detects the pressure and internal temperature of the tire and transmits the measured values and the ID code to the door control receiver.</p>
Combination Meter Assembly	<p>Transmits the tire pressure warning light signal to the door control receiver.</p>
Tire Pressure Warning Light	<ul style="list-style-type: none"> • Illuminates after blinking for 1 minute to warn the driver in accordance with the signal from the door control receiver. • Displays 2-digit Diagnostic Trouble Codes (DTC).
Main Body ECU (Network Gateway ECU)	<ul style="list-style-type: none"> • The main body ECU (network gateway ECU) and door control receiver are connected using 2 direct lines that they use to communicate with each other. • The main body ECU (network gateway ECU) is connected to the combination meter assembly via CAN No. 1 bus.



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XMN06DX
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM



HINT:

Each tire pressure warning valve and transmitter sends its transmitter ID, temperature and tire pressure information to the door control receiver.

TRANSMITTING ECU	RECEIVING ECU	SIGNAL	COMMUNICATION
------------------	---------------	--------	---------------

(TRANSMITTER)			METHOD
Skid Control ECU (Brake Actuator Assembly)	Main Body ECU (Network Gateway ECU)	Vehicle speed signal	CAN communication line
Main Body ECU (Network Gateway ECU)	Combination Meter Assembly	Tire pressure warning light signal	CAN communication line

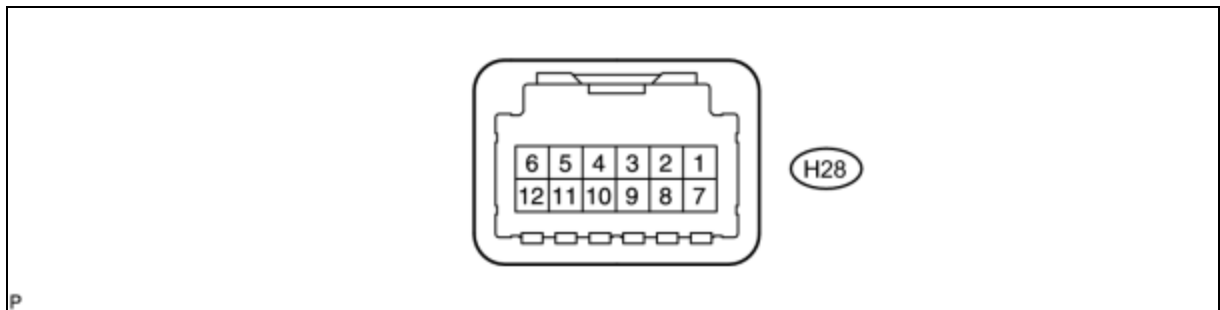
Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XMS054X
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. CHECK DOOR CONTROL RECEIVER

HINT:

Inspect the connectors from the back side while the connectors are connected.



(a) Measure the voltage and resistance according to the value(s) in the table below. If the result is not as specified, the ECU may have a malfunction.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
H28-1 (IG) - H28-12 (GND)	W - B	IG power source	Ignition switch ON	11 to 14 V
H28-4 (RDA) - H28-12 (GND)	R - B	Output signals	Ignition switch ON	Pulse generation (see waveform 1)
H28-5 (PRG) - H28-12 (GND)	P - B	Input signals	Ignition switch ON	Pulse generation (see waveform 1)
H28-7 (+B) - H28-12 (GND)	Y-R - B	Power Supply	Always	11 to 14 V
H28-12 (GND) - Body ground	B - Body ground	Ground	Always	Below 1 Ω

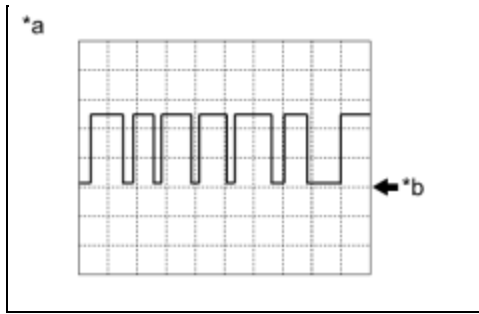
(b) Using an oscilloscope, check waveform 1.

Text in Illustration

*a	Example
*b	GND

Waveform 1:

ITEM	CONTENTS



Terminal	H28-4 (RDA) - H28-12 (GND) H28-5 (PRG) - H28-12 (GND)
Tool setting	5 V/DIV, 50 μ s./DIV.
Vehicle condition	Ignition switch ON

HINT:

The waveform shown in the illustration is an example. If the tester displays a waveform that alternates between high and low, where high is a voltage that is between the IG power source voltage and a voltage 2.2 V lower than the IG power source voltage, and where low is a voltage of between 0 and 1.2 V, the ECU can be judged normal.

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XN008BX
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: TEST MODE PROCEDURE (2013 FR-S)		

TEST MODE PROCEDURE

1. TEST MODE (SIGNAL CHECK MODE) PROCEDURE

HINT:

- When entering test mode (signal check mode), the door control receiver sets all the test mode (signal check mode) DTCs first.

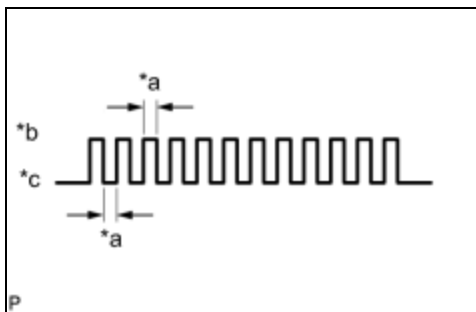
After the door control receiver completes the signal check for each inspection item, the DTCs for systems that are determined to be normal will be cleared.

The DTCs for other inspection items may not be cleared when only a certain signal is inspected.

- When test mode (signal check mode) returns to normal mode, all the test mode (signal check mode) DTCs will be cleared.
- Turn the ignition switch off.
 - Connect the Techstream to the DLC3.
 - Turn the ignition switch to ON and the Techstream on.
 - Enter the following menus: Chassis / Tire Pressure Monitor / Utility / Signal Check.

HINT:

Every time the test mode (signal check mode) DTC clear conditions are satisfied, the tire pressure warning light illuminated for 1 second. Following this, the tire pressure warning light blinks at 0.125 second intervals.



Text in Illustration

*a	0.125 sec.
*b	ON
*c	OFF

- Wait for 1.5 minutes with the vehicle stopped, or drive the vehicle for 1 minute (C21811 to C2184).

HINT:

The tire pressure warning valve and transmitters send signals to the door control receiver once every 1.5 minutes while the vehicle is stopped and once every minute while driving.

(f) Check that the tire pressure warning system test mode (signal check mode) DTCs are cleared.

TEST MODE (SIGNAL CHECK MODE) DTC	TEST SIGNAL	TEST MODE (SIGNAL CHECK MODE) DTC CLEAR CONDITION
C2181 to C2184	Transmitter Data	Data is received from the relevant transmitter which has a registered ID in the door control receiver.

(g) Result

HINT:

After the signal check is completed, check for test mode (signal check mode) DTCs to confirm the system status.

CONDITION	PROCEDURE
Test mode (signal check mode) DTC is output	Repair the faulty part and enter Signal Check again
Test mode (signal check mode) DTCs are cleared	No problem

(h) End of test mode (signal check mode)

(1) After completing the test mode (signal check mode), turn the ignition switch off and disconnect the Techstream.

(i) Test mode (signal check mode) DTCs

(1) If a trouble code is displayed during the test mode (signal check mode) DTC check, check the diagnosis procedure listed for that code. For details of each code, refer to See page below.

DTC NO.	DETECTION ITEM	TROUBLE AREA	SEE PAGE
C2181	Transmitter ID1 not received	<ul style="list-style-type: none"> • Tire pressure warning valve and transmitter • Harness or connector • Door control receiver 	INFO
C2182	Transmitter ID2 not received	<ul style="list-style-type: none"> • Tire pressure warning valve and transmitter • Harness or connector • Door control receiver 	INFO
C2183	Transmitter ID3 not received	<ul style="list-style-type: none"> • Tire pressure warning valve and transmitter • Harness or connector • Door control receiver 	INFO
C2184	Transmitter ID4 not received	<ul style="list-style-type: none"> • Tire pressure warning valve and transmitter • Harness or connector • Door control receiver 	INFO



Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XN305KX
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING SYSTEM: Tire Pressure Warning Light Circuit (2013 FR-S)		

Tire Pressure Warning Light Circuit

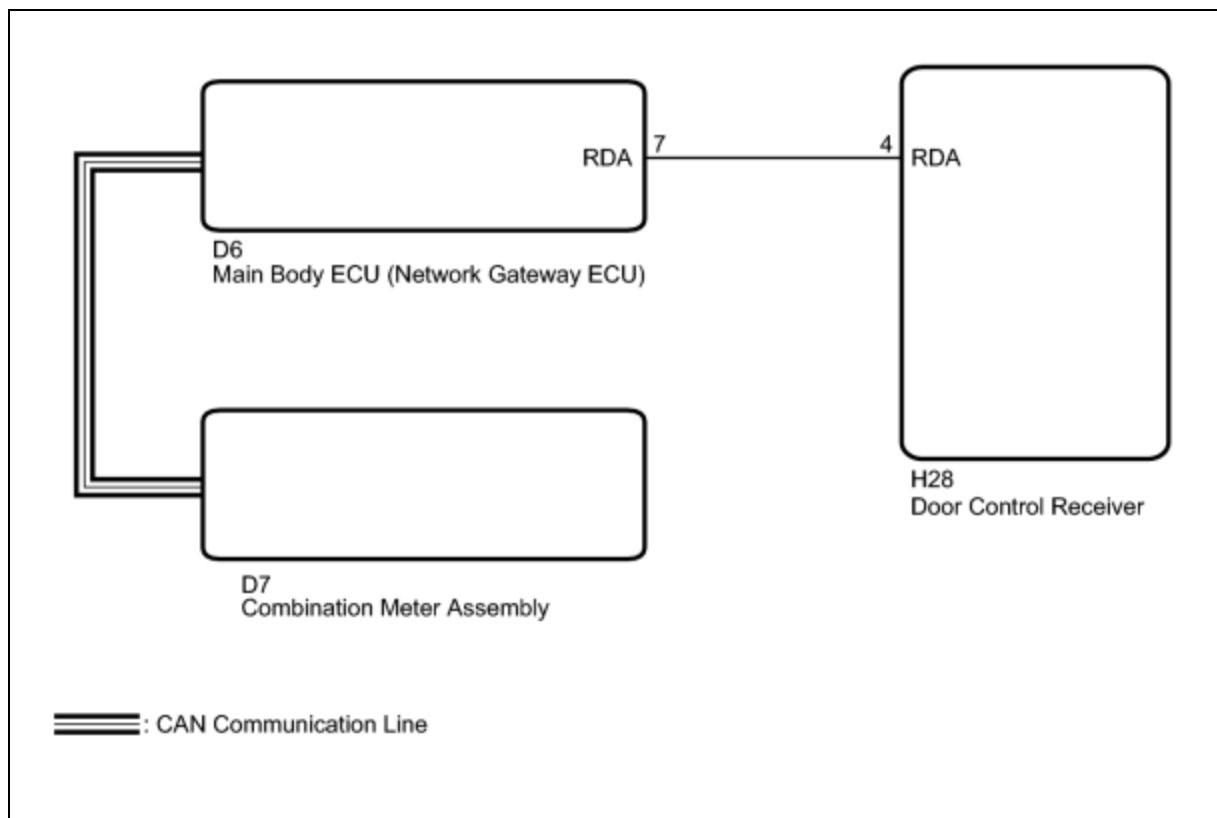
DESCRIPTION

If the door control receiver detects any problems, the tire pressure warning light blinks (stays on after blinking for 1 minute) and tire pressure monitoring is cancelled at the same time. At this time, the ECU stores a DTC in memory.

Connecting terminals TC and CG of the DLC3 makes the tire pressure warning light blink to output DTCs.

The door control receiver sends the tire pressure warning light illumination request signal to the main body ECU (network gateway ECU) via a direct line. The main body ECU (network gateway ECU) then sends the signal to the combination meter assembly via CAN communication.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- When replacing the door control receiver, read the IDs stored in the old ECU using the Techstream and write them down before removal.

- It is necessary to perform registration **INFO** of the transmitter IDs into the tire pressure warning ECU after the ECU has been replaced.
- When replacing the door control receiver on vehicles, be sure to perform Registration of Recognition Code to register the transmitter IDs after ECU replacement **INFO** .

PROCEDURE

1. CHECK FOR DTC (CAN COMMUNICATION SYSTEM)

(a) Check if a CAN communication system DTC is output **INFO** .

Result:

RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B

B ► GO TO CAN COMMUNICATION SYSTEM

A



2. CHECK DTC OUTPUT (B1247)

- (a) Clear the DTCs **INFO** .
- (b) Turn the ignition switch off.
- (c) Turn the ignition switch to ON.
- (d) Check for DTCs **INFO** .

OK:

DTC B1247 is not output.

NG ► GO TO DTC B1247

OK



3. CHECK OPERATION OF TIRE PRESSURE WARNING LIGHT (ACTIVE TEST)

- (a) Turn the ignition switch off.

- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Body Electrical / Combination Meter / Active Test.
- (f) Check the condition of the tire pressure warning light by using the Techstream.

Combination Meter

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Indicat. Tire Pressure Warning System	Tire pressure warning light	Tire pressure warning light OFF or ON	Confirm that the vehicle is stopped, engine idling

OK:

The tire pressure warning light turns on or off in accordance with the Techstream operation.

NG ► **GO TO METER / GAUGE SYSTEM**

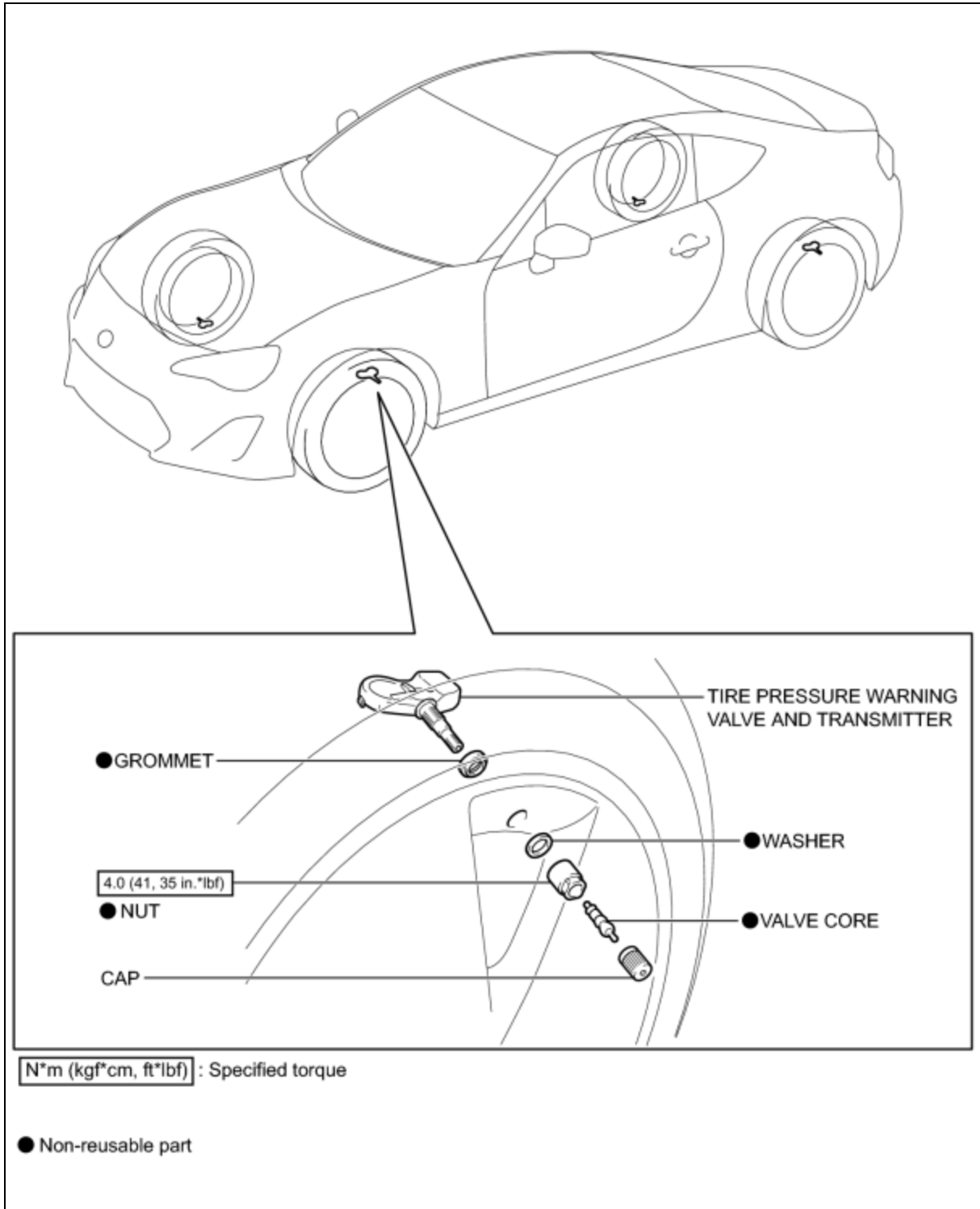
OK ► **REPLACE DOOR CONTROL RECEIVER**



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XV6042X
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING VALVE: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000X9J04LX
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING VALVE: DISPOSAL (2013 FR-S)		

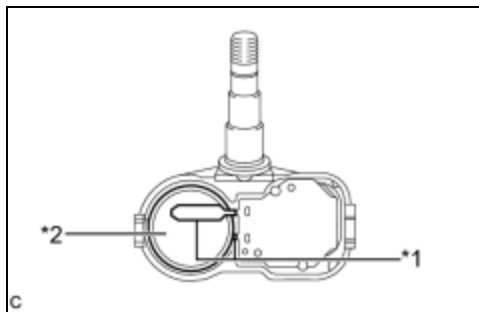
DISPOSAL

HINT:

The tire pressure warning valve and transmitter is powered by a lithium battery. When disposing of the tire pressure warning valve and transmitter, remove the battery and dispose of it correctly.

1. DISPOSE OF TIRE PRESSURE WARNING VALVE AND TRANSMITTER

(a) Cut the 2 terminals that connect the battery to the base board to remove the battery.



Text in Illustration

*1	Terminal
*2	Lithium Battery

HINT:

The battery and base board are covered with urethane.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001F7Q04BX
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING VALVE: INSTALLATION (2013 FR-S)		

INSTALLATION

NOTICE:

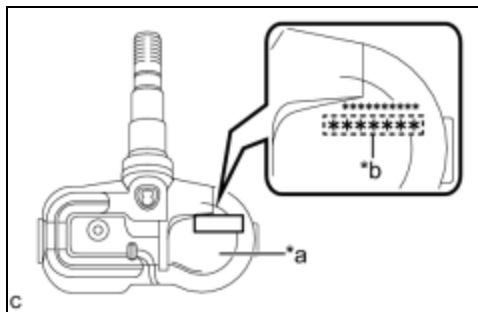
- Always use a new grommet, washer, nut and valve core when installing the tire pressure warning valve and transmitter.
- Make sure not to damage the urethane covered backside of the tire pressure warning valve and transmitter (the surface opposite to the side with the ID code) with anything sharp.
- If installing a new tire pressure warning valve and transmitter, write down the ID number before installation.
- Check that there is no oil, water or lubricant around the rim hole, tire pressure warning valve and transmitter, washer and nut. Failing to do so may result in improper installation.
- Use only a specified cap. If an unspecified cap is used, it may seize to the tire pressure warning valve and transmitter.

1. INSTALL TIRE PRESSURE WARNING VALVE AND TRANSMITTER

(a) Install a new grommet to the tire pressure warning valve and transmitter.

(b) Insert the tire pressure warning valve and transmitter into the valve installation hole from the inside of the rim so that the printed surface can be seen.

Text in Illustration



*a	Printed Surface
*b	7-digit Number Transmitter ID

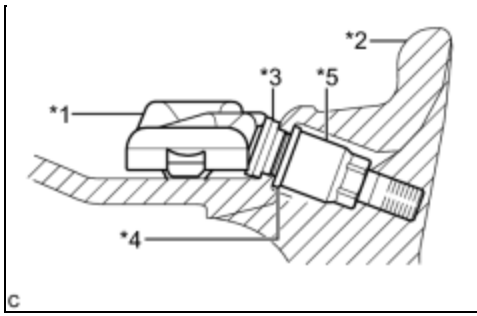
NOTICE:

- Check that there is no visible deformation, damage, or other abnormalities on the tire pressure warning valve and transmitter.
- Check that there is no foreign matter on the grommet and around the rim hole.
- If the tire pressure warning valve and transmitter is installed upside down, it may be damaged or fail to transmit signals when driving at high speeds.

(c) From the outside of the rim, install a new washer onto the tire pressure warning valve and transmitter, and tighten a new nut.

Text in Illustration

*1	Tire Pressure Warning Valve and Transmitter
*2	Rim
*3	Grommet



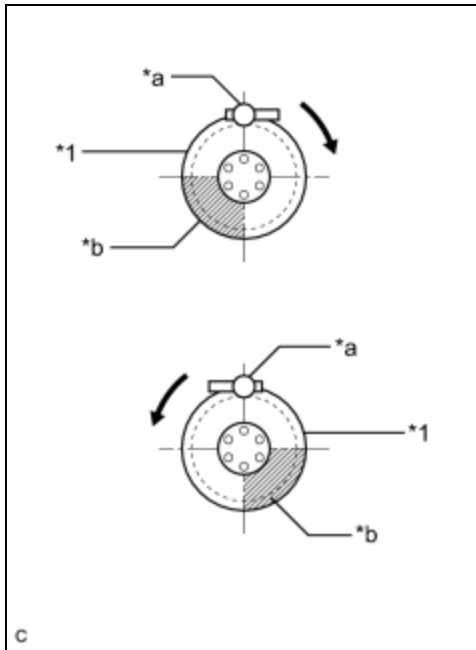
*4	Washer
*5	Nut

Torque: 4.0 N·m (41 kgf·cm, 35in·lbf)


NOTICE:

- No further tightening is required once the nut is tightened to the specified torque.
- Check that there is no foreign matter on the washer and nut.

(d) Set the wheel onto the mounting machine and install the lower bead. Position the main body of the tire pressure warning valve and transmitter in the shaded area shown in the illustration.



Text in Illustration

*1	Rim
*a	Mount Tool of the Mounting Machine
*b	Area for Tire Pressure Warning Valve and Transmitter
	Rim Rotating Direction

NOTICE:

- If the tire pressure warning valve and transmitter is positioned outside this area, it will interfere with the tire bead and may be damaged.
- If the use of lubricant is required when installing the bead, do not apply lubricant directly to the tire pressure warning valve and transmitter.

(e) Install the upper bead.

NOTICE:

Make sure that the tire bead and tool do not interfere with the main body of the tire pressure warning valve and transmitter and that it is not clamped by the bead.

(f) Install the new valve core.

(g) After the tire is inflated, the valve nut may be loose. Retighten the nut to the specified torque.

Torque: 4.0 N·m (41 kgf·cm, 35in·lbf)

NOTICE:

No further tightening is required once the nut is tightened to the specified torque.

(h) Check for air leaks with soapy water.

If there is air leakage, push the valve core 2 or 3 times to remove any dirt attached to the valve core. If air continues to leak, replace the grommet, washer and nut.

(i) Install the cap.

2. INSTALL FRONT WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

3. INSTALL REAR WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

4. INSPECT TIRES

INFO

5. REGISTER TRANSMITTER ID

INFO

6. REGISTER TRANSMITTER ID

INFO

7. INSPECT TIRE PRESSURE WARNING SYSTEM

INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001F7R047X
Title: TIRE PRESSURE MONITORING: TIRE PRESSURE WARNING VALVE: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE FRONT WHEEL

2. REMOVE REAR WHEEL

3. REMOVE TIRE PRESSURE WARNING VALVE AND TRANSMITTER

- (a) Remove the cap and valve core to release the air from the tire.

NOTICE:

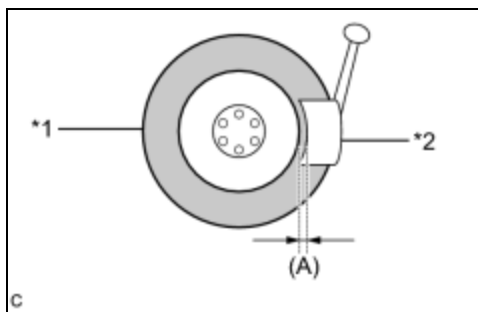
Keep the removed cap.

- (b) After ensuring that a sufficient amount of air has been released, remove the nut and washer used to secure the tire pressure warning valve and transmitter. Drop the tire pressure warning valve and transmitter with the grommet into the tire.

HINT:

The grommet may remain attached to the rim.

- (c) After dropping the tire pressure warning valve and transmitter into the tire, disengage the bead using the shoe of a tire remover.



Text in Illustration

*1	Tire
*2	Shoe

NOTICE:

- Be careful not to damage the tire pressure warning valve and transmitter due to interference between the valve and the tire bead.
- Set the tire remover shoe as shown in the illustration.
Width (A):
10 to 20 mm (0.394 to 0.787 in.)

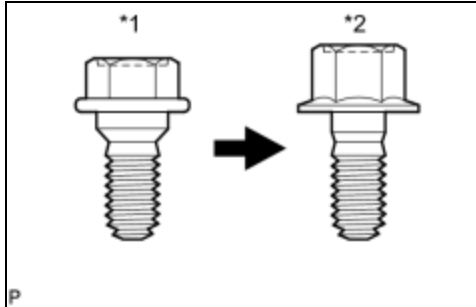
- (d) Separate the upper bead.

- (e) Take out the tire pressure warning valve and transmitter with the grommet from the tire and separate the lower bead.

- (f) Remove the grommet from the tire pressure warning valve and transmitter.

Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XB8085X
Title: DOOR / HATCH: FRONT DOOR: ADJUSTMENT (2013 FR-S)		

ADJUSTMENT



HINT:

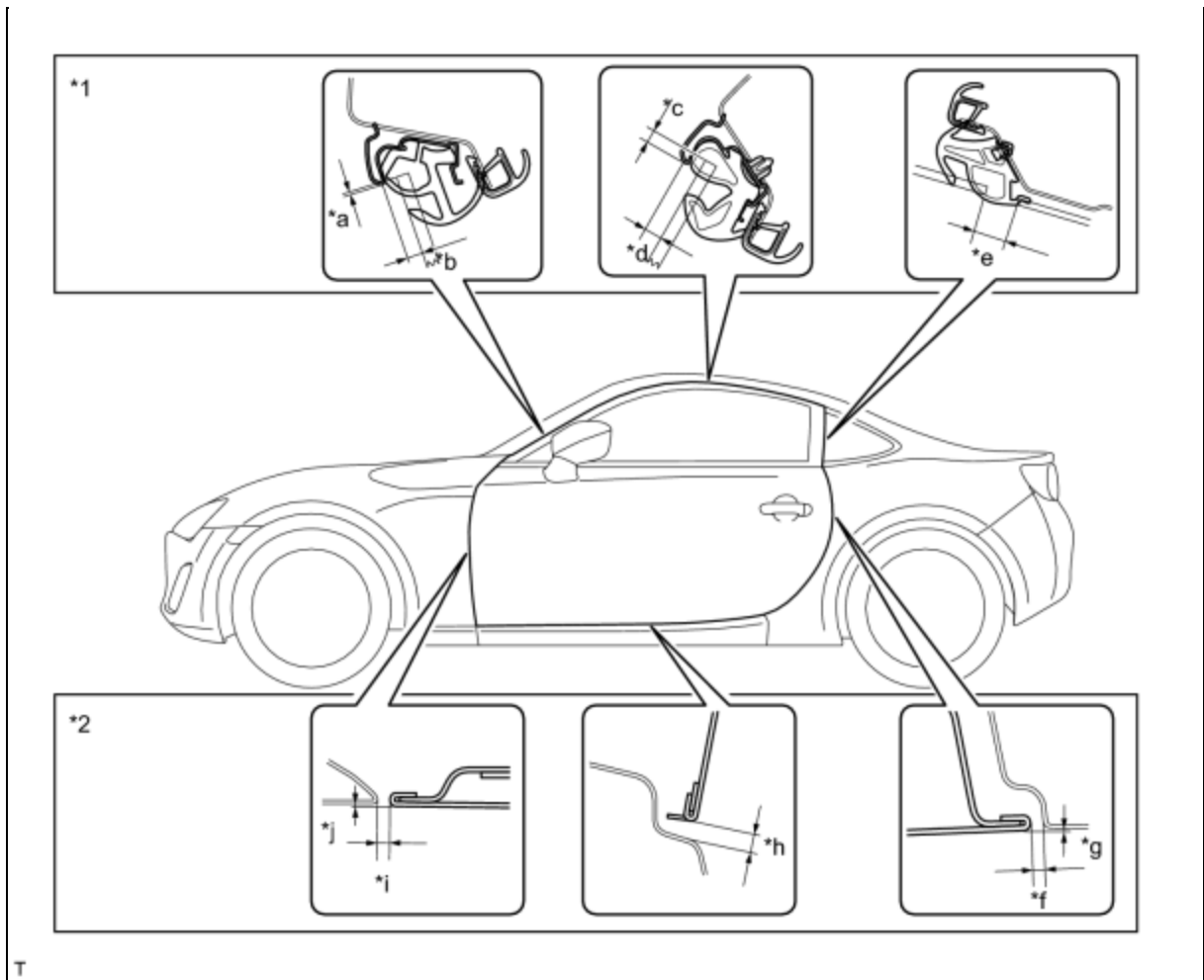
- Use the same procedure for both the RH and LH sides.
- The following procedure is for the LH side.
- Centering bolts are used to mount the door hinge to the vehicle body and door. The door cannot be adjusted with the centering bolts installed on it. Substitute the centering bolts with standard bolts when making adjustments.
- Specified torque for standard bolts is shown in the standard bolt chart [INFO](#).

Text in Illustration

*1	Centering Bolt
*2	Standard Bolt

1. INSPECT FRONT DOOR

- (a) Check that the clearance measurements of areas *a through *j are within each standard range.



Standard Clearance

AREA	DIMENSION	AREA	DIMENSION
*a	0.5 mm (0.0197 in.)	*b	7.0 mm (0.2756 in.)
*c	5.0 mm (0.1969 in.)	*d	6.7 mm (0.2638 in.)
*e	13.5 to 16.5 mm (0.5315 to 0.6496 in.)	*f	2.5 to 5.5 mm (0.0984 to 0.2165 in.)
*g	0.0 to 1.5 mm (0.0 to 0.0591 in.)	*h	4.8 to 7.8 mm (0.1890 to 0.3071 in.)
*i	3.1 to 5.6 mm (0.122 to 0.220 in.)	*j	-1.0 to 1.5 mm (-0.0394 to 0.0591 in.)

Text in Illustration

*1	Front Glass	*2	Front Door
----	-------------	----	------------

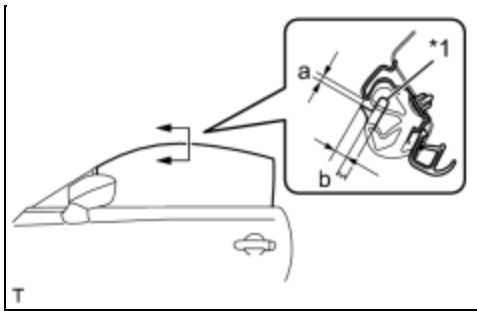
2. ADJUST FRONT DOOR GLASS

(a) Using a SST, check that the clearance measurements of areas "a" to "b" are within each standard range .

SST: 09812-18010

Text in Illustration

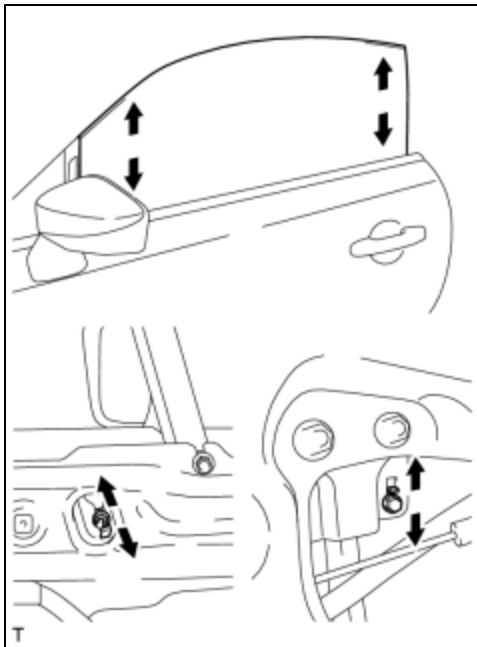
*1	SST
----	-----



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Standard Clearance:

AREA	DIMENSION
*a	5.0 mm (0.1969 in.)
*b	6.7 mm (0.2638 in.)



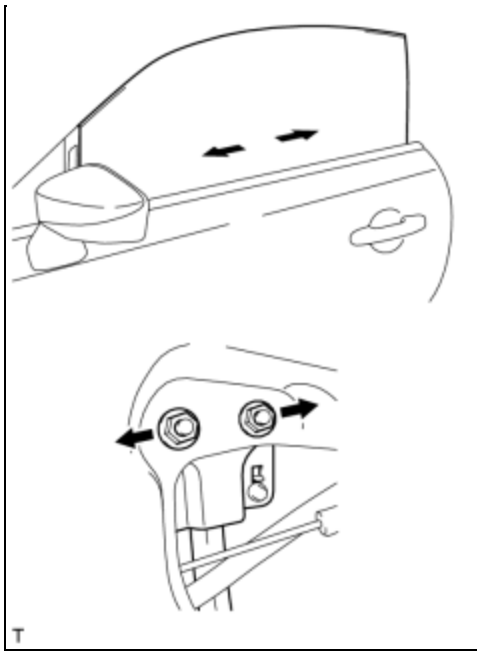
(b) Adjust the front door glass so that the fitting dimensions come within the reference values.

(c) Loosen the nut on the front door sush stopper and front door rear sush stopper, and adjust the glass position.

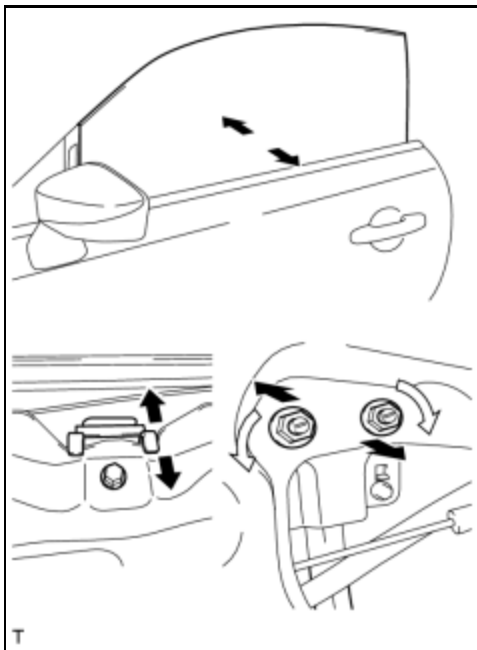
(d) After the adjustment, tighten the nut on the front door sush stopper and front door rear sush stopper.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

(e) Loosen the 2 nuts on the front door rear lower frame sub-assembly, and adjust the glass position.



- (f) After the adjustment, tighten the 2 nuts on the front door rear lower frame sub-assembly.
Torque: 14 N·m (143 kgf·cm, 10ft·lbf)



- (g) Loosen the bolt on the door glass inner stabilizer and adjust the glass position.

- (h) After the adjustment, tighten the bolt on the door glass inner stabilizer.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

- (i) Loosen the 2 nuts on the front door rear lower frame sub-assembly.

- (j) Using a screwdriver, rotate the bolts and then adjust the position of the front door glass in lateral direction.

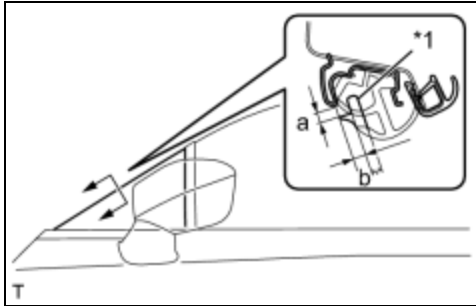
- (k) After the adjustment, tighten the 2 nuts on the front door rear lower frame sub-assembly.

Torque: 14 N·m (143 kgf·cm, 10ft·lbf)

- (l) Using a SST, check that the clearance measurements of areas "a" to "b" are within each standard range .

SST: 09812-18020

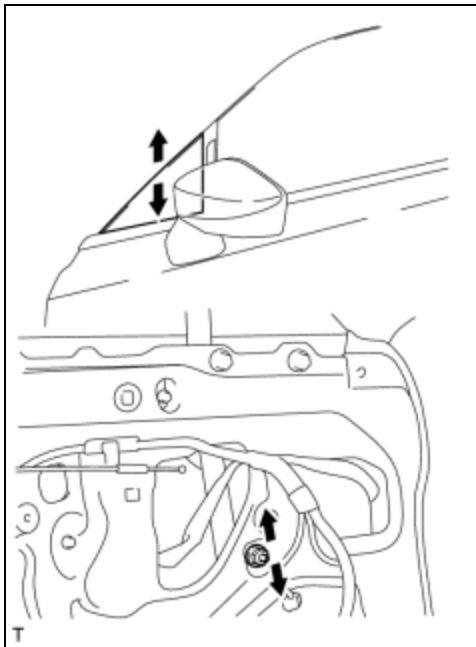
Text in Illustration



*1	SST
----	-----

Standard Clearance:

AREA	DIMENSION
*a	2.5 to 5.5 mm (0.0984 to 0.2165 in.)
*b	5.2 to 8.2 mm (0.2047 to 0.3228 in.)



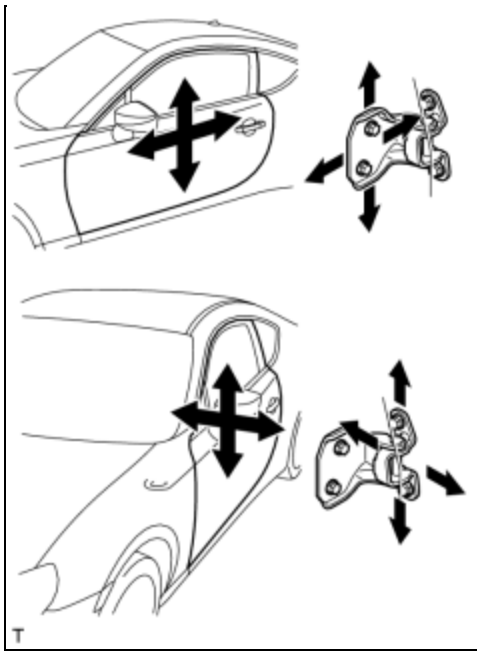
- (m) Adjust the front door sush so that the fitting dimensions come within the reference values.

(n) Loosen the nut on the front door sush and adjust the front door sash position.

(o) After the adjustment, tighten the nut on the front door sush.

Torque: 14 N·m (143 kgf·cm, 10ft·lbf)

3. ADJUST FRONT DOOR



(a) Loosen the hinge bolts on the vehicle body and adjust the door position.

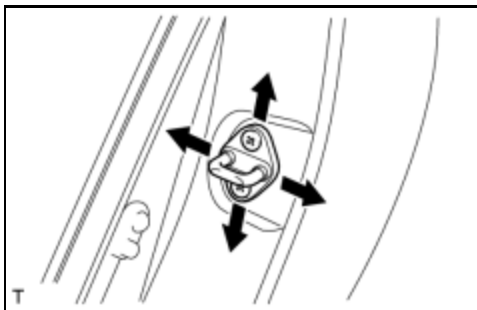
(b) After the adjustment, tighten the hinge bolts on the vehicle body.

Torque: 30 N·m (306 kgf·cm, 22ft·lbf)

(c) Loosen the hinge bolts on the door and adjust the door position.

(d) After the adjustment, tighten the hinge bolts on the door.

Torque: 25 N·m (255 kgf·cm, 18ft·lbf)



(e) Adjust the striker position by slightly loosening the striker mounting screws and hitting the striker with a plastic-faced hammer.

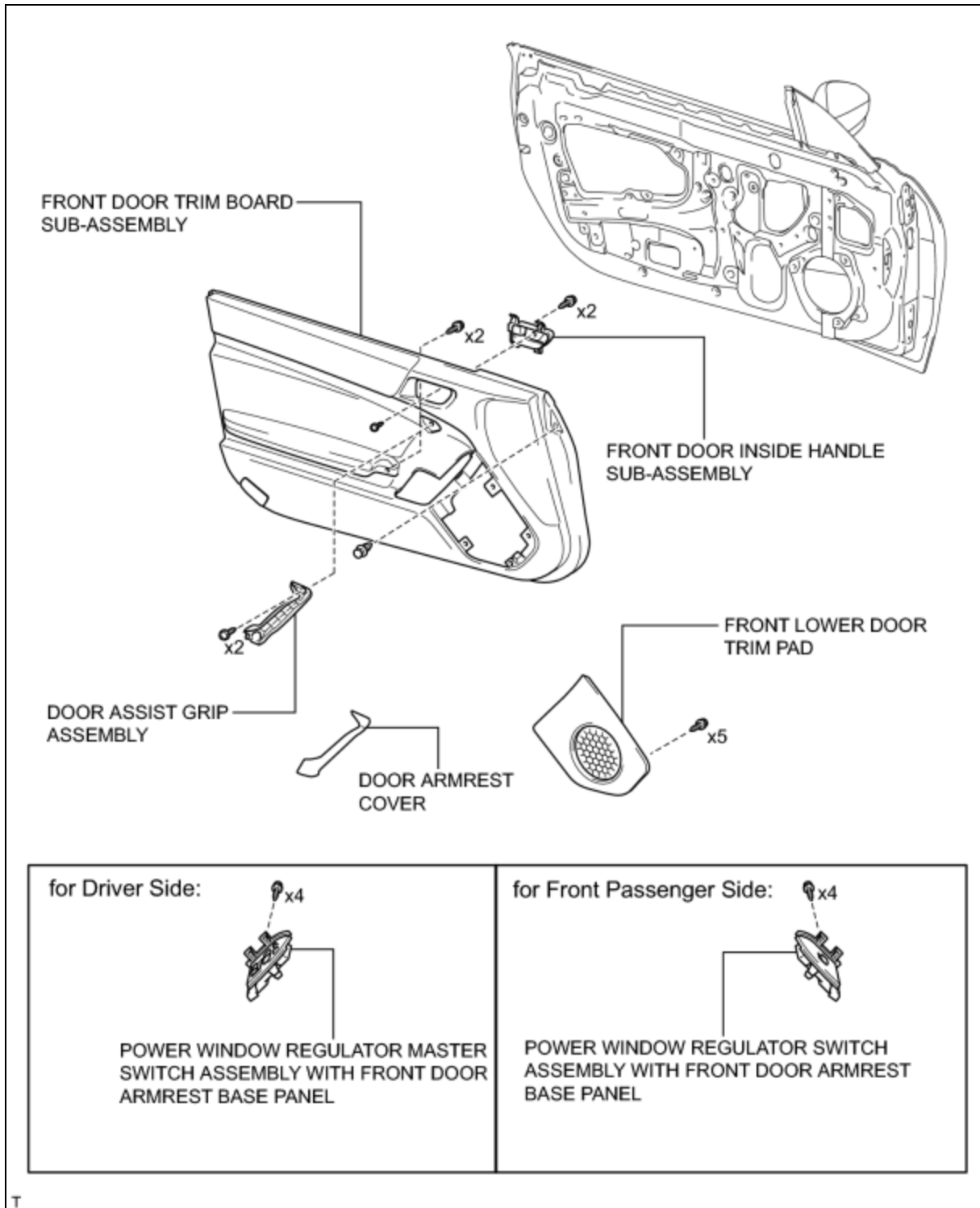
(f) After the adjustment, tighten the striker mounting screws.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

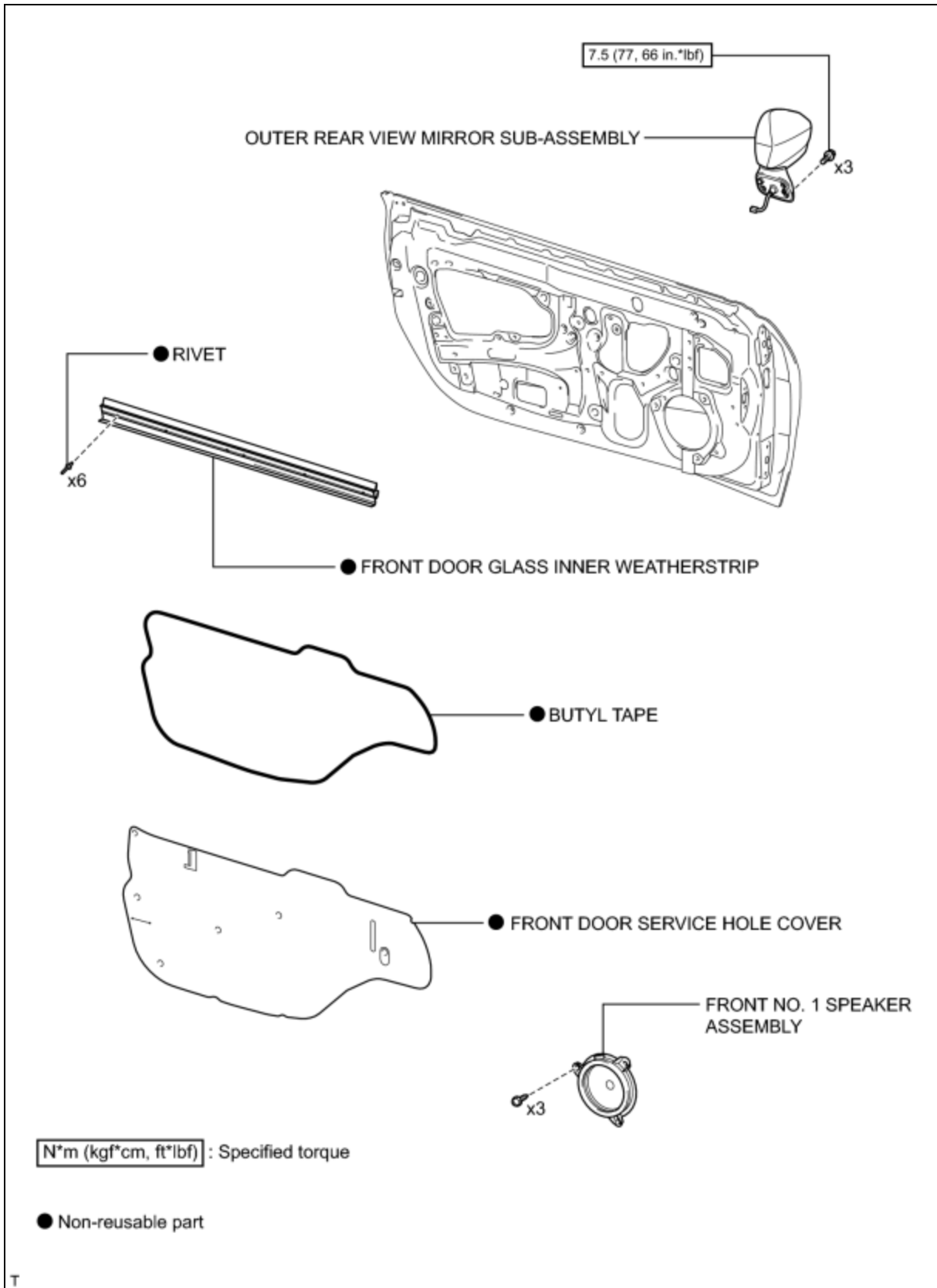
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XBA06EX
Title: DOOR / HATCH: FRONT DOOR: COMPONENTS (2013 FR-S)		

COMPONENTS

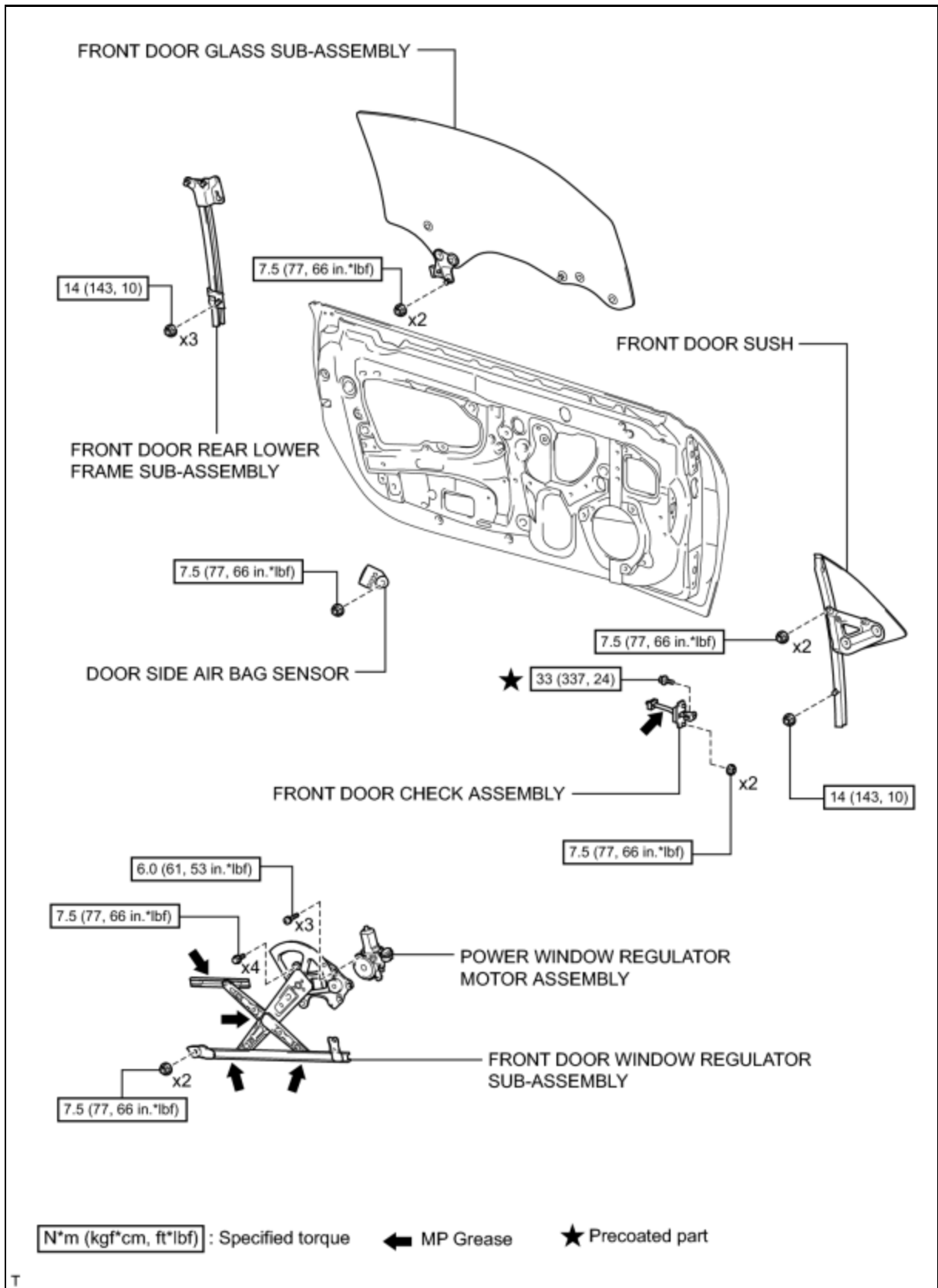
ILLUSTRATION



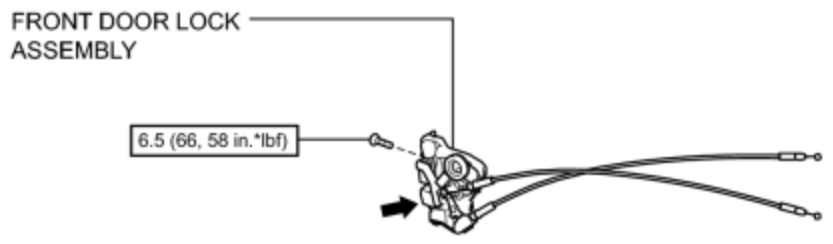
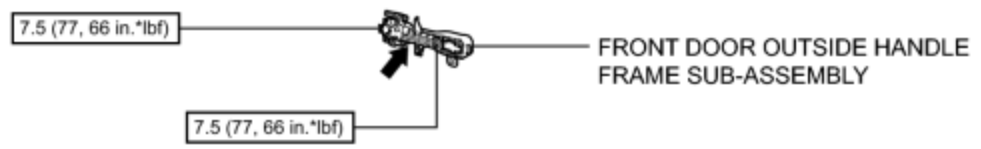
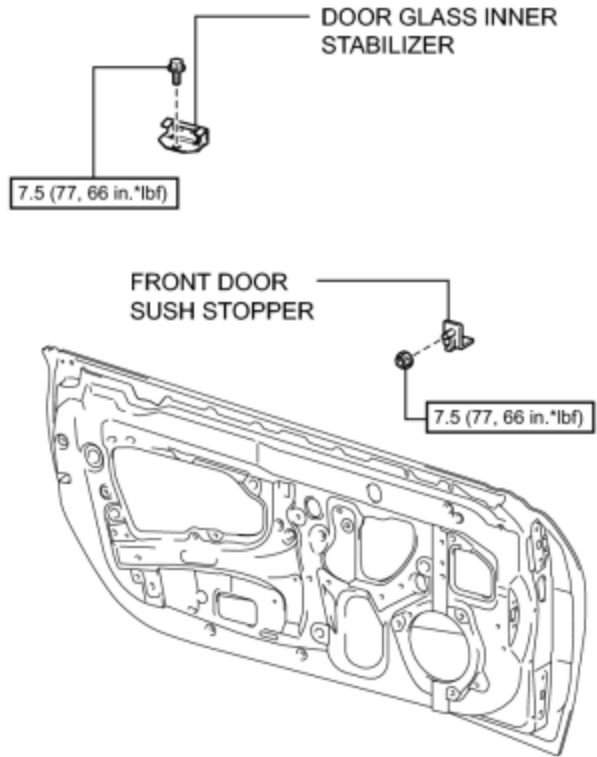
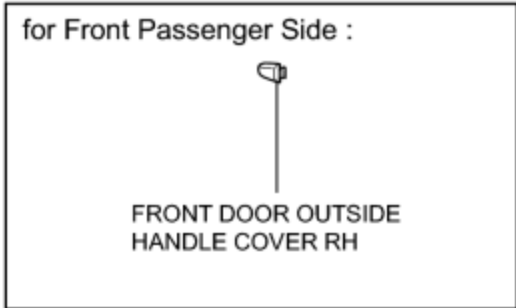
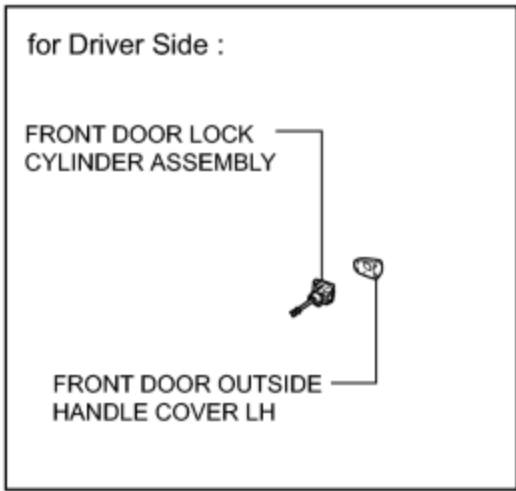
ILLUSTRATION



ILLUSTRATION



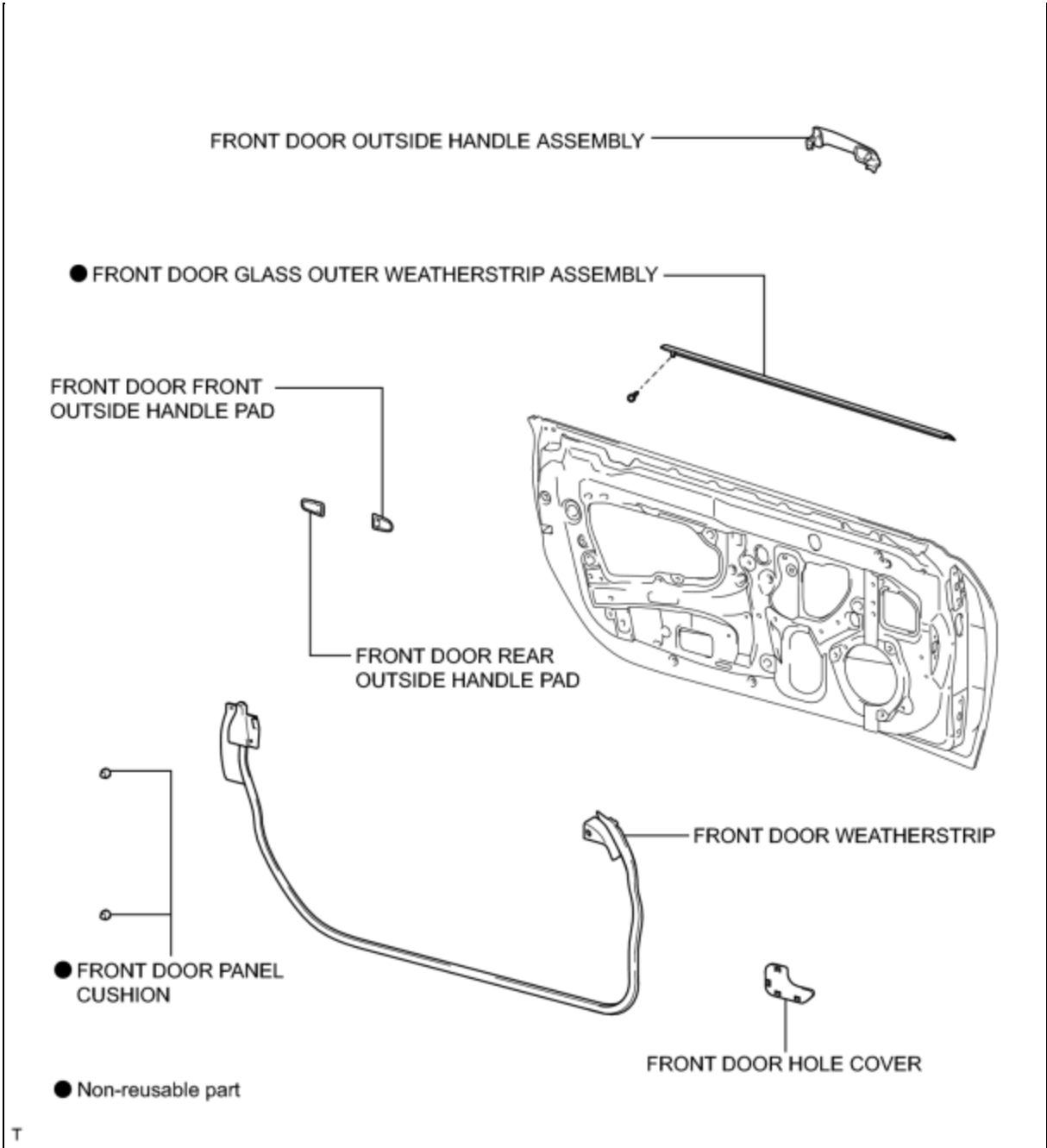
ILLUSTRATION



N*m (kgf*cm, ft*lbf) : Specified torque

T

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011QFOANX
Title: DOOR / HATCH: FRONT DOOR: DISASSEMBLY (2013 FR-S)		

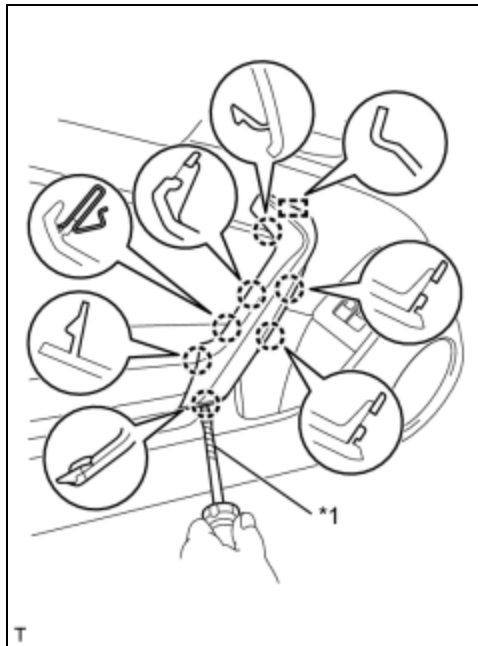
DISASSEMBLY

HINT:

- Use the same procedure for both the RH and LH sides.
- The following procedure is for the LH side.

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

2. REMOVE DOOR ARMREST COVER



(a) Using a screwdriver with its tip wrapped in protective tape, disengage the 7 claws.

(b) Disengage the guides and remove the door armrest cover.

Text in Illustration

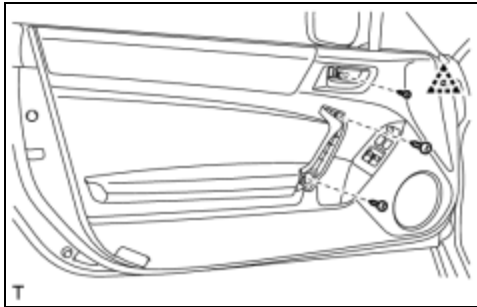
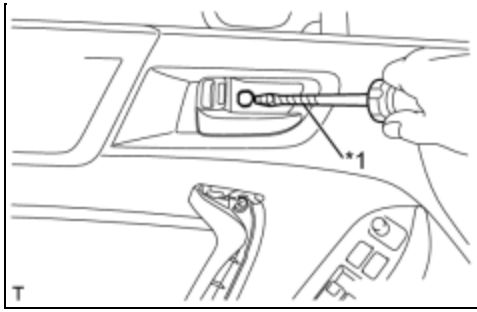
*1	Protective Tape
----	-----------------

3. REMOVE FRONT DOOR TRIM BOARD SUB-ASSEMBLY

(a) Using a screwdriver with its tip wrapped in protective tape, open the cap.

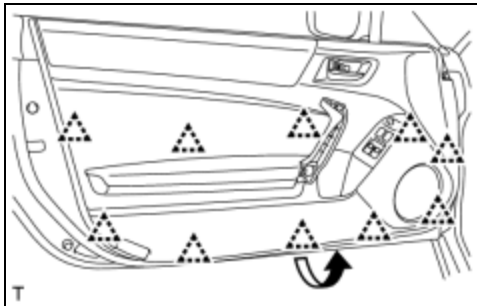
Text in Illustration

*1	Protective Tape
----	-----------------



(b) Using a clip remover, disengage the clip.

(c) Remove the 3 screws.

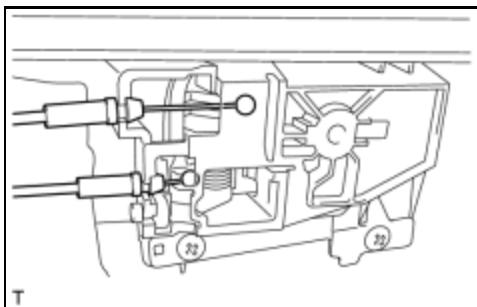


(d) Using a moulding remover, disengage the 10 clips.

(e) Pull out the front door trim board sub-assembly in the direction indicated by the arrow in the illustration.

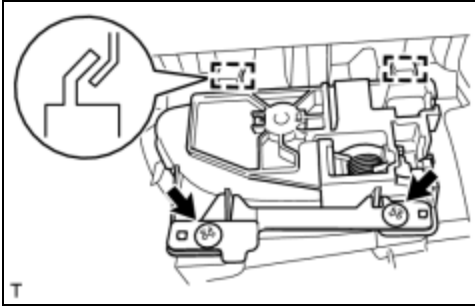
(f) Disconnect each connector.

(g) Raise the front door trim board sub-assembly and remove the front door trim board sub-assembly together with the front door glass weatherstrip inner.



(h) Disconnect the front door lock remote control cable and the front door inside locking cable.

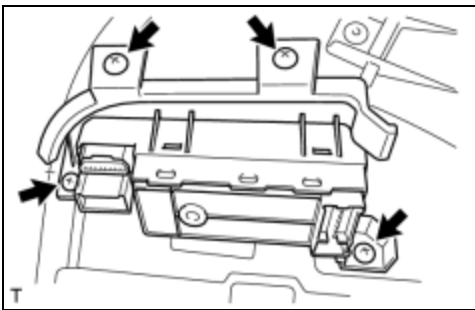
4. REMOVE FRONT DOOR INSIDE HANDLE SUB-ASSEMBLY



(a) Remove the 2 screws.

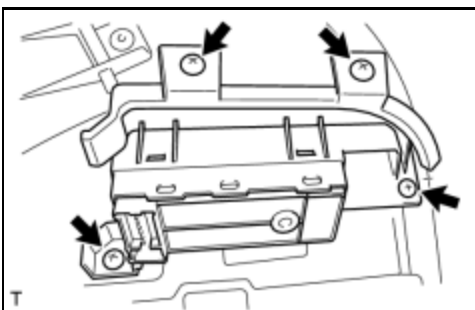
(b) Disengage the 2 guides and remove the front door inside handle sub-assembly.

5. REMOVE POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY WITH FRONT DOOR ARMREST BASE PANEL (for Driver Side)



(a) Remove the 4 screws and power window regulator master switch assembly with front door armrest base panel.

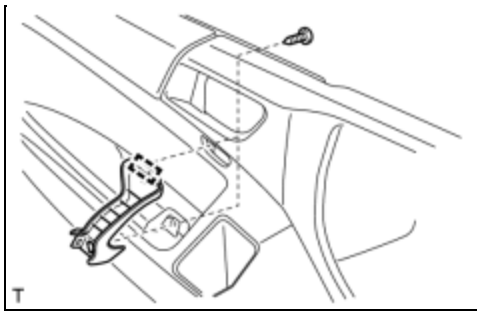
6. REMOVE POWER WINDOW REGULATOR SWITCH ASSEMBLY WITH FRONT DOOR ARMREST BASE PANEL (for Front Passenger Side)



(a) Remove the 4 screws and power window regulator switch assembly with front door armrest base panel.

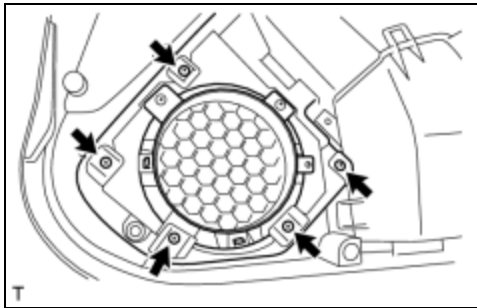
7. REMOVE DOOR ASSIST GRIP ASSEMBLY

(a) Remove the 2 screws.



(b) Disengage the guide and remove the door assist grip assembly.

8. REMOVE FRONT LOWER DOOR TRIM PAD



(a) Remove the front lower door trim pad with the 5 screws.

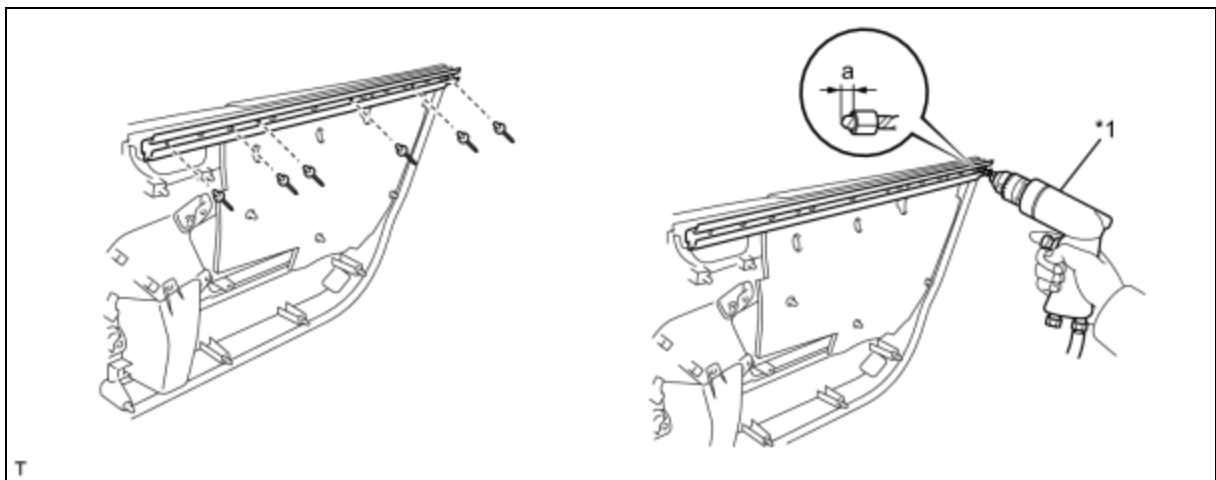
9. REMOVE FRONT DOOR GLASS INNER WEATHERSTRIP

(a) Put a 4 mm (0.1575 in.) drill bit into a drill.

(b) Wind tape around the drill bit approximately 5 mm (0.1969 in.) from the tip of the drill, as shown in the illustration.

HINT:

Tape the 4 mm (0.1575 in.) drill bit to prevent the drill bit from going too deep.



Text in Illustration

*1	Drill	-	-
a	5.0 mm (0.1969 in.)	-	-

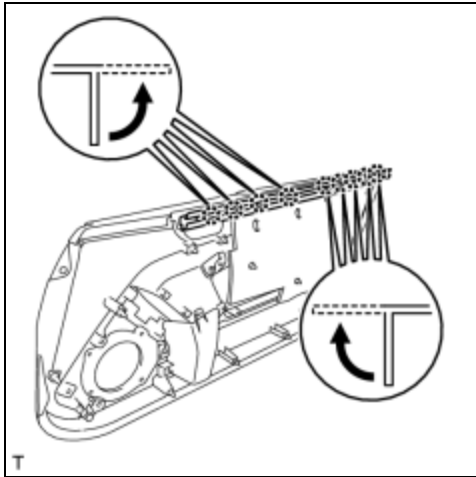
(c) Lightly press the drill against the 6 rivets and drill off the flanges of the 6 rivets.

CAUTION:

Be careful of the drilled rivet as it may become hot.

NOTICE:

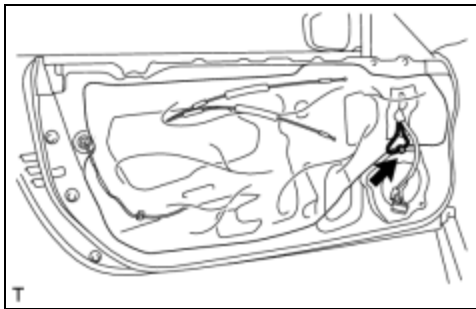
- Pressing the drill too firmly will cause the rivet to turn and result in the rivet not being drilled through.
- Do not pry the rivet with the drill because this may cause damage to the installation holes of the rivet or the drill bit.



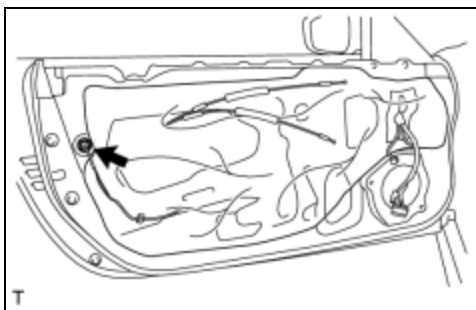
(d) Disengage the 9 claws and remove the front door glass inner weatherstrip from the front door trim board sub-assembly as shown in the illustration.

10. REMOVE FRONT NO. 1 SPEAKER ASSEMBLY INFO

11. REMOVE FRONT DOOR SERVICE HOLE COVER



(a) Disconnect the outer rear view mirror sub-assembly connector.



(b) Disconnect the front door lock assembly connector.

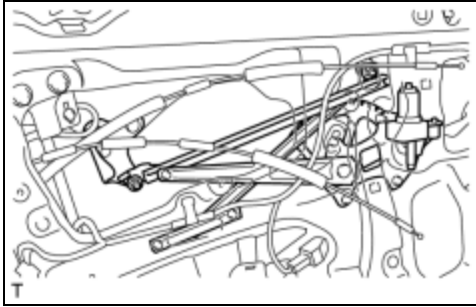
(c) Remove the front door service hole cover.

HINT:

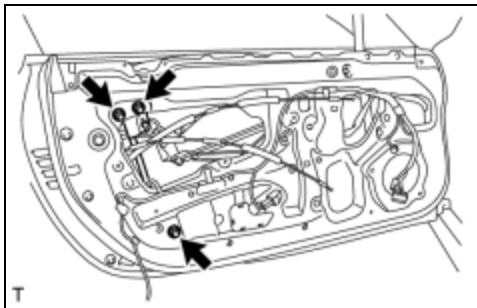
Remove any remaining butyl tape from the door.

12. REMOVE OUTER REAR VIEW MIRROR SUB-ASSEMBLY INFO

13. REMOVE FRONT DOOR GLASS SUB-ASSEMBLY

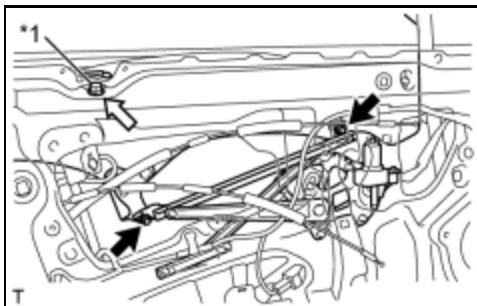


- (a) Provisionally install the power window regulator master switch (for driver side).
- (b) Provisionally install the power window regulator switch (for passenger side).
- (c) Connect the cable to the negative (-) battery terminal.
- (d) Move the front door glass sub-assembly until the 2 nuts can be seen through the service holes.
- (e) Disconnect the power window regulator master switch connector. (for driver side).
- (f) Disconnect the power window regulator switch connector. (for passenger side).
- (g) Disconnect the cable from the negative (-) battery terminal.



(h) Remove the 3 nuts.

(i) Shift the front door rear lower frame sub-assembly to the lower side of the door frame.



(j) Remove the 2 nuts.

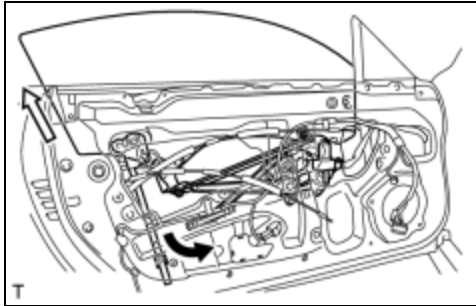
(k) Loosen the door glass inner stabilizer bolt.

NOTICE:

After the 2 nuts are removed, do not allow the door glass to fall.

Text in Illustration

*1	Door Glass Inner Stabilizer Bolt
----	----------------------------------

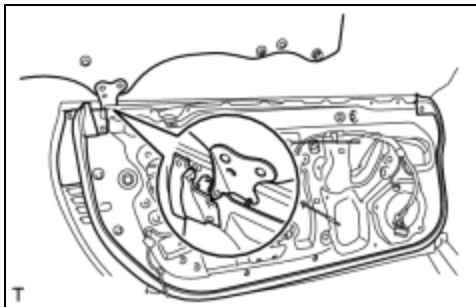


(l) While holding the front door glass sub-assembly up, slide the front door rear lower frame sub-assembly downward, and pull the front door glass sub-assembly out from the front door rear lower frame sub-assembly.

NOTICE:

- Do not allow the door glass to fall.
- Do not damage the door glass.

(m) Partially remove the rear end of the front door weatherstrip until the front door glass sub-assembly can be removed.



(n) Remove the front door glass sub-assembly from the position indicated in the illustration.

NOTICE:

Do not damage the front door weatherstrip.

HINT:

The front glass sub-assembly can only be removed from the position indicated in the illustration.

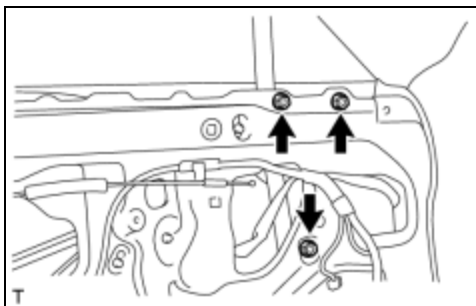
14. REMOVE FRONT DOOR REAR LOWER FRAME SUB-ASSEMBLY

(a) Remove the front door rear lower frame sub-assembly from the front door frame.

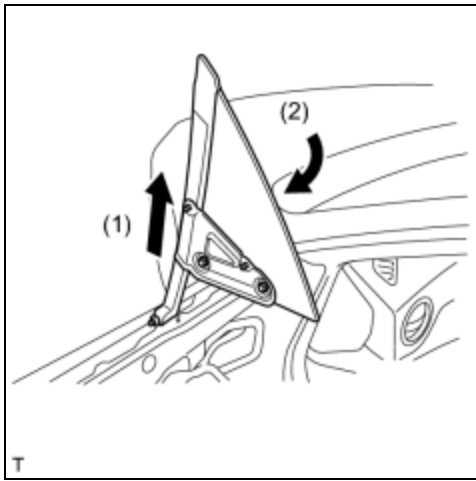
15. REMOVE DOOR GLASS INNER STABILIZER

(a) Remove the bolt and the door glass inner stabilizer.

16. REMOVE FRONT DOOR SUSH



(a) Remove the 3 nuts.



- (b) Rotate the front door sush as indicated by the arrows in the order shown in the illustration, and remove the front door sush.

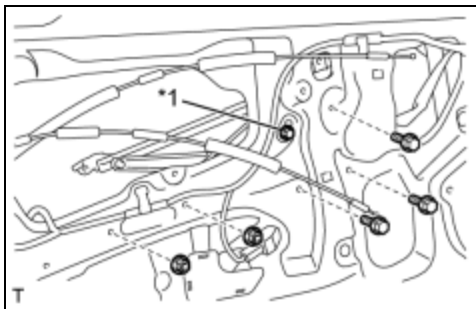
NOTICE:

- Since the front door sush attachment bolts interfere, be sure to follow the procedure shown in the illustration.
- Do not allow the front door sush to fall.
- Do not damage the front door sush.

17. REMOVE FRONT DOOR SUSH STOPPER

- (a) Remove the nut and front door sush stopper.

18. REMOVE FRONT DOOR WINDOW REGULATOR SUB-ASSEMBLY



- (a) Disconnect the connector.

- (b) Loosen the temporary bolt.

Text in Illustration

*1	Temporary Bolt
----	----------------

NOTICE:

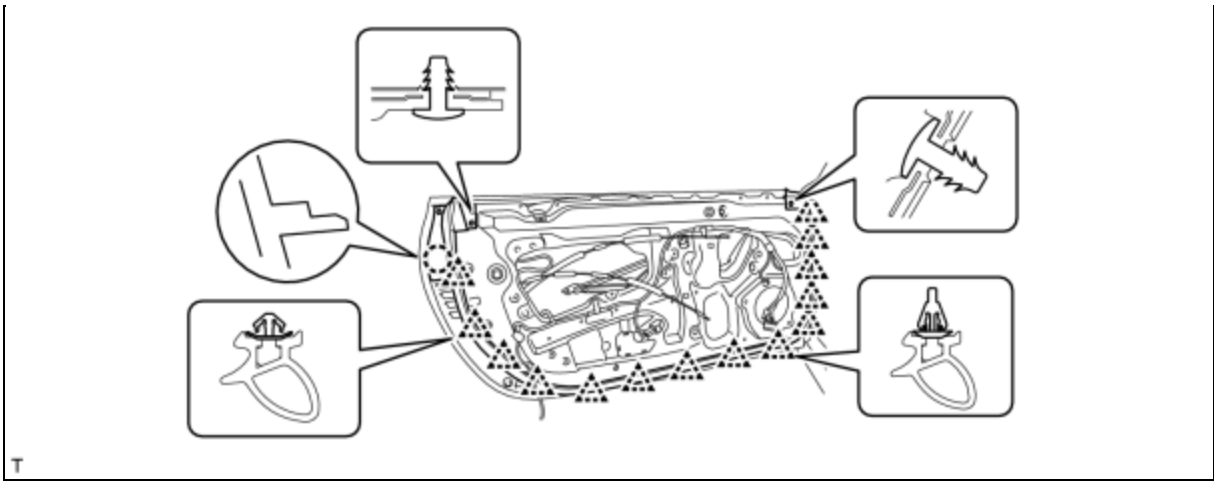
Do not remove the temporary bolt. If the temporary bolt is removed, the front door window regulator sub-assembly may fall and cause damage.

- (c) Remove the 3 bolts and 2 nuts.
 (d) Remove the temporary bolt and the front door window regulator sub-assembly with power window regulator motor assembly.

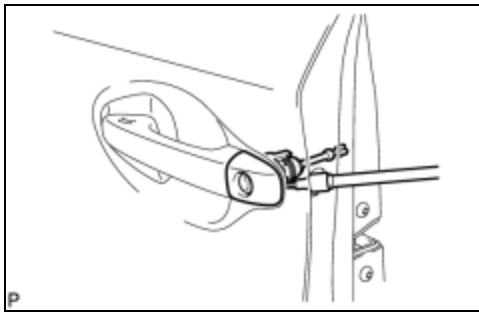
19. REMOVE POWER WINDOW REGULATOR MOTOR ASSEMBLY INFO

20. REMOVE FRONT DOOR WEATHERSTRIP

- (a) Disengage the 2 claws and remove the screw.
 (b) Using a clip remover, disengage the 16 clips and remove the front door weatherstrip.



21. REMOVE FRONT DOOR LOCK CYLINDER ASSEMBLY (for Driver Side)

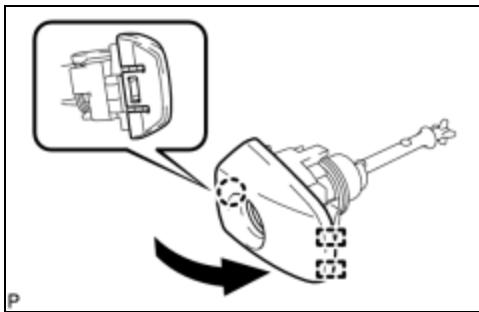


- (a) Using a T30 "TORX" socket wrench, loosen the screw and remove the front door lock cylinder assembly with front door outside handle cover LH.

HINT:

The screw cannot be removed because it is integrated into the front door outside handle frame sub-assembly.

22. REMOVE FRONT DOOR OUTSIDE HANDLE COVER LH (for Driver Side)



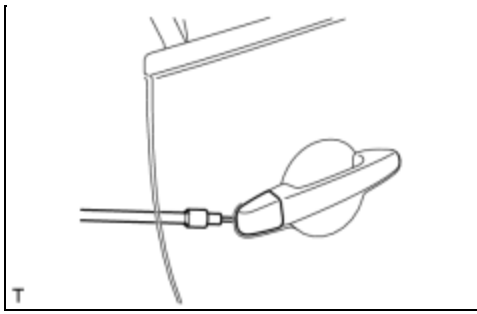
- (a) Using a screwdriver, disengage the claw and 2 guides and remove the front door outside handle cover LH as shown in the illustration.

23. REMOVE FRONT DOOR OUTSIDE HANDLE COVER RH (for Front Passenger Side)

- (a) Using a T30 "TORX" socket wrench, loosen the screw and remove the front door outside handle cover RH.

HINT:

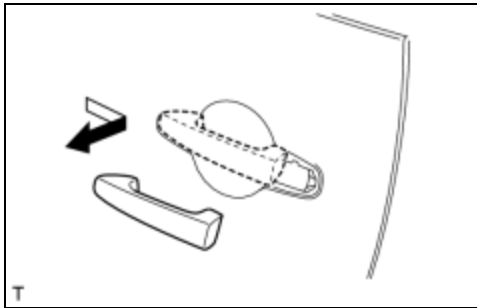
The screw cannot be removed because it is integrated into the front door outside handle frame sub-assembly.



24. REMOVE FRONT DOOR LOCK ASSEMBLY

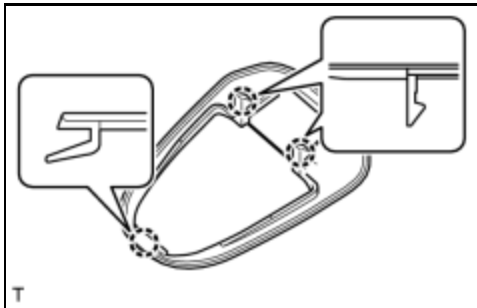
INFO

25. REMOVE FRONT DOOR OUTSIDE HANDLE ASSEMBLY



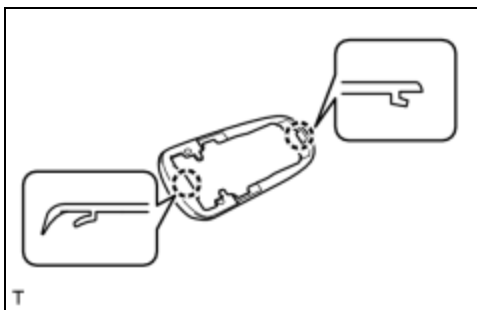
(a) Remove the front door outside handle assembly as shown in the illustration.

26. REMOVE FRONT DOOR FRONT OUTSIDE HANDLE PAD



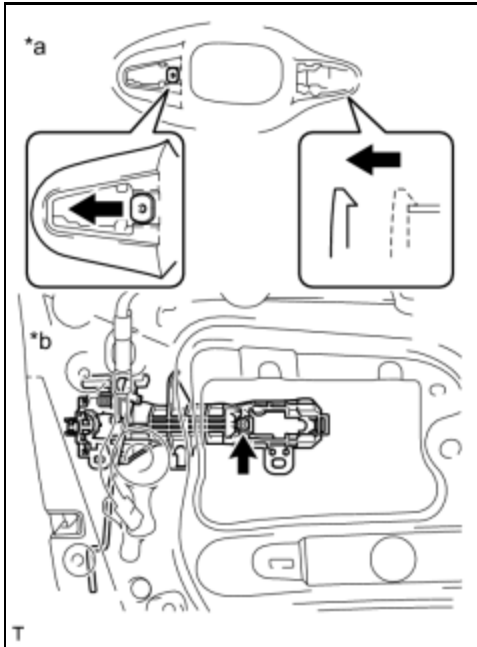
(a) Disengage the 3 claws and remove the front door front outside handle pad.

27. REMOVE FRONT DOOR REAR OUTSIDE HANDLE PAD



(a) Disengage the 2 claws and remove the front door rear outside handle pad.

28. REMOVE FRONT DOOR OUTSIDE HANDLE FRAME SUB-ASSEMBLY



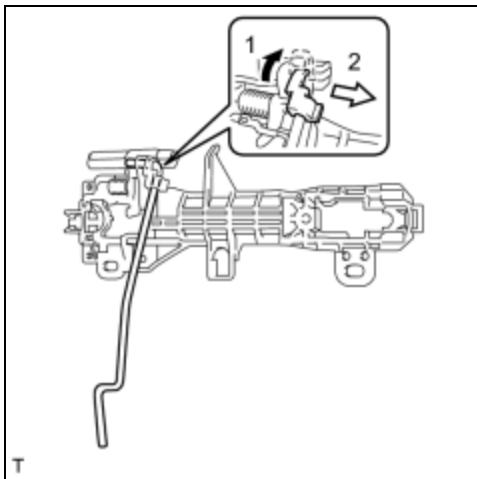
(a) Using a T30 "TORX" socket wrench, loosen the screw.

(b) Slide the front door outside handle frame sub-assembly to disengage the claw of the front door outside handle frame sub-assembly, and then remove it.

Text in Illustration

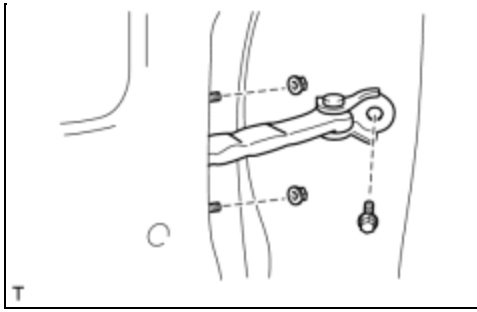
*a	Outside Vehicle
*b	Inside Vehicle

29. REMOVE FRONT DOOR LOCK OPEN ROD



(a) Remove the front door lock open rod as indicated by the arrows, in the order shown in the illustration.

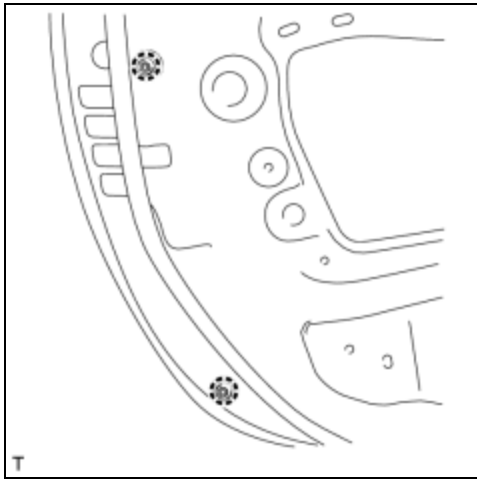
30. REMOVE FRONT DOOR CHECK ASSEMBLY



(a) Remove the bolt.

(b) Remove the 2 nuts and front door check assembly.

31. REMOVE FRONT DOOR PANEL CUSHION

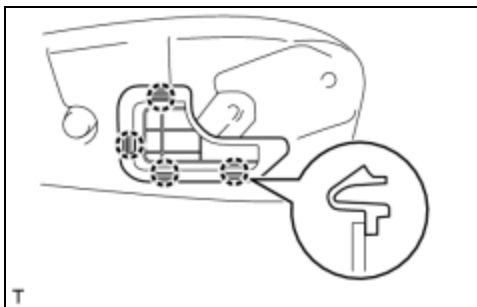


(a) Disengage the 2 claws and remove the 2 front door panel cushions.

32. REMOVE FRONT DOOR GLASS OUTER WEATHERSTRIP ASSEMBLY INFO

33. REMOVE DOOR SIDE AIR BAG SENSOR INFO

34. REMOVE FRONT DOOR HOLE COVER



(a) Disengage the 4 claws and remove the front door hole cover.

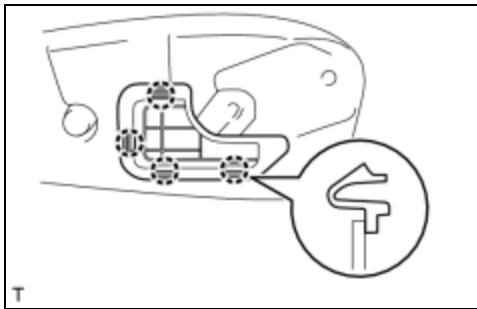
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011QG0ATX
Title: DOOR / HATCH: FRONT DOOR: REASSEMBLY (2013 FR-S)		

REASSEMBLY

HINT:

- Use the same procedure for both the RH and LH sides.
- The following procedure is for the LH side.

1. INSTALL FRONT DOOR HOLE COVER

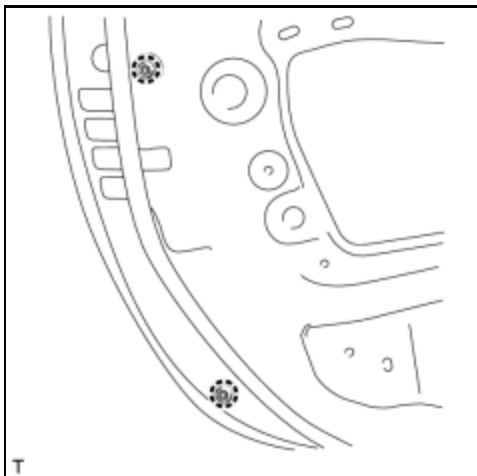


(a) Insert the front door hole cover with the 4 claws.

2. INSTALL DOOR SIDE AIR BAG SENSOR INFO

3. INSTALL FRONT DOOR GLASS OUTER WEATHERSTRIP ASSEMBLY INFO

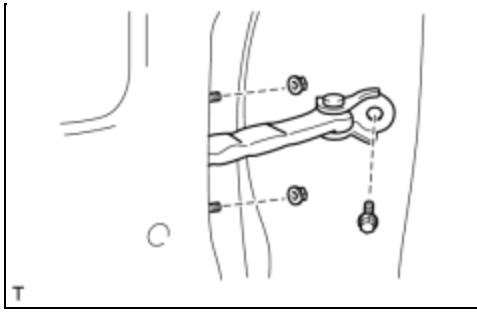
4. INSTALL FRONT DOOR PANEL CUSHION



(a) Engage the 2 claws and install 2 new front door panel cushions.

5. INSTALL FRONT DOOR CHECK ASSEMBLY

(a) Apply MP grease to the sliding areas of the front door check assembly.



(b) Apply adhesive to the threads of the bolt.

Adhesive:

Toyota Genuine Adhesive 1324, Three Bond 1324 or equivalent

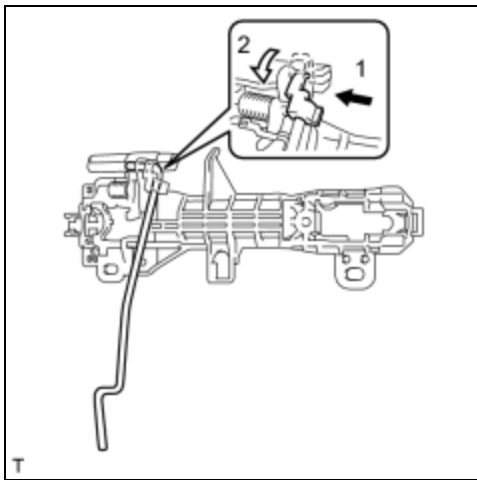
(c) Install the bolt.

Torque: 33 N·m (337 kgf·cm, 24ft·lbf)

(d) Install the front door check assembly with the 2 nuts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

6. INSTALL FRONT DOOR LOCK OPEN ROD

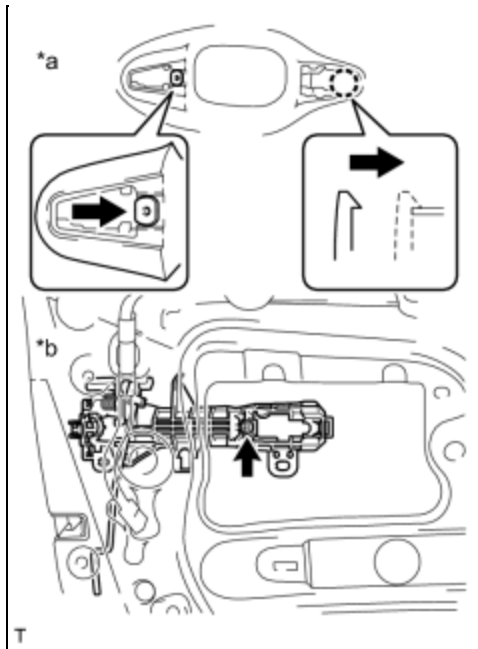


(a) Install the front door lock open rod as indicated by the arrows, in the order shown in the illustration.

7. INSTALL FRONT DOOR OUTSIDE HANDLE FRAME SUB-ASSEMBLY

(a) Apply MP grease to the sliding parts on the front door outside handle frame sub-assembly.

(b) Engage the claw.



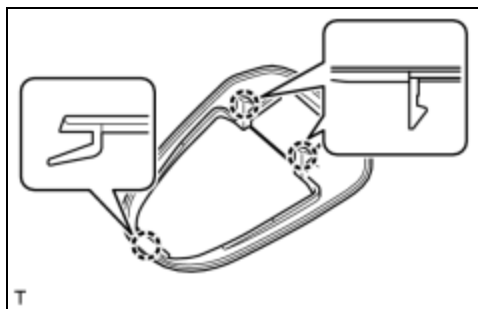
(c) Using a T30 "TORX" socket wrench, install the front door outside handle frame sub-assembly with the screw.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

Text in Illustration

*a	Outside Vehicle
*b	Inside Vehicle

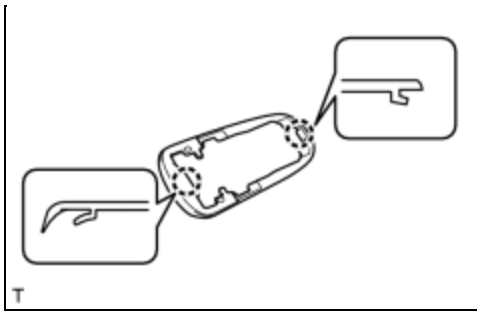
8. INSTALL FRONT DOOR FRONT OUTSIDE HANDLE PAD



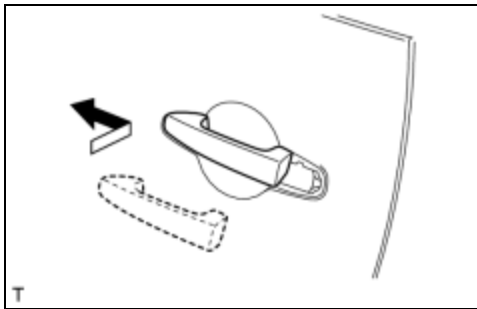
(a) Engage the 3 claws and install the front door front outside handle pad.

9. INSTALL FRONT DOOR REAR OUTSIDE HANDLE PAD

(a) Engage the 2 claws and install the front door rear outside handle pad.



10. INSTALL FRONT DOOR OUTSIDE HANDLE ASSEMBLY

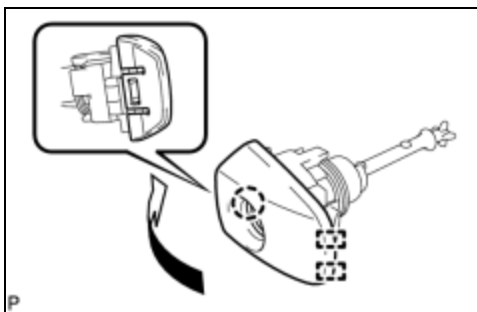


- (a) Insert the front end of the front door outside handle assembly into the front door outside handle frame sub-assembly.

- (b) Insert the rear end of the front door outside handle assembly into the front door outside handle frame sub-assembly, and then slide the front door outside handle assembly toward the front of the vehicle to install it.

11. INSTALL FRONT DOOR LOCK ASSEMBLY INFO

12. INSTALL FRONT DOOR OUTSIDE HANDLE COVER LH (for Driver Side)

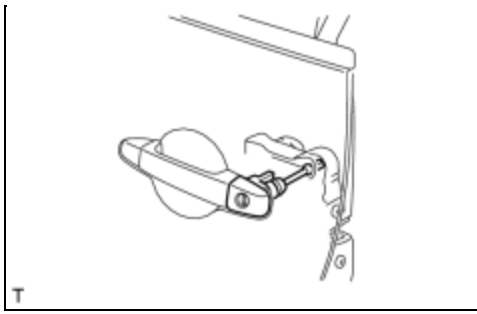


- (a) Engage the claw and 2 guides, and install the front door outside handle cover LH to the front door lock cylinder assembly.

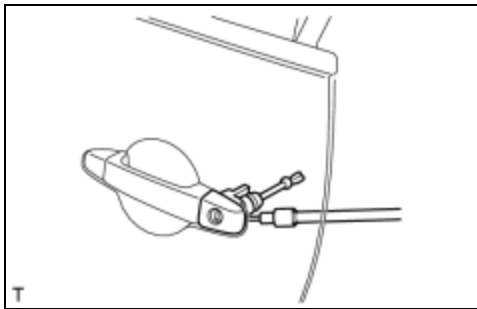
13. INSTALL FRONT DOOR LOCK CYLINDER ASSEMBLY (for Driver Side)

- (a) Install the front door outside handle cover with front door lock cylinder assembly.

HINT:



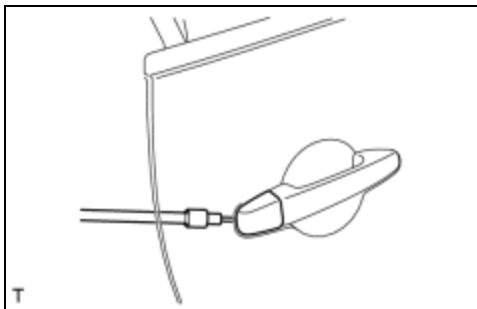
Make sure that the front door lock cylinder rod is inserted into the front door lock assembly.



(b) Using a T30 "TORX" socket wrench, install the front door lock cylinder assembly with the screw.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

14. INSTALL FRONT DOOR OUTSIDE HANDLE COVER RH (for Front Passenger Side)

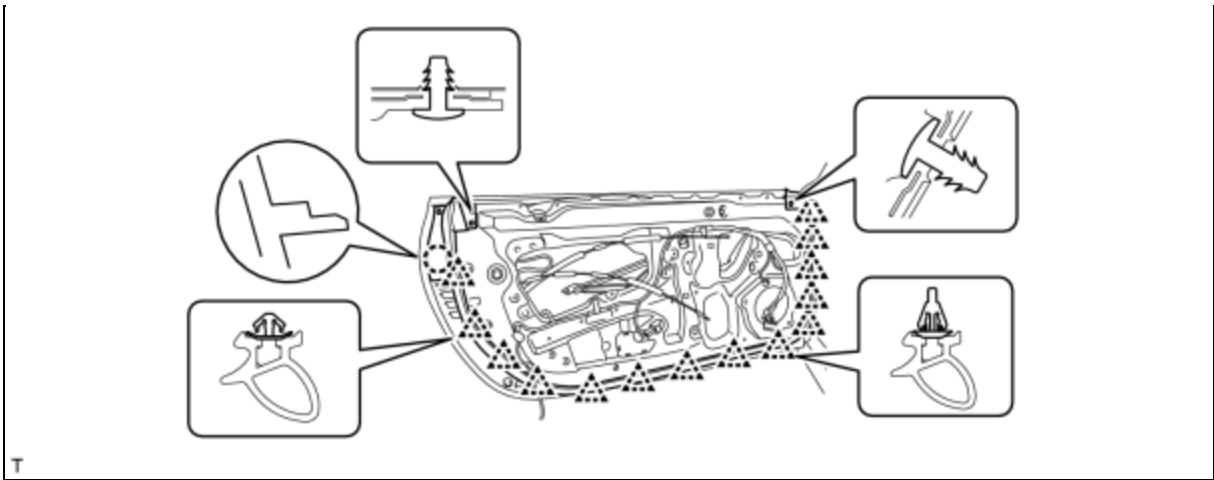


(a) Using a T30 "TORX" socket wrench, install the front door outside handle cover with the screw.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

15. INSTALL FRONT DOOR WEATHERSTRIP

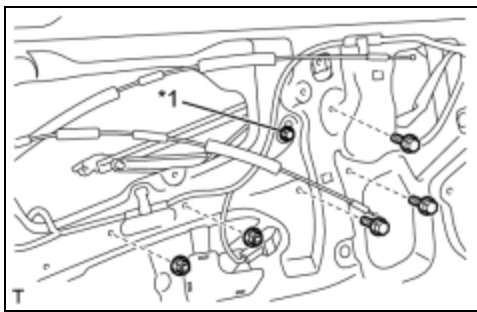
- (a) Engage the 16 clips.
- (b) Engage the claw.
- (c) Install the front door weatherstrip with the screw.



16. INSTALL POWER WINDOW REGULATOR MOTOR ASSEMBLY INFO

17. INSTALL FRONT DOOR WINDOW REGULATOR SUB-ASSEMBLY

- (a) Apply MP grease to the sliding parts of the front door window regulator sub-assembly.
- (b) Install the temporary bolt to the front door window regulator sub-assembly.



- (c) Temporarily install the front door window regulator sub-assembly.

- (d) Tighten the 3 bolts and 2 nuts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

- (e) Tighten the temporary bolt.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

- (f) Connect the connector.

Text in Illustration

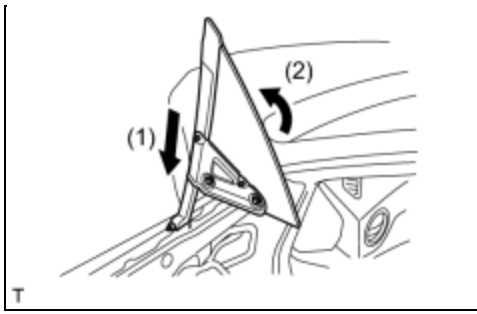
*1	Temporary Bolt
----	----------------

18. INSTALL FRONT DOOR SUSH STOPPER

- (a) Install the front door sush stopper with the bolt.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

19. INSTALL FRONT DOOR SUSH

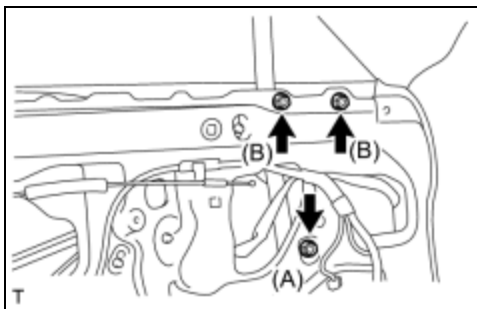


- (a) Insert the front door sush so that it is perpendicular to the front door frame, in the order shown in the illustration.

- (b) Rotate the front door sush 90°.

NOTICE:

Do not damage the front door sush.



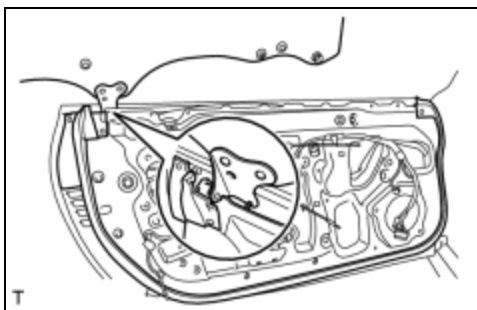
- (c) Install the front door sush with the 3 nuts.

Nut(A) - Torque: 14 N·m (143 kgf·cm, 10ft·lbf)

Nut(B) - Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

20. INSTALL FRONT DOOR GLASS SUB-ASSEMBLY

- (a) Connect the cable to the negative (-) battery terminal.
 (b) Connect the power window regulator master switch assembly connector. (for driver side)
 (c) Connect the power window regulator switch assembly connector. (for front passenger side)
 (d) Move the front door glass sub-assembly until the 2 nuts can be seen through the service holes.
 (e) Disconnect the cable from the negative (-) battery terminal.
 (f) Disconnect the power window regulator master switch assembly connector. (for driver side)
 (g) Disconnect the power window regulator switch assembly connector. (for front passenger side)



- (h) Insert the front door glass sub-assembly into the front door frame from the position indicated in the illustration.

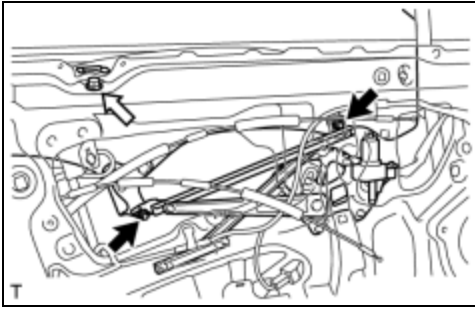
NOTICE:

Do not damage the front door weatherstrip.

HINT:

The front door glass sub-assembly can only be installed from the position indicated in the illustration, so install it while sliding the front door rear lower frame sub-assembly.

- (i) Insert the grommet of front door glass assembly into the rail of the front door rear lower frame sub-assembly.



- (j) Install the front door glass sub-assembly with the 2 nuts.
Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

21. INSTALL DOOR GLASS INNER STABILIZER

- (a) Install the door glass inner stabilizer with the bolt.
Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

22. INSTALL FRONT DOOR REAR LOWER FRAME SUB-ASSEMBLY

- (a) Install the front door rear lower frame sub-assembly with the 3 nuts.
Torque: 14 N·m (143 kgf·cm, 10ft·lbf)

23. INSTALL OUTER REAR VIEW MIRROR SUB-ASSEMBLY

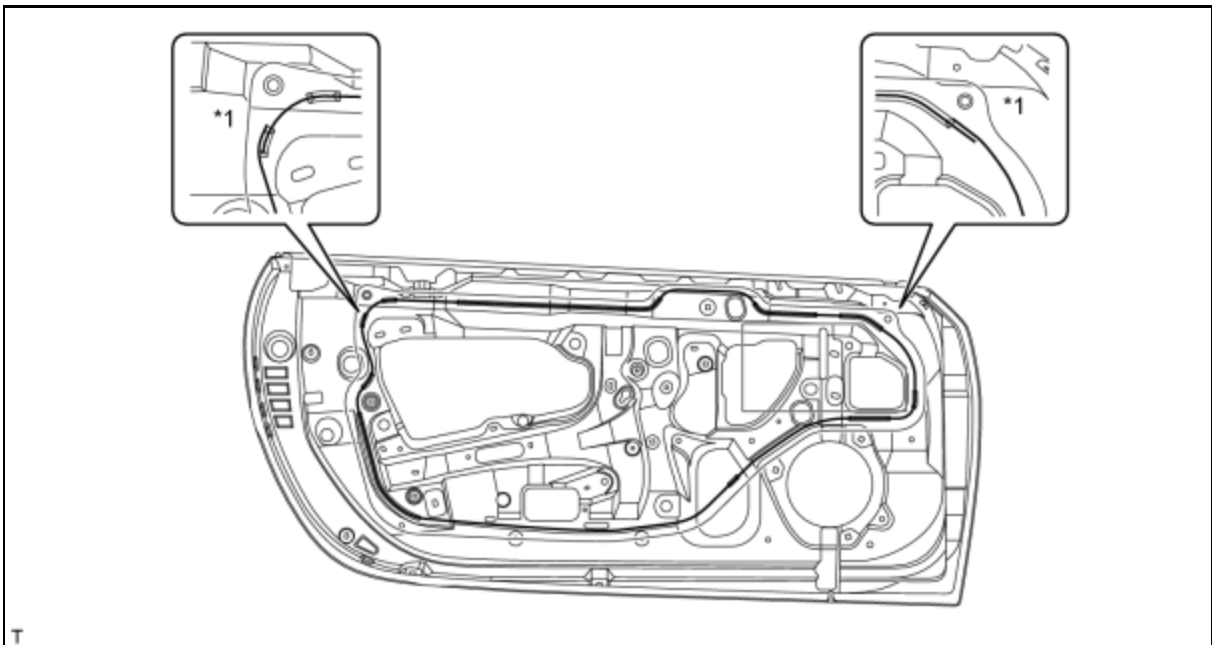
INFO

24. ADJUST FRONT DOOR GLASS SUB-ASSEMBLY

- (a) Check the front door glass sub-assembly. **INFO**
(b) Adjust the front door glass sub-assembly. **INFO**

25. INSTALL FRONT DOOR SERVICE HOLE COVER

- (a) Apply butyl tape to the front door panel.
(b) Pass the front door lock remote control cable assembly and the front door inside locking cable assembly through a new front door service hole cover.



Text in Illustration

(c) Attach the front door service hole cover according to the reference points on the front door panel.

NOTICE:

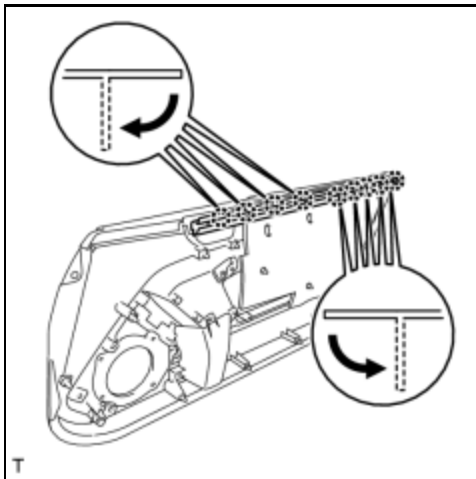
- Overlay the butyl tape in lengths of 20 cm (7.874 in.) or more.
- Do not block the drip holes in the front door panel with butyl tape.
- Securely install the front door service hole cover preventing wrinkles and air bubbles.

(d) Connect each connector.

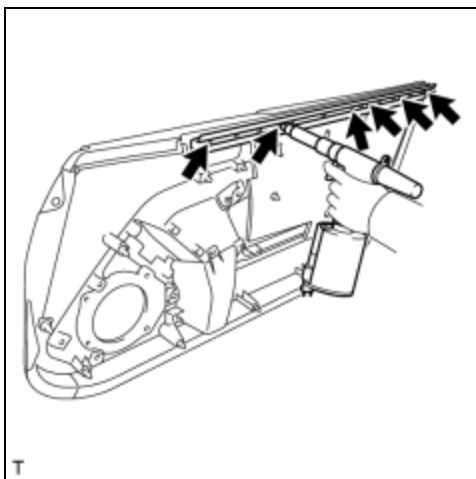
26. INSTALL FRONT NO. 1 SPEAKER ASSEMBLY (w/ Front Speaker)

INFO

27. INSTALL FRONT DOOR GLASS INNER WEATHERSTRIP



- (a) Engage the 9 claws and install the front door glass inner weatherstrip to the front door trim board sub-assembly as shown in the illustration.



- (b) Install a nose piece to an air riveter or hand riveter.

(c) Insert the mandrel part of a new rivet into the nose piece.

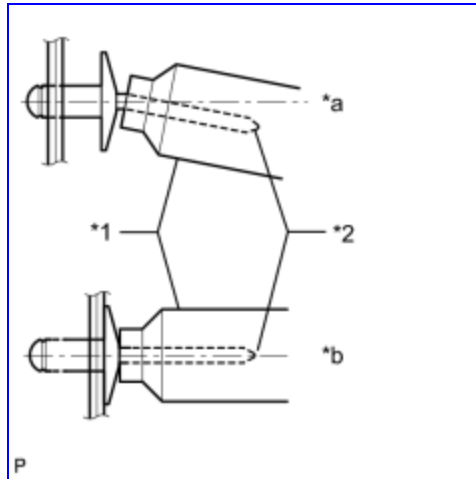
(d) Place the riveter upright against the moulding and install the 9 rivets.

HINT:

If the rivet cannot be cut, pull it once and cut it.

NOTICE:

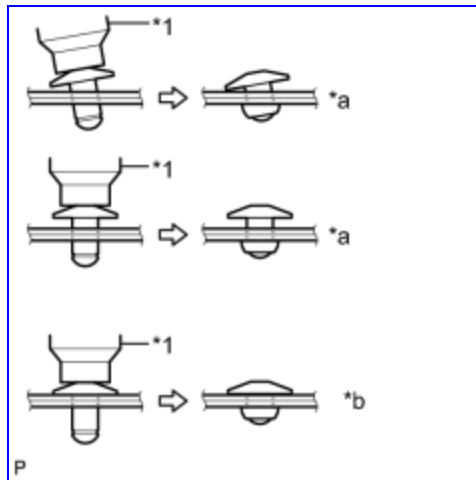
- Do not pry the rivet with the riveter as this will cause damage to the riveter and mandrel.



Text in Illustration

*1	Riveter
*2	Mandrel
*a	Incorrect
*b	Correct

- Confirm that the rivets are seated properly against the front door glass inner weatherstrip.

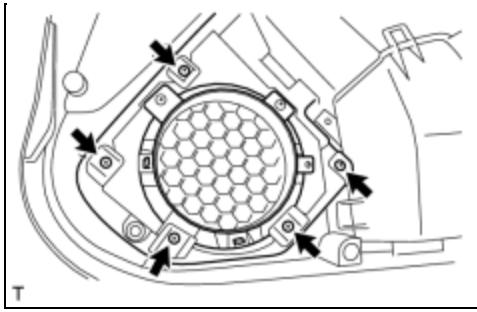


Text in Illustration

*1	Riveter
*a	Incorrect
*b	Correct

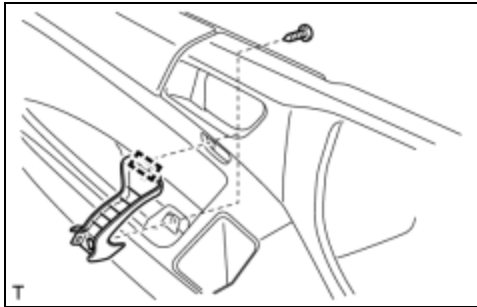
- Do not tilt the riveter when installing the rivet to the front door glass inner weatherstrip
- Do not leave any space between the rivet head and front door glass inner weatherstrip.

28. INSTALL FRONT LOWER DOOR TRIM PAD



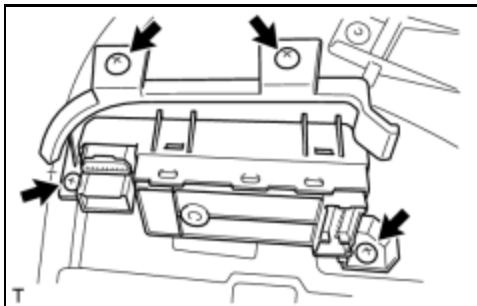
(a) Install the front lower door trim pad with the 5 screws.

29. INSTALL DOOR ASSIST GRIP ASSEMBLY



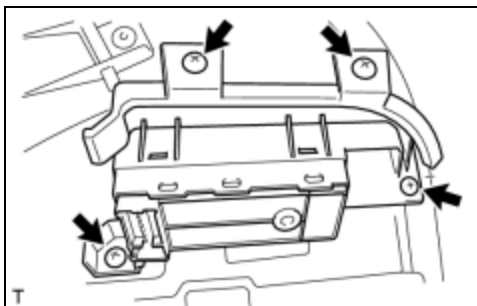
(a) Engage the guide and install the door assist grip assembly with the 2 screws.

30. INSTALL POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY WITH FRONT DOOR ARMREST BASE PANEL (for Driver Side)



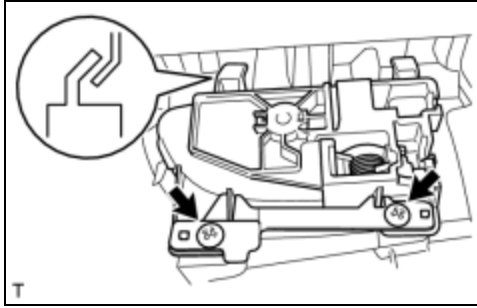
(a) Install the power window regulator master switch assembly with front door armrest base panel with the 4 screws.

31. INSTALL POWER WINDOW REGULATOR SWITCH ASSEMBLY WITH FRONT DOOR ARMREST BASE PANEL (for Front Passenger Side)



(a) Install the power window regulator switch assembly with front door armrest base panel with the 4 screws.

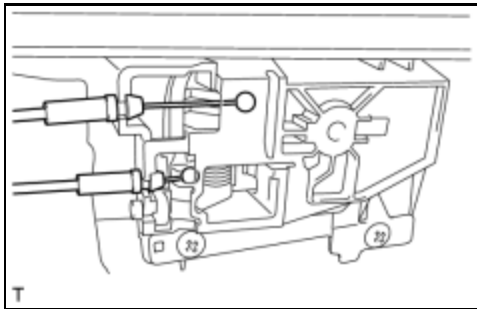
32. INSTALL FRONT DOOR INSIDE HANDLE SUB-ASSEMBLY



(a) Engage the 2 guides.

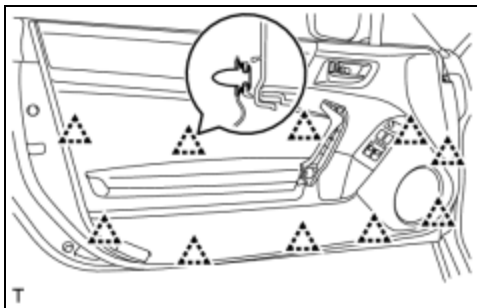
(b) Install the front door inside handle sub-assembly to the front door trim board sub-assembly with the 2 screws.

33. INSTALL FRONT DOOR TRIM BOARD SUB-ASSEMBLY



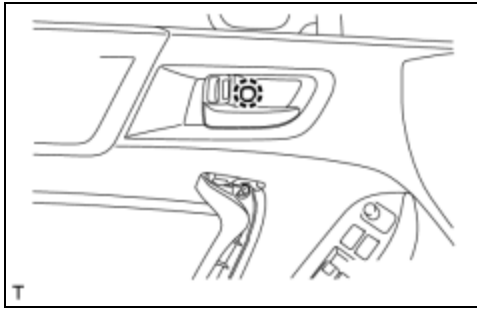
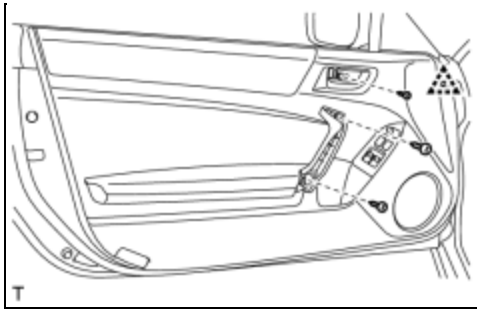
(a) Connect the front door lock remote control cable assembly and front door inside locking cable assembly to the front door inside handle.

(b) Connect each connector.



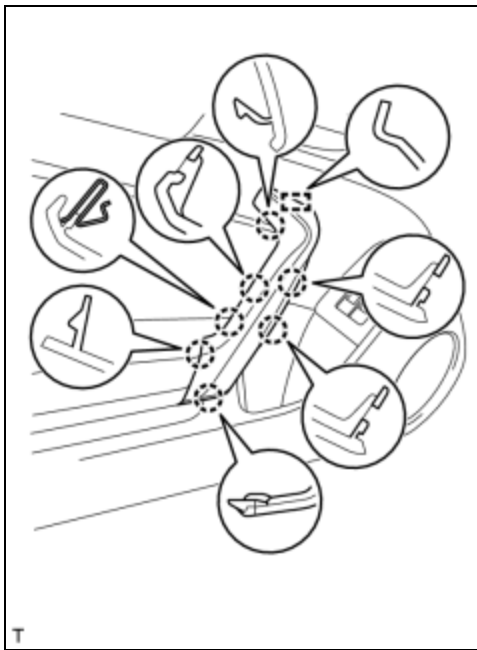
(c) Engage the 10 clips and install the front door trim board sub-assembly.

(d) Engage the clip and install the 3 screws.



(e) Engage the claw and install the cap.

34. INSTALL DOOR ARMREST COVER



(a) Engage the guide and 7 claws, and install the door armrest cover.

35. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

36. INITIALIZE POWER WINDOW CONTROL SYSTEM

INFO

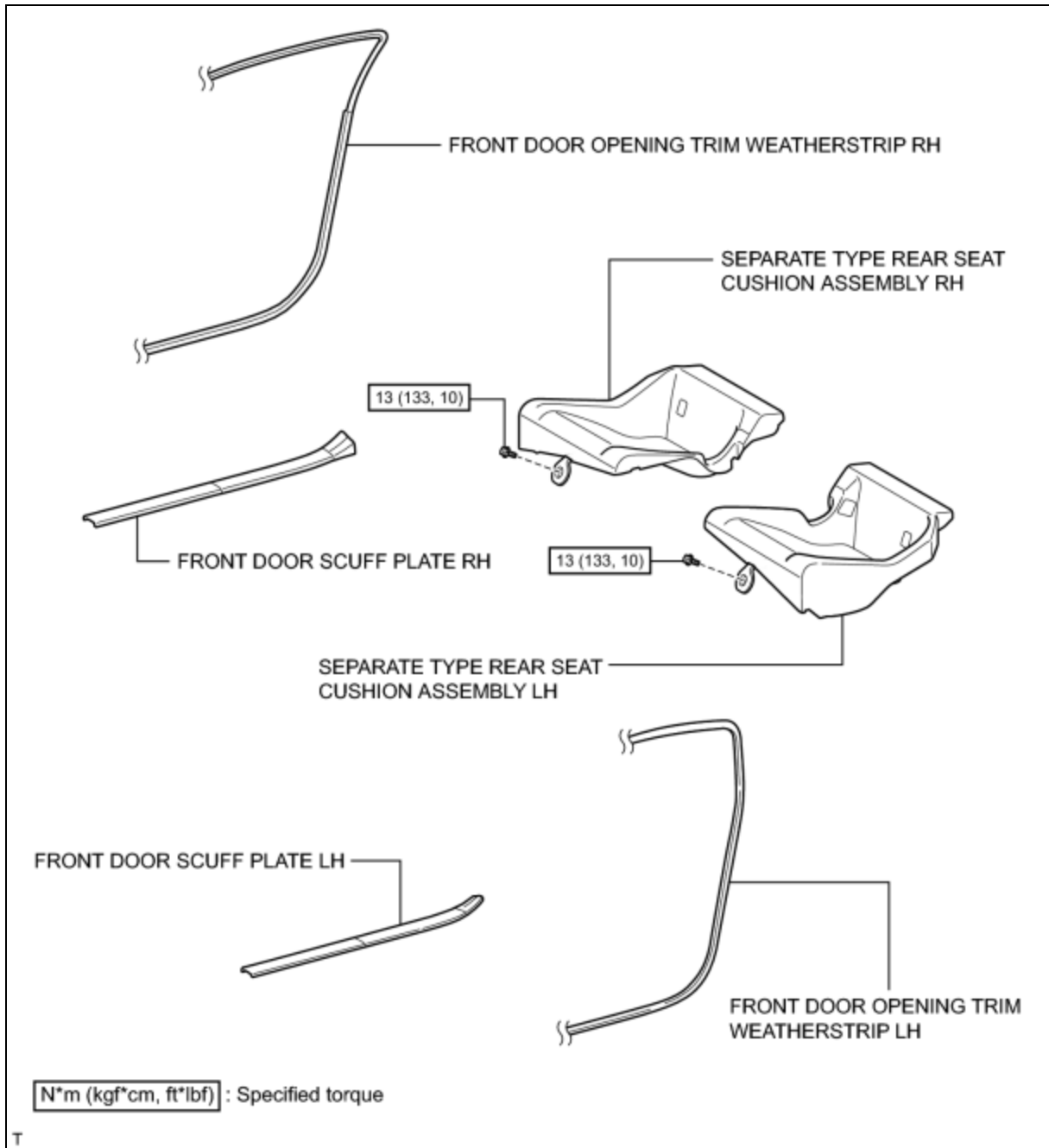
37. INSPECT POWER WINDOW



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002W9G02BX
Title: DOOR / HATCH: FUEL LID LOCK CONTROL CABLE ASSEMBLY: COMPONENTS (2013 FR-S)		

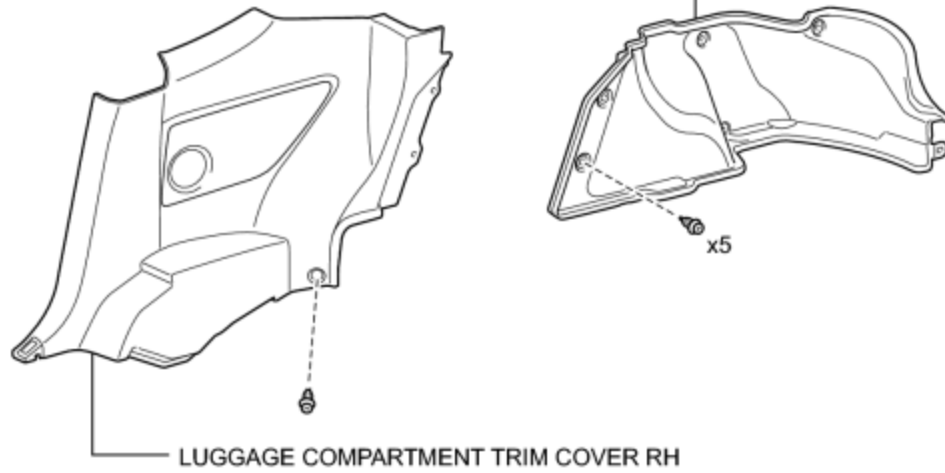
COMPONENTS

ILLUSTRATION

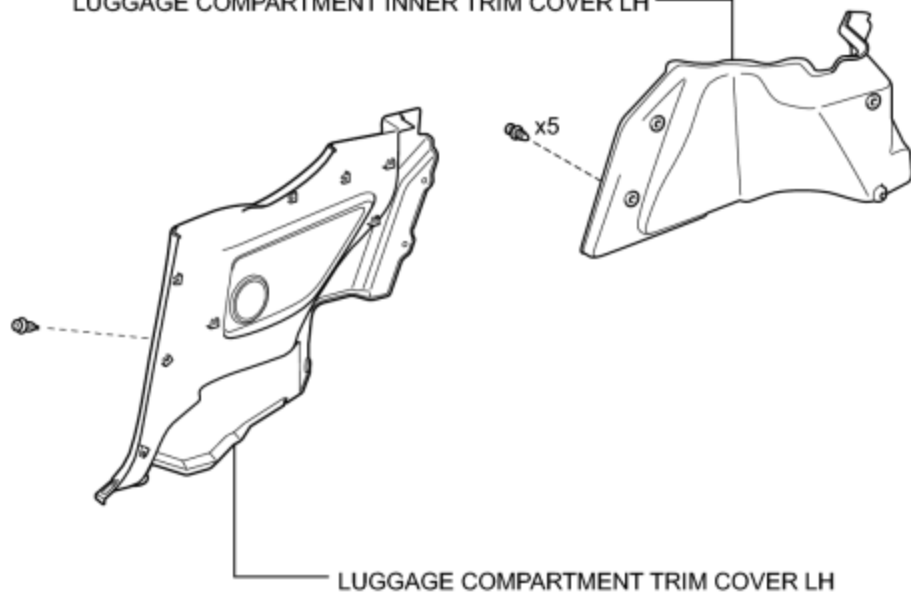


ILLUSTRATION

LUGGAGE COMPARTMENT INNER TRIM COVER RH

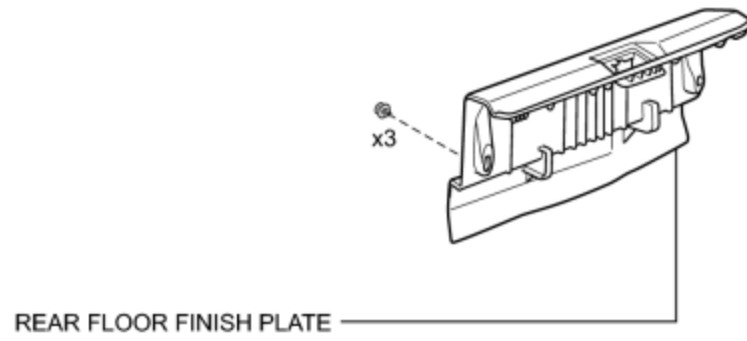
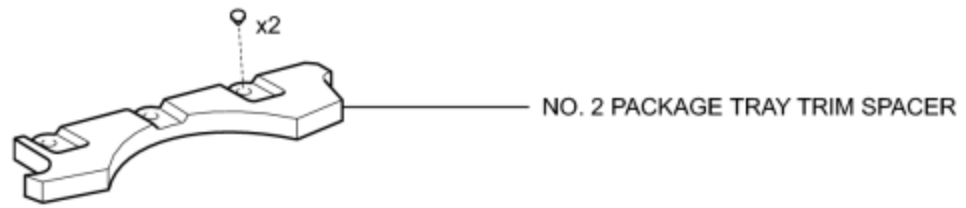


LUGGAGE COMPARTMENT INNER TRIM COVER LH



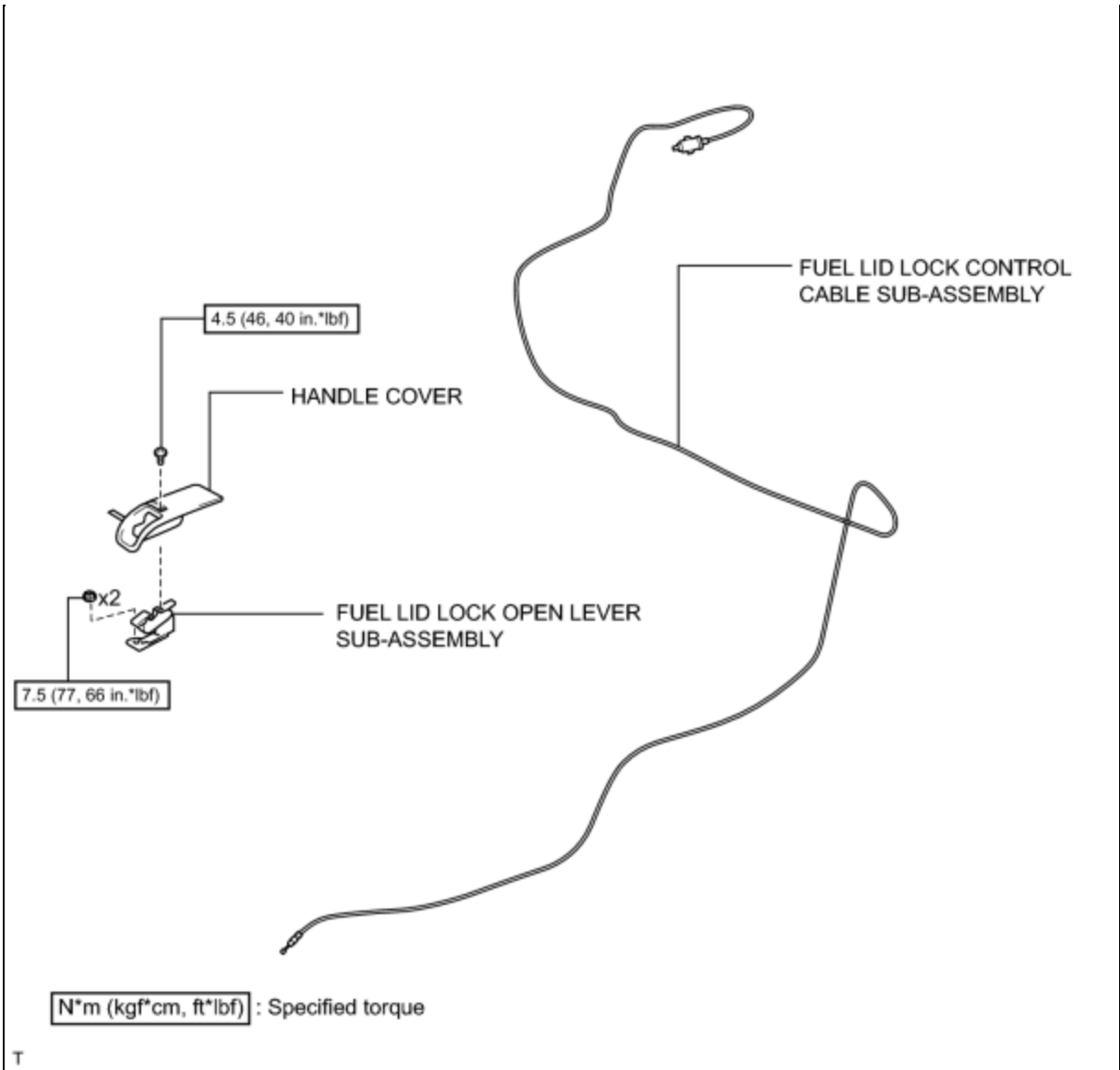
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ILLUSTRATION



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ILLUSTRATION

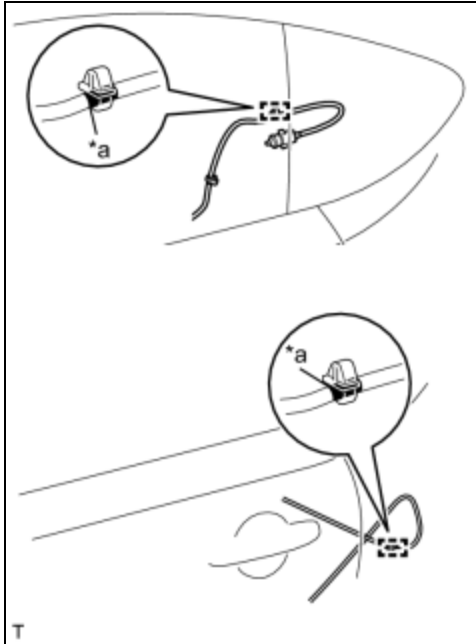


Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002W9F03NX
Title: DOOR / HATCH: FUEL LID LOCK CONTROL CABLE ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL FUEL LID LOCK CONTROL CABLE SUB-ASSEMBLY

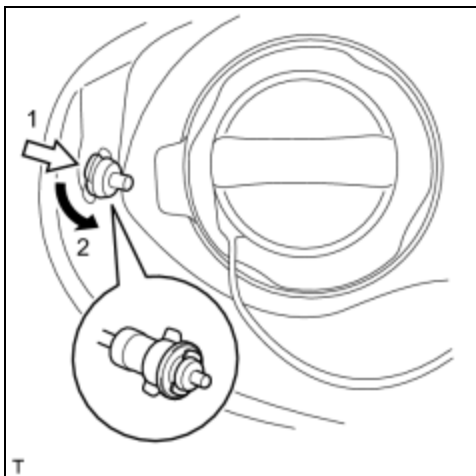
(a) Engage the 11 clamps.



(b) Check that the matchmark of the fuel lid lock control cable sub-assembly is aligned with the center of the clamp.

Text in Illustration

*a	Matchmark
----	-----------



(c) Install the fuel lid lock control cable sub-assembly as indicated by the arrows in the order shown in the illustration.

2. INSTALL FUEL LID LOCK OPEN LEVER SUB-ASSEMBLY

(a) Connect the fuel lid lock control cable sub-assembly.

(b) Install the 2 nuts and fuel lid lock open lever sub-assembly.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

(c) Return the floor mat.

3. INSTALL HANDLE COVER

(a) Install the handle cover with the screw.

Torque: 4.5 N·m (46 kgf·cm, 40in·lbf)

4. INSTALL NO. 2 PACKAGE TRAY TRIM SPACER

(a) Install the NO. 2 package tray trim spacer.

(b) Install the 2 clips.

5. INSTALL LUGGAGE COMPARTMENT TRIM COVER LH INFO

6. INSTALL LUGGAGE COMPARTMENT TRIM COVER RH

HINT:

Use the same procedure as for the LH side.

7. INSTALL LUGGAGE COMPARTMENT INNER TRIM COVER LH INFO

8. INSTALL LUGGAGE COMPARTMENT INNER TRIM COVER RH

(a) Install the 5 clips and the luggage compartment inner trim cover RH.

9. INSTALL REAR FLOOR FINISH PLATE INFO

10. INSTALL LUGGAGE COMPARTMENT FLOOR MAT

11. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY LH INFO

12. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY RH

HINT:

Use the same procedure as for the LH side.

13. INSTALL FRONT SEAT ASSEMBLY

INFO

14. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP LH INFO

15. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP RH

HINT:

Use the same procedure as for the LH side.

16. INSTALL FRONT DOOR SCUFF PLATE LH INFO

17. INSTALL FRONT DOOR SCUFF PLATE RH

HINT:

Use the same procedure as for the LH side.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002W9H03OX
Title: DOOR / HATCH: FUEL LID LOCK CONTROL CABLE ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE FRONT DOOR SCUFF PLATE LH (for LH Side) INFO

2. REMOVE FRONT DOOR SCUFF PLATE RH (for RH Side)

HINT:

Use the same procedure as for the LH side.

3. DISCONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP LH

HINT:

Disconnect the front door opening trim weatherstrip to the extent that allows the removal of the luggage compartment trim cover LH.

4. DISCONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP RH

HINT:

Use the same procedure as for the LH side.

5. REMOVE FRONT SEAT ASSEMBLY

INFO

6. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY LH INFO

7. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY RH

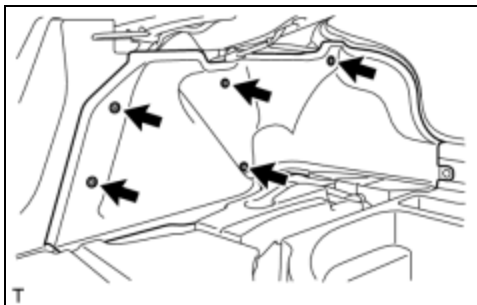
HINT:

Use the same procedure as for the LH side.

8. REMOVE LUGGAGE COMPARTMENT FLOOR MAT

9. REMOVE REAR FLOOR FINISH PLATE INFO

10. REMOVE LUGGAGE COMPARTMENT INNER TRIM COVER RH



(a) Disengage the 5 clips and remove the luggage compartment inner trim cover RH.

11. REMOVE LUGGAGE COMPARTMENT INNER TRIM COVER LH INFO

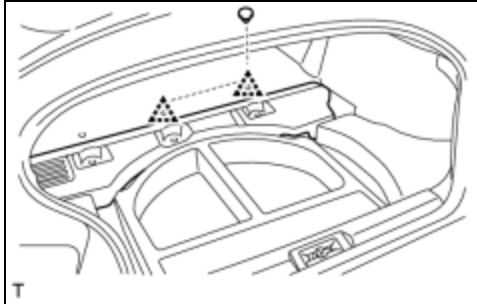
12. REMOVE LUGGAGE COMPARTMENT TRIM COVER LH INFO

13. REMOVE LUGGAGE COMPARTMENT TRIM COVER RH

HINT:

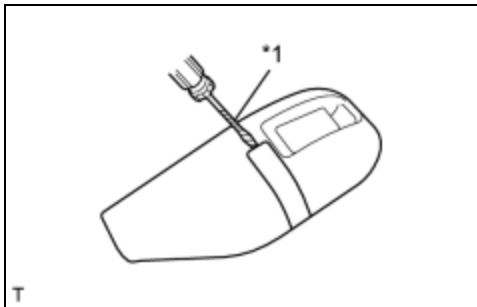
Use the same procedure as for the LH side.

14. REMOVE NO. 2 PACKAGE TRAY TRIM SPACER



- (a) Using a clip remover, disengage the 2 clips and remove the NO. 2 package tray trim spacer.

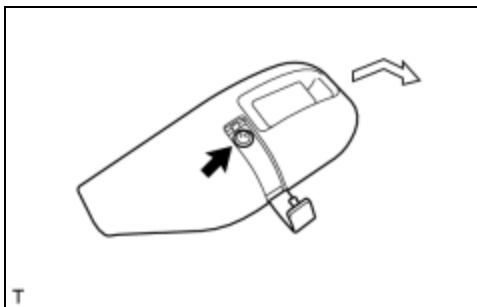
15. REMOVE HANDLE COVER



- (a) Using a screwdriver with its tip wrapped in protective tape, disengage the claw.

Text in Illustration

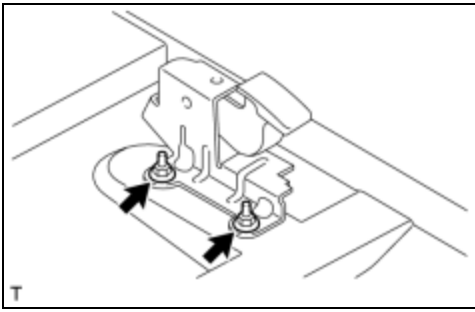
*1	Protective Tape
----	-----------------



- (b) Remove the screw.

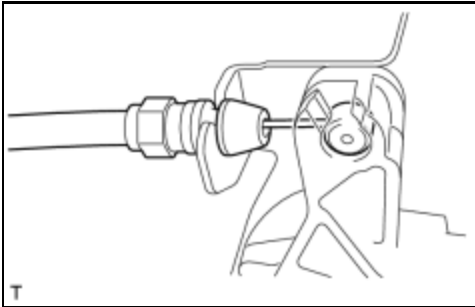
- (c) Remove the handle cover as shown in the illustration.

16. REMOVE FUEL LID LOCK OPEN LEVER SUB-ASSEMBLY



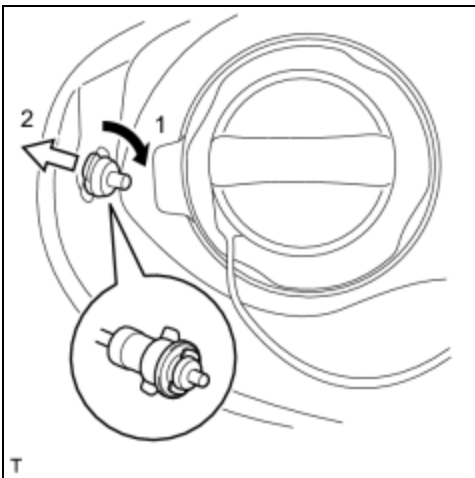
(a) Peel back the floor carpet.

(b) Remove the 2 nuts and the fuel lid lock open lever sub-assembly.



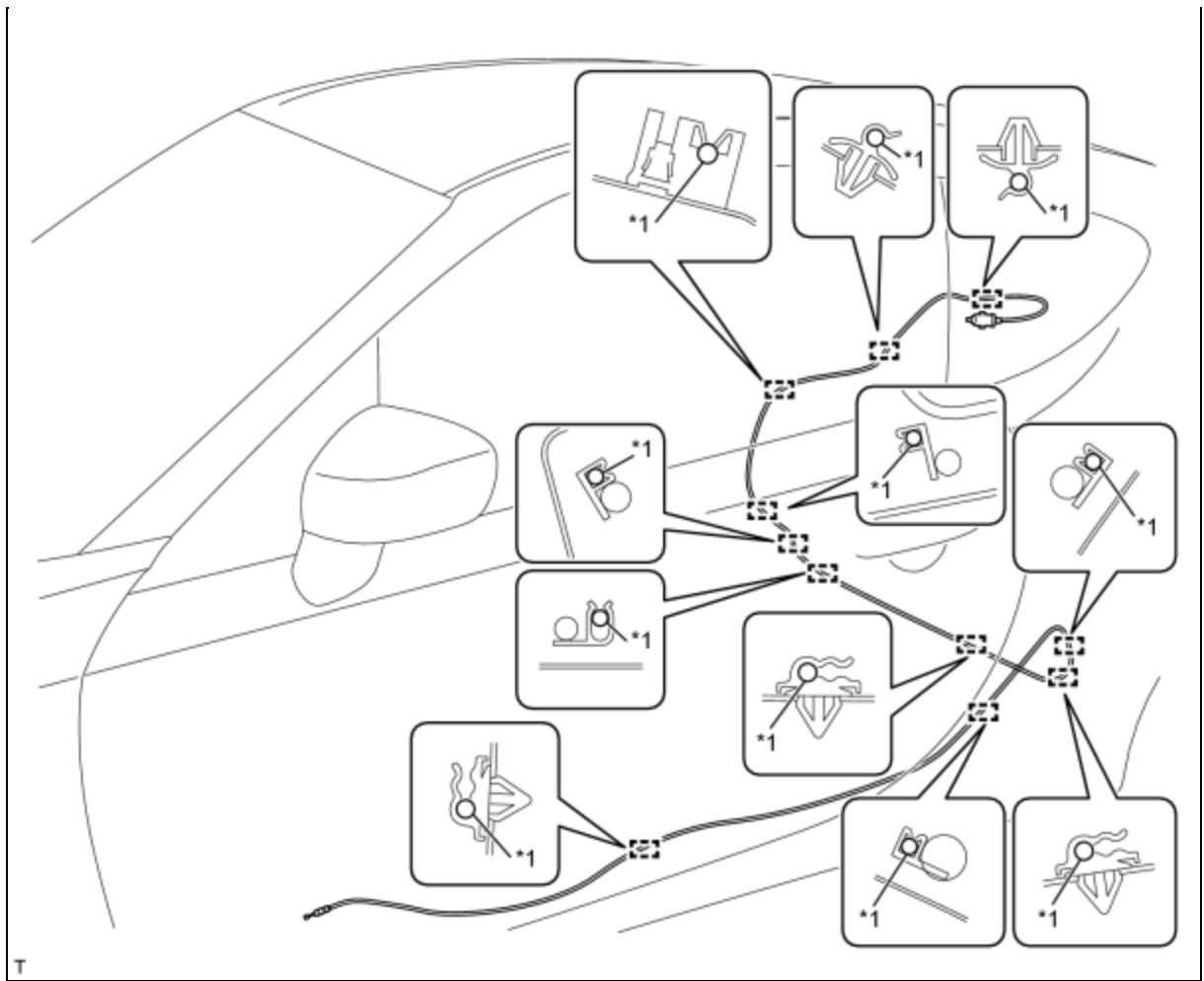
(c) Disconnect the fuel lid lock control cable sub-assembly.

17. REMOVE FUEL LID LOCK CONTROL CABLE SUB-ASSEMBLY



(a) Remove the fuel lid lock control cable sub-assembly as indicated by the arrows, in the order shown in the illustration.

(b) Using a screwdriver with its tip wrapped in protective tape, disengage the 11 clamps and remove the fuel lid lock control cable sub-assembly.



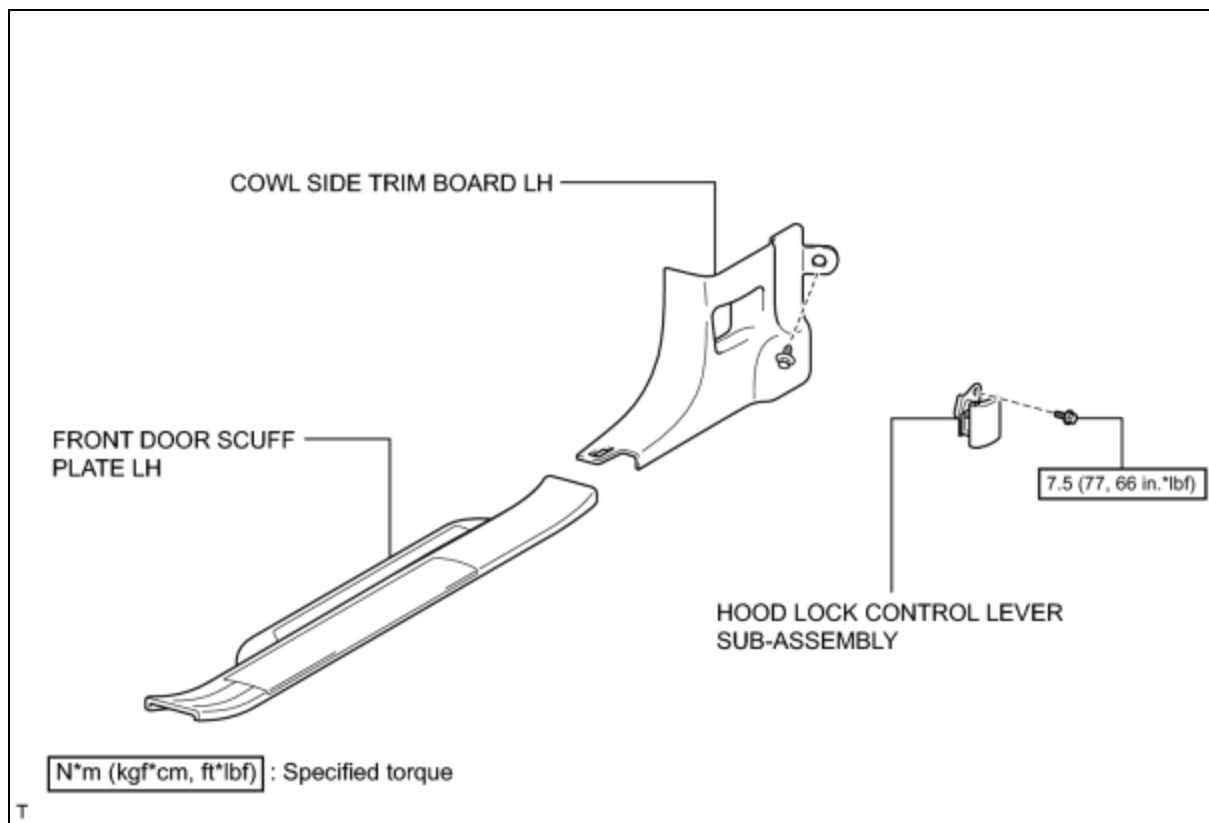
Text in Illustration

*1	Fuel Lid Lock Control Cable Sub-Assembly	-	-
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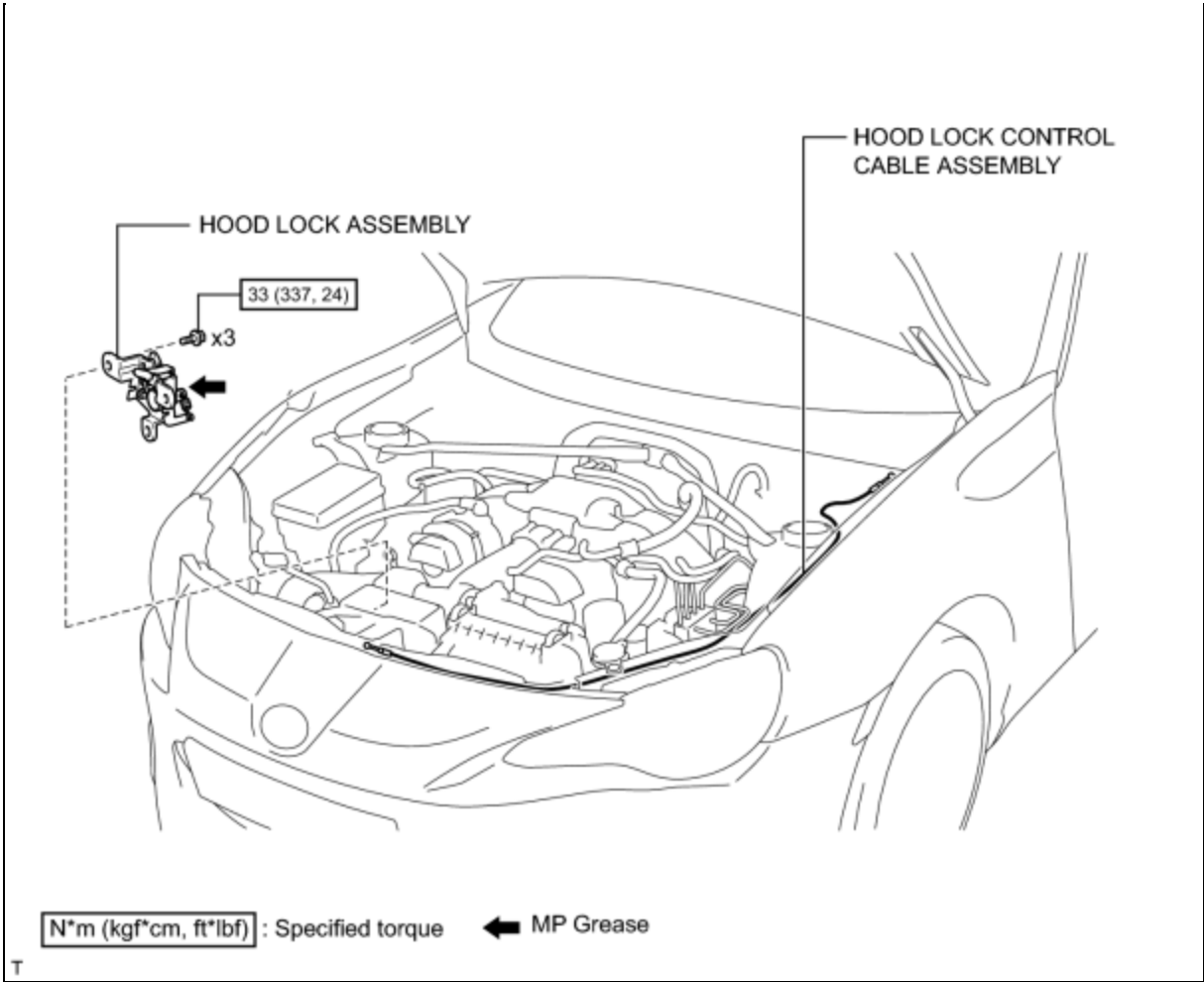
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000Y5406YX
Title: DOOR / HATCH: HOOD LOCK CONTROL CABLE ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION

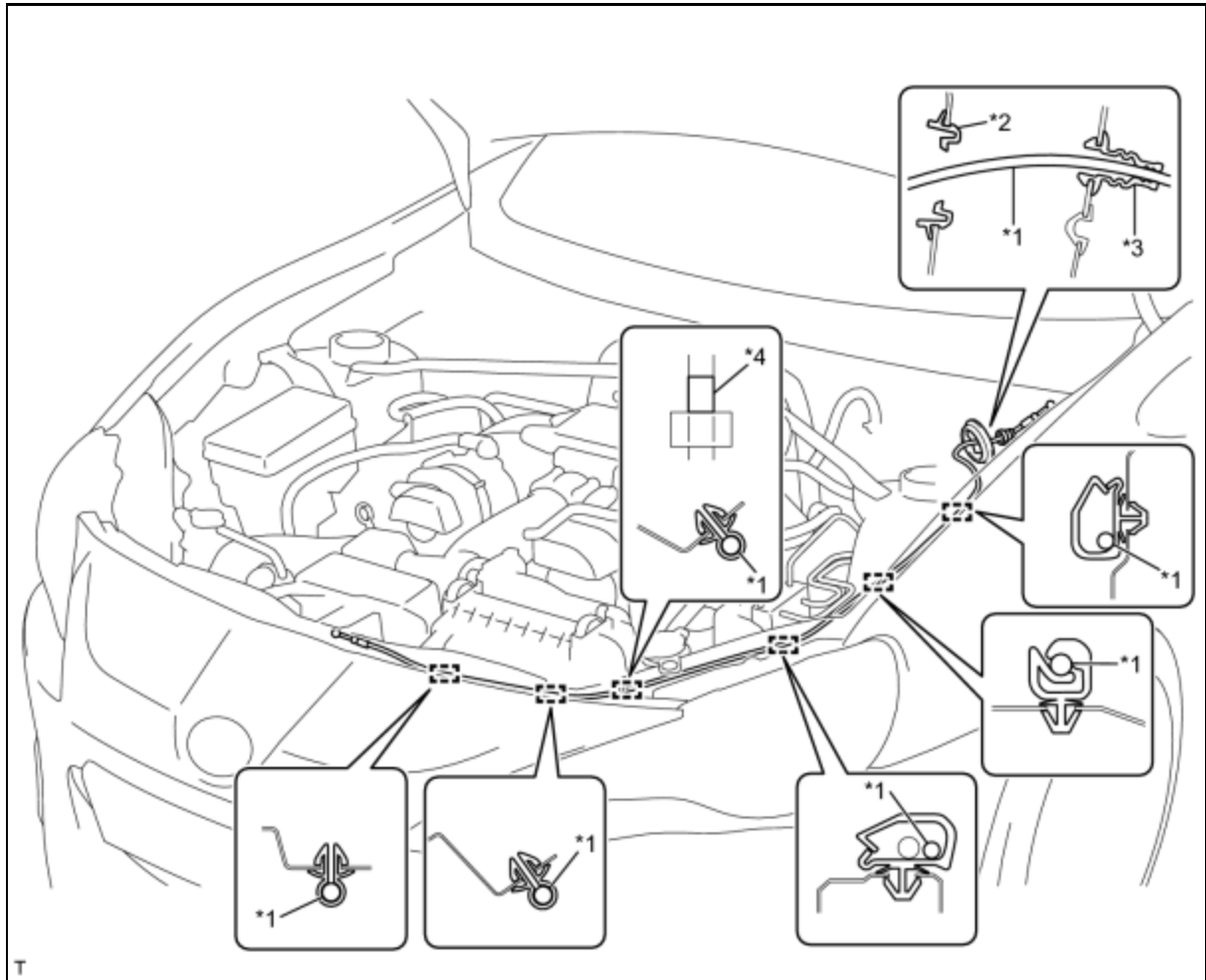


Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000Y530AMX
Title: DOOR / HATCH: HOOD LOCK CONTROL CABLE ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL HOOD LOCK CONTROL CABLE ASSEMBLY

- (a) Pass the hood lock control cable assembly into the engine compartment.



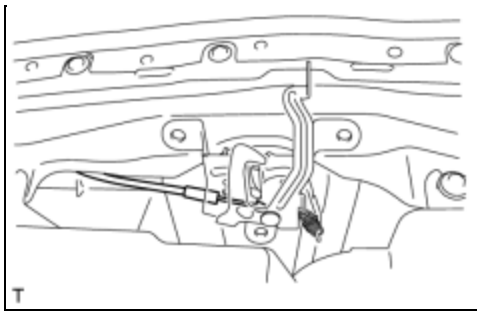
Text in Illustration

*1	Hood Lock Control Cable	*2	Grommet
*3	Hood Cable Grommet	*4	Matchmark

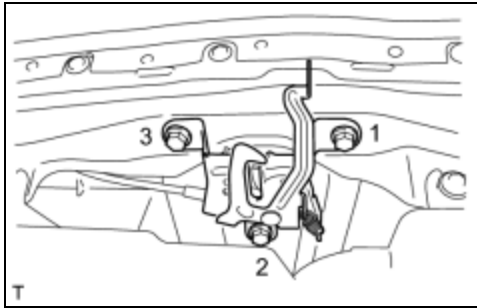
- (b) Engage 6 clamps shown in the illustration.

2. INSTALL HOOD LOCK ASSEMBLY

- (a) Apply MP grease to the sliding areas of the hood lock assembly.



(b) Connect the hood lock control cable assembly.



(c) Install the hood lock assembly with the 3 bolts in the order shown in the illustration.

Torque: 33 N·m (337 kgf·cm, 24ft·lbf)

3. INSTALL HOOD LOCK CONTROL LEVER SUB-ASSEMBLY

(a) Connect the hood lock control cable assembly to install the hood lock control lever sub-assembly.

(b) Install the hood lock control lever sub-assembly with the bolt

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

4. INSPECT HOOD SUB-ASSEMBLY

INFO

5. ADJUST HOOD SUB-ASSEMBLY

INFO

6. INSTALL AIR CLEANER CAP WITH AIR CLEANER HOSE

INFO

7. INSTALL COWL SIDE TRIM BOARD LH

INFO

8. INSTALL FRONT DOOR SCUFF PLATE LH

INFO

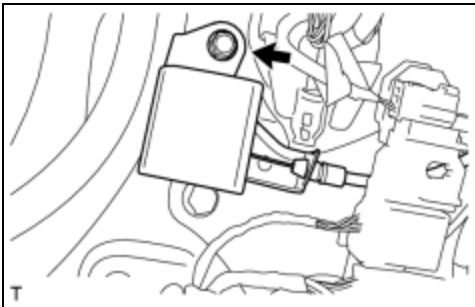
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000Y5509ZX
Title: DOOR / HATCH: HOOD LOCK CONTROL CABLE ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE FRONT DOOR SCUFF PLATE LH INFO

2. REMOVE COWL SIDE TRIM BOARD LH INFO

3. REMOVE HOOD LOCK CONTROL LEVER SUB-ASSEMBLY



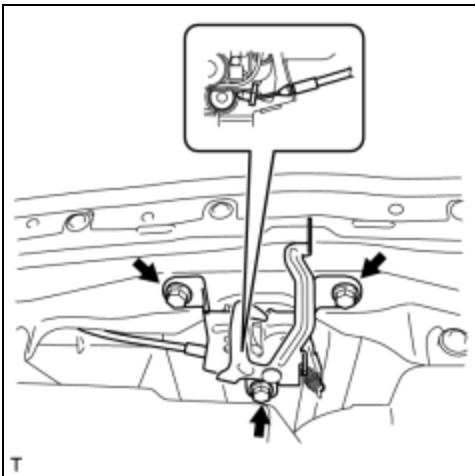
(a) Remove the bolt and hood lock control lever sub-assembly.

(b) Disconnect the hood lock control cable assembly.

4. REMOVE AIR CLEANER CAP WITH AIR CLEANER HOSE

INFO

5. REMOVE HOOD LOCK ASSEMBLY

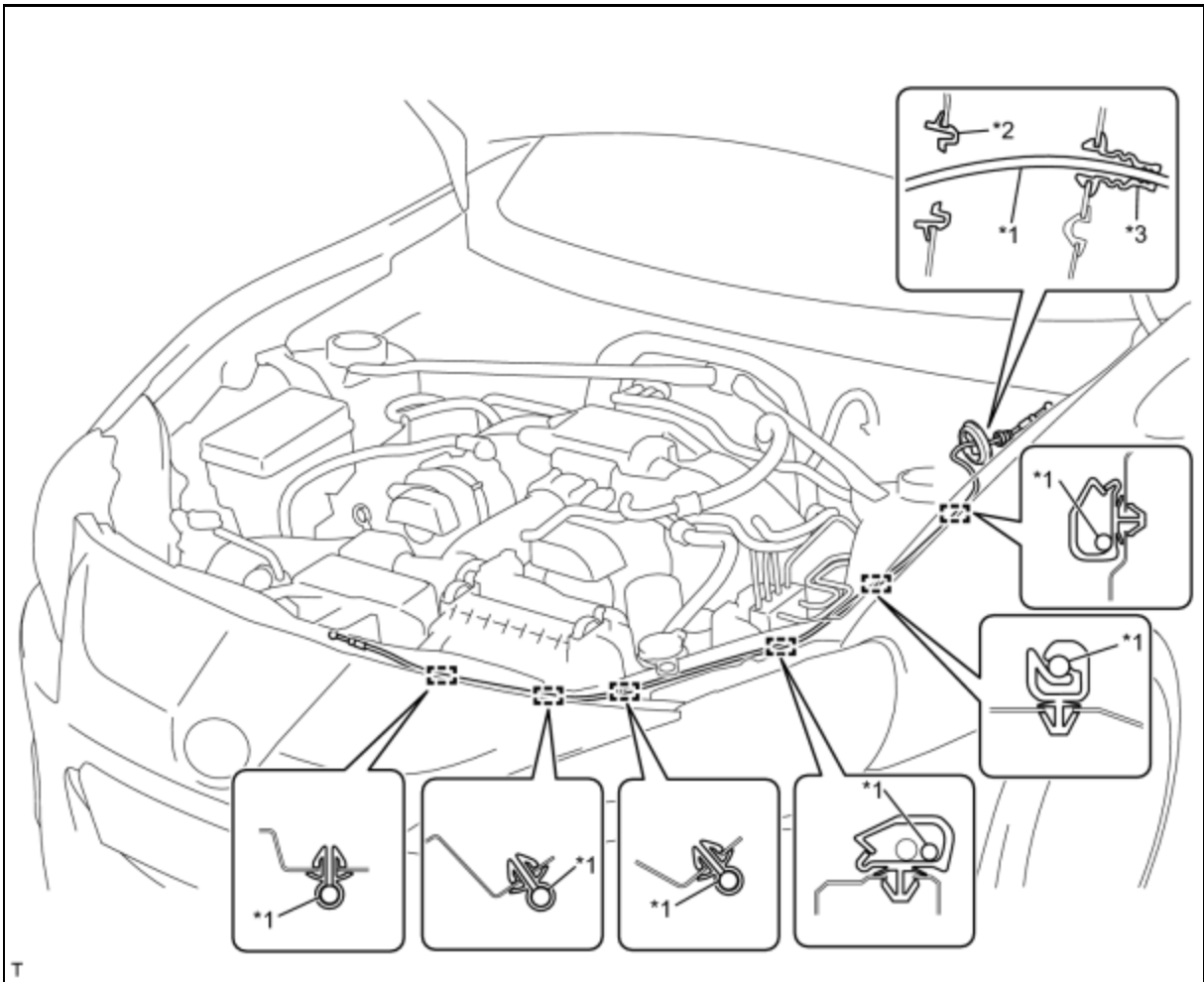


(a) Remove the 3 bolts and hood lock assembly.

(b) Disconnect the hood lock control cable assembly.

6. REMOVE HOOD LOCK CONTROL CABLE ASSEMBLY

(a) Using a screwdriver, disengage 6 clamps shown in the illustration.



Text in Illustration

*1	Hood Lock Control Cable	*2	Grommet
*3	Hood Cable Grommet	-	-

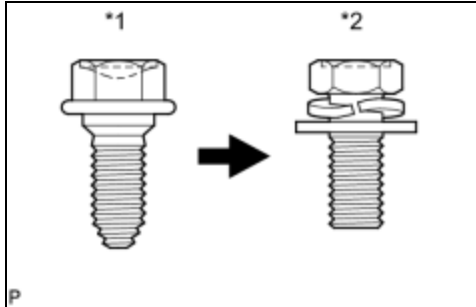
HINT:

Tape the screwdriver tip before use.

(b) Pull the hood lock control cable assembly from the engine compartment and remove it.

Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XB506SX
Title: DOOR / HATCH: HOOD: ADJUSTMENT (2013 FR-S)		

ADJUSTMENT



HINT:

- Centering bolts are used to mount the hood hinge and hood lock. The hood and hood lock cannot be adjusted with the centering bolts installed. Substitute the centering bolts with standard bolts when making adjustments.
- Specified torque for standard bolts is shown in the standard bolt chart [INFO](#).

Text in Illustration

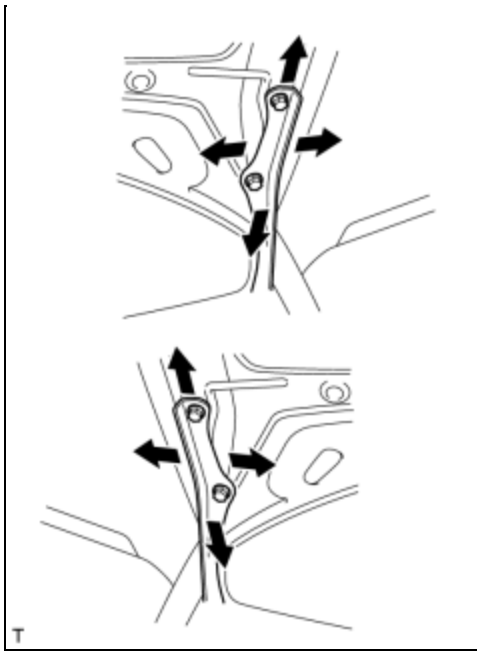
*1	Centering Bolt
*2	Standard Bolt

1. INSPECT HOOD SUB-ASSEMBLY [INFO](#)

2. ADJUST HOOD SUB-ASSEMBLY

- Horizontally and vertically adjust the hood.

(1) Loosen the 4 hinge bolts of the hood.

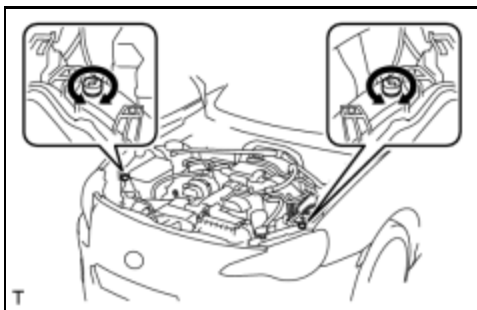


(2) Adjust the clearance between the hood and front fender by moving the hood.

(3) Tighten the 4 hinge bolts after the adjustment.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

(b) Adjust the height of the front end of the hood using the cushion rubbers.



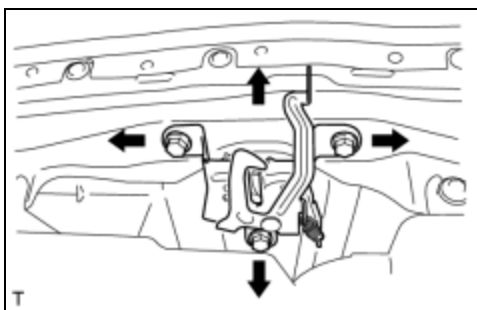
(1) Adjust the 2 cushion rubbers so that the heights of the hood and fender are aligned.

HINT:

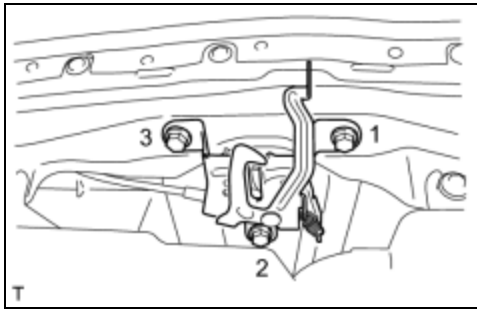
Raise or lower the front end of the hood by turning the 2 cushion rubbers.

(c) Adjust the hood lock.

(1) Loosen the 3 bolts.



(2) Adjust the hood lock position so that the striker can enter it smoothly.



(3) Tighten the 3 bolts after the adjustment in the order shown in the illustration.

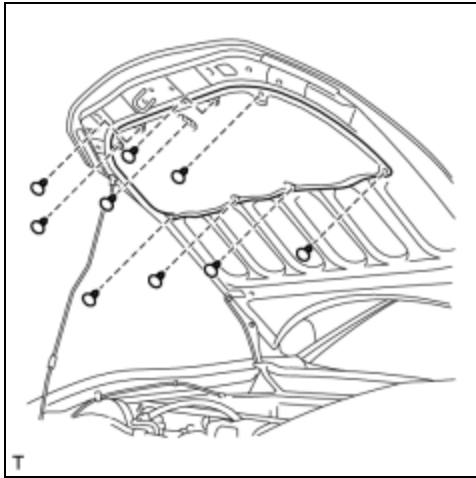
Torque: 33 N·m (337 kgf·cm, 24ft·lbf)

(4) Check that the striker can engage smoothly with the hood lock.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002Y4M049X
Title: DOOR / HATCH: HOOD: DISASSEMBLY (2013 FR-S)		

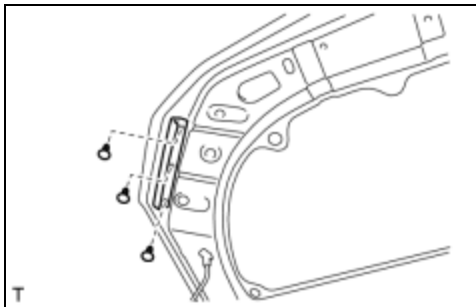
DISASSEMBLY

1. REMOVE HOOD INSULATOR



(a) Using a clip remover, remove the 9 clips and hood insulator.

2. REMOVE HOOD TO RADIATOR SUPPORT SEAL RH



(a) Using a clip remover, remove the 3 clips and hood to radiator support seal RH.

3. REMOVE HOOD TO RADIATOR SUPPORT SEAL LH

HINT:

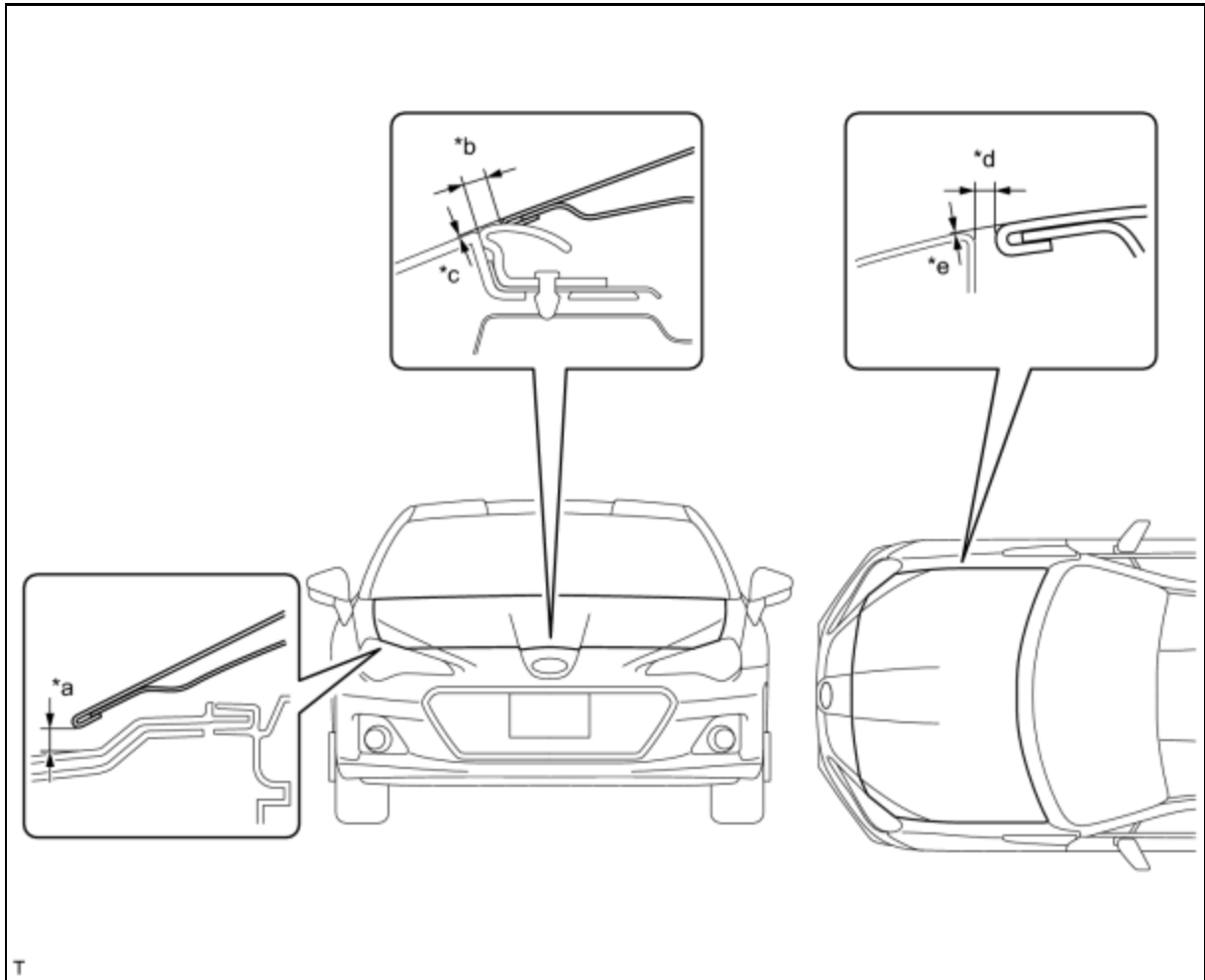
Use the same procedure as for the RH side.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XB7067X
Title: DOOR / HATCH: HOOD: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT HOOD SUB-ASSEMBLY

(a) Check that the clearance measurements of areas *a through *e are within each standard range.



Standard Clearance

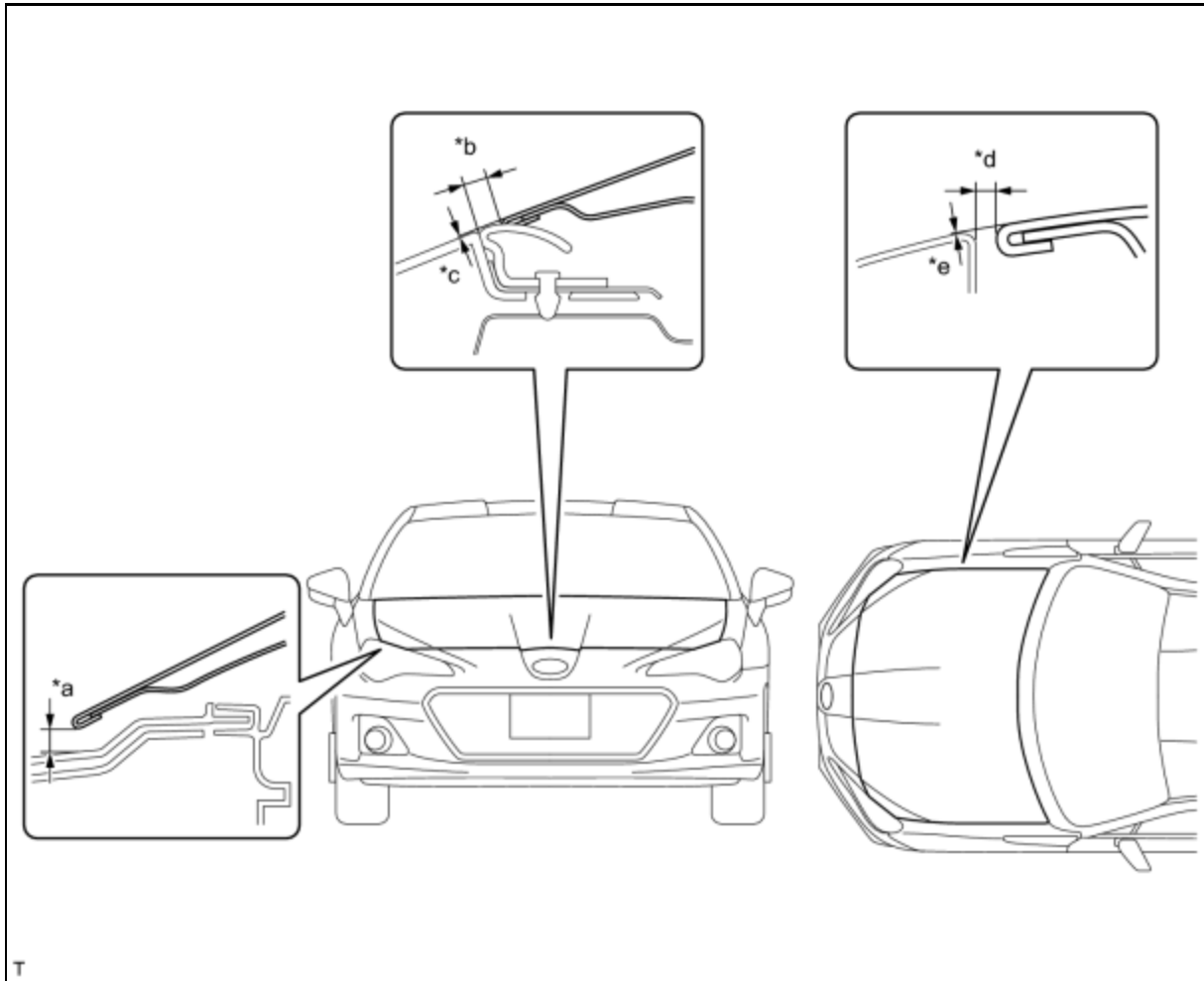
AREA	MEASUREMENT	AREA	MEASUREMENT
*a	5.8 to 9.8 mm (0.2283 to 0.3858 in.)	*b	3.0 to 7.0 mm (0.1181 to 0.2756 in.)
*c	-2.0 to 2.0 mm (-0.0787 to 0.0787 in.)	*d	2.0 to 5.0 mm (0.0787 to 0.1969 in.)
*e	-2.0 to 1.0 mm (-0.0787 to 0.0394 in.)	-	-

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XB7067X
Title: DOOR / HATCH: HOOD: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT HOOD SUB-ASSEMBLY

(a) Check that the clearance measurements of areas *a through *e are within each standard range.



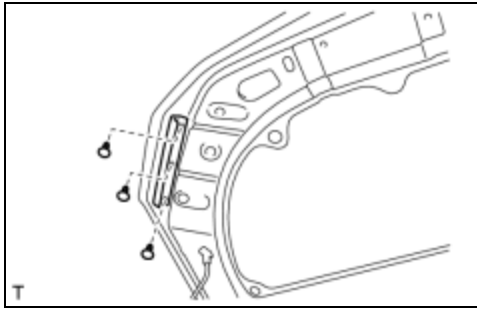
Standard Clearance

AREA	MEASUREMENT	AREA	MEASUREMENT
*a	5.8 to 9.8 mm (0.2283 to 0.3858 in.)	*b	3.0 to 7.0 mm (0.1181 to 0.2756 in.)
*c	-2.0 to 2.0 mm (-0.0787 to 0.0787 in.)	*d	2.0 to 5.0 mm (0.0787 to 0.1969 in.)
*e	-2.0 to 1.0 mm (-0.0787 to 0.0394 in.)	-	-

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002Y4N04CX
Title: DOOR / HATCH: HOOD: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL HOOD TO RADIATOR SUPPORT SEAL RH



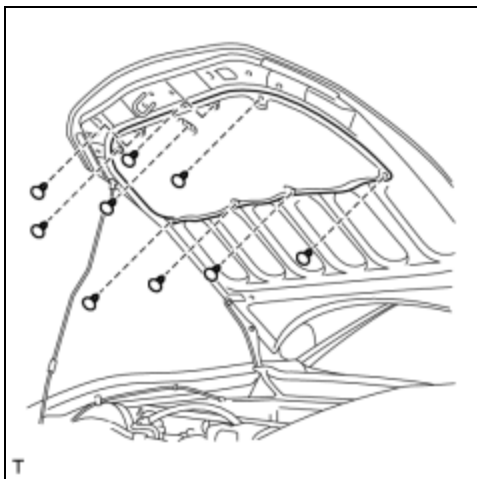
(a) Install the hood to radiator support seal RH with the 3 clips.

2. INSTALL HOOD TO RADIATOR SUPPORT SEAL LH

HINT:

Use the same procedure as for the RH side.

3. INSTALL HOOD INSULATOR



(a) Install the hood insulator with the 9 clips.

4. INSPECT HOOD SUB-ASSEMBLY

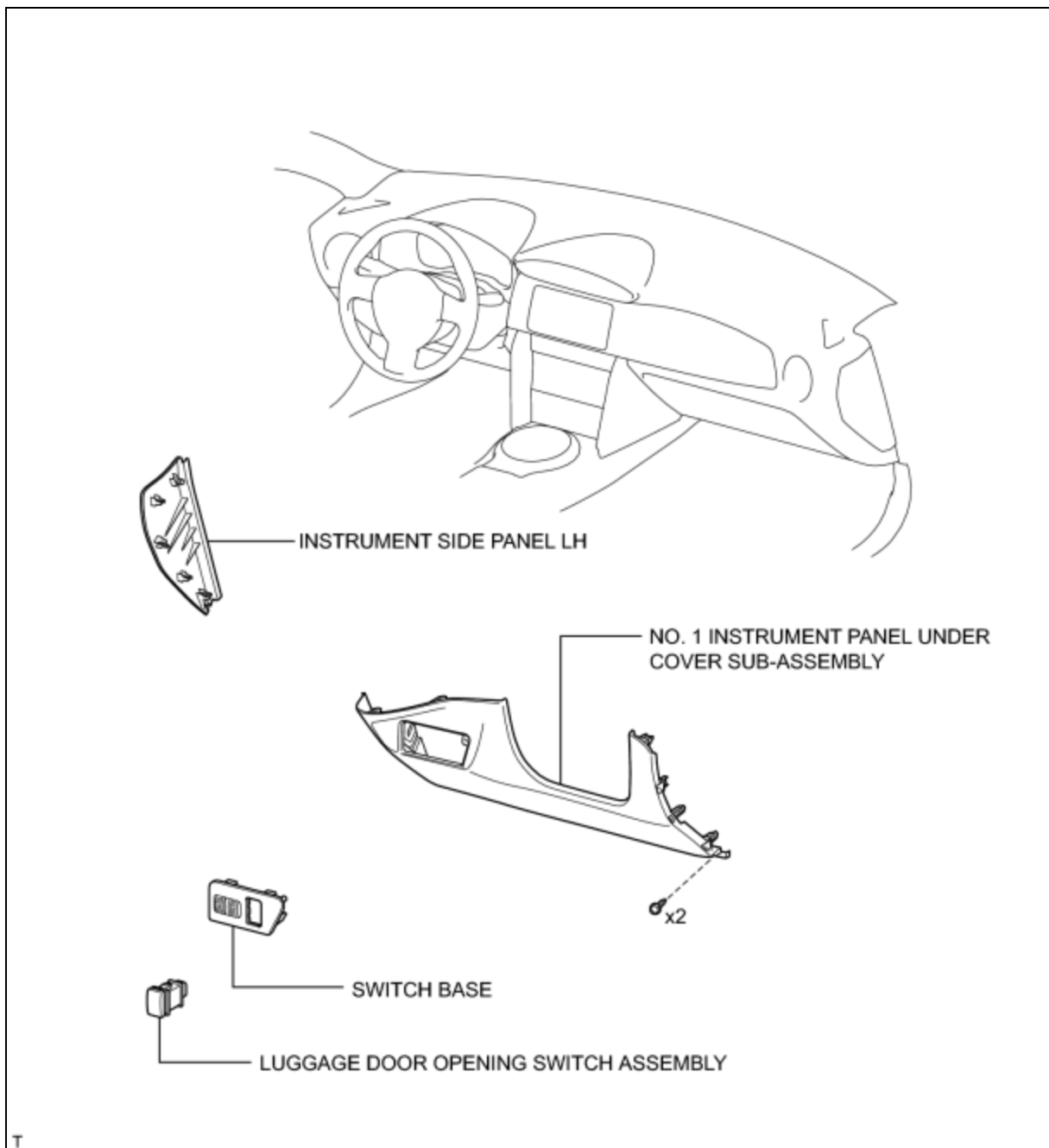
INFO



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001OIV04VX
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER INNER SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



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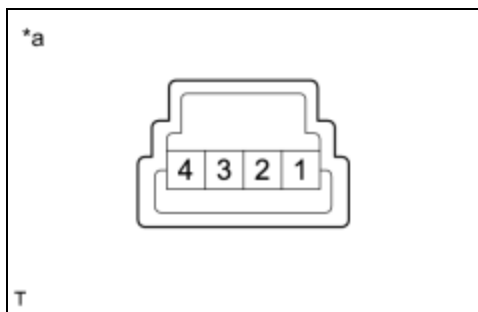
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020BR010X
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER INNER SWITCH: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT LUGGAGE DOOR OPENING SWITCH ASSEMBLY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
4 - 1	Pushed (ON)	Below 1 Ω
4 - 1	Not pushed (OFF)	10 k Ω or higher

Text in Illustration

*a	Component without harness connected (Luggage Door Opening Switch Assembly)
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If the result is not as specified, replace the switch assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001OIU06IX
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER INNER SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL LUGGAGE DOOR OPENING SWITCH ASSEMBLY

(a) Engage the 2 claws and install the luggage door opening switch assembly.

2. INSTALL SWITCH BASE [INFO](#)

3. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)

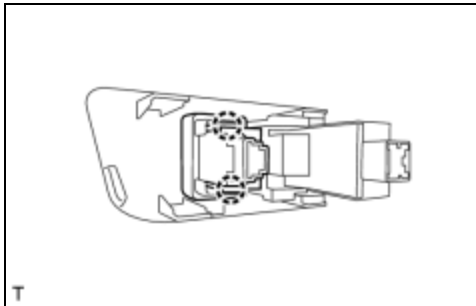
4. INSTALL INSTRUMENT SIDE PANEL LH [INFO](#)



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001OIW06JX
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER INNER SWITCH: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE INSTRUMENT SIDE PANEL LH [INFO](#)
2. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)
3. REMOVE SWITCH BASE [INFO](#)
4. REMOVE LUGGAGE DOOR OPENING SWITCH ASSEMBLY

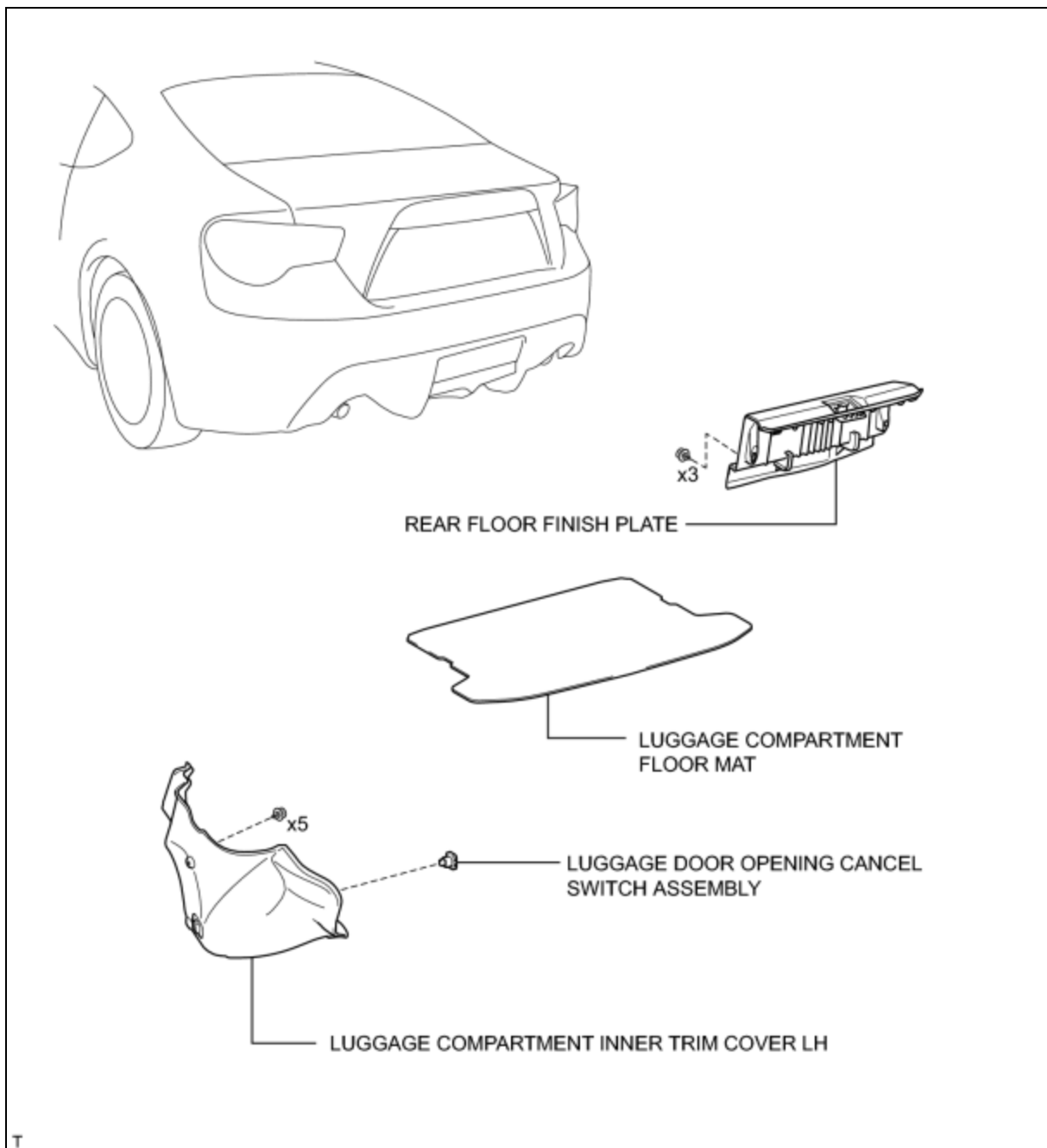


(a) Disengage the 2 claws and remove the luggage door opening switch assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001XT600XX
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER MAIN SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



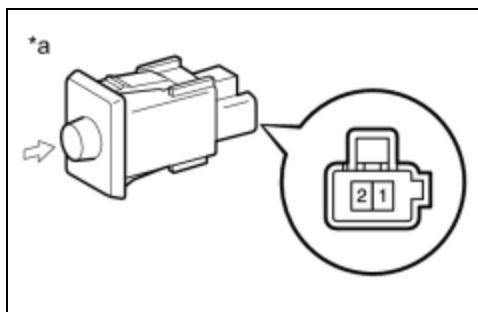
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020BS00PX
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER MAIN SWITCH: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT LUGGAGE DOOR OPENING CANCEL SWITCH ASSEMBLY

- (a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 - 2	Pushed (ON)	Below 1 Ω
1 - 2	Not pushed (OFF)	10 k Ω or higher

Text in Illustration

*a	Component without harness connected (Luggage Door Opening Cancel Switch Assembly)
----	--

If the result is not as specified, replace the switch assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001XT501LX
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER MAIN SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL LUGGAGE DOOR OPENING CANCEL SWITCH ASSEMBLY

- (a) Engage the 2 claws and install the luggage door opening cancel switch assembly.

2. INSTALL LUGGAGE COMPARTMENT INNER TRIM COVER LH

- (a) Connect the connector.
- (b) Install the luggage compartment inner trim cover LH with the 5 clips.

3. INSTALL REAR FLOOR FINISH PLATE INFO

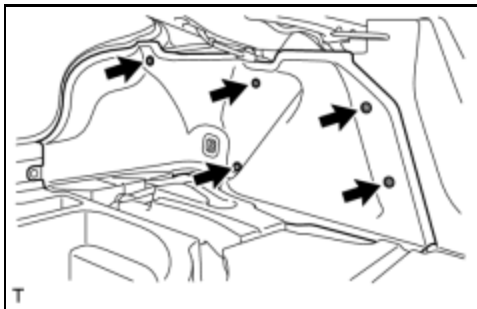
4. INSTALL LUGGAGE COMPARTMENT FLOOR MAT



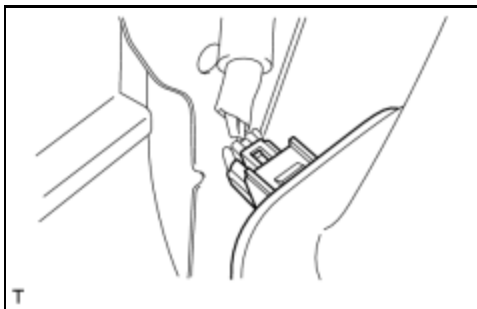
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001XT701LX
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER MAIN SWITCH: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE LUGGAGE COMPARTMENT FLOOR MAT
2. REMOVE REAR FLOOR FINISH PLATE INFO
3. REMOVE LUGGAGE COMPARTMENT INNER TRIM COVER LH

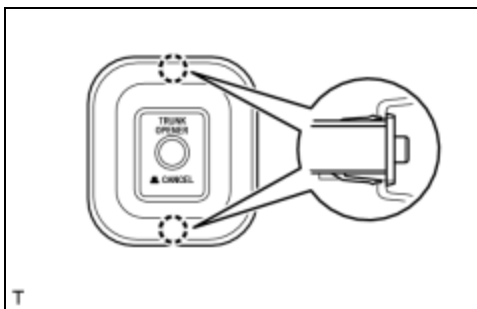


(a) Disengage the 5 clips.



(b) Disconnect the connector and remove the luggage compartment inner trim cover LH.

4. REMOVE LUGGAGE DOOR OPENING CANCEL SWITCH ASSEMBLY

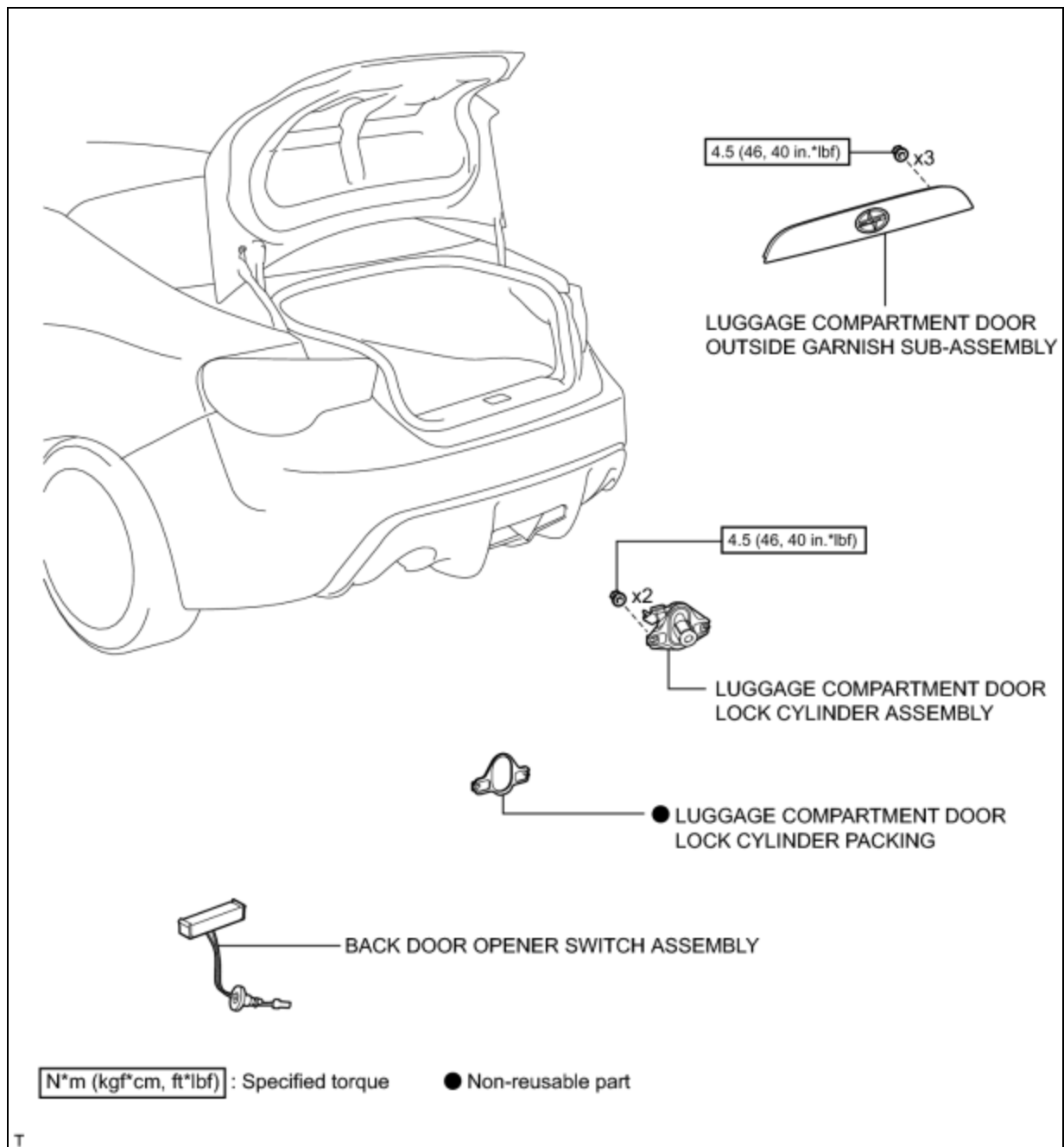


(a) Disengage the 2 claws and remove the luggage door opening cancel switch assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001OIV04TX
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER OUTER SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



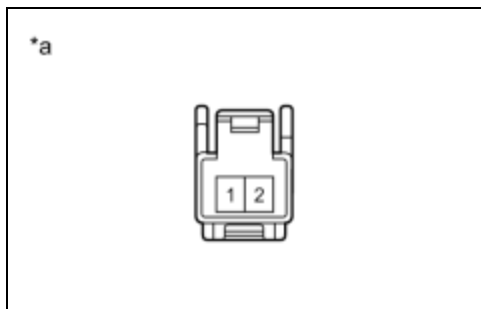
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001UM202DX
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER OUTER SWITCH: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT BACK DOOR OPENER SWITCH ASSEMBLY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 - 2	Back door opener switch not pushed	10 k Ω or higher
1 - 2	Back door opener switch pushed	Below 1 Ω

Text in Illustration

*a	Component without harness connected (Back Door Opener Switch Assembly)
----	---

If the result is not specified, replace the back door opener switch assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001OIU06GX
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER OUTER SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL BACK DOOR OPENER SWITCH ASSEMBLY

(a) Engage the 2 claws and install the back door opener switch assembly.

2. INSTALL LUGGAGE COMPARTMENT DOOR OUTSIDE GARNISH SUB-ASSEMBLY [INFO](#)

3. INSTALL LUGGAGE COMPARTMENT DOOR LOCK CYLINDER PACKING [INFO](#)

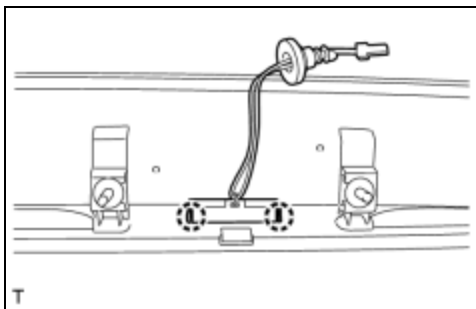
4. INSTALL LUGGAGE COMPARTMENT DOOR LOCK CYLINDER ASSEMBLY [INFO](#)



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010IW06HX
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER OUTER SWITCH: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE LUGGAGE COMPARTMENT DOOR LOCK CYLINDER ASSEMBLY [INFO](#)
2. REMOVE LUGGAGE COMPARTMENT DOOR LOCK CYLINDER PACKING [INFO](#)
3. REMOVE LUGGAGE COMPARTMENT DOOR OUTSIDE GARNISH SUB-ASSEMBLY [INFO](#)
4. REMOVE BACK DOOR OPENER SWITCH ASSEMBLY



(a) Disengage the 2 claws and remove the back door opener switch assembly.

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VPK024X
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Data List.
- (e) Read the Data List according to the display on the Techstream.

Main Body

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Trunk/BDoor Open SW	Luggage door opening switch signal/ON or OFF	ON: Luggage door opening switch assembly pushed OFF: Luggage door opening switch assembly not pushed	-
Trunk Cancel Switch	Luggage door opening cancel switch signal/ON or OFF	ON: Luggage door opening cancel switch assembly pushed OFF: Luggage door opening cancel switch assembly not pushed	-

2. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Active Test.

(e) Perform the Active Test according to the display on the Techstream.

Main Body

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Trunk and Back-Door Open	Operate luggage compartment door lock motor	ON/OFF	This test will open the trunk



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001TFV016X
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedure to troubleshoot the luggage compartment door opener system.
- *: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	INSPECT BATTERY VOLTAGE
-----------	--------------------------------

Standard Voltage:

11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding to the next step.

NEXT




3.	PROBLEM SYMPTOMS TABLE
-----------	-------------------------------

(a) Refer to Problem Symptoms Table  .

Result:

RESULT	PROCEED TO
Fault is not listed in Problem Symptoms Table	A
Fault is listed in Problem Symptoms Table	B

B  Go to step 6

A



4. OVERALL ANALYSIS AND TROUBLESHOOTING*

(a) Data List / Active Test **INFO**

(b) Operation Check **INFO**

(c) Terminals of ECU **INFO**

NEXT



5. REPAIR OR REPLACE

NEXT



6. CONFIRMATION TEST

NEXT  **END**



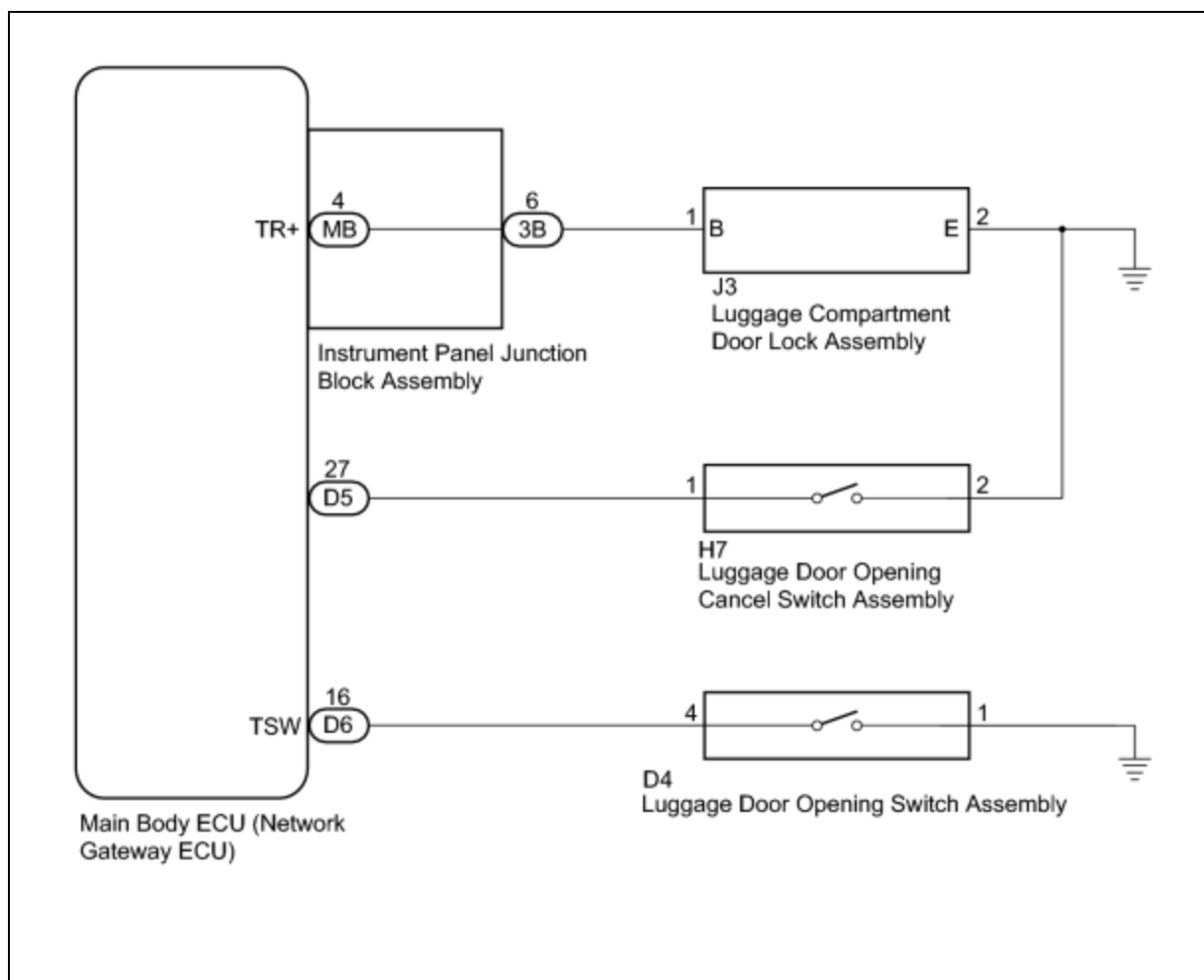
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001SHK019X
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER SYSTEM: Luggage Compartment Door Opener does not Operate (2013 FR-S)		

[Luggage Compartment Door Opener does not Operate](#)

DESCRIPTION

When the main body ECU (network gateway ECU) has received the ON signal from the luggage opening cancel switch assembly and the ON signal from the luggage door opening switch assembly, the main body ECU (network gateway ECU) activates the luggage compartment door lock motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

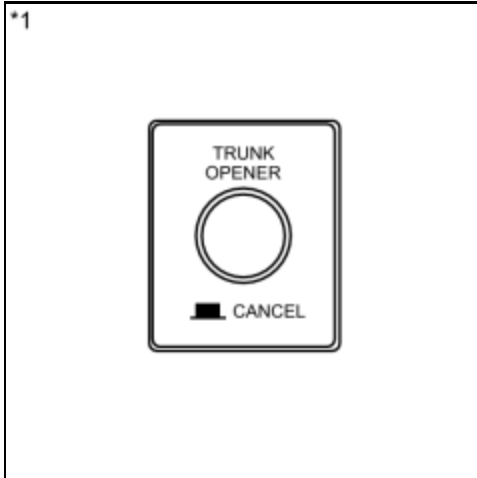
CHECK LUGGAGE COMPARTMENT DOOR OPENER SYSTEM (LUGGAGE DOOR

1. OPENING CANCEL SWITCH ASSEMBLY)

(a) When the luggage door opening cancel switch assembly is on, push the luggage door opening switch assembly and check that the luggage compartment door opens.

OK:

Luggage compartment door opener system operates normally.



(b) When the luggage door opening cancel switch assembly is off, push the luggage door opening switch assembly and check that the luggage compartment door does not open.

Text in Illustration

*1	Luggage Door Opening Cancel Switch Assembly
----	---

OK:

Luggage compartment door opener system does not operate.

NG ► **PERFORM ACTIVE TEST USING TECHSTREAM**

OK ► **END**

2. PERFORM ACTIVE TEST USING TECHSTREAM

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Body Electrical / Main Body / Active Test.

(e) Perform the Active Test according to the display on the Techstream.

Main Body

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Trunk and Back-Door Open	Operate luggage compartment door lock motor	ON/OFF	This test will open the trunk

OK:

Luggage compartment door lock motor operates.

INSPECT LUGGAGE COMPARTMENT DOOR

OK
▼

3.	READ VALUE USING TECHSTREAM
-----------	------------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Data List.
- (e) Read the Data List according to the display on the Techstream.

Main Body

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Trunk/BDoor Open SW	Luggage door opening switch signal/ON or OFF	ON: Luggage door opening switch assembly is pushed OFF: Luggage door opening switch assembly is not pushed	-
Trunk Main SW	Luggage door opening cancel switch signal/ON or OFF	ON: Luggage door opening cancel switch assembly is pushed OFF: Luggage door opening cancel switch assembly is not pushed	-

OK:

On the Techstream screen, each item changes between ON and OFF according to the above.

Result:

RESULT	PROCEED TO
NG (Luggage door opening switch assembly is abnormal)	A
NG (Luggage door opening cancel switch assembly is abnormal)	B
OK	C



B  **INSPECT LUGGAGE DOOR OPENING CANCEL SWITCH ASSEMBLY**

C  **INSPECT LUGGAGE COMPARTMENT DOOR LOCK ASSEMBLY**

A



4.	INSPECT LUGGAGE DOOR OPENING SWITCH ASSEMBLY
-----------	---

- (a) Remove the luggage door opening switch assembly  .
- (b) Inspect the luggage door opening switch assembly  .

B  **REPLACE LUGGAGE DOOR OPENING SWITCH ASSEMBLY**

A



5.	CHECK HARNESS AND CONNECTOR (LUGGAGE DOOR OPENING SWITCH ASSEMBLY - MAIN BODY ECU (NETWORK GATEWAY ECU))
-----------	---

- (a) Disconnect the D6 main body ECU (network gateway ECU) connector and the D4 luggage door opening switch assembly.
- (b) Measure the resistance according to the value(s) in the table below.


Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D6-16 (TSW) - D4-4	Always	Below 1 Ω


Standard Resistance (Check for Short):


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D6-16 (TSW) - Body ground	Always	10 k Ω or higher
D4-1 - Body ground	Always	Below 1 Ω

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

6.	INSPECT LUGGAGE DOOR OPENING CANCEL SWITCH ASSEMBLY
-----------	--

(a) Remove the luggage door opening cancel switch assembly  .

(b) Inspect the luggage door opening cancel switch assembly  .

NG  **REPLACE LUGGAGE DOOR OPENING CANCEL SWITCH ASSEMBLY**

OK



7.	CHECK HARNESS AND CONNECTOR (LUGGAGE DOOR OPENING CANCEL SWITCH ASSEMBLY - MAIN BODY ECU (NETWORK GATEWAY ECU))
-----------	--

(a) Disconnect the D5 main body ECU (network gateway ECU) connector and the H7 luggage door opening cancel switch assembly.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D5-27 - H7-1	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D5-27 - Body ground	Always	10 k Ω or higher
H7-2 - Body ground	Always	Below 1 Ω

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

8.	INSPECT LUGGAGE COMPARTMENT DOOR LOCK ASSEMBLY
-----------	---

(a) Remove the luggage compartment door lock assembly  .

(b) Inspect the luggage compartment door lock assembly  .

NG  **REPLACE LUGGAGE COMPARTMENT DOOR LOCK ASSEMBLY**

OK



9.	CHECK HARNESS AND CONNECTOR (LUGGAGE COMPARTMENT DOOR LOCK ASSEMBLY - MAIN BODY ECU (NETWORK GATEWAY ECU))
-----------	---

(a) Disconnect the 3B instrument panel junction block assembly connector and the J3 luggage compartment door lock assembly.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
J3-1 (B) - 3B-6	Always	Below 1 Ω

Standard Resistance (Check for Short):


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
J3-1 (B) - Body ground	Always	10 k Ω or higher
J3-2 (E) - Body ground	Always	Below 1 Ω

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



10.	REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY
------------	---

(a) Temporarily replace the instrument panel junction block assembly with a new or normally functioning one  .

(b) Check the door closer operation.

OK:

Door closer operation normal.

NG **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

OK **END**



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000025VO02EX
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER SYSTEM: OPERATION CHECK (2013 FR-S)		

OPERATION CHECK

1. CHECK LUGGAGE COMPARTMENT DOOR OPENER OPERATION

NOTICE:

- To prevent inadvertent operation of the luggage compartment door, the opener does not operate while driving.
- When the theft deterrent system is in the armed state or alarm sounding state, the luggage compartment door opener does not operate.*

*: w/ Theft Deterrent System

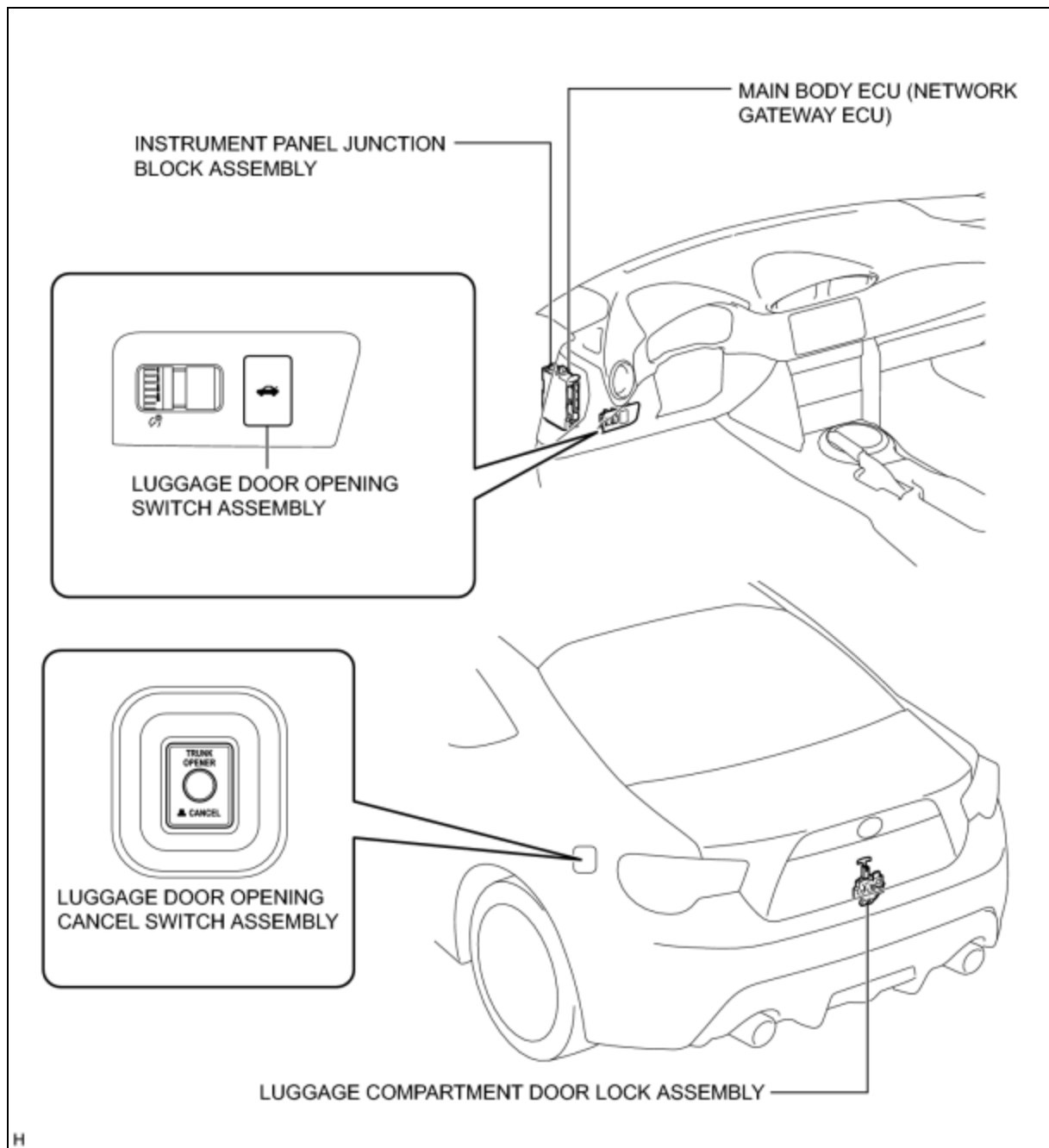
- (a) When the luggage door opening switch is on, push the luggage door opening switch assembly and check that the luggage compartment door opens.
- (b) When the luggage door opening switch assembly is off, push the luggage door opening switch assembly and check that the luggage compartment door does not open.
- (c) While the luggage door opening cancel switch is on, check that the luggage compartment door does not open when the luggage door opening switch is pressed.



Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001WLL00QX
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001SHF015X
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Luggage Compartment Door Opener System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Luggage compartment door opener does not operate	Luggage Compartment Door Lock Assembly	INFO
	Luggage door opening switch assembly	INFO
	Luggage door opening cancel switch assembly	INFO
	Main body ECU (network gateway ECU)	-
	Wire harness or connector	-



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001SHG011X
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

SYSTEM DESCRIPTION

1. LUGGAGE COMPARTMENT DOOR OPENER SYSTEM DESCRIPTION

- (a) The luggage compartment door opener is electrically controlled.
- (b) The main body ECU (network gateway ECU) activates the luggage compartment door lock motor when the ON signal from the luggage door opening switch assembly is received.
- (c) Close the luggage compartment door.
- (d) The luggage compartment door opener system operates as follows:

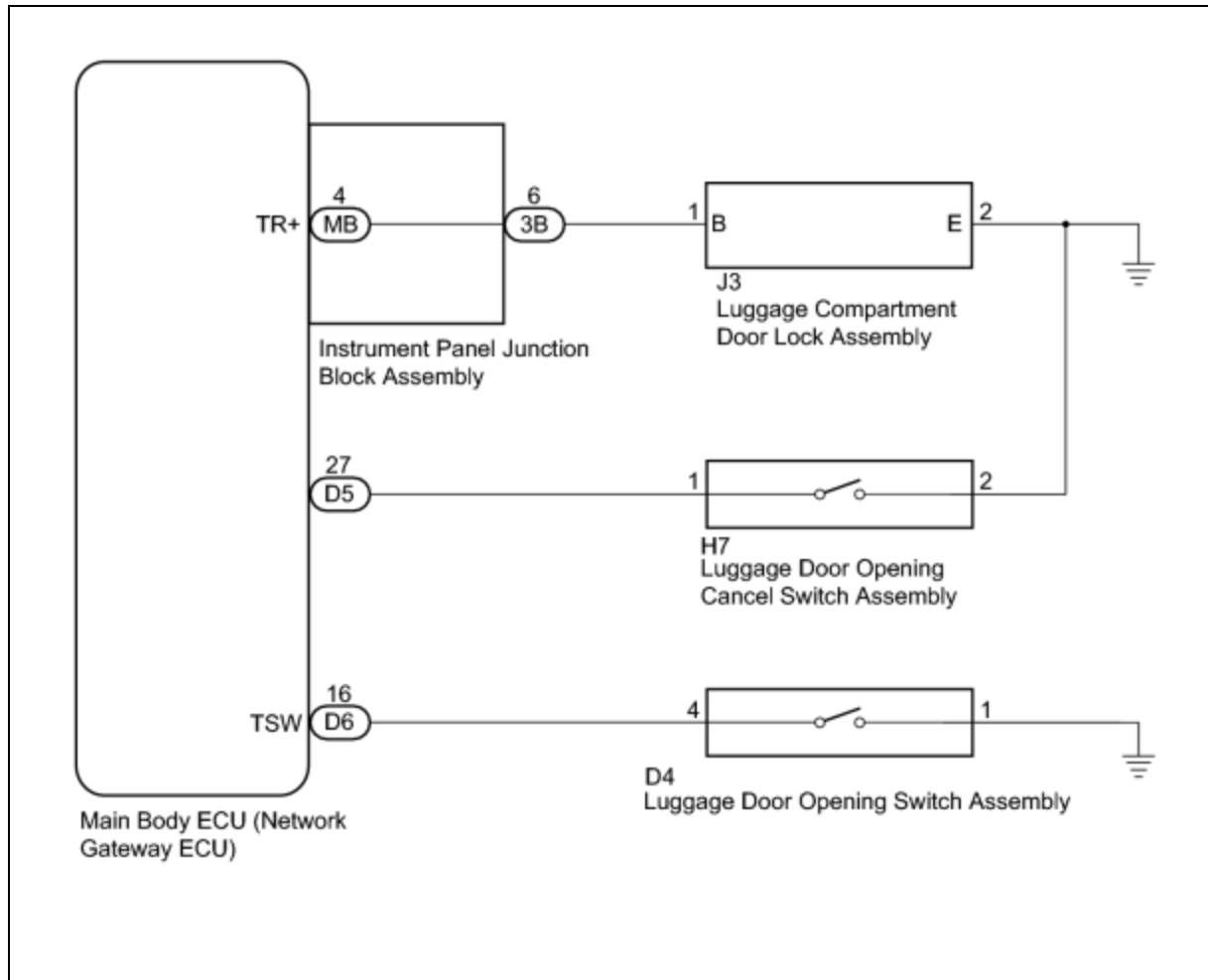
OPENING CANCEL SWITCH CONDITION	OPENING SWITCH CONDITION	LUGGAGE COMPARTMENT DOOR OPENER SYSTEM CONDITION
ON (Pushed)	Pushed (ON)	Does not operate
ON (Pushed)	Not pushed (OFF)	Does not operate
OFF (Not pushed)	Pushed (ON)	Operates
OFF (Not pushed)	Not pushed (OFF)	Does not operate

2. FUNCTION OF MAIN COMPONENTS

COMPONENT	FUNCTION
Luggage Compartment Door Lock Cylinder Assembly	Controlled by main body ECU (network gateway ECU) and unlatches luggage compartment door lock.
Luggage Door Opening Switch Assembly	When luggage door opening switch is pushed, opening switch ON signal is sent to main body ECU (network gateway ECU).
Luggage Door Opening Cancel Switch Assembly	When luggage door opening cancel switch is pushed, opening cancel switch ON signal is sent to main body ECU (network gateway ECU).
Main Body ECU (Network Gateway ECU)	When luggage door opening switch is pushed, main body ECU (network gateway ECU) receives opening switch ON signal. When luggage door opening cancel switch is pushed, main body ECU (network gateway ECU) receives opening cancel switch ON signal.

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000418F00AX
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM



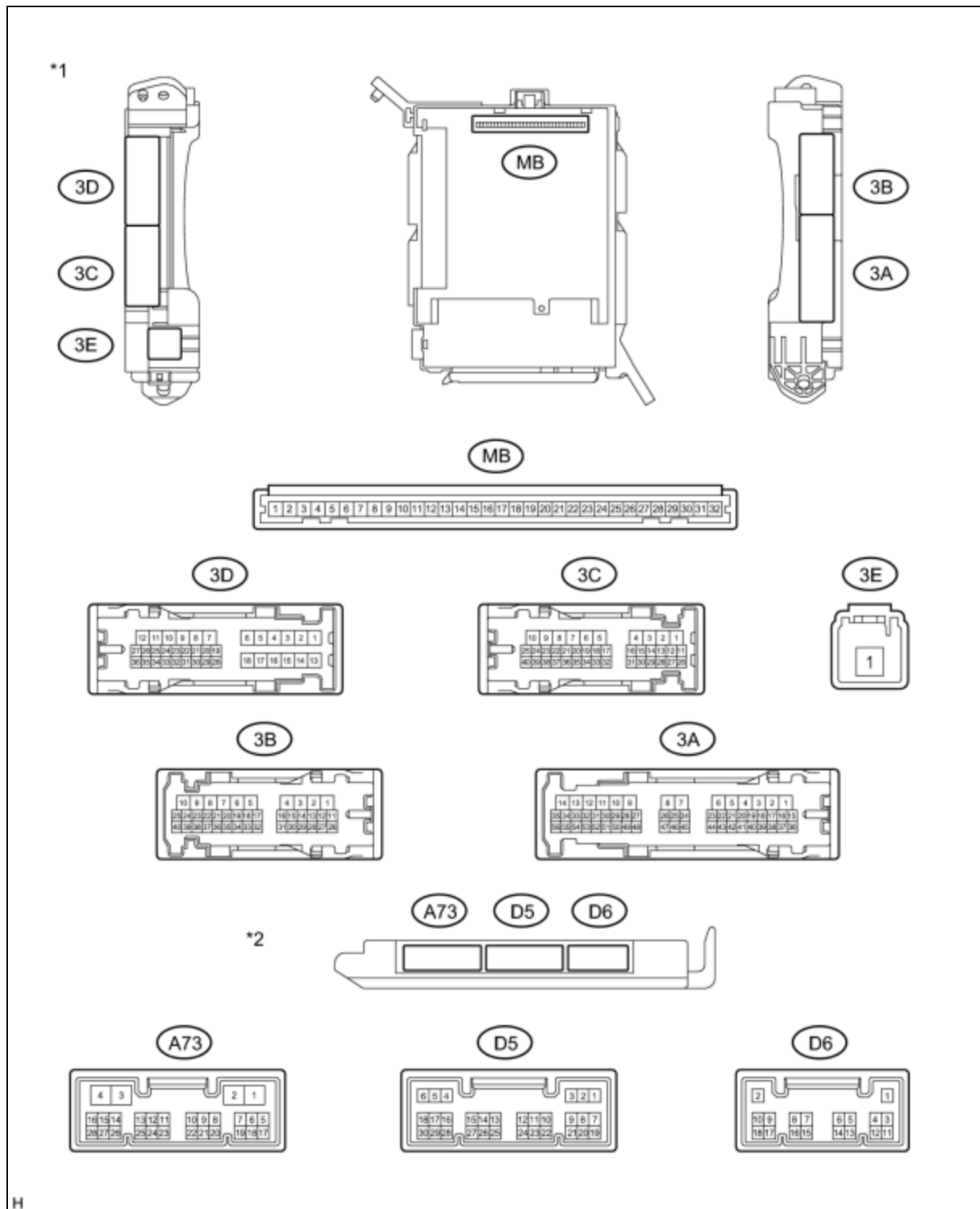
Communication Table

SENDER	RECEIVER	SIGNAL	LINE
Luggage Compartment Door Opening Switch	Main body ECU (Network gateway ECU)	Luggage compartment door opening switch signal	Local communication
Luggage Compartment Door Opener Cancel Switch	Main body ECU (Network gateway ECU)	Luggage compartment door opener cancel switch signal	Local communication

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001TFW011X
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR OPENER SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. CHECK MAIN BODY ECU (NETWORK GATEWAY ECU)



Text in Illustration

*1	Instrument Panel Junction Block Assembly	*2	Main Body ECU (Network Gateway ECU)
----	--	----	-------------------------------------

- (a) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (b) Disconnect the D5 and D6 main body ECU (network gateway ECU) connectors.
- (c) Measure the resistance and voltage according to the value(s) in the table below.

TESTER CONNECTION	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
D5-27 - Body ground	G - Body ground	Luggage door opening cancel switch signal input	Luggage door opening cancel switch assembly off	10 k Ω or higher
			Luggage door opening cancel switch assembly on	Below 1 Ω
D6-16 (TSW) - Body ground	L - Body ground	Luggage door opening switch signal input	Luggage door opening switch assembly off	10 k Ω or higher
			Luggage door opening switch assembly on	Below 1 Ω

If the result is not as specified, there may be a malfunction on the wire harness side.

- (d) Reconnect the D5 and D6 main body ECU (network gateway ECU) connectors.
- (e) Install the main body ECU (network gateway ECU) to the instrument panel junction block assembly.
- (f) Measure the voltage according to the value(s) in the table below.

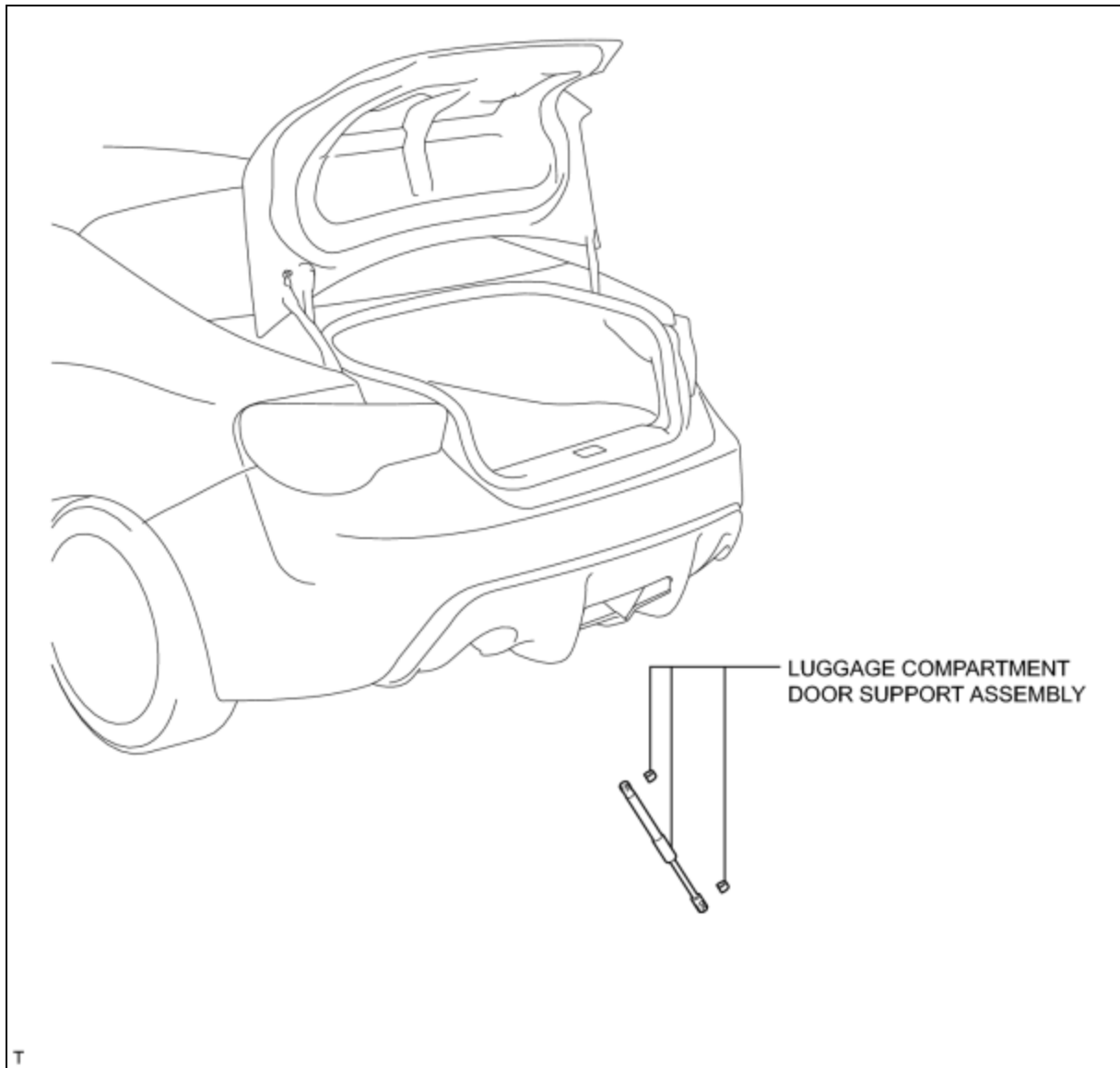
TESTER CONNECTION	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
D5-27 - Body ground	G - Body ground	Luggage compartment door lock motor drive output	Ignition switch ON Luggage door opening cancel switch on	Below 1 V
D6-16 (TSW) - Body ground	L - Body ground	Luggage compartment door lock motor drive output	Ignition switch ON Luggage door opening switch on	Below 1 V
3B-6 - Body ground	G - Body ground	Luggage compartment door lock motor drive output	Ignition switch ON Luggage door opening switch on	11 to 14 V

If the result is not as specified, the main body ECU (network gateway ECU) or instrument panel junction block assembly may have a malfunction.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010WL000X
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR SUPPORT: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION

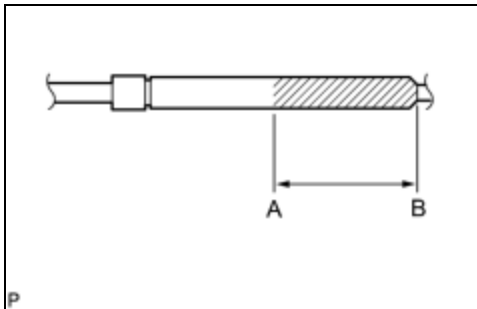


Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XCH016X
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR SUPPORT: DISPOSAL (2013 FR-S)		

DISPOSAL

1. DISPOSE OF LUGGAGE COMPARTMENT DOOR SUPPORT ASSEMBLY

(a) Secure the luggage compartment door support assembly horizontally in a vise with the piston rod pulled out.

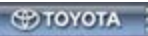


(b) Wear safety glasses. Use a metal saw to slowly cut a groove between A and B, as shown in the illustration, to release the gas.

AREA	MEASUREMENT
A-B	80 mm (3.15 in.)

CAUTION:

Although the gas inside the luggage compartment door support assembly is colorless, odorless and harmless, there is a possibility that metal debris could scatter. Therefore, cover it with a piece of cloth or other material.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010WK00UX
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR SUPPORT: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

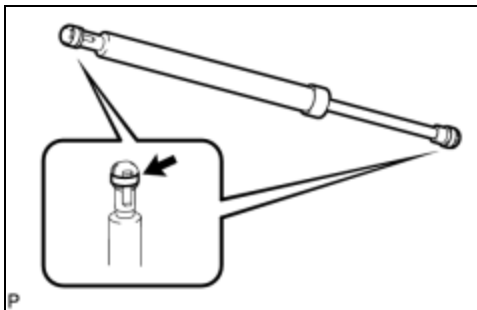
- Use the same procedure for both the RH and LH sides.
- The following procedure is for the LH side.

1. INSTALL LUGGAGE COMPARTMENT DOOR SUPPORT ASSEMBLY

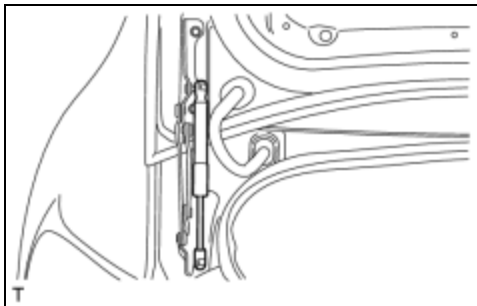
NOTICE:

- Avoid touching the piston rod as much as possible to prevent foreign matter from attaching to it. Be sure to hold the cylinder while servicing.
- Do not wear cotton gloves or other similar materials when handling the piston rod. Fibers may attach to the rod and result in gas leaks.
- In order to prevent the piston rod from deforming, do not apply any horizontal load to the door support.

(a) When reusing the luggage compartment door support assembly:



(1) Install the 2 stop rings to the luggage compartment door support assembly.



(b) Install the luggage compartment door support assembly.

NOTICE:

- Install the luggage compartment door support assembly while supporting the luggage compartment door by hand.
- Check that the luggage compartment door support assembly is engaged in the ball joint and that the luggage compartment door support assembly cannot be pulled out.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010WM00VX
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR SUPPORT: REMOVAL (2013 FR-S)		

REMOVAL

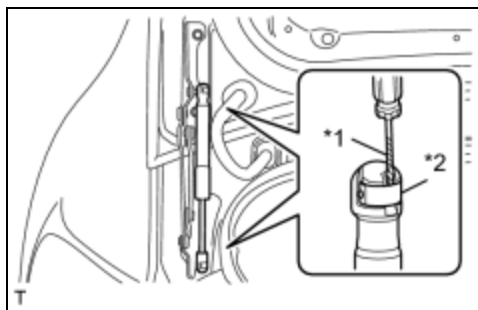
HINT:

- Use the same procedure for both the RH and LH sides.
- The following procedure is for the LH side.

1. REMOVE LUGGAGE COMPARTMENT DOOR SUPPORT ASSEMBLY

NOTICE:

- Avoid touching the piston rod as much as possible to prevent foreign matter from attaching to it. Be sure to hold the cylinder while servicing.
- Do not wear cotton gloves or other similar materials when handling the piston rod. Fibers may attach to the rod and result in gas leaks.
- In order to prevent the piston rod from deforming, do not apply any horizontal load to the door support.



(a) Using a screwdriver, remove the 2 stop rings along the groove.

Text in Illustration

*1	Protective Tape
*2	Stop Ring

HINT:

Tape the screwdriver tip before use.

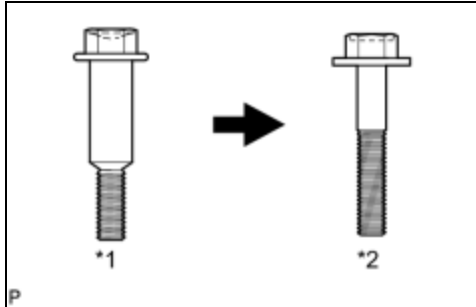
(b) Release the ball joint and remove the luggage compartment door support.

NOTICE:

Remove the luggage compartment door support while supporting the luggage compartment door by hand.

Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XBX03HX
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR: ADJUSTMENT (2013 FR-S)		

ADJUSTMENT



HINT:

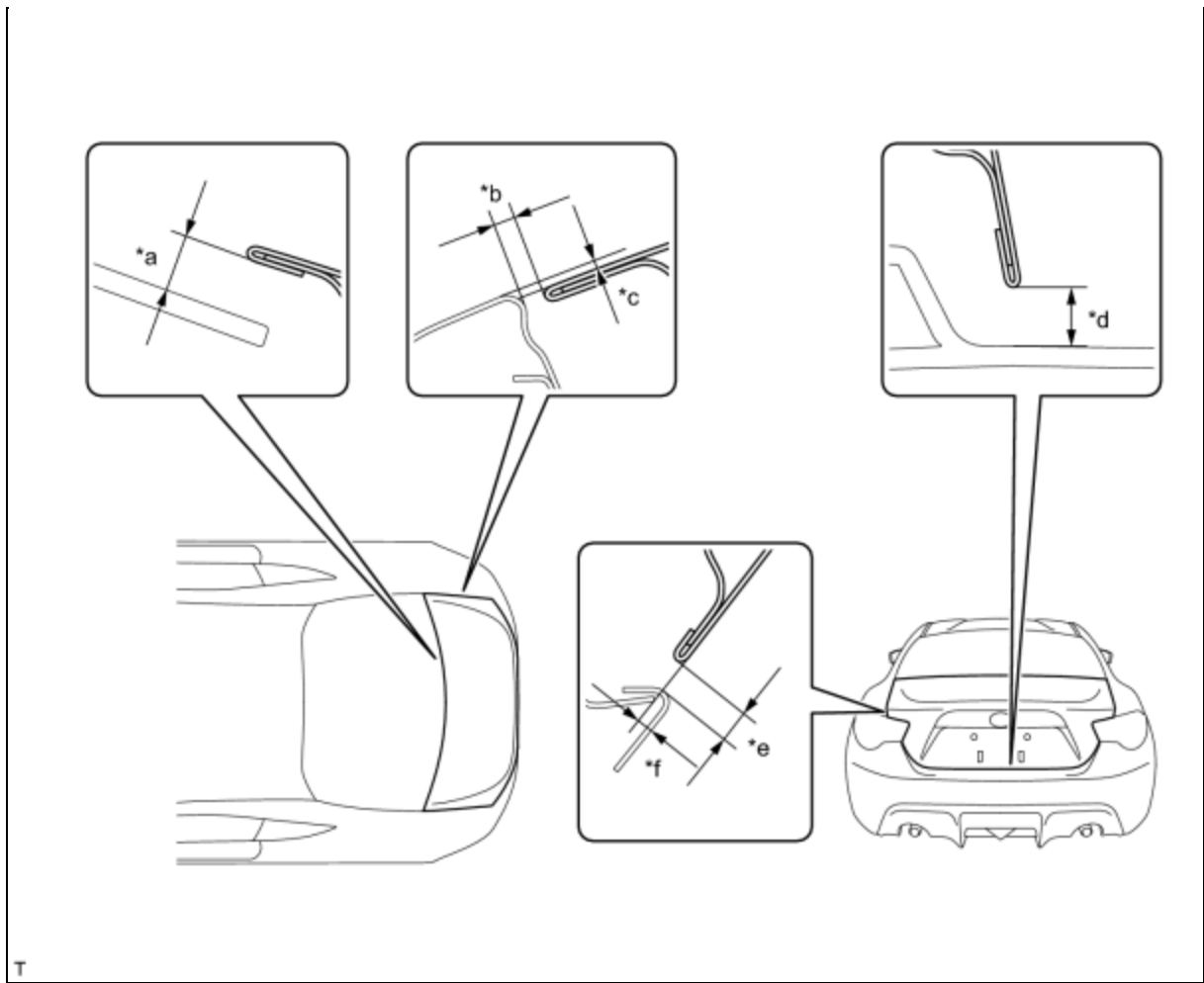
- Centering bolts are used to mount the door hinge to the vehicle body and door. The door cannot be adjusted with the centering bolts on. Substitute the centering bolts with standard bolts when making adjustments.
- A bolt without a torque specification is shown in the standard bolt chart [INFO](#).

Text in Illustration

*1	Centering Bolt
*2	Standard Bolt

1. INSPECT LUGGAGE COMPARTMENT DOOR PANEL SUB-ASSEMBLY

- Check that the clearance measurements of areas *a to *f are within each standard range.



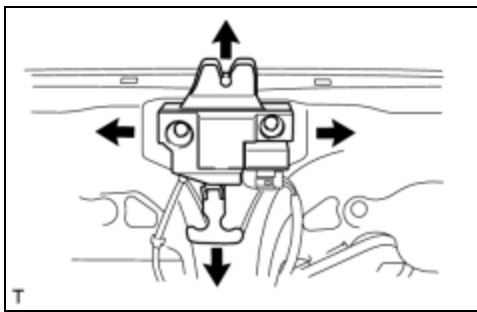
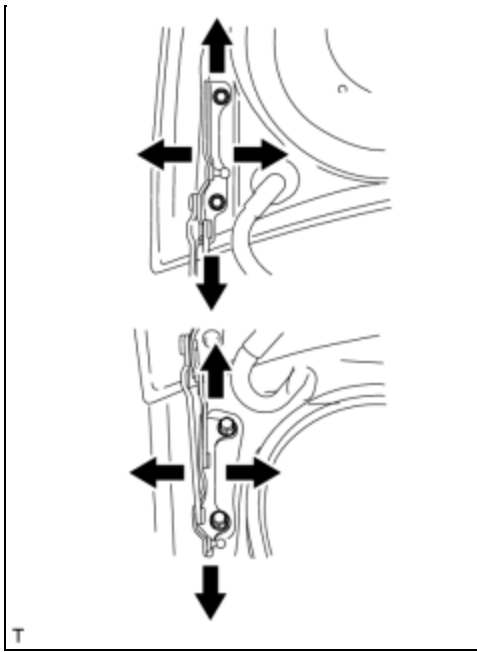
Standard Clearance

AREA	MEASUREMENT	AREA	MEASUREMENT
*a	8.2 mm (0.3228 in.)	*b	2.0 to 5.0 mm (0.0787 to 0.1969 in.)
*c	-2.0 to 1.0 mm (-0.0787 to 0.0394 in.)	*d	5.8 to 10.2 mm (0.2283 to 0.4016 in.)
*e	4.3 to 7.3 mm (0.1693 to 0.2874 in.)	*f	-2.0 to 1.0 mm (-0.0787 to 0.0394 in.)

2. ADJUST LUGGAGE COMPARTMENT DOOR PANEL SUB-ASSEMBLY

- (a) Horizontally and vertically adjust the door by loosening the door side hinge bolts.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)



(b) When adjusting the rear edge of the doors left or right, or adjusting the luggage compartment door lock, loosen the bolts before making adjustments.

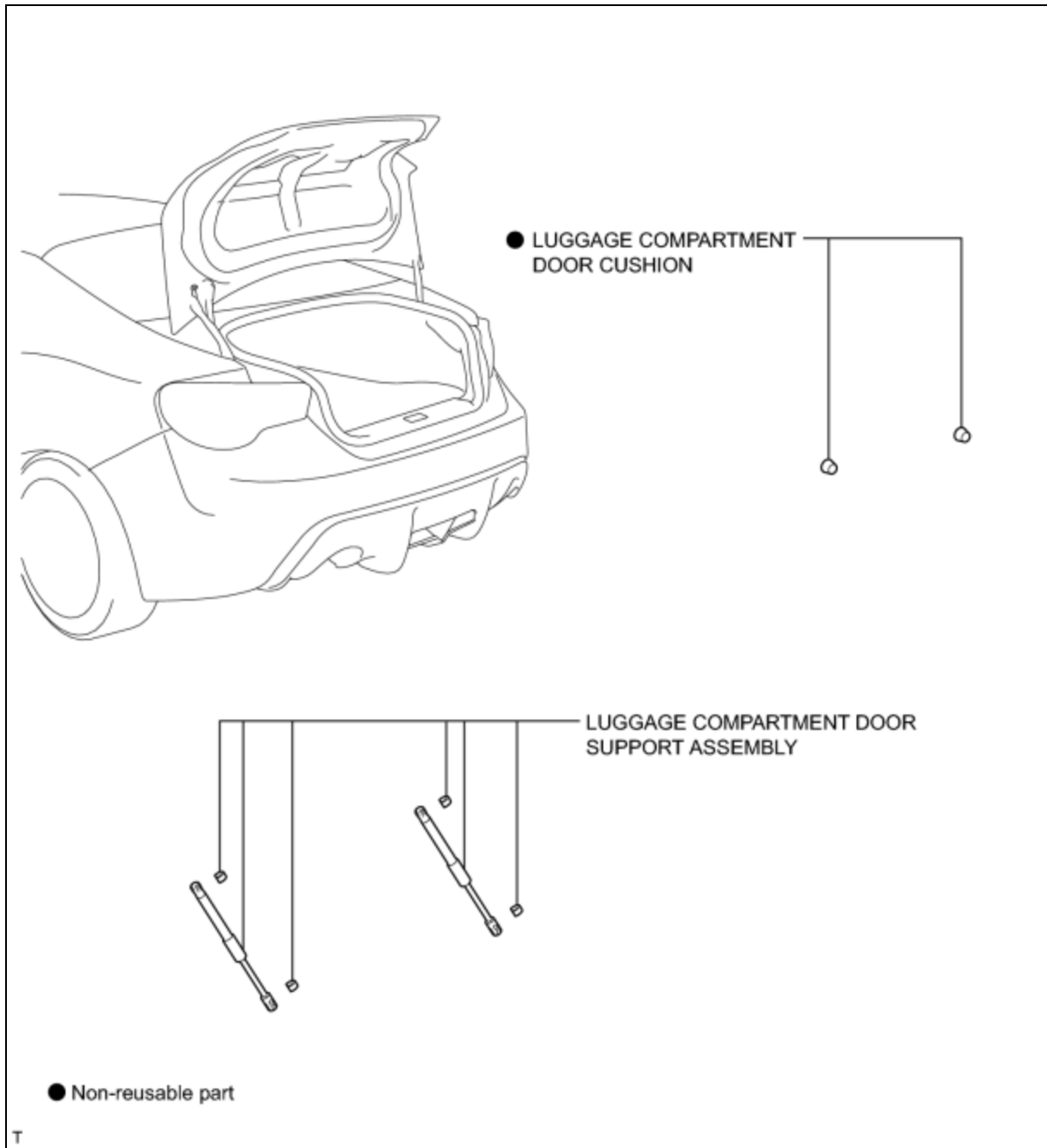
(c) After the adjustment, tighten the 2 bolts on the luggage compartment door lock.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

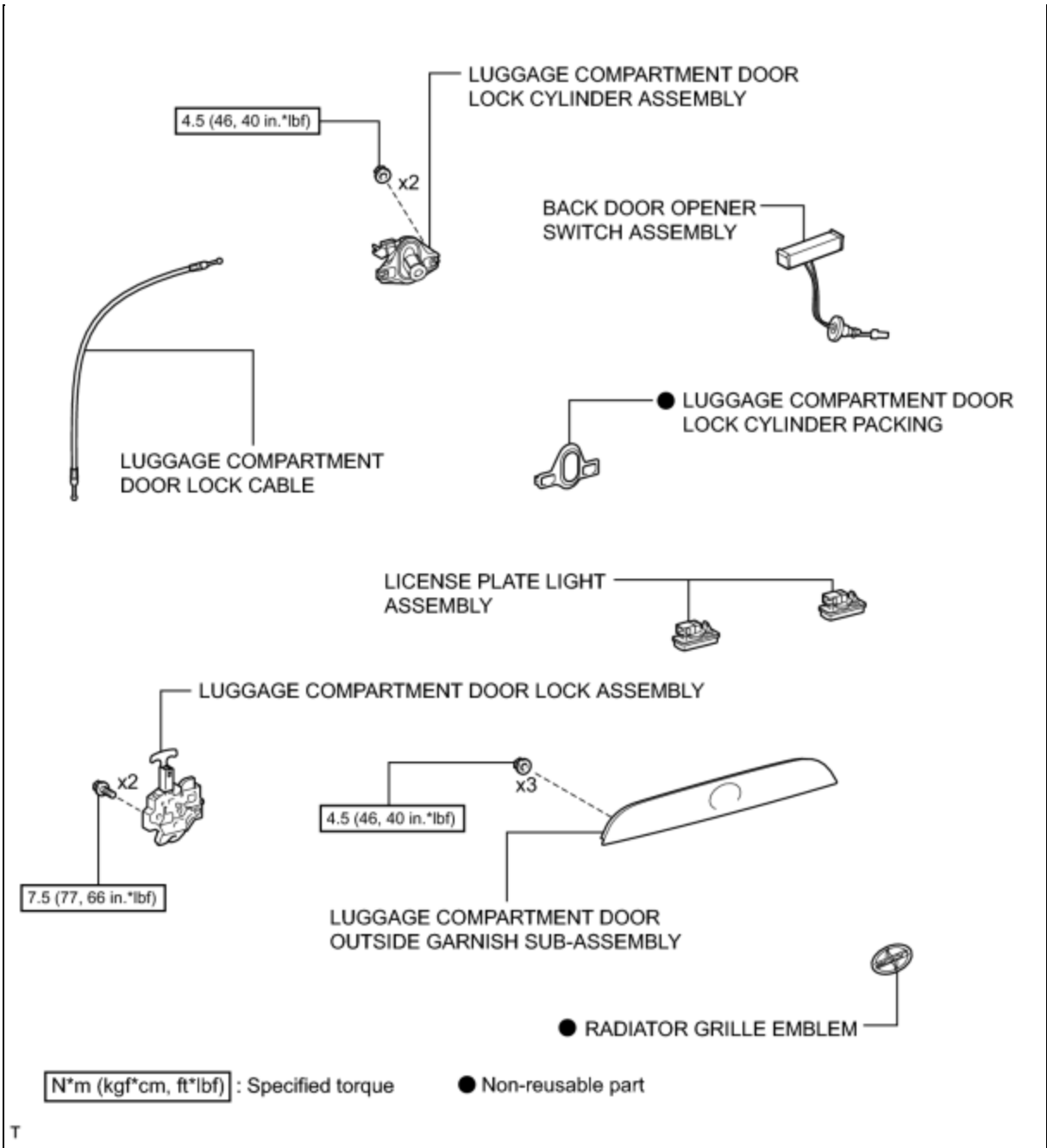
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XBZ052X
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION

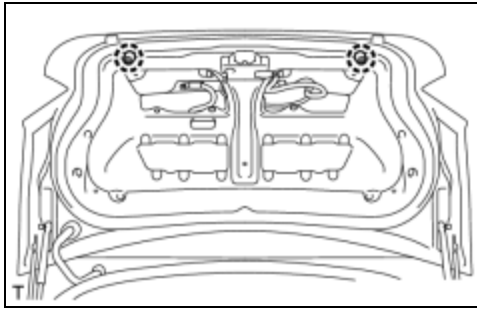


T

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001OIM058X
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. REMOVE LUGGAGE COMPARTMENT DOOR CUSHION



(a) Disengage the 2 claws and remove the 2 luggage compartment door cushions.

2. REMOVE LUGGAGE COMPARTMENT DOOR LOCK CYLINDER ASSEMBLY [INFO](#)

3. REMOVE LUGGAGE COMPARTMENT DOOR LOCK CYLINDER PACKING [INFO](#)

4. REMOVE LUGGAGE COMPARTMENT DOOR LOCK ASSEMBLY [INFO](#)

5. REMOVE LUGGAGE COMPARTMENT DOOR LOCK CABLE [INFO](#)

6. REMOVE LUGGAGE COMPARTMENT DOOR OUTSIDE GARNISH SUB-ASSEMBLY [INFO](#)

7. REMOVE BACK DOOR OPENER SWITCH ASSEMBLY [INFO](#)

8. REMOVE RADIATOR GRILLE EMBLEM (for Rear Side) [INFO](#)

9. REMOVE LICENSE PLATE LIGHT ASSEMBLY [INFO](#)

10. REMOVE LUGGAGE COMPARTMENT DOOR SUPPORT ASSEMBLY (for LH Side) [INFO](#)

11. REMOVE LUGGAGE COMPARTMENT DOOR SUPPORT ASSEMBLY (for RH Side)

HINT:

Use the same procedure as for the LH side.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001OIN05AX
Title: DOOR / HATCH: LUGGAGE COMPARTMENT DOOR: REASSEMBLY (2013 FR-S)		

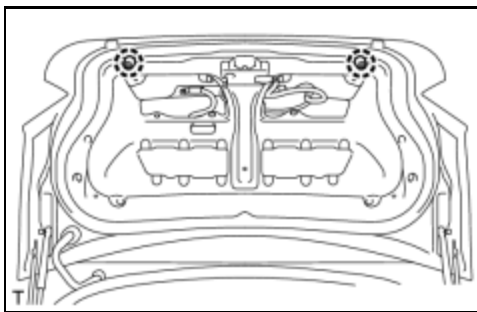
REASSEMBLY

1. INSTALL LUGGAGE COMPARTMENT DOOR SUPPORT ASSEMBLY (for LH Side) [INFO](#)
2. INSTALL LUGGAGE COMPARTMENT DOOR SUPPORT ASSEMBLY (for RH Side)

HINT:

Use the same procedure as for the LH side.

3. INSTALL LICENSE PLATE LIGHT ASSEMBLY [INFO](#)
4. INSTALL RADIATOR GRILLE EMBLEM (for Rear Side) [INFO](#)
5. INSTALL BACK DOOR OPENER SWITCH ASSEMBLY [INFO](#)
6. INSTALL LUGGAGE COMPARTMENT DOOR OUTSIDE GARNISH SUB-ASSEMBLY [INFO](#)
7. INSTALL LUGGAGE COMPARTMENT DOOR LOCK CABLE [INFO](#)
8. INSTALL LUGGAGE COMPARTMENT DOOR LOCK ASSEMBLY [INFO](#)
9. INSTALL LUGGAGE COMPARTMENT DOOR LOCK CYLINDER PACKING [INFO](#)
10. INSTALL LUGGAGE COMPARTMENT DOOR LOCK CYLINDER ASSEMBLY [INFO](#)
11. INSTALL LUGGAGE COMPARTMENT DOOR CUSHION

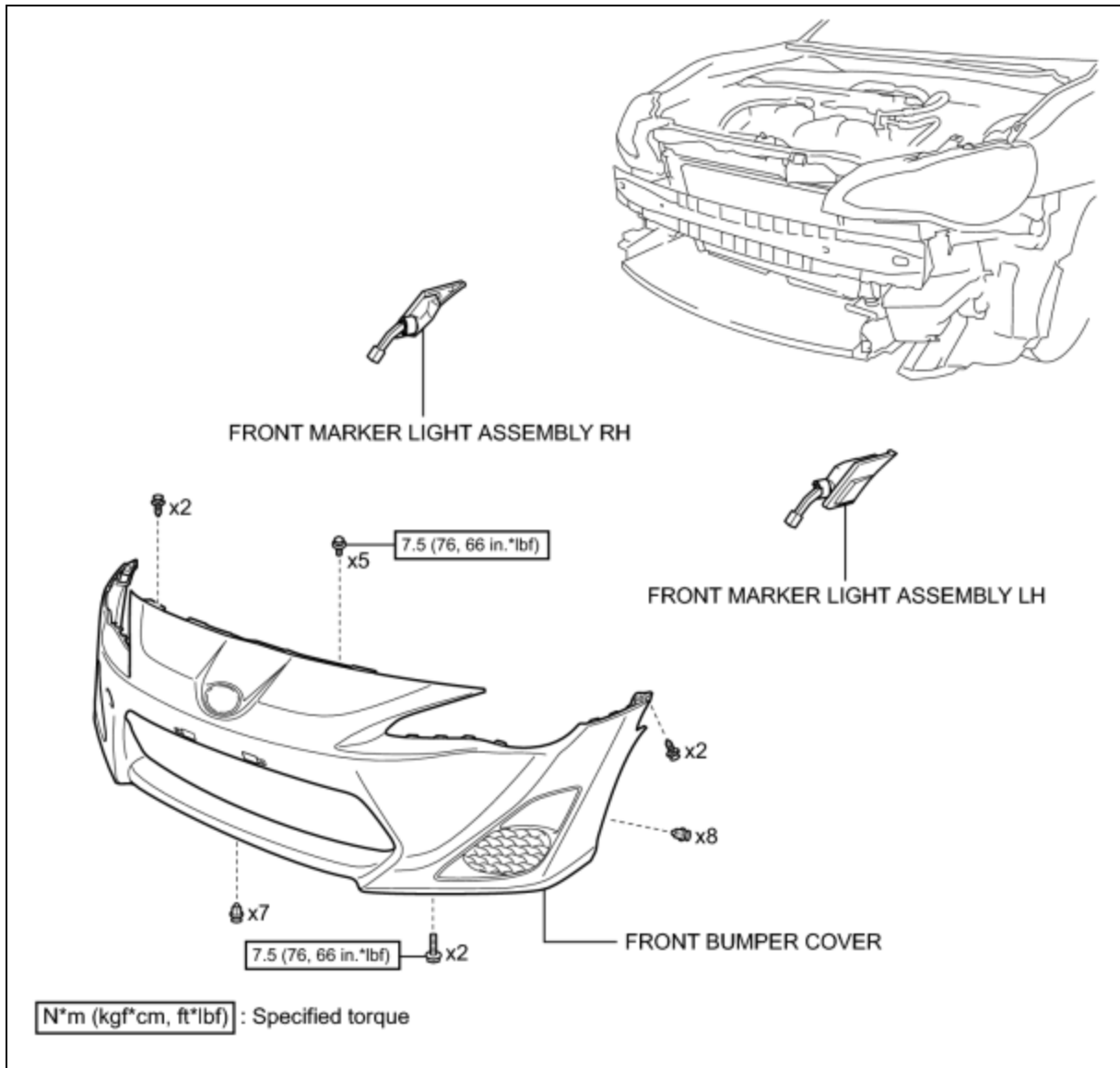


- (a) Engage the 2 claws and install 2 new luggage compartment door cushions.

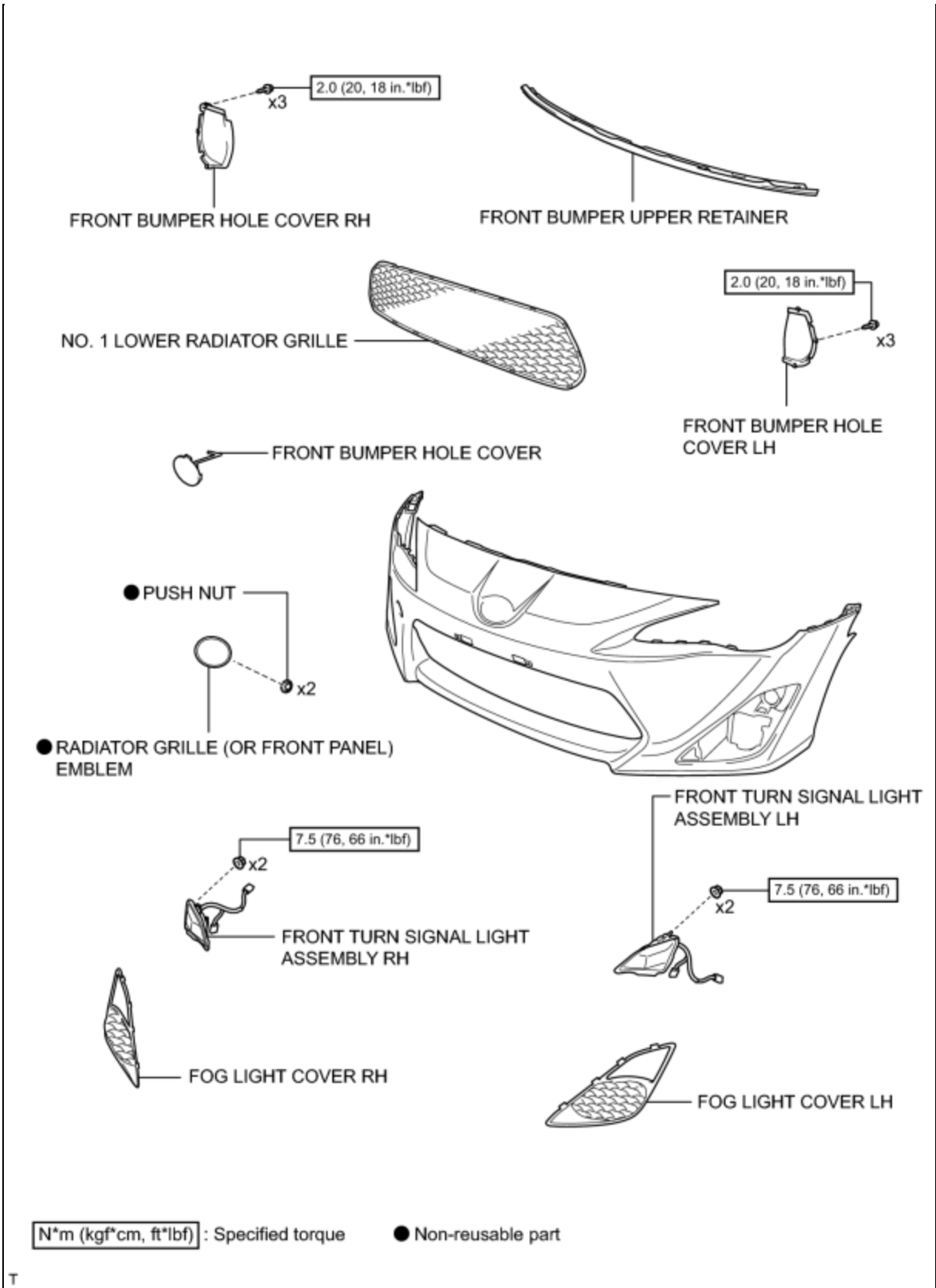
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000454000LX
Title: EXTERIOR PANELS / TRIM: FRONT BUMPER: COMPONENTS (2013 FR-S)		

COMPONENTS

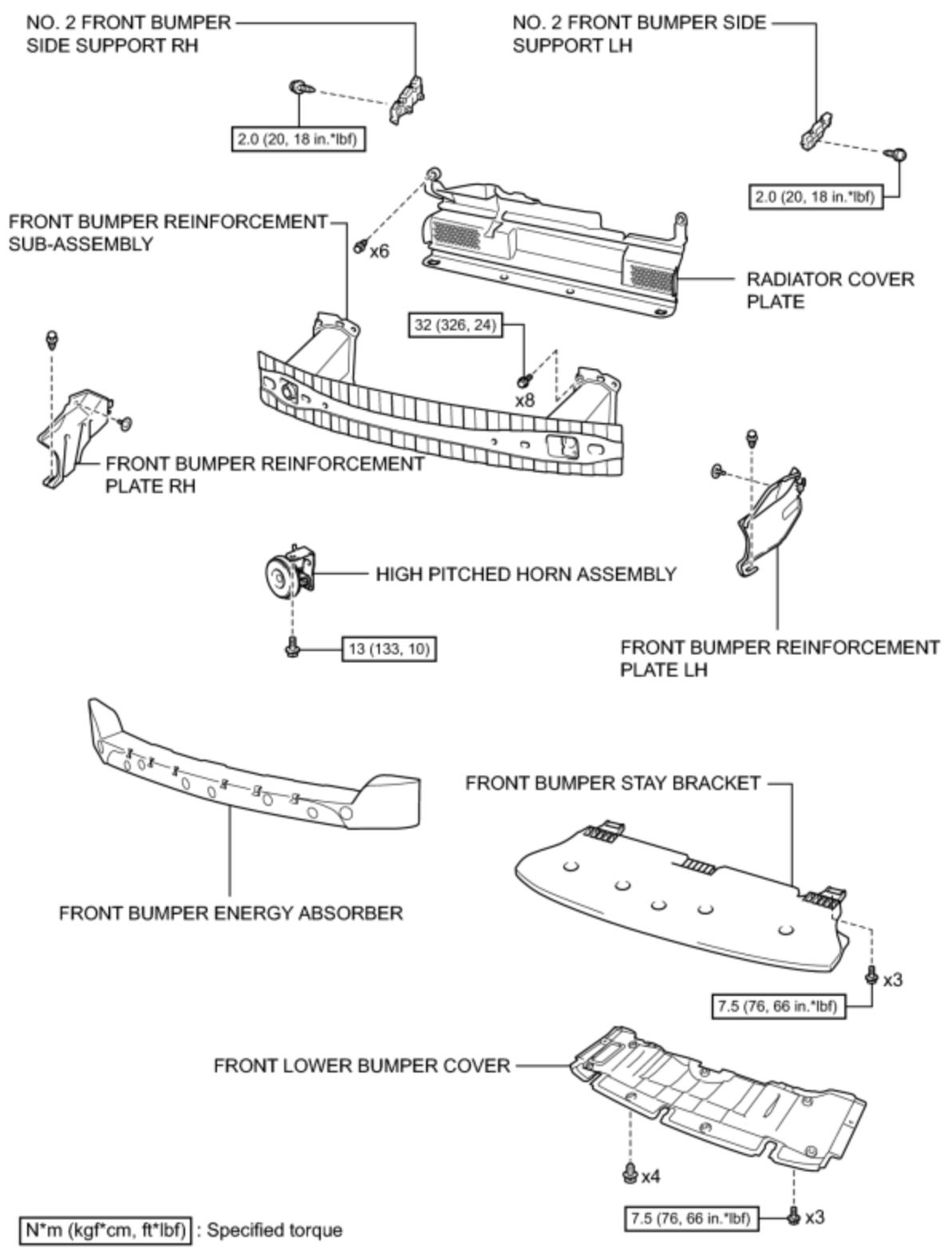
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION

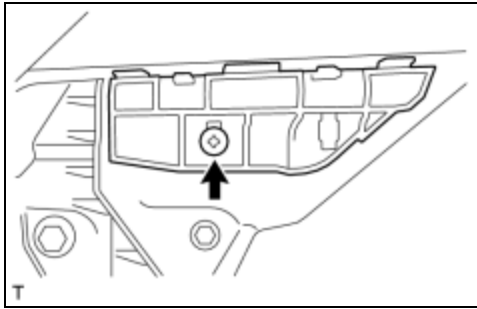


T

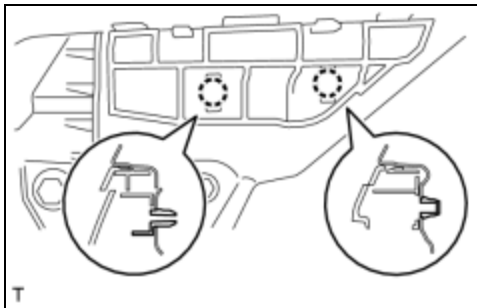
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003CVF02AX
Title: EXTERIOR PANELS / TRIM: FRONT BUMPER: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. REMOVE NO. 2 FRONT BUMPER SIDE SUPPORT LH



(a) Remove the screw.



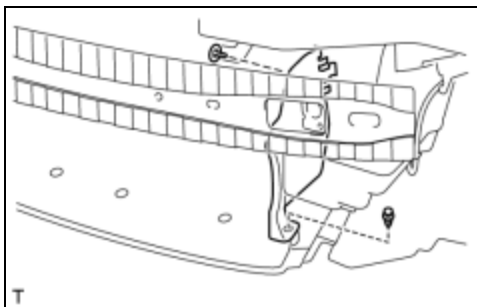
(b) Disengage the 2 claws and remove the No. 2 front bumper side support LH.

2. REMOVE NO. 2 FRONT BUMPER SIDE SUPPORT RH

HINT:

Use the same procedure as for the LH side.

3. REMOVE FRONT BUMPER REINFORCEMENT PLATE LH



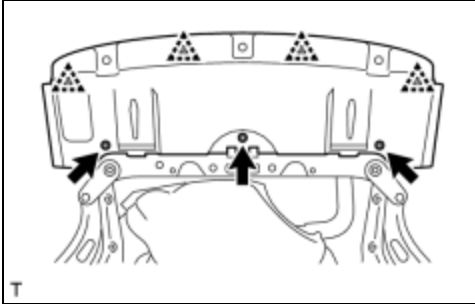
(a) Remove the 2 clips and the front bumper reinforcement plate LH.

4. REMOVE FRONT BUMPER REINFORCEMENT PLATE RH

HINT:

Use the same procedure as for the LH side.

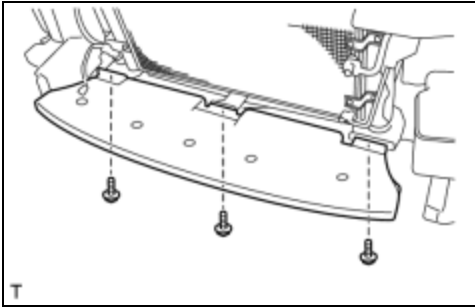
5. REMOVE FRONT LOWER BUMPER COVER



(a) Remove the 3 bolts.

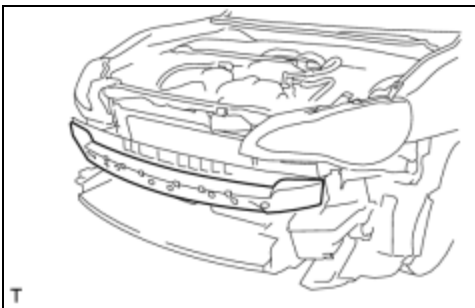
(b) Remove the 4 clips and the front lower bumper cover.

6. REMOVE FRONT BUMPER STAY BRACKET



(a) Remove the 3 bolts and the front bumper stay bracket.

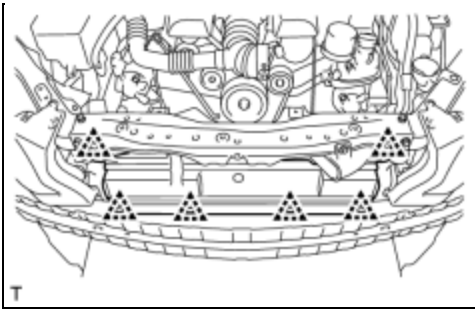
7. REMOVE FRONT BUMPER ENERGY ABSORBER



(a) Remove the front bumper energy absorber.

8. REMOVE RADIATOR COVER PLATE

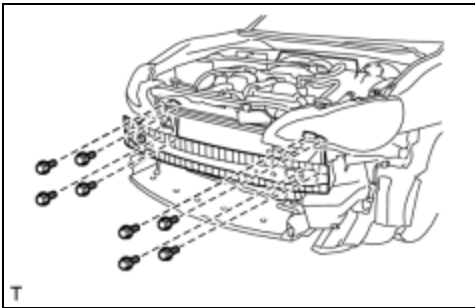
(a) Remove the 6 clips and the radiator cover plate.



9. REMOVE HIGH PITCHED HORN ASSEMBLY

INFO

10. REMOVE FRONT BUMPER REINFORCEMENT SUB-ASSEMBLY

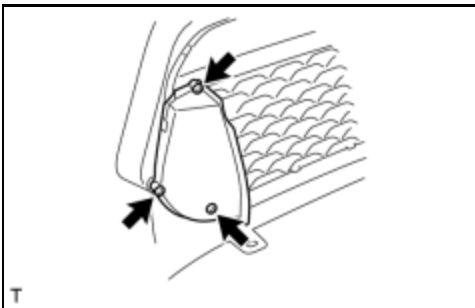


(a) Remove the 8 bolts and front bumper reinforcement sub-assembly.

11. REMOVE RADIATOR GRILLE (OR FRONT PANEL) EMBLEM

INFO

12. REMOVE FRONT BUMPER HOLE COVER LH



(a) Remove the 3 screws and front bumper hole cover LH.

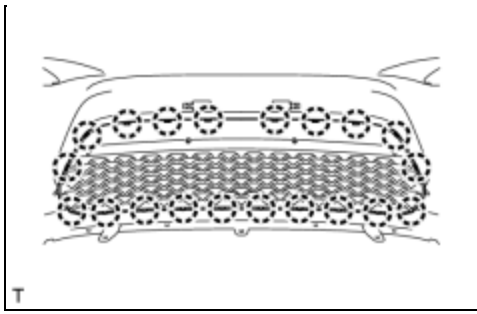
13. REMOVE FRONT BUMPER HOLE COVER RH

HINT:

Use the same procedure as for the LH side.

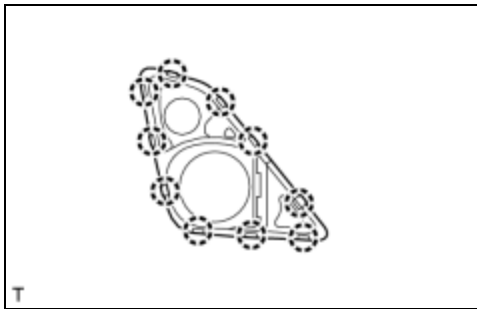
14. REMOVE NO. 1 LOWER RADIATOR GRILLE

(a) Disengage the 20 claws and remove the No. 1 lower



radiator grille.

15. REMOVE FOG LIGHT COVER LH



(a) Disengage the 10 claws and remove the fog light cover LH.

16. REMOVE FOG LIGHT COVER RH

HINT:

Use the same procedure as for the LH side.

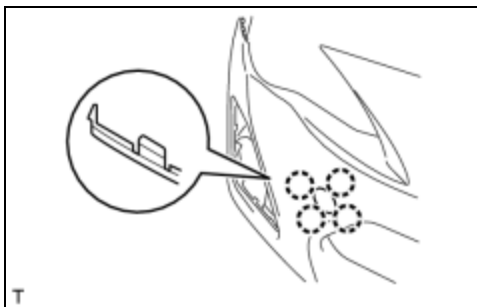
17. REMOVE FRONT TURN SIGNAL LIGHT ASSEMBLY LH

INFO

18. REMOVE FRONT TURN SIGNAL LIGHT ASSEMBLY RH

Use the same procedure as for the LH side.

19. REMOVE FRONT BUMPER HOLE COVER



(a) Disengage the 4 claws and remove the front bumper hole cover.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000034WP02MX
Title: EXTERIOR PANELS / TRIM: FRONT BUMPER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL FRONT BUMPER COVER

- (a) Connect each connector.
- (b) Engage the 6 claws to install the front bumper cover.
- (c) Install the clip.

HINT:

Use the same procedure for the RH side and LH side.

- (d) Install the 4 clips.

HINT:

Use the same procedure for the RH side and LH side.

- (e) Install the 7 clips.
- (f) Install the 2 bolts.

Torque: 7.5 N·m (76 kgf·cm, 66in·lbf)

2. INSTALL FRONT BUMPER UPPER RETAINER

- (a) Install the front bumper upper retainer with the 5 bolts.
Torque: 7.5 N·m (76 kgf·cm, 66in·lbf)
- (b) Install the 2 clips.

3. INSTALL FRONT MARKER LIGHT ASSEMBLY LH

INFO

4. INSTALL FRONT MARKER LIGHT ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003CVG02AX
Title: EXTERIOR PANELS / TRIM: FRONT BUMPER: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL FRONT BUMPER HOLE COVER



(a) Engage the 4 claws to install the front bumper hole cover.

2. INSTALL FRONT TURN SIGNAL LIGHT ASSEMBLY LH

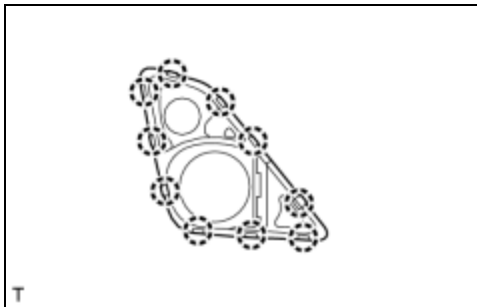
INFO

3. INSTALL FRONT TURN SIGNAL LIGHT ASSEMBLY RH

HINT:

Use the same procedure as for the LH side.

4. INSTALL FOG LIGHT COVER LH



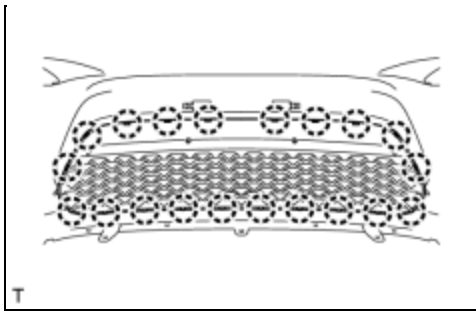
(a) Engage the 10 claws to install the fog light cover LH.

5. INSTALL FOG LIGHT COVER RH

HINT:

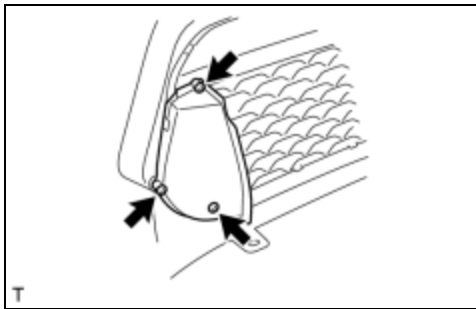
Use the same procedure as for the LH side.

6. INSTALL NO. 1 LOWER RADIATOR GRILLE



- (a) Engage the 20 claws to install the No. 1 lower radiator grille.

7. INSTALL FRONT BUMPER HOLE COVER LH



- (a) Install the front bumper hole cover LH with the 3 screws.
Torque: 2.0 N·m (20 kgf·cm, 18in·lbf)

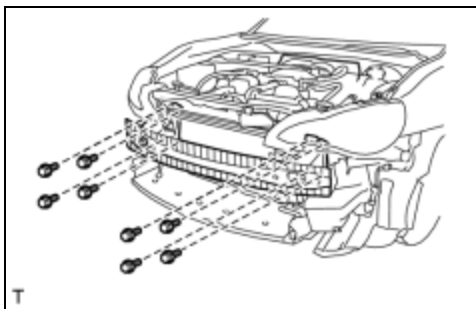
8. INSTALL FRONT BUMPER HOLE COVER RH

HINT:

Use the same procedure as for the LH side.

9. INSTALL RADIATOR GRILLE (OR FRONT PANEL) EMBLEM INFO

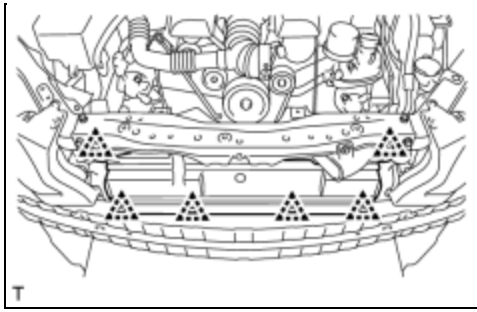
10. INSTALL FRONT BUMPER REINFORCEMENT SUB-ASSEMBLY



- (a) Install the front bumper reinforcement sub-assembly with the 8 bolts.
Torque: 32 N·m (326 kgf·cm, 24ft·lbf)

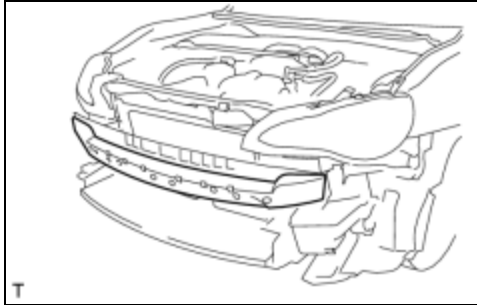
11. INSTALL HIGH PITCHED HORN ASSEMBLY INFO

12. INSTALL RADIATOR COVER PLATE



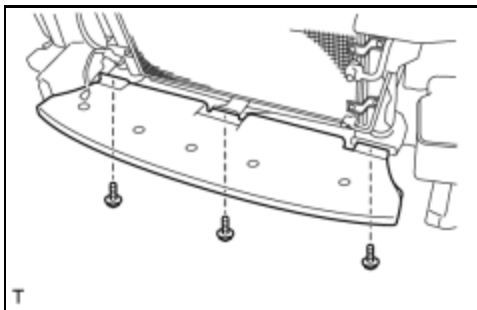
(a) Install the radiator cover plate with the 6 clips.

13. INSTALL FRONT BUMPER ENERGY ABSORBER



(a) Install the front bumper energy absorber.

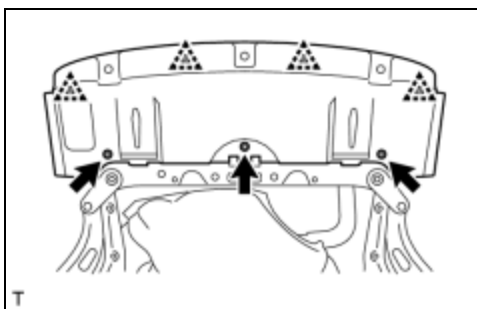
14. INSTALL FRONT BUMPER STAY BRACKET



(a) Install the front bumper stay bracket with the 3 bolts.

Torque: 7.5 N·m (76 kgf·cm, 66in·lbf)

15. INSTALL FRONT LOWER BUMPER COVER

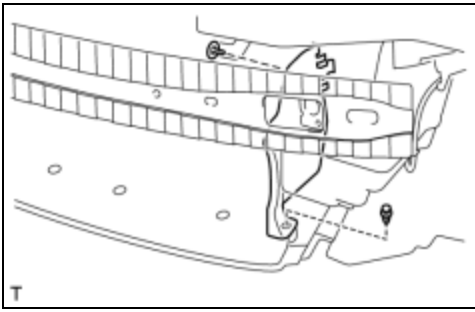


(a) Install the front lower bumper cover with the 3 bolts.

Torque: 7.5 N·m (76 kgf·cm, 66in·lbf)

(b) Install the 4 clips.

16. INSTALL FRONT BUMPER REINFORCEMENT PLATE LH



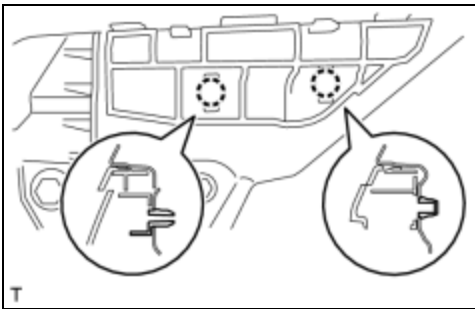
- (a) Install the front bumper reinforcement plate LH with the 2 clips.

17. INSTALL FRONT BUMPER REINFORCEMENT PLATE RH

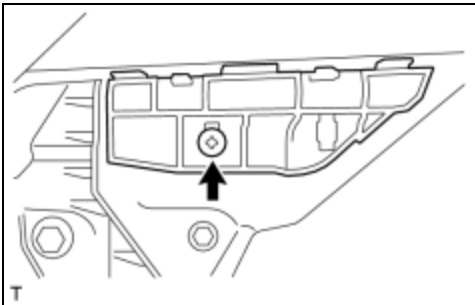
HINT:

Use the same procedure as for the LH side.

18. INSTALL NO. 2 FRONT BUMPER SIDE SUPPORT LH



- (a) Engage the 2 claws.



- (b) Install the No. 2 front bumper side support LH with the screw.

Torque: 2.0 N·m (20 kgf·cm, 18in·lbf)

19. INSTALL NO. 2 FRONT BUMPER SIDE SUPPORT RH

HINT:

Use the same procedure as for the LH side.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000034WR02LX
Title: EXTERIOR PANELS / TRIM: FRONT BUMPER: REMOVAL (2013 FR-S)		

REMOVAL

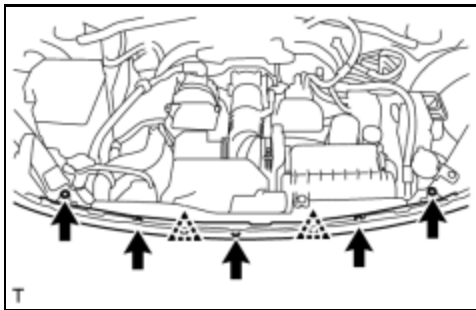
1. REMOVE FRONT MARKER LIGHT ASSEMBLY LH INFO

2. REMOVE FRONT MARKER LIGHT ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

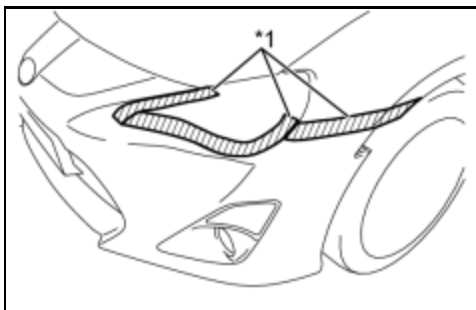
3. REMOVE FRONT BUMPER UPPER RETAINER



(a) Remove the 2 clips.

(b) Remove the 5 bolts and front bumper upper retainer.

4. REMOVE FRONT BUMPER COVER



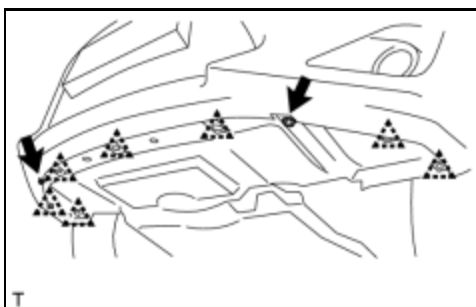
(a) Put protective tape around the front bumper assembly.

Text in Illustration

*1	Protective Tape
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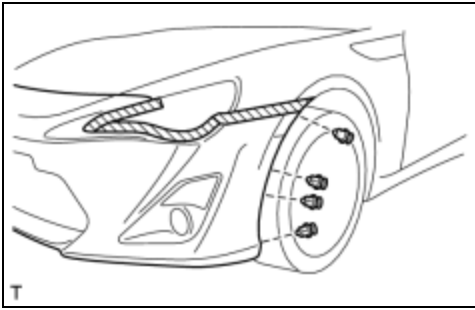
HINT:

Use the same procedure for the RH side and LH side.



(b) Remove the 7 clips.

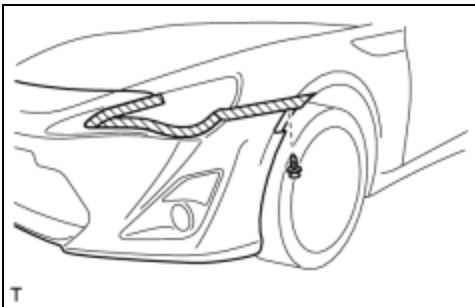
(c) Remove the 2 bolts.



(d) Remove the 4 clips.

HINT:

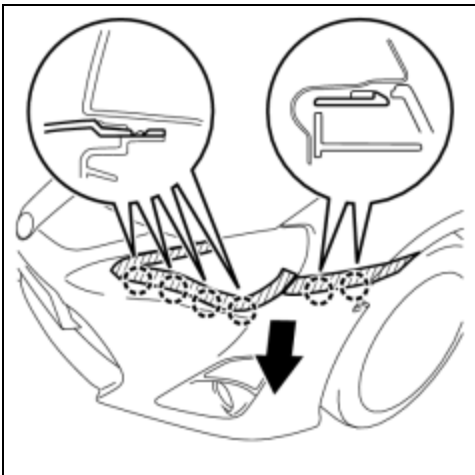
Use the same procedure for the RH side and LH side.



(e) Remove the clip.

HINT:

Use the same procedure for the RH side and LH side.



(f) Disengage the 6 claws indicated by the arrow in the illustration.

HINT:

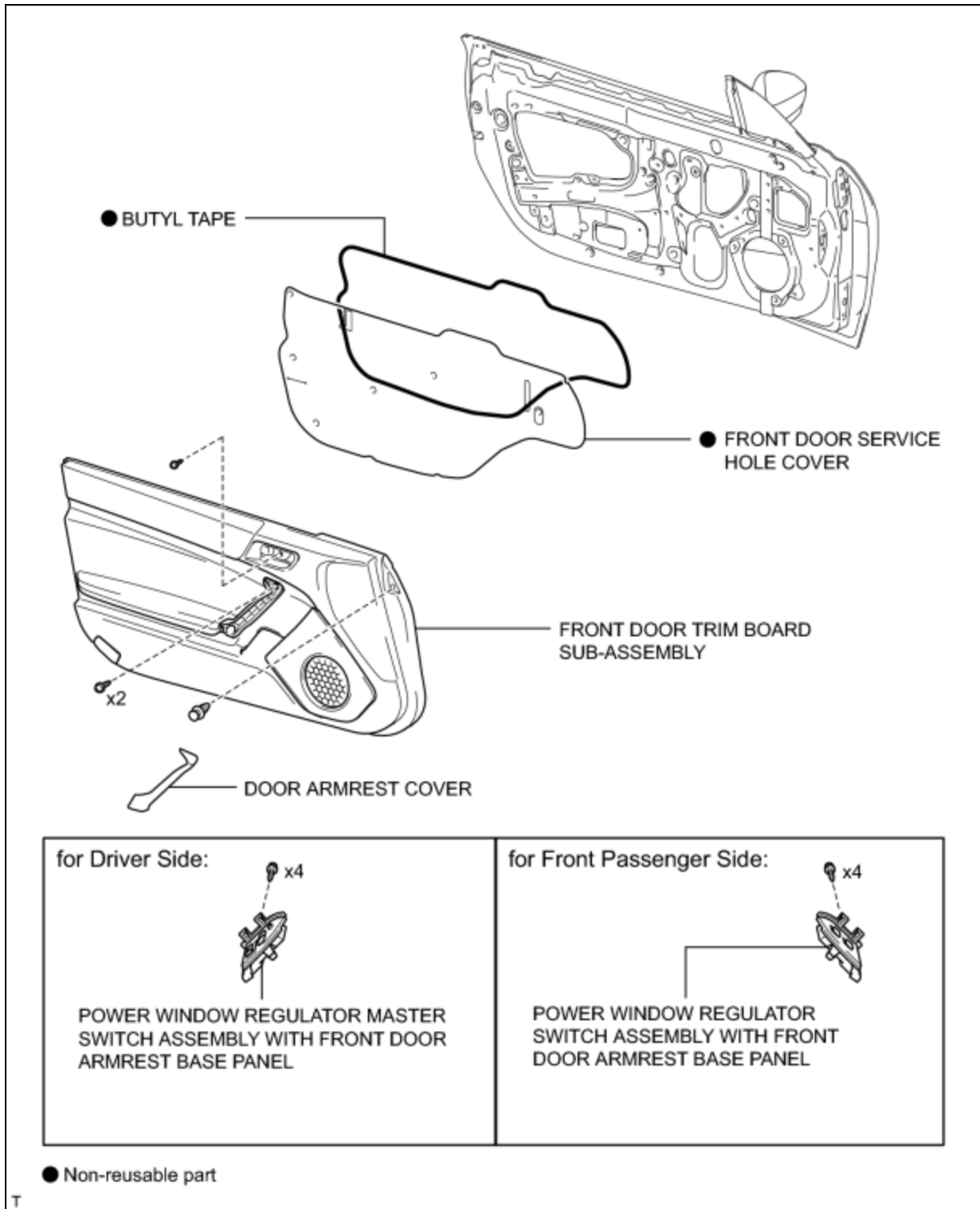
Use the same procedure for the RH side and LH side.

(g) Disconnect each connector and remove the front bumper cover.

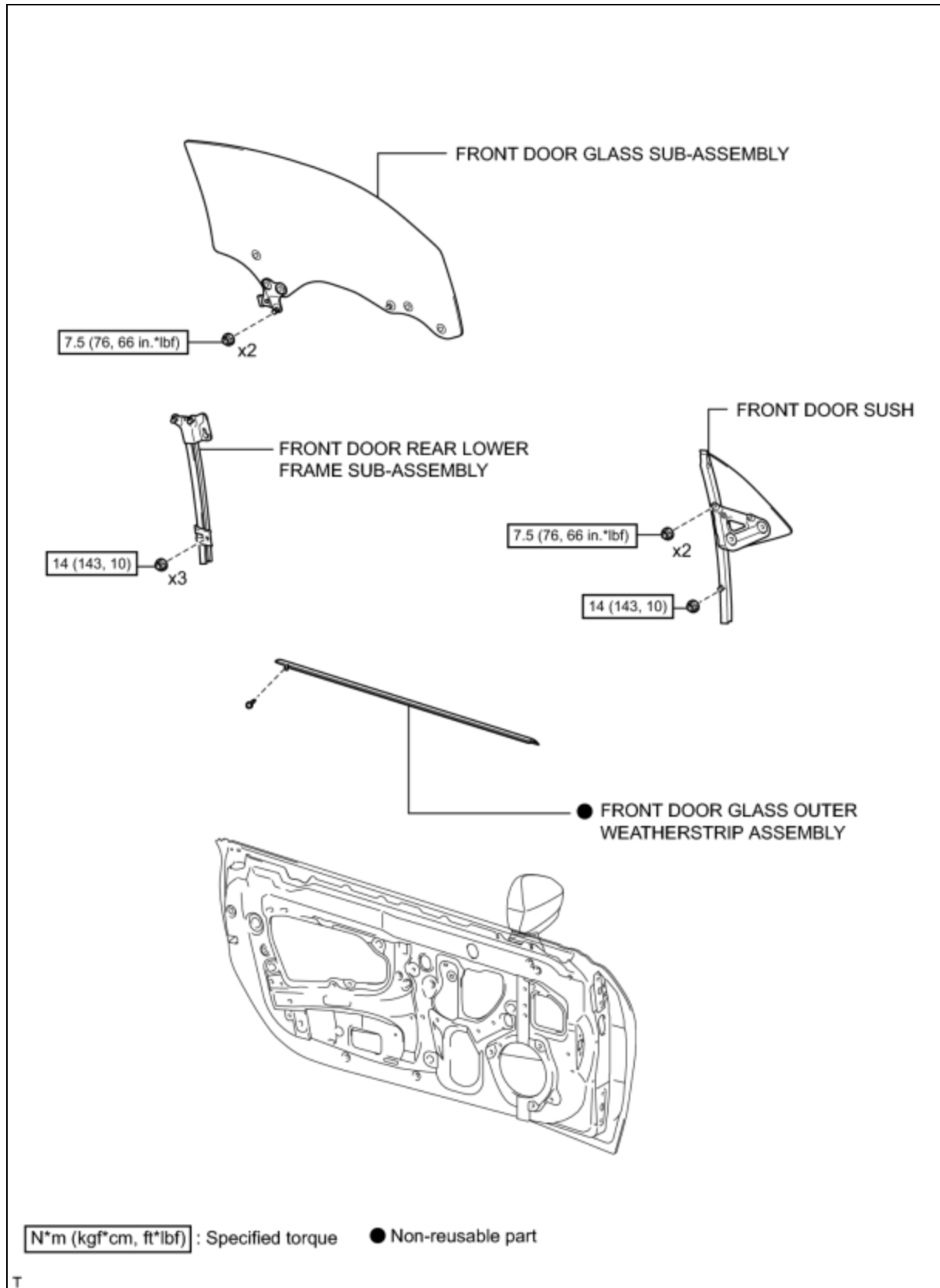
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003W5W014X
Title: EXTERIOR PANELS / TRIM: FRONT DOOR BELT MOULDING: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



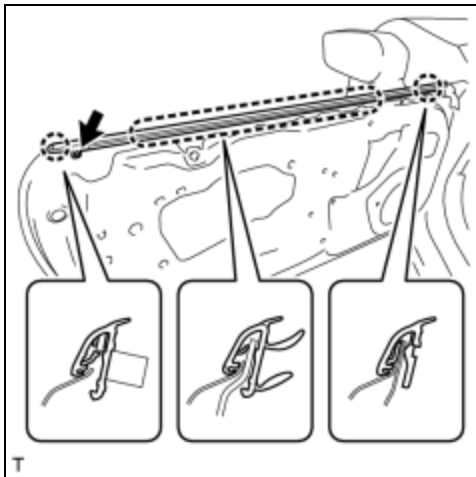
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001P7Y06ZX
Title: EXTERIOR PANELS / TRIM: FRONT DOOR BELT MOULDING: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

Use the same procedure for both the RH and LH sides.

1. INSTALL FRONT DOOR GLASS OUTER WEATHERSTRIP ASSEMBLY



- (a) Engage the claws to install the screw and a new front door glass outer weatherstrip assembly as shown in the illustration.

2. INSTALL FRONT DOOR SUSH [INFO](#)

3. INSTALL FRONT DOOR REAR LOWER FRAME SUB-ASSEMBLY [INFO](#)

4. INSTALL FRONT DOOR GLASS SUB-ASSEMBLY [INFO](#)

5. ADJUST FRONT DOOR GLASS SUB-ASSEMBLY

- (a) Check the front door glass sub-assembly. [INFO](#)
- (b) Adjust the front door glass sub-assembly. [INFO](#)

6. INSTALL FRONT DOOR SERVICE HOLE COVER [INFO](#)

7. INSTALL POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY WITH FRONT DOOR ARMREST BASE PANEL (for Driver Side) [INFO](#)

8. INSTALL POWER WINDOW REGULATOR SWITCH ASSEMBLY WITH FRONT DOOR ARMREST BASE PANEL (for Front Passenger Side) [INFO](#)

9. INSTALL FRONT DOOR TRIM BOARD SUB-ASSEMBLY [INFO](#)

10. INSTALL DOOR ARMREST COVER [INFO](#)

11. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

12. INITIALIZE POWER WINDOW CONTROL SYSTEM

INFO

13. INSPECT POWER WINDOW OPERATION

INFO



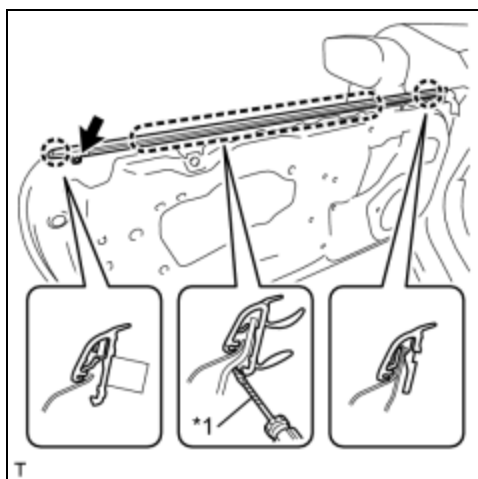
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001P8106ZX
Title: EXTERIOR PANELS / TRIM: FRONT DOOR BELT MOULDING: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

Use the same procedure for both the RH and LH sides.

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO
2. REMOVE DOOR ARMREST COVER INFO
3. REMOVE FRONT DOOR TRIM BOARD SUB-ASSEMBLY INFO
4. REMOVE POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY WITH FRONT DOOR ARMREST BASE PANEL (for Driver Side) INFO
5. REMOVE POWER WINDOW REGULATOR SWITCH ASSEMBLY WITH FRONT DOOR ARMREST BASE PANEL (for Front Passenger Side) INFO
6. REMOVE FRONT DOOR SERVICE HOLE COVER INFO
7. REMOVE FRONT DOOR GLASS SUB-ASSEMBLY INFO
8. REMOVE FRONT DOOR REAR LOWER FRAME SUB-ASSEMBLY INFO
9. REMOVE FRONT DOOR SUSH INFO
10. REMOVE FRONT DOOR GLASS OUTER WEATHERSTRIP ASSEMBLY



(a) Remove the screw.

Text in Illustration

*1	Protective Tape
----	-----------------

(b) Using a screwdriver, disengage the claw and remove the front door glass outer weatherstrip assembly.

HINT:

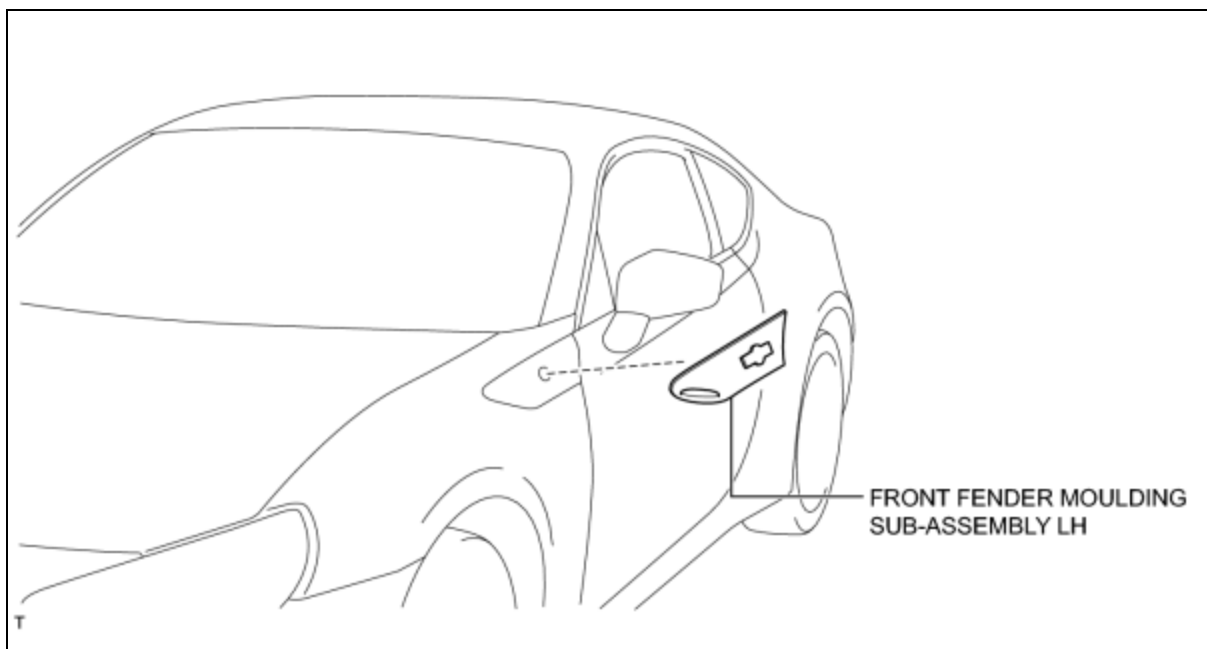
Tape the screwdriver tip before use.



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003UYJ005X
Title: EXTERIOR PANELS / TRIM: FRONT FENDER GARNISH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003UYI005X
Title: EXTERIOR PANELS / TRIM: FRONT FENDER GARNISH: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for both the RH and LH sides.
- The following procedure is for the LH side.

1. INSTALL FRONT FENDER MOULDING SUB-ASSEMBLY LH

(a) Clean the attachment surface.

- (1) Using an infrared light, heat the double-sided adhesive tape remaining on the front fender panel.

Heating Temperature:

ITEM	TEMPERATURE
Front Fender Panel	40 to 60°C (104 to 140°F)

CAUTION:

Do not burn yourself with the hot front fender panel or with the infrared light.

NOTICE:

Do not heat the front fender panel excessively.

- (2) Using a piece of cloth, rub the remaining double-sided tape off the front fender panel while it is hot from the infrared light.

NOTICE:

Installing the front fender moulding sub-assembly LH while any double-sided tape remains on the front fender panel may cause adhesion failure. Therefore, completely remove the double-sided adhesive tape.

- (3) Using a non-residue solvent, clean the attachment surface.

(b) Using an infrared light, heat the front fender moulding sub-assembly installation surface of the front fender panel and new front fender moulding sub-assembly.

Heating Temperature:

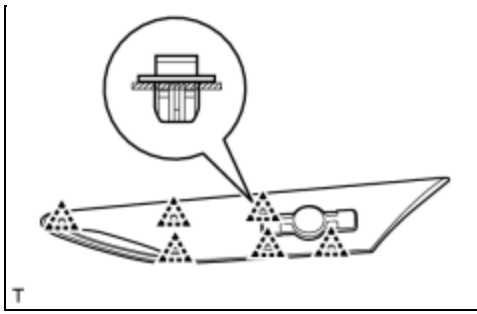
ITEM	TEMPERATURE
Front Fender Panel	40 to 60°C (104 to 140°F)
Front Fender Moulding Sub-Assembly	20 to 30°C (68 to 86°F)

CAUTION:

Do not burn yourself with the hot front fender panel and front fender moulding sub-assembly or with the infrared light.

NOTICE:

Do not heat the front fender panel and front fender moulding sub-assembly excessively.



(c) Install the front fender moulding sub-assembly with the 6 clips.

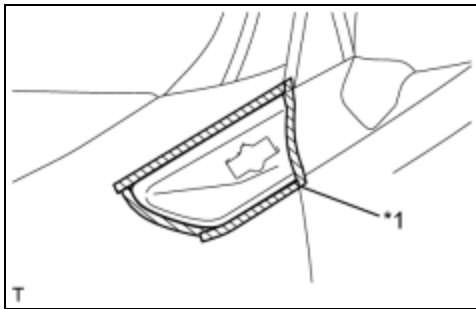
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003UYK005X
Title: EXTERIOR PANELS / TRIM: FRONT FENDER GARNISH: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

- Use the same procedure for both the RH and LH sides.
- The following procedure is for the LH side.

1. REMOVE FRONT FENDER MOULDING SUB-ASSEMBLY LH



- (a) Apply protective tape to the front fender panel in the area around the front fender moulding sub-assembly.

Text in Illustration

*1	Protective Tape
----	-----------------

- (b) Using an infrared light, heat the front fender panel and the front fender moulding sub-assembly.

Heating Temperature:

ITEM	TEMPERATURE
Front Fender Panel	40 to 60°C (104 to 140°F)
Front Fender Moulding Sub-Assembly	20 to 30°C (68 to 86°F)

CAUTION:

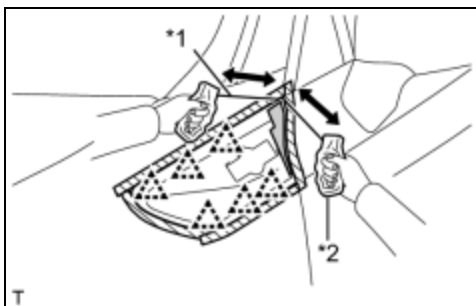
Do not burn yourself with the hot front fender panel and front fender moulding sub-assembly or with the infrared light.

NOTICE:

Do not heat the front fender panel and front fender moulding sub-assembly excessively.

- (c) Insert piano wire between the front fender panel and the front fender moulding sub-assembly.

Text in Illustration



*1	Piano Wire
*2	Wooden Block

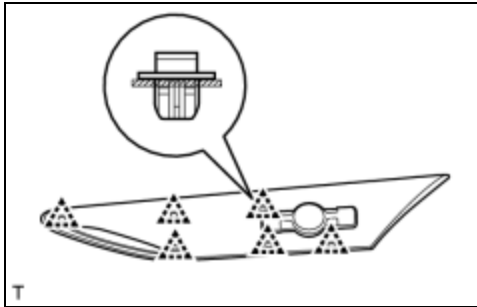
HINT:

Be careful of the boss positions.

- (d) Tie objects that can serve as handles (for example, wooden blocks) to the piano wire ends.
- (e) Pull the piano wire and scrape off the double-sided tape that holds the front fender moulding sub-assembly to the front fender panel.

NOTICE:

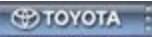
Be careful not to damage the front fender panel.



- (f) Using a moulding remover, disengage the 6 clips and remove the front fender moulding sub-assembly.

NOTICE:

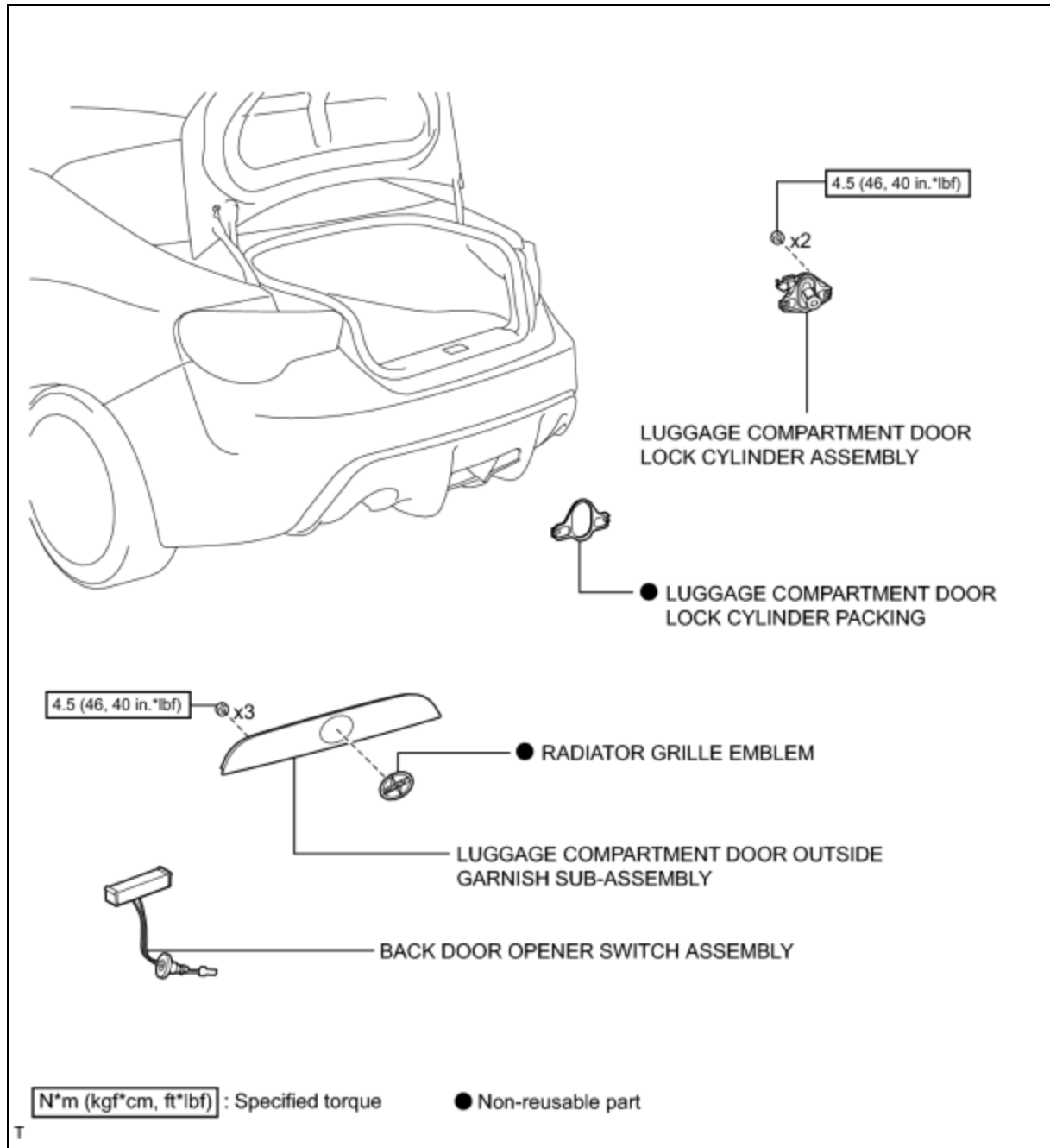
- If reusing the garnish, take care not to damage the front fender moulding sub-assembly.
- Be careful not to damage the vehicle body.



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003HHF01CX
Title: EXTERIOR PANELS / TRIM: LUGGAGE COMPARTMENT DOOR GARNISH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003HHE01PX
Title: EXTERIOR PANELS / TRIM: LUGGAGE COMPARTMENT DOOR GARNISH: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL RADIATOR GRILLE EMBLEM (for Rear Side) [INFO](#)

2. INSTALL BACK DOOR OPENER SWITCH ASSEMBLY [INFO](#)

3. INSTALL LUGGAGE COMPARTMENT DOOR OUTSIDE GARNISH SUB-ASSEMBLY

- (a) Engage the clip to install the 3 screws and the luggage compartment door outside garnish sub-assembly.

Torque: 4.5 N·m (46 kgf·cm, 40in·lbf)

- (b) Connect the 2 license plate light connectors.
(c) Connect the back door opener switch assembly connector.

4. REMOVE LUGGAGE COMPARTMENT DOOR LOCK CYLINDER PACKING [INFO](#)

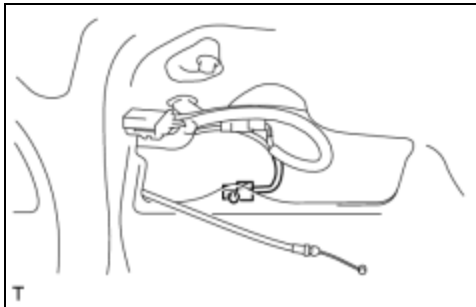
5. INSTALL LUGGAGE COMPARTMENT DOOR LOCK CYLINDER ASSEMBLY [INFO](#)



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003HHG010X
Title: EXTERIOR PANELS / TRIM: LUGGAGE COMPARTMENT DOOR GARNISH: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE LUGGAGE COMPARTMENT DOOR LOCK CYLINDER ASSEMBLY INFO
2. REMOVE LUGGAGE COMPARTMENT DOOR LOCK CYLINDER PACKING INFO
3. REMOVE LUGGAGE COMPARTMENT DOOR OUTSIDE GARNISH SUB-ASSEMBLY

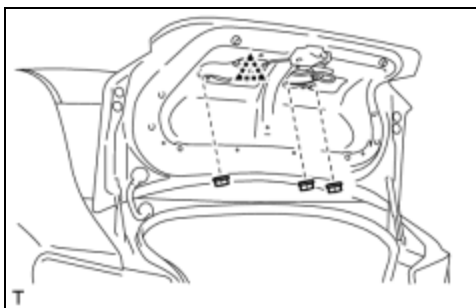


(a) Disconnect the back door opener switch assembly connector.

(b) Remove the back door opener switch assembly grommet.



(c) Disconnect the 2 license plate light connectors.



(d) Remove the 3 nuts.

(e) Disengage the clip and remove the luggage compartment door outside garnish sub-assembly.

4. REMOVE BACK DOOR OPENER SWITCH ASSEMBLY INFO

5. REMOVE RADIATOR GRILLE EMBLEM (for Rear Side)

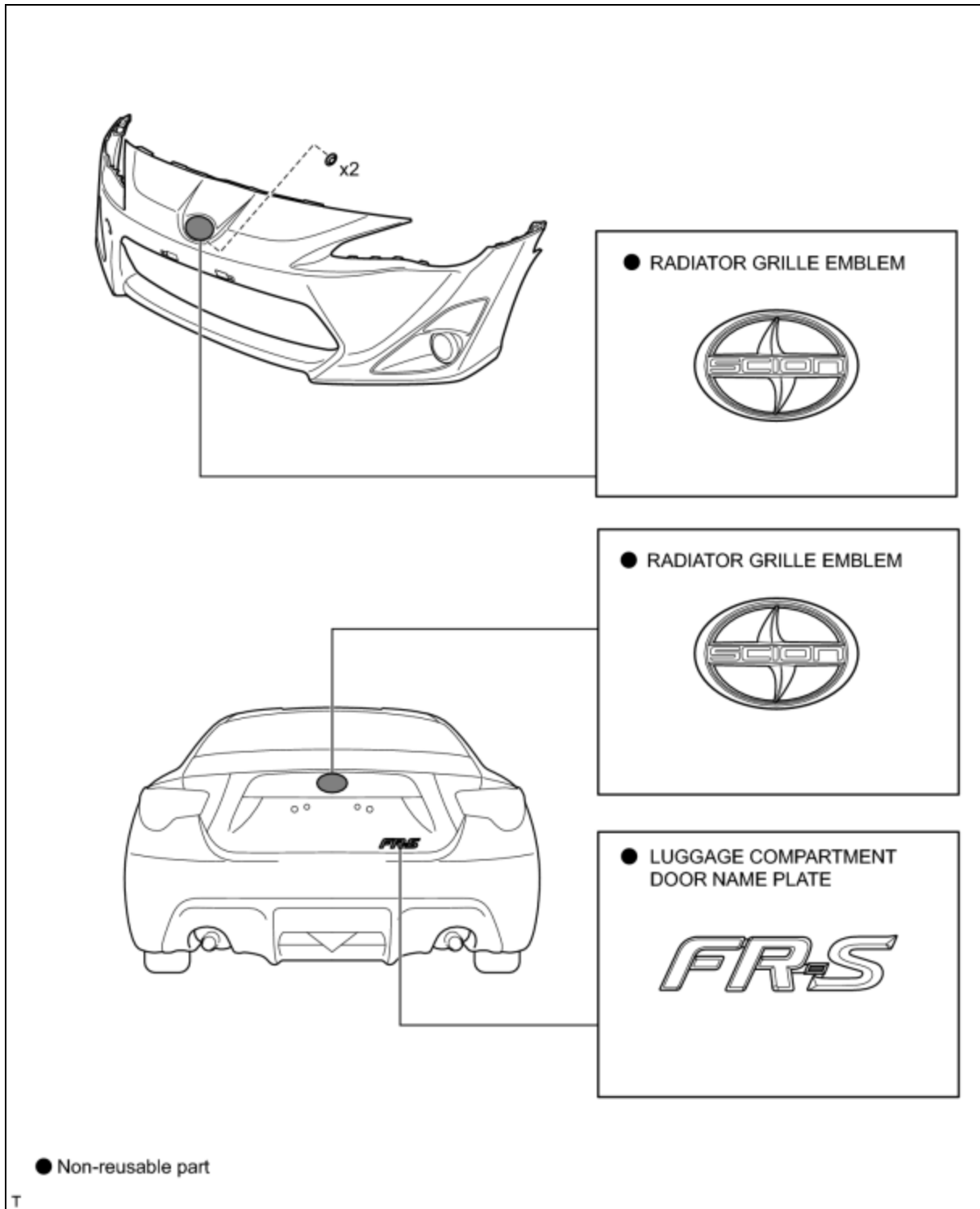
INFO



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003W5S016X
Title: EXTERIOR PANELS / TRIM: NAME PLATE: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000035V301ZX
Title: EXTERIOR PANELS / TRIM: NAME PLATE: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

When installing the name plates or emblem, heat the vehicle body and name plates or emblem using a heat light.

Heating Temperature:

ITEM	TEMPERATURE
Vehicle Body	40 to 60°C (104 to 140°F)
Name Plate or Emblem	20 to 30°C (68 to 86°F)

NOTICE:

Do not heat the vehicle body, name plates or emblem excessively.

1. INSTALL RADIATOR GRILLE EMBLEM (for Front Side)

(a) Clean the vehicle body surface.

(1) Using an infrared light, heat the double-sided tape remaining on the front bumper cover.

Heating Temperature:

ITEM	TEMPERATURE
Front Bumper Cover	40 to 60°C (104 to 140°F)

CAUTION:

Do not burn yourself with the hot front bumper cover or with the infrared light.

NOTICE:

Do not heat the front bumper cover excessively.

(2) Using a piece of cloth, rub the remaining double-sided tape off the front bumper cover while it is hot from the infrared light.

NOTICE:

Installing the radiator grille emblem while any double-sided tape remains on the front bumper cover may cause adhesion failure. Therefore, completely remove the double-sided tape.

(3) Using a non-residue solvent, clean the attachment surface.

(b) Using an infrared light, heat the radiator grille emblem installation surface of the front bumper cover and new radiator grille emblem.

Heating Temperature:

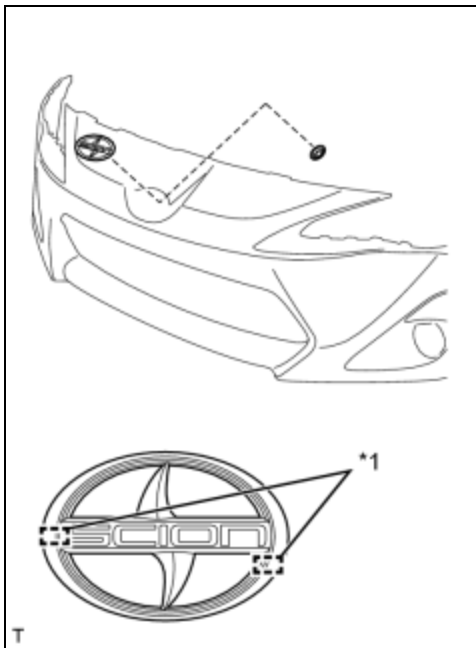
ITEM	TEMPERATURE
Front Bumper Cover	40 to 60°C (104 to 140°F)
Radiator Grille Emblem	20 to 30°C (68 to 86°F)

CAUTION:

Do not burn yourself with the hot front bumper cover and radiator grille emblem or with the infrared light.

NOTICE:

Do not heat the front bumper cover and radiator grille emblem excessively.



(c) Insert the 2 pins into the front bumper cover and install a new radiator grille emblem with the new 2 push nuts.

Text in Illustration

*1	Location Pin
----	--------------

2. INSTALL FRONT BUMPER COVER

INFO

3. INSTALL RADIATOR GRILLE EMBLEM (for Rear Side)

(a) Clean the vehicle body surface.

(1) Using an infrared light, heat the double-sided tape remaining on the luggage compartment door panel.

Heating Temperature:

ITEM	TEMPERATURE
Luggage Compartment Door Panel	40 to 60°C (104 to 140°F)

CAUTION:

Do not burn yourself with the hot luggage compartment door panel or with the infrared light.

NOTICE:

Do not heat the luggage compartment door panel excessively.

(2) Using a piece of cloth, rub the remaining double-sided tape off the luggage compartment door panel while it is hot from the infrared light.

NOTICE:

Installing the radiator grille emblem while any double-sided tape remains on the luggage compartment door panel may cause adhesion failure. Therefore, completely remove the double-sided tape.

(3) Using a non-residue solvent, clean the attachment surface.

(b) Using an infrared light, heat the radiator grille emblem installation surface of the luggage compartment door panel and new radiator grille emblem.

Heating Temperature:

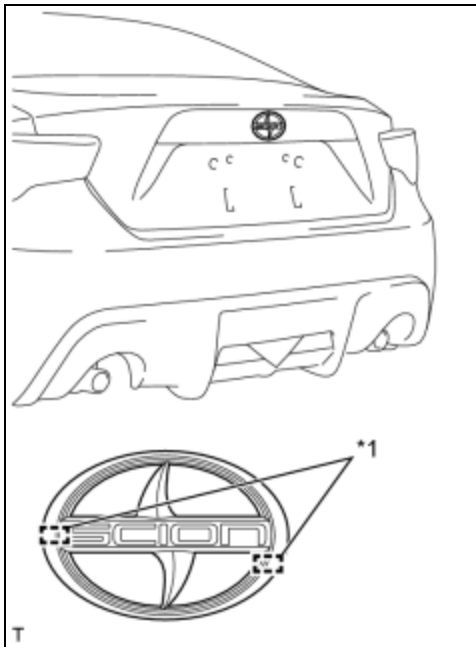
ITEM	TEMPERATURE
Luggage Compartment Door Panel	40 to 60°C (104 to 140°F)
Radiator Grille Emblem	20 to 30°C (68 to 86°F)

CAUTION:

Do not burn yourself with the hot luggage compartment door panel and radiator grille emblem or with the infrared light.

NOTICE:

Do not heat the luggage compartment door panel and radiator grille emblem excessively.



(c) Insert the 2 pins into the luggage compartment door panel and install a new radiator grille emblem.

Text in Illustration

*1	Location Pin
----	--------------

4. INSTALL LUGGAGE COMPARTMENT DOOR NAME PLATE

(a) Clean the attachment surface.

(1) Using an infrared light, heat the double-sided tape remaining on the luggage compartment door panel.

Heating Temperature:

ITEM	TEMPERATURE
Luggage Compartment Door Panel	40 to 60°C (104 to 140°F)

CAUTION:

Do not burn yourself with the hot luggage compartment door panel or with the infrared light.

NOTICE:

Do not heat the luggage compartment door panel excessively.

(2) Using a piece of cloth, rub the remaining double-sided tape off the luggage compartment door

panel while it is hot from the infrared light.

NOTICE:

Installing the luggage compartment door name plate while any double-sided tape remains on the luggage compartment door panel may cause adhesion failure. Therefore, completely remove the double-sided tape.

- (3) Using a non-residue solvent, clean the attachment surface.
- (b) Using an infrared light, heat the luggage compartment door name plate installation surface of the luggage compartment door panel and new luggage compartment door name plate.

Heating Temperature:

ITEM	TEMPERATURE
Luggage Compartment Door Panel	40 to 60°C (104 to 140°F)
Luggage Compartment Door Name Plate	20 to 30°C (68 to 86°F)

CAUTION:

Do not burn yourself with the hot luggage compartment door panel and luggage compartment door name plate or with the infrared light.

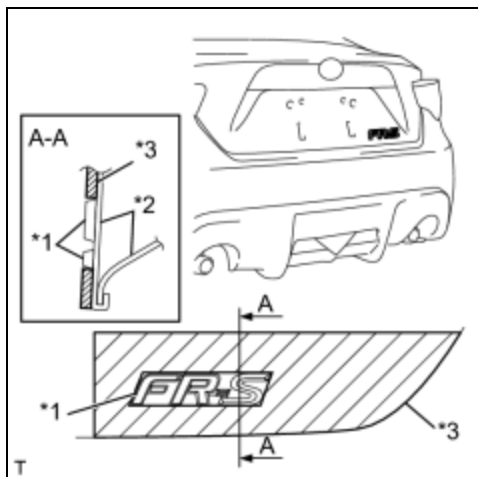
NOTICE:

Do not heat the luggage compartment door panel and luggage compartment door name plate excessively.

- (c) Install a new luggage compartment door name plate as shown in the illustration.
 - (1) Using a heat light, heat the vehicle body and luggage compartment door name plate.
 - (2) Install the enclosed bracket with luggage compartment door name plate, to the luggage compartment door panel.
 - (3) Remove the release paper from the luggage compartment door name plate.

HINT:

After removing the release paper, keep the exposed adhesive free from foreign matter.



- (4) Using the bracket, install the luggage compartment door name plate.

Text in Illustration

*1	Luggage Compartment Door Name Plate
*2	Luggage Compartment Door Panel
*3	Bracket

- (5) Remove the bracket from luggage compartment door panel.

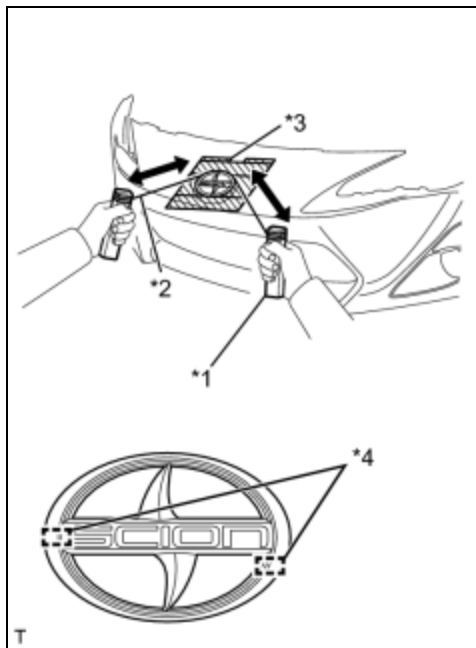
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000035V401ZX
Title: EXTERIOR PANELS / TRIM: NAME PLATE: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE FRONT BUMPER COVER

INFO

2. REMOVE RADIATOR GRILLE EMBLEM (for Front Side)



- (a) Apply protective tape to the front bumper cover in the area around the radiator grille emblem.

Text in Illustration

*1	Wooden Block
*2	Piano Wire
*3	Protective Tape
*4	Location Pin

- (b) Using an infrared light, heat the front bumper cover and the radiator grille emblem.

Heating Temperature:

ITEM	TEMPERATURE
Front Bumper Cover	40 to 60°C (104 to 140°F)
Radiator Grille Emblem	20 to 30°C (68 to 86°F)

CAUTION:

Do not burn yourself with the hot front bumper cover and radiator grille emblem or with the infrared light.

NOTICE:

Do not heat the front bumper cover and radiator grille emblem excessively.

- (c) Insert piano wire between the front bumper cover and the radiator grille emblem.

HINT:

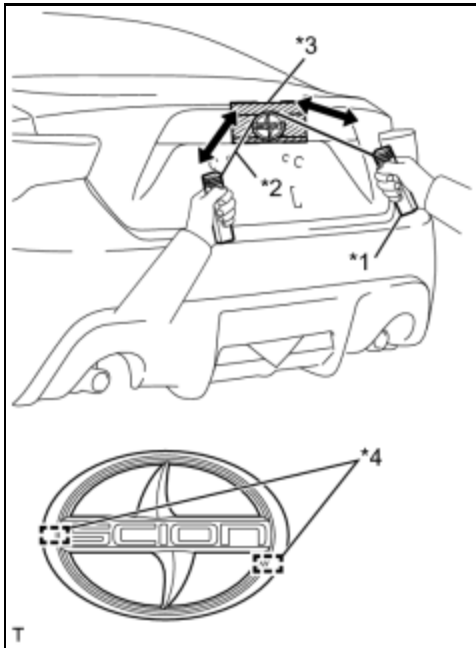
Be careful of the boss positions.

- (d) Tie objects that can serve as handles (for example, wooden blocks) to the piano wire ends.
- (e) Remove the 2 push nuts and the radiator grille emblem.
- (f) Pull the piano wire and scrape off the double-sided tape that holds the radiator grille emblem to the front bumper cover.

NOTICE:

Be careful not to damage the front bumper cover.

3. REMOVE RADIATOR GRILLE EMBLEM (for Rear Side)



- (a) Apply protective tape to the luggage compartment door panel in the area around the radiator grille emblem.

Text in Illustration

*1	Wooden Block
*2	Piano Wire
*3	Protective Tape
*4	Location Pin

- (b) Using an infrared light, heat the luggage compartment door panel and the radiator grille emblem.
Heating Temperature:

ITEM	TEMPERATURE
Luggage Compartment Door Panel	40 to 60°C (104 to 140°F)
Radiator Grille Emblem	20 to 30°C (68 to 86°F)

CAUTION:

Do not burn yourself with the hot luggage compartment door panel and radiator grille emblem or with the infrared light.

NOTICE:

Do not heat the luggage compartment door panel and radiator grille emblem excessively.

- (c) Insert piano wire between the luggage compartment door panel and the radiator grille emblem.

HINT:

Be careful of the boss positions.

- (d) Tie objects that can serve as handles (for example, wooden blocks) to the piano wire ends.
- (e) Pull the piano wire and scrape off the double-sided tape that holds the radiator grille emblem to the

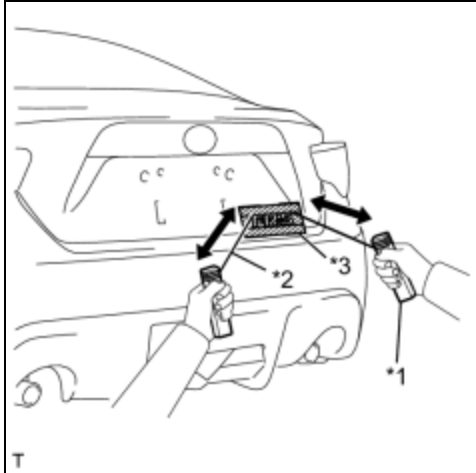
luggage compartment door panel.

NOTICE:

Be careful not to damage the luggage compartment door panel.

(f) Remove the radiator grille emblem.

4. REMOVE LUGGAGE COMPARTMENT DOOR NAME PLATE



(a) Apply protective tape to the luggage compartment door panel in the area around the luggage compartment door name plate.

Text in Illustration

*1	Wooden Block
*2	Piano Wire
*3	Protective Tape

(b) Using an infrared light, heat the luggage compartment door panel and the luggage compartment door name plate.

Heating Temperature:

ITEM	TEMPERATURE
Luggage Compartment Door Panel	40 to 60°C (104 to 140°F)
Luggage Compartment Door Name Plate	20 to 30°C (68 to 86°F)

CAUTION:

Do not burn yourself with the hot luggage compartment door panel and luggage compartment door name plate or with the infrared light.

NOTICE:

Do not heat the luggage compartment door panel and luggage compartment door name plate excessively.

(c) Insert piano wire between the luggage compartment door panel and the luggage compartment door name plate.

(d) Tie objects that can serve as handles (for example, wooden blocks) to the piano wire ends.

(e) Pull the piano wire and scrape off the double-sided tape that holds the luggage compartment door name plate to the luggage compartment door panel.

NOTICE:

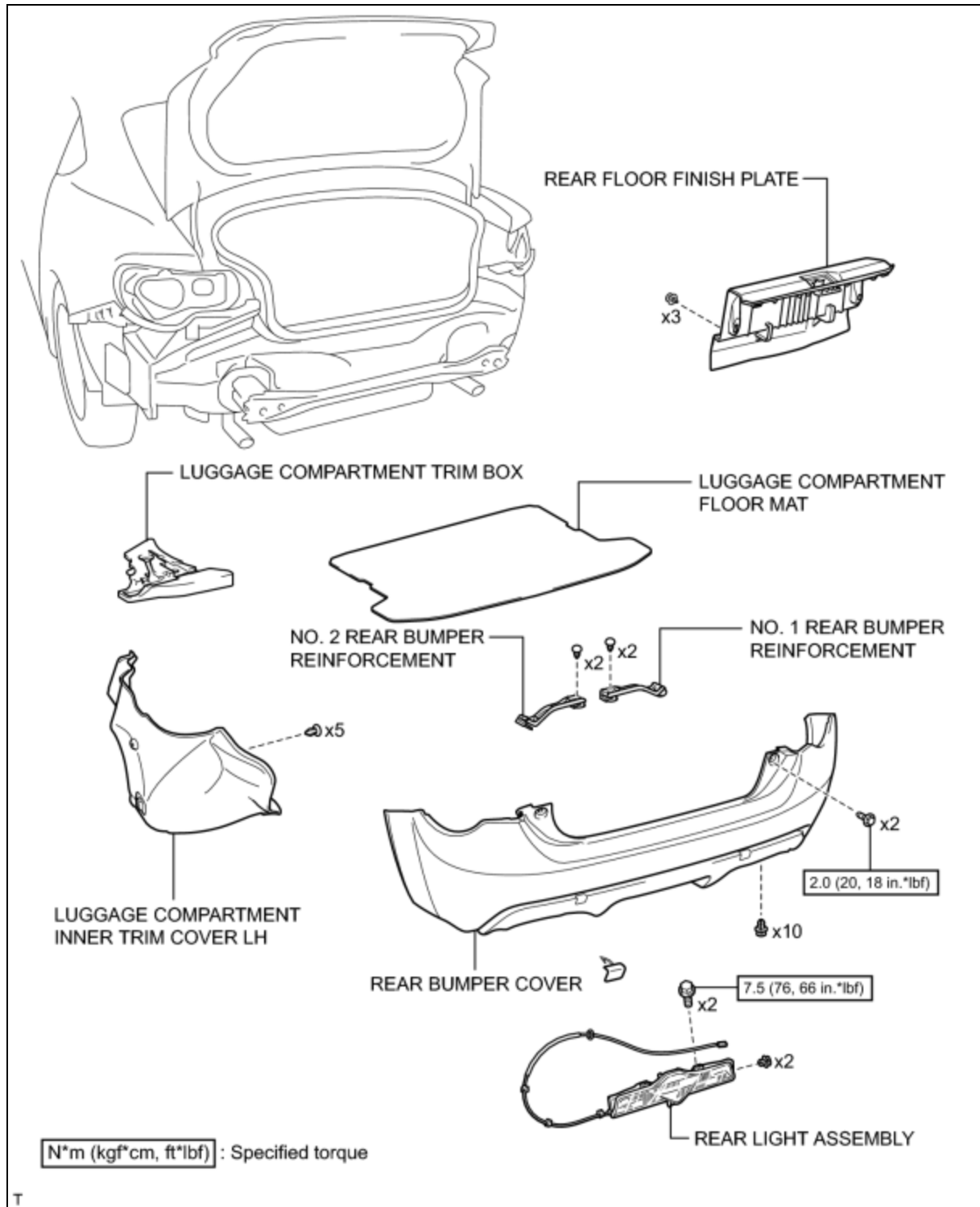
Be careful not to damage the luggage compartment door panel.

(f) Remove the luggage compartment door name plate.

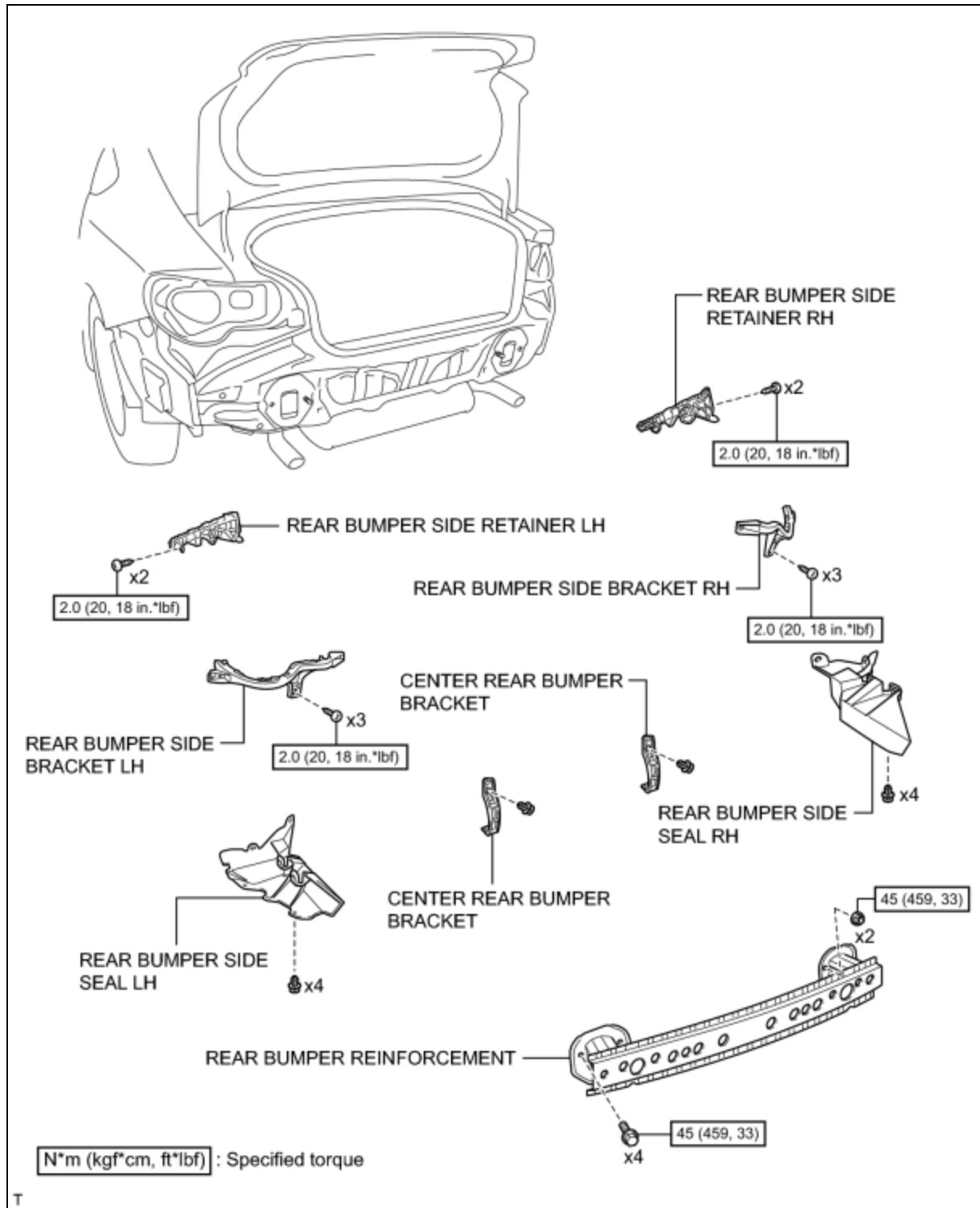
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003W5B01SX
Title: EXTERIOR PANELS / TRIM: REAR BUMPER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION

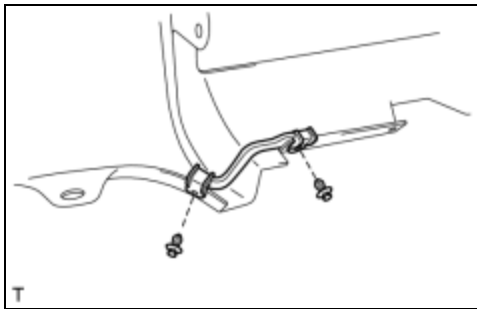


Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003CVK025X
Title: EXTERIOR PANELS / TRIM: REAR BUMPER: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. REMOVE REAR LIGHT ASSEMBLY INFO

2. REMOVE NO. 2 REAR BUMPER REINFORCEMENT



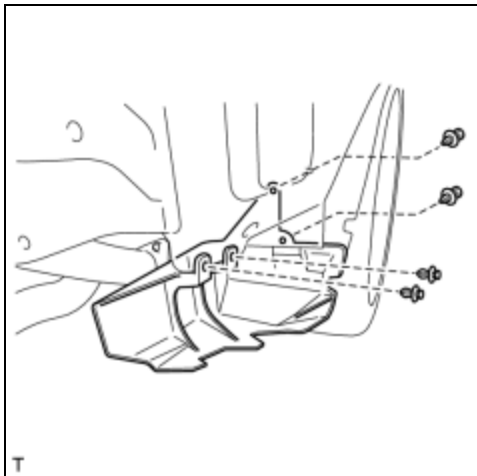
(a) Remove the 2 clips and remove the No. 2 rear bumper reinforcement.

3. REMOVE NO. 1 REAR BUMPER REINFORCEMENT

HINT:

Use the same procedure as for the No. 2 rear bumper reinforcement.

4. REMOVE REAR BUMPER SIDE SEAL LH



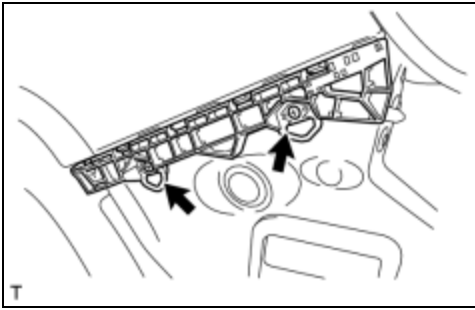
(a) Remove the 4 clips and rear bumper side seal LH.

5. REMOVE REAR BUMPER SIDE SEAL RH

HINT:

Use the same procedure as for the LH side.

6. REMOVE REAR BUMPER SIDE RETAINER LH



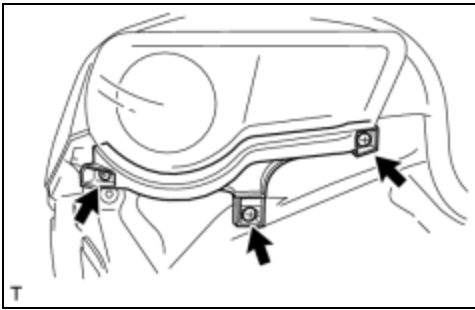
(a) Remove the 2 screws and the rear bumper side retainer LH.

7. REMOVE REAR BUMPER SIDE RETAINER RH

HINT:

Use the same procedure as for the LH side.

8. REMOVE REAR BUMPER SIDE BRACKET LH



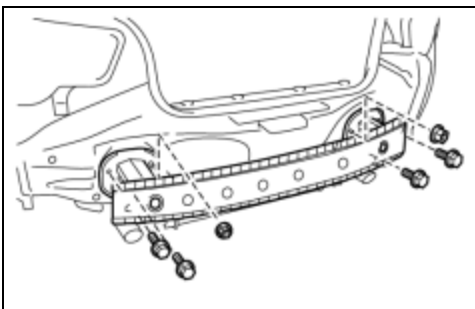
(a) Remove the 3 screws and rear bumper side bracket LH.

9. REMOVE REAR BUMPER SIDE BRACKET RH

HINT:

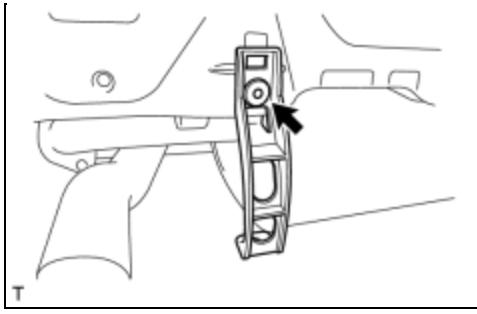
Use the same procedure as for the LH side.

10. REMOVE REAR BUMPER REINFORCEMENT



(a) Remove the 4 bolts, 2 nuts and rear bumper reinforcement.

11. REMOVE CENTER REAR BUMPER BRACKET



(a) Remove the clip and the center rear bumper bracket.

HINT:

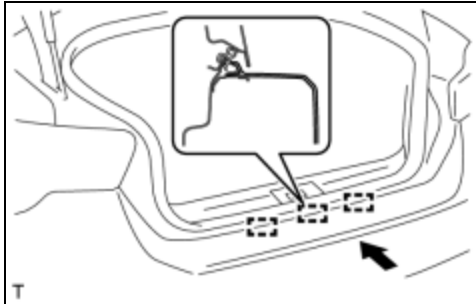
Use the same procedure as for the LH side and the RH side.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000034WU02QX
Title: EXTERIOR PANELS / TRIM: REAR BUMPER: INSTALLATION (2013 FR-S)		

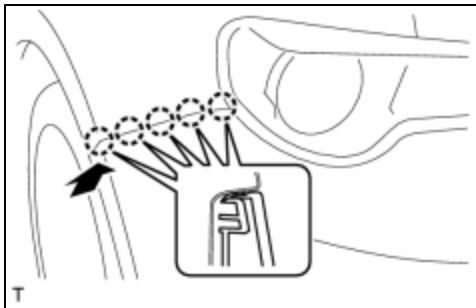
INSTALLATION

1. INSTALL REAR BUMPER COVER

- (a) Insert the rear light harness to the luggage compartment room.



- (b) Engage the 3 guides.



- (c) Engage the 5 claws.

HINT:

Use the same procedure for the RH side and LH side.

- (d) Install the 2 screws.

Torque: 2.0 N·m (20 kgf·cm, 18in·lbf)

- (e) Install the rear bumper cover with the 10 clips.

- (f) Connect the connector.

- (g) Engage the clamp to install the rear light assembly harness.

2. INSTALL LUGGAGE COMPARTMENT INNER TRIM COVER LH INFO

3. INSTALL LUGGAGE COMPARTMENT TRIM BOX

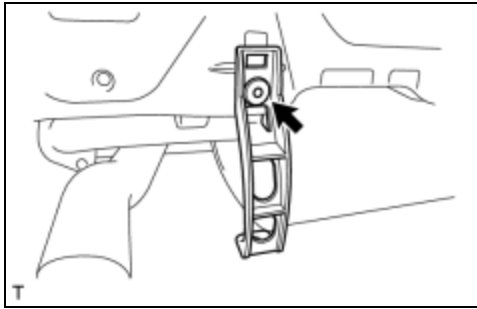
4. INSTALL REAR FLOOR FINISH PLATE INFO

5. INSTALL LUGGAGE COMPARTMENT FLOOR MAT

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003CVL027X
Title: EXTERIOR PANELS / TRIM: REAR BUMPER: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL CENTER REAR BUMPER BRACKET

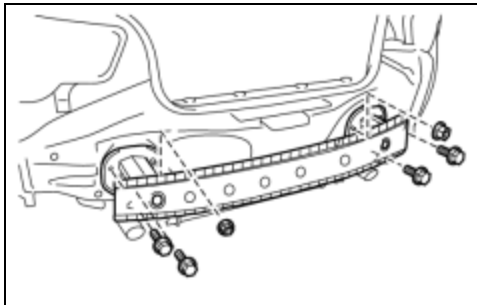


(a) Install the center rear bumper bracket with the clip.

HINT:

Use the same procedure as for the LH side and the RH side.

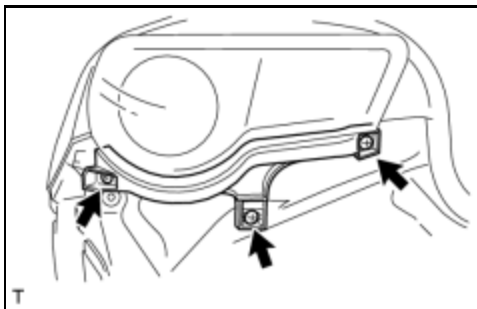
2. INSTALL REAR BUMPER REINFORCEMENT



(a) Install the rear bumper reinforcement with the 4 bolts and the 2 nuts.

Torque: 45 N·m (459 kgf·cm, 33ft·lbf)

3. INSTALL REAR BUMPER SIDE BRACKET LH



(a) Install the rear bumper side bracket LH with the 3 screws.

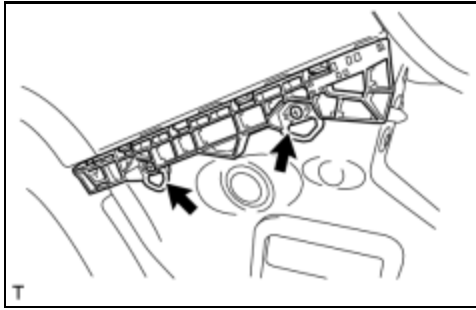
Torque: 2.0 N·m (20 kgf·cm, 18in·lbf)

4. INSTALL REAR BUMPER SIDE BRACKET RH

HINT:

Use the same procedure as for the LH side.

5. INSTALL REAR BUMPER SIDE RETAINER LH



- (a) Install the rear bumper side retainer LH with the 2 screws.

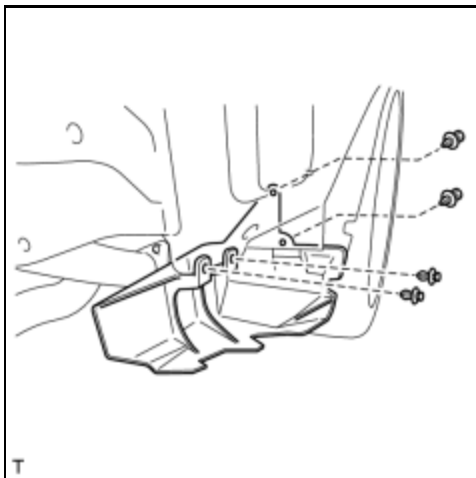
Torque: 2.0 N·m (20 kgf·cm, 18in·lbf)

6. INSTALL REAR BUMPER SIDE RETAINER RH

HINT:

Use the same procedure as for the LH side.

7. INSTALL REAR BUMPER SIDE SEAL LH



- (a) Install the rear bumper side seal LH with the 4 clips.

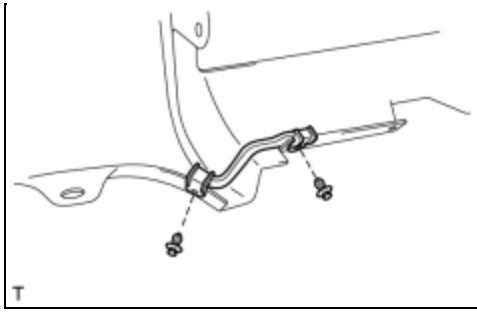
8. INSTALL REAR BUMPER SIDE SEAL RH

HINT:

Use the same procedure as for the LH side.

9. INSTALL NO. 2 REAR BUMPER REINFORCEMENT

- (a) Install the No. 2 rear bumper reinforcement with the 2 clips.



10. INSTALL NO. 1 REAR BUMPER REINFORCEMENT

HINT:

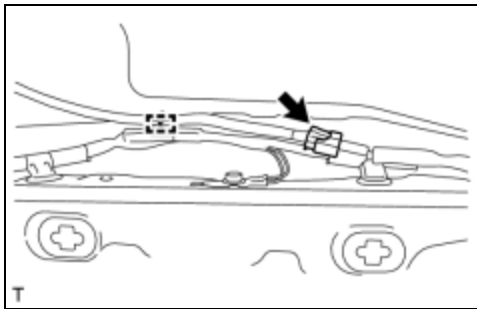
Use the same procedure as for the No. 2 rear bumper reinforcement.

11. INSTALL REAR LIGHT ASSEMBLY INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000034WW02MX
Title: EXTERIOR PANELS / TRIM: REAR BUMPER: REMOVAL (2013 FR-S)		

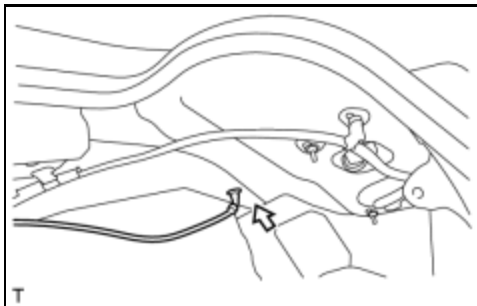
REMOVAL

1. REMOVE LUGGAGE COMPARTMENT FLOOR MAT
2. REMOVE REAR FLOOR FINISH PLATE INFO
3. REMOVE LUGGAGE COMPARTMENT TRIM BOX
4. REMOVE LUGGAGE COMPARTMENT INNER TRIM COVER LH INFO
5. REMOVE REAR BUMPER COVER

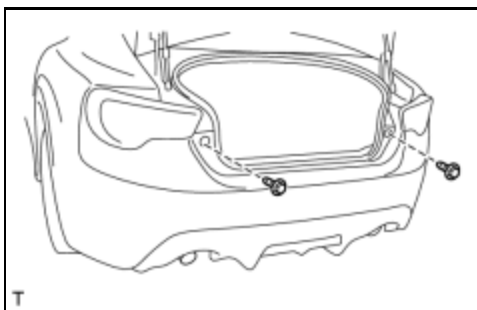


(a) Disconnect the rear light assembly connector.

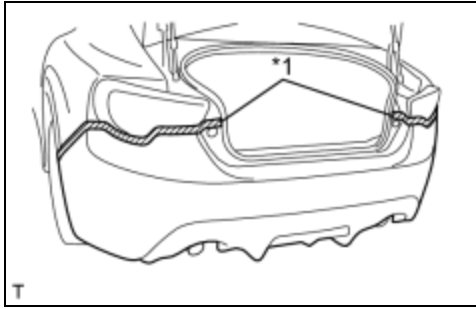
(b) Disengage the clamp and disconnect the wire harness.



(c) Disengage the grommet and pull out the wire harness.



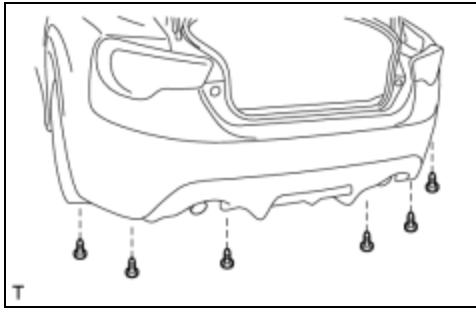
(d) Remove the 2 screws.



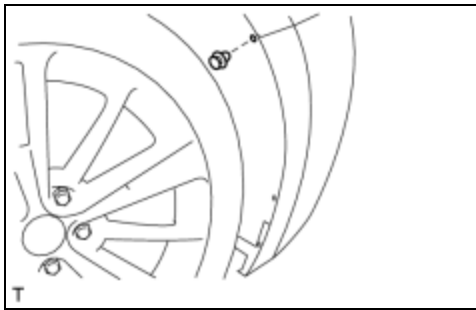
(e) Put protective tape around the rear bumper cover.

Text in Illustration

*1	Protective Tape
----	-----------------



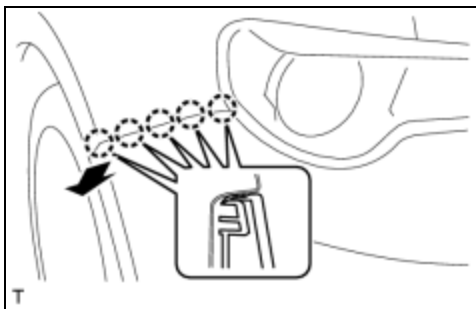
(f) Using a clip remover, remove the 8 clips.



(g) Remove the clip.

HINT:

Use the same procedure for the RH side and LH side.

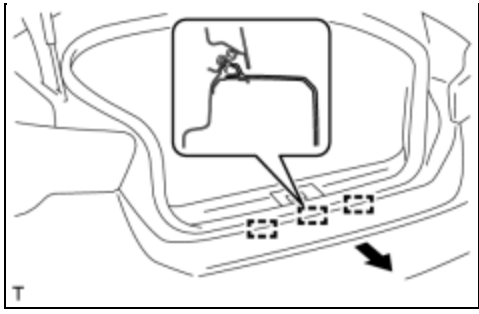


(h) Disengage the 5 claws as shown in the illustration.

HINT:

Use the same procedure for the RH side and LH side.

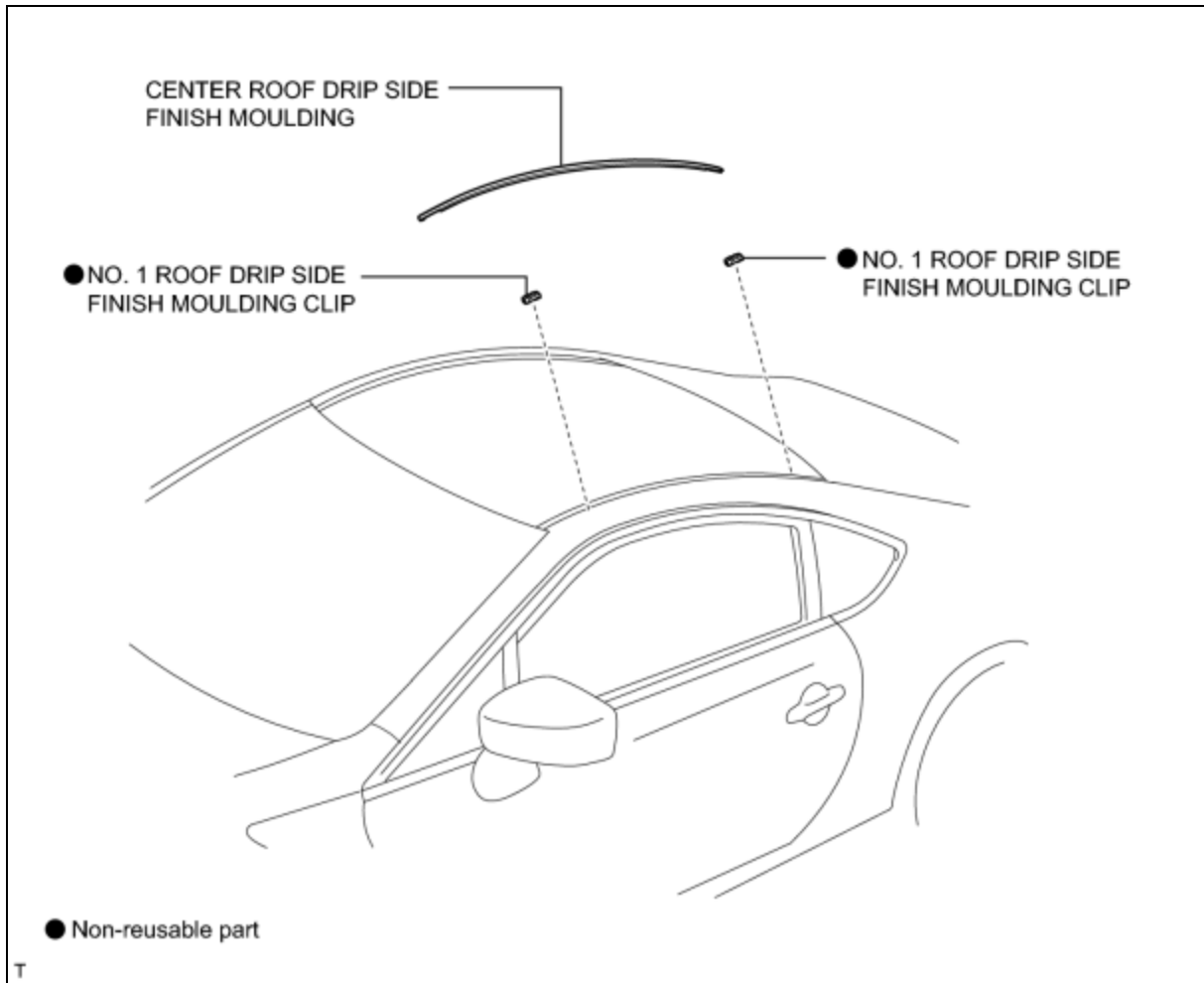
(i) Disengage the 3 guides and remove the rear bumper cover.



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000036EL012X
Title: EXTERIOR PANELS / TRIM: ROOF DRIP SIDE FINISH MOULDING: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000036EK01NX
Title: EXTERIOR PANELS / TRIM: ROOF DRIP SIDE FINISH MOULDING: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

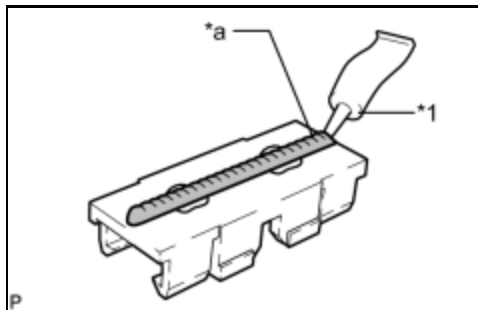
- Use the same procedure for both the RH and LH sides.
- The following procedure is for the LH side.

1. INSTALL NO. 1 ROOF DRIP SIDE FINISH MOULDING CLIP

NOTICE:

- If reusing the clips, do not remove the double-sided tape remaining on the clips and where the clips will be installed on the body.
- If installing new clips, remove the double-sided tape remaining where the clips will be installed on the body and clean the body with a non-residue solvent.

- (a) Apply a 2 to 3 mm (0.0787 to 0.118 in.) bead of adhesive (3M DP-105 or equivalent) to new NO. 1 roof drip side finish moulding clip.



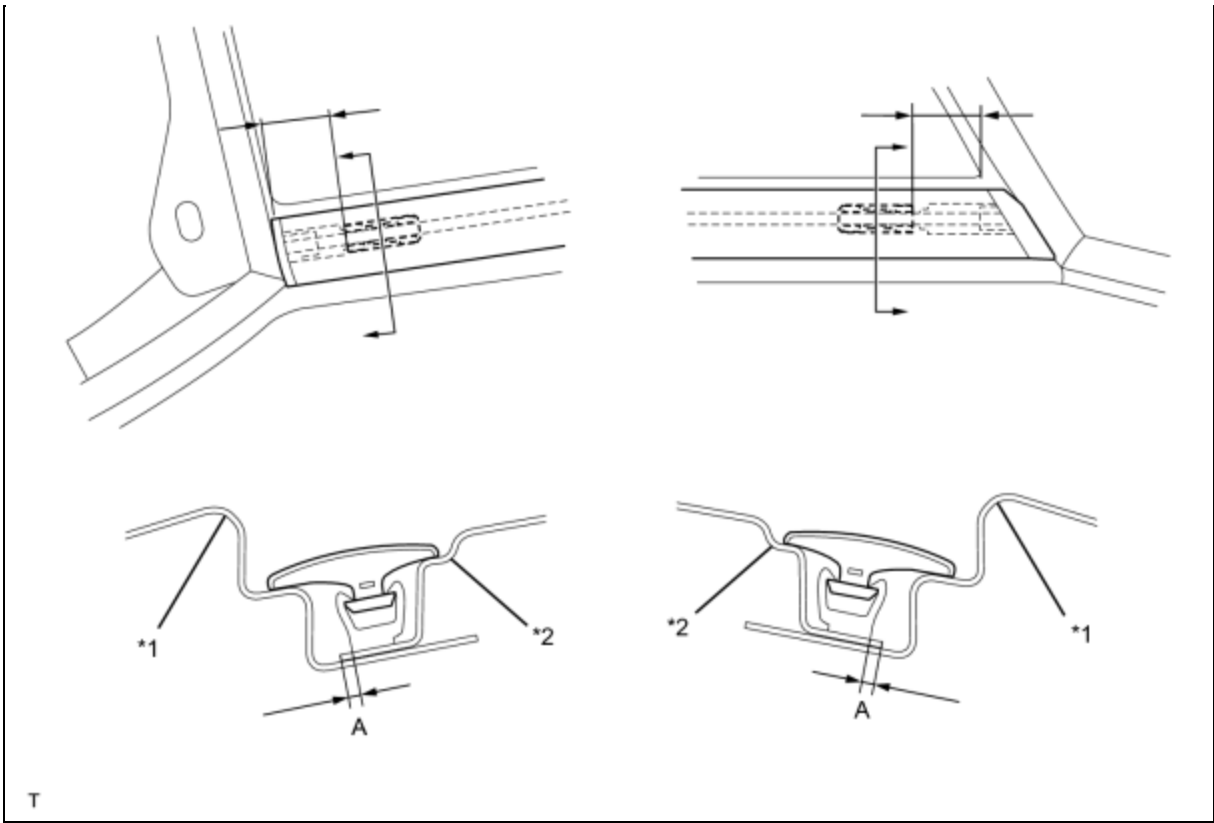
Text in Illustration

*1	Adhesive
*a	2 to 3 mm (0.0787 to 0.118 in.) Bead of Adhesive

HINT:

Adhesive strength (tensile strength): 13.7 MPa (140 kgf/cm², 1987 psi) or more (when the temperature is 23°C (73°F)).

- (b) Press and install the NO. 1 roof drip side finish moulding clip.
- (c) Install the clips to the positions on the roof panel shown in the illustration. Determine the locations and firmly press and install the NO. 1 roof drip side finish moulding clip after lightly applying adhesive (3M DP-105 or equivalent).



Standard Dimension:

AREA	DIMENSION
A	2.0 mm (0.0787 in.)

Text in Illustration

*1	Out Side Panel	*2	Roof Panel
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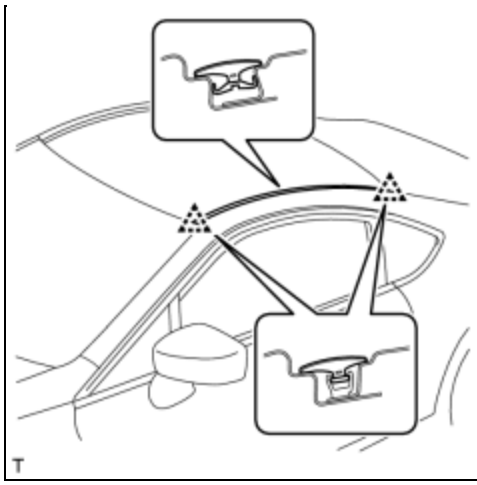
(d) Install the roof drip center side finish moulding when 40 minutes or more have elapsed after pressing and installing the NO. 1 roof drip side finish moulding clips.

HINT:

- Initial hardening time: 40 minutes
- Complete hardening time: 24 hours

2. INSTALL CENTER ROOF DRIP SIDE FINISH MOULDING

(a) Engage the 2 clips and install the center roof drip side finish moulding as shown in the illustration.



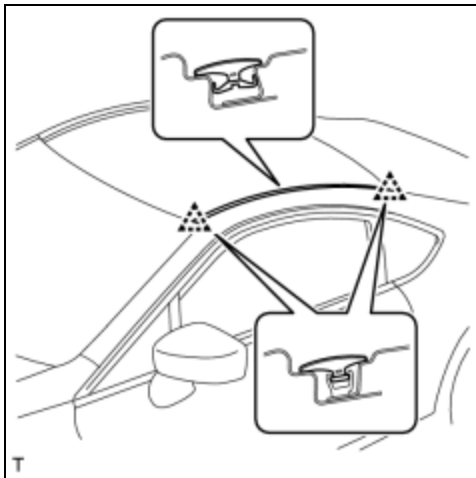
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000036EM021X
Title: EXTERIOR PANELS / TRIM: ROOF DRIP SIDE FINISH MOULDING: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

- Use the same procedure for both the RH and LH sides.
- The following procedure is for the LH side.

1. REMOVE CENTER ROOF DRIP SIDE FINISH MOULDING



- (a) Disengage the 2 clips and remove the center roof drip side finish moulding.

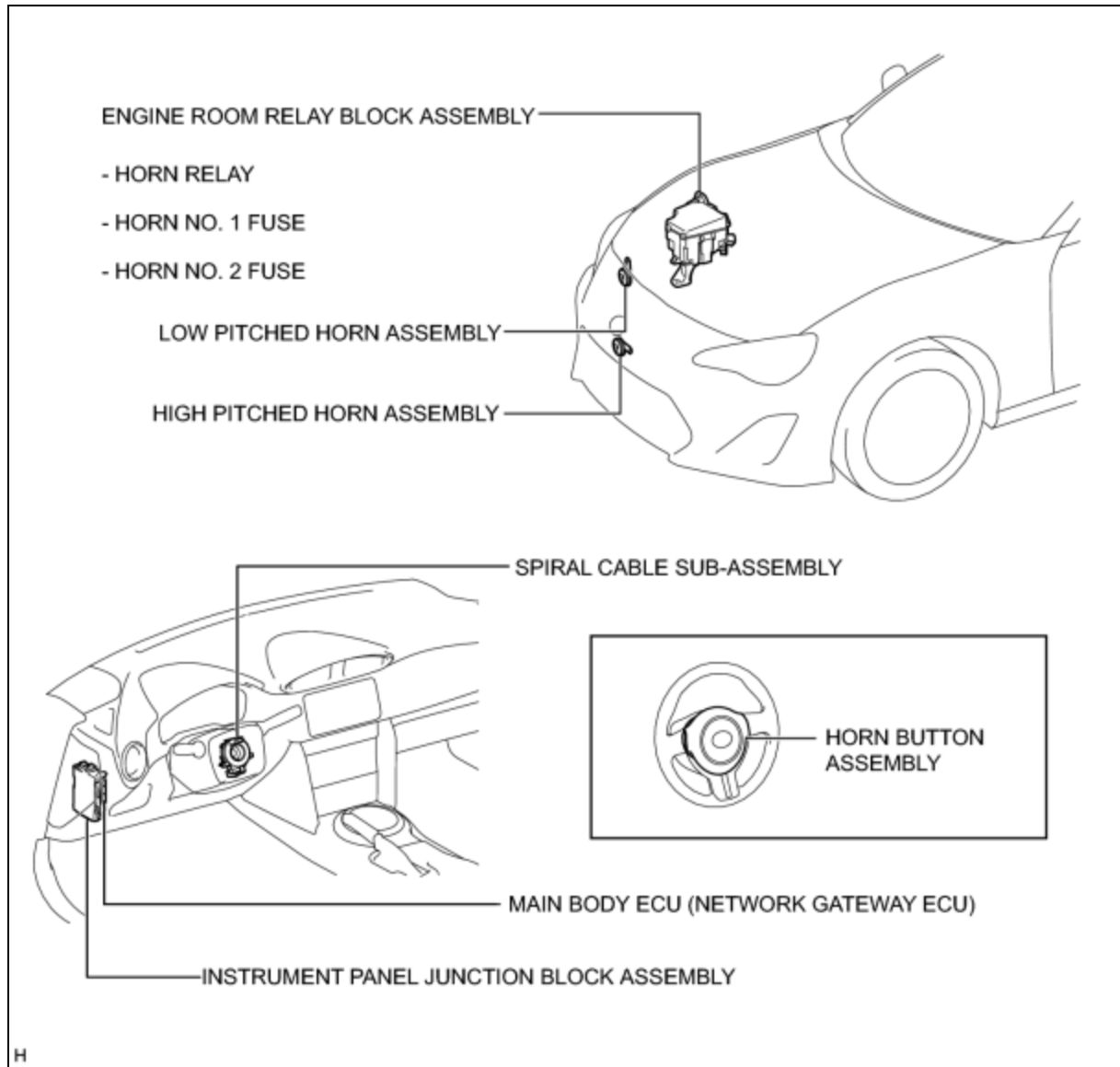
NOTICE:

- Do not remove the clips.
- If the clips are damaged or dropped off, replace them with new clips.

Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000016F404LX
Title: HORN: HORN SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000016F506PX
Title: HORN: HORN SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

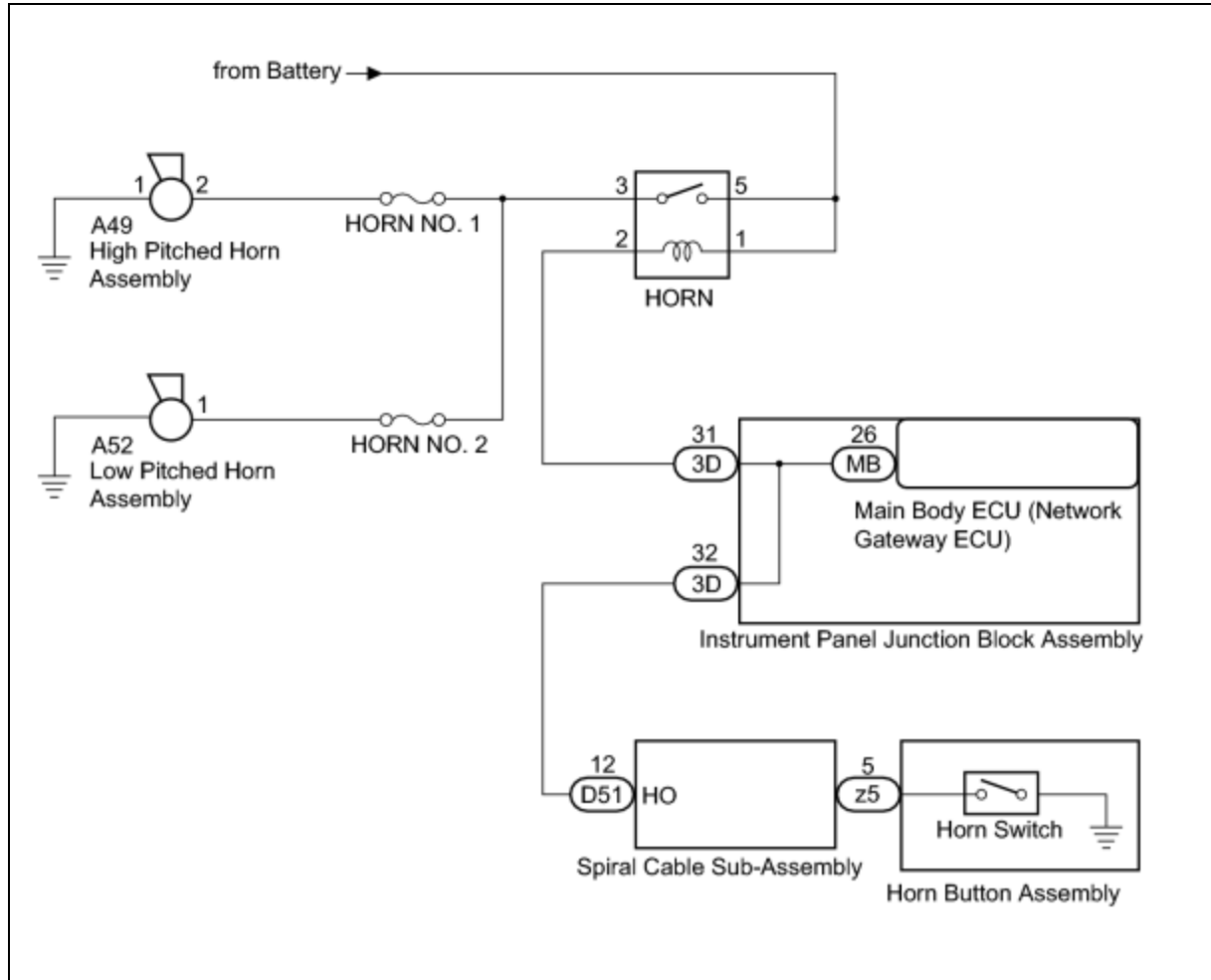
HORN SYSTEM

SYMPTOM	SUSPECTED AREA	SEE PAGE
Horn does not sound	HORN NO. 1 fuse	-
	HORN NO. 2 fuse	-
	HORN relay	-
	Horn button assembly	-
	Spiral cable sub-assembly	INFO
	Wire harness	-
Horn blows all the time	HORN relay	-
	Horn button assembly	-
	Wire harness	-
Low pitched horn operates but high pitched horn does not operate	High pitched horn assembly	INFO
	Wire harness	-
High pitched horn operates but low pitched horn does not operate	Low pitched horn assembly	INFO
	Wire harness	-



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000016F604OX
Title: HORN: HORN SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

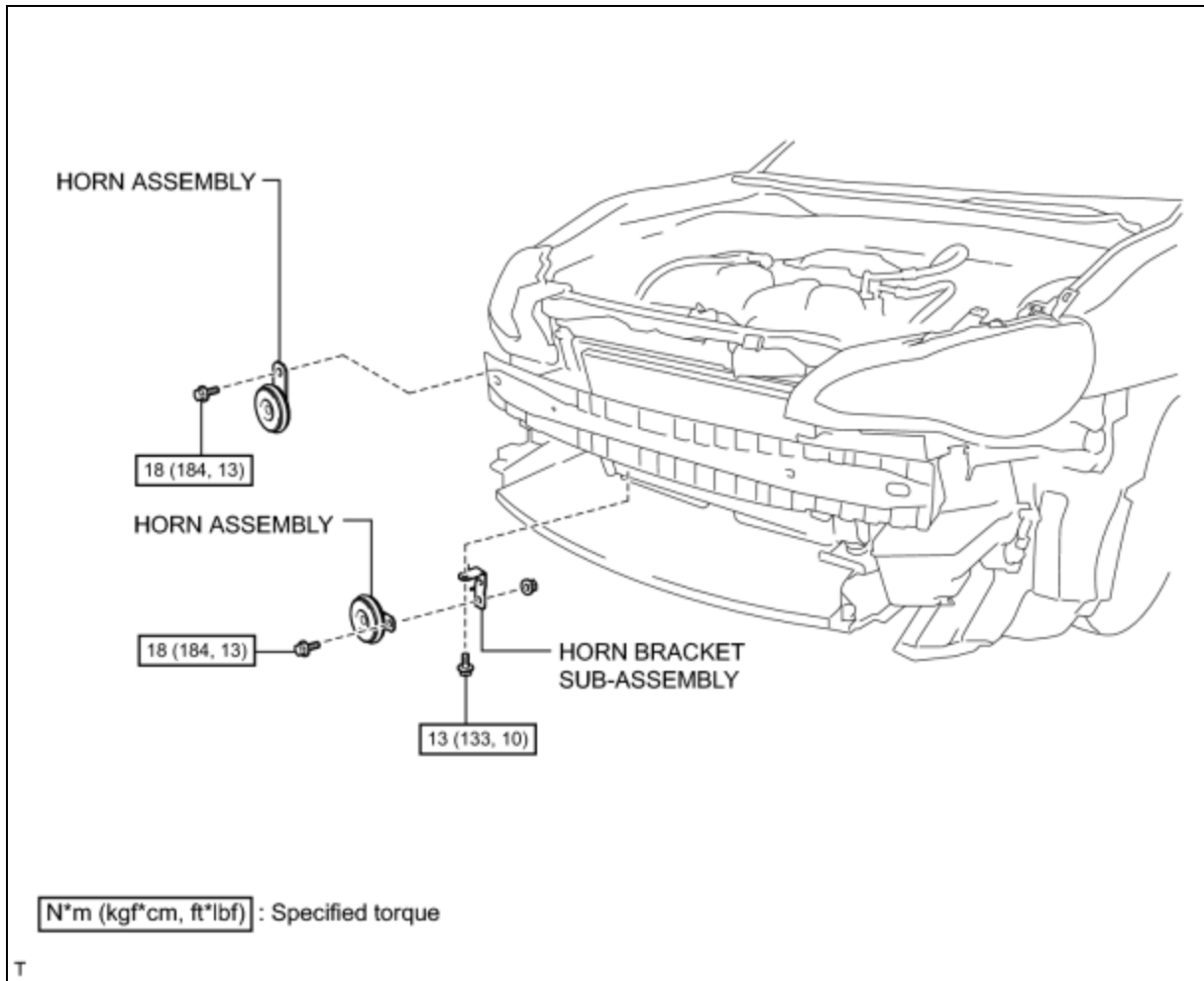
SYSTEM DIAGRAM



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000455Y001X
Title: HORN: HORN: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



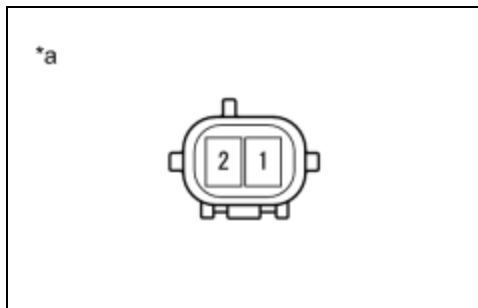
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000455V00VX
Title: HORN: HORN: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT HIGH PITCHED HORN ASSEMBLY

(a) Apply battery voltage and check the operation of the horn according to the table below.

OK:



MEASUREMENT CONDITION	SPECIFIED CONDITION
Battery positive (+) → Terminal 1 Battery negative (-) → Terminal 2	High pitched horn sounds

If the result is not as specified, replace the high pitched horn assembly.

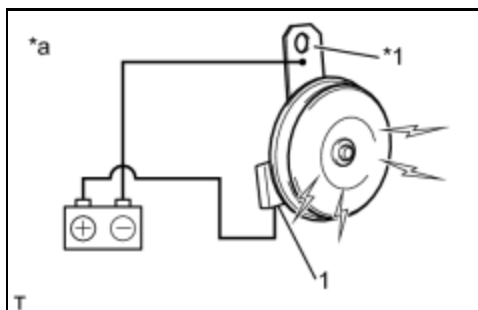
Text in Illustration

*a	Component without harness connected (High Pitched Horn Assembly)
----	---

2. INSPECT LOW PITCHED HORN ASSEMBLY

(a) Check that the low pitched horn sounds when the battery voltage is applied between the terminal and the bracket.

OK:



MEASUREMENT CONDITION	SPECIFIED CONDITION
Battery positive (+) → Terminal 1 Battery negative (-) → Horn bracket	Low pitched horn sounds

If the result is not as specified, replace the low pitched horn assembly.

Text in Illustration

*1	Bracket
*a	Component without harness connected (Low Pitched Horn Assembly)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000455U00KX
Title: HORN: HORN: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL LOW PITCHED HORN ASSEMBLY

(a) Install the low pitched horn assembly with the bolt.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

(b) Connect the connector.

2. INSTALL HORN BRACKET SUB-ASSEMBLY

(a) Install the horn bracket sub-assembly with the bolt and nut.

Torque: 13 N·m (133 kgf·cm, 10ft·lbf)

3. INSTALL HIGH PITCHED HORN ASSEMBLY

(a) Install the bolt and high pitched horn assembly with horn bracket sub-assembly.

Torque: 18 N·m (184 kgf·cm, 13ft·lbf)

(b) Connect the connector.

4. INSTALL FRONT BUMPER COVER

INFO



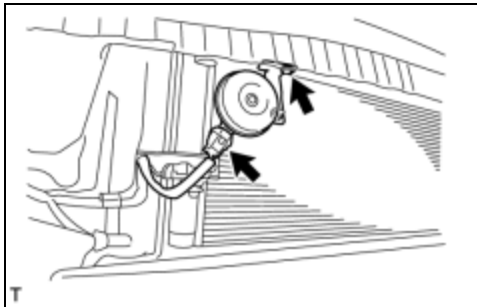
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000455W00KX
Title: HORN: HORN: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE FRONT BUMPER COVER

INFO

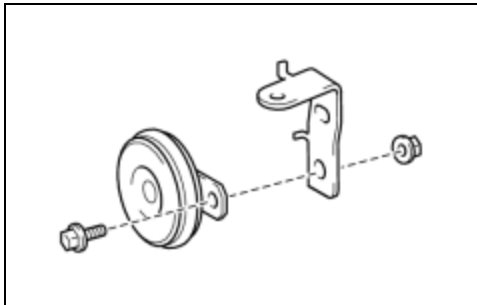
2. REMOVE HIGH PITCHED HORN ASSEMBLY



(a) Disconnect the connector.

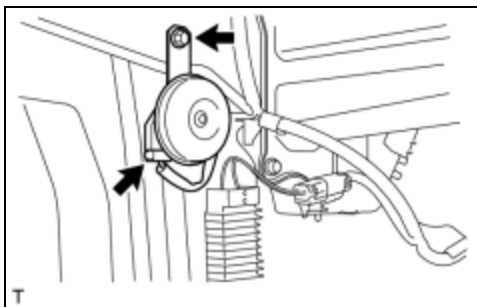
(b) Remove the bolt, and the high pitched horn assembly with horn bracket sub-assembly.

3. REMOVE HORN BRACKET SUB-ASSEMBLY



(a) Remove the bolt and nut, and the horn bracket sub-assembly.

4. REMOVE LOW PITCHED HORN ASSEMBLY



(a) Disconnect the connector.

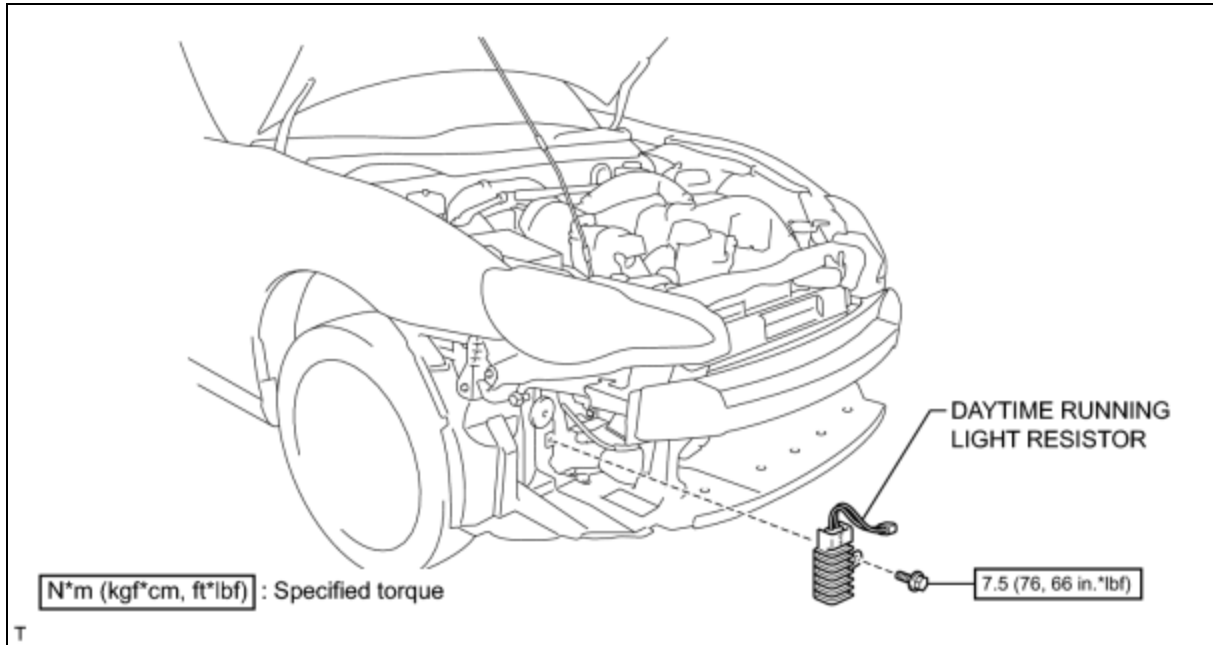
(b) Remove the bolt and low pitched horn assembly.



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003EJR00DX
Title: LIGHTING (EXT): DAYTIME RUNNING LIGHT RESISTOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



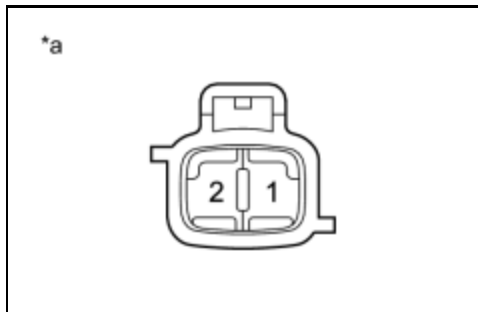
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003QJN003X
Title: LIGHTING (EXT): DAYTIME RUNNING LIGHT RESISTOR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT DAYTIME RUNNING LIGHT RESISTOR

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 - 2	Headlight swivel main switch off	0.80 to 0.86 kΩ

Text in Illustration

*a	Component without harness connected (Daytime Running Light Resistor)
----	---

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003EJP00DX
Title: LIGHTING (EXT): DAYTIME RUNNING LIGHT RESISTOR: INSTALLATION (2013 FR-S)		

INSTALLATION

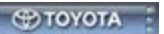
1. INSTALL DAYTIME RUNNING LIGHT RESISTOR

- (a) Connect the connector.
- (b) Install the daytime running light resistor with the bolt.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

2. INSTALL FRONT BUMPER COVER

INFO



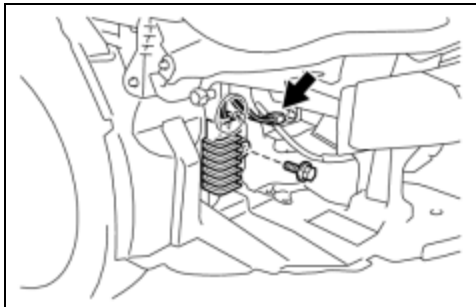
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003EJS00DX
Title: LIGHTING (EXT): DAYTIME RUNNING LIGHT RESISTOR: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE FRONT BUMPER COVER

INFO

2. REMOVE DAYTIME RUNNING LIGHT RESISTOR



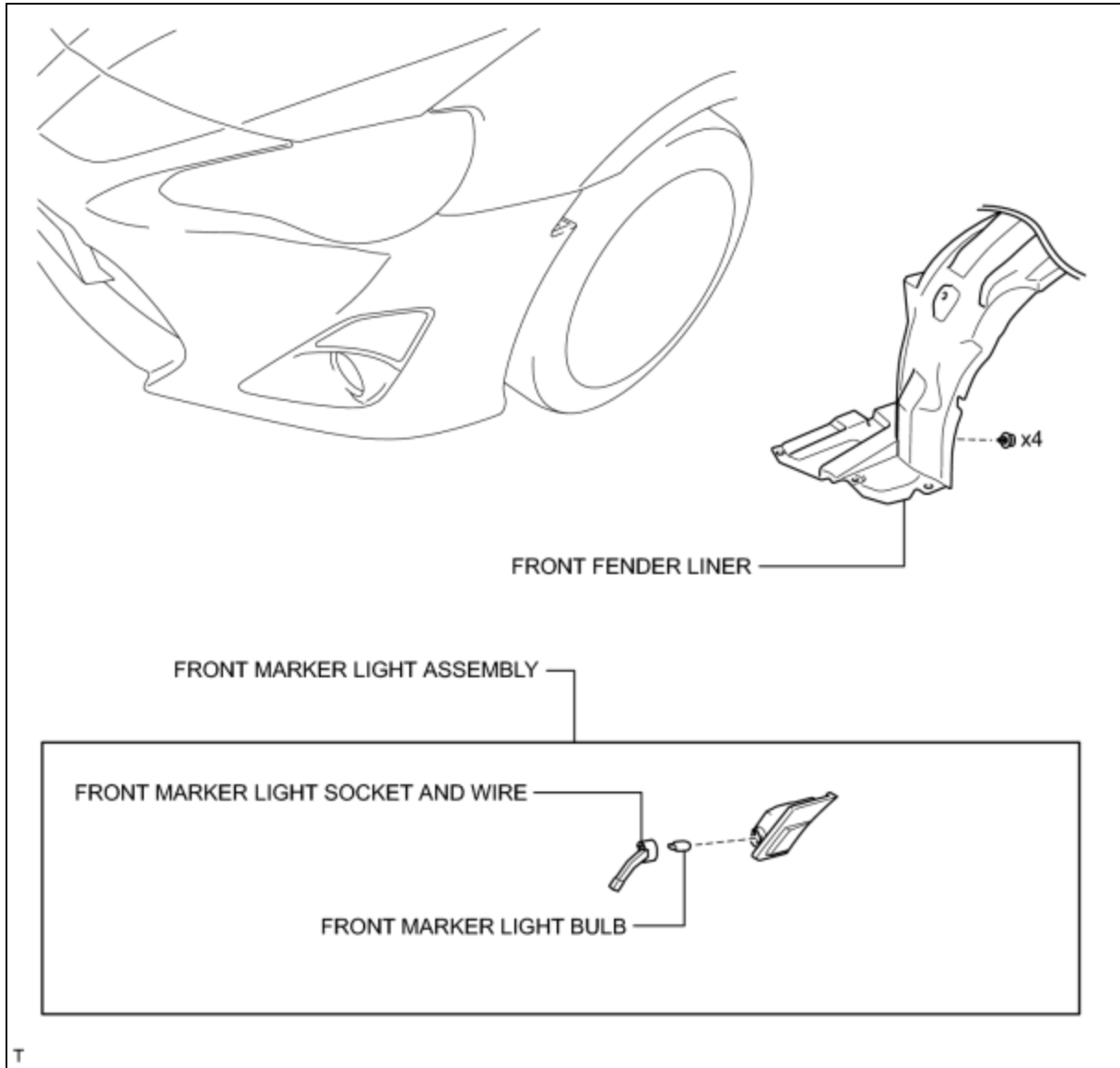
(a) Disconnect the connector.

(b) Remove the bolt and daytime running light resistor.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MVI01JX
Title: LIGHTING (EXT): FRONT SIDE MARKER LIGHT ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



T

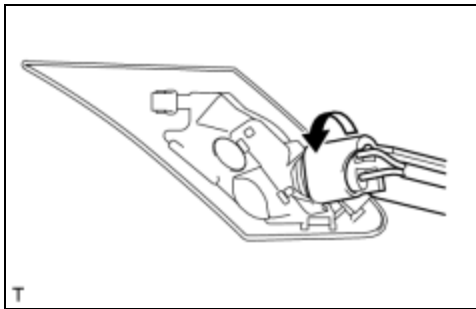
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003N8Y01EX
Title: LIGHTING (EXT): FRONT SIDE MARKER LIGHT ASSEMBLY: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. REMOVE FRONT MARKER LIGHT SOCKET AND WIRE



- (a) Turn the front marker light socket and wire with the front marker light bulb in the direction indicated by the arrow shown in the illustration to remove them as a unit.

2. REMOVE FRONT MARKER LIGHT BULB

- (a) Remove the front marker light bulb from the front marker light socket and wire.

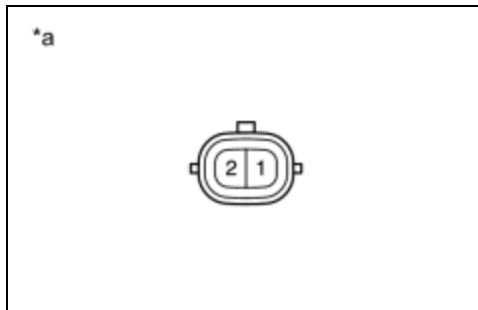
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002WM0032X
Title: LIGHTING (EXT): FRONT SIDE MARKER LIGHT ASSEMBLY: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT SIDE MARKER LIGHT ASSEMBLY

(a) Apply battery voltage to the connector and check the side marker light assembly.

OK:



CONDITION	SPECIFIED CONDITION
Battery positive (+) → 1	Side marker light assembly comes on.
Battery negative (-) → 2	

Text in illustration

*a	Component without harness connected (Side Marker Light Assembly)
----	---

If the result is not specified, replace the side marker light bulb or the side marker light assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MVJ01VX
Title: LIGHTING (EXT): FRONT SIDE MARKER LIGHT ASSEMBLY: INSTALLATION (2013 FR-S)		

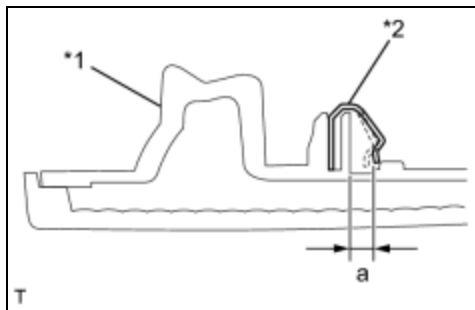
INSTALLATION

HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. INSTALL FRONT MARKER LIGHT ASSEMBLY

- Connect the connector.
- Engage the claw to install the front marker light assembly.
- Check that the side front marker light assembly is installed securely.



HINT:

If the front marker light assembly is not installed securely, widen and adjust the claw.

Standard:

AREA	SPECIFIED CONDITION
a	3.0 mm (0.118 in.)

Text in Illustration

*1	Front Marker Light Assembly
*2	Claw

2. INSTALL FRONT FENDER LINER

- Install the fender liner with the 4 clips.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003N8Z01EX
Title: LIGHTING (EXT): FRONT SIDE MARKER LIGHT ASSEMBLY: REASSEMBLY (2013 FR-S)		

REASSEMBLY

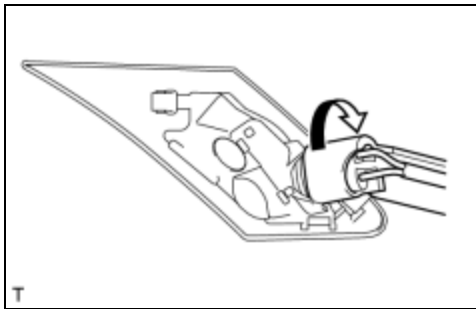
HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. INSTALL FRONT MARKER LIGHT BULB

- (a) Install the front marker light bulb to the front marker light socket and wire.

2. INSTALL FRONT MARKER LIGHT SOCKET AND WIRE



- (a) Turn the front marker light socket and wire with the front marker light bulb in the direction indicated by the arrow shown in the illustration and install them as a unit.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MVK01VX
Title: LIGHTING (EXT): FRONT SIDE MARKER LIGHT ASSEMBLY: REMOVAL (2013 FR-S)		

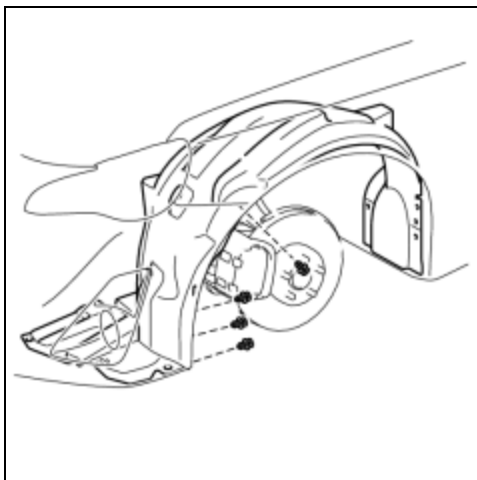
REMOVAL

HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. SEPARATE FRONT FENDER LINER

(a) Steer the front tire right most.



(b) Remove the 4 clips and partially remove the front fender liner.

2. REMOVE FRONT MARKER LIGHT ASSEMBLY

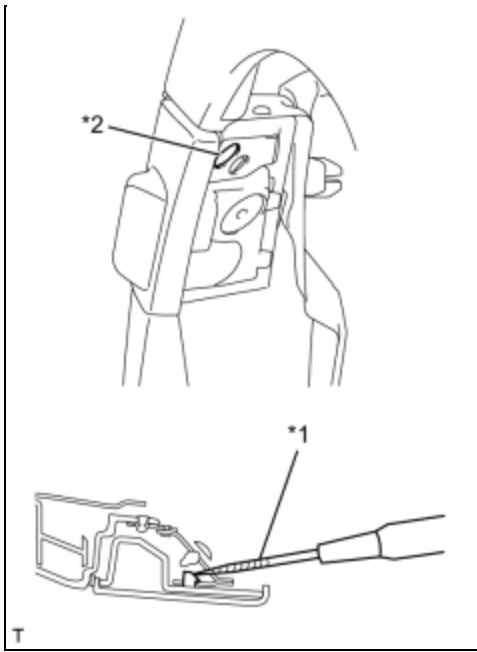
(a) Using a screwdriver wrapped with protective tape, disengage the claw from service hole.

Text in Illustration

*1	Protective Tape
*2	Service Hole

HINT:

Insert screwdriver on the level.



(b) Disconnect the connector to remove the front marker light assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MVK01VX
Title: LIGHTING (EXT): FRONT SIDE MARKER LIGHT ASSEMBLY: REMOVAL (2013 FR-S)		

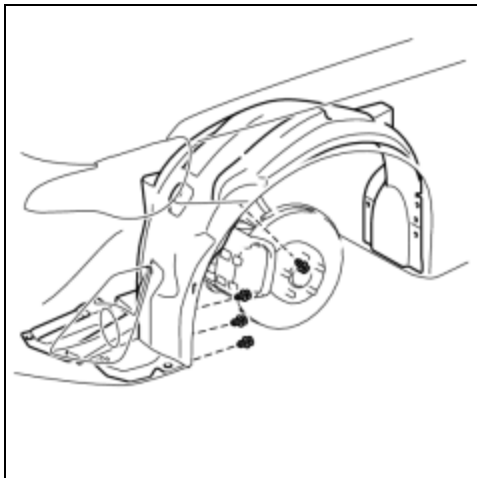
REMOVAL

HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. SEPARATE FRONT FENDER LINER

(a) Steer the front tire right most.



(b) Remove the 4 clips and partially remove the front fender liner.

2. REMOVE FRONT MARKER LIGHT ASSEMBLY

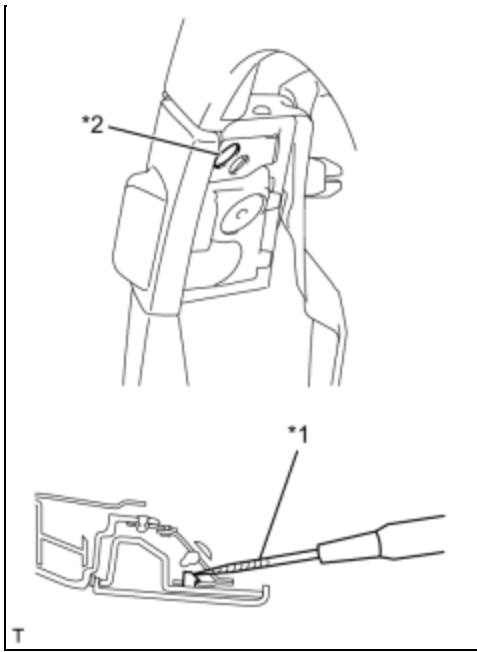
(a) Using a screwdriver wrapped with protective tape, disengage the claw from service hole.

Text in Illustration

*1	Protective Tape
*2	Service Hole

HINT:

Insert screwdriver on the level.

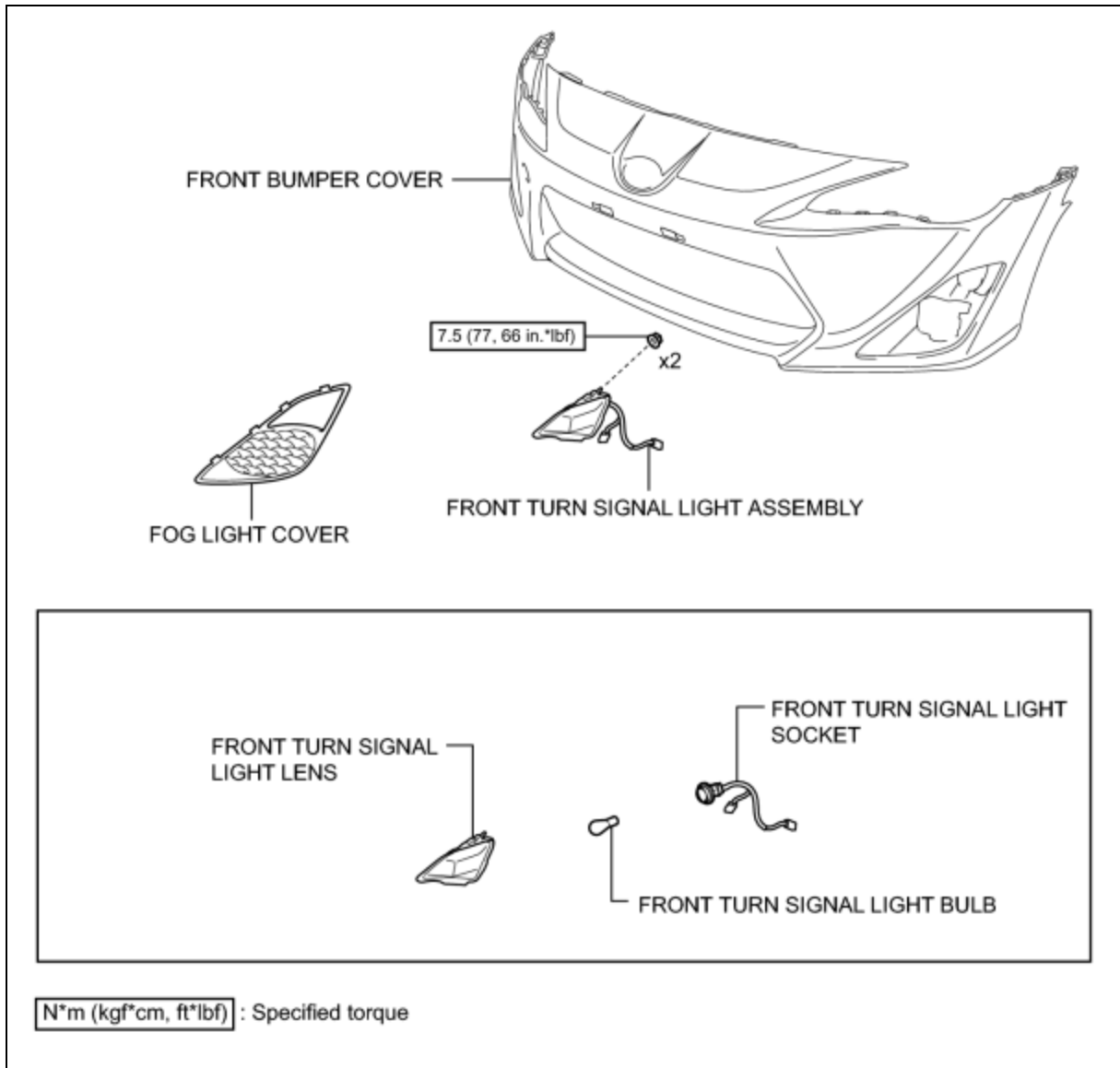


(b) Disconnect the connector to remove the front marker light assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000420900FX
Title: LIGHTING (EXT): FRONT TURN SIGNAL LIGHT ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



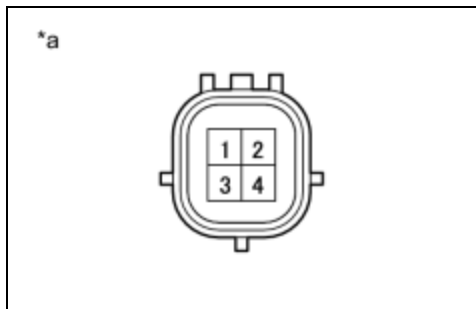
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XVR01AX
Title: LIGHTING (EXT): FRONT TURN SIGNAL LIGHT ASSEMBLY: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT FRONT TURN SIGNAL LIGHT SOCKET

(a) Measure the voltage according to the value(s) in the table below.

Standard:



CONDITION	SPECIFIED CONDITION
Battery positive (+) → 2 Battery negative (-) → 4	Clearance light comes on
Battery positive (+) → 1 Battery negative (-) → 4	Turn signal light comes on

Text in Illustration

*a	Component without harness connected (Front Turn Signal Light Socket)
----	---

If the result is not as specified, replace the bulb or the front turn signal light socket.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000420800HX
Title: LIGHTING (EXT): FRONT TURN SIGNAL LIGHT ASSEMBLY: INSTALLATION (2013 FR-S)		

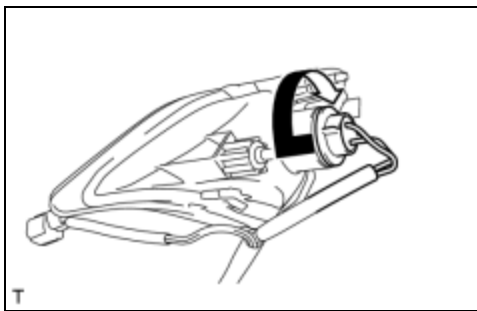
INSTALLATION

HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. INSTALL FRONT TURN SIGNAL LIGHT BULB

- (a) Install the front turn signal light bulb to the front turn signal light socket.



- (b) Turn the front turn signal light socket with the front turn signal light bulb in the direction indicated by the arrow shown in the illustration and install them as a unit.

2. INSTALL FRONT TURN SIGNAL LIGHT ASSEMBLY

- (a) Engage the 2 claws to install the front turn signal light assembly.
(b) Install the 2 nuts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

- (c) Connect the fog light connector.

3. INSTALL FOG LIGHT COVER INFO

4. INSTALL FRONT BUMPER COVER

INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000420A00HX
Title: LIGHTING (EXT): FRONT TURN SIGNAL LIGHT ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

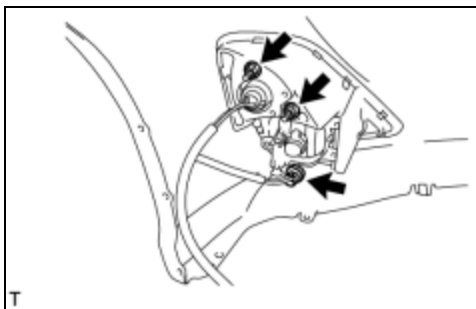
1. REMOVE FRONT BUMPER COVER

INFO

2. REMOVE FOG LIGHT COVER

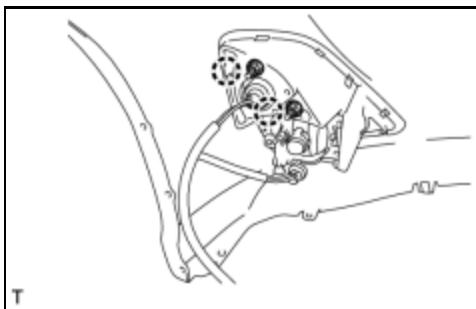
INFO

3. REMOVE FRONT TURN SIGNAL LIGHT ASSEMBLY



(a) Disconnect the fog light connector.

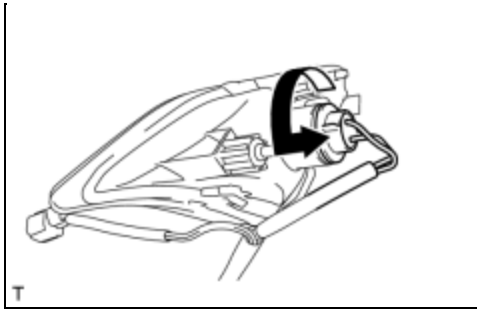
(b) Remove the 2 nuts.



(c) Disengage the 2 claws to remove the front turn signal light assembly.

4. REMOVE FRONT TURN SIGNAL LIGHT BULB

(a) Turn the front turn signal light socket with front turn signal light bulb in the direction indicated by the arrow



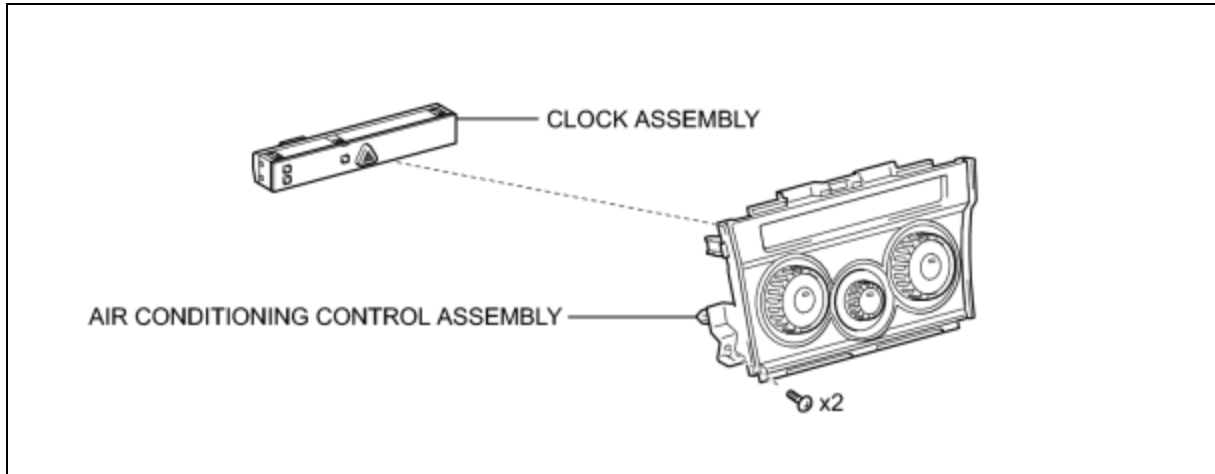
shown in the illustration, and remove them as a unit.

(b) Remove the front turn signal light bulb from the front turn signal light socket and wire.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000015XI01GX
Title: LIGHTING (EXT): HAZARD WARNING SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

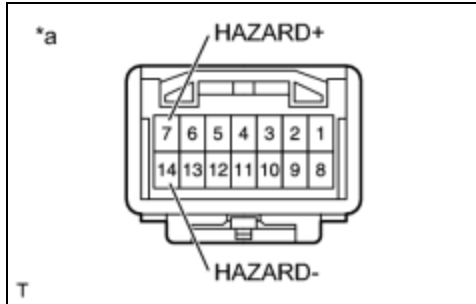
ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003QJV012X
Title: LIGHTING (EXT): HAZARD WARNING SWITCH: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT CLOCK ASSEMBLY



(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
7 (HAZARD+) - 14 (HAZARD-)	Hazard warning signal switch off	10 k Ω or higher
7 (HAZARD+) - 14 (HAZARD-)	Hazard warning signal switch on	Below 1 Ω

(b) Apply battery voltage to the connector and check the LED illumination condition.

OK:

CONDITION	SPECIFIED CONDITION
Battery positive (+) → 9 Battery negative (-) → 13	LED illuminates

Text in Illustration

*a	Component without harness connected (Clock Assembly)
----	---

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000014MX01SX
Title: LIGHTING (EXT): HAZARD WARNING SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL CLOCK ASSEMBLY

- (a) Engage the 4 claws to install the clock assembly.

2. INSTALL AIR CONDITIONING PANEL ASSEMBLY

INFO



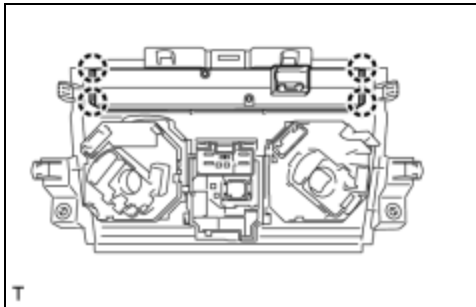
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000014MY01RX
Title: LIGHTING (EXT): HAZARD WARNING SWITCH: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE AIR CONDITIONING PANEL ASSEMBLY

INFO

2. REMOVE CLOCK ASSEMBLY



(a) Disengage the 4 claws to remove the clock assembly.

Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011MI07KX
Title: LIGHTING (EXT): HEADLIGHT ASSEMBLY: ADJUSTMENT (2013 FR-S)		

ADJUSTMENT

HINT:

It is possible that a bulb is incorrectly installed, affecting headlight aim. Bulb installation should be considered prior to performing the adjustment procedure.

1. PREPARE VEHICLE FOR HEADLIGHT AIM ADJUSTMENT

(a) Prepare the vehicle:

- Ensure there is no damage or deformation to the body around the headlights.
- Fill the fuel tank.
- Make sure that the oil is filled to the specified level.
- Make sure that the coolant is filled to the specified level.
- Inflate the tires to the appropriate pressure.
- Unload the trunk and vehicle, ensuring that the spare tire, tools and jack are in their original positions.
- Sit a person of average weight (68 kg, 150 lb) in the driver's seat.

2. PREPARE FOR HEADLIGHT AIMING (Using a headlight aim test machine)

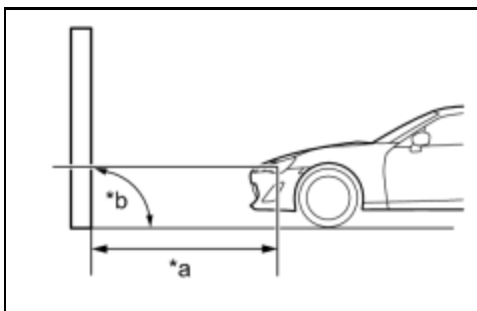
(a) Adjust the headlight aim in accordance with the headlight aim test machine instructions.

3. PREPARE FOR HEADLIGHT AIMING (Using a screen)

(a) Prepare the vehicle:

Text in illustration

*a	7.62 or 3 m (25 or 9.84 ft.)
*b	90°



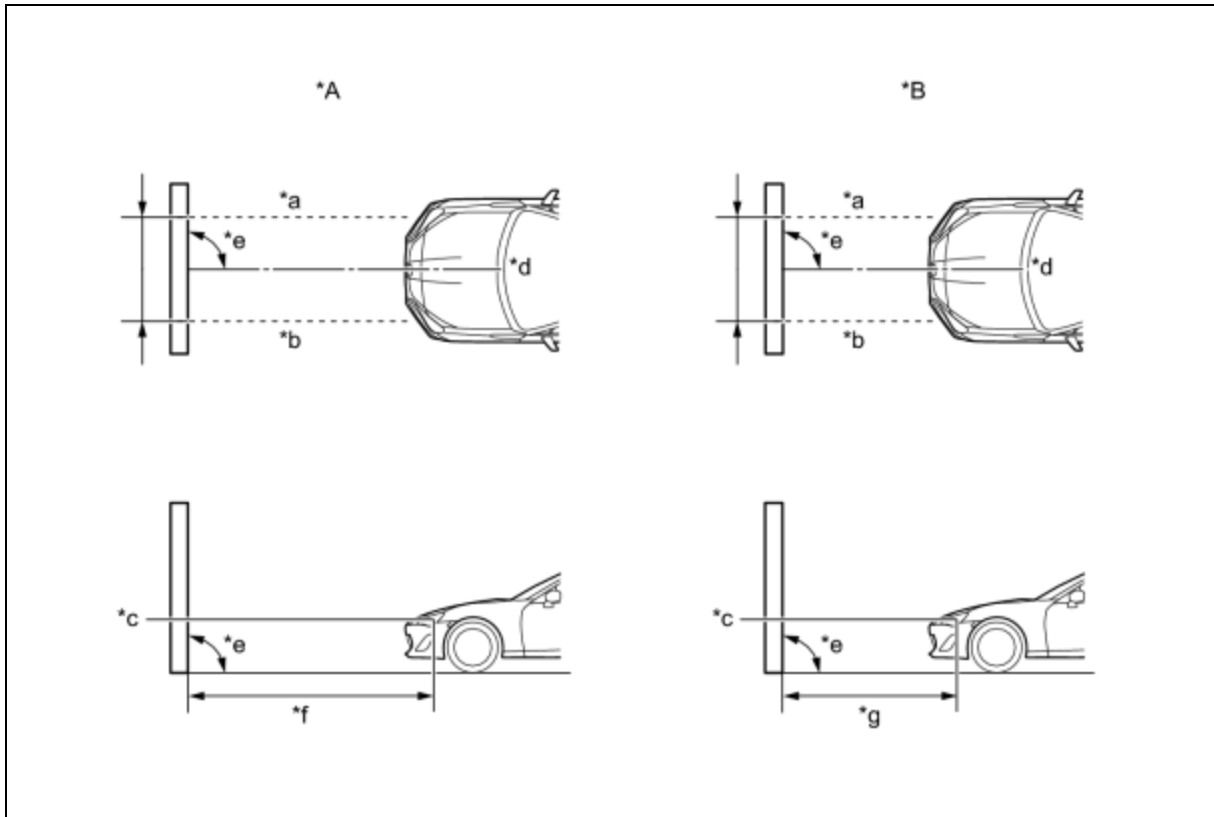
- Place the vehicle in a location that is dark enough to clearly observe the cutoff line. The cutoff line is a distinct line, below which light from the headlights can be observed and above which it cannot.
- Place the vehicle at a 90° angle to the wall.
- Create a 7.62 m (25 ft.) distance between the vehicle (headlight bulb center) and the wall.
- Make sure that the vehicle is on a level surface.
- Position the front wheels straight ahead.
- Bounce the vehicle up and down to settle the suspension.

NOTICE:

A distance of 7.62 m (25 ft.) between the vehicle (headlight bulb center) and the wall is necessary for proper aim adjustment. If sufficient space is not

available, secure a distance of exactly 3 m (9.84 ft.) to allow for checking and adjustment of headlight aim. (The size of the target zone will change with the distance, so follow the instructions in the illustration.)

- (b) Prepare a piece of thick white paper (approximately 2 m (6.6 ft.) (height) x 4 m (13.1 ft.) (width)) to use as a screen.
- (c) Draw a vertical line down the center of the screen (V line).
- (d) Set the screen as shown in the illustration.



Text in illustration

*A	Aligning distance 7.62 m (25 ft.)	*B	Aligning distance 3 m (9.84 ft.)
*a	V RH Line	*b	V LH Line
*c	H Line	*d	V Line
*e	90°	*f	7.62 m (25 ft.)
*g	3 m (9.84 ft.)	-	-

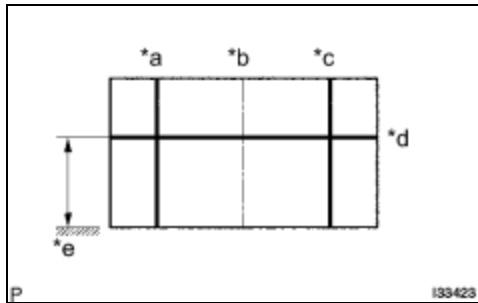
HINT:

- Stand the screen perpendicular to the ground.
- Align the V line on the screen with the center of the vehicle.

- (e) Draw base lines (H, V LH, and V RH lines) on the screen as shown in the illustration.

HINT:

- The base lines differ for "low beam inspection" and "high beam inspection".
- Mark the headlight bulb center marks on the screen. If the center mark cannot be observed on the headlight, use the center of the headlight bulb or the manufacturer's name marked on the headlight as the center mark.



(1) H Line (Headlight height):

Draw a horizontal line across the screen so that it passes through the center marks. The H line should be at the same height as the headlight bulb center marks of the low beam headlights.

(2) V LH Line, V RH Line (Center mark position of left-hand (LH) and right-hand (RH) headlights):

Draw 2 vertical lines so that they intersect the H line at each center mark (aligned with the center of the low beam headlight bulbs).

Text in illustration

*a	V LH Line
*b	V Line
*c	V RH Line
*d	H Line
*e	Ground

4. INSPECT HEADLIGHT AIMING

- (a) Cover the headlight or disconnect the connector of the headlight on the opposite side to prevent light from the headlight that is not being inspected from affecting the headlight aiming inspection.

NOTICE:

Do not keep the headlight covered for more than 3 minutes. The headlight lens is made of synthetic resin, which may melt or be damaged due to excessive heat.

HINT:

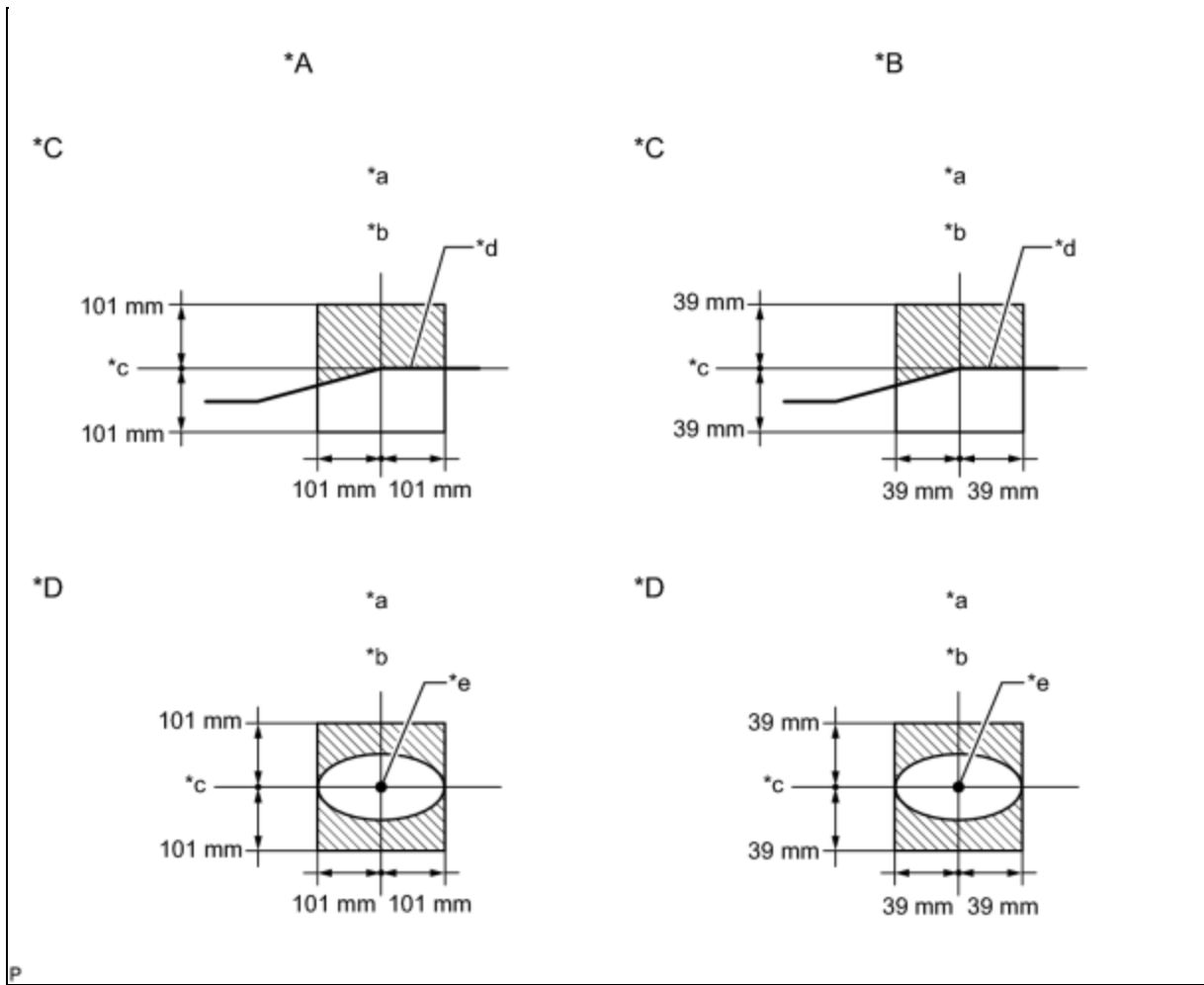
When checking the aim of the high beam, cover the low beam or disconnect the connector.

- (b) Start the engine.
 (c) Turn on the headlights and check the aiming of each beam.

HINT:

Preferred position for the low beam: Matches preferred cutoff line shown in the illustration

Preferred position for the high beam: Matches center of intensity shown in the illustration



Text in illustration

*A	Aligning distance 7.62 m (25 ft.)	*B	Aligning distance 3 m (9.84 ft.)
*C	Low Beam	*D	High Beam
*a	V LH Line	*b	V RH Line
*c	H Line	*d	Preferred Cutoff Line
*e	Center of Intensity	-	-

HINT:

- Since the low beam light and the high beam light are a unit, if the aim on the low beam is correct, the high beam should also be correct. However, check both beams just to make sure.
- If the alignment distance is 7.62 m (25 ft.):
 - The low beam cutoff line should be within 101 mm (3.97 in.) above or below the H line as well as 101 mm (3.97 in.) left or right of the V line (SAE J599).
- If the alignment distance is 3 m (9.84 ft.):
 - The low beam cutoff line should be within 39 mm (1.56 in.) above or below the H line as well as 39 mm (1.56 in.) left or right of the H line (SAE J599).
- If the alignment distance is 7.62 m (25 ft.):
 - The high beam center of intensity should be within 101 mm (3.97 in.) above or below the H line as well as 101 mm (3.97 in.) left or right of the V LH or V RH line (SAE J599).
- If the alignment distance is 3 m (9.84 ft.):

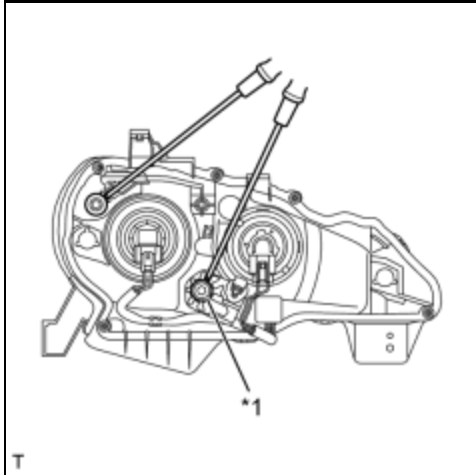
The high beam center of intensity should be within 39 mm (1.56 in.) above or below the H line as well as 39 mm (1.56 in.) left or right of the V LH or V RH line (SAE J599).

5. ADJUST HEADLIGHT AIMING

(a) Remove any covers necessary to access the headlight adjusters.

(b) Adjust the aim vertically:

Adjust the aim of each headlight to the specified range by turning each aiming screw with a screwdriver.



Text in Illustration

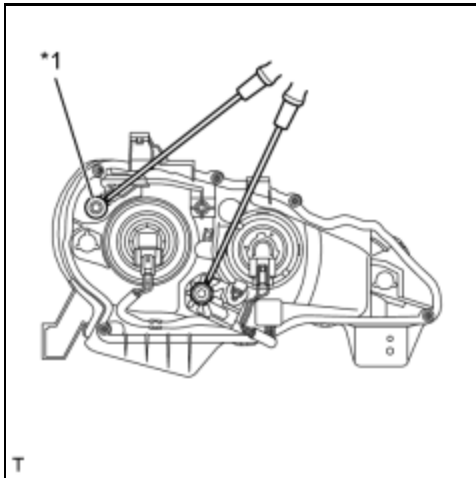
*1	Aiming Screw A
----	----------------

NOTICE:

- The high beam light and low beam light aim move in the diagonal direction when aiming screw A is turned. Remember the turning direction and the number of turns of aiming screw A to correct the horizontal position in the next step.
- The final turn of the aiming screw should be made in the clockwise direction. If the screw is tightened excessively, loosen it and then retighten it, so that the final turn of the screw is in the clockwise direction.

(c) Turn aiming screw B the same number of turns and in the same direction as aiming screw A.

Text in Illustration



*1	Aiming Screw B
----	----------------

NOTICE:

The final turn of the aiming screw should be made in the clockwise direction. If the screw is tightened excessively, loosen it and then retighten it, so that the final turn of the screw is in the clockwise direction.

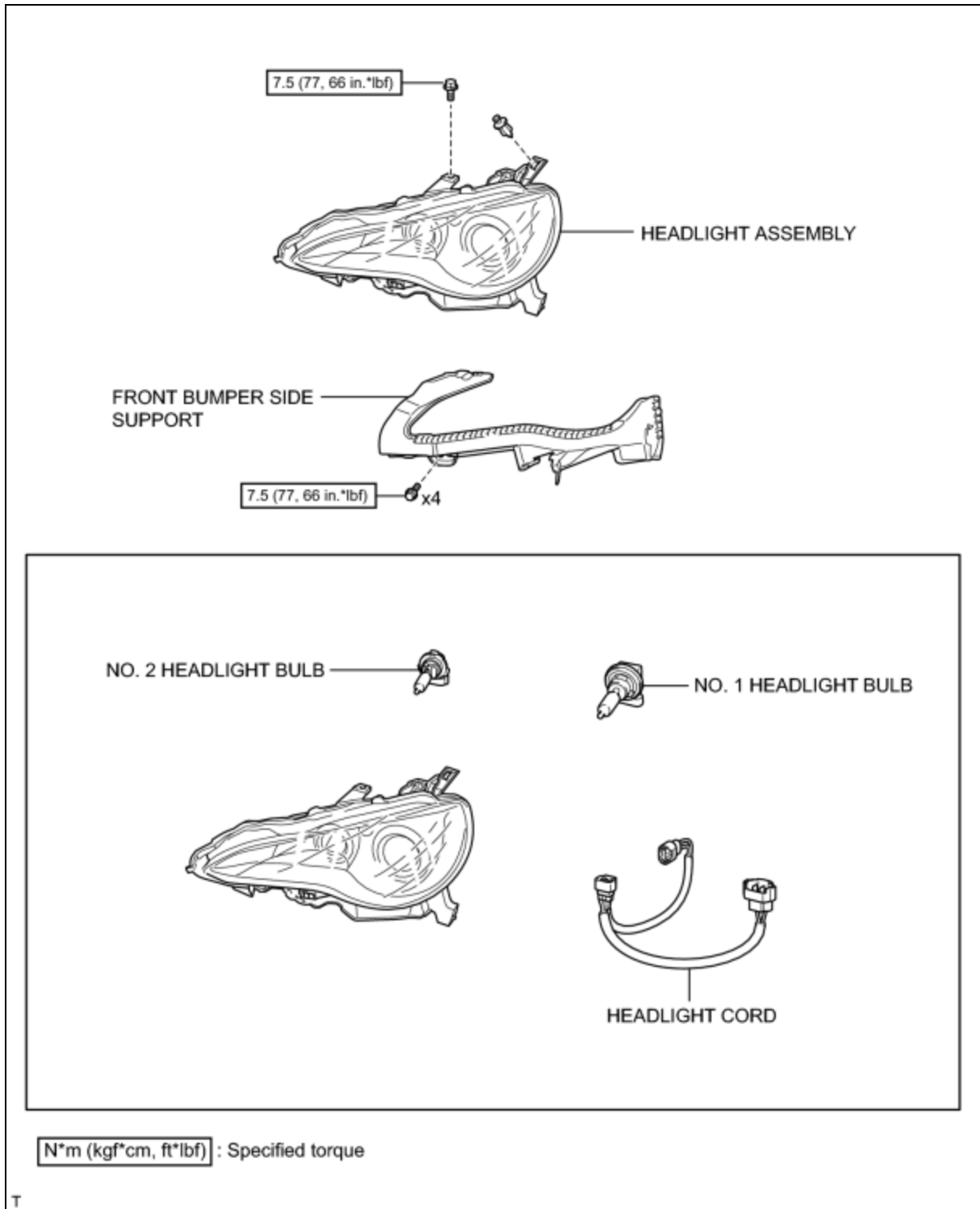
HINT:

- The low beam light and the high beam light are a unit. Adjusting the aim on the low beam to the correct position should also result in the high beam adjustment being correct.
- If it is not possible to correctly adjust headlight aim, check bulb, headlight unit, and headlight unit reflector installation.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001QBR02FX
Title: LIGHTING (EXT): HEADLIGHT ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



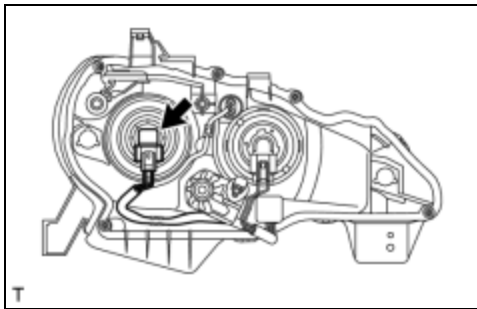
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001QBT02WX
Title: LIGHTING (EXT): HEADLIGHT ASSEMBLY: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

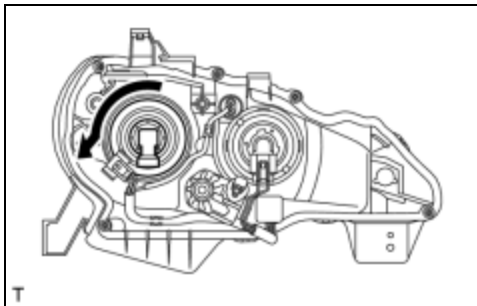
HINT:

- Use the same procedure for RH and LH sides.
- The procedure listed below is for LH side.

1. REMOVE NO. 1 HEADLIGHT BULB



(a) Disconnect the connector.

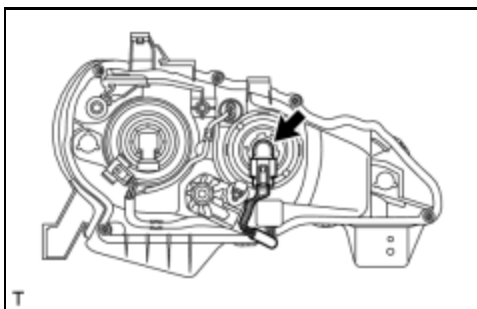


(b) Turn the No. 1 headlight bulb in the direction indicated by the arrow shown in the illustration, and remove it.

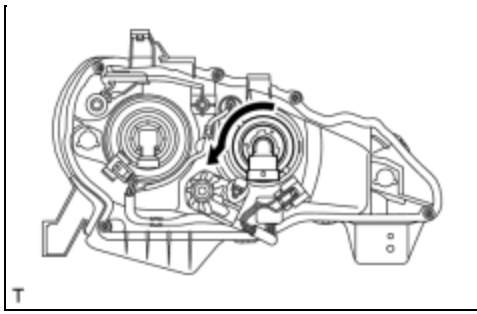
NOTICE:

Do not touch the bulb glass.

2. REMOVE NO. 2 HEADLIGHT BULB



(a) Disconnect the connector.

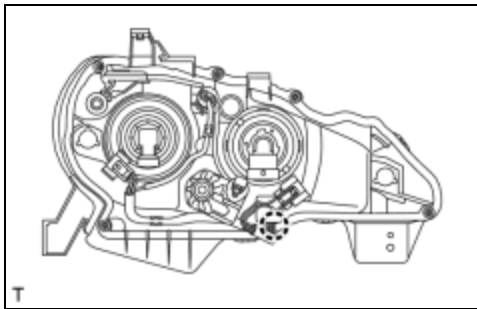


(b) Turn the No. 2 headlight bulb in the direction indicated by the arrow shown in the illustration, and remove it.

NOTICE:

Do not touch the bulb glass.

3. REMOVE HEADLIGHT CORD



(a) Disengage the claw to remove the headlight cord.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001QBQ03LX
Title: LIGHTING (EXT): HEADLIGHT ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for RH and LH sides.
- The procedure listed below is for LH side.

1. INSTALL HEADLIGHT ASSEMBLY

- (a) Engage the clamp.
- (b) Install the headlight assembly with the bolt.
Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)
- (c) Install the clip.
- (d) Connect each connector.

2. INSTALL FRONT BUMPER SIDE SUPPORT

- (a) Install the front bumper side support LH with the 3 bolts B.
Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)
- (b) Install the bolt A.
Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)
- (c) Engage the 2 clamps to connect the wire harness.

3. INSTALL FRONT BUMPER COVER

INFO

4. PREPARE VEHICLE FOR HEADLIGHT AIM ADJUSTMENT

INFO

5. PREPARE FOR HEADLIGHT AIMING (Using a headlight aim test machine)

INFO

6. PREPARE FOR HEADLIGHT AIMING (Using a screen)

INFO

7. INSPECT HEADLIGHT AIMING

INFO

8. ADJUST HEADLIGHT AIMING

INFO

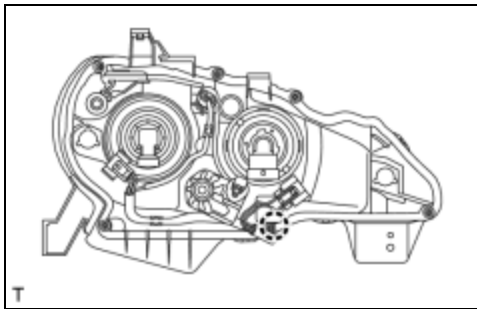
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001QBU02WX
Title: LIGHTING (EXT): HEADLIGHT ASSEMBLY: REASSEMBLY (2013 FR-S)		

REASSEMBLY

HINT:

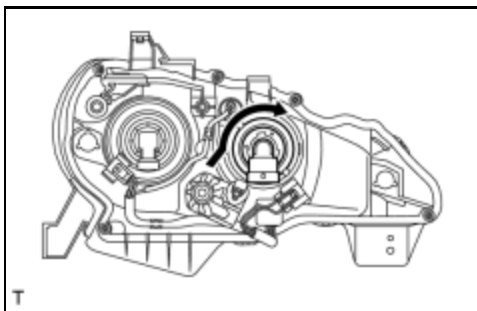
- Use the same procedure for RH and LH sides.
- The procedure listed below is for LH side.

1. INSTALL HEADLIGHT CORD



(a) Engage the claw to install the headlight cord.

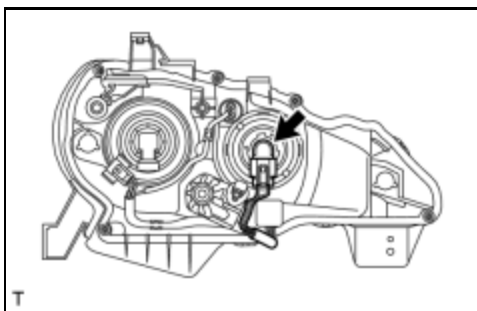
2. INSTALL NO. 2 HEADLIGHT BULB



(a) Turn the No. 2 headlight bulb in the direction indicated by the arrow shown in the illustration to install it.

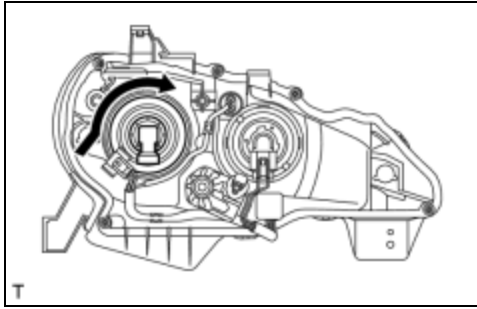
NOTICE:

Do not touch the bulb glass.



(b) Connect the connector.

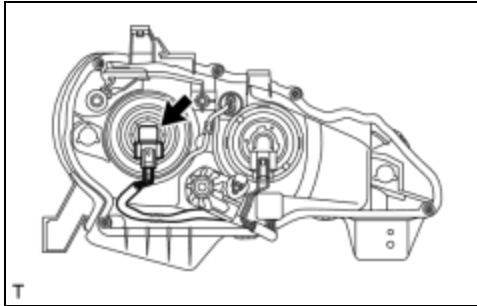
3. INSTALL NO. 1 HEADLIGHT BULB



(a) Turn the No. 1 headlight bulb in the direction indicated by the arrow shown in the illustration to install it.

NOTICE:

Do not touch the bulb glass.



(b) Connect the connector.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001QBS031X
Title: LIGHTING (EXT): HEADLIGHT ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

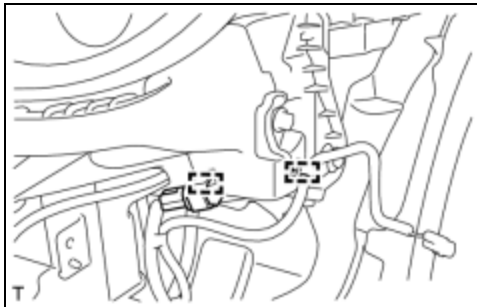
HINT:

- Use the same procedure for RH and LH sides.
- The procedure listed below is for LH side.

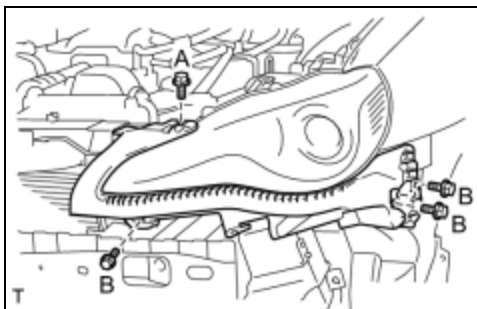
1. REMOVE FRONT BUMPER COVER

INFO

2. REMOVE FRONT BUMPER SIDE SUPPORT



(a) Disengage the 2 clamps to disconnect the wire harness.



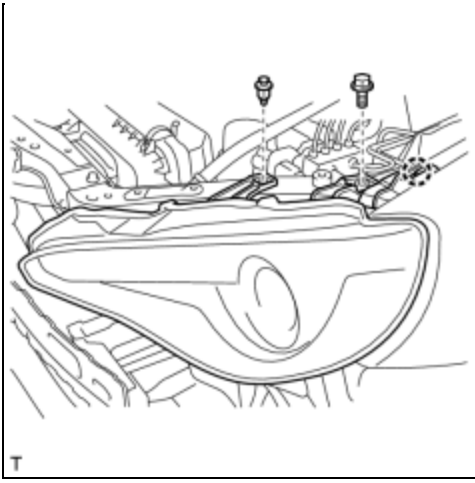
(b) Remove the bolt A.

(c) Remove the 3 bolts B and the front bumper side support.

3. REMOVE HEADLIGHT ASSEMBLY

(a) Disconnect each connector.

(b) Remove the clip.



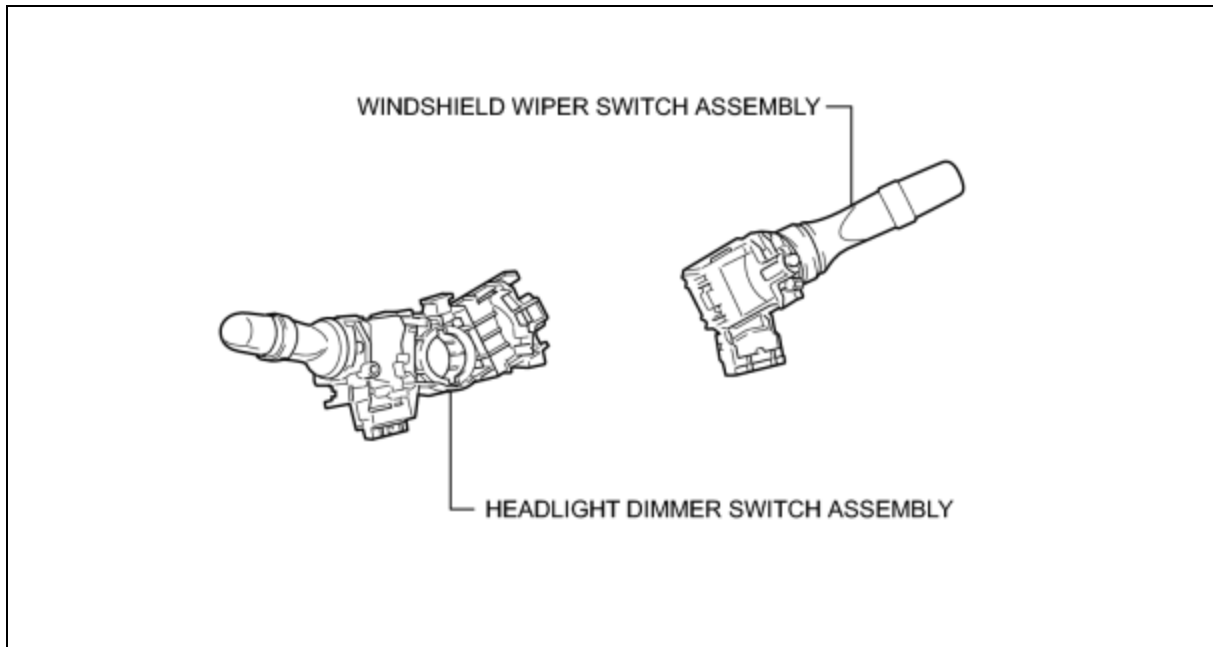
(c) Remove the bolt.

(d) Disengage the claw to remove the headlight assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MW101LX
Title: LIGHTING (EXT): HEADLIGHT DIMMER SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000202H02DX
Title: LIGHTING (EXT): HEADLIGHT DIMMER SWITCH: INSPECTION (2013 FR-S)		

INSPECTION

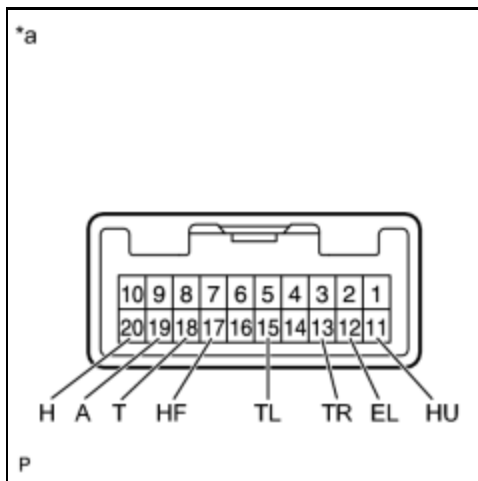
1. INSPECT HEADLIGHT DIMMER SWITCH ASSEMBLY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Light Control Switch

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
19 (A) - 12 (EL)	Light control switch off	10 k Ω or higher
20 (H) - 12 (EL)		10 k Ω or higher
19 (A) - 12 (EL)		10 k Ω or higher
18 (T) - 12 (EL)	Light control switch in tail position	Below 1 Ω
18 (T) - 12 (EL)	Light control switch in head position	Below 1 Ω
20 (H) - 12 (EL)		Below 1 Ω



Dimmer Switch

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
11 (HU) - 12 (EL)	Dimmer switch in high position	Below 1 Ω
11 (HU) - 12 (EL)	Dimmer switch in high flasher position	Below 1 Ω
17 (HF) - 12 (EL)		Below 1 Ω

Turn Signal Switch

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
13 (TR) - 12 (EL)	Right turn	Below 1 Ω
13 (TR) - 12 (EL)	Neutral	10 k Ω or higher

15 (TL) - 12 (EL)		10 k Ω or higher
15 (TL) - 12 (EL)	Left turn	Below 1 Ω

Text in Illustration

*a	Component without harness connected (Headlight Dimmer Switch Assembly)
----	---

If the result is not as specified, replace the headlight dimmer switch assembly.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000202H02DX
Title: LIGHTING (EXT): HEADLIGHT DIMMER SWITCH: INSPECTION (2013 FR-S)		

INSPECTION

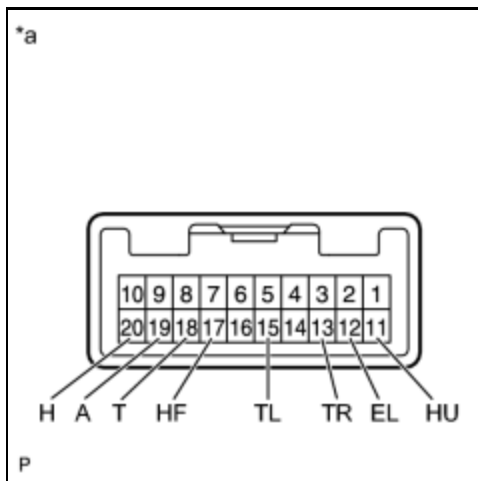
1. INSPECT HEADLIGHT DIMMER SWITCH ASSEMBLY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Light Control Switch

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
19 (A) - 12 (EL)	Light control switch off	10 k Ω or higher
20 (H) - 12 (EL)		10 k Ω or higher
19 (A) - 12 (EL)		10 k Ω or higher
18 (T) - 12 (EL)	Light control switch in tail position	Below 1 Ω
18 (T) - 12 (EL)	Light control switch in head position	Below 1 Ω
20 (H) - 12 (EL)		Below 1 Ω



Dimmer Switch

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
11 (HU) - 12 (EL)	Dimmer switch in high position	Below 1 Ω
11 (HU) - 12 (EL)	Dimmer switch in high flasher position	Below 1 Ω
17 (HF) - 12 (EL)		Below 1 Ω

Turn Signal Switch

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
13 (TR) - 12 (EL)	Right turn	Below 1 Ω
13 (TR) - 12 (EL)	Neutral	10 k Ω or higher

15 (TL) - 12 (EL)		10 k Ω or higher
15 (TL) - 12 (EL)	Left turn	Below 1 Ω

Text in Illustration

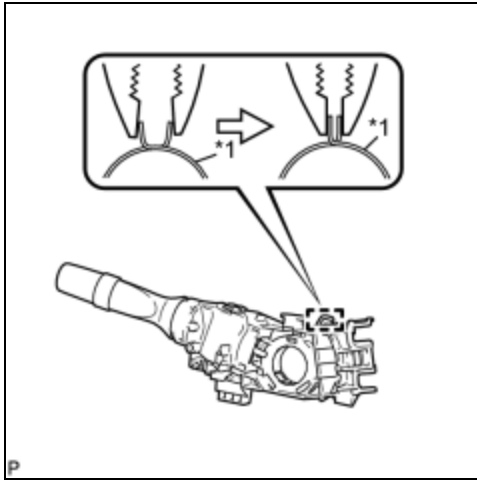
*a	Component without harness connected (Headlight Dimmer Switch Assembly)
----	---

If the result is not as specified, replace the headlight dimmer switch assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001QCP03AX
Title: LIGHTING (EXT): HEADLIGHT DIMMER SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

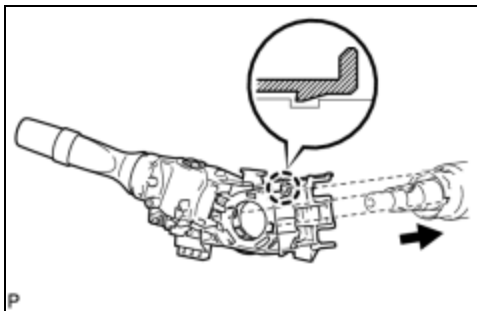
1. INSTALL HEADLIGHT DIMMER SWITCH ASSEMBLY



(a) Using pliers, expand the clamp as shown in the illustration.

Text in Illustration

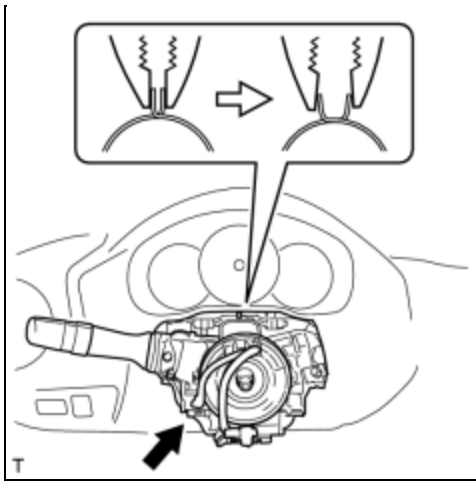
*1	Clamp
----	-------



(b) While holding the clamp expanded, install the headlight dimmer switch assembly as shown in the illustration.

(c) Engage the claw.

(d) Release the clamp to install the headlight dimmer switch assembly.



(e) Connect the connector.

2. INSTALL WINDSHIELD WIPER SWITCH ASSEMBLY [INFO](#)

3. INSTALL SPIRAL CABLE WITH SENSOR SUB-ASSEMBLY

[INFO](#)



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001QCR03AX
Title: LIGHTING (EXT): HEADLIGHT DIMMER SWITCH: REMOVAL (2013 FR-S)		

REMOVAL

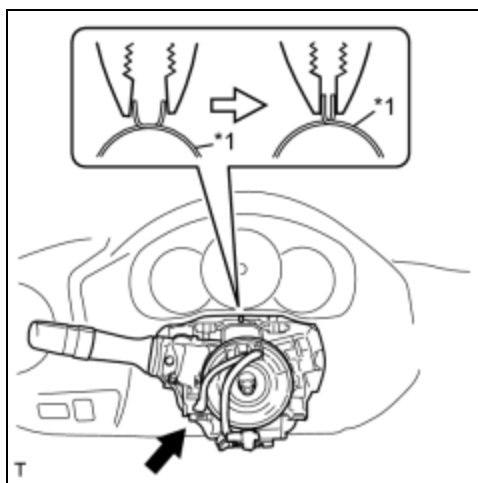
1. REMOVE SPIRAL CABLE WITH SENSOR SUB-ASSEMBLY

INFO

2. REMOVE WINDSHIELD WIPER SWITCH ASSEMBLY

INFO

3. REMOVE HEADLIGHT DIMMER SWITCH ASSEMBLY

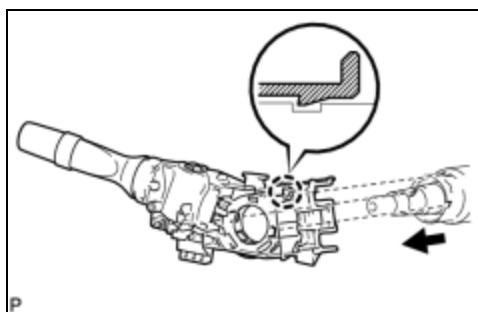


(a) Disconnect the connector.

(b) Using pliers, expand the clamp as shown in the illustration.

Text in Illustration

*1	Clamp
----	-------

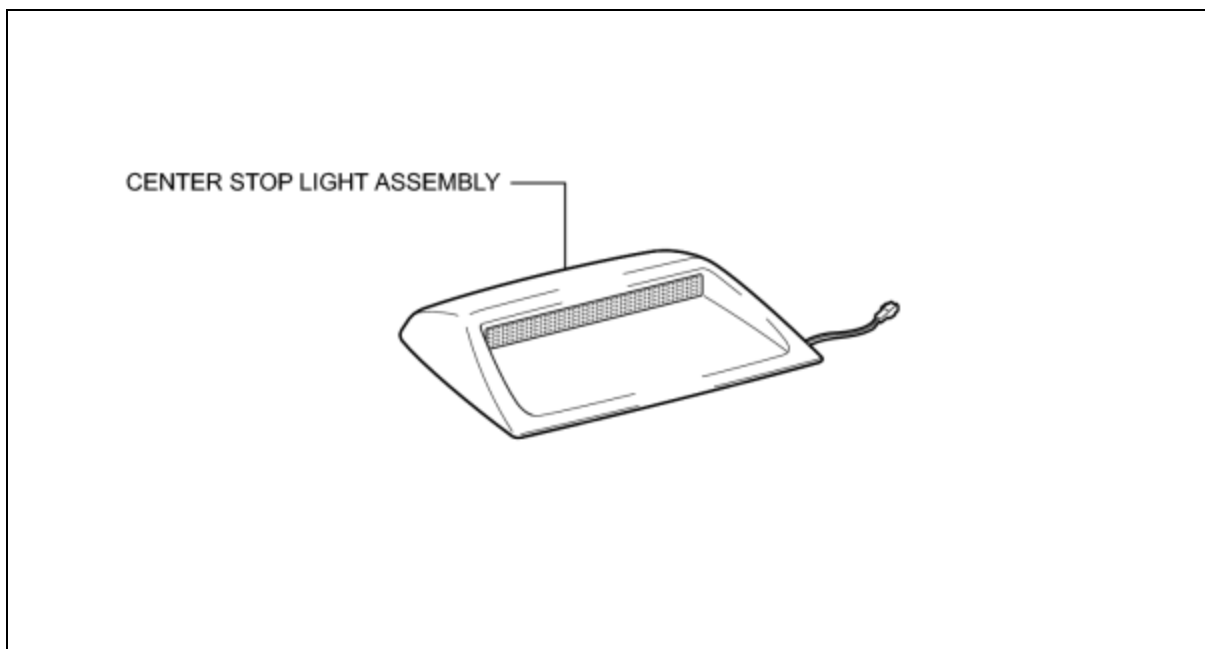


(c) While holding the clamp expanded, disengage the claw and remove the headlight dimmer switch assembly as shown in the illustration.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MVY01LX
Title: LIGHTING (EXT): HIGH MOUNTED STOP LIGHT ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



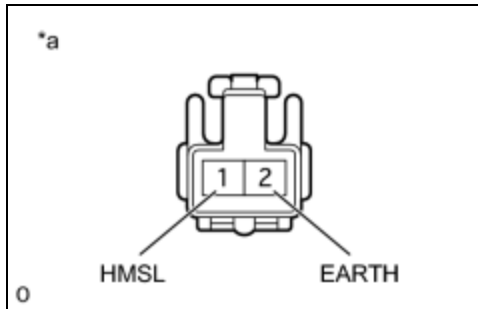
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001UX703KX
Title: LIGHTING (EXT): HIGH MOUNTED STOP LIGHT ASSEMBLY: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT CENTER STOP LIGHT ASSEMBLY

(a) Apply battery voltage to the connector and check the center stop light comes on.

OK:



CONDITION	SPECIFIED CONDITION
Battery positive (+) → 1 (HMSEL) Battery negative (-) → 2 (EARTH)	Center stop light comes on

Text in Illustration

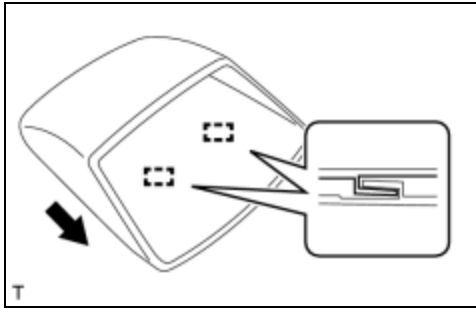
*a	Component without harness connected (Center Stop Light Assembly)
----	---

If the result is not as specified, replace the center stop light assembly.

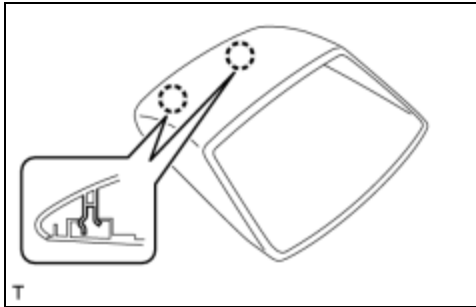
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002PLM022X
Title: LIGHTING (EXT): HIGH MOUNTED STOP LIGHT ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL CENTER STOP LIGHT ASSEMBLY



(a) Slide the center stop light assembly directions shown by the arrows in the illustration to engage the 2 guides.



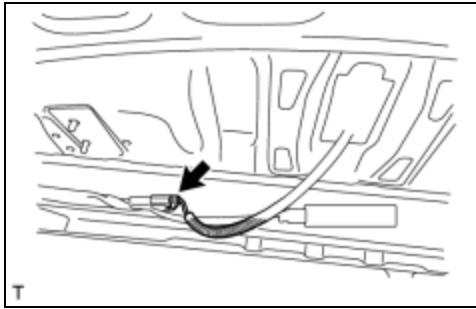
(b) Engage the 2 claws to install the center stop light assembly.

(c) Connect the connector.

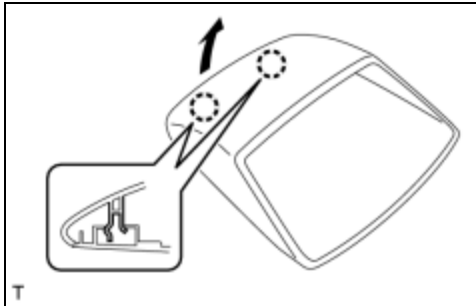
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002PLO01VX
Title: LIGHTING (EXT): HIGH MOUNTED STOP LIGHT ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

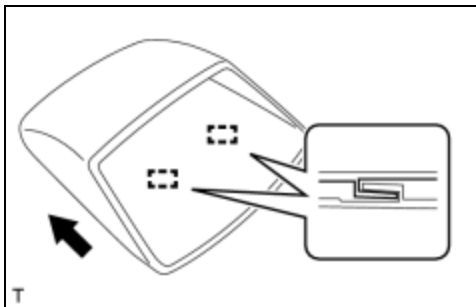
1. REMOVE CENTER STOP LIGHT ASSEMBLY



(a) Disconnect the connector.



(b) Pull the center stop light assembly directions shown by the arrow in the illustration to disengage the 2 claws.

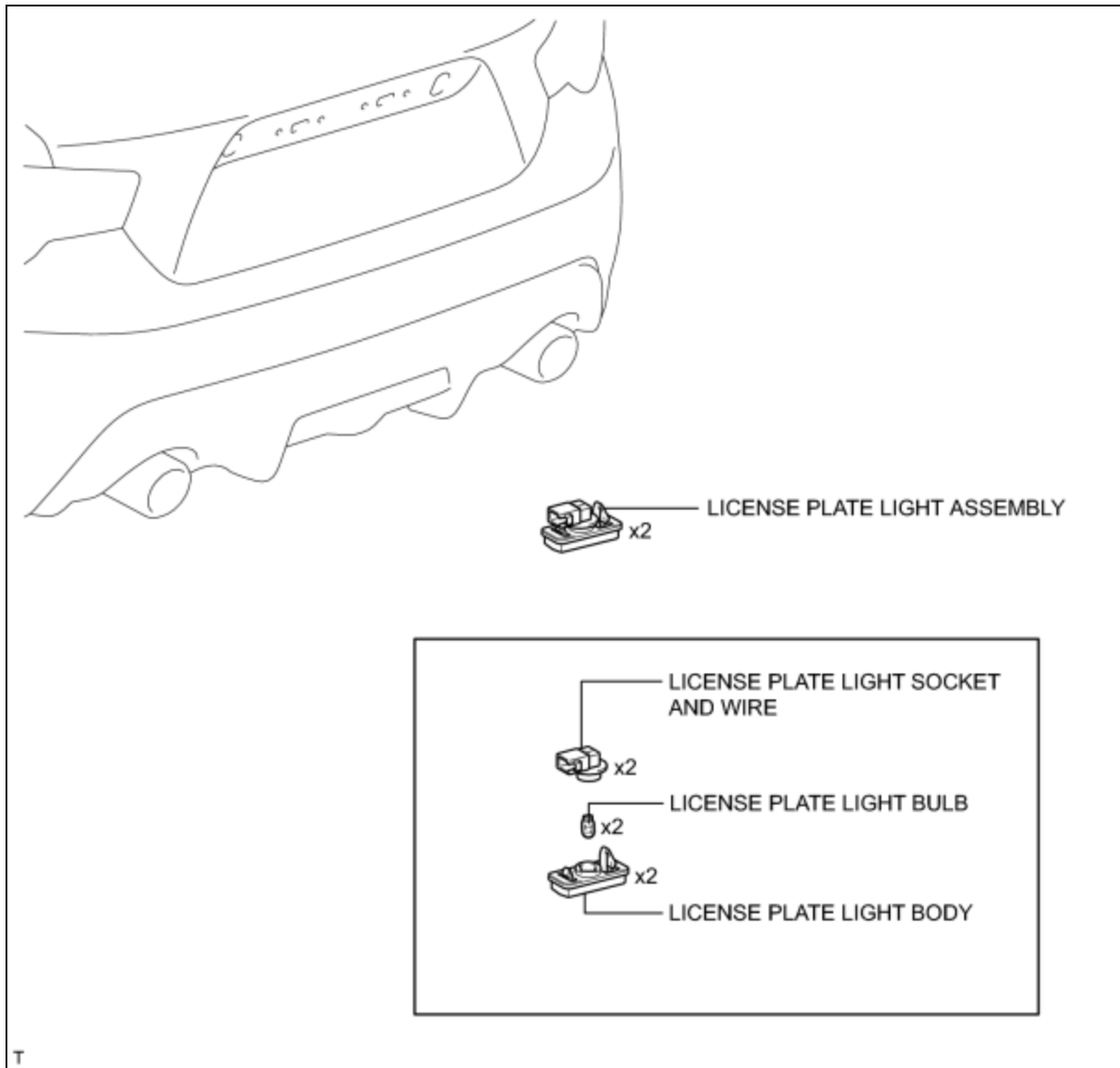


(c) Slide the center stop light assembly directions shown by the arrow in the illustration to disengage the 2 guides and remove it.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003B3400FX
Title: LIGHTING (EXT): LICENSE PLATE LIGHT ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



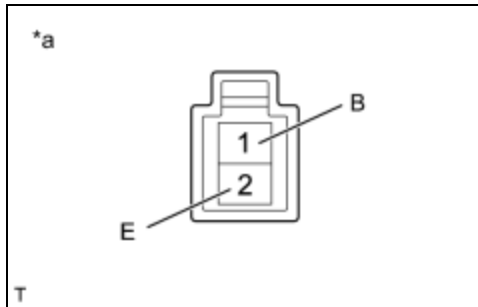
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003FVZ007X
Title: LIGHTING (EXT): LICENSE PLATE LIGHT ASSEMBLY: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT LICENSE PLATE LIGHT ASSEMBLY

(a) Apply battery voltage to the connector and check the light comes on.

OK:



CONDITION	SPECIFIED CONDITION
Battery positive (+) → 1 (B) Battery negative (-) → 2 (E)	License plate light comes on.

Text in illustration

*a	Component without harness connected (License Plate Light Assembly)
----	---

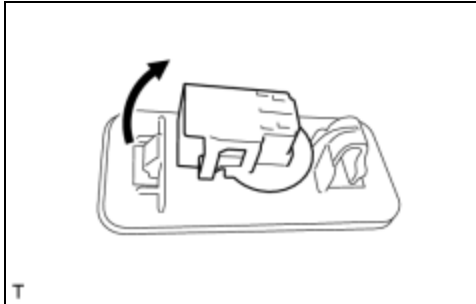
If the result is not specified, replace the license plate light bulb or the license plate light assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003B3200GX
Title: LIGHTING (EXT): LICENSE PLATE LIGHT ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL LICENSE PLATE LIGHT BULB

- (a) Install the license plate light bulb to the license plate light socket and wire.



- (b) Turn the license plate light socket and wire with the license plate light bulb in the direction indicated by the arrow shown in the illustration and install them as a unit.

HINT:

Use the same procedure as for the other side.

2. INSTALL LICENSE PLATE LIGHT ASSEMBLY

- (a) Engage the 2 claws to install the license plate light assembly.
(b) Connect the connector.

HINT:

Use the same procedure as for the other side.

3. INSTALL LUGGAGE COMPARTMENT DOOR OUTSIDE GARNISH SUB-ASSEMBLY

INFO

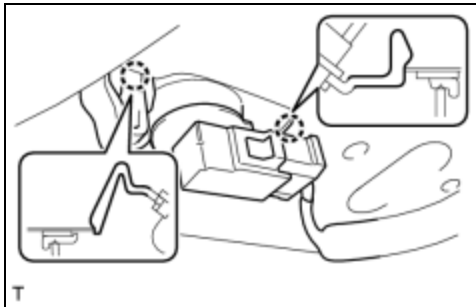
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003B3500GX
Title: LIGHTING (EXT): LICENSE PLATE LIGHT ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE LUGGAGE COMPARTMENT DOOR OUTSIDE GARNISH SUB-ASSEMBLY

INFO

2. REMOVE LICENSE PLATE LIGHT ASSEMBLY



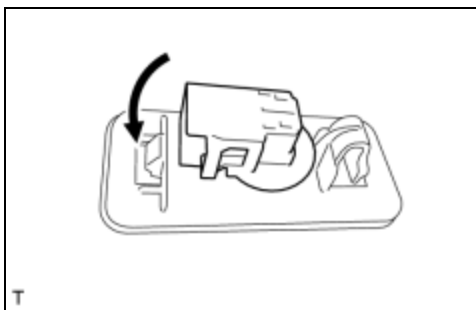
(a) Disconnect the connector.

(b) Disengage the 2 claws to remove the license plate light assembly.

HINT:

Use the same procedure as for the other side.

3. REMOVE LICENSE PLATE LIGHT BULB



(a) Turn the license plate light socket and wire with the license plate light bulb in the direction indicated by the arrow shown in the illustration to remove them as a unit.

(b) Remove the license plate light bulb from the license plate light socket and wire.

HINT:

Use the same procedure as for the other side.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004NUM00RX
Title: LIGHTING (EXT): LIGHTING SYSTEM: CUSTOMIZE PARAMETERS (2013 FR-S)		

CUSTOMIZE PARAMETERS

1. CUSTOMIZE LIGHTING SYSTEM (EXT)

HINT:

The following items can be customized.

NOTICE:

- When the customer requests a change in a function, first make sure that the function can be customized.
- Be sure to make a note of the current settings before customizing.
- When troubleshooting a function, first make sure that the function is set to the default setting.

(a) Customizing with the Techstream

- (1) Connect the Techstream to the DLC3.
- (2) Turn the ignition switch to ON.
- (3) Turn the Techstream on.
- (4) Enter the following menus: Body Electrical / Main Body / Utility / Customize / Light Control.
- (5) Select the setting by referring to the table below.

Light Control

DISPLAY	DEFAULT	CONTENT	SETTING	RELEVANT ECU
Response Time	Normal	Changes the delay timing of lighting the taillights when going into a tunnel when the light control switch is in the AUTO position.	Normal or Long	Main Body ECU (Network Gateway ECU)
Light Auto OFF Delay	30 s	Keeps the headlights on for a certain period of time after turning the ignition switch off and closing all doors with the low beam headlights on.	OFF, 30 s, 60 s or 90 s	
DRL Function	ON	ON/OFF of the DRL function	ON or OFF	
Follow Me Home Lighting Time	30 s	Changes the low beam headlight lighting time when ignition switch is off and dimmer switch is pulled to flash headlights once.	30 s, 60 s, 90s, or 120s	

HINT:

Items for which there are no settings do not appear on the Techstream, or do not operate.

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PKVOAVX
Title: LIGHTING (EXT): LIGHTING SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuator and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Main Body / Data List.
- Read the Data List according to the display on the Techstream.

Main Body

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
IG SW	Ignition switch ON signal / ON or OFF	ON: Ignition switch ON OFF: Ignition switch off	-
ACC SW	Ignition switch ACC signal / ON or OFF	ON: Ignition switch ACC OFF: Ignition switch off	-
Dimmer SW	Dimmer switch high position signal / ON or OFF	ON: Dimmer switch in high or high flash position OFF: Dimmer switch in low position	-
Passing Light SW	Dimmer switch high flash position (pass) signal / ON or OFF	ON: Dimmer switch in high flash position OFF: Dimmer switch not in high flash position	-
Lighting 1	Light control switch tail position signal / ON or OFF	ON: Light control switch in tail or head position OFF: Light control switch in neither tail nor head position	-
Lighting 2	Light control switch head position signal / ON or	ON: Light control switch in head position OFF: Light control	-

	OFF	switch not in head position	
Lighting Hi	Light control switch head (Hi) position signal / ON or OFF	ON: Headlight high beam on OFF: Normal	-
Rear Fog Light SW	Rear fog light switch signal / ON or OFF	ON: Rear fog light switch on OFF: Rear fog light switch off	-
Front Fog Light SW	Front fog light switch signal / ON or OFF	ON: Front fog light switch on OFF: Front fog light switch off	-
Rear Fog Lamp Output	Rear fog light output / ON or OFF	ON: Rear fog light on OFF: Rear fog light off	-
Rear Fog Lamp Monitor	Rear fog light output / ON or OFF	ON: Rear fog light on OFF: Rear fog light off	-
Front Fog Light Output	Front fog light output / ON or OFF	ON: Front fog light on OFF: Front fog light off	-
Auto Light SW	Light control switch AUTO position signal / ON or OFF	ON: Light control switch in AUTO position OFF: Light control switch not in AUTO position	-
Head Light SW (Head)	Light control switch head position signal / ON or OFF	ON: Light control switch in head position OFF: Light control switch not in head position	-
Head Light SW (Tail)	Light control switch tail position signal / ON or OFF	ON: Light control switch in tail or head position OFF: Light control switch in neither tail nor head position	-
D Door Courtesy SW	Driver side door courtesy light switch signal / ON or OFF	ON: Driver side door open OFF: Driver side door closed	-
Response Time	Delay timing of lighting the taillights when the automatic light control sensor detects brightness change / Normal or Long	Customize setting displayed	-
Illumination Rate Info	Illumination rate information / 0.00 ms. to 2162.65 ms.	Value is output according to ambient light levels	-
Sensitivity	Sensitivity of the automatic light control system / Light2, Light1, Normal, Dark1 or Dark2	Customize setting displayed	-

DRL Function	DRL function / ON or OFF	Customize setting displayed	-
DRL Cancel SW	DRL cancel switch / ON or OFF	ON: DRL cancel OFF: Normal	-
DRL Output	DRL output / ON or OFF	ON: DRL output OFF: Normal	-
Light Auto OFF Delay	Light auto OFF delay / Off, 30 s, 60 s or 90 s	Customize setting displayed	-
Follow Me Home Lighting Time	Changes the lighting time of the follow me home system / 30 s, 60 s, 90s, or 120s	Customize setting displayed	-

HINT:

Items for which there are no settings do not appear on the Techstream, or do not operate.

2. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Active Test.
- (e) Perform the Active Test according to the display on the Techstream.

Main Body

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Daytime Running Light	Daytime running lights	ON/OFF	-
Taillight Relay	Taillight relay	ON/OFF	-
Headlight Relay	Headlight relay	ON/OFF	-
Headlight Hi	Headlight (high beam headlights)	ON/OFF	-
Front Fog Light Relay	Front fog light relay	ON/OFF	-
Rear Fog Light Relay	Rear fog light relay	ON/OFF	-

HINT:

Items for which there are no settings do not appear on the Techstream, or do not operate.


Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PKS08HX
Title: LIGHTING (EXT): LIGHTING SYSTEM: DIAGNOSIS SYSTEM (2013 FR-S)		

DIAGNOSIS SYSTEM

1. DESCRIPTION

- (a) Lighting system data and the Diagnostic Trouble Codes (DTCs) can be read from the Data Link Connector 3 (DLC3) of the vehicle. When the system seems to be malfunctioning, use the Techstream to check for malfunctions and to repair it.

2. CHECK DLC3

- (a) Check the DLC3  .

3. INSPECT BATTERY VOLTAGE

- (a) Measure the battery voltage with the ignition switch off.

Standard Voltage:

11 to 14 V

If the voltage is below 11 V, recharge or replace the battery.



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PKT06BX
Title: LIGHTING (EXT): LIGHTING SYSTEM: DTC CHECK / CLEAR (2013 FR-S)		

DTC CHECK / CLEAR

1. CHECK DTC

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Trouble Codes.
- (e) Check for DTCs.

2. CLEAR DTC

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Trouble Codes.
- (e) Clear the DTCs.

Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011M307RX
Title: LIGHTING (EXT): LIGHTING SYSTEM: Headlight Dimmer Switch Circuit (2013 FR-S)		

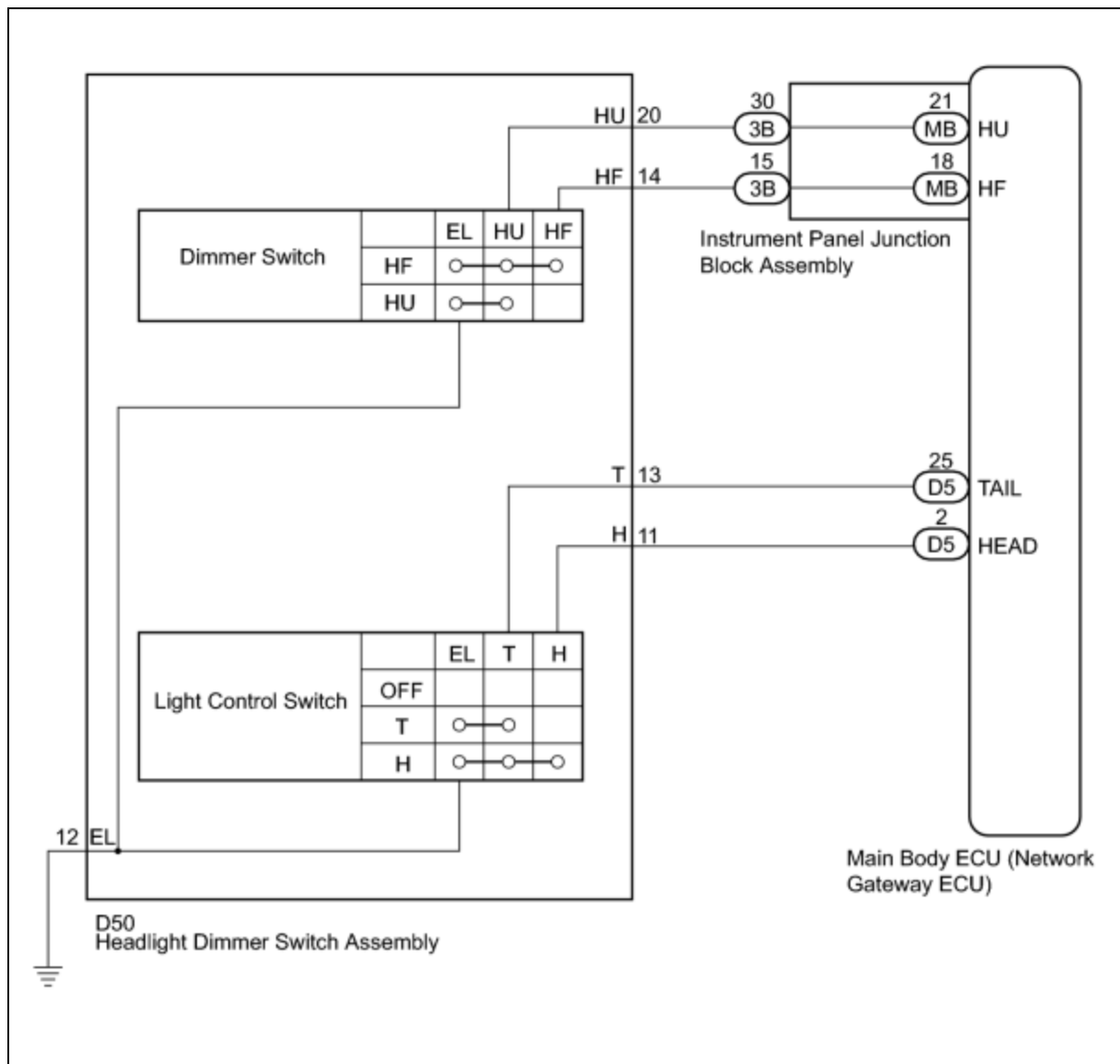
Headlight Dimmer Switch Circuit

DESCRIPTION

The main body ECU (network gateway ECU) receives the following switch information:

- Light control switch is in off, tail or head position
- Headlight dimmer switch is in high, low or high flash position

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	READ VALUE USING TECHSTREAM (HEADLIGHT DIMMER SWITCH ASSEMBLY)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Data List.
- (e) Read the display on the Techstream.

Main Body

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Dimmer SW	Dimmer switch high position signal / ON or OFF	ON: Dimmer switch in high or high flash position OFF: Dimmer switch in low position	-
Passing Light SW	Dimmer switch high flash position (pass) signal / ON or OFF	ON: Dimmer switch in high flash position OFF: Dimmer switch not in high flash position	-
Head Light SW (Head)	Light control switch head position signal / ON or OFF	ON: Light control switch in head position OFF: Light control switch not in head position	-
Head Light SW (Tail)	Light control switch tail position signal / ON or OFF	ON: Light control switch in tail or head position OFF: Light control switch in neither tail nor head position	-
Lighting Hi	Light control switch head (Hi) position signal / ON or OFF	ON: Headlight high beam on OFF: Normal	-

OK:

The display is as specified in the normal condition column.

Result :

RESULT	PROCEED TO
OK	A
NG (Dimmer switch)	B
NG (Light control switch)	C

C ▶ **INSPECT HEADLIGHT DIMMER SWITCH ASSEMBLY**

A ▶ **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

2.	INSPECT HEADLIGHT DIMMER SWITCH ASSEMBLY
-----------	---

(a) Remove the headlight dimmer switch assembly **INFO** .

(b) Inspect the headlight dimmer switch assembly **INFO** .

NG ▶ **REPLACE HEADLIGHT DIMMER SWITCH ASSEMBLY**

OK
▼

3.	CHECK HARNESS AND CONNECTOR (HEADLIGHT DIMMER SWITCH ASSEMBLY - INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY, BODY GROUND)
-----------	---

(a) Disconnect the 3B instrument panel junction block assembly connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D50-17 (HF) - 3B-15	Always	Below 1 Ω
D50-11 (HU) - 3B-30	Always	Below 1 Ω
D50-12 (EL) - Body ground	Always	Below 1 Ω



Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D50-17 (HF) - Body ground	Always	10 k Ω or higher
D50-11 (HU) - Body ground	Always	10 k Ω or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

4. INSPECT HEADLIGHT DIMMER SWITCH ASSEMBLY

- (a) Remove the headlight dimmer switch assembly  .
- (b) Inspect the headlight dimmer switch assembly  .

NG  **REPLACE HEADLIGHT DIMMER SWITCH ASSEMBLY**

OK



5. CHECK HARNESS AND CONNECTOR (HEADLIGHT DIMMER SWITCH ASSEMBLY - MAIN BODY ECU (NETWORK GATEWAY ECU), BODY GROUND)

- (a) Disconnect the D5 main body ECU (network gateway ECU) connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D50-20 (H) - D5-2 (HEAD)	Always	Below 1 Ω
D50-18 (T) - D5-25 (TAIL)	Always	Below 1 Ω
D50-12 (EL) - Body ground	Always	Below 1 Ω
D50-3 (LFG) - Body ground	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D50-20 (H) - Body ground	Always	10 k Ω or higher
D50-18 (T) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

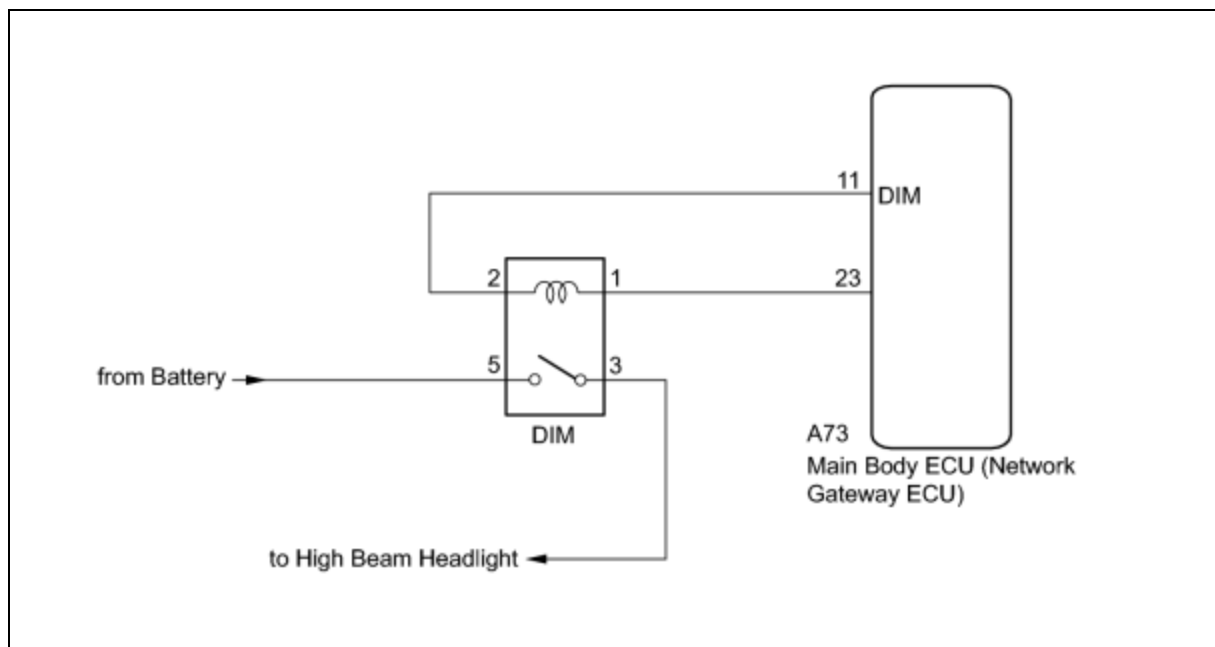
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001A7L070X
Title: LIGHTING (EXT): LIGHTING SYSTEM: High Beam Headlight Circuit (2013 FR-S)		

High Beam Headlight Circuit

DESCRIPTION

The main body ECU (network gateway ECU) receives headlight dimmer switch information signals, and illuminates the high beam headlight.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Inspect the fuses and bulbs for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. PERFORM ACTIVE TEST USING TECHSTREAM (HEAD LIGHT HI)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.

(d) Enter the following menus: Body Electrical / Main Body / Active Test

(e) Check that the relay operates.

Main Body

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Head Light Hi	Headlight dimmer relay	ON/OFF	-

OK:

Relay operates (high beam headlights illuminate).

Result:

RESULT	PROCEED TO
NG	A
OK	B

B ▶ REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

A



2.	INSPECT DIM RELAY
-----------	--------------------------

(a) Remove the DIM relay from the engine room relay block.

(b) Inspect the DIM relay **INFO**.

NG ▶ REPLACE DIM RELAY

OK

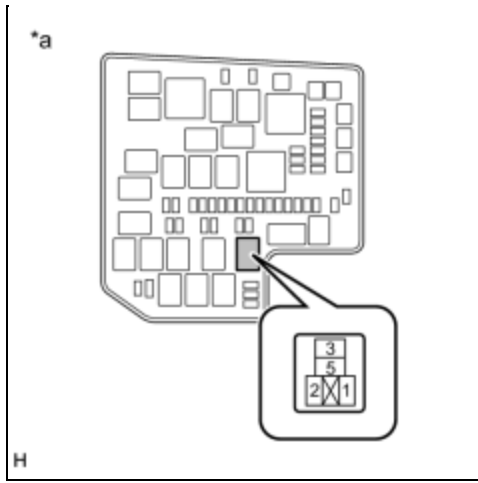


3.	CHECK HARNESS AND CONNECTOR (BATTERY - DIM RELAY)
-----------	--

(a) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED
-------------------	-----------	-----------



		CONDITION
Relay terminal 5 - Body ground	Always	11 to 14 V

Text in Illustration

*a	Engine Room Relay Block (DIM Relay Terminal)
----	--

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

4. CHECK HARNESS AND CONNECTOR (DIM RELAY - MAIN BODY ECU (NETWORK GATEWAY ECU))

(a) Disconnect the A73 main body ECU (network gateway ECU) connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Relay terminal 2 - A73-11 (DIM)	Always	Below 1 Ω
Relay terminal 1 - A73-23	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A73-11 (DIM) - Body ground	Always	10 kΩ or higher
A73-23 - Body ground	Always	10 kΩ or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ PROCEED TO NEXT SUSPECTED AREA
SHOWN IN PROBLEM SYMPTOMS TABLE



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PKJOE5X
Title: LIGHTING (EXT): LIGHTING SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedure to troubleshoot the lighting system.
- *: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	CUSTOMER PROBLEM ANALYSIS CHECK AND SYMPTOM CHECK
-----------	--

NEXT



3.	INSPECT BATTERY VOLTAGE
-----------	--------------------------------

(a) Measure the battery voltage with the ignition switch off.

Standard Voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding to the next step.

NEXT



4.	CHECK FOR DTC*
-----------	-----------------------

(a) Check for DTCs INFO.

Result:

RESULT	PROCEED TO
DTC is not output.	A

DTC is output.	B
----------------	---

B ▶ Go to step 7

A
▼

5.	PROBLEM SYMPTOMS TABLE
-----------	-------------------------------

(a) Refer to Problem Symptoms Table INFO.

Result:

RESULT	PROCEED TO
Fault is not listed in Problem Symptoms Table.	A
Fault is listed in Problem Symptoms Table.	B

B ▶ Go to step 7

A
▼

6.	OVERALL ANALYSIS AND TROUBLESHOOTING*
-----------	--

(a) Data List / Active Test INFO

(b) Terminals of ECU INFO

NEXT
▼

7.	ADJUST, REPAIR OR REPLACE
-----------	----------------------------------

NEXT
▼

--	--

8. CONFIRMATION TEST

NEXT  END



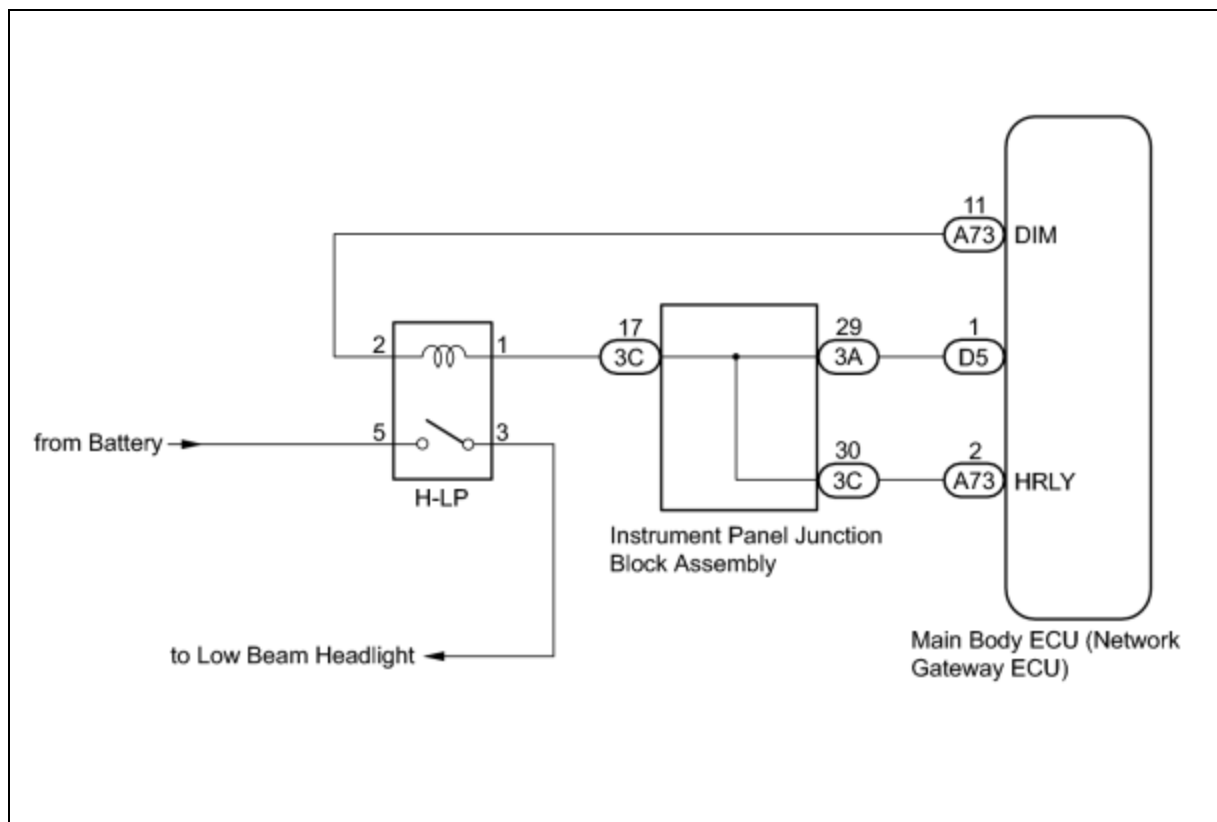
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000ZBM070X
Title: LIGHTING (EXT): LIGHTING SYSTEM: Low Beam Headlight Circuit (2013 FR-S)		

Low Beam Headlight Circuit

DESCRIPTION

The main body ECU (network gateway ECU) receives headlight dimmer switch assembly information signals, and illuminates the low beam headlight.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Inspect the fuses and bulbs for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	PERFORM ACTIVE TEST USING TECHSTREAM (H-LP RELAY)
----	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Active Test
- (e) Check that the relay operates.

Main Body

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Headlight Relay	Low beam headlight relay	ON/OFF	-

OK:

Headlight relay operates (low beam headlights illuminate).

Result:

RESULT	PROCEED TO
NG	A
OK	B


B ▶ REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

A



2.	INSPECT H-LP RELAY
-----------	---------------------------

(a) Remove the H-LP relay from the engine room relay block.

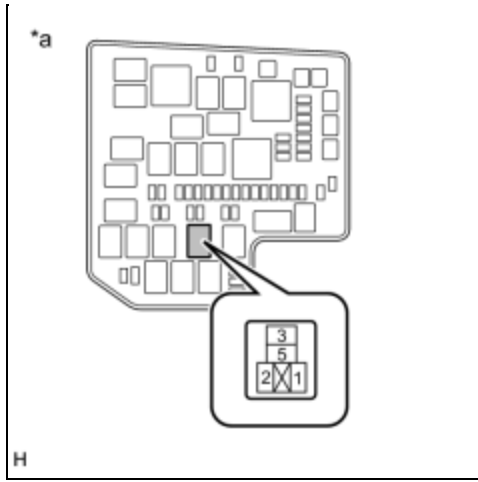
(b) Inspect the H-LP relay  .

NG ▶ REPLACE H-LP RELAY

OK



3.	CHECK HARNESS AND CONNECTOR (H-LP RELAY - BATTERY)
-----------	---



(a) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Relay terminal 5 - Body ground	Always	11 to 14 V

Text in Illustration

*a	Engine Room Relay Block (H-LP Relay Terminal)
----	--

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

4. CHECK HARNESS AND CONNECTOR (H-LP RELAY - MAIN BODY ECU (NETWORK GATEWAY ECU))

(a) Disconnect the A73 main body ECU (network gateway ECU) connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Relay terminal 2 - A73-11 (DIM)	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A73-11 (DIM) - Body ground	Always	10 kΩ or higher

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

5.	CHECK HARNESS AND CONNECTOR (H-LP RELAY - INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY)
-----------	--

(a) Disconnect the 3C instrument panel junction block assembly connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Relay terminal 1 - 3C-17	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3C-17 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



6.	CHECK HARNESS AND CONNECTOR (INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY - MAIN BODY ECU (NETWORK GATEWAY ECU))
-----------	---

(a) Disconnect the 3A and 3C instrument panel junction block assembly connector.

(b) Disconnect the D5 and A73 main body ECU (network gateway ECU) connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3A-29 - D5-1	Always	Below 1 Ω
3C-30 - A73-2 (HRLY)	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D5-1 - Body ground	Always	10 k Ω or higher

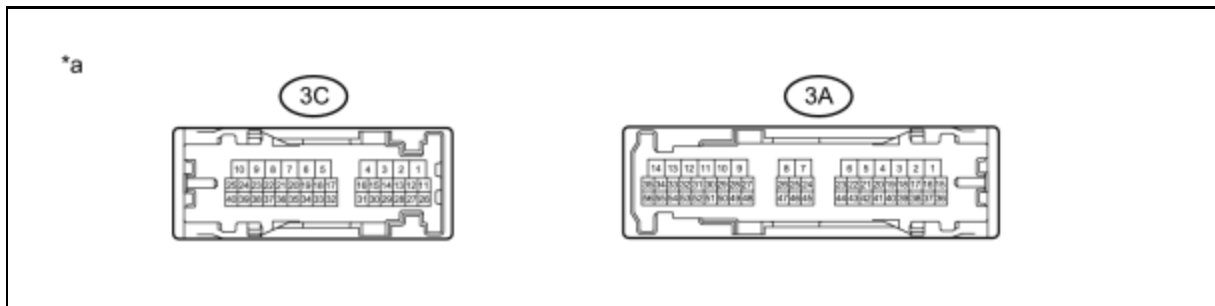
NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK



7. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

- (a) Remove the instrument panel junction block assembly **INFO** .
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (c) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	---	---	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3C-17 - 3A-29	Always	Below 1 Ω
3C-17 - 3C-30	Always	Below 1 Ω

NG ► REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

OK ► PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011RO03FX
Title: LIGHTING (EXT): LIGHTING SYSTEM: OPERATION CHECK (2013 FR-S)		

OPERATION CHECK

1. DAYTIME RUNNING LIGHT SYSTEM OPERATION CHECK

- (a) Start the engine.
- (b) Shift lever is other than in P*1.
- (c) Release the parking brake.
- (d) Turn the light control switch to the off.
- (e) Ignition switch ON.
- (f) Check that the high beam headlights*2 and taillights come on (when the light control switch is in off, the taillights do not come on).

*1: for Automatic Transmission

*2: Brightness of the headlights is decreased.

2. INSPECT BATTERY SAVER

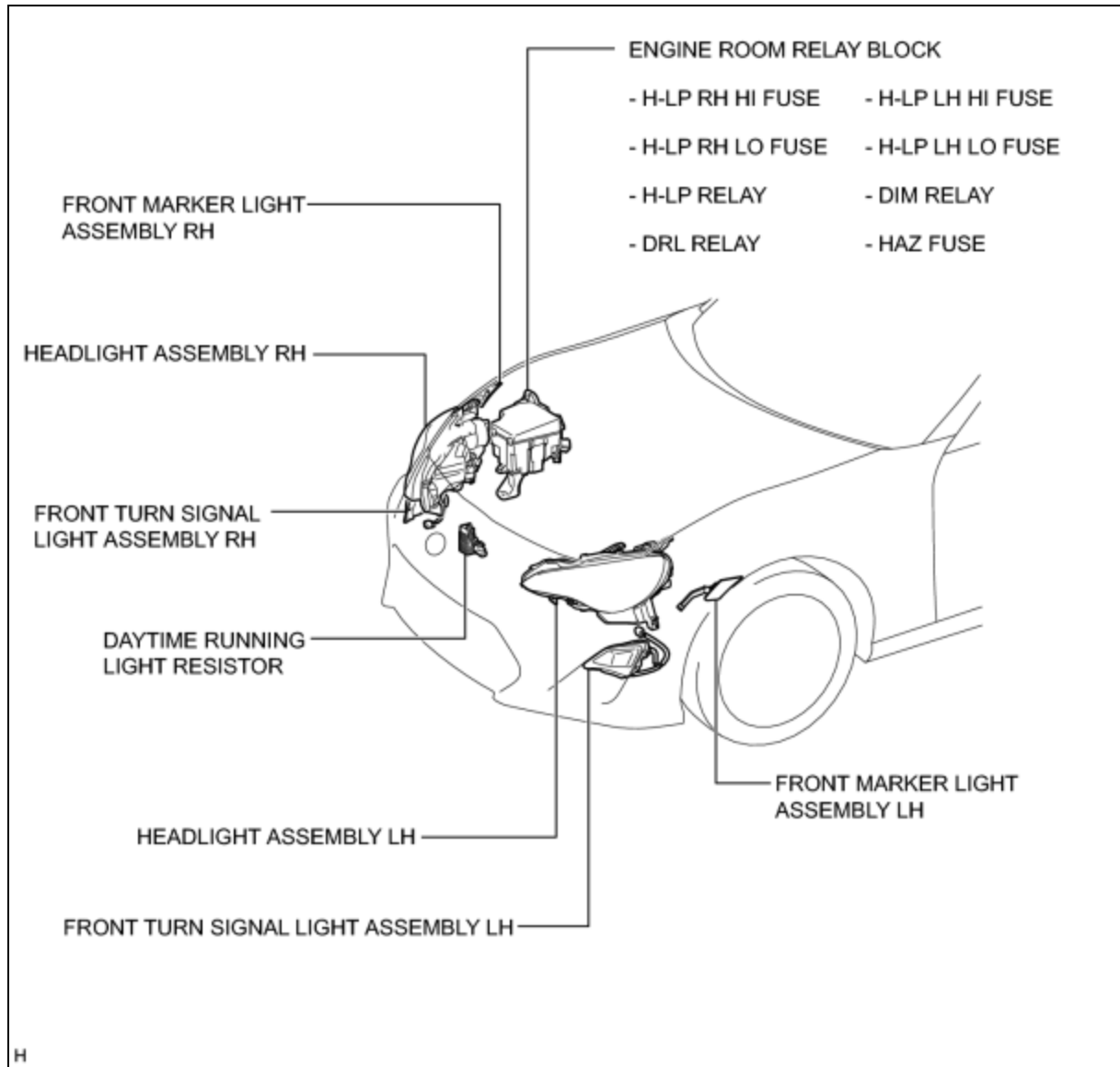
- (a) With the ignition switch off, turn the light control switch to HEAD to illuminate the headlights.
- (b) Check that the headlights and taillights turn off when the light control switch remain in the same condition for 20 minutes.



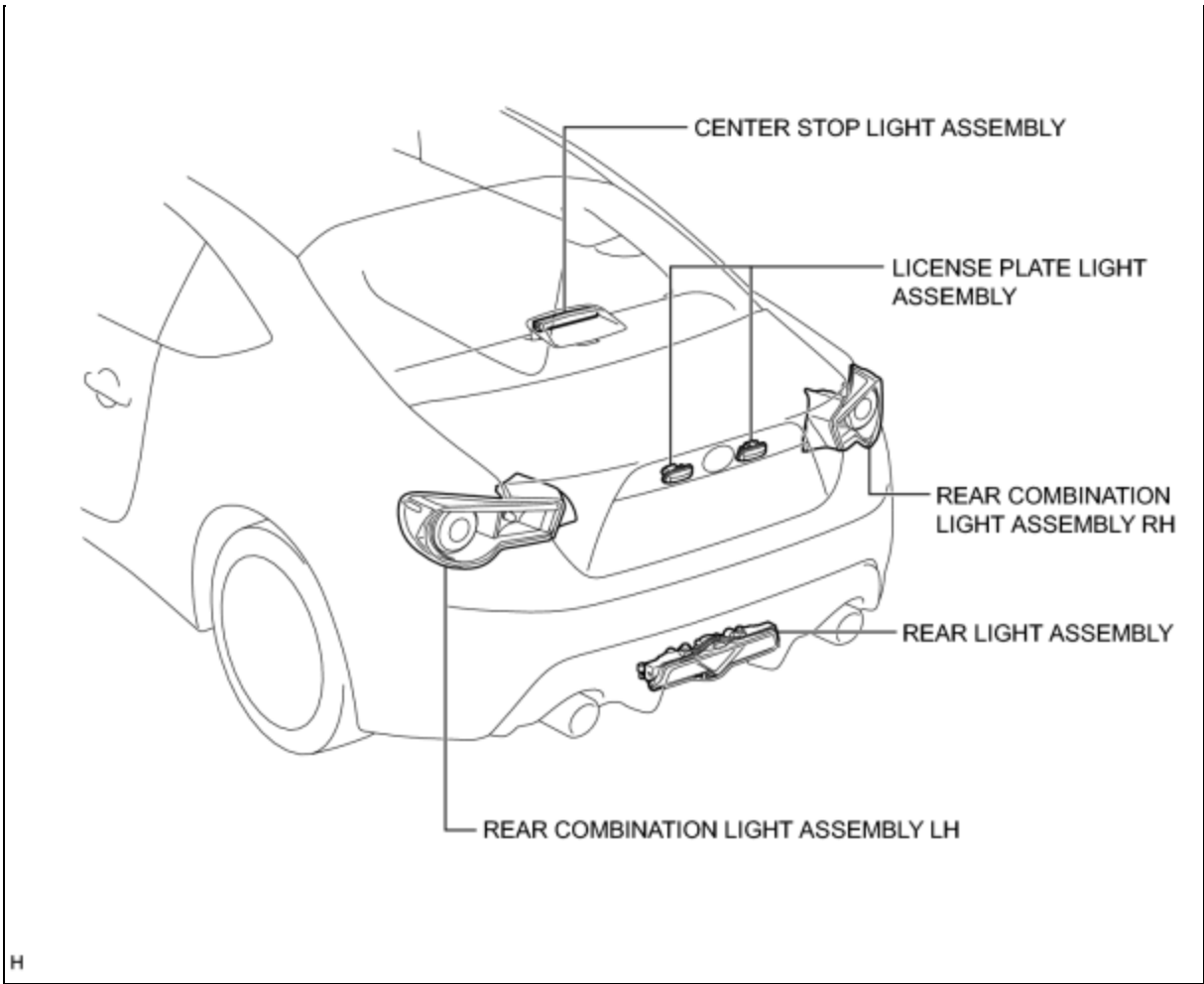
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PKL06CX
Title: LIGHTING (EXT): LIGHTING SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

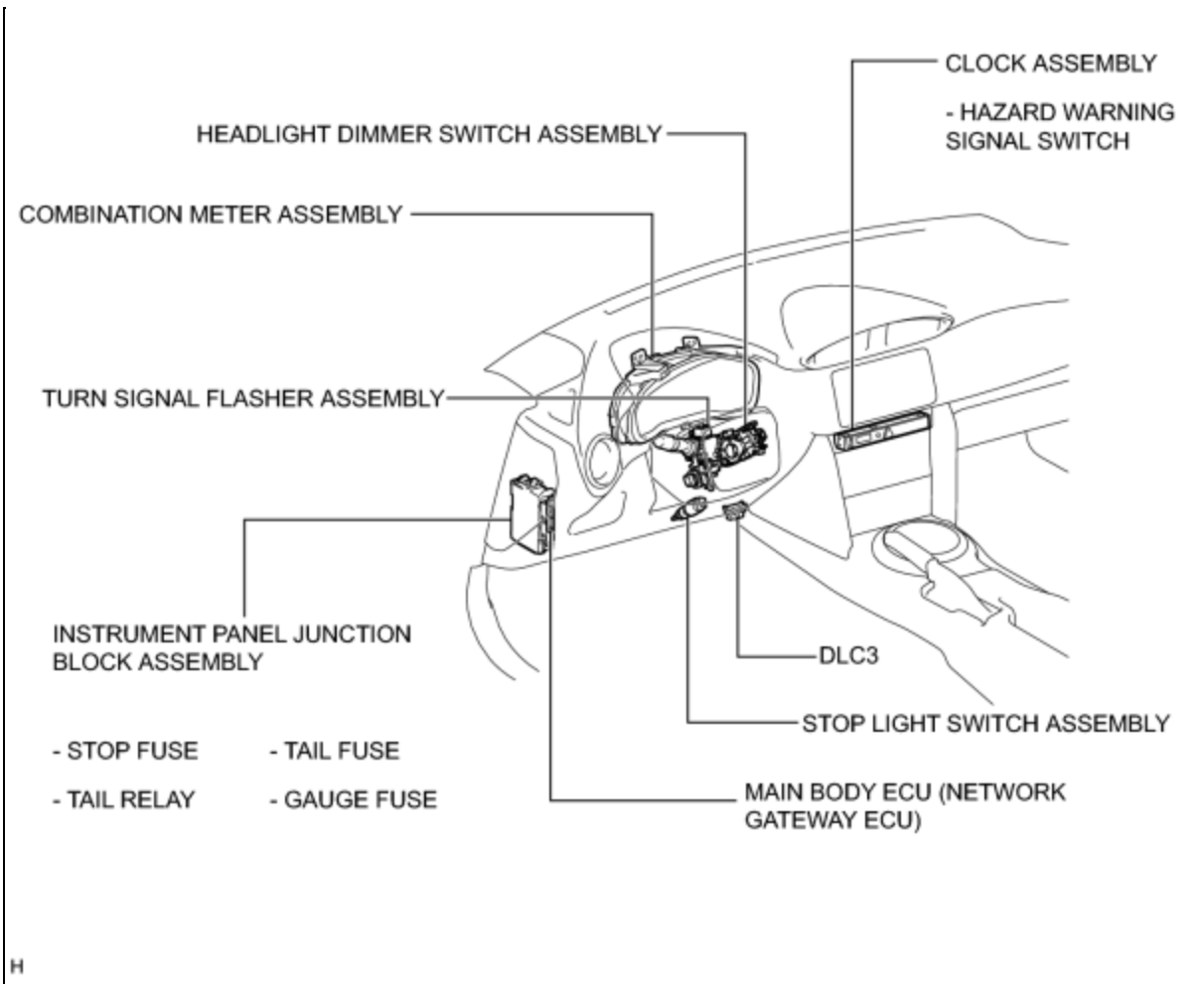
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002CDW04CX
Title: LIGHTING (EXT): LIGHTING SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

1. PRECAUTION FOR LIGHT BULB REPLACEMENT

- (a) When the headlights are illuminated, do not cover the headlights for 3 minutes or more.

NOTICE:

As the outer lens of the headlight is made of resin, the resulting heat created when covering the headlight for an extended period of time may deform the headlight.



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002CE20BVX
Title: LIGHTING (EXT): LIGHTING SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

Headlight

SYMPTOM	SUSPECTED AREA	SEE PAGE
Low beam headlights and high beam headlights do not illuminate.	MAIN fuse	-
	Headlight dimmer switch circuit	INFO
	Main body ECU (network gateway ECU)	-
	Harness or connector	-
Low beam headlight on one side does not illuminate.	H-LP LH LO fuse or H-LP RH LO fuse	-
	No. 1 headlight bulb	-
	Headlight unit	-
	Main body ECU (network gateway ECU)	-
	Harness or connector	-
Both left and right low beam headlights do not illuminate.	H-LP LH LO fuse and H-LP RH LO fuse	-
	Headlight dimmer switch circuit	INFO
	Low beam headlight circuit	INFO
	Harness or connector	-
High beam headlight on one side do not illuminate.	H-LP LH HI fuse or H-LP RH HI fuse	-
	No. 2 headlight bulb	-
	Headlight unit	-
	Main body ECU (network gateway ECU)	-
	Harness or connector	-
	H-LP LH HI fuse and H-LP RH HI fuse	-
	Headlight dimmer switch	

Both left and right high beam headlight do not illuminate.	circuit	INFO
	High beam headlight circuit	INFO
	Harness or connector	-
High beam headlights do not illuminate with "High Flash " function (passing function)	Headlight dimmer switch circuit	INFO
	Harness or connector	-

Taillight

SYMPTOM	SUSPECTED AREA	SEE PAGE
Both left and right tail lights do not illuminate (clearance lights and license plate lights included).	TAIL fuse	-
	Headlight dimmer switch circuit	INFO
	Taillight circuit	INFO
	Main body ECU (network gateway ECU)	-
	Harness or connector	-
Tail light on one side does not illuminate.	Rear combination light socket and wire sub-assembly	INFO
	Rear combination light lens and body	-
	Harness or connector	-

License Plate Light

SYMPTOM	SUSPECTED AREA	SEE PAGE
License plate lights do not illuminate (taillight is normal).	License plate light bulb	-
	License plate light assembly	INFO
	Harness or connector	-

Rear Light

SYMPTOM	SUSPECTED AREA	SEE PAGE
Rear light does not illuminate.	Back-up light switch assembly*1	INFO
	Park/neutral position switch assembly*2	INFO
	Harness or connector	-
Rear light on one side does not illuminate.	Buck-up light bulb	INFO
	Back-up light socket and wire sub-assembly	-
	Harness or connector	-

*1: w/ Manual Transmission

*2: w/ Automatic Transmission

Stop Light

SYMPTOM	SUSPECTED AREA	SEE PAGE
Stop light does not illuminate.	STOP fuse	-
	Stop light switch assembly	INFO
	Noise filter	INFO
	Harness or connector	-
Stop light on one side does not illuminate.	Rear combination light socket and wire sub-assembly	INFO
	Rear combination light lens and body	-
	Harness or connector	-

Center Stop Light

SYMPTOM	SUSPECTED AREA	SEE PAGE
Center stop light does not illuminate.	Center stop light assembly	INFO
	Harness or connector	-

Turn Signal Light

SYMPTOM	SUSPECTED AREA	SEE PAGE
Turn signal lights does not illuminate.	GAUGE fuse	-
	Turn signal flasher assembly	INFO
	Headlight dimmer switch circuit	INFO
	Harness or connector	-
Front turn signal light on one side does not illuminate.	Front turn signal light bulb	-
	Front turn signal light assembly	-
	Front turn signal light socket	INFO
	Harness or connector	-
Clearance lights do not illuminate (taillights are normal).	Front turn signal light bulb	-
	Front turn signal light assembly	-
	Front turn signal light socket	INFO
	Harness or connector	-
Front marker light on one side does not illuminate.	Front marker light bulb	-
	Front marker light assembly	-
	Front marker light socket and wire	-
	Harness or connector	-
	Rear turn signal light bulb	-

Rear turn signal light on one side does not illuminate.	Rear combination light lens and body	-
	Rear combination light socket and wire sub-assembly	INFO
	Harness or connector	-

Hazard Warning Light

SYMPTOM	SUSPECTED AREA	SEE PAGE
Hazard warning lights do not operate (turn signal lights are normal).	Turn signal flasher assembly	INFO
	Clock assembly	INFO
	Harness or connector	-

Battery Saving Control

SYMPTOM	SUSPECTED AREA	SEE PAGE
Light auto turn off system does not operate.	Door courtesy switch circuit	INFO
	IG signal circuit	INFO
	Main body ECU (network gateway ECU)	-

Daytime Running Light System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Daytime running light system does not operate.	MPX-B fuse	-
	DRL relay	-
	Low beam headlight relay circuit	INFO
	Taillight relay circuit	INFO
	Main body ECU (network gateway ECU)	-
	Daytime Running Light Resister	-
	Harness or connector	-



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PKR06HX
Title: LIGHTING (EXT): LIGHTING SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

SYSTEM DESCRIPTION

1. DAYTIME RUNNING LIGHT SYSTEM

(a) The daytime running light system is designed to automatically illuminate the high beam headlights*1, taillights, clearance lights and license plate lights during the daytime to make the vehicle more visible to other vehicles.

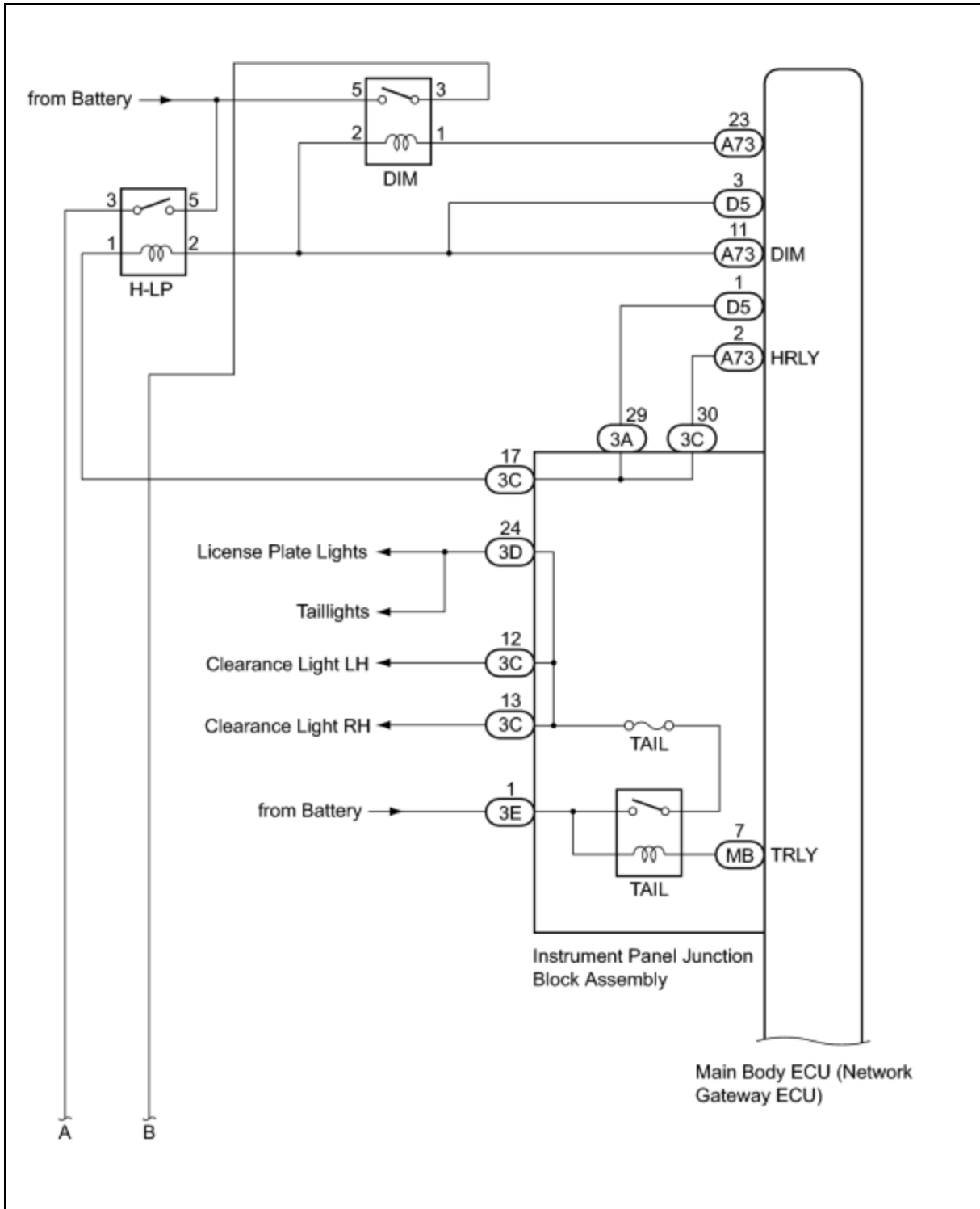
- This system is controlled by the main body ECU (network gateway ECU).
- This system is enabled when the following conditions are met:
 - Ignition switch is ON.
 - Shift lever is other than in P*2.
 - Parking brake switch is off.
 - Engine speed signal is input (engine running).
 - The light control switch is in off or the tail position (when the light control switch is in off, the taillights, clearance lights and license plate lights do not come on).
 - Ignition switch is ACC.
 - *1: Brightness of the headlights is decreased.
 - *2: for Automatic Transmission

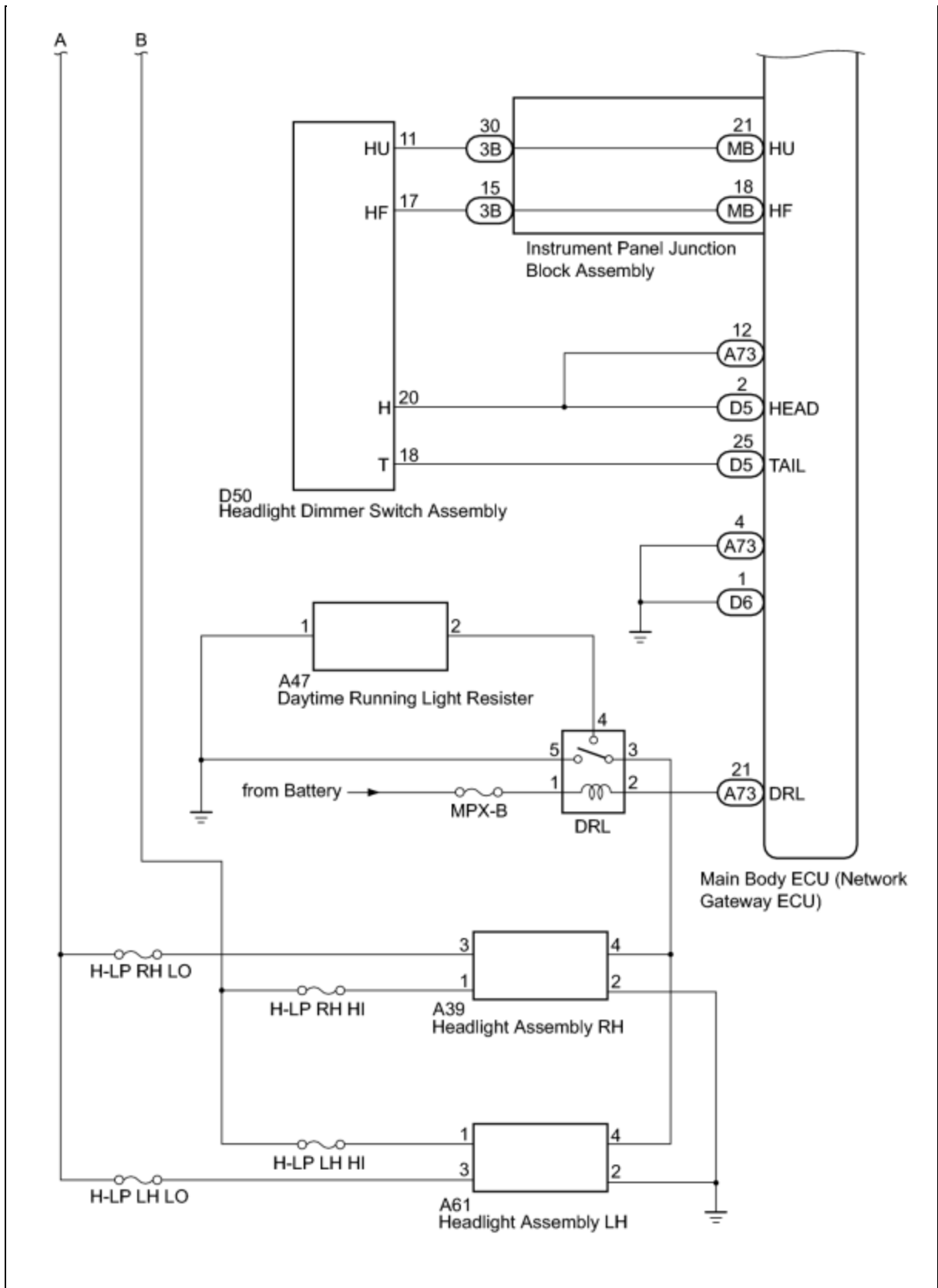


Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PKU05UX
Title: LIGHTING (EXT): LIGHTING SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

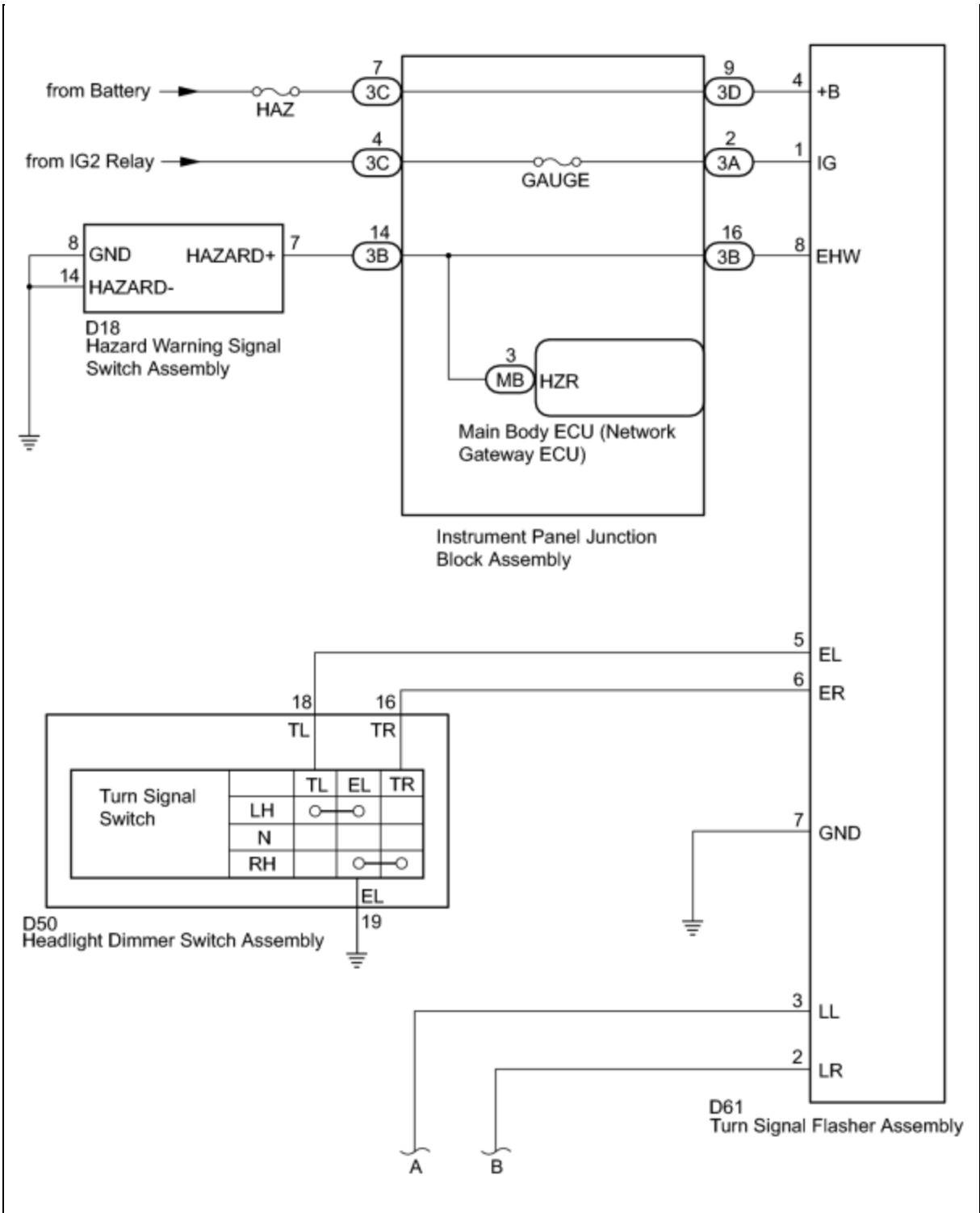
SYSTEM DIAGRAM

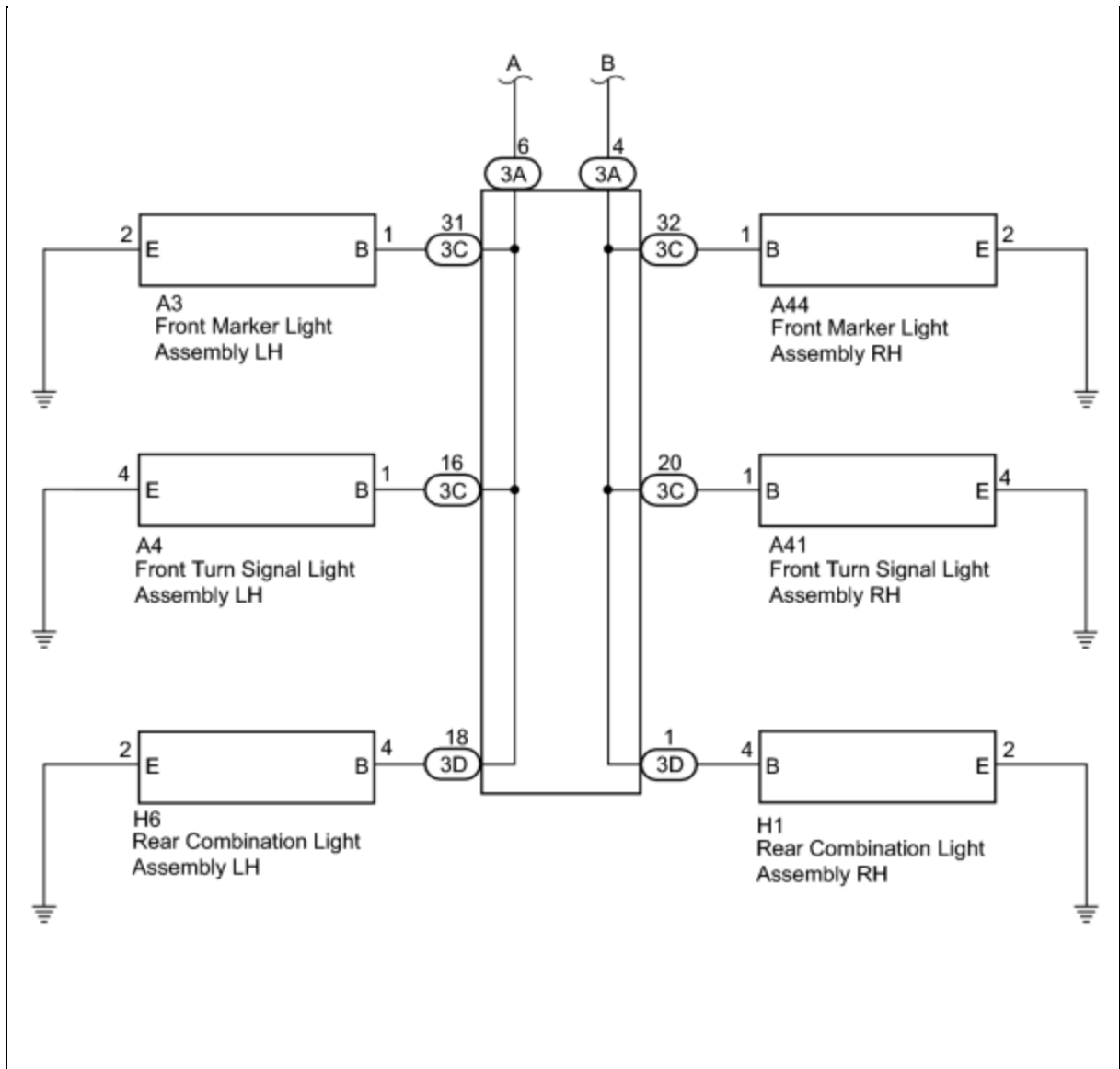
1. HEADLIGHT



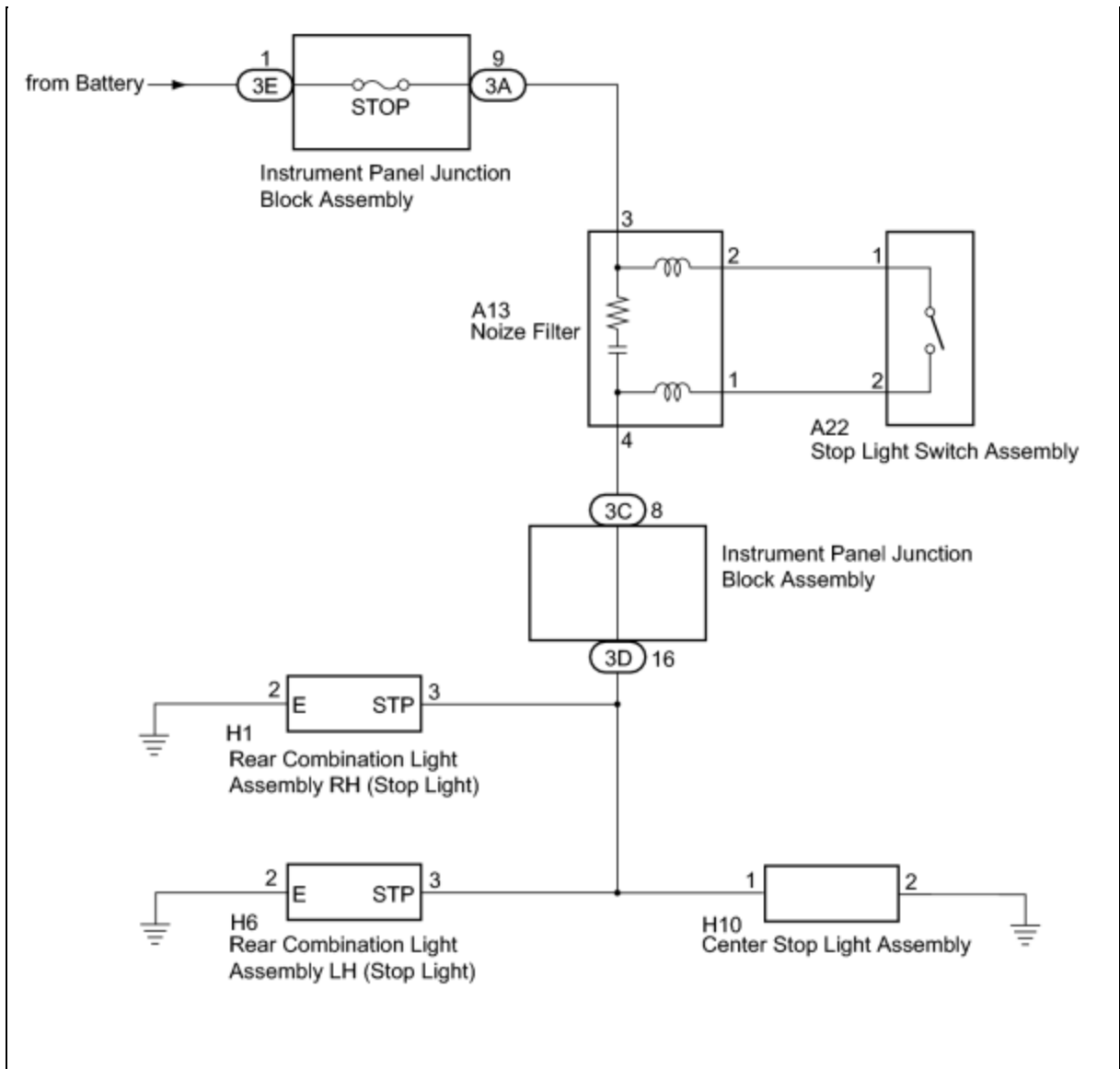


2. TURN SIGNAL LIGHT

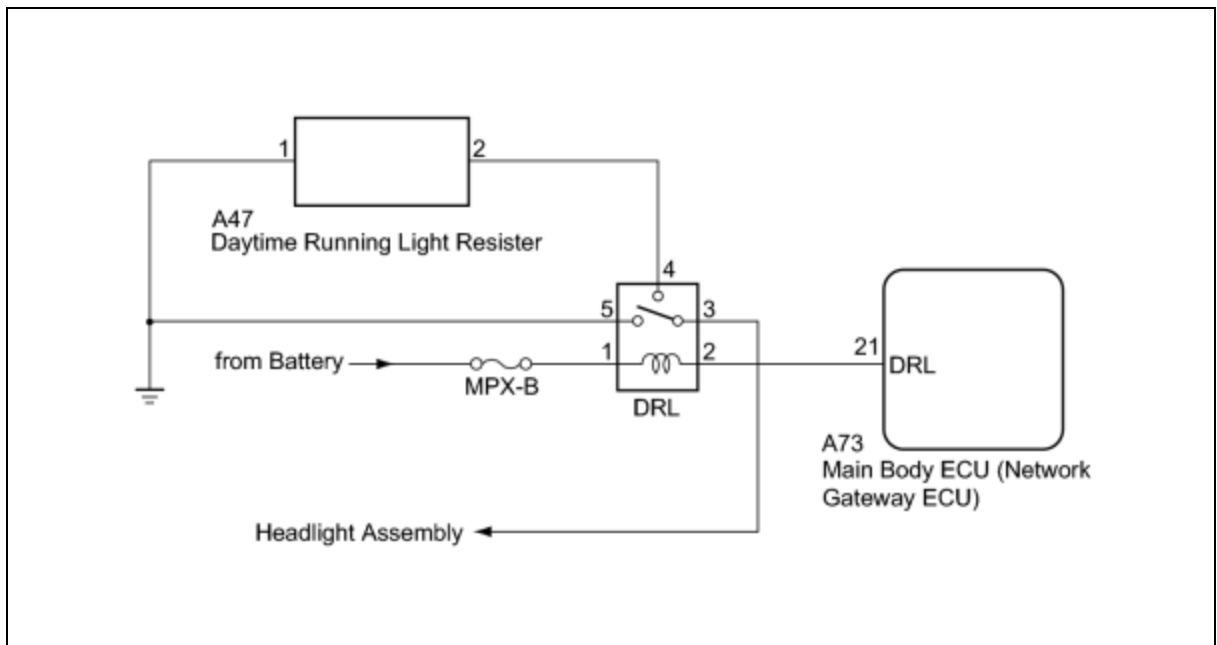




3. STOP LIGHT



4. DAYTIME RUNNING LIGHT SYSTEM





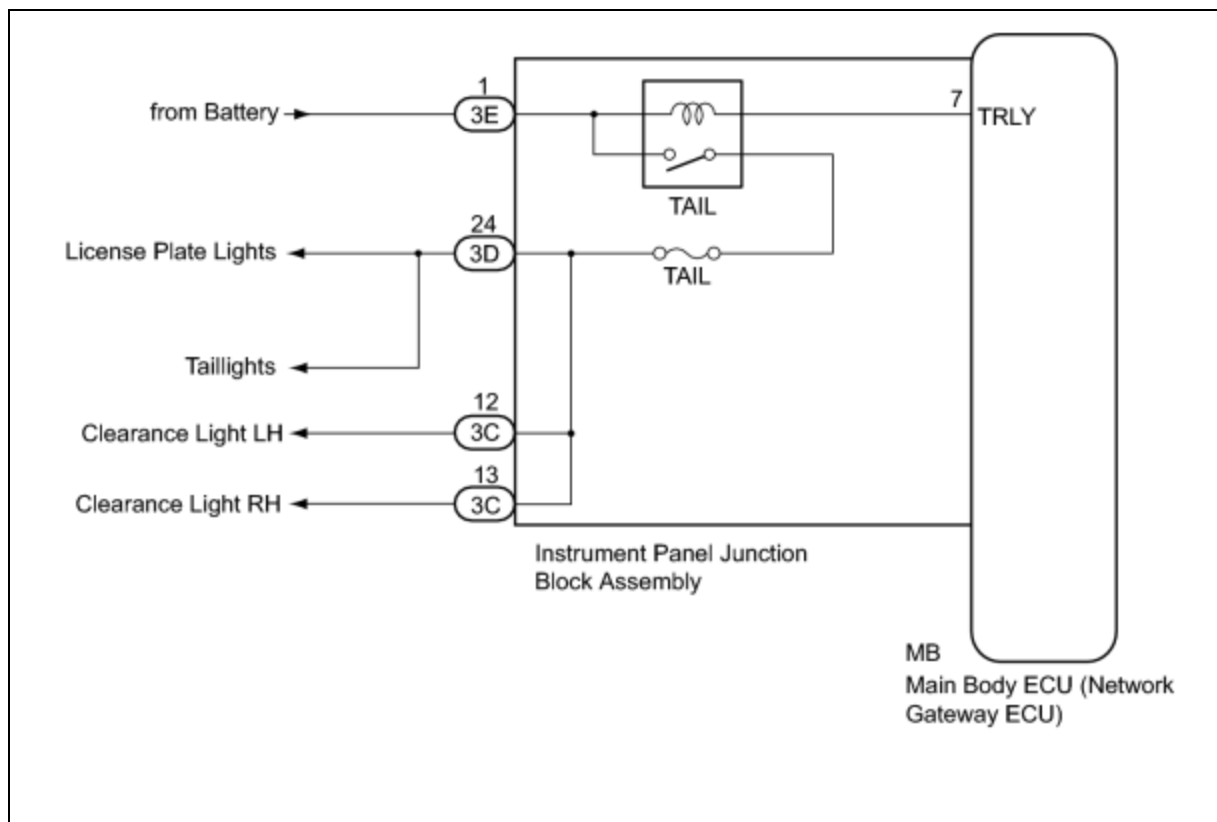
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001MEH08MX
Title: LIGHTING (EXT): LIGHTING SYSTEM: Taillight Relay Circuit (2013 FR-S)		

Taillight Relay Circuit

DESCRIPTION

The main body ECU (network gateway ECU) receives headlight dimmer switch assembly information signals, and illuminates the clearance lights, taillights and license plate lights.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Inspect the fuses and bulbs for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	PERFORM ACTIVE TEST USING TECHSTREAM (TAIL RELAY)
----	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Active Test
- (e) Check that the relay operates.

Main Body

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Taillight Relay	Taillight relay	ON/OFF	-

OK:
Taillight relay operates (taillights illuminate).
Result:

RESULT	PROCEED TO
NG	A
OK	B

B ▶ REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

A

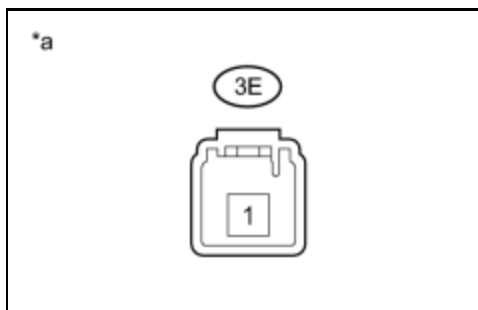


2.	CHECK HARNESS AND CONNECTOR (BATTERY - INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY)
-----------	---

- (a) Disconnect the 3E instrument panel junction block assembly connector.

- (b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3E-1 - Body ground	Always	11 to 14 V

Text in Illustration

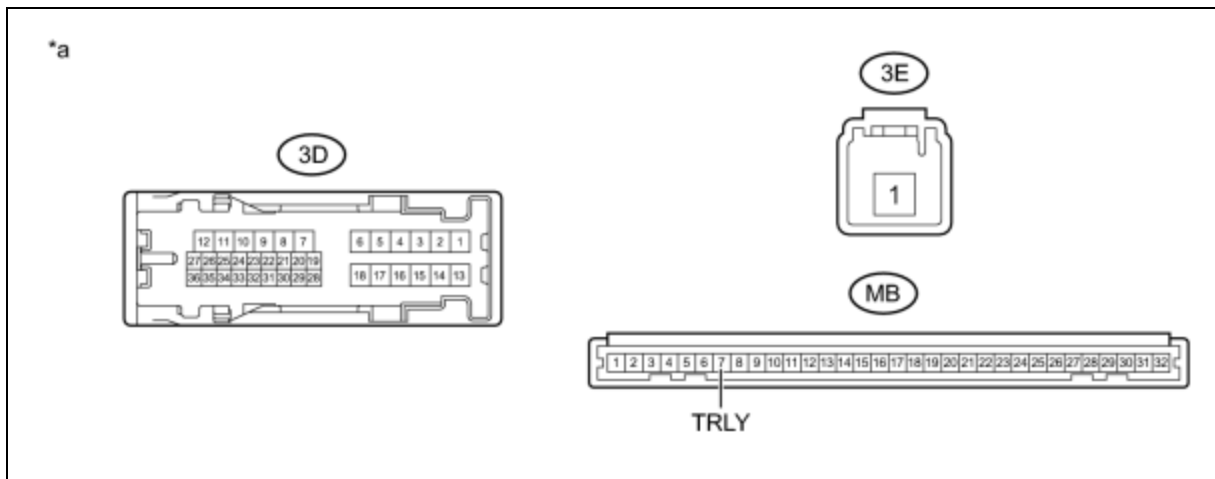
*a	Component without harness connected (Instrument Panel Junction Block Assembly)
----	--

OK



3. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

- (a) Remove the instrument panel junction block assembly INFO.
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (c) Measure the voltage according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	---	---	---

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3C-12 - Battery negative (-) terminal	Connect a positive (+) lead from the battery → 3E-1 Connect a negative (-) lead from the battery → MB-7 (TRLY)	11 to 14 V
3C-13 - Battery negative (-) terminal	Connect a positive (+) lead from the battery → 3E-1 Connect a negative (-) lead from the battery → MB-7 (TRLY)	11 to 14 V

3D-24 - Battery negative (-) terminal	Connect a positive (+) lead from the battery → 3E-1 Connect a negative (-) lead from the battery → MB-7 (TRLY)	11 to 14 V
---------------------------------------	---	------------

(d) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3E-1 - 3C-12	Always	10 kΩ or higher
3E-1 - 3C-13	Always	10 kΩ or higher
3E-1 - 3D-24	Always	10 kΩ or higher

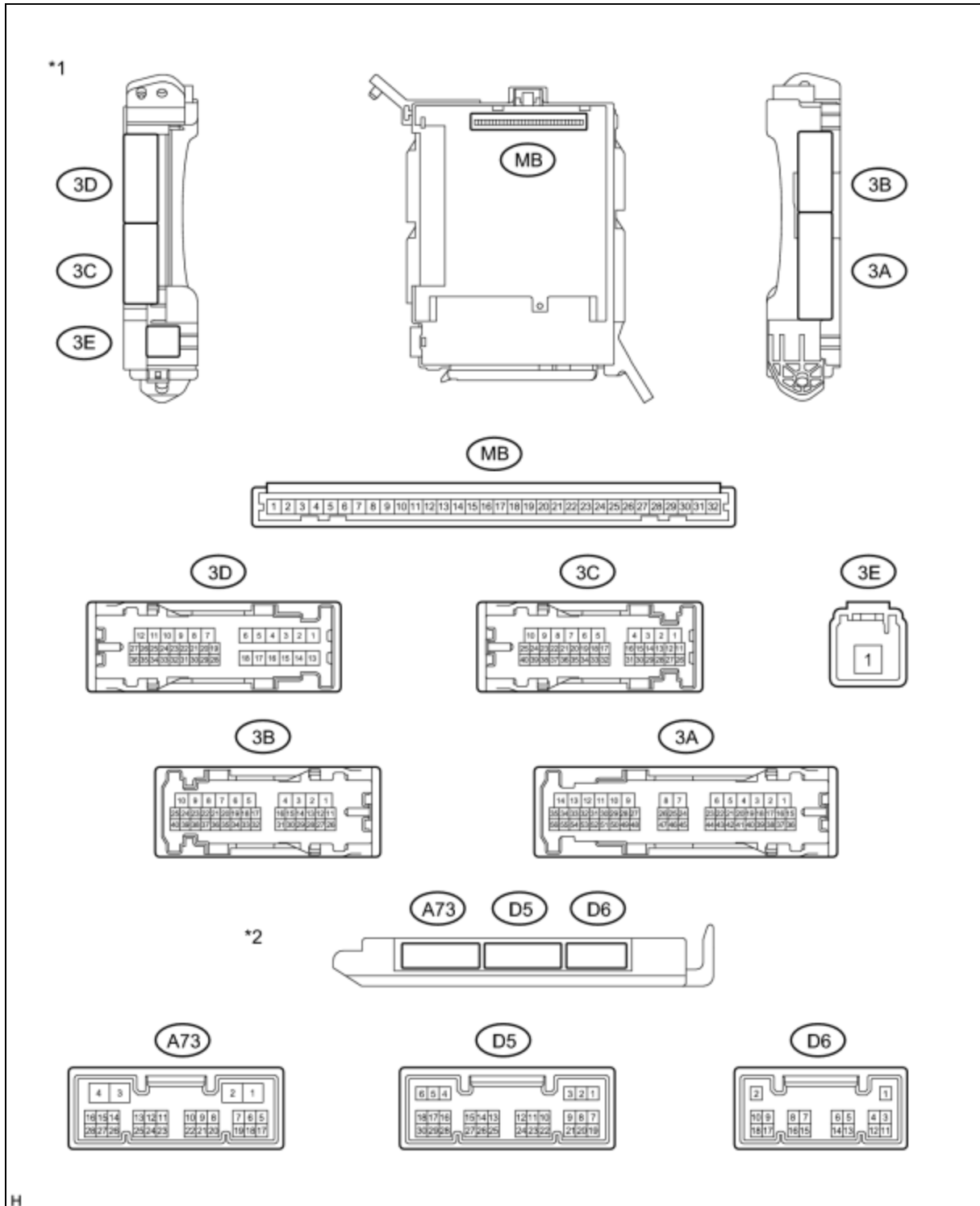
NG ▶ **REPLACE INSTRUMENT PANEL JUNCTION
BLOCK ASSEMBLY**

OK ▶ **PROCEED TO NEXT SUSPECTED AREA
SHOWN IN PROBLEM SYMPTOMS TABLE**

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PKM051X
Title: LIGHTING (EXT): LIGHTING SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. CHECK MAIN BODY ECU (NETWORK GATEWAY ECU)



Text in Illustration

*1	Instrument Panel Junction Block Assembly	*2	Main Body ECU (Network Gateway ECU)
----	--	----	-------------------------------------

- (a) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (b) Disconnect the A73 and D6 main body ECU (network gateway ECU) connectors.
- (c) Measure the resistance and voltage according to the value(s) in the table below.

TERMINAL NO.	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A73-4 (GND) - Body ground	B-Y - Body ground	Ground	Always	Below 1 Ω
D6-1 (GND) - Body ground	B - Body ground	Ground	Always	Below 1 Ω
3C-4 - Body ground	None - Body ground	Ignition switch power supply	Ignition switch ON	11 to 14 V
			Ignition switch off	Below 1 V
3C-7 - Body ground	None - Body ground	Battery power supply	Always	11 to 14 V
3E-1 - Body ground	None - Body ground	Battery power supply	Always	11 to 14 V

If the result is not as specified, there may be a malfunction in the wire harness.

- (d) Reconnect the instrument panel junction block assembly and main body ECU (network gateway ECU) connectors.
- (e) Measure the voltage or check for pulses according to the value(s) in the table below.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
MB-21 (HU) - Body ground	None - Body ground	Dimmer switch high signal	Dimmer switch in high position	Below 1 V
			Dimmer switch in low position	11 to 14 V
MB-18 (HF) - Body ground	None - Body ground	Dimmer switch high flash signal	Dimmer switch in high flash position	Below 1 V
			Dimmer switch not in high flash position	11 to 14 V
D5-2 (HEAD) - Body ground	W - Body ground	Light control switch head signal	Light control switch in head position	Below 1 V
			Light control switch not in head position	11 to 14 V
D5-25 (TAIL) - Body ground	BE - Body ground	Light control switch tail signal	Light control switch in tail or head position	Below 1 V
			Light control switch in neither tail nor head position	11 to 14 V
A73-2 (HRLY) - Body ground	L - Body ground	Headlight relay drive output	Light control switch in head	Below 1 V

			Light control switch not in head	11 to 14 V
A73-11 (DIM) - Body ground	G - Body ground	Dimmer relay drive output	Dimmer switch in high or high flash position	Below 1 V
			Dimmer switch in low position	11 to 14 V

HINT:

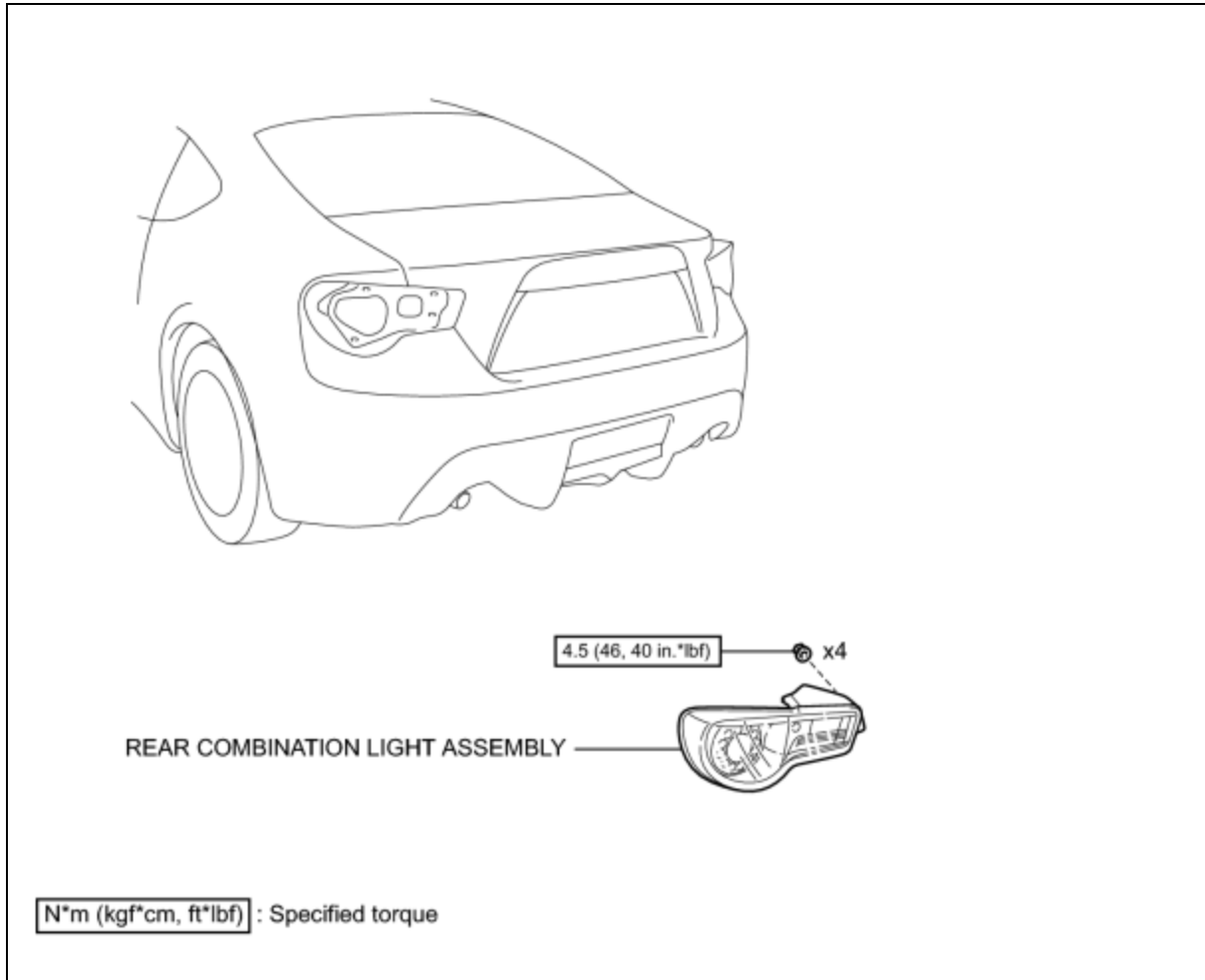
If the result is not as specified, the main body ECU (network gateway ECU) may have a malfunction.



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MVM01SX
Title: LIGHTING (EXT): REAR COMBINATION LIGHT ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



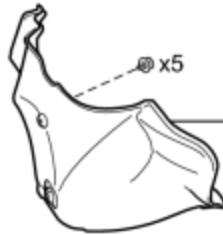
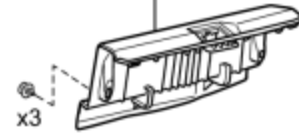
ILLUSTRATION

w/ Side Marker Light:

LUGGAGE COMPARTMENT FLOOR MAT



REAR FLOOR FINISH PLATE



LUGGAGE COMPARTMENT
INNER TRIM COVER LH

● REAR COMBINATION LIGHT GASKET LH



REAR COMBINATION LIGHT SOCKET
AND WIRE SUB-ASSEMBLY



REAR TURN SIGNAL LIGHT BULB



REAR SIDE MARKER LIGHT BULB



REAR COMBINATION LIGHT
LENS AND BODY LH

N*m (kgf*cm, ft*lbf) : Specified torque

● Non-reusable part

T

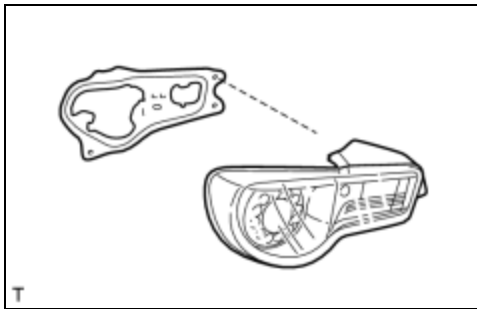
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003N8Y01CX
Title: LIGHTING (EXT): REAR COMBINATION LIGHT ASSEMBLY: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. REMOVE REAR COMBINATION LIGHT GASKET LH

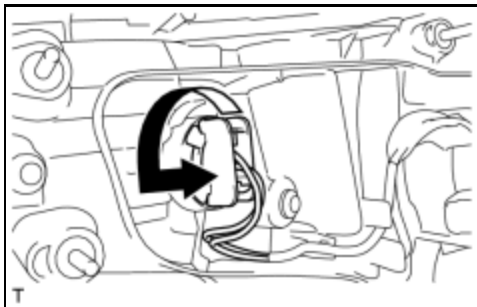


(a) Remove the rear combination light gasket LH.

HINT:

- Be sure to remove all the traces of the old rear combination light gasket from the body.
- Do not reuse the removed packing. Be sure to install a new rear combination light gasket to prevent water ingress.

2. REMOVE REAR TURN SIGNAL LIGHT BULB

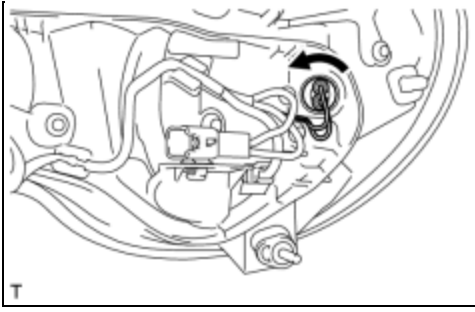


(a) Turn the rear combination light socket and wire sub-assembly with the rear turn signal light bulb in the direction indicated by the arrow shown in the illustration, and remove them as a unit.

(b) Remove the rear turn signal light bulb from the rear combination light socket and wire sub-assembly.

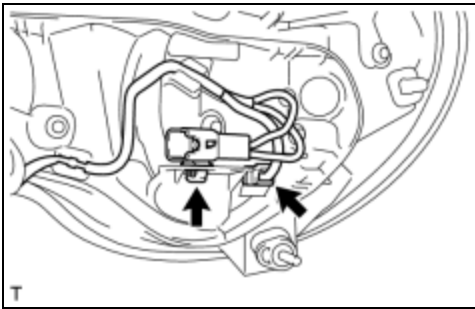
3. REMOVE REAR SIDE MARKER LIGHT BULB

(a) Turn the rear combination light socket and wire sub-assembly with the rear side marker light bulb in the direction indicated by the arrow shown in the illustration, and remove them as a unit.



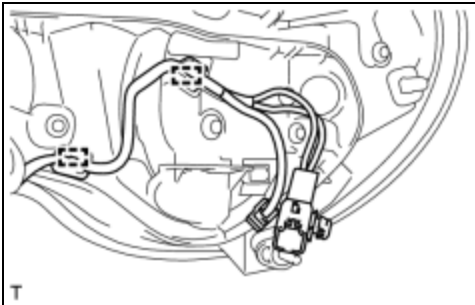
(b) Remove the rear side marker light bulb from the rear combination light socket and wire sub-assembly.

4. REMOVE REAR COMBINATION LIGHT SOCKET AND WIRE SUB-ASSEMBLY



(a) Disengage the clamp.

(b) Disconnect the connector.



(c) Disengage the 2 clamps to remove the rear combination light socket and wire sub-assembly.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000202E05ZX
Title: LIGHTING (EXT): REAR COMBINATION LIGHT ASSEMBLY: INSPECTION (2013 FR-S)		

INSPECTION

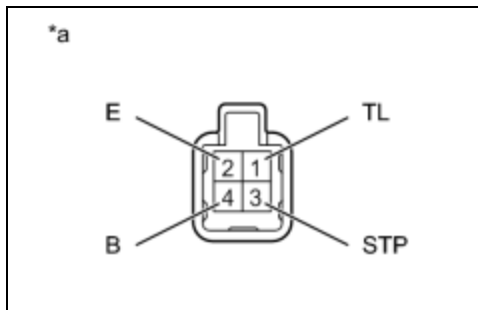
HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. INSPECT REAR COMBINATION LIGHT SOCKET AND WIRE SUB-ASSEMBLY

(a) Apply battery voltage to the connector and check the light comes on.

Standard Voltage:



CONDITION	SPECIFIED CONDITION
Battery positive (+) → 4 (B) Battery negative (-) → 2 (E)	Turn signal light comes on
Battery positive (+) → 3 (STP) Battery negative (-) → 2 (E)	Stop light comes on
Battery positive (+) → 1 (TL) Battery negative (-) → 2 (E)	Tail and Side marker light comes on

Text in Illustration

*a	Component without harness connected (Rear Combination Light Socket and Wire Sub-assembly)
----	--

If the result is not as specified, replace the bulb or the rear combination light socket and wire sub-assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MVL025X
Title: LIGHTING (EXT): REAR COMBINATION LIGHT ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. INSTALL REAR COMBINATION LIGHT ASSEMBLY

- (a) Engage the guide to temporarily install the rear combination light assembly.
- (b) Install the rear combination light assembly with the 4 nuts.

Torque: 4.5 N·m (46 kgf·cm, 40in·lbf)

- (c) Engage the 2 grommets to connect the rear combination light socket and wire sub-assembly.
- (d) Connect the connector.

2. INSTALL LUGGAGE COMPARTMENT INNER TRIM COVER LH INFO

3. INSTALL REAR FLOOR FINISH PLATE

- (a) Engage the 4 claws to install the rear floor finish plate.
- (b) Install the 3 clips.

4. INSTALL LUGGAGE COMPARTMENT FLOOR MAT



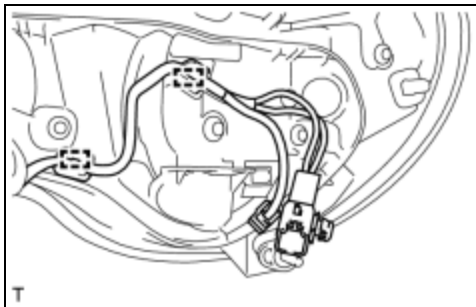
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003N8Z01CX
Title: LIGHTING (EXT): REAR COMBINATION LIGHT ASSEMBLY: REASSEMBLY (2013 FR-S)		

REASSEMBLY

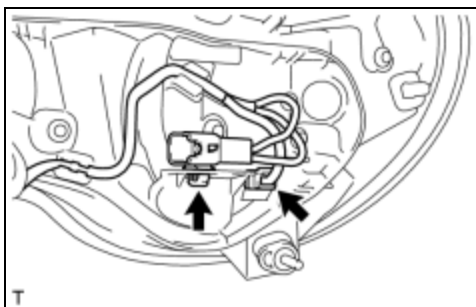
HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. INSTALL REAR COMBINATION LIGHT SOCKET AND WIRE SUB-ASSEMBLY



- (a) Engage the 2 clamps to install the rear combination light socket and wire sub-assembly.

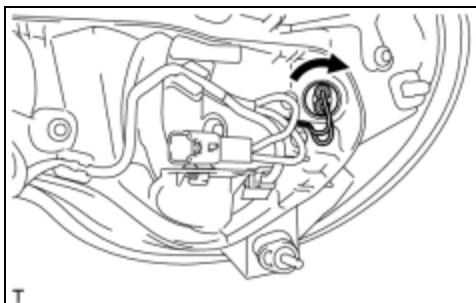


- (b) Connect the connector.

- (c) Engage the clamp.

2. INSTALL REAR SIDE MARKER LIGHT BULB

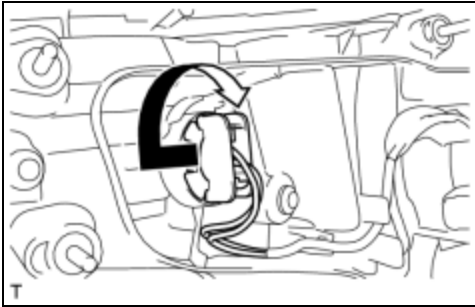
- (a) Install the side marker light bulb to the rear combination light socket and wire sub-assembly.



- (b) Turn the rear combination light socket and wire sub-assembly with the side marker light bulb in the direction indicated by the arrow shown in the illustration to install them as a unit.

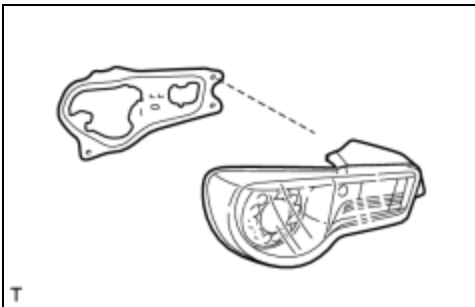
3. INSTALL REAR TURN SIGNAL LIGHT BULB

(a) Install the rear turn signal light bulb to the rear combination light socket and wire sub-assembly.



(b) Turn the rear combination light socket and wire sub-assembly with the rear turn signal light bulb in the direction indicated by the arrow shown in the illustration to install them as a unit.

4. INSTALL REAR COMBINATION LIGHT GASKET LH



(a) Install a new rear combination light gasket LH.

HINT:

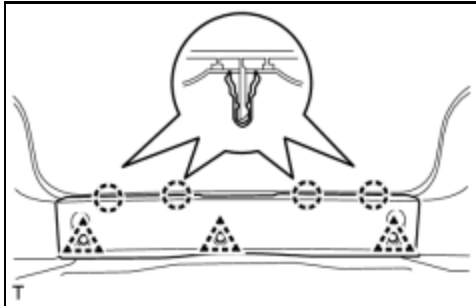
- Be sure to remove all the traces of the old rear combination light gasket from the body.
- Do not reuse the removed packing. Be sure to install a new rear combination light gasket to prevent water ingress.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MVN023X
Title: LIGHTING (EXT): REAR COMBINATION LIGHT ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE LUGGAGE COMPARTMENT FLOOR MAT

2. REMOVE REAR FLOOR FINISH PLATE

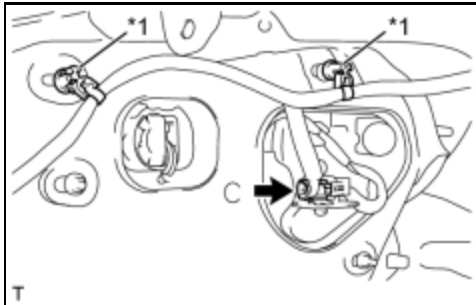


(a) Using a clip remover, remove the 3 clips.

(b) Disengage the 4 claws to remove the rear floor finish plate.

3. REMOVE LUGGAGE COMPARTMENT INNER TRIM COVER LH INFO

4. REMOVE REAR COMBINATION LIGHT ASSEMBLY



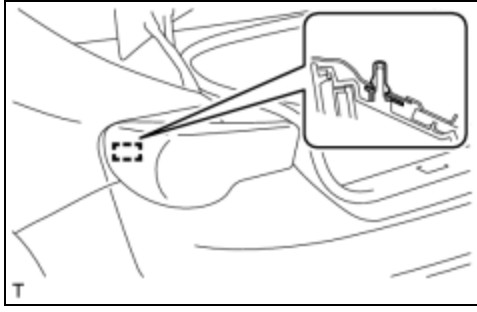
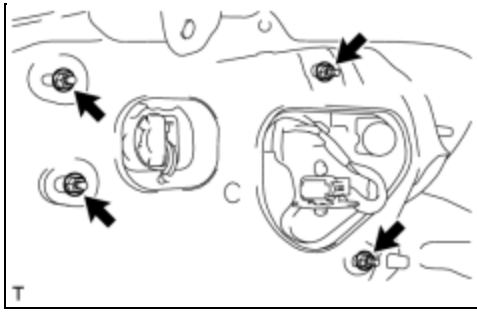
(a) Disconnect the connector.

(b) Disengage the 2 grommets and disconnect the wire harness.

Text in Illustration

*1	Grommet
----	---------

(c) Remove the 4 nuts.

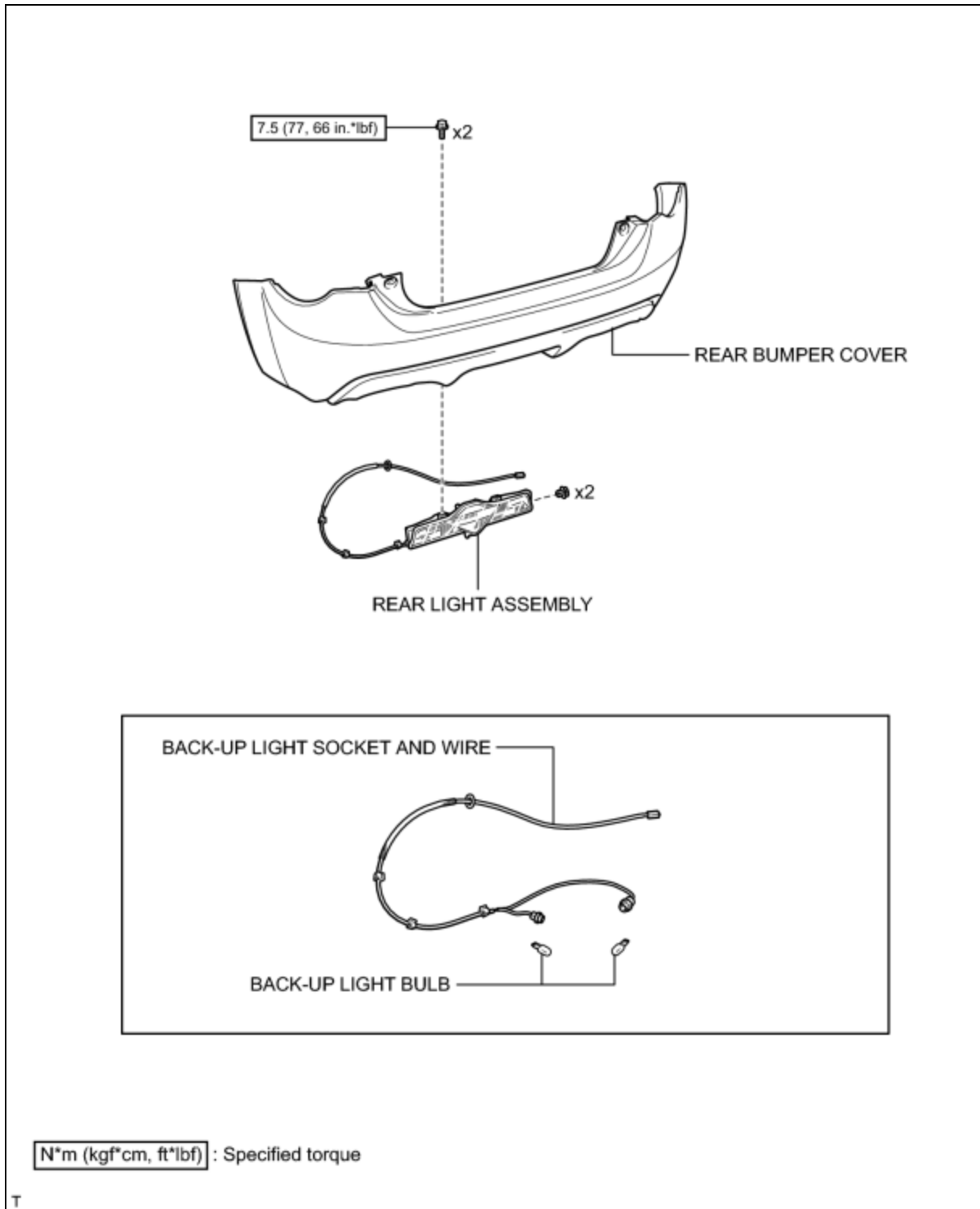


(d) Disengage the guide to remove the rear combination light assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MVP015X
Title: LIGHTING (EXT): REAR LIGHT ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



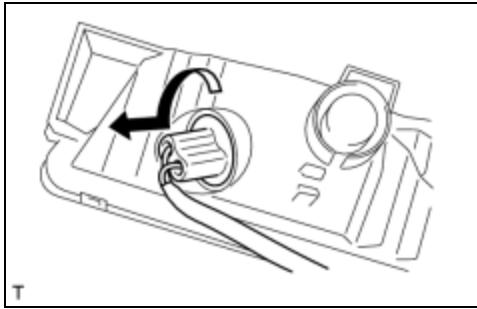
N*m (kgf*cm, ft*lbf) : Specified torque

T

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003N9F015X
Title: LIGHTING (EXT): REAR LIGHT ASSEMBLY: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. REMOVE BACK-UP LIGHT BULB



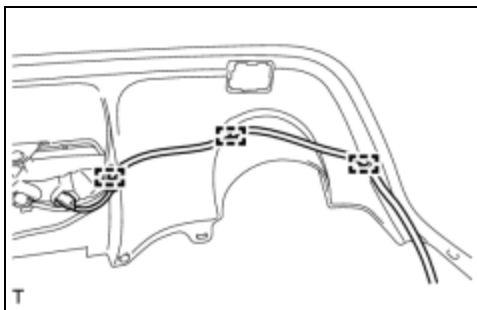
- (a) Turn the back-up light socket and wire with the back-up light bulb in the direction indicated by the arrow shown in the illustration and remove them as a unit.

- (b) Remove the back-up light bulb from the rear light socket and wire.

HINT:

Use the same procedure for the LH side and RH side.

2. REMOVE BACK-UP LIGHT SOCKET AND WIRE

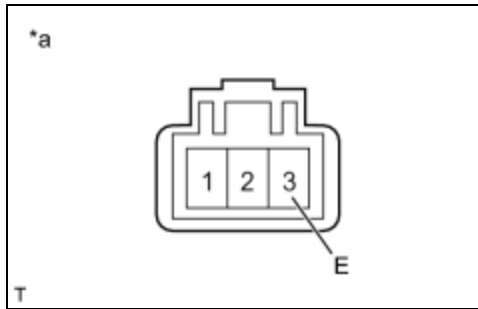


- (a) Disengage the 2 clamps to remove the back-up light socket and wire.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000202E060X
Title: LIGHTING (EXT): REAR LIGHT ASSEMBLY: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT BACK-UP LIGHT SOCKET AND WIRE



(a) Apply battery voltage to the connector and check the light comes on.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

CONDITION	SPECIFIED CONDITION
Battery positive (+) → 1 Battery negative (-) → 3 (E)	Back-up light comes on

Text in Illustration

*a	Component without harness connected (Back-Up Light Socket and Wire)
----	--

If the result is not as specified, replace the bulb or the back-up light socket and wire.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MVO01DX
Title: LIGHTING (EXT): REAR LIGHT ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL REAR LIGHT ASSEMBLY

- (a) Engage the claw to install the rear light assembly.
- (b) Install the 2 bolts.
Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)
- (c) Install the 2 clips.

2. INSTALL REAR BUMPER COVER

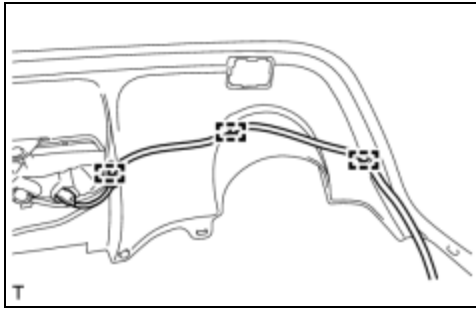
INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003N9G015X
Title: LIGHTING (EXT): REAR LIGHT ASSEMBLY: REASSEMBLY (2013 FR-S)		

REASSEMBLY

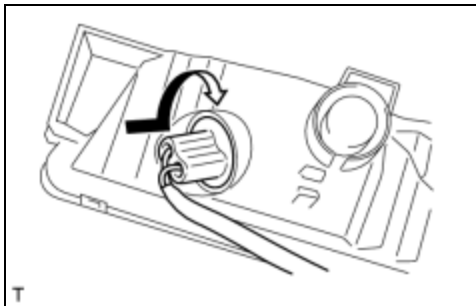
1. INSTALL BACK-UP LIGHT SOCKET AND WIRE



- (a) Engage the 2 clamps to install the back-up light socket and wire.

2. INSTALL BACK-UP LIGHT BULB

- (a) Install the back-up light bulb to the back-up light socket and wire.



- (b) Turn the back-up light socket and wire with the back-up light bulb in the direction indicated by the arrow shown in the illustration to install them as a unit.

HINT:

Use the same procedure for the LH side and RH side.

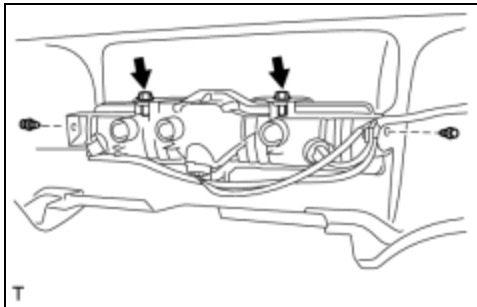
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MVQ01DX
Title: LIGHTING (EXT): REAR LIGHT ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE REAR BUMPER COVER

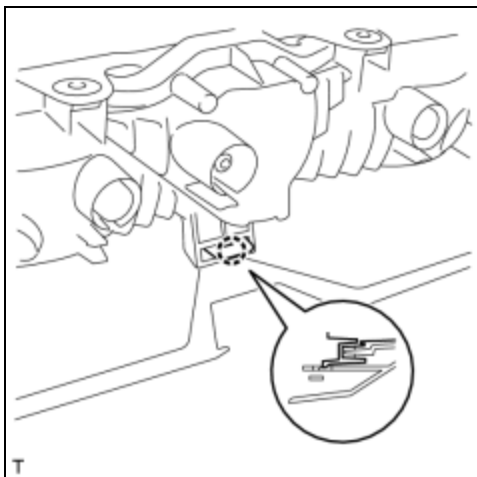
INFO

2. REMOVE REAR LIGHT ASSEMBLY



(a) Using a clip remover, remove the 2 clips.

(b) Remove the 2 bolts.



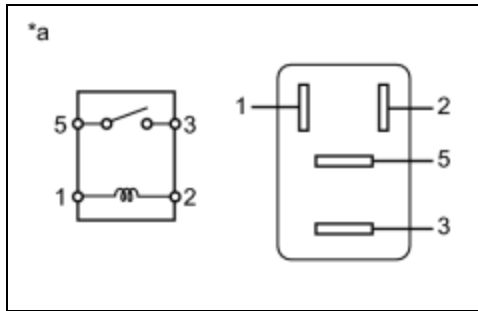
(c) Disengage the claw to remove the rear light assembly.



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001UPP059X
Title: LIGHTING (EXT): RELAY: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT H-LP RELAY



(a) Remove the H-LP relay from the engine room relay block.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

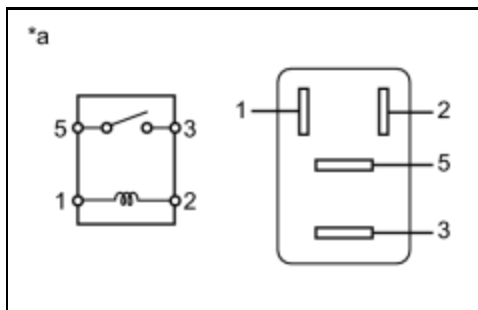
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 5	Voltage is not applied between terminals 1 and 2	10 k Ω or higher
3 - 5	Voltage is applied between terminals 1 and 2	Below 1 Ω

Text in Illustration

*a	Component without harness connected (H-LP Relay)
----	---

If the result is not as specified, replace the H-LP relay.

2. INSPECT DIM RELAY



(a) Remove the DIM relay from the engine room relay block.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

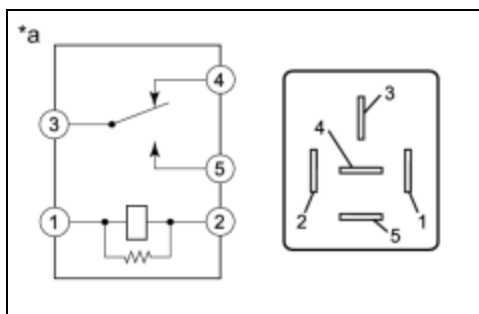
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 5	Voltage is not applied between terminals 1 and 2	10 k Ω or higher
3 - 5	Voltage is applied between terminals 1 and 2	Below 1 Ω

Text in Illustration

*a	Component without harness connected (DIM Relay)
----	--

If the result is not as specified, replace the DIM relay.

3. INSPECT DRL RELAY



(a) Remove the DRL relay from the engine room relay block.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 4	Battery voltage not applied	Below 1 Ω
3 - 4	Battery voltage applied to terminals 1 and 2	10 k Ω or higher
3 - 5	Battery voltage not applied	10 k Ω or higher
3 - 5	Battery voltage applied to terminals 1 and 2	Below 1 Ω

Text in Illustration

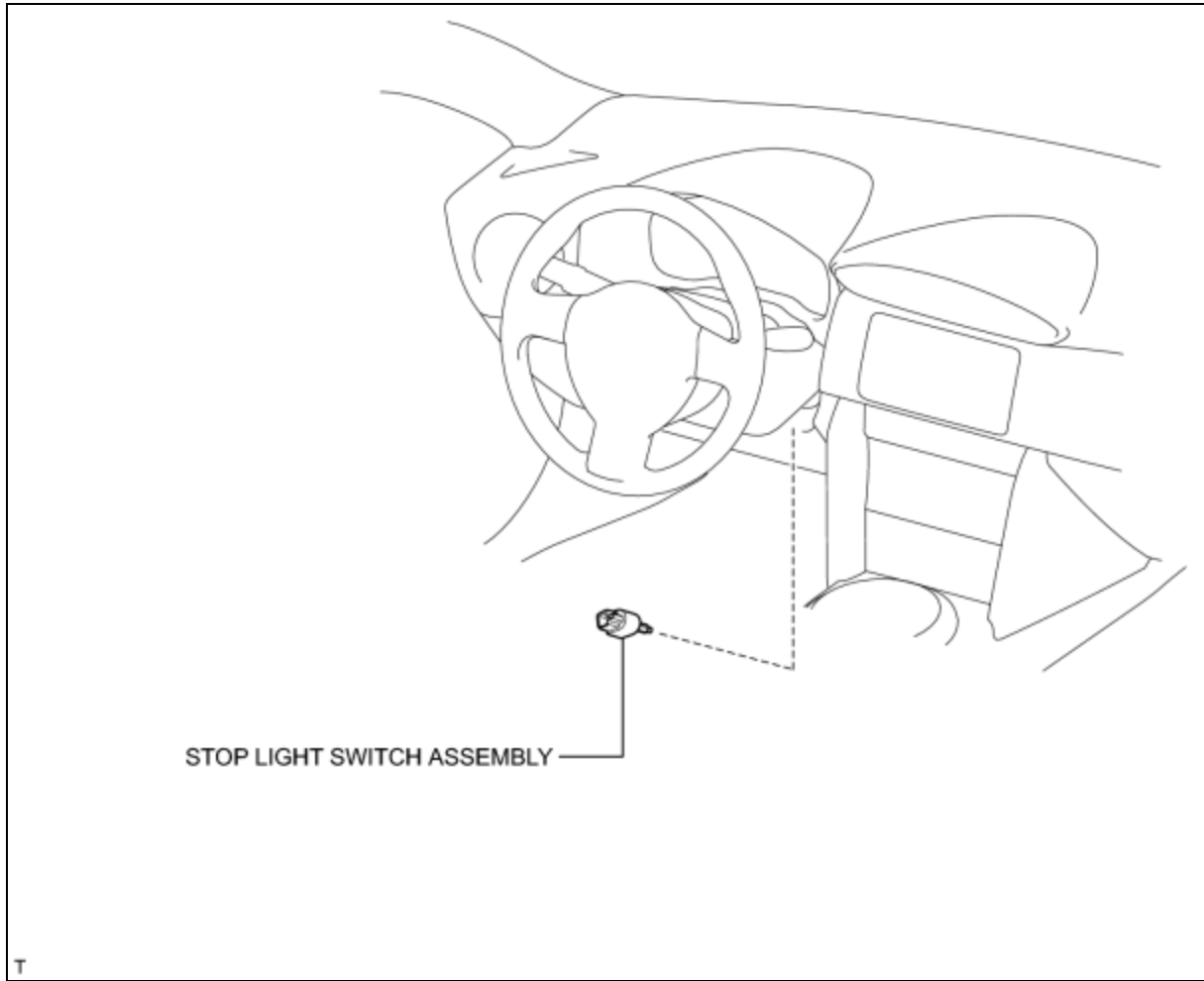
*a	Component without harness connected (DRL Relay)
----	--

If the result is not as specified, replace the DRL relay.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MWA011X
Title: LIGHTING (EXT): STOP LIGHT SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



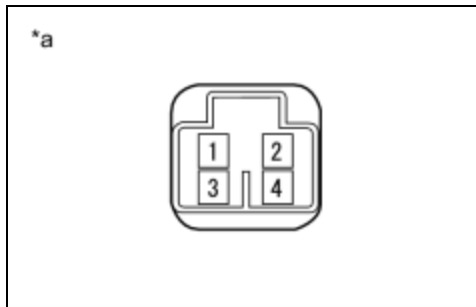
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001UPN02JX
Title: LIGHTING (EXT): STOP LIGHT SWITCH: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT STOP LIGHT SWITCH ASSEMBLY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 - 2	Pushed	10 k Ω or higher
	Not pushed	Below 1 Ω

Text in Illustration

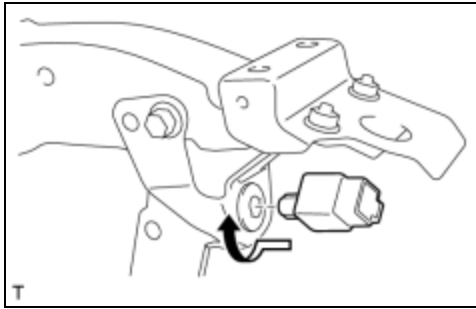
*a	Component without harness connected (Stop Light Switch Assembly)
----	---

If the result is not as specified, replace the stop light switch assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MW901XX
Title: LIGHTING (EXT): STOP LIGHT SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

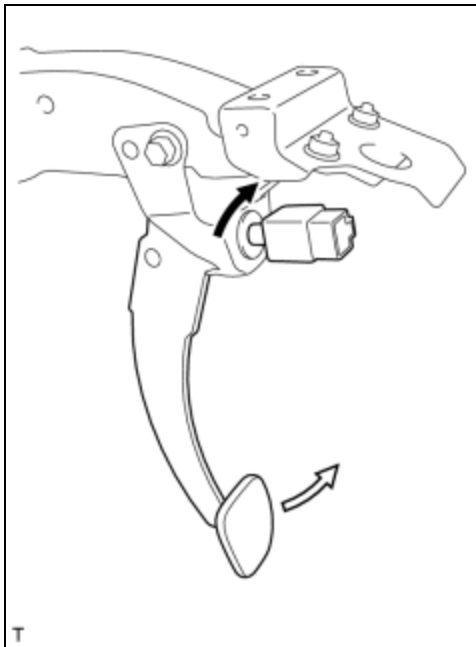
1. INSTALL STOP LIGHT SWITCH ASSEMBLY



- (a) Insert the stop light switch assembly until the threaded sleeve hits the pedal.

NOTICE:

When inserting the stop light switch assembly, support the pedal from behind so that the pedal is not pushed in.



- (b) Pull up the brake pedal.

- (c) Turn the stop light switch assembly in the direction indicated by the arrow in the illustration and install it.

NOTICE:

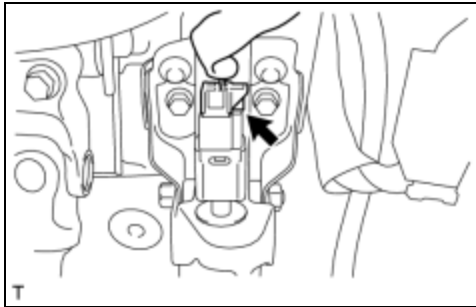
When inserting the stop light switch assembly, support the pedal from behind so that the pedal is not pushed in.

- (d) Connect the connector.

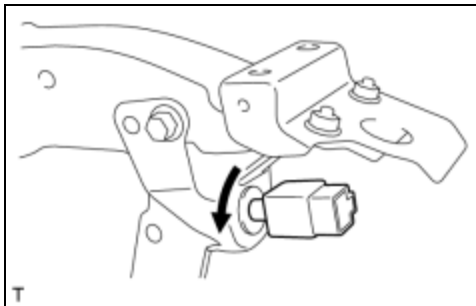
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MWB01YX
Title: LIGHTING (EXT): STOP LIGHT SWITCH: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE STOP LIGHT SWITCH ASSEMBLY



(a) Disconnect the connector.

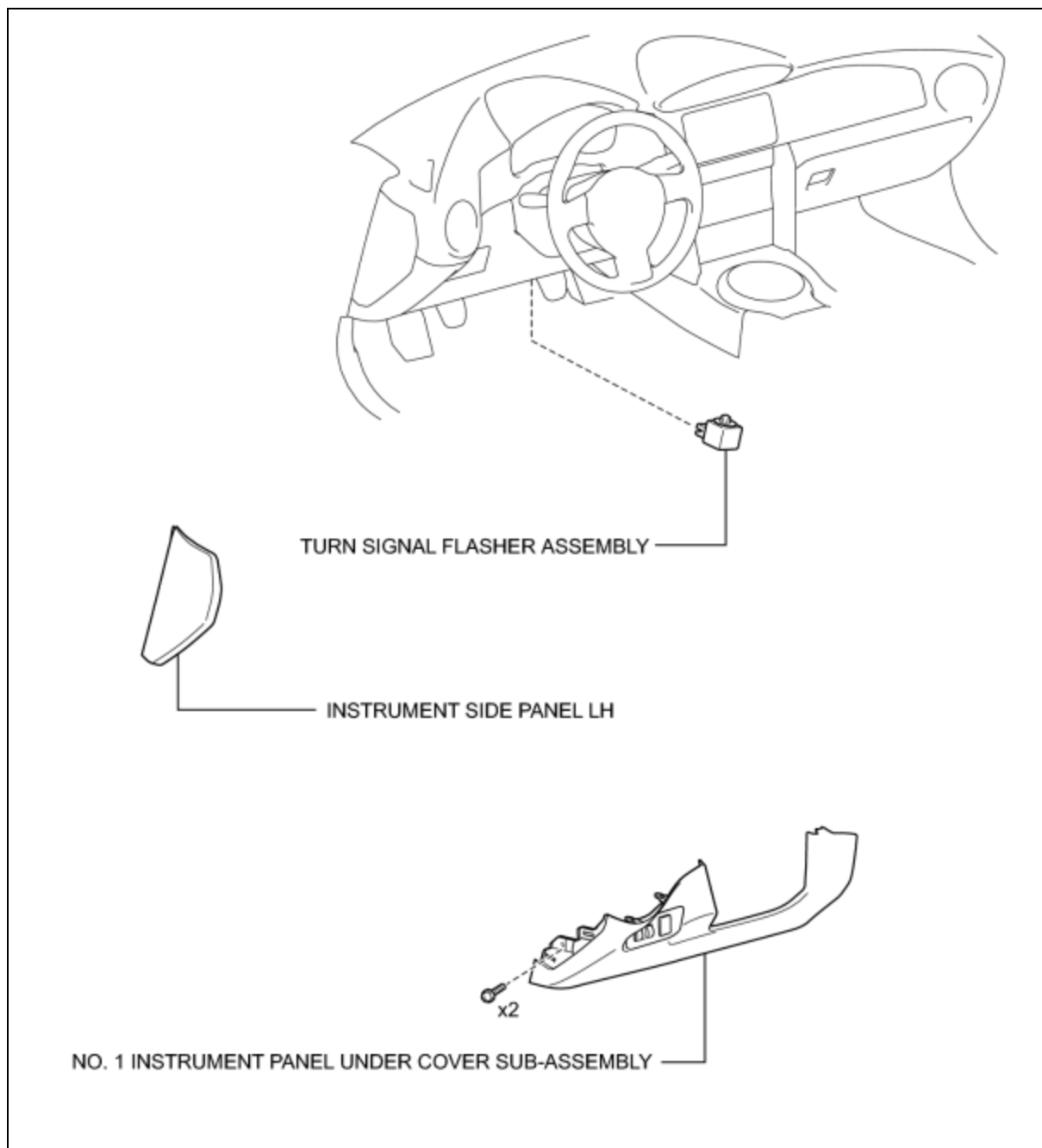


(b) Turn the stop light switch assembly counterclockwise and remove it.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MWM016X
Title: LIGHTING (EXT): TURN SIGNAL FLASHER ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

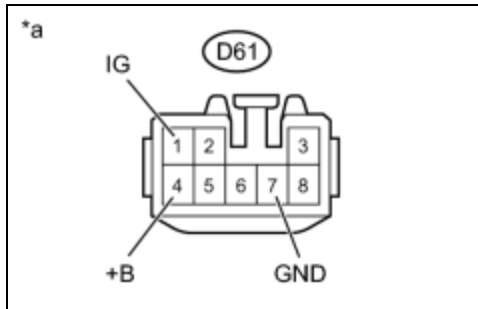
ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001ZTV078X
Title: LIGHTING (EXT): TURN SIGNAL FLASHER ASSEMBLY: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT TURN SIGNAL FLASHER ASSEMBLY



(a) Disconnect the D61 turn signal flasher assembly connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D61-4 (+B) - Body ground	Ignition switch off	Below 1 V
	Ignition switch ON	11 to 14 V
D61-1 (IG) - Body ground	Always	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Turn Signal Flasher Assembly)
----	---

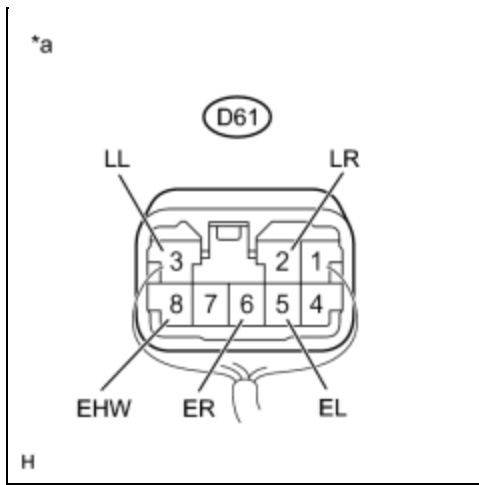
If the result is not as specified, repair or replace the wire harness or connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D61-7 (GND) - Body ground	Always	Below 1 Ω

If the result is not as specified, repair or replace the wire harness or connector.



(d) Reconnect the D61 turn signal flasher assembly connector.

(e) Measure the voltage according to the valve(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D61-6 (ER) - Body ground	Turn signal switch in RH position OFF to ON	9 V or higher to below 1 V
D61-5 (EL) - Body ground	Turn signal switch in LH position OFF to ON	9 V or higher to below 1 V
D61-8 (EHW) - Body ground	Hazard warning switch OFF to ON	9 V or higher to below 1 V
D61-2 (LR) - Body ground	Turn signal switch in RH position OFF to ON	Below 1 V to 9 V (60 to 120 times per minute)
D61-3 (LL) - Body ground	Turn signal switch in LH position OFF to ON	Below 1 V to 9 V (60 to 120 times per minute)
D61-2 (LR) - Body ground	Hazard warning switch OFF to ON	Below 1 V to 9 V (60 to 120 times per minute)
D61-3 (LL) - Body ground	Hazard warning switch OFF to ON	Below 1 V to 9 V (60 to 120 times per minute)

Text in Illustration

*a	Component with harness connected (Turn Signal Flasher Assembly)
----	--

If the result is not as specified, the turn signal flasher assembly may have a malfunction.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MWL01JX
Title: LIGHTING (EXT): TURN SIGNAL FLASHER ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL TURN SIGNAL FLASHER ASSEMBLY

- (a) Connect the connector.
- (b) Engage the clamp to install the turn signal flasher assembly.

2. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)

3. INSTALL INSTRUMENT SIDE PANEL LH [INFO](#)



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MWN01JX
Title: LIGHTING (EXT): TURN SIGNAL FLASHER ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

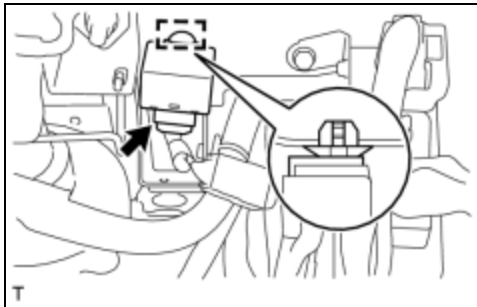
1. REMOVE INSTRUMENT SIDE PANEL LH

[INFO](#)

2. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

[INFO](#)

3. REMOVE TURN SIGNAL FLASHER ASSEMBLY



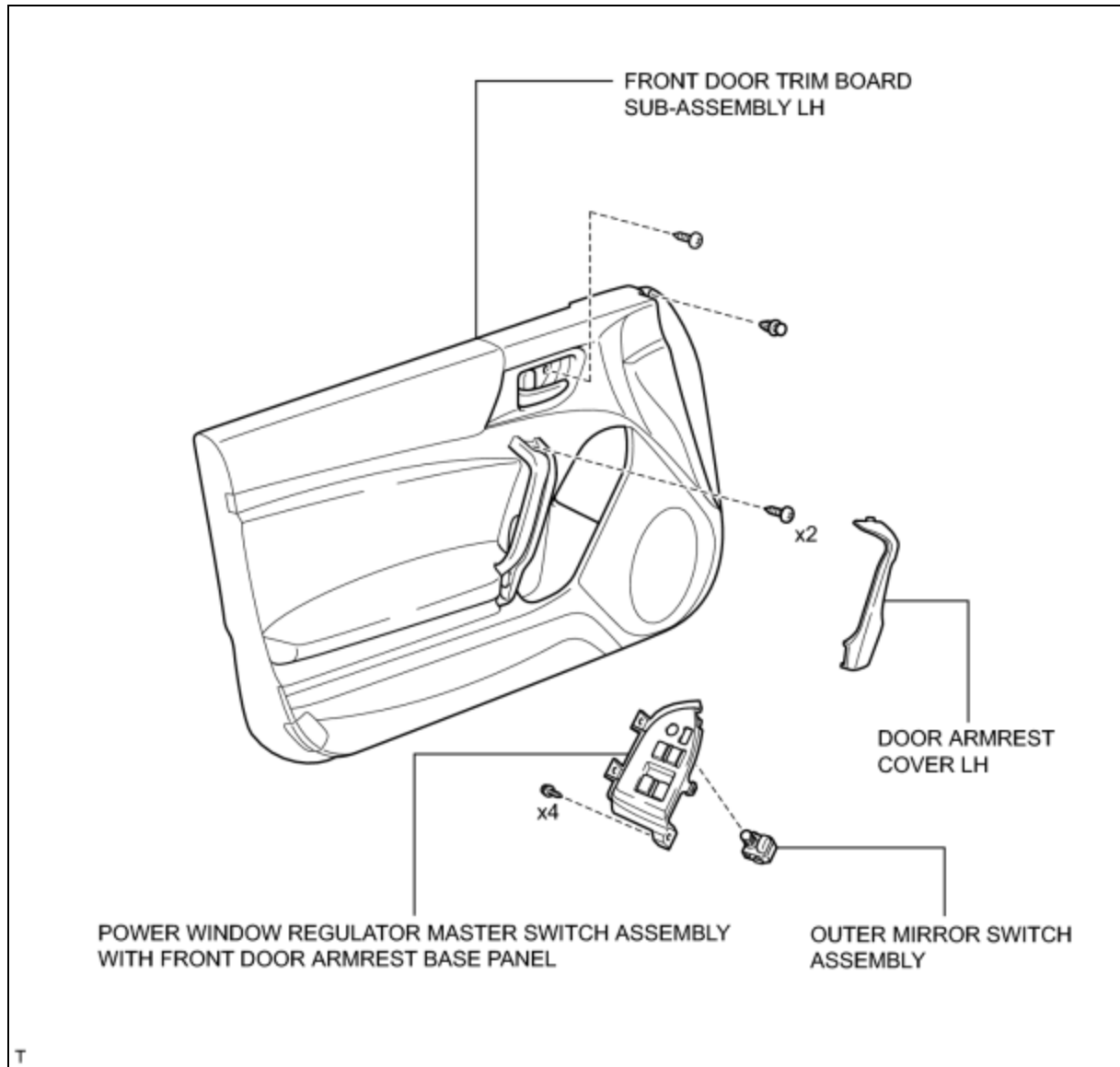
(a) Using a clip remover, disengage the clamp.

(b) Disconnect the connector to remove the turn signal flasher assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PGN01TX
Title: MIRROR (EXT): OUTER MIRROR SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000015DS072X
Title: MIRROR (EXT): OUTER MIRROR SWITCH: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT OUTER MIRROR SWITCH ASSEMBLY

(a) Check the switch functions.

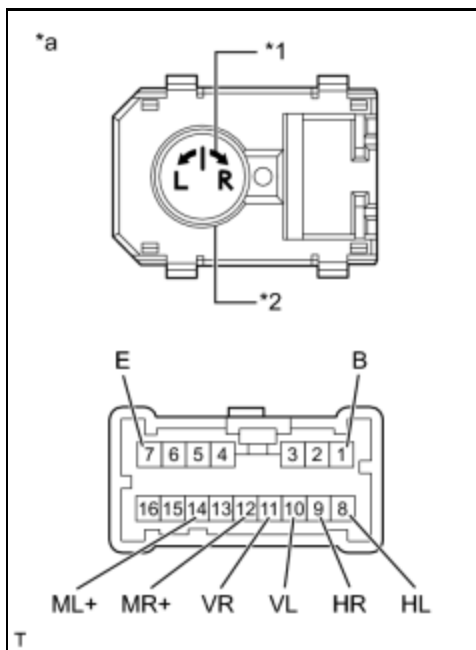
(1) Turn the mirror select switch to the L position.

(2) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*1	Mirror Select Switch
*2	Mirror Surface Adjust Switch
*a	Component without harness connected (Outer Mirror Switch Assembly)

Standard Resistance (for left side):



TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 (B) - 14 (ML+) 10 (VL) - 7 (E)	UP	Below 1 Ω
1 (B) - 10 (VL) 14 (ML+) - 7 (E)	DOWN	Below 1 Ω
1 (B) - 8 (HL) 14 (ML+) - 7 (E)	LEFT	Below 1 Ω
1 (B) - 14 (ML+) 8 (HL) - 7 (E)	RIGHT	Below 1 Ω

(3) Turn the mirror select switch to the R position.

(4) Measure the resistance according to the value(s) in the table below.

Standard Resistance (for right side):

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 (B) - 12 (MR+) 11 (VR) - 7 (E)	UP	Below 1 Ω
1 (B) - 11 (VR) 12 (MR+) - 7 (E)	DOWN	Below 1 Ω
1 (B) - 9 (HR)		

12 (MR+) - 7 (E)	LEFT	Below 1 Ω
1 (B) - 12 (MR+) 9 (HR) - 7 (E)	RIGHT	Below 1 Ω

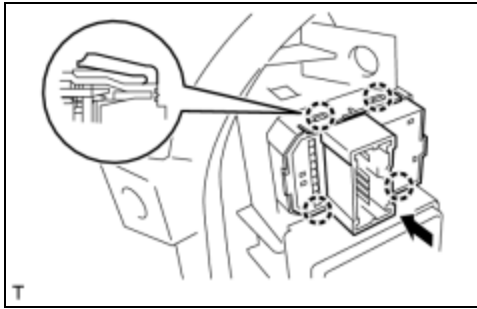
If the result is not as specified, replace the outer mirror switch assembly.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003DK602SX
Title: MIRROR (EXT): OUTER MIRROR SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL OUTER MIRROR SWITCH ASSEMBLY



(a) Engage the 4 claws and install the outer mirror switch assembly.

2. INSTALL POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY WITH FRONT DOOR ARMREST BASE PANEL [INFO](#)

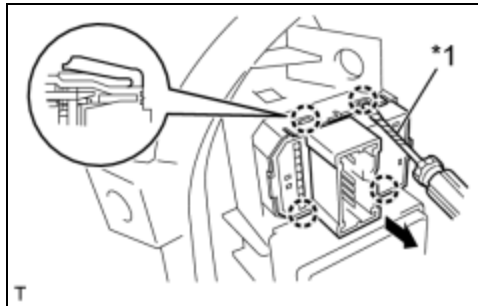
3. INSTALL FRONT DOOR TRIM BOARD SUB-ASSEMBLY LH [INFO](#)

4. INSTALL DOOR ARMREST COVER LH [INFO](#)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003DK802MX
Title: MIRROR (EXT): OUTER MIRROR SWITCH: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE DOOR ARMREST COVER LH [INFO](#)
2. REMOVE FRONT DOOR TRIM BOARD SUB-ASSEMBLY LH [INFO](#)
3. REMOVE POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY WITH FRONT DOOR ARMREST BASE PANEL [INFO](#)
4. REMOVE OUTER MIRROR SWITCH ASSEMBLY



- (a) Using a screwdriver with its tip wrapped in protective tape, disengage the 4 claws and remove the outer mirror switch assembly.

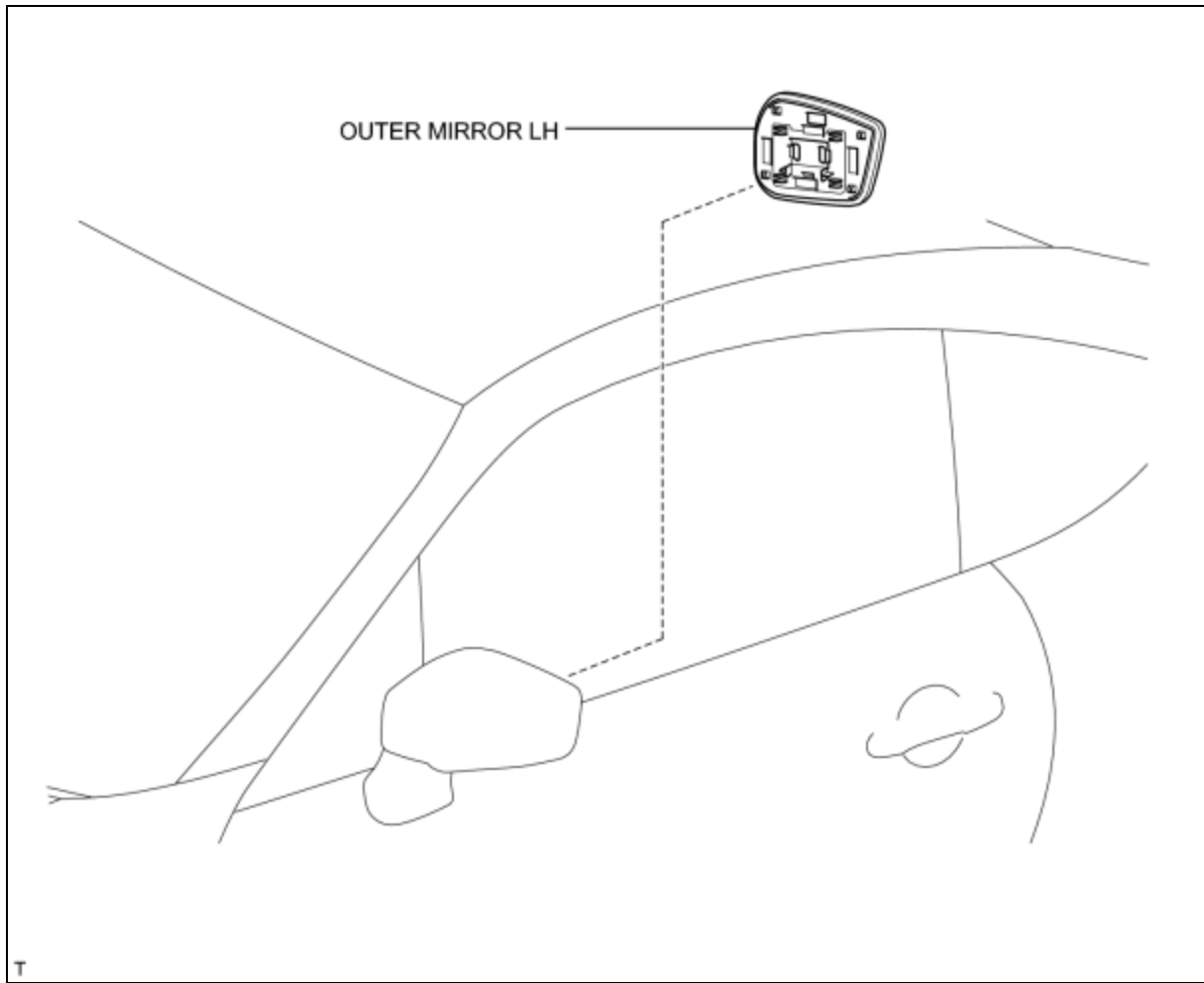
Text in Illustration

*1	Protective Tape
----	-----------------

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PGK03SX
Title: MIRROR (EXT): OUTER REAR VIEW MIRROR GLASS: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION

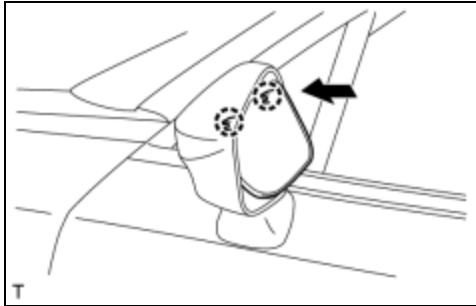


Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003EWR01MX
Title: MIRROR (EXT): OUTER REAR VIEW MIRROR GLASS: INSTALLATION (2013 FR-S)		

INSTALLATION

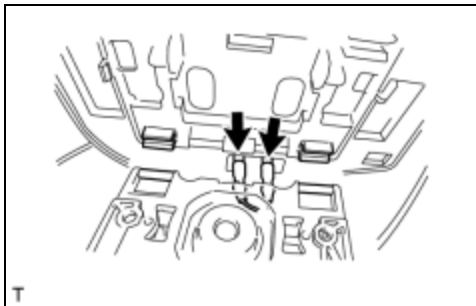
1. INSTALL OUTER MIRROR LH

(a) w/o Mirror Heater:

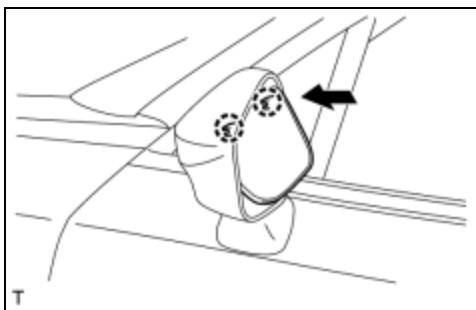


(1) Engage the 2 claws on the upper part of the outer rear view mirror sub-assembly LH to the outer mirror LH.

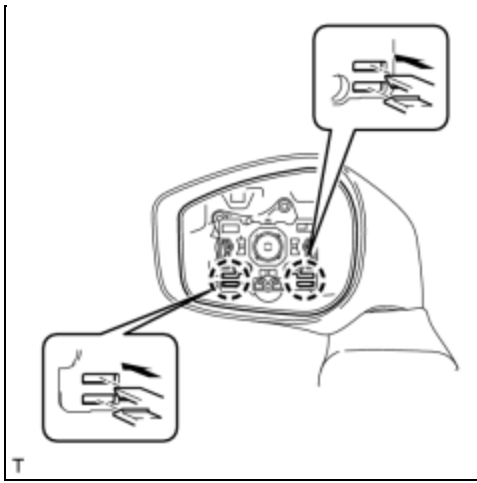
(b) w/ Mirror Heater:



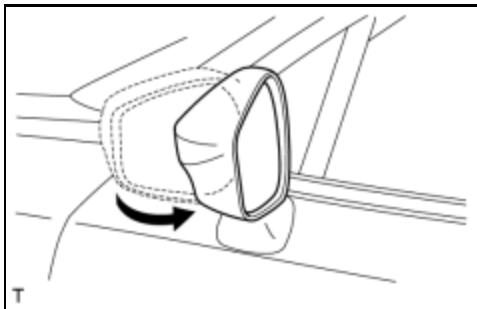
(1) Connect the 2 connectors.



(2) Engage the 2 claws on the upper part of the outer rear view mirror sub-assembly LH to the outer mirror LH.



(c) Engage the 2 claws on the lower part of the outer rear view mirror sub-assembly LH to the outer mirror LH as shown in the illustration.



(d) Push the outside part of the outer rear view mirror sub-assembly LH and tilt it as show in the illustration.

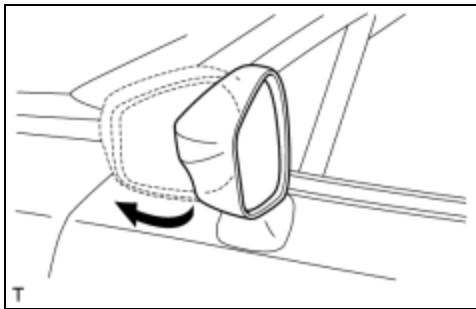
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001Q5703WX
Title: MIRROR (EXT): OUTER REAR VIEW MIRROR GLASS: REMOVAL (2013 FR-S)		

REMOVAL

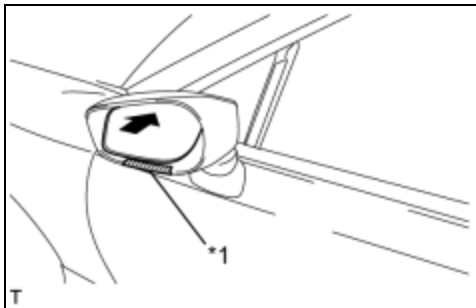
HINT:

- Use the same procedure for both the RH and LH sides.
- The following procedure is for the LH side.

1. REMOVE OUTER MIRROR LH



- (a) Push the outside part of the outer rear view mirror sub-assembly LH and tilt it as show in the illustration.



- (b) Push the upper part of the mirror surface and tilt it.

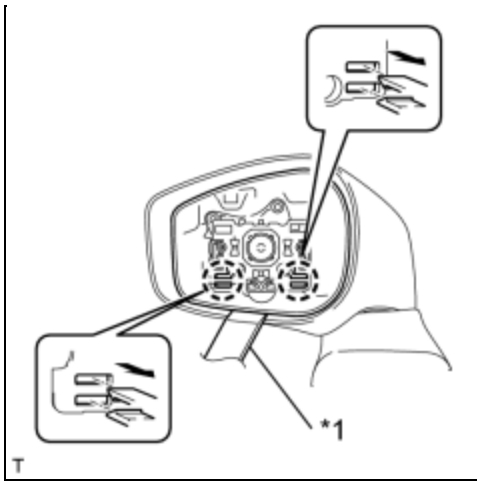
- (c) Apply protective tape as shown in the illustration.

Text in Illustration

*1	Protective Tape
----	-----------------

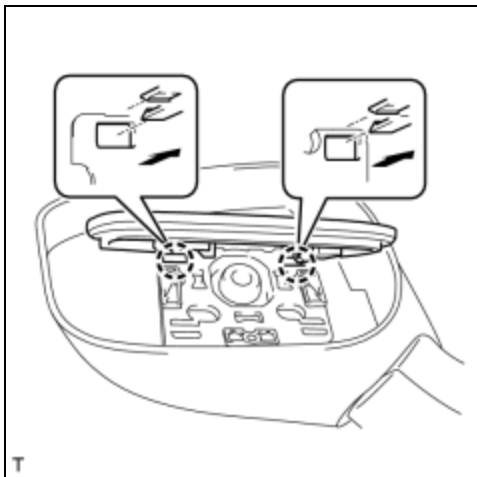
- (d) Using a moulding remover, disengage the 2 claws at the lower part of the outer rear view mirror sub-assembly LH, and separate the outer mirror LH.

Text in Illustration



*1	Moulding Remover
----	------------------

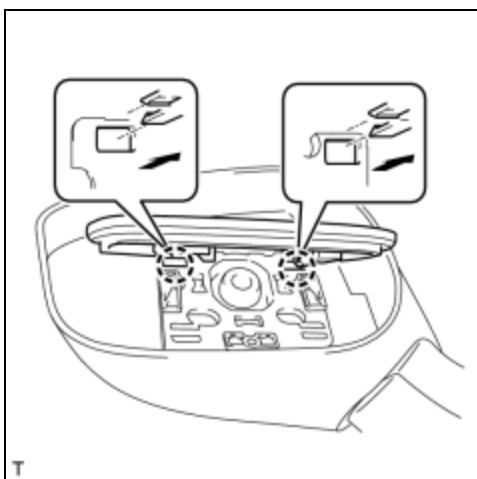
(e) w/o Mirror Heater:



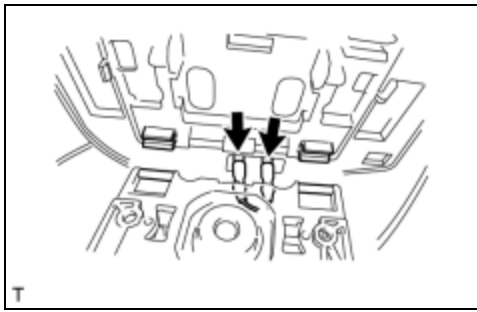
(1) Disengage the 2 claws at the upper part of the outer mirror LH.

(2) Remove the outer mirror LH.

(f) w/ Mirror Heater:



(1) Disengage the 2 claws at the upper part of the outer mirror LH.

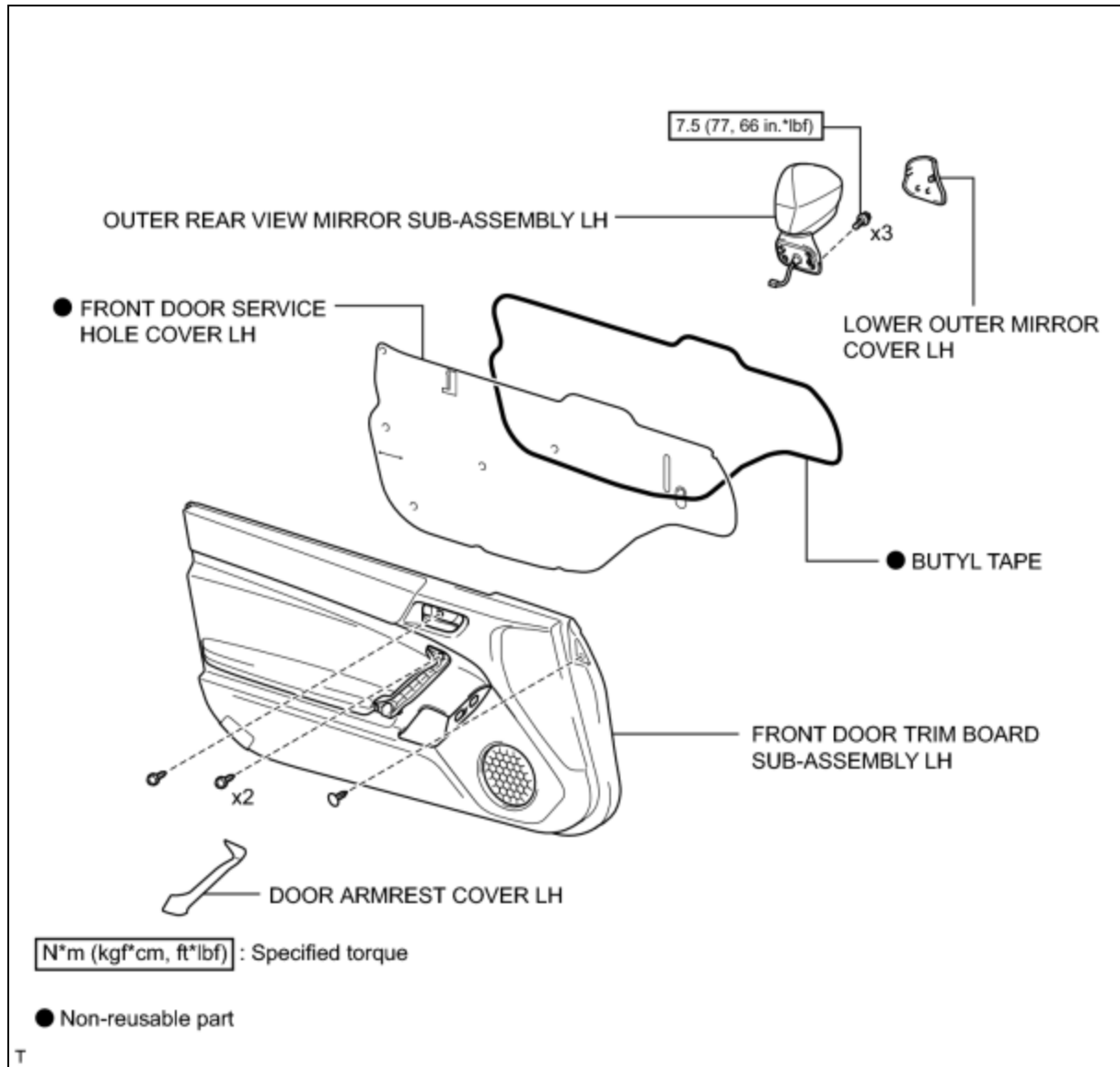


(2) Disconnect the 2 connectors and remove the outer mirror LH.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PGQ04WX
Title: MIRROR (EXT): OUTER REAR VIEW MIRROR: COMPONENTS (2013 FR-S)		

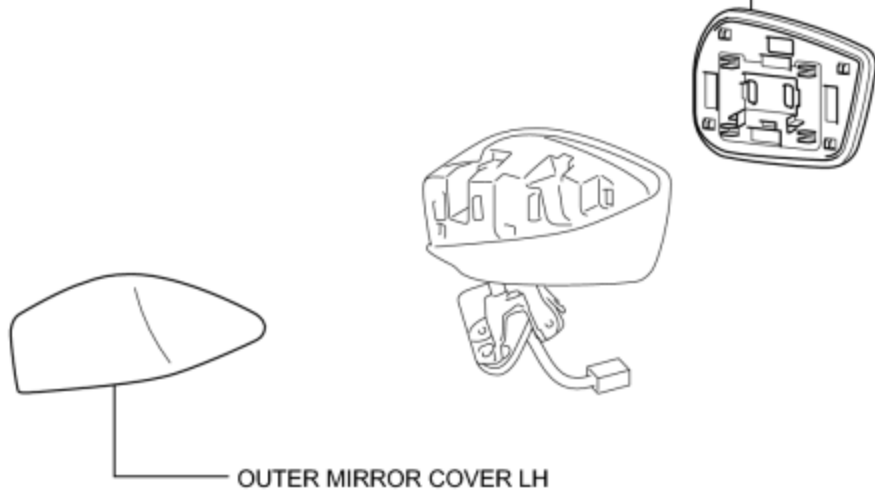
COMPONENTS

ILLUSTRATION



ILLUSTRATION

OUTER MIRROR LH



T

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000044KC00PX
Title: MIRROR (EXT): OUTER REAR VIEW MIRROR: DISASSEMBLY (2013 FR-S)		

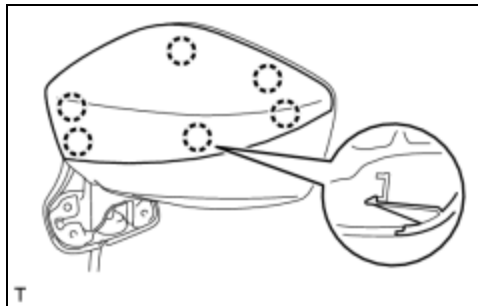
DISASSEMBLY

HINT:

- Use the same procedure for both the RH and LH sides.
- The following procedure is for the LH side.

1. REMOVE OUTER MIRROR LH INFO

2. REMOVE OUTER MIRROR COVER LH



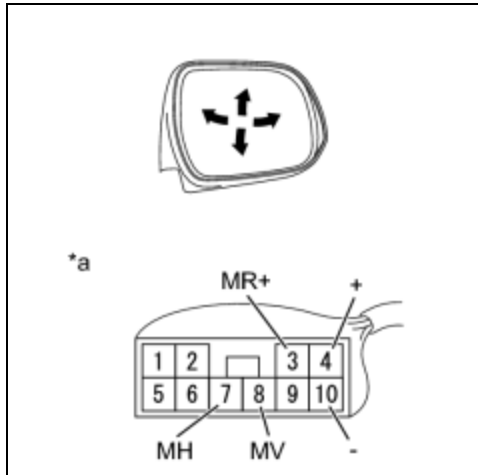
(a) Disengage the 6 claws and remove the outer mirror cover LH.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000014YH04VX
Title: MIRROR (EXT): OUTER REAR VIEW MIRROR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT OUTER REAR VIEW MIRROR SUB-ASSEMBLY RH

- (a) Check the operation of the mirror surface.



- (1) Disconnect the outer rear view mirror sub-assembly RH connector.

- (2) Apply battery voltage and check the operation of the mirror.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
Battery positive (+) → Terminal 3 (MR+) Battery negative (-) → Terminal 8 (MV)	Turns upward
Battery positive (+) → Terminal 8 (MV) Battery negative (-) → Terminal 3 (MR+)	Turns downward
Battery positive (+) → Terminal 3 (MR+) Battery negative (-) → Terminal 7 (MH)	Turns right
Battery positive (+) → Terminal 7 (MH) Battery negative (-) → Terminal 3 (MR+)	Turns left

Text in Illustration

*a	Component without harness connected (Outer Rear View Mirror Sub-assembly RH)
----	---

If the result is not as specified, replace the outer rear view mirror sub-assembly RH.

- (b) Check the operation of the mirror heater (w/ Mirror Heater).

- (1) Disconnect the outer rear view mirror sub-assembly RH connector.
Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 (+) - 10 (-)	25°C (75°F)	9.6 to 14.4 Ω

If the result is not as specified, replace the outer rear view mirror sub-assembly RH.

- (2) Connect the cable from the positive (+) terminal to terminal 4 (+) and the negative battery (-) terminal to terminal 10 (-), then check that the mirror becomes warm.

HINT:

It takes a short time for the mirror to become warm.

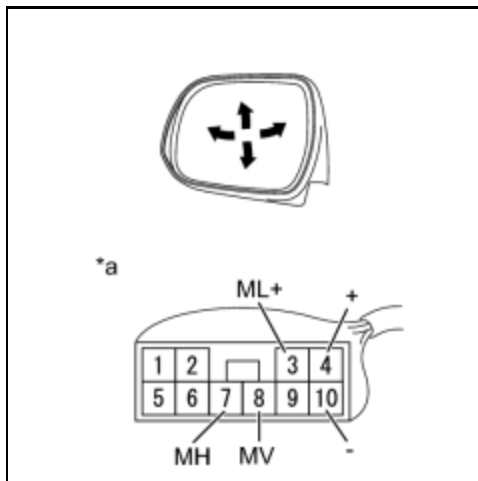
OK:

Mirror becomes warm.

If the result is not as specified, replace the outer rear view mirror sub-assembly RH.

2. INSPECT OUTER REAR VIEW MIRROR SUB-ASSEMBLY LH

- (a) Check the operation of the mirror surface.



- (1) Disconnect the outer rear view mirror sub-assembly LH connector.

- (2) Apply battery voltage and check the operation of the mirror.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
Battery positive (+) → Terminal 3 (ML+) Battery negative (-) → Terminal 8 (MV)	Turns upward
Battery positive (+) → Terminal 8 (MV) Battery negative (-) → Terminal 3 (ML+)	Turns downward
Battery positive (+) → Terminal 7 (MH) Battery negative (-) → Terminal 3 (ML+)	Turns left
Battery positive (+) → Terminal 3 (ML+)	

Battery negative (-) → Terminal 7 (MH)

Turns right

Text in Illustration

*a

Component without harness connected
(Outer Rear View Mirror Sub-assembly LH)

If the result is not as specified, replace the outer rear view mirror sub-assembly LH.

(b) Check the operation of the mirror heater (w/ Mirror Heater).

- (1) Disconnect the outer rear view mirror sub-assembly LH connector.
- (2) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 (+) - 10(-)	25°C (75°F)	9.6 to 14.4 Ω

If the result is not as specified, replace the outer rear view mirror sub-assembly LH.

- (3) Connect the cable from the positive (+) terminal to terminal 4 (+) and the negative battery (-) terminal to terminal 10 (-), then check that the mirror becomes warm.

HINT:

It takes a short time for the mirror to become warm.

OK:

Mirror becomes warm.

If the result is not as specified, replace the outer rear view mirror sub-assembly LH.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PGP091X
Title: MIRROR (EXT): OUTER REAR VIEW MIRROR: INSTALLATION (2013 FR-S)		

INSTALLATION

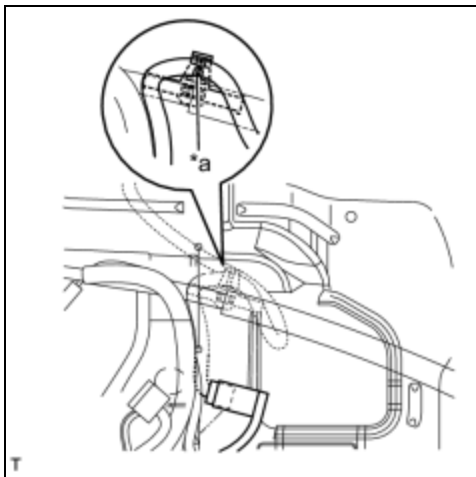
HINT:

- Use the same procedure for both the RH and LH sides.
- The following procedure is for the LH side.

1. INSTALL OUTER REAR VIEW MIRROR SUB-ASSEMBLY LH

- Retract the outer rear view mirror sub-assembly LH.
- Install the outer rear view mirror sub-assembly LH with the 3 bolts.

Torque: 7.5 N·m (77 kgf·cm, 6ft·lbf)



- Align the matchmark on the wire harness with the harness clip on the body side, and engage the wire harness.

*a	Matchmark
----	-----------

2. INSTALL LOWER OUTER MIRROR COVER LH

- Engage the 5 claws and install the lower outer mirror cover LH.

3. INSTALL FRONT DOOR SERVICE HOLE COVER LH INFO

4. INSTALL FRONT DOOR TRIM BOARD SUB-ASSEMBLY LH INFO

5. INSTALL DOOR ARMREST COVER LH INFO

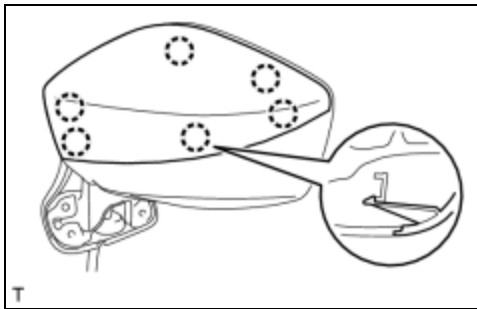
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000044KD00PX
Title: MIRROR (EXT): OUTER REAR VIEW MIRROR: REASSEMBLY (2013 FR-S)		

REASSEMBLY

HINT:

- Use the same procedure for both the RH and LH sides.
- The following procedure is for the LH side.

1. INSTALL OUTER MIRROR COVER LH



(a) Engage the 6 claws to install the outer mirror cover LH.

2. INSTALL OUTER MIRROR LH INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001PGR09CX
Title: MIRROR (EXT): OUTER REAR VIEW MIRROR: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

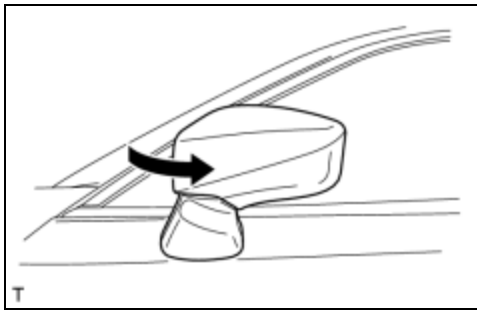
- Use the same procedure for both the RH and LH sides.
- The following procedure is for the LH side.

1. REMOVE DOOR ARMREST COVER LH INFO

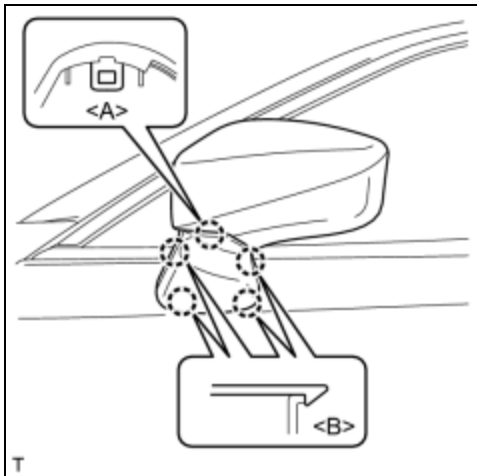
2. REMOVE FRONT DOOR TRIM BOARD SUB-ASSEMBLY LH INFO

3. REMOVE FRONT DOOR SERVICE HOLE COVER LH INFO

4. REMOVE LOWER OUTER MIRROR COVER LH



(a) Retract the outer rear view mirror sub-assembly LH.

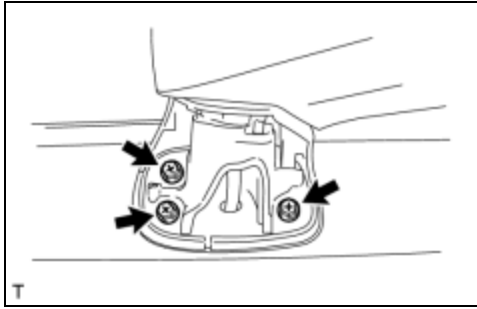


(b) Using a screwdriver with its tip wrapped in protective tape, disengage the claw<A>.

(c) Disengage the 4 claws and remove the lower outer mirror cover LH.

5. REMOVE OUTER REAR VIEW MIRROR SUB-ASSEMBLY LH

(a) Disengage the wire harness clip.



(b) Remove the 3 bolts and the outer rear view mirror sub-assembly LH.

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000030W901VX
Title: MIRROR (EXT): POWER MIRROR CONTROL SYSTEM: OPERATION CHECK (2013 FR-S)		

OPERATION CHECK

1. CHECK OUTER MIRROR SWITCH OPERATION

- (a) Turn the ignition switch to ACC.
- (b) With the mirror master switch set to L, check that the mirror surface moves up, down, left and right normally.
- (c) With the mirror master switch set to R, check that the mirror surface moves up, down, left and right normally.

2. CHECK MIRROR HEATER

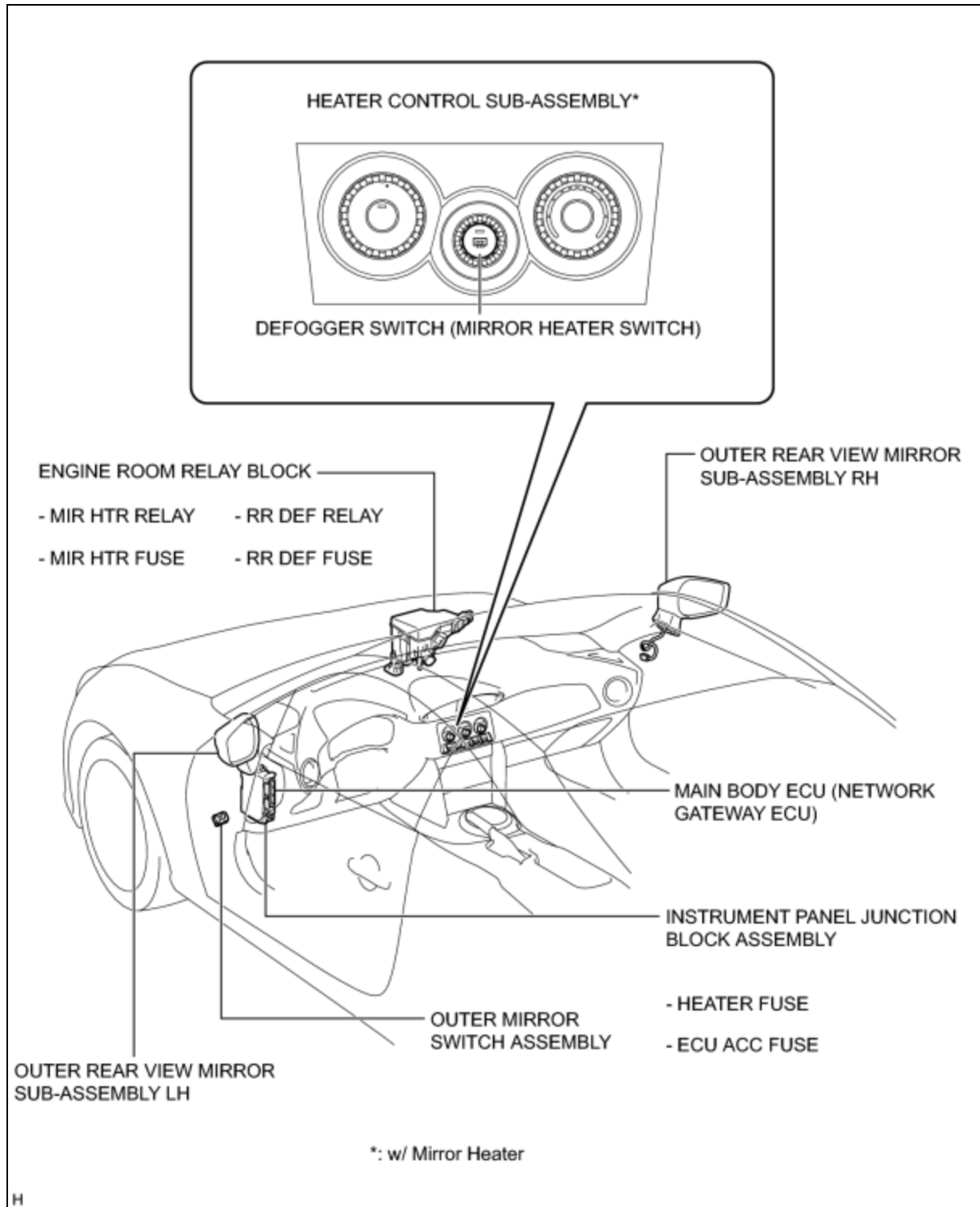
- (a) Turn the ignition switch to ON.
- (b) Check that pressing the mirror heater switch illuminates the indicator and warms the mirror surface.
- (c) Check that after approximately 15 minutes, the indicator light turns off and the mirror heater deactivates.



Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000030W7012X
Title: MIRROR (EXT): POWER MIRROR CONTROL SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



H

Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000030W8018X
Title: MIRROR (EXT): POWER MIRROR CONTROL SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

Power Mirror Control System

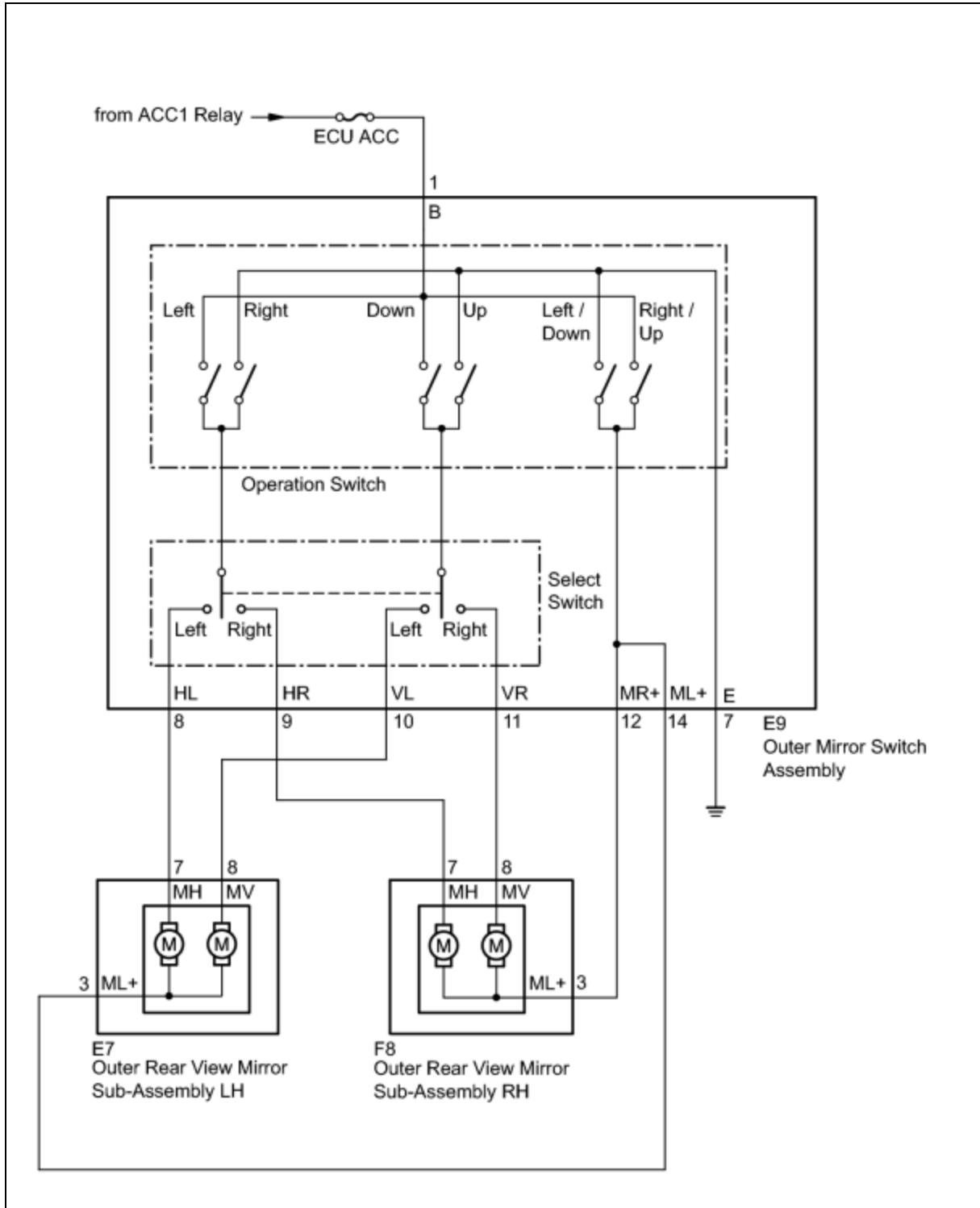
SYMPTOM	SUSPECTED AREA	SEE PAGE
Power retractable mirror does not operate*1	ACC fuse	-
	Outer mirror switch assembly	INFO
	Outer rear view mirror assembly LH	INFO
	Outer rear view mirror assembly RH	INFO
	Wire harness or connector	-
Mirror heater does not operate with rear defogger switch*2	MIR HTR fuse	-
	MIR HTR relay	-
	Outer rear view mirror assembly LH	INFO
	Outer rear view mirror assembly RH	INFO
	Wire harness or connector	-
	Window defogger system	INFO

*1: w/ Retract Mirror

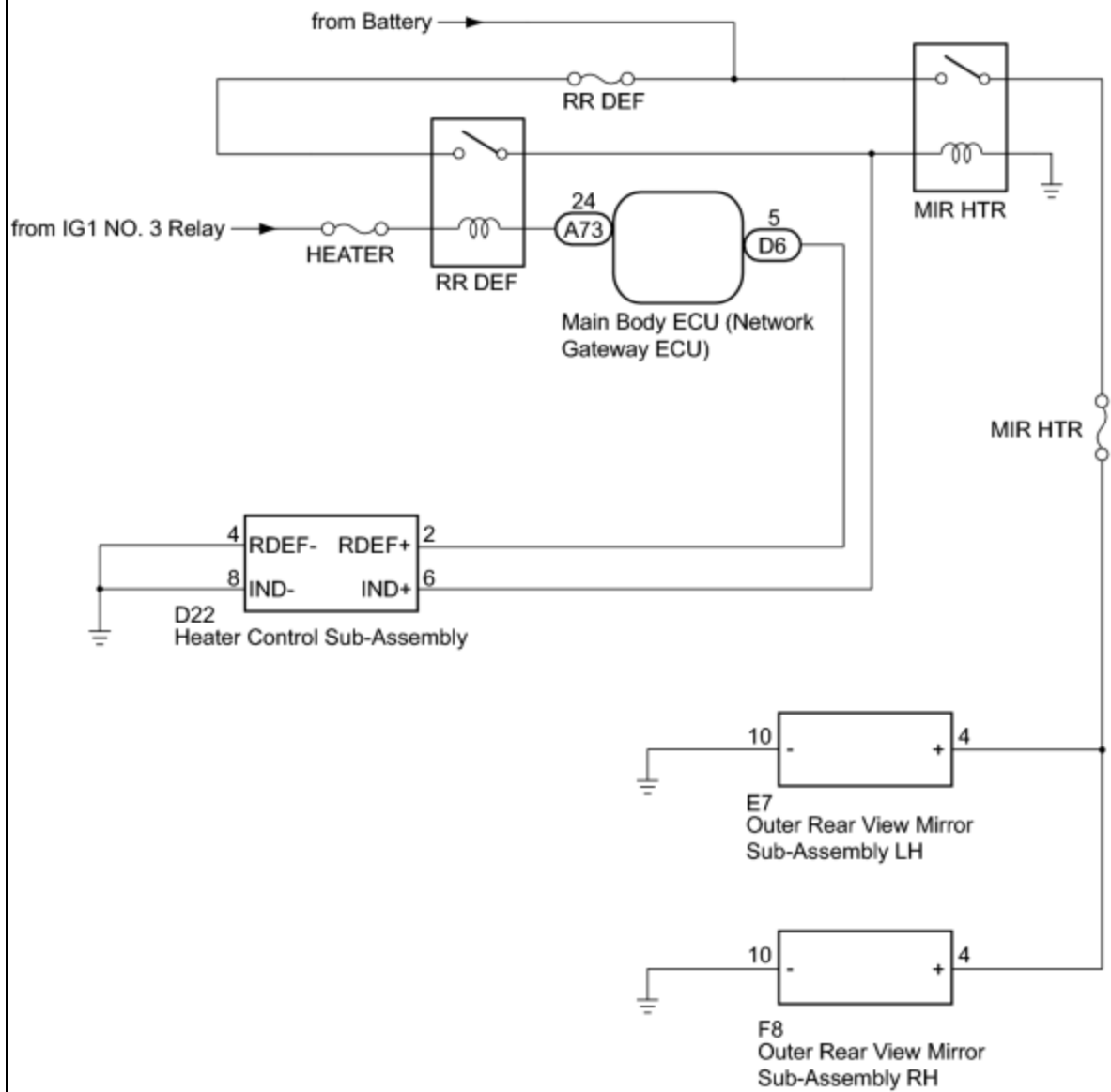
*2: w/ Mirror Heater

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000030WA017X
Title: MIRROR (EXT): POWER MIRROR CONTROL SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM



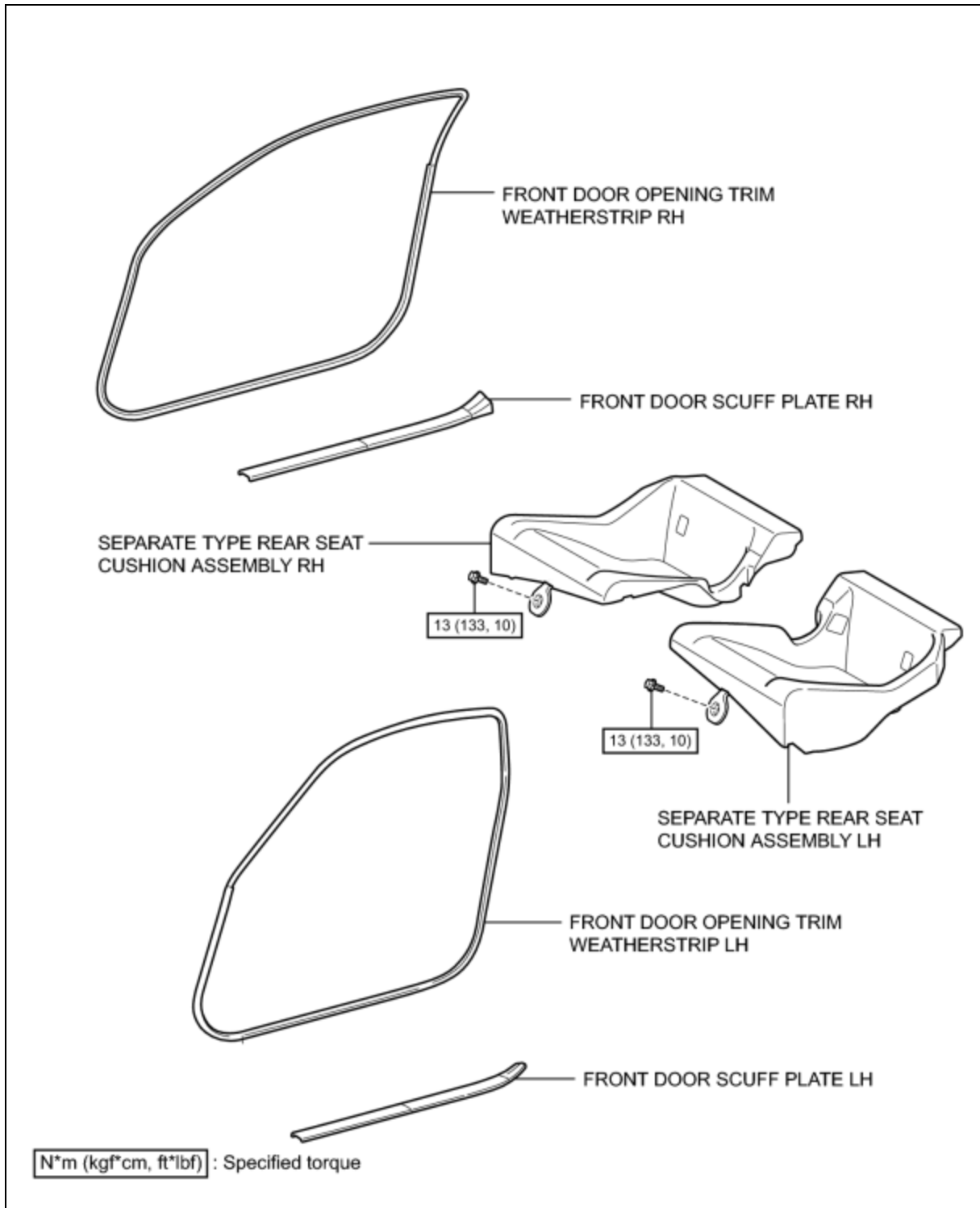
w/ Mirror Heater:



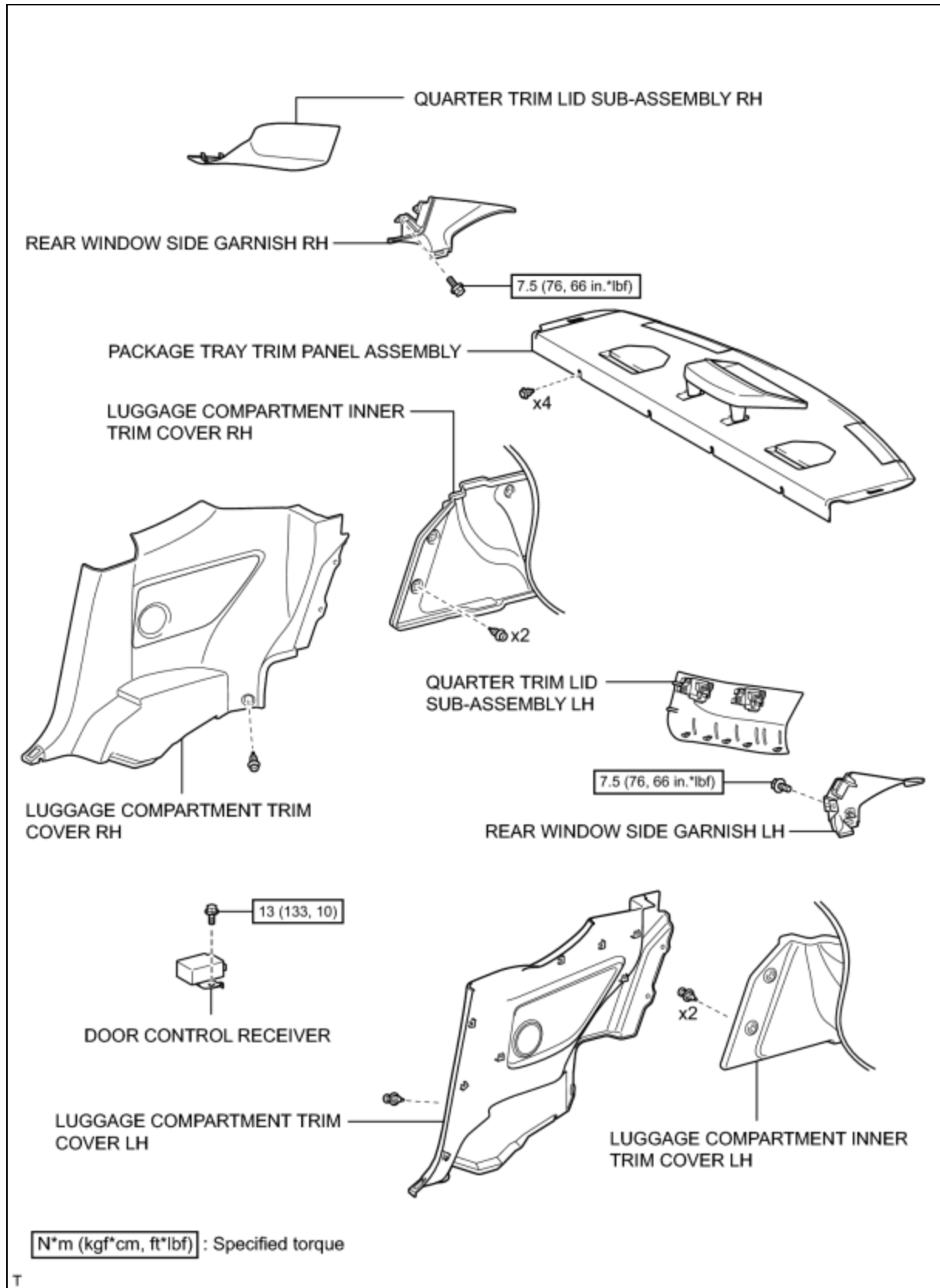
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003ZWC005X
Title: DOOR LOCK: DOOR CONTROL RECEIVER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002PLM020X
Title: DOOR LOCK: DOOR CONTROL RECEIVER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL DOOR CONTROL RECEIVER

- (a) Engage the guide and install the door control receiver.
- (b) Install the bolt.

Torque: 13 N·m (133 kgf·cm, 10ft·lbf)

- (c) Connect the connector.

NOTICE:

- Do not drop the door control receiver or apply impact on it.
- When replacing or inspecting the door control receiver, do not change the wiring route or the length of the harness around the receiver.

2. INSTALL PACKAGE TRAY TRIM PANEL ASSEMBLY

- (a) Engage the 4 clips and install the package tray trim panel assembly with the center stop light assembly.
- (b) Install the 4 clips.
- (c) Connect the connector.

3. INSTALL REAR WINDOW SIDE GARNISH LH INFO

4. INSTALL REAR WINDOW SIDE GARNISH RH

HINT:

Use the same procedure described for the LH side.

5. INSTALL QUARTER TRIM LID SUB-ASSEMBLY LH INFO

6. INSTALL QUARTER TRIM LID SUB-ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

7. INSTALL LUGGAGE COMPARTMENT TRIM COVER LH INFO

8. INSTALL LUGGAGE COMPARTMENT TRIM COVER RH

HINT:

Use the same procedure described for the LH side.

9. CONNECT LUGGAGE COMPARTMENT INNER TRIM COVER LH INFO

10. CONNECT LUGGAGE COMPARTMENT INNER TRIM COVER RH

HINT:

Use the same procedure described for the LH side.

11. INSTALL FRONT DOOR SCUFF PLATE LH [INFO](#)

12. INSTALL FRONT DOOR SCUFF PLATE RH

HINT:

Use the same procedure described for the LH side.

13. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP LH [INFO](#)

14. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP RH

HINT:

Use the same procedure described for the LH side.

15. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY LH [INFO](#)

16. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY RH [INFO](#)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002PLO01TX
Title: DOOR LOCK: DOOR CONTROL RECEIVER: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY LH INFO

2. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY RH INFO

3. REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP LH INFO

4. REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP RH

HINT:

Use the same procedure described for the LH side.

5. REMOVE FRONT DOOR SCUFF PLATE LH INFO

6. REMOVE FRONT DOOR SCUFF PLATE RH

HINT:

Use the same procedure described for the LH side.

7. SEPARATE LUGGAGE COMPARTMENT INNER TRIM COVER LH INFO

8. SEPARATE LUGGAGE COMPARTMENT INNER TRIM COVER RH

HINT:

Use the same procedure described for the LH side.

9. REMOVE LUGGAGE COMPARTMENT TRIM COVER LH INFO

10. REMOVE LUGGAGE COMPARTMENT TRIM COVER RH

HINT:

Use the same procedure described for the LH side.

11. REMOVE QUARTER TRIM LID SUB-ASSEMBLY LH INFO

12. REMOVE QUARTER TRIM LID SUB-ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

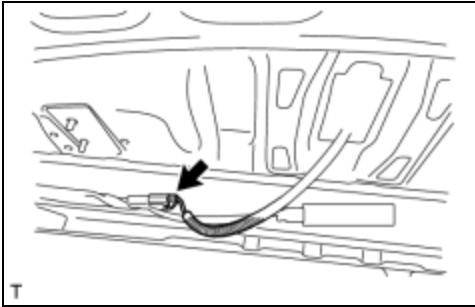
13. REMOVE REAR WINDOW SIDE GARNISH LH INFO

14. REMOVE REAR WINDOW SIDE GARNISH RH

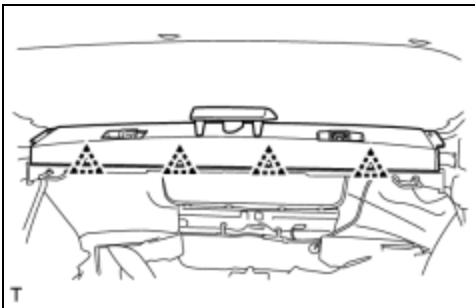
HINT:

Use the same procedure described for the LH side.

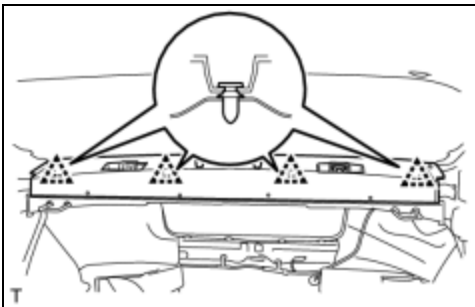
15. REMOVE PACKAGE TRAY TRIM PANEL ASSEMBLY



(a) Disconnect the connector.

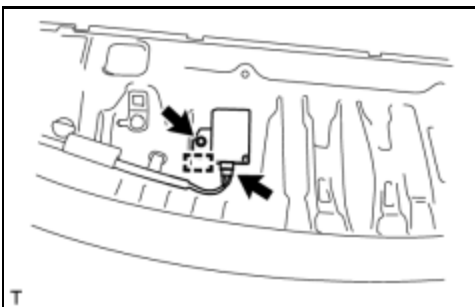


(b) Remove the 4 clips.



(c) Disengage the 4 clips and remove the package tray trim panel assembly with the center stop light assembly.

16. REMOVE DOOR CONTROL RECEIVER



(a) Disconnect the connector.

(b) Remove the bolt.

(c) Disengage the guide and remove the door control receiver.

NOTICE:

Do not drop the door control receiver or apply impact on it.

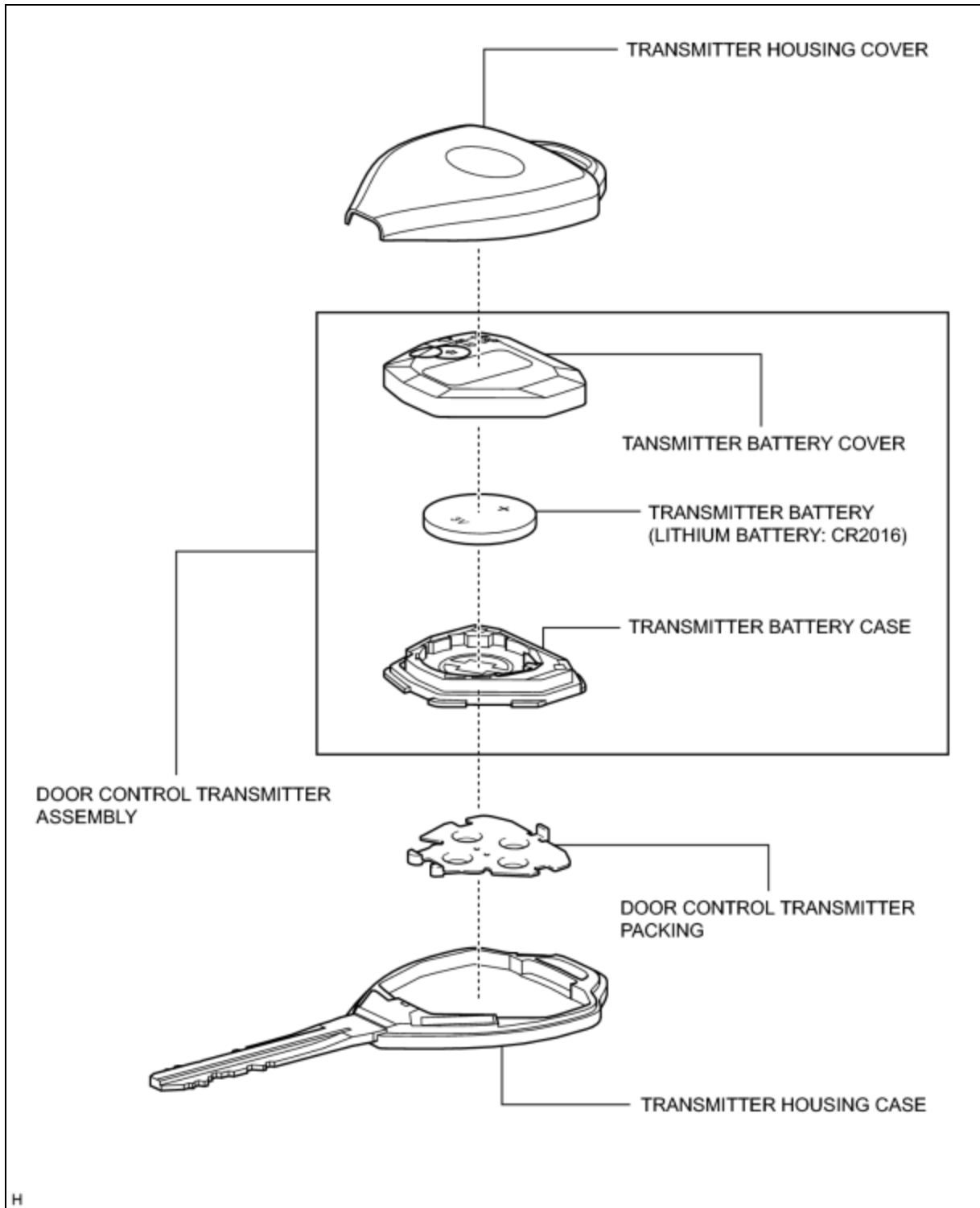


TOYOTA

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010WI01TX
Title: DOOR LOCK: DOOR CONTROL TRANSMITTER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



H

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010DZ022X
Title: DOOR LOCK: DOOR CONTROL TRANSMITTER: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT DOOR CONTROL TRANSMITTER ASSEMBLY

(a) Inspect the operation of the door control transmitter assembly.

- (1) Remove the transmitter battery (lithium battery: CR2016) from the door control transmitter assembly.

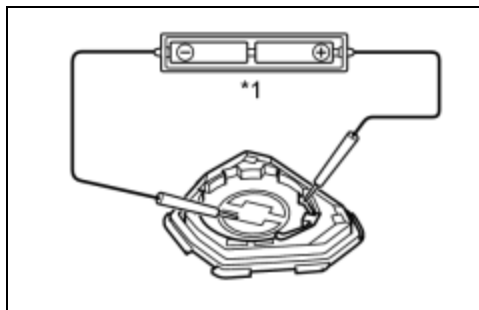
NOTICE:

When replacing the transmitter battery, before starting work, remove static electricity that has built up in the body by touching, for example, the vehicle to prevent the door control transmitter from being damaged.

- (2) Install a new or normal transmitter battery (lithium battery: CR2016).

NOTICE:

When replacing the transmitter battery, before starting work, remove static electricity that has built up in the body by touching, for example, the vehicle to prevent the door control transmitter from being damaged.



- (3) If a new or normal transmitter battery is not available, connect 2 new dry cell batteries (1.5 V) in series. Connect the positive (+) battery electrode to the battery receptacle side terminal, and the negative (-) battery electrode to the bottom terminal, and apply a voltage of 3 V to the transmitter.

Text in Illustration

*1	Battery
----	---------

- (4) In a location that is approximately 1 m (3.28ft.) away from the driver door outside handle, point the transmitter at the vehicle and check the operation of the transmitter by pressing the transmitter switches on the transmitter body.

OK:

The door lock/unlock can be operated via remote control. The LED illuminates when each switch is pressed.

HINT:

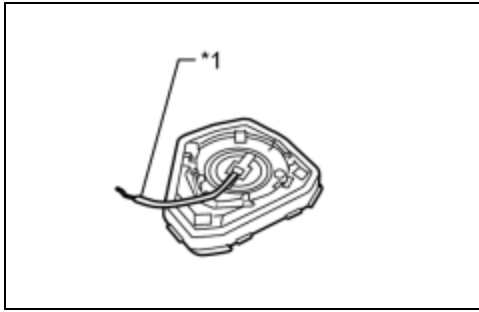
- The minimum operational distance differs depending on the way the transmitter is held and the location.
- Since the transmitter uses faint electric waves, the operational distance might be shortened if noise or strong electric waves occur in the area.

- (5) Install the battery (lithium battery: CR2016).

(b) Inspect the battery charge.

- (1) Remove the battery from the door control

transmitter assembly that does not operate. Attach a lead wire (0.6 mm (0.0236 in.) or less in diameter including wire sheath) with tape or equivalent to the negative terminal.

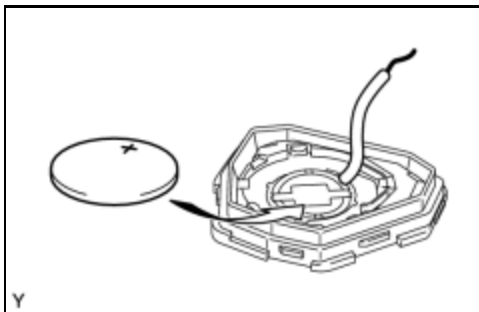


NOTICE:

- Do not wrap the lead wire around the terminal, wedge it between terminals, or solder it. The terminal may be deformed or damaged, and the battery will not be able to be installed correctly.
- When replacing the transmitter battery, before starting work, remove static electricity that has built up in the body by touching, for example, the vehicle to prevent the door control transmitter from being damaged.

Text in Illustration

*1	Wire
----	------



(2) Carefully pull the lead wire out from the position shown in the illustration and install the previously removed transmitter battery.

NOTICE:

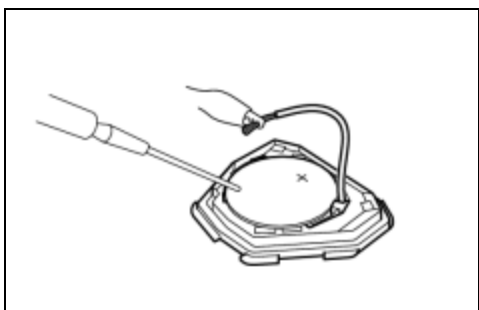
When replacing the transmitter battery, before starting work, remove static electricity that has built up in the body by touching, for example, the vehicle to prevent the electrical key transmitter from being damaged.

(3) Check the transmitter battery voltage.

HINT:

Measure the transmitter battery voltage while pressing the lock or unlock switch on the door control transmitter assembly set sub-assembly.

Standard Voltage:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Battery positive (+) - Battery negative (-)	Ignition switch off, all doors closed and lock or unlock switch is pressed	2.2 to 3.2 V

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010W8022X
Title: DOOR LOCK: DOOR CONTROL TRANSMITTER: INSTALLATION (2013 FR-S)		

INSTALLATION

NOTICE:

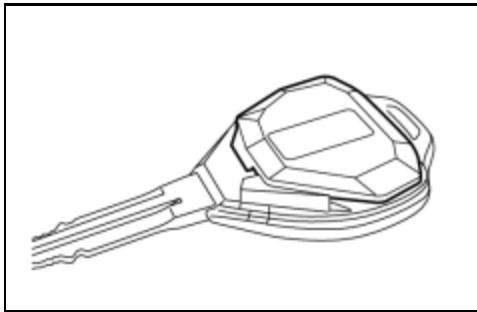
Take extra care when handling these precision electronic components.

1. INSTALL TRANSMITTER BATTERY INFO

2. INSTALL DOOR CONTROL TRANSMITTER PACKING

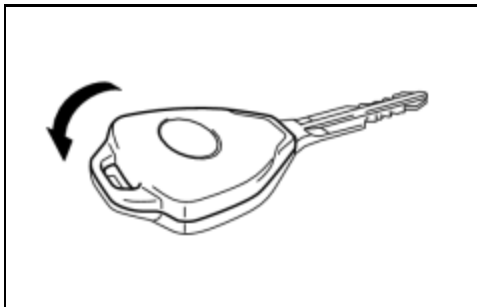
(a) Install the door control transmitter packing.

3. INSTALL DOOR CONTROL TRANSMITTER ASSEMBLY



(a) Install the door control transmitter assembly.

4. INSTALL TRANSMITTER HOUSING COVER



(a) Install the transmitter housing cover onto the transmitter housing case securely.

(b) After the installation, press any of the transmitter switches.



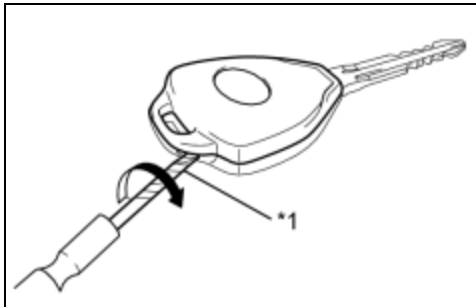
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010W9022X
Title: DOOR LOCK: DOOR CONTROL TRANSMITTER: REMOVAL (2013 FR-S)		

REMOVAL

NOTICE:

Take extra care when handling these precision electronic components.

1. REMOVE TRANSMITTER HOUSING COVER



- (a) Using a screwdriver with its tip wrapped in protective tape, pry apart the transmitter housing cover.

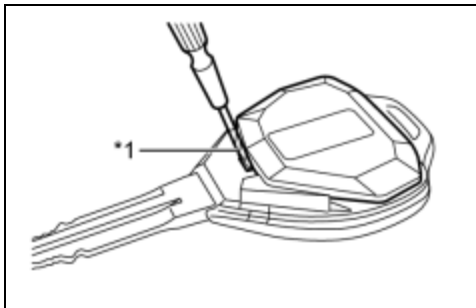
Text in Illustration

*1	Protective Tape
----	-----------------

NOTICE:

Do not use excessive force when prying apart the housing cover.

2. REMOVE DOOR CONTROL TRANSMITTER ASSEMBLY



- (a) Using a screwdriver with its tip wrapped in protective tape, remove the door control transmitter assembly.

Text in Illustration

*1	Protective Tape
----	-----------------

3. REMOVE DOOR CONTROL TRANSMITTER PACKING

- (a) Remove the door control transmitter packing.

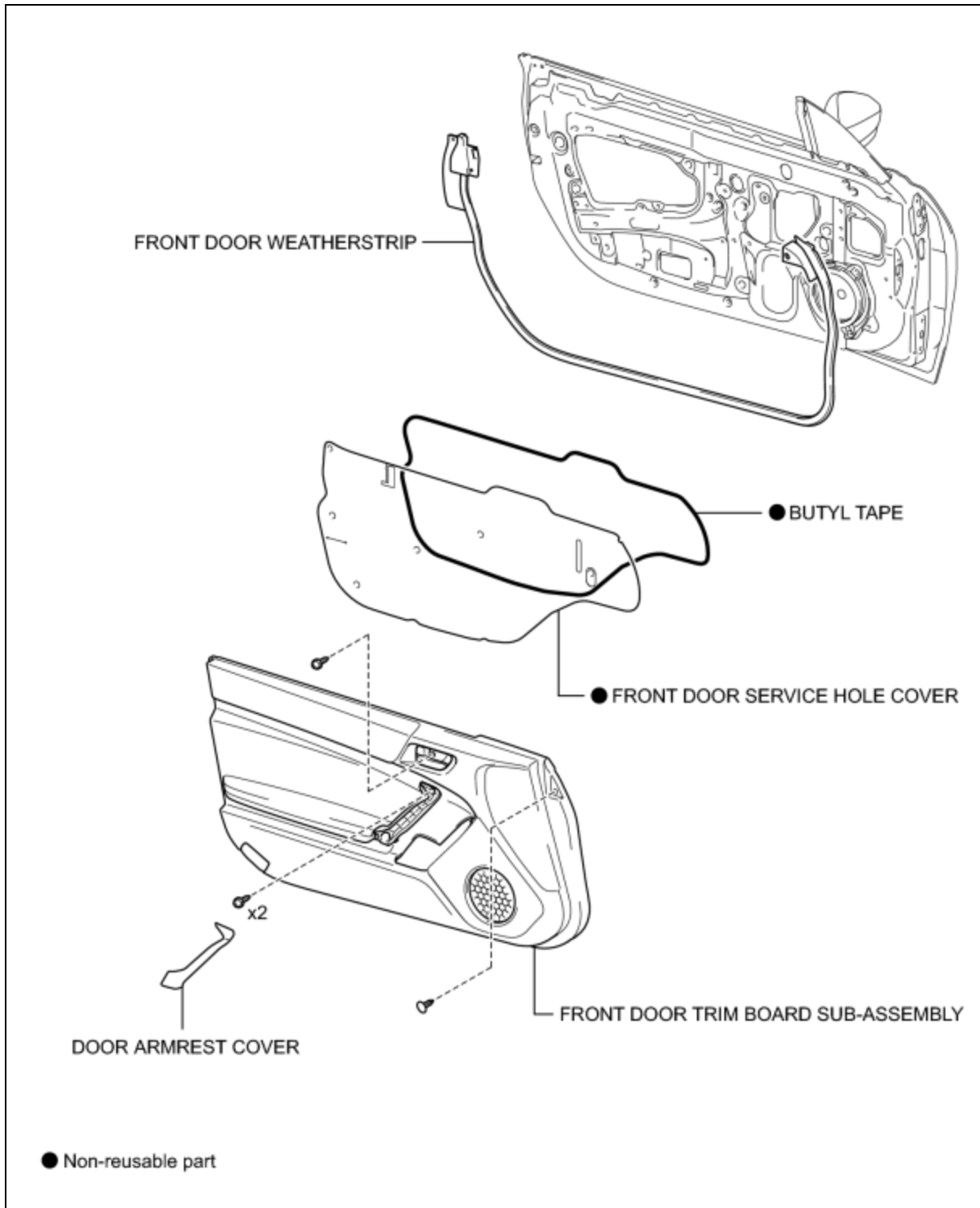
4. REMOVE TRANSMITTER BATTERY

INFO

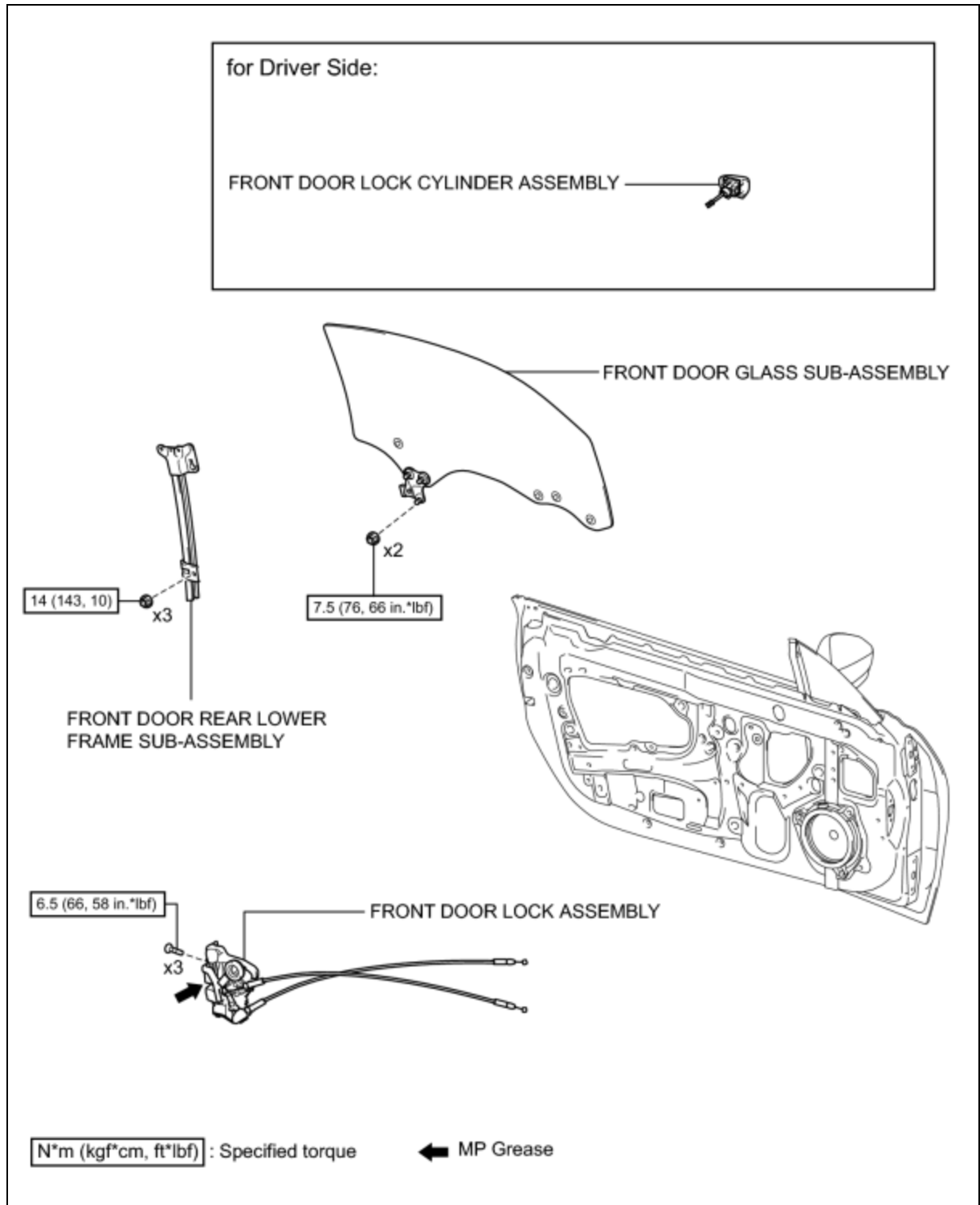
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XBA06CX
Title: DOOR LOCK: FRONT DOOR LOCK: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



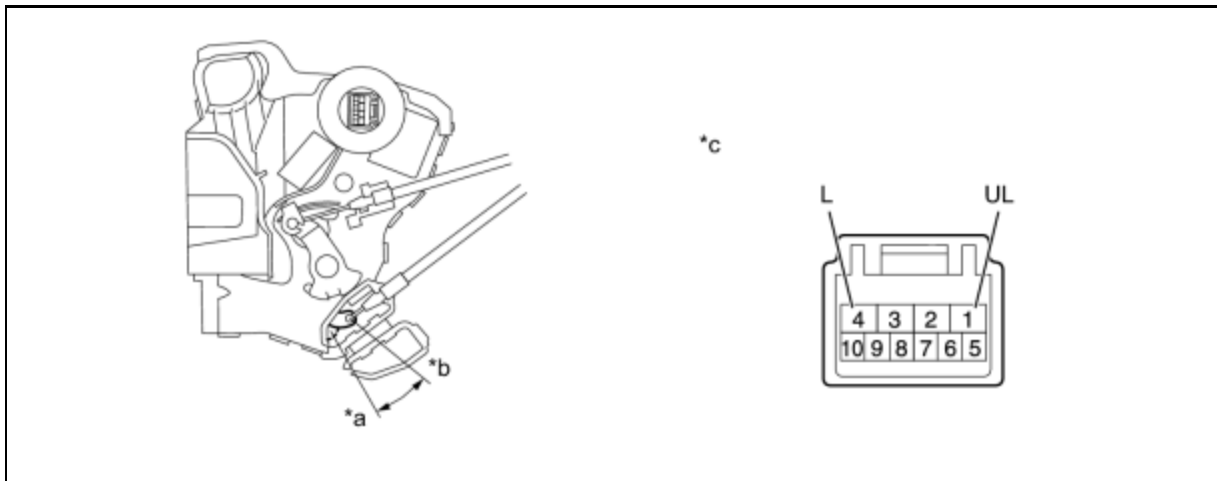
ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001Y7Y03QX
Title: DOOR LOCK: FRONT DOOR LOCK: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT FRONT DOOR LOCK ASSEMBLY LH



Text in Illustration

*a	Lock	*b	Unlock
*c	Component without harness connected (Front Door Lock Assembly LH)	-	-

(a) Check the door lock motor operation.

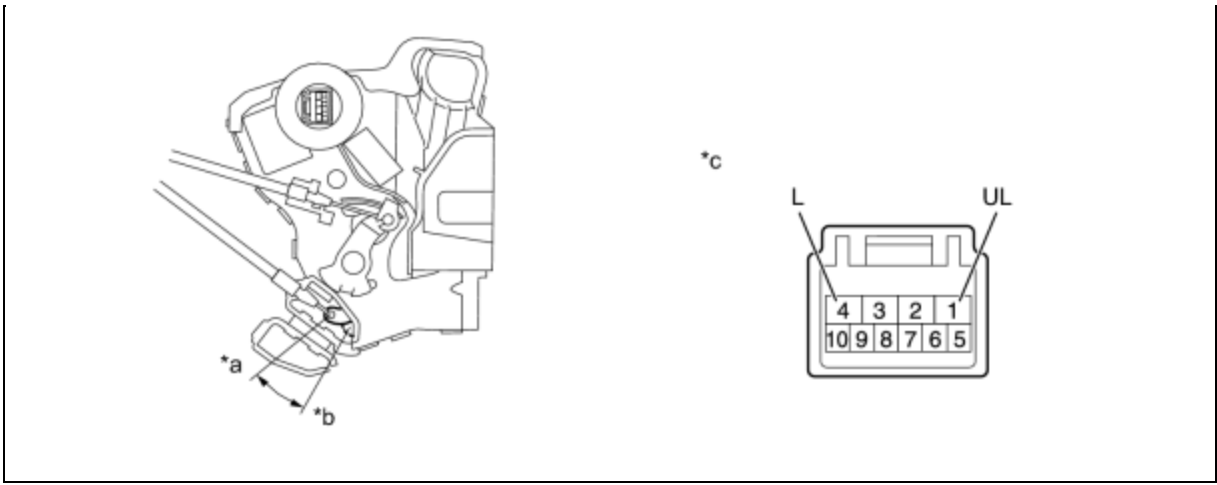
(1) Apply battery voltage to the motor connector and check the operation of the front door lock motor.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
Battery positive (+) → 4 (L) Battery negative (-) → 1 (UL)	Lock
Battery positive (+) → 1 (UL) Battery negative (-) → 4 (L)	Unlock

If the result is not as specified, replace the front door lock assembly.

2. INSPECT FRONT DOOR LOCK ASSEMBLY RH



Text in Illustration

*a	Unlock	*b	Lock
*c	Component without harness connected (Front Door Lock Assembly RH)	-	-

(a) Check the door lock motor operation.

(1) Apply battery voltage to the door lock motor connector and check the operation of the door lock motor.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
Battery positive (+) → 4 (L) Battery negative (-) → 1 (UL)	Lock
Battery positive (+) → 1 (UL) Battery negative (-) → 4 (L)	Unlock

If the result is not as specified, replace the front door lock assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002M7W02RX
Title: DOOR LOCK: FRONT DOOR LOCK: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. INSTALL FRONT DOOR LOCK ASSEMBLY

NOTICE:

Do not allow grease or dust to adhere to the surface of the connector which contacts the door lock wire harness seal.

- Apply MP grease to the sliding parts of the front door lock assembly.
- Insert the front door lock open rod into the front door lock assembly.
- Check that the front door lock open rod is securely connected to the front door lock assembly.
- Install the front door lock assembly with the 3 bolts.

Torque: 6.5 N·m (66 kgf·cm, 58in·lbf)

2. INSTALL FRONT DOOR LOCK CYLINDER ASSEMBLY (for Driver Side) INFO

3. INSTALL FRONT DOOR REAR LOWER FRAME SUB-ASSEMBLY INFO

4. INSTALL FRONT DOOR GLASS SUB-ASSEMBLY INFO

5. INSTALL FRONT DOOR WEATHERSTRIP INFO

6. INSTALL FRONT DOOR SERVICE HOLE COVER INFO

7. INSTALL FRONT DOOR TRIM BOARD SUB-ASSEMBLY INFO

8. INSTALL DOOR ARMREST COVER INFO

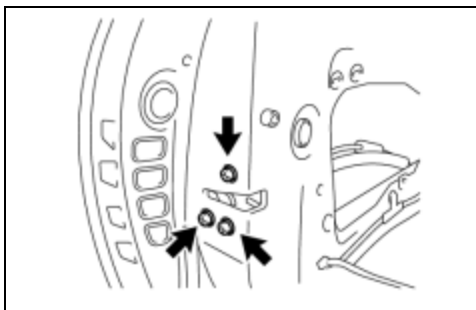
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002M7W02SX
Title: DOOR LOCK: FRONT DOOR LOCK: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. REMOVE DOOR ARMREST COVER [INFO](#)
2. REMOVE FRONT DOOR TRIM BOARD SUB-ASSEMBLY [INFO](#)
3. REMOVE FRONT DOOR SERVICE HOLE COVER [INFO](#)
4. REMOVE FRONT DOOR WEATHERSTRIP [INFO](#)
5. REMOVE FRONT DOOR GLASS SUB-ASSEMBLY [INFO](#)
6. REMOVE FRONT DOOR REAR LOWER FRAME SUB-ASSEMBLY [INFO](#)
7. REMOVE FRONT DOOR LOCK CYLINDER ASSEMBLY (for Driver Side) [INFO](#)
8. REMOVE FRONT DOOR LOCK ASSEMBLY



(a) Remove the 3 bolts.

(b) Slide the front door lock assembly downward, pull out the front door lock open rod from the outside handle frame, and remove the front door lock assembly and cables as a unit.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000593G000X
Title: DOOR LOCK: KEY REMINDER WARNING SYSTEM: CUSTOMIZE PARAMETERS (2013 FR-S)		

CUSTOMIZE PARAMETERS

1. CUSTOMIZE KEY REMINDER WARNING SYSTEM

(a) Customizing with the Techstream

NOTICE:

- When the customer requests a change in a function, first make sure that the function can be customized.
- Record the current settings before customizing.
- When troubleshooting a function, first make sure that the function is set to the default setting.

HINT:

The following items can be customized.

- (1) Connect the Techstream to the DLC3.
- (2) Turn the ignition switch to ON.
- (3) Turn the Techstream on.
- (4) Enter the following menus: Body Electrical / Combination Meter / Utility / Customize / Warning.
- (5) Select the setting by referring to the table below.

Warning

DISPLAY	DEFAULT	FUNCTION	SETTING	RELEVANT ECU
Key Remind Sound	Normal	Function to change cycle of the key reminder warning buzzer.	Normal, Slow or Fast	Combination meter assembly



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011WG042X
Title: DOOR LOCK: KEY REMINDER WARNING SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

[DATA LIST / ACTIVE TEST](#)

1. READ DATA LIST

NOTICE:

In the following table, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Body Electrical / Main Body / Data List.
- (f) Read the Data List according to the display on the Techstream.

Main Body

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
IG SW	Ignition switch on signal / OFF or ON	OFF: Ignition switch off ON: Ignition switch ON	-
ACC SW	Ignition switch ACC signal / OFF or ON	OFF: Ignition switch off ON: Ignition switch ACC	-
Key Unlock Warning SW	Unlock warning switch / OFF or ON	OFF: Ignition key is not inserted ON: Ignition key is inserted	-
D Door Courtesy SW	Driver side door courtesy light switch signal / ON or OFF	ON: Driver side door opened OFF: Driver side door closed	-



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011G204ZX
Title: DOOR LOCK: KEY REMINDER WARNING SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use these procedures to troubleshoot the key reminder warning system.
- *: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	INSPECT BATTERY VOLTAGE
-----------	--------------------------------

(a) Check the battery voltage.

Standard voltage:

11 to 14 V


HINT:

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT



3.	CHECK COMMUNICATION FUNCTION OF CAN COMMUNICATION SYSTEM*
-----------	--

(a) Using the Techstream, inspect the CAN communication function to ensure that there are no malfunctions in the communication system  .

Result

RESULT	PROCEED TO
DTC is not output	A
DTC is output	B

B  **GO TO CAN COMMUNICATION SYSTEM .**

A



4.	PROBLEM SYMPTOMS TABLE
-----------	-------------------------------

Result

RESULT	PROCEED TO
Fault is not listed on Problem Symptoms Table	A
Fault is listed on Problem Symptoms Table	B

B ▶ Go to step 6

A



5.	OVERALL ANALYSIS AND TROUBLESHOOTING*
-----------	--

(a) Terminals of ECU INFO .

(b) Data list/Active test INFO .

NEXT



6.	REPAIR OR REPLACE
-----------	--------------------------

NEXT



7.	CONFIRMATION TEST
-----------	--------------------------

NEXT ▶ **END**

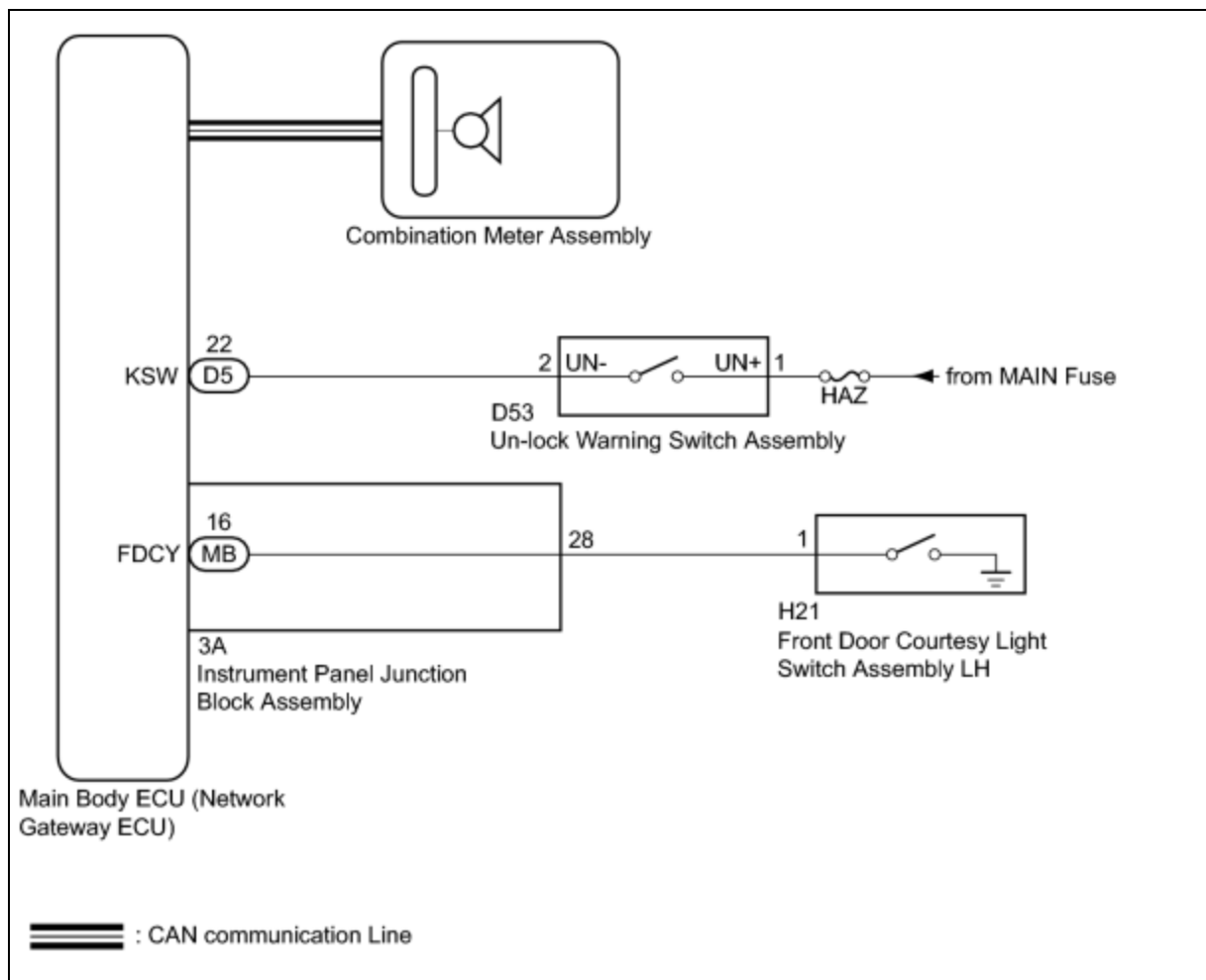
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000ZDE02GX
Title: DOOR LOCK: KEY REMINDER WARNING SYSTEM: Key Reminder Buzzer does not Sound (2013 FR-S)		

Key Reminder Buzzer does not Sound

DESCRIPTION

The key reminder warning buzzer sounds when the driver side door is opened while the ignition switch is in the LOCK or ACC positions. The key reminder warning buzzer is activated when the main body ECU (network gateway ECU) sends a buzzer sound request signal to the combination meter assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Since the key reminder warning system has functions that use CAN communication, first confirm that there is no malfunction in the communication system by inspecting the CAN communication

functions in accordance with **How to Proceed with Troubleshooting**. Then conduct the following troubleshooting procedure.

PROCEDURE

1.	READ VALUE USING TECHSTREAM (D DOOR COURTESY SW)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Data List.
- (e) Read the Data List according to the display on the Techstream.

Main Body

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
D Door Courtesy SW	Driver side door courtesy light switch signal / ON or OFF	ON: Driver side door opened OFF: Driver side door closed	-

OK:

ON or OFF appears on the screen according to the driver door condition.

NG ► **GO TO LIGHTING SYSTEM (DOOR COURTESY LIGHT SWITCH CIRCUIT)**

OK



2.	READ VALUE USING TECHSTREAM (KEY UNLOCK WARNING SW)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Data List.
- (e) Read the Data List according to the display on the Techstream.

Main Body

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
----------------	------------------------	------------------	-----------------

Key Unlock Warning SW	Unlock warning switch signal / OFF or ON	OFF: Ignition key is not inserted ON: Ignition key is inserted	-
-----------------------	--	---	---

OK:

When the un-lock warning switch assembly is operated, the display changes as shown in the table.

NG ▶ **INSPECT UN-LOCK WARNING SWITCH ASSEMBLY**

OK



3.	CHECK COMBINATION METER ASSEMBLY (BUZZER OPERATION)
-----------	--

(a) Remove the key from the key cylinder, turn the light control switch on the headlight dimmer switch assembly to the tail position, and open the driver door.

OK:

The light reminder warning buzzer sounds.

HINT:

The key reminder warning system sounds the buzzer built in to the combination meter for key reminder warnings. This buzzer is also used for the light reminder warning system. Therefore, check the operation of the combination meter buzzer by checking if the buzzer sounds to inform that the lights are still on.

NG ▶ **REPLACE COMBINATION METER ASSEMBLY**

OK ▶ **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

4.	INSPECT UN-LOCK WARNING SWITCH ASSEMBLY
-----------	--

(a) Remove the un-lock warning switch assembly INFO .

(b) Inspect the un-lock warning switch assembly INFO .

NG ▶ **REPLACE UN-LOCK WARNING SWITCH ASSEMBLY**

OK



5.	CHECK HARNESS AND CONNECTOR (MAIN BODY ECU - UN-LOCK WARNING SWITCH ASSEMBLY)
----	--

(a) Disconnect the D53 un-lock warning switch assembly connector.

(b) Disconnect the D5 main body ECU (network gateway ECU) connector.

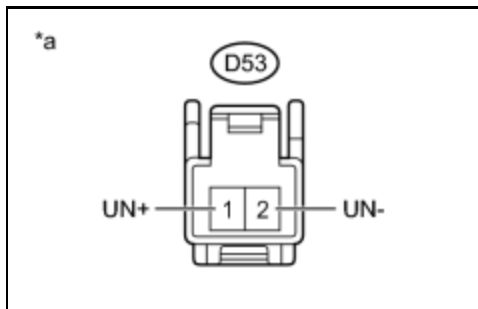
(c) Measure the voltage and resistance according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D53-1 (UN+) - Body ground	Always	11 to 14 V

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D53-2 (UN-) - D5-22 (KSW)	Always	Below 1 Ω
D53-2 (UN-) - Body ground	Always	10 k Ω or higher



Text in Illustration

*a	Front view of wire harness connector (to Un-lock Warning Switch Assembly)
----	--

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001332043X
Title: DOOR LOCK: KEY REMINDER WARNING SYSTEM: OPERATION CHECK (2013 FR-S)		

OPERATION CHECK

1. CHECK FUNCTION

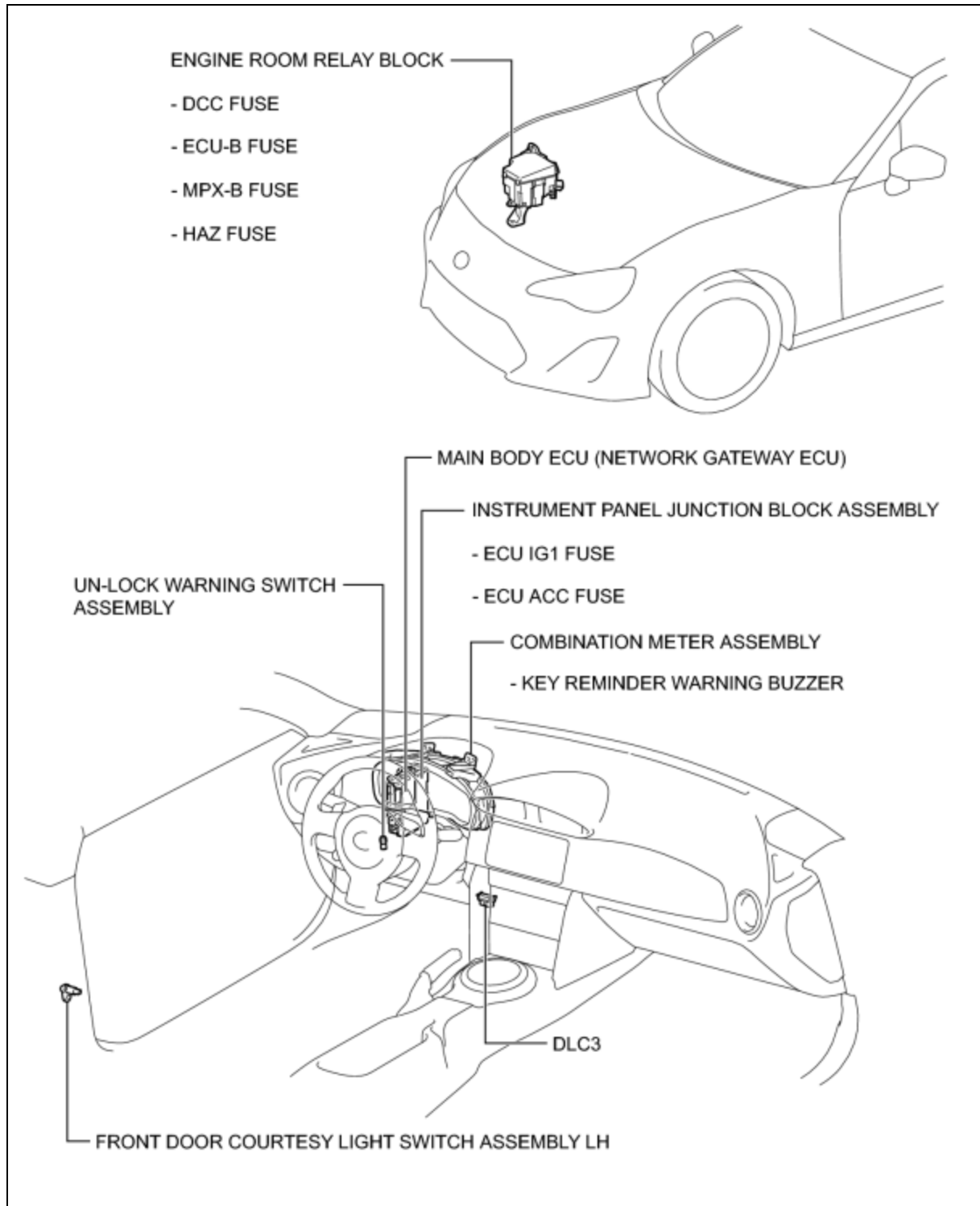
- (a) Check that the key reminder warning buzzer sounds.
- (1) With the driver side door closed, insert the key into the ignition key cylinder and then turn the key to LOCK or ACC.
 - (2) Check that the buzzer sounds intermittently when the driver side door is open.
- (b) Check that the key reminder warning buzzer stops.
- (1) Check that the buzzer stops sounding if any of the following operations are performed while the buzzer is sounding:
 - Close the driver side door (front door courtesy light switch is off).
 - Turn the ignition switch to ON.
 - Pull the key out from the ignition key cylinder.



Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000037K1000X
Title: DOOR LOCK: KEY REMINDER WARNING SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011G502GX
Title: DOOR LOCK: KEY REMINDER WARNING SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Key Reminder Warning System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Key reminder buzzer does not sound	Proceed to "Key Reminder Buzzer does not Sound"	INFO



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011G603SX
Title: DOOR LOCK: KEY REMINDER WARNING SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

SYSTEM DESCRIPTION

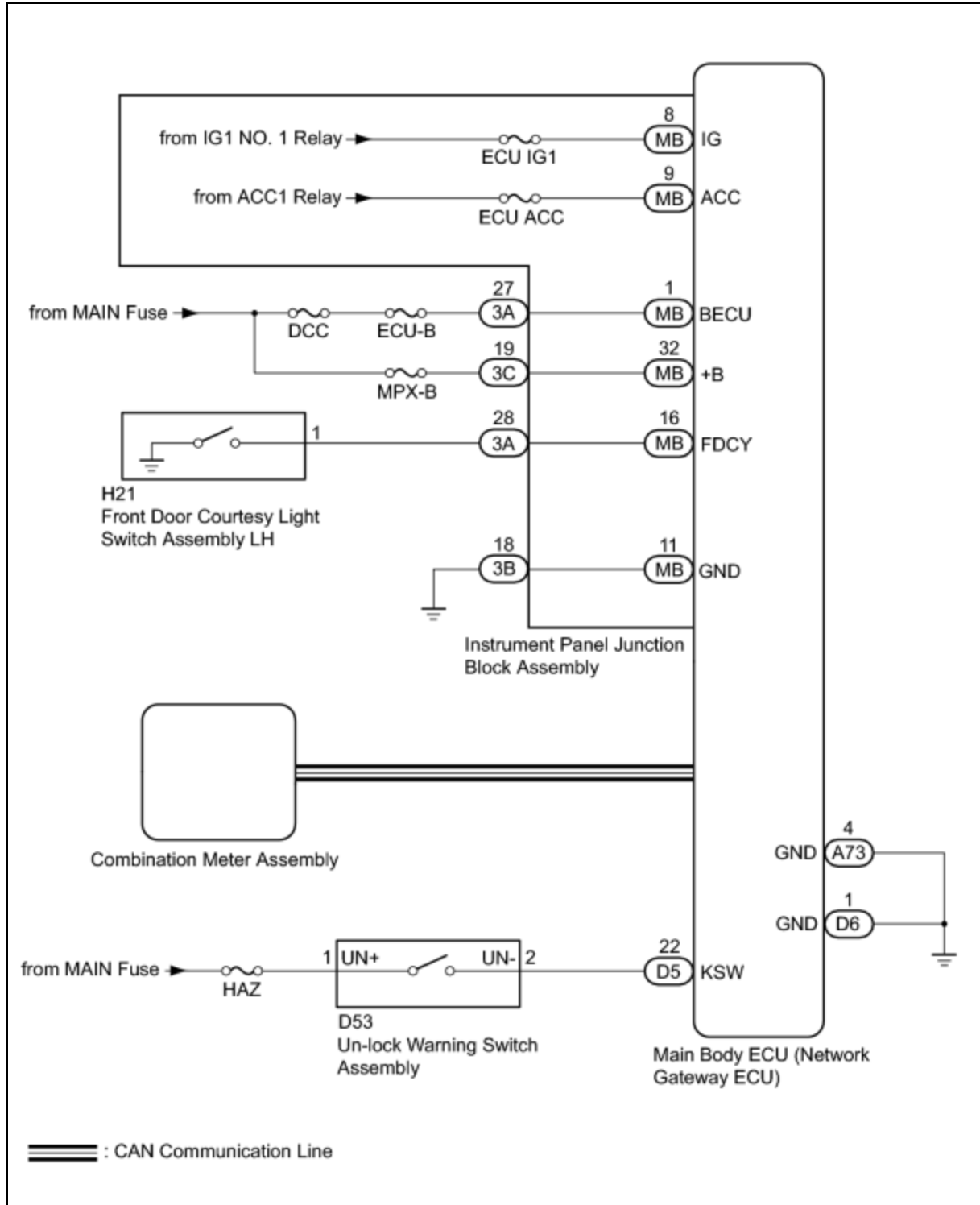
1. KEY REMINDER WARNING SYSTEM DESCRIPTION

- (a) When the driver side door is opened with the ignition key in the ACC or LOCK position, this system causes the key reminder warning buzzer to sound in order to warn the driver that the ignition key has not been removed.



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000013P003NX
Title: DOOR LOCK: KEY REMINDER WARNING SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

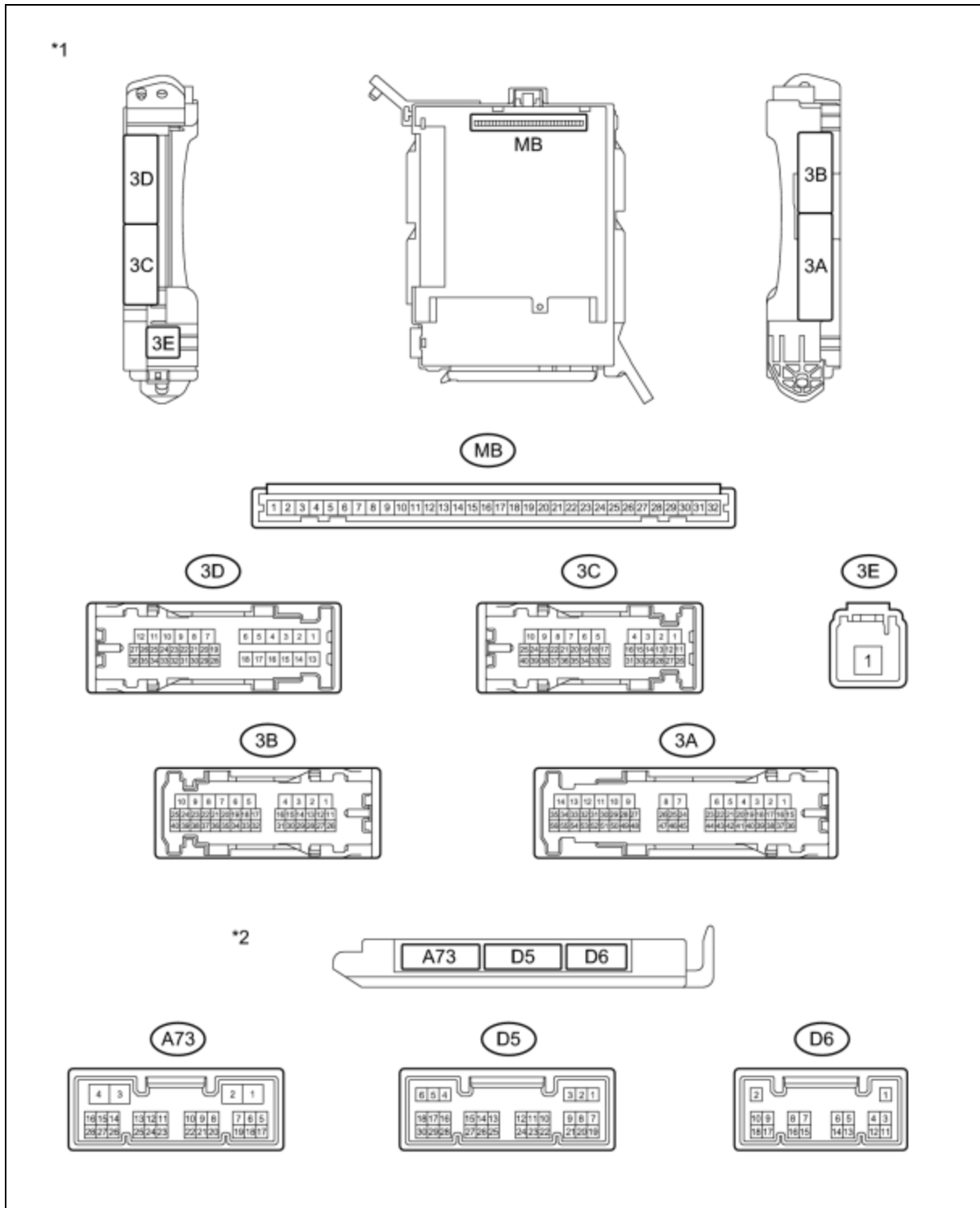
SYSTEM DIAGRAM



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011G4045X
Title: DOOR LOCK: KEY REMINDER WARNING SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. CHECK INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY AND MAIN BODY ECU (NETWORK GATEWAY ECU)



Text in Illustration

*1	Instrument Panel Junction Block Assembly	*2	Main Body ECU (Network Gateway ECU)
----	--	----	-------------------------------------

- (a) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (b) Disconnect the D5, D6 and A73 main body ECU (network gateway ECU) connectors.
- (c) Measure the voltage and resistance according to the value(s) in the table below.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
MB-1 (BECU) - Body ground	None - Body ground	Battery power supply	Always	11 to 14 V
MB-8 (IG) - Body ground	None - Body ground	Ignition switch power supply	Ignition switch ON	11 to 14 V
			Ignition switch off	Below 1 V
MB-9 (ACC) - Body ground	None - Body ground	ACC power supply	Ignition switch ACC	11 to 14 V
			Ignition switch off	Below 1 V
MB-11 (GND) - Body ground	None - Body ground	Ground	Always	Below 1 Ω
MB-32 (+B) - Body ground	None - Body ground	Battery power supply	Always	11 to 14 V
D5-22 (KSW) - Body ground	BR - Body ground	Unlock warning switch input	No Key in ignition key cylinder (off)	Below 1 V
			Key inserted ignition key cylinder (on)	11 to 14 V
D6-1 (GND) - Body ground	B - Body ground	Ground	Always	Below 1 Ω
A73-4 (GND) - Body ground	B-Y - Body ground	Ground	Always	Below 1 Ω

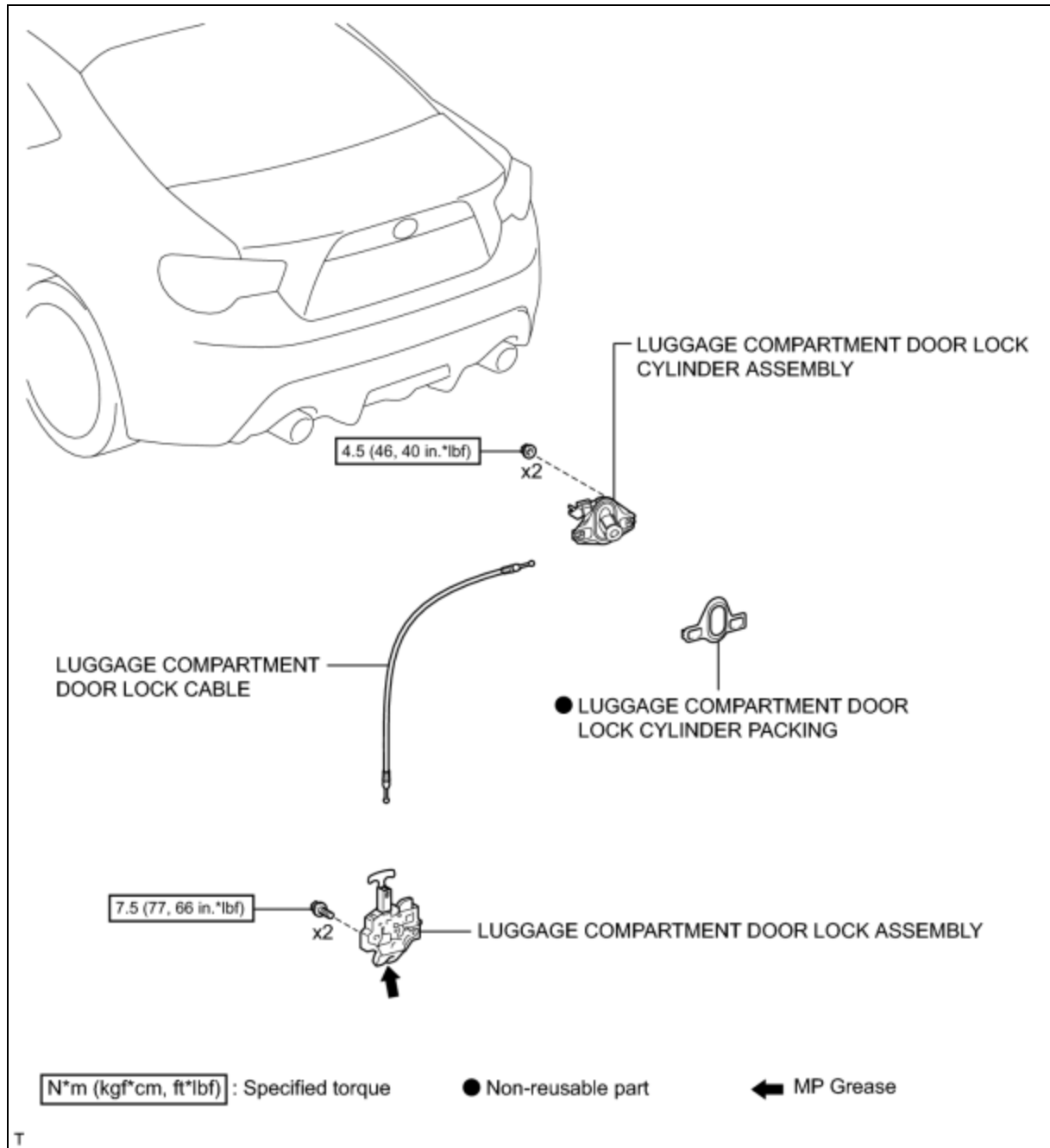
- (d) Reconnect the D5, D6 and A73 main body ECU (network gateway ECU) connectors.
- (e) Install the main body ECU (network gateway ECU) to the instrument panel junction block assembly.
- (f) Measure the voltage according to the valve(s) in the table below.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
3A-28 - Body ground	V - Body ground	Driver side door courtesy light switch input	Driver side door open	Below 1 V
			Driver side door closed	11 to 14 V

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004FZG004X
Title: DOOR LOCK: LUGGAGE COMPARTMENT DOOR LOCK: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000020BT02DX
Title: DOOR LOCK: LUGGAGE COMPARTMENT DOOR LOCK: INSPECTION (2013 FR-S)		

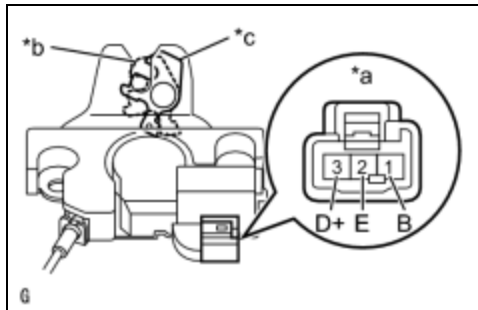
INSPECTION

1. INSPECT LUGGAGE COMPARTMENT DOOR LOCK ASSEMBLY

(a) Check the operation of the door lock motor.

- (1) Move the door lock to the closed (lock) position.
- (2) Apply battery voltage to the door lock motor and check the operation of the door lock motor.

OK:



MEASUREMENT CONDITION	SPECIFIED CONDITION
Battery positive (+) → 1 (B) Battery negative (-) → 2 (E)	Luggage compartment door lock motor open (unlock) operation

If the result is not as specified, replace the back door lock assembly.

(b) Check the operation of the door courtesy switch.

- (1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
2 (E) - 3 (D+)	Locked	10 k Ω or higher
2 (E) - 3 (D+)	Unlocked	Below 1 Ω

Text in Illustration

*a	Component without harness connected (Luggage Compartment Door Lock Assembly)
*b	Lock
*c	Open

If the result is not as specified, replace the back door lock assembly.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004FZF003X
Title: DOOR LOCK: LUGGAGE COMPARTMENT DOOR LOCK: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL LUGGAGE COMPARTMENT DOOR LOCK CABLE

- (a) Engage the clamp to install the luggage compartment door lock cable.

2. INSTALL LUGGAGE COMPARTMENT DOOR LOCK CYLINDER PACKING

- (a) Install the new luggage compartment door lock cylinder packing.

NOTICE:

Do not reuse the removed packing. Be sure to install a new luggage compartment door lock cylinder packing to prevent water ingress.

3. INSTALL LUGGAGE COMPARTMENT DOOR LOCK CYLINDER ASSEMBLY

- (a) Connect the luggage compartment door lock cable to the luggage compartment door lock cylinder assembly.
- (b) Install the luggage compartment door lock cylinder assembly with the 2 nuts.

Torque: 4.5 N·m (46 kgf·cm, 40in·lbf)

4. INSTALL LUGGAGE COMPARTMENT DOOR LOCK ASSEMBLY

- (a) Install the luggage compartment door lock assembly with the 2 bolts.

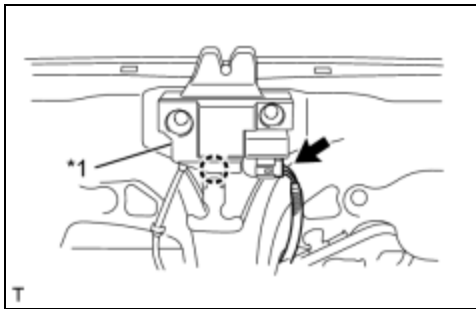
Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)
- (b) Connect the luggage compartment door lock cable to the luggage compartment door lock assembly.
- (c) Engage the claw to close the cover.
- (d) Connect the connector.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004FZH003X
Title: DOOR LOCK: LUGGAGE COMPARTMENT DOOR LOCK: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE LUGGAGE COMPARTMENT DOOR LOCK ASSEMBLY

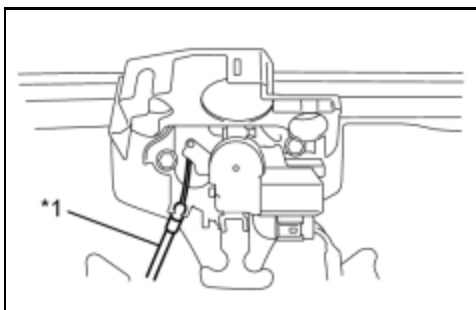


(a) Disconnect the connector.

(b) Disengage the claw and open the cover.

Text in illustration

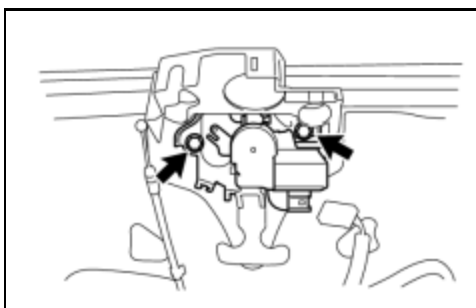
*1	Cover
----	-------



(c) Disconnect the luggage compartment door lock cable.

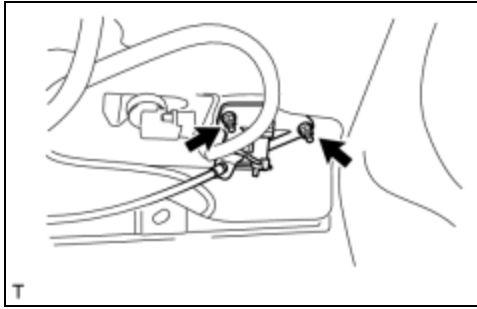
Text in illustration

*1	Luggage Compartment Door Lock Cable
----	-------------------------------------

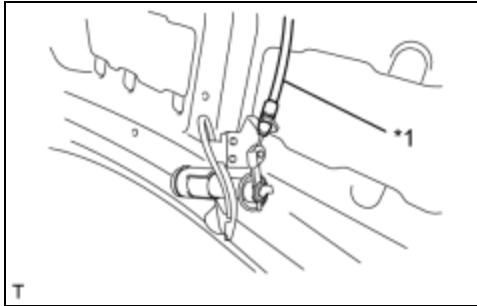


(d) Remove the 2 bolts and the luggage compartment door lock assembly.

2. REMOVE LUGGAGE COMPARTMENT DOOR LOCK CYLINDER ASSEMBLY



- (a) Remove the 2 nuts and the luggage compartment door lock cylinder assembly.

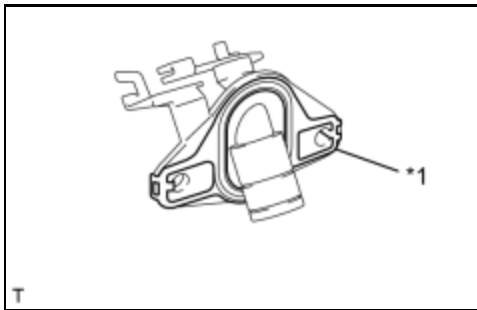


- (b) Disconnect the luggage compartment door lock cable.

Text in illustration

*1	Luggage Compartment Door Lock Cable
----	-------------------------------------

3. REMOVE LUGGAGE COMPARTMENT DOOR LOCK CYLINDER PACKING



- (a) Remove the luggage compartment door lock cylinder packing.

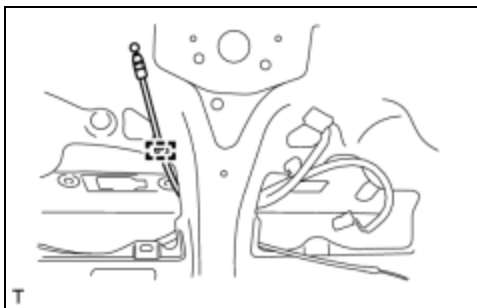
NOTICE:

Do not reuse the removed packing. Be sure to install a new luggage compartment door lock cylinder packing to prevent water ingress.

Text in illustration

*1	Luggage Compartment Door Lock Cylinder Packing
----	--

4. REMOVE LUGGAGE COMPARTMENT DOOR LOCK CABLE



- (a) Disengage the clamp and remove the luggage compartment door lock cable.

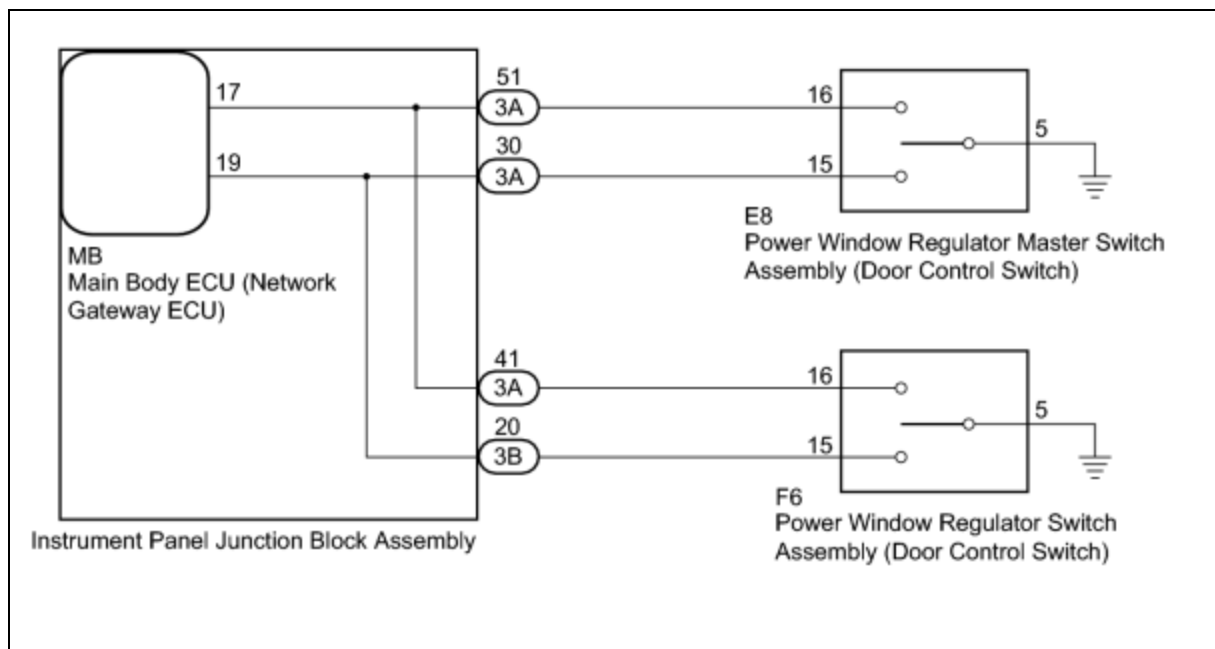
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000128S03EX
Title: DOOR LOCK: POWER DOOR LOCK CONTROL SYSTEM: All Doors LOCK/UNLOCK Functions do not Operate Via Door Control Switch (2013 FR-S)		

All Doors LOCK/UNLOCK Functions do not Operate Via Door Control Switch

DESCRIPTION

The main body ECU (network gateway ECU) receives switch signals from the door control switch, activates the door lock motor on each door accordingly.

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	CHECK DOOR LOCK OPERATION
-----------	----------------------------------

(a) Proceed to the next step according to the symptom listed in the table below.

Result

RESULT	PROCEED TO
Doors cannot be locked through power window regulator master switch assembly	A
Doors cannot be locked through power window regulator switch assembly	B

B ▶ READ VALUE USING TECHSTREAM (DOOR LOCK SW-LOCK AND DOOR LOCK SW-UNLOCK)

A



2.	READ VALUE USING TECHSTREAM (DOOR LOCK SW-LOCK AND DOOR LOCK SW-UNLOCK)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Data List.
- (e) Read the Data List according to the display on the Techstream.

Main Body

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Door Lock SW-Lock	Door control switch (power window regulator master switch assembly) lock signal / OFF or ON	OFF: OFF: Lock side of door control switch (power window regulator master switch assembly) not pushed ON: Lock side of door control switch (power window regulator master switch assembly) pushed	-
Door Lock SW-Unlock	Door control switch (power window regulator master switch assembly) unlock signal / OFF or ON	OFF: Unlock side of door control switch (power window regulator master switch assembly) not pushed ON: Unlock side of door control switch (power window regulator master switch assembly) pushed	-

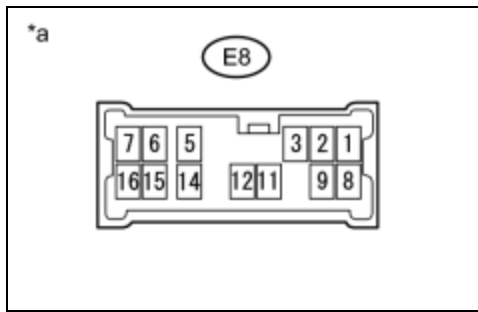
OK:

The Techstream indicates ON or OFF according to the switch operation shown in the table above.

NG ▶ INSPECT POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY

OK ▶ REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

3.	INSPECT POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY
-----------	--



(a) Remove the power window regulator master switch assembly **INFO** .

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
E8-16 - E8-5	Lock switch pushed	Below 1 Ω
	off	10 k Ω or higher
E8-15 - E8-5	Unlock switch pushed	Below 1 Ω
	off	10 k Ω or higher

Text in Illustration

*a	Component without harness connected (Power Window Regulator Master Switch Assembly (Door Control Switch))
----	--

NG ► **REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY**

OK



4.	CHECK HARNESS AND CONNECTOR (POWER WINDOW MASTER SWITCH - JUNCTION BLOCK AND BODY GROUND)
-----------	--

(a) Disconnect the 3A instrument panel junction block assembly connector.

(b) Disconnect the E8 power window regulator master switch assembly (door control switch) connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3A-51 - E8-16	Always	Below 1 Ω

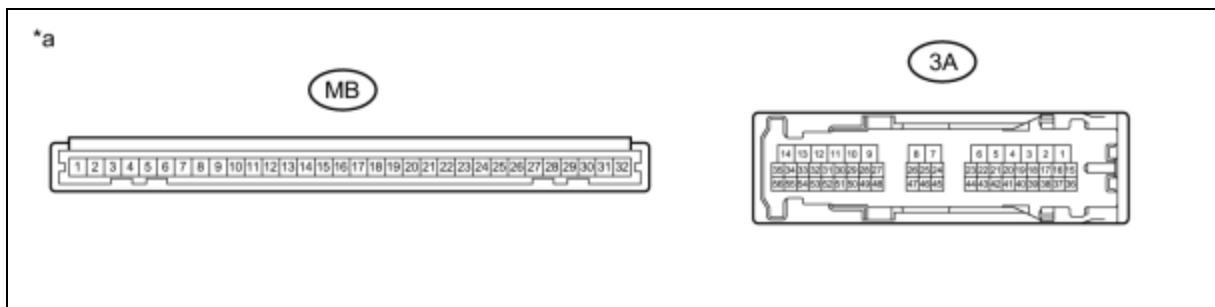
3A-30 - E8-15	Always	Below 1 Ω
E8-5 - Body ground	Always	Below 1 Ω
3A-51 or E8-16 - Body ground	Always	10 kΩ or higher
3A-30 or E8-15 - Body ground	Always	10 kΩ or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

5. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

- (a) Remove the instrument panel junction block assembly **INFO** .
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (c) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	---	---	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
MB-17 - 3A-51	Always	Below 1 Ω
MB-19 - 3A-30	Always	Below 1 Ω

NG ▶ REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

OK ► **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

6.	READ VALUE USING TECHSTREAM (DOOR LOCK SW-LOCK AND DOOR LOCK SW-UNLOCK)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Data List.
- (e) Read the Data List according to the display on the Techstream.

Main Body

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Door Lock SW-Lock	Door control switch (power window regulator switch assembly) lock signal / OFF or ON	OFF: OFF: Lock side of door control switch (power window regulator switch assembly) not pushed ON: Lock side of door control switch (power window regulator switch assembly) pushed	-
Door Lock SW-Unlock	Door control switch (power window regulator switch assembly) unlock signal / OFF or ON	OFF: Unlock side of door control switch (power window regulator switch assembly) not pushed ON: Unlock side of door control switch (power window regulator switch assembly) pushed	-

OK:

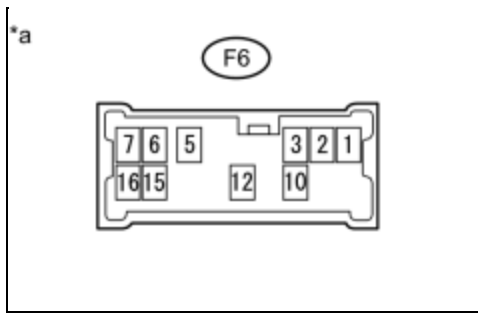
The Techstream indicates ON or OFF according to the switch operation shown in the table above.

NG ► **INSPECT POWER WINDOW REGULATOR SWITCH ASSEMBLY**

OK ► **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

7.	INSPECT POWER WINDOW REGULATOR SWITCH ASSEMBLY
-----------	---

- (a) Remove the power window regulator switch



assembly **INFC** .

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
F6-16 - F6-5	Lock switch pushed	Below 1 Ω
	off	10 k Ω or higher
F6-15 - F6-5	Unlock switch pushed	Below 1 Ω
	off	10 k Ω or higher

Text in Illustration

*a	Component without harness connected (Power Window Regulator Master Switch Assembly (Door Control Switch))
----	--

NG **REPLACE POWER WINDOW REGULATOR SWITCH ASSEMBLY**

OK



8.	CHECK HARNESS AND CONNECTOR (POWER WINDOW SWITCH - JUNCTION BLOCK AND BODY GROUND)
-----------	---

- (a) Disconnect the 3A and 3B instrument panel junction block assembly connector.
- (b) Disconnect the F6 power window regulator switch assembly (door control switch) connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3A-41 - F6-16	Always	Below 1 Ω
3B-20 - F6-15	Always	Below 1 Ω

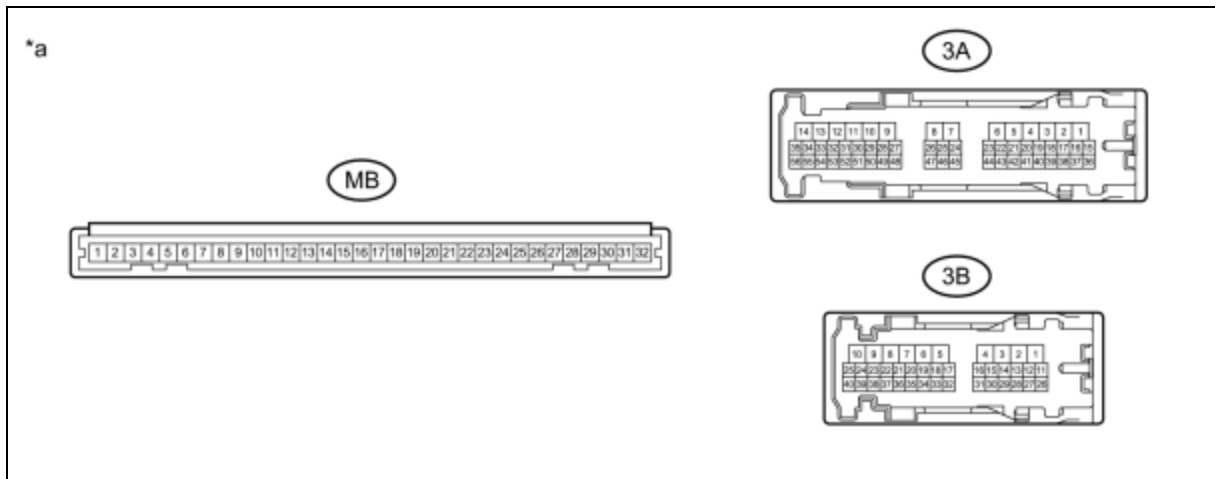
F6-5 - Body ground	Always	Below 1 Ω
3A-41 or F6-16 - Body ground	Always	10 k Ω or higher
3B-20 or F6-15 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK


9. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

- (a) Remove the instrument panel junction block assembly  .
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (c) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	---	---	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
MB-17 - 3A-41	Always	Below 1 Ω
MB-19 - 3B-20	Always	Below 1 Ω

REPLACE INSTRUMENT PANEL JUNCTION

NG ▶ BLOCK ASSEMBLY

OK ▶ REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000TNZ091X
Title: DOOR LOCK: POWER DOOR LOCK CONTROL SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

DATA LIST / ACTIVE TEST

1. DATA LIST

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus:
Body Electrical / Main Body / Data List.
- (e) Read the Data List according to the display on the Techstream.

Main Body

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Open Door Warning	Open door warning / OFF or ON	Customized setting displayed	-
D Door Courtesy SW	Driver side door courtesy light switch signal / ON or OFF	ON: Driver side door opened OFF: Driver side door closed	-
Door Lock SW-Lock	Door control switch (power window regulator master switch assembly or power window regulator switch assembly) lock signal / OFF or ON	OFF: Lock side of door control switch (power window regulator master switch assembly or power window regulator switch assembly) not pushed ON: Lock side of door control switch (power window regulator master switch assembly or power window regulator switch assembly) pushed	-
Door Lock SW-Unlock	Door control switch (power window regulator master switch assembly or power window regulator switch assembly) unlock signal / OFF or	OFF: Unlock side of door control switch (power window regulator master switch assembly or power window regulator switch assembly) not pushed ON: Unlock side of door control	-

	ON	switch (power window regulator master switch assembly or power window regulator switch assembly) pushed	
P Door Courtesy SW	Passenger side door courtesy light switch signal / ON or OFF	ON: Passenger side door opened OFF: Passenger side door closed	-
Luggage Courtesy SW	Luggage compartment door courtesy switch signal / OFF or ON	OFF: Luggage compartment door closed ON: Luggage compartment door opened	-
Back Door Open	Luggage compartment door lock / Prohibit or Permit	Prohibit: Luggage compartment door locked Permit: Luggage compartment door unlocked	-
Trunk Lock/Unlock SW	Status of the luggage compartment door lock/unlock switch /OFF or ON	OFF: Luggage compartment door key cylinder not turned to unlock position ON: Luggage compartment door key cylinder turned to unlock position	-
Back Door Open Handle SW	Back door opener switch / OFF or ON	OFF: Back door opener switch not pushed ON: Back door opener switch pushed	-
IG SW	Ignition switch status / OFF or ON	OFF: Ignition switch off ON: Ignition switch to ON	-
ACC SW	Ignition switch status / OFF or ON	OFF: Ignition switch off ON: Ignition switch on (ACC)	-
Key Unlock Warning SW	Unlock warning switch signal / OFF or ON	OFF: No key is in ignition key cylinder ON: Key is in ignition key cylinder	-
Front Passenger Unlock	Status of passenger side door unlock / OFF or ON	OFF: Passenger side door locked ON: Passenger side door unlocked	-
Door Lock Output	Status of all doors lock signal output / OFF or ON	OFF: All doors lock operation is not performed ON: All doors lock operation is performed	-
All Unlock	Status of all doors unlock signal output / OFF or ON	OFF: All doors unlock operation is not performed ON: All doors unlock operation is performed	-
Driver Unlock	Status of driver side door unlock / OFF or ON	OFF: Driver side door locked ON: Driver side door unlocked	-
Rear Gate/Trunk Output	Luggage compartment door unlock signal output / OFF or ON	OFF: Luggage compartment door open operation is not performed ON: Luggage compartment door open operation is performed	-

2. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus:
Body Electrical / Main Body / Active Test.
- (e) Perform the Active Test according to the display on the Techstream.

Main Body

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Door Lock	Door lock motor	OFF / Unlock / Lock	-
D-Door Unlock	Driver door lock motor	OFF / ON	-
Trunk and Back-Door Open	Back door lock motor	OFF / ON	-
Door Open/Close State	Main body ECU (network gateway ECU)	OFF / ON	-



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000TNQ03UX
Title: DOOR LOCK: POWER DOOR LOCK CONTROL SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedures to troubleshoot the power door lock control system.
- *: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	INSPECT BATTERY VOLTAGE
-----------	--------------------------------

Standard voltage:

11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT



3.	PROBLEM SYMPTOMS TABLE
-----------	-------------------------------

(a) Refer to Problem Symptoms Table  .

Result

RESULT	PROCEED TO
Fault is not listed in Problem Symptoms Table	A
Fault is listed in Problem Symptoms Table	B

B  Go to step 5

A



4.	OVERALL ANALYSIS AND TROUBLESHOOTING*
-----------	--

- (a) Terminals of ECU INFO .
- (b) Operation check INFO .
- (c) Data List/Active Test INFO .

NEXT
▼

5.	ADJUST, REPAIR OR REPLACE
-----------	----------------------------------

NEXT
▼

6.	CONFIRMATION TEST
-----------	--------------------------

NEXT ► **END**

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002T6K04FX
Title: DOOR LOCK: POWER DOOR LOCK CONTROL SYSTEM: OPERATION CHECK (2013 FR-S)		

OPERATION CHECK

1. CHECK POWER DOOR LOCK OPERATION

NOTICE:

The operation check below is based on the noncustomized initial condition of the vehicle.

- (a) Check the basic function.
 - (1) Check that all doors lock when the door lock control switch (for manual operation) is turned to lock and all doors unlock when turned to unlock.
- (b) Check the key lock-in prevention function.

NOTICE:

In order to prevent the key from being actually locked-in, the following inspection should be performed with the driver side door window open.

- (1) Turn the ignition switch to ON or ACC.
- (2) With the driver door open, check that all doors unlock immediately after the lock side of the door control switch (for manual operation) is pressed.
- (c) Check the security function of the door lock control system.
 - (1) Close all doors and leave the driver door window open so that the door lock knob can be operated from outside the vehicle. (Step 1)
 - (2) Starting from Step 1, with the key outside the vehicle, close and lock the driver door using wireless door lock operation. Then, check that the doors do not unlock when the unlock side of the door control switch (for manual operation) is pressed from outside the vehicle.

HINT:

Check that the security function of the door lock control system is canceled under the following conditions:

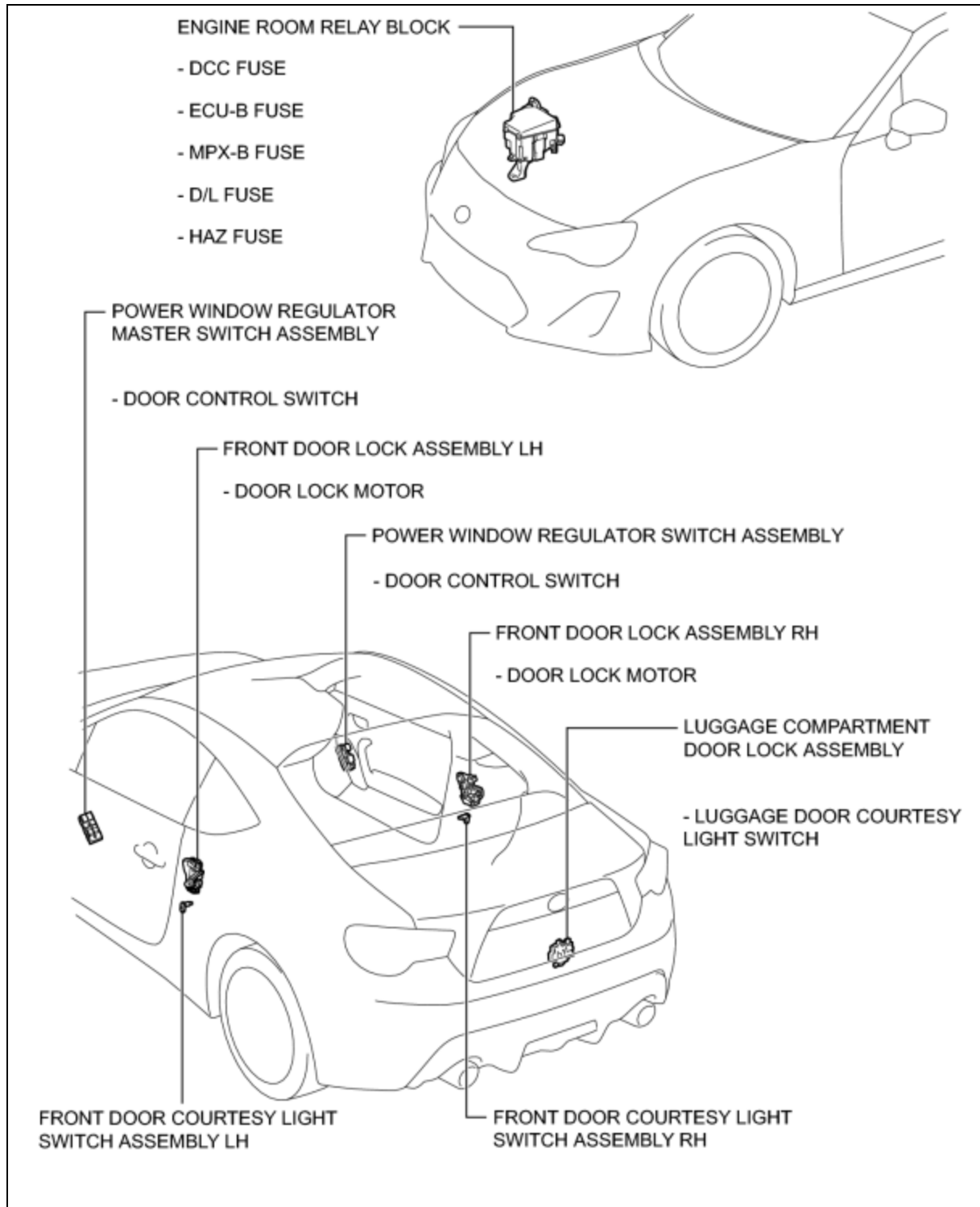
- Turn the ignition switch to ON.
- The doors are unlocked by a wireless operation.



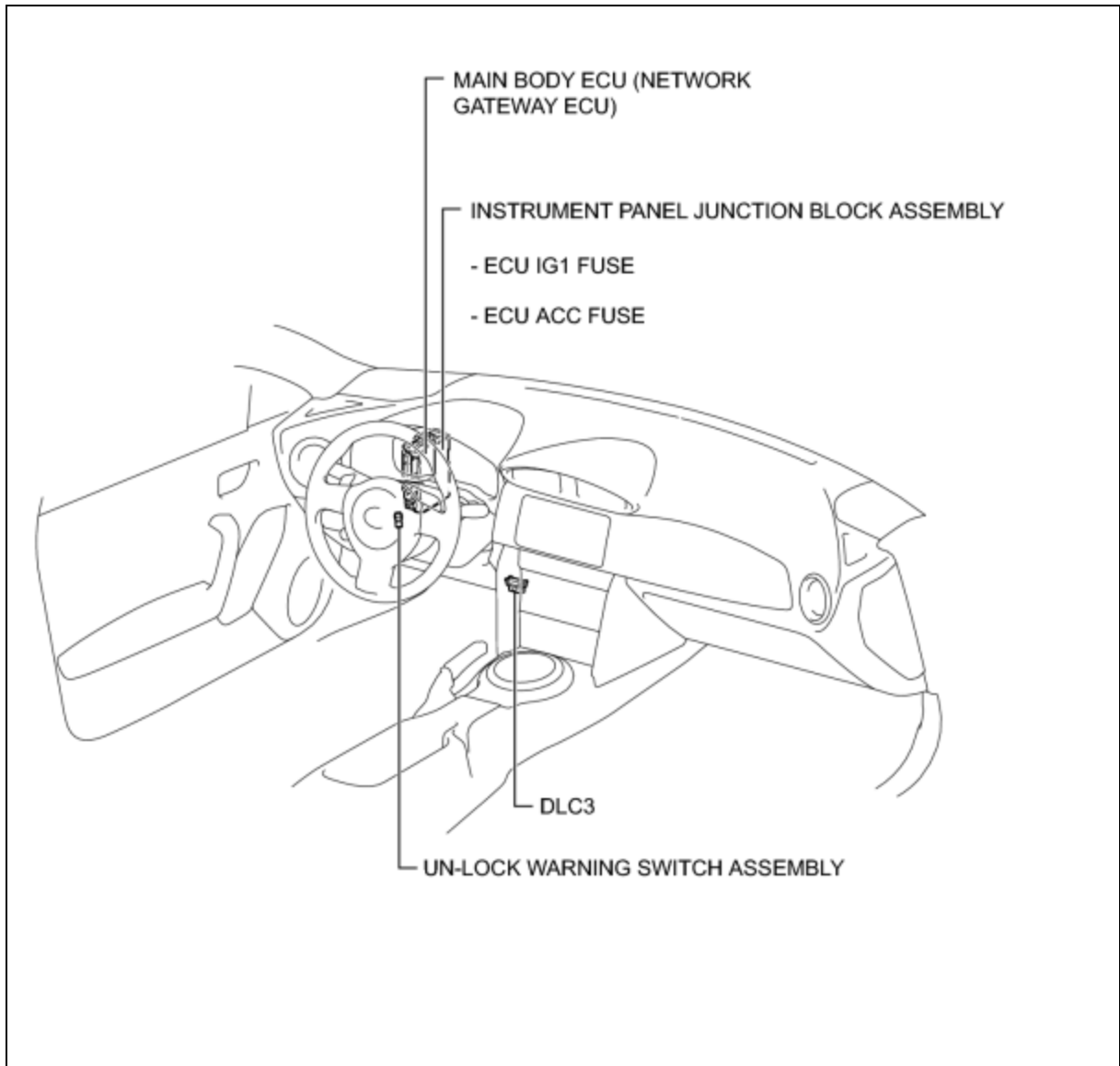
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000026V5019X
Title: DOOR LOCK: POWER DOOR LOCK CONTROL SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000TNU065X
Title: DOOR LOCK: POWER DOOR LOCK CONTROL SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Power Door Lock Control System

SYMPTOM	SUSPECTED AREA	SEE PAGE
All Doors LOCK/UNLOCK Functions do not Operate Via Power Window Regulator Master Switch Assembly	Power window regulator master switch assembly	INFO
	Main body ECU (network gateway ECU)	-
	Instrument panel junction block assembly	-
	Wire harness or connector	-
All Doors LOCK/UNLOCK Functions do not Operate Via Power Window Regulator Switch Assembly	Power window regulator switch assembly	INFO
	Main body ECU (network gateway ECU)	-
	Instrument panel junction block assembly	-
	Wire harness or connector	-
Only Driver Door LOCK/UNLOCK Functions do not Operate	Front door lock assembly LH	INFO
	Main body ECU (network gateway ECU)	-
	Instrument panel junction block assembly	-
	Wire harness or connector	-
Only Passenger Door LOCK/UNLOCK Functions do not Operate	Front door lock assembly RH	INFO
	Main body ECU (network gateway ECU)	-
	Instrument panel junction block assembly	-
	Wire harness or connector	-



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000TINV03PX
Title: DOOR LOCK: POWER DOOR LOCK CONTROL SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

SYSTEM DESCRIPTION

1. POWER DOOR LOCK CONTROL SYSTEM DESCRIPTION

(a) The power door lock system locks/unlocks all the doors.

The main body ECU (network gateway ECU) receives lock/unlock request signals from a door control switch. Then, the main body ECU (network gateway ECU) sends these request signals to the door lock motors in each door to lock/unlock each door in response to the inputs.

2. FUNCTION OF MAIN COMPONENTS

COMPONENTS	FUNCTION
Power window regulator master switch assembly <ul style="list-style-type: none"> Door control switch 	The door control switch on the power window regulator master switch assembly locks/unlocks all doors.
Power window regulator switch assembly <ul style="list-style-type: none"> Door control switch 	The door control switch on the power window regulator switch assembly locks/unlocks all doors.
Door courtesy light switch assembly	<ul style="list-style-type: none"> Placed on each door. Detects door status (open or closed) and outputs a signal to main body ECU (network gateway ECU). Turns on when door is opened and turns off when door is closed.
Front door Lock assembly LH Front door Lock assembly RH	The built-in motor locks/unlocks the door.
Luggage compartment door lock assembly	<ul style="list-style-type: none"> Built-in motor unlatches door latch. Built-in courtesy switch detects luggage compartment door status (open or closed) and outputs a signal to main body ECU (network gateway ECU). This switch turns on when luggage compartment door is opened and turns off when luggage compartment door is closed

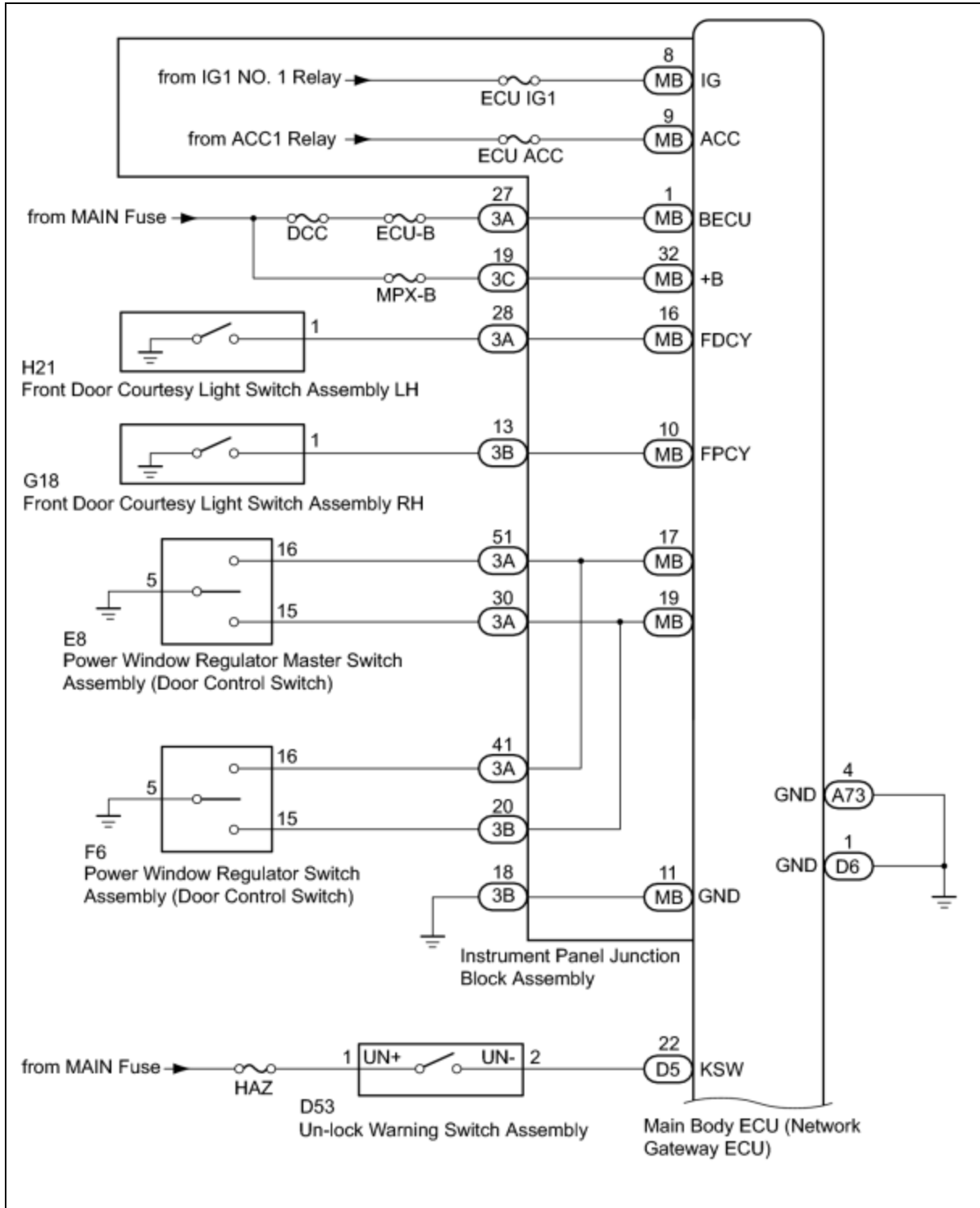
3. SYSTEM FUNCTION

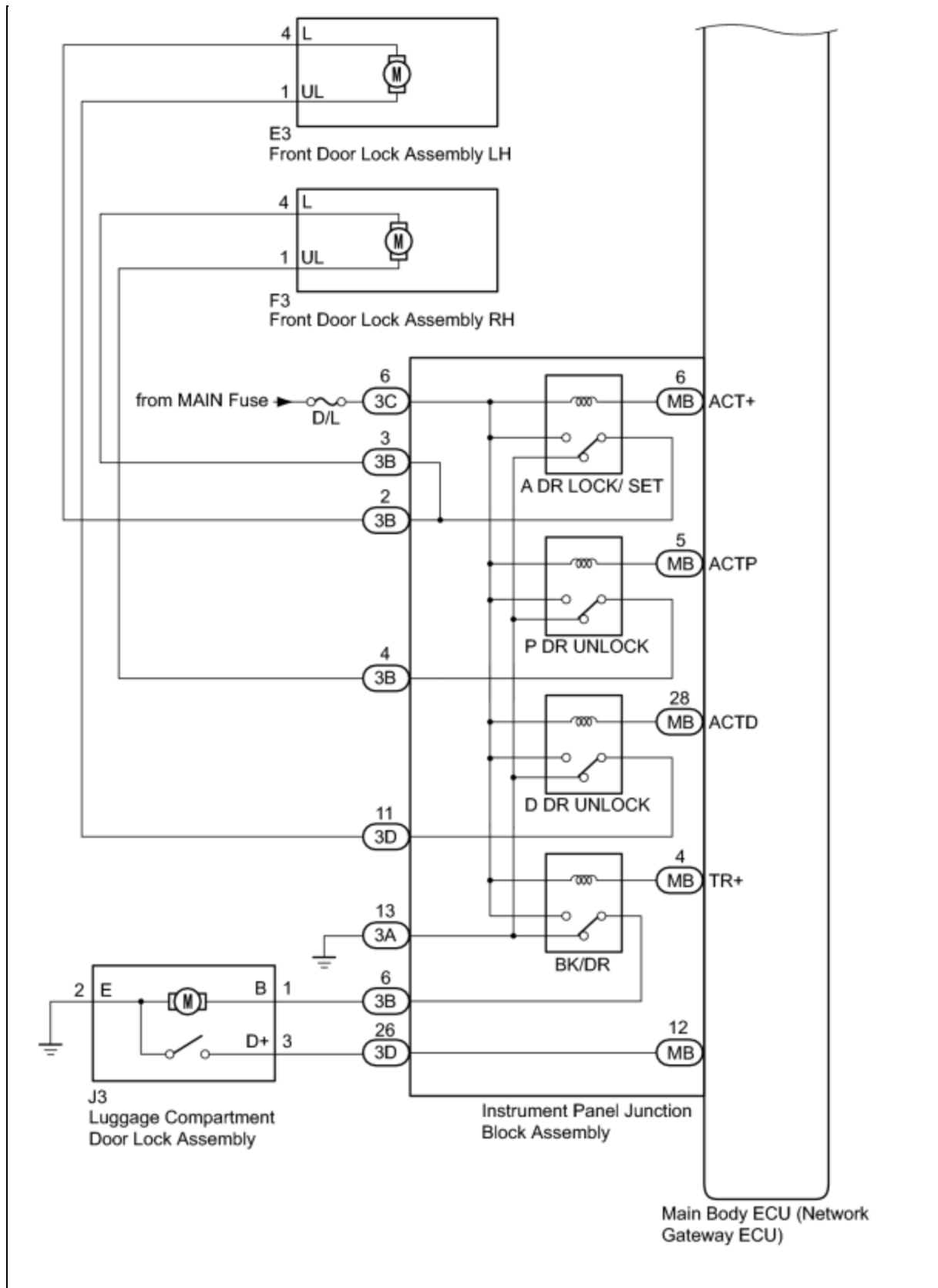
(a) This system is controlled by the main body ECU (network gateway ECU). The main body ECU (network gateway ECU) outputs signals to each door lock motor. The power door lock control system has the following functions:

FUNCTION	OUTLINE
Manual lock and unlock function	This function can lock or unlock all doors by the door control switch operation.
Key lock-in prevention function	When the door lock operation is performed with the ignition key in the ignition key cylinder, door will be locked once and immediately unlocked.
Manual unlock prohibition function	<p>When the condition below is met, unlocking the vehicle using the door control switch will be prohibited:</p> <ul style="list-style-type: none"> • The doors are locked using a wireless key operation with all doors closed.

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001XM401JX
Title: DOOR LOCK: POWER DOOR LOCK CONTROL SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM

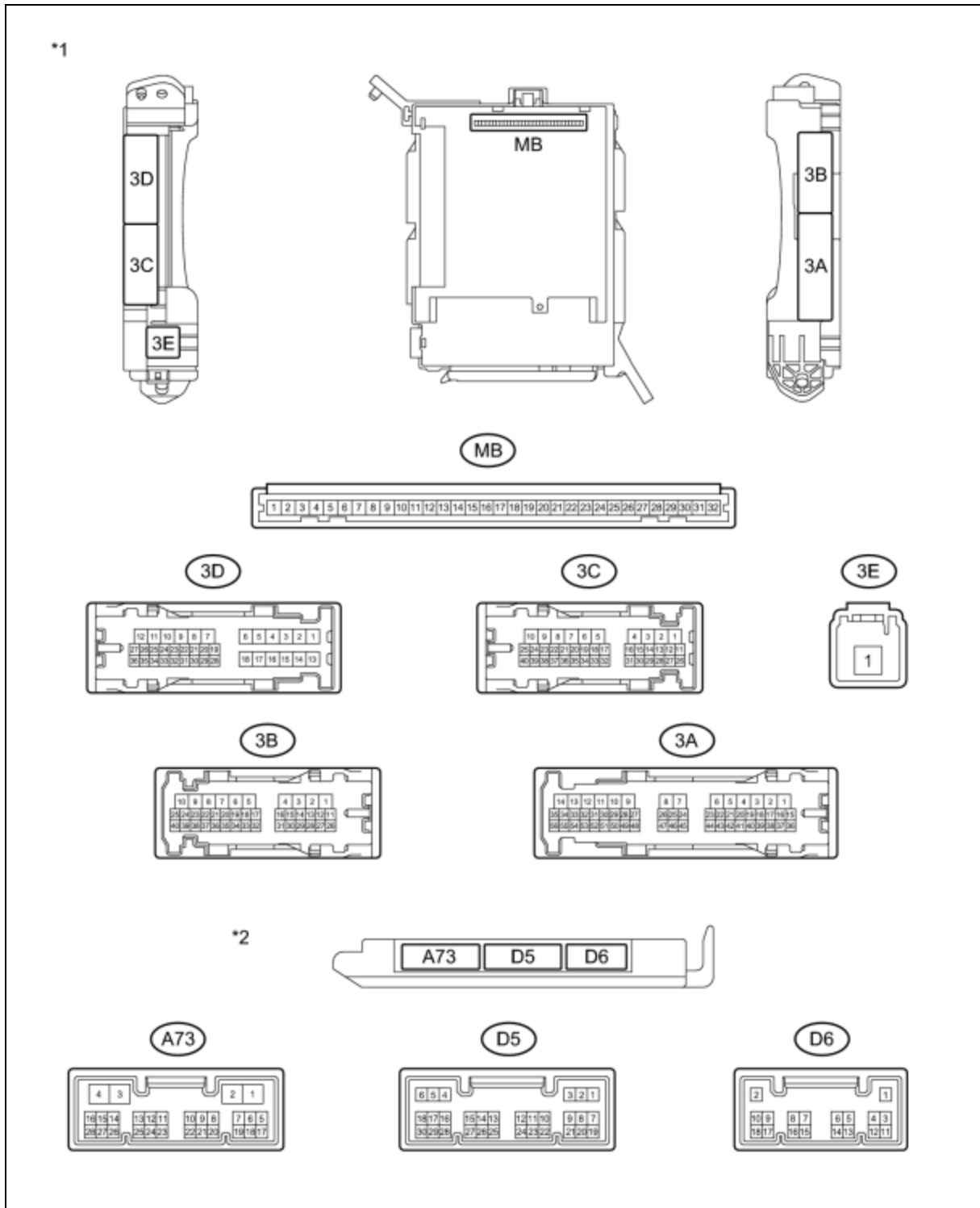




Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001JW703SX
Title: DOOR LOCK: POWER DOOR LOCK CONTROL SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. CHECK INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY AND MAIN BODY ECU (NETWORK GATEWAY ECU)



Text in Illustration

*1	Instrument Panel Junction Block Assembly	*2	Main Body ECU (Network Gateway ECU)
----	--	----	-------------------------------------

- (a) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (b) Disconnect the D5, D6 and A73 main body ECU (network gateway ECU) connectors.
- (c) Measure the resistance and voltage between each terminal of the wire harness side connectors and body ground.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
MB-1 (BECU) - Body ground	None - Body ground	Battery power supply	Always	11 to 14 V
MB-8 (IG) - Body ground	None - Body ground	Ignition switch power supply	Ignition switch ON	11 to 14 V
			Ignition switch off	Below 1 V
MB-9 (ACC) - Body ground	None - Body ground	ACC power supply	Ignition switch ACC	11 to 14 V
			Ignition switch off	Below 1 V
MB-11 (GND) - Body ground	None - Body ground	Ground	Always	Below 1 Ω
MB-32 (+B) - Body ground	None - Body ground	Battery power supply	Always	11 to 14 V
D5-22 (KSW) - Body ground	BR - Body ground	Unlock warning switch input	No key in ignition key cylinder (off)	Below 1 V
			Key inserted ignition key cylinder (on)	11 to 14 V
D6-1 (GND) - Body ground	B - Body ground	Ground	Always	Below 1 Ω
A73-4 (GND) - Body ground	B-Y - Body ground	Ground	Always	Below 1 Ω

- (d) Reconnect the D5, D6 and A73 main body ECU (network gateway ECU) connectors.
- (e) Install the main body ECU (network gateway ECU) to the instrument panel junction block assembly.
- (f) Measure the voltage and resistance, according to the valve(s) in the table below.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
3A-28 - Body ground	Y - Body ground	Driver side door courtesy light switch input	Driver side door open	Below 1 V
			Driver side door closed	11 to 14 V
3B-13 - Body ground	L - Body ground	Passenger side door courtesy light switch input	Passenger side door open	Below 1 V
			Passenger side door closed	11 to 14 V
			Door control switch not	Below 1 V

3B-2 - Body ground	Y - Body ground	Door lock motor lock drive output (for driver side)	pushed	
			Lock side of door control switch pushed	11 to 14 V
3B-3 - Body ground	L - Body ground	Door lock motor lock drive output (for passenger side)	Door control switch not pushed	Below 1 V
			Lock side of door control switch pushed	11 to 14 V
3D-11 - Body ground	R-G - Body ground	Door lock motor unlock drive output (for driver side)	Door control switch not pushed	Below 1 V
			Unlock side of door control switch pushed	11 to 14 V
3B-4 - Body ground	L-W - Body ground	Door lock motor unlock drive output (for passenger side)	Door control switch not pushed	Below 1 V
			Unlock side of door control switch pushed	11 to 14 V
3D-26 - Body ground	SB - Body ground	Luggage compartment door courtesy light switch input	Luggage compartment door open	Below 1 V
			Luggage compartment door closed	11 to 14 V

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003ZV300TX
Title: DOOR LOCK: TRANSMITTER BATTERY: REPLACEMENT (2013 FR-S)		

REPLACEMENT

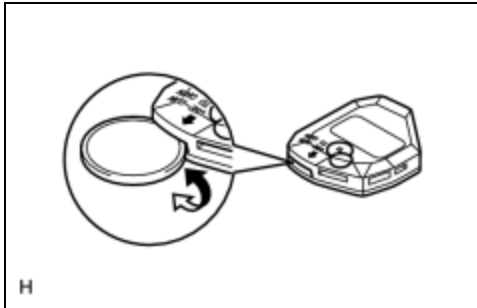
NOTICE:

Take extra care when handling these precision electronic components.

1. REMOVE TRANSMITTER HOUSING COVER INFO

2. REMOVE DOOR CONTROL TRANSMITTER ASSEMBLY INFO

3. REMOVE TRANSMITTER BATTERY

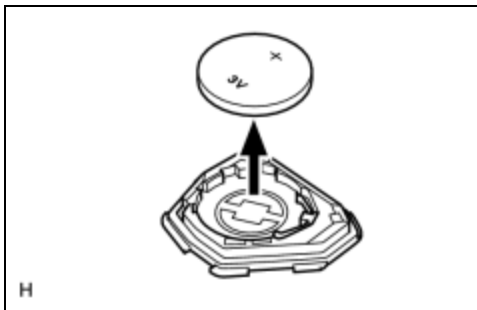


(a) Disengage the hook and remove the transmitter battery cover.

(b) Remove the transmitter battery (lithium battery: CR2016).

NOTICE:

- Do not push the terminals with your finger.
- Do not use excessive force when prying up the battery (lithium battery: CR2016) as this may damage the terminals.
- Do not touch the battery with wet hands. Water may cause it to rust.
- Do not touch or move any components inside the transmitter as this may interfere with its proper operation.
- When replacing the transmitter battery, before starting work, remove static electricity that has built up in the body by touching, for example, the vehicle to prevent the door control transmitter from being damaged.

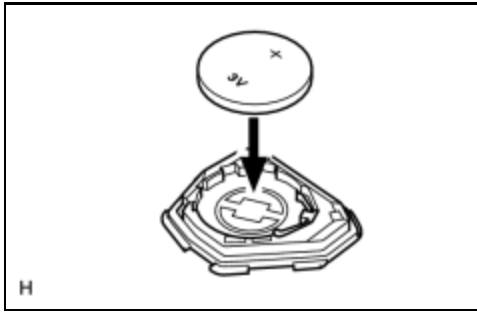


HINT:

Tape the screwdriver tip before use.

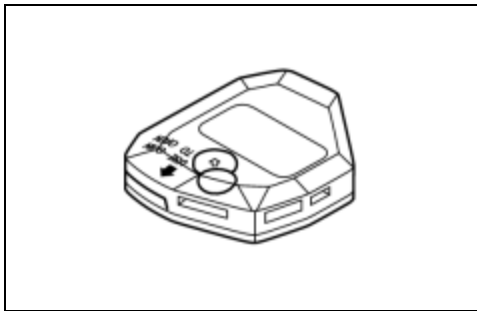
4. INSTALL TRANSMITTER BATTERY

- (a) Install a battery (lithium battery: CR2016) with the positive (+) side up, as shown in the illustration.



NOTICE:

- Make sure that the positive (+) side and the negative (-) side of the transmitter battery are correctly matched with the transmitter terminals.
- Do not bend the transmitter battery electrode during insertion.
- Keep the transmitter cover interior free of dust and oil.
- When replacing the transmitter battery, before starting work, remove static electricity that has built up in the body by touching, for example, the vehicle to prevent the door control transmitter from being damaged.



- (b) Engage the hook and install the transmitter battery cover.

NOTICE:

Securely engage the claws of the cover to prevent the poor contact between the battery and terminal.

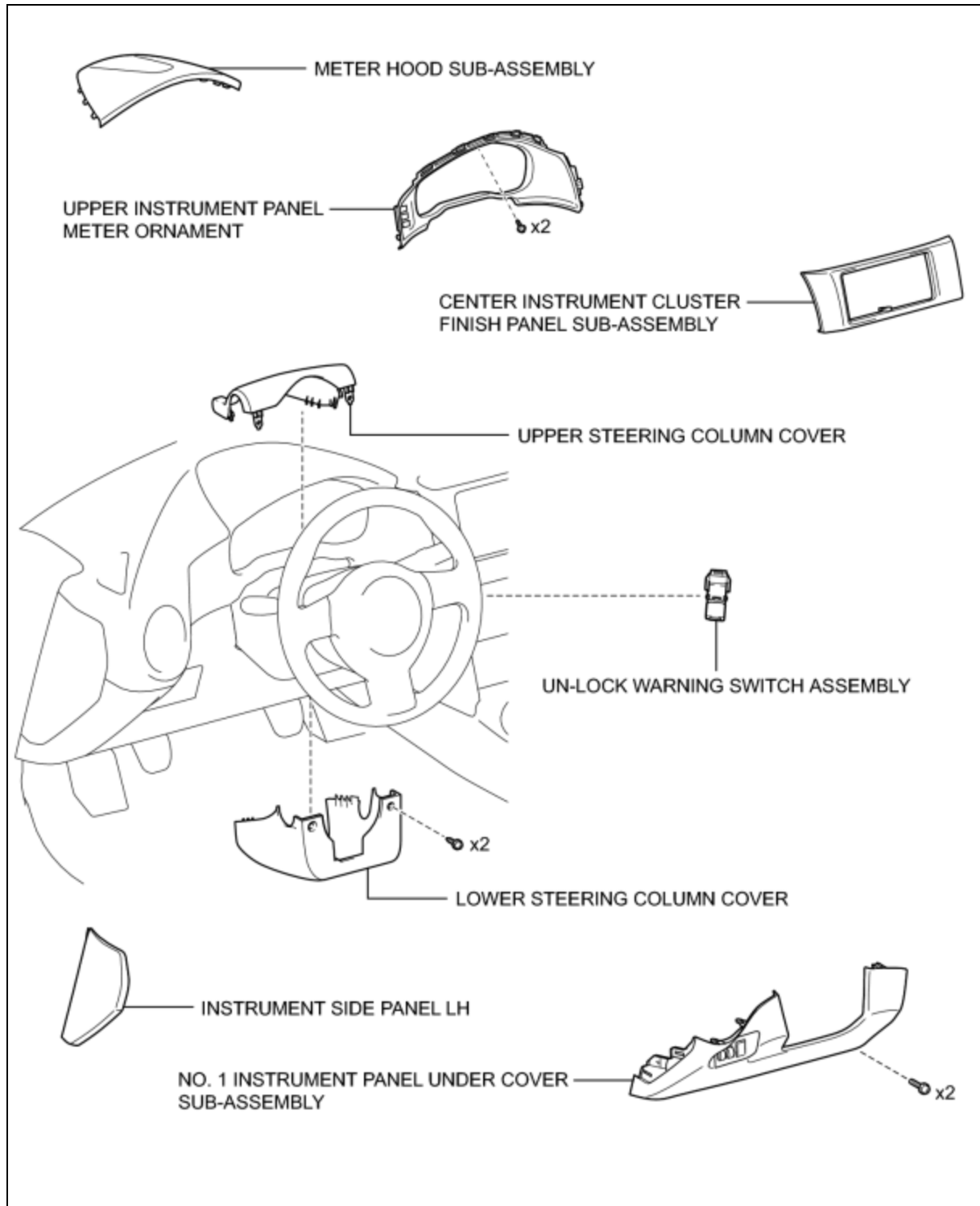
5. INSTALL DOOR CONTROL TRANSMITTER ASSEMBLY INFO

6. INSTALL TRANSMITTER HOUSING COVER INFO

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002ZQ501LX
Title: DOOR LOCK: UNLOCK WARNING SWITCH: COMPONENTS (2013 FR-S)		

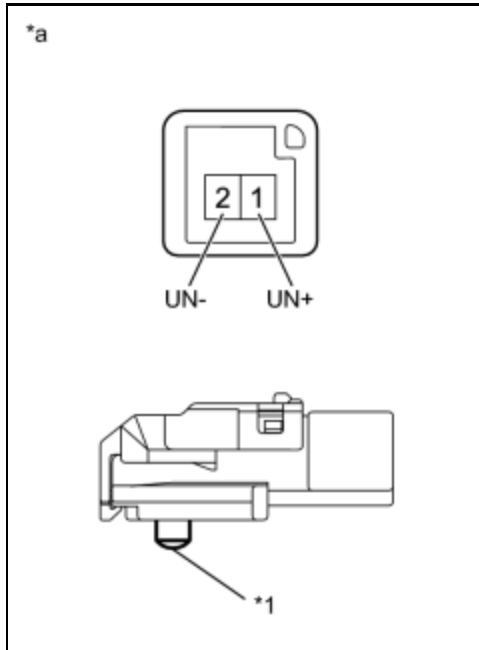
COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002ZQ401ZX
Title: DOOR LOCK: UNLOCK WARNING SWITCH: INSPECTION (2013 FR-S)		

INSPECTION



1. INSPECT UN-LOCK WARNING SWITCH ASSEMBLY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 (UN+) - 2 (UN-)	Not pushed	10 k Ω or higher
	Pushed	Below 1 Ω

If the result is not as specified, replace the un-lock warning switch assembly.

Text in Illustration

*1	Pin
*a	Component without harness connected (Un-lock Warning Switch Assembly)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002ZQ302GX
Title: DOOR LOCK: UNLOCK WARNING SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL UN-LOCK WARNING SWITCH ASSEMBLY

- (a) Attach the 2 claws to install the un-lock warning switch assembly.
- (b) Connect the un-lock warning switch assembly connector.

2. INSTALL UPPER STEERING COLUMN COVER [INFO](#)

3. INSTALL LOWER STEERING COLUMN COVER [INFO](#)

4. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)

5. INSTALL UPPER INSTRUMENT PANEL METER ORNAMENT [INFO](#)

6. INSTALL METER HOOD SUB-ASSEMBLY [INFO](#)

7. INSTALL CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY [INFO](#)

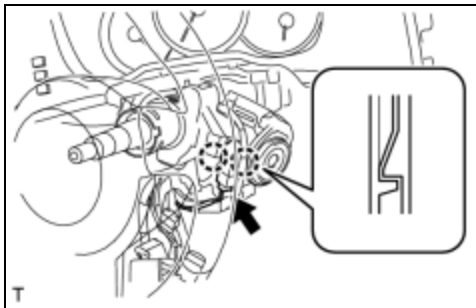
8. INSTALL INSTRUMENT SIDE PANEL LH [INFO](#)



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002ZQ602HX
Title: DOOR LOCK: UNLOCK WARNING SWITCH: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE INSTRUMENT SIDE PANEL LH [INFO](#)
2. REMOVE CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY [INFO](#)
3. REMOVE METER HOOD SUB-ASSEMBLY [INFO](#)
4. REMOVE UPPER INSTRUMENT PANEL METER ORNAMENT [INFO](#)
5. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)
6. REMOVE LOWER STEERING COLUMN COVER [INFO](#)
7. REMOVE UPPER STEERING COLUMN COVER [INFO](#)
8. REMOVE UN-LOCK WARNING SWITCH ASSEMBLY



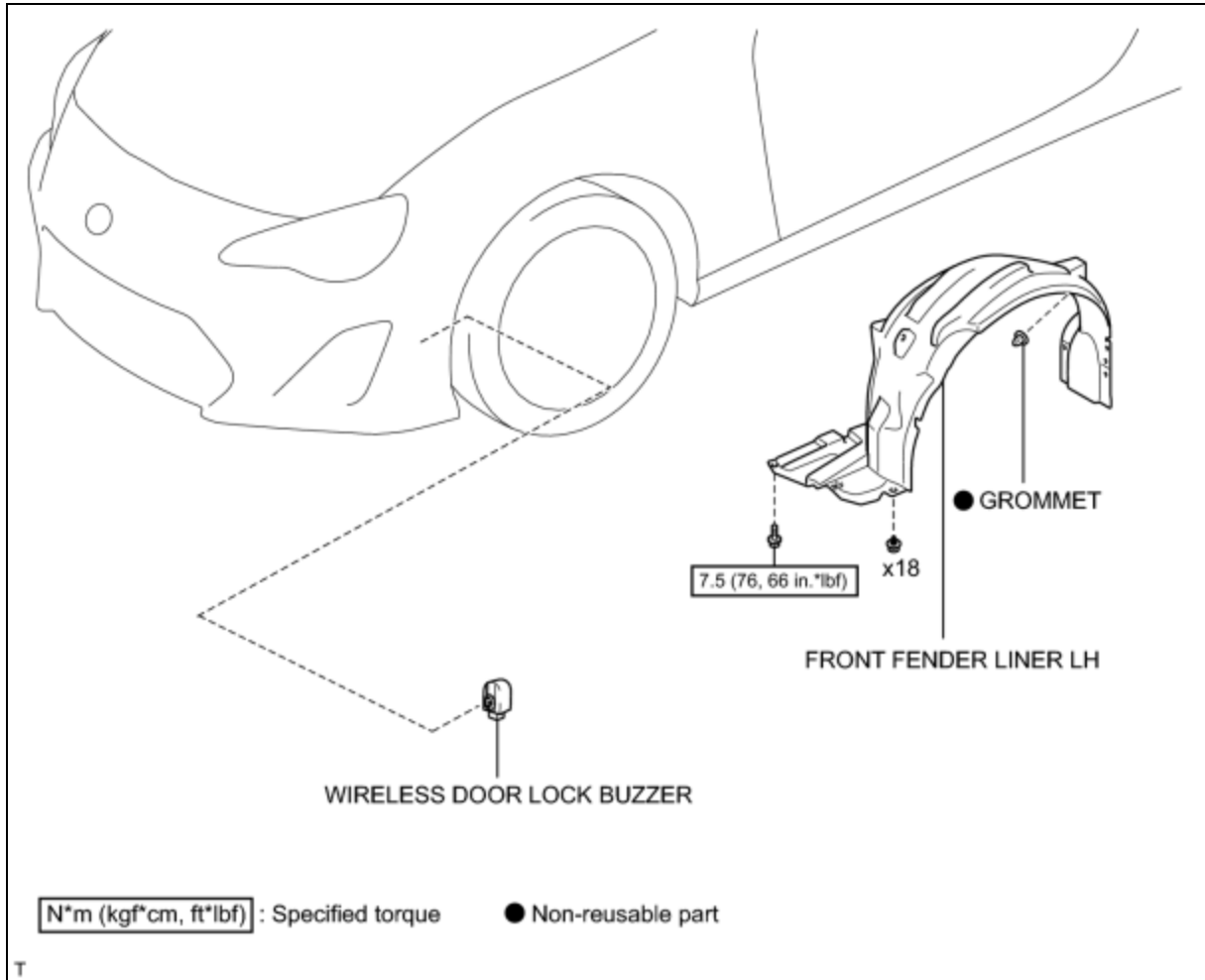
(a) Disconnect the un-lock warning switch assembly connector.

(b) Detach the 2 claws and remove the un-lock warning switch assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XKV011X
Title: DOOR LOCK: WIRELESS DOOR LOCK BUZZER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XKT025X
Title: DOOR LOCK: WIRELESS DOOR LOCK BUZZER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL WIRELESS DOOR LOCK BUZZER

- (a) Connect the connector.
- (b) Engage the clamp to install the wireless door lock buzzer.

2. INSTALL FRONT FENDER LINER LH INFO

3. INSTALL FRONT WHEEL

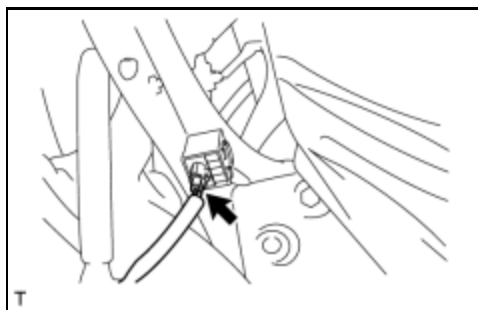
Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)



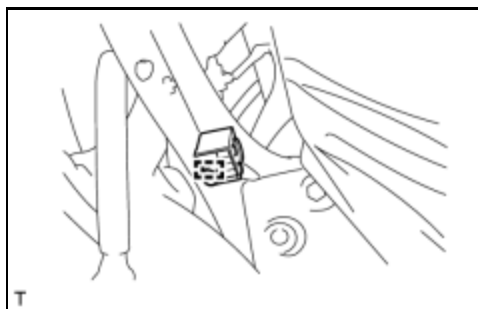
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XKW01VX
Title: DOOR LOCK: WIRELESS DOOR LOCK BUZZER: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE FRONT WHEEL
2. REMOVE FRONT FENDER LINER LH INFO
3. REMOVE WIRELESS DOOR LOCK BUZZER



(a) Disconnect the connector.



(b) Detach the clamp and remove the wireless door lock buzzer.

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001TQK00RX
Title: DOOR LOCK: WIRELESS DOOR LOCK CONTROL SYSTEM: B1242: Wireless Door Lock Tuner Circuit Malfunction (2013 FR-S)		

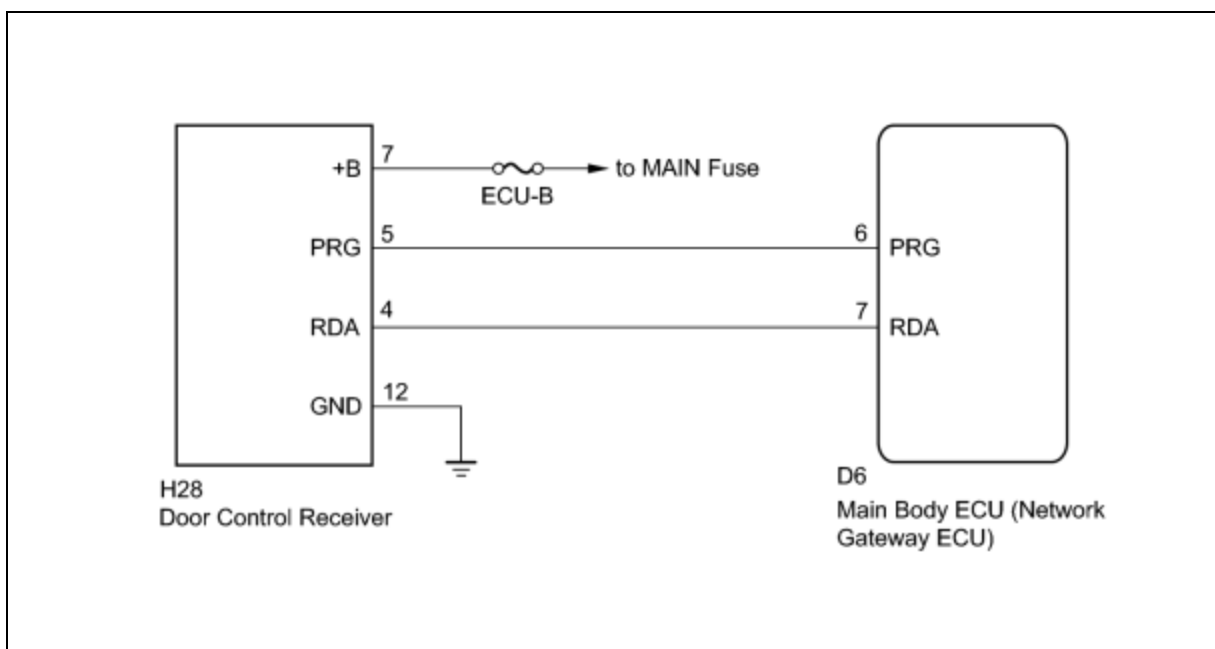
DTC	B1242	Wireless Door Lock Tuner Circuit Malfunction
------------	--------------	---

DESCRIPTION

This door control receiver receives signals from the transmitter and sends these signals to the main body ECU (network gateway ECU).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1242	In diagnostic mode, applicable RDA signal cannot be received 3 times in succession after the PRG signal is output from the main body ECU (network gateway ECU).	<ul style="list-style-type: none"> • Wire harness or connector • Door control receiver • Main body ECU (network gateway ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CHECK HARNESS AND CONNECTOR (MAIN BODY ECU (NETWORK GATEWAY ECU) - DOOR CONTROL RECEIVER)
-----------	--

- (a) Disconnect the D6 main body ECU (network gateway ECU) connector.
- (b) Disconnect the H28 door control receiver connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D6-6 (PRG) - H28-5 (PRG)	Always	Below 1 Ω
D6-7 (RDA) - H28-4 (RDA)	Always	Below 1 Ω
D6-6 (PRG) - Body ground	Always	10 k Ω or higher
D6-7 (RDA) - Body ground	Always	10 k Ω or higher

**REPAIR OR REPLACE HARNESS OR
NG  CONNECTOR**

OK


2.	INSPECT DOOR CONTROL RECEIVER (POWER SOURCE, GROUND)
-----------	---

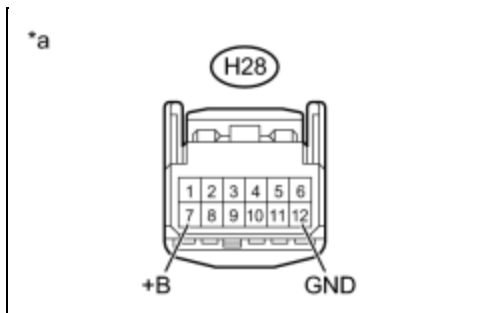
- (a) Measure the voltage and resistance according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H28-7 (+B) - Body ground	Always	11 to 14 V

Standard Resistance:

--	--	--



--	--	--

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H28-12 (GND) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Door Control Receiver)
----	---

**REPAIR OR REPLACE HARNESS OR
NG ► CONNECTOR**

OK



3.	REPLACE DOOR CONTROL RECEIVER
-----------	--------------------------------------

(a) Temporarily replace the door control receiver with a new or normally functioning one

INFO .

NEXT



4.	REGISTER RECOGNITION CODE
-----------	----------------------------------

(a) Perform the Registration procedures **INFO** .

HINT:

If a new or normal functioning door control receiver is available, connect it and check if the wireless door lock function is normal or the DTC is output. If the alternative receiver functions normally, replace the original door control receiver.

NEXT



5.	CLEAR DTC
-----------	------------------

(a) Clear the DTC  .

NEXT



6.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs  .

OK:

DTC is not output.

HINT:

Reinstall the parts, such as sensors and connectors, and restore the vehicle to its previous conditions before rechecking for DTCs.

NG ► REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

OK ► END (DOOR CONTROL RECEIVER IS DEFECTIVE)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000593H000X
Title: DOOR LOCK: WIRELESS DOOR LOCK CONTROL SYSTEM: CUSTOMIZE PARAMETERS (2013 FR-S)		

CUSTOMIZE PARAMETERS

1. CUSTOMIZE WIRELESS DOOR LOCK CONTROL SYSTEM

(a) Customizing with the Techstream

NOTICE:

- When the customer requests a change in a function, first make sure that the function can be customized.
- Record the current settings before customizing.
- When troubleshooting a function, first make sure that the function is set to the default setting.

HINT:

The following items can be customized.

- (1) Connect the Techstream to the DLC3.
- (2) Turn the ignition switch to ON.
- (3) Turn the Techstream on.
- (4) Enter the following menus: Body Electrical / Main Body / Utility / Customize / Wireless Door Lock or Others.
- (5) Select the setting by referring to the table below.

Wireless Door Lock

DISPLAY	DEFAULT	FUNCTION	SETTING	RELEVANT ECU
Wireless Control	ON	Function that turns wireless door lock function / OFF or ON	OFF or ON	Main body ECU (network gateway ECU)
Wireless Buzzer Resp	ON	Wireless door lock buzzer response	OFF or ON	Main body ECU (network gateway ECU)
Hazard Answer Back	ON	When wireless lock switch on transmitter pressed, illuminate all hazard warning lights once. When unlock switch pressed, all hazard warning lights illuminate twice.	OFF or ON	Main body ECU (network gateway ECU)
Open Door	ON	The buzzer sounds when lock is pressed when any	OFF or ON	Main body ECU (network

Warning		of the doors are ajar.		gateway ECU)
Unlock 2 Operation	ON	Function that unlocks driver door when unlock switch on door control transmitter module set sub-assembly is pressed once, and unlocks all doors when pressed twice. If setting is OFF, pressing unlock switch once makes all doors unlock.	OFF or ON	Main body ECU (network gateway ECU)
Panic Function	ON	Function to operate theft deterrent system by continuously pressing panic switch on door control transmitter module set sub-assembly for 1.5 seconds	OFF or ON	Main body ECU (network gateway ECU)
Wireless Auto Lock	ON	This function turns the wireless auto lock function OFF or ON	OFF or ON	Main body ECU (network gateway ECU)
Auto Lock Time	60 s	Time until relocking after unlocking with wireless door lock function	30 s, 60 s or 120 s	Main body ECU (network gateway ECU)
Trunk Lid Operation	Long1	Function to change the operation method of opening the luggage compartment door by the door control transmitter module set sub-assembly.	1tim ON, 2tim ON, Long1 or Long2	Main body ECU (network gateway ECU)
Wireless Buzzer Vol	Level 5	Wireless door lock buzzer volume	Level 7, Level 6, Level 5, Level 4, Level 3, Level 2, Level 1 or Level 0	Main body ECU (network gateway ECU)

Others

DISPLAY	DEFAULT	FUNCTION	SETTING	RELEVANT ECU
Detection of Vehicle	ON	This function turns the detection of vehicle function OFF or ON.	OFF or ON	Main body ECU (network gateway ECU)

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XXB02BX
Title: DOOR LOCK: WIRELESS DOOR LOCK CONTROL SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

DATA LIST / ACTIVE TEST

1. READ DATA LIST

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Data List.
- (e) Read the Data List according to the display on the Techstream.

Main Body

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Wireless Control	Wireless door lock control function / OFF or ON	Customized setting displayed	-
Wireless Buzzer Resp	Wireless buzzer response / OFF or ON	Customized setting displayed	-
Hazard Answer Back	Hazard answer-back of wireless / OFF or ON	Customized setting displayed	-
Open Door Warning	Open door warning / OFF or ON	Customized setting displayed	-
Unlock 2 Operation	2 times operation of wireless unlock / OFF or ON	Customized setting displayed	-
Panic Function	Panic function / OFF or ON	Customized setting displayed	-
Wireless Auto Lock	Automatic lock function / OFF or ON	Customized setting displayed	-
Auto Lock Time	Automatic lock time / 30 s, 60 s or 120 s	Customized setting displayed	-

Trunk Lid Operation	Opening the luggage compartment door by the door control transmitter module set sub-assembly/ 1 tim ON, 2 tim ON, Long1 or Long2	Customized setting displayed	-
Wireless Buzzer Vol	Wireless door lock buzzer volume/Level7, Level6, Level5, Level4, Level3, Level2, Level1 or Level0	Customized setting displayed	-
Detection of Vehicle	Detection of vehicle function OFF or ON	Customized setting displayed	-
D Door Courtesy SW	Driver side door courtesy light switch signal / ON or OFF	ON: Driver side door opened OFF: Driver side door closed	-
P Door Courtesy SW	Passenger side door courtesy light switch signal / ON or OFF	ON: Passenger side door opened OFF: Passenger side door closed	-
Luggage Courtesy SW	Luggage compartment door courtesy switch signal / OFF or ON	ON: Luggage compartment door is open OFF: Luggage compartment door is closed	-
IG SW	Ignition switch IG signal / ON or OFF	ON: Ignition switch ON OFF: Ignition switch off	-
ACC SW	Ignition switch ACC signal / ON or OFF	ON: Ignition switch ACC OFF: Ignition switch off	-
Key Unlock Warning SW	Unlock warning switch / OFF or ON	OFF: Ignition key is not inserted ON: Ignition key is inserted	-
Hazard Output	Hazard warning light output / OFF or ON	OFF: Not during hazard answer-back operation ON: During hazard answer-back operation	-
Wireless Buzzer Output	Wireless door lock buzzer output / OFF or ON	OFF: Not during wireless door lock buzzer answer-back operation ON: During wireless door lock buzzer answer-back operation	-

2. PERFORM ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can

be displayed while performing Active Tests.

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Active Test.
- (e) Perform the Active Test according to the display on the Techstream.

Main Body

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Door Lock	Door lock motor	Unlock / Lock	-
D-Door Unlock	Driver side door lock motor	OFF / ON	-
Trunk and Back-Door Open	Luggage door lock motor	OFF / ON	-
Illuminated Entry System	Interior lights (Interior light switch is in door position and all doors are closed)	OFF / ON	-
Wireless Buzzer	Wireless door lock buzzer	OFF / ON	-
Hazard	Turn signal flasher assembly	OFF / ON	-
Door Open/Close State	Main body ECU (network gateway ECU)	OFF / ON	-

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001POX0CMX
Title: DOOR LOCK: WIRELESS DOOR LOCK CONTROL SYSTEM: DIAGNOSIS SYSTEM (2013 FR-S)		

DIAGNOSIS SYSTEM

1. CHECK DLC3

- (a) Check the DLC3  .

2. INSPECT BATTERY VOLTAGE

- (a) Measure the battery voltage.

Standard Voltage:

11 to 14 V

If the voltage is below 11 V, recharge or replace the battery.

3. SELF-DIAGNOSTIC MODE (OPERATING IGNITION KEY CYLINDER)

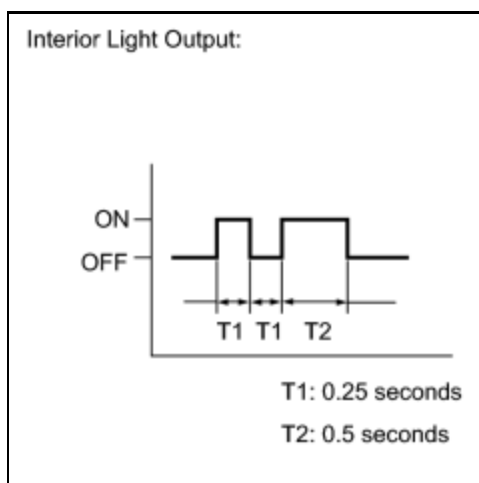
- (a) Switch to self-diagnostic mode.
- (1) Insert the key into the ignition key cylinder and remove it.
 - (2) Within 5 seconds after the key is removed, insert it into the ignition key cylinder and then turn the ignition switch to ON then off once. (End in off)
 - (3) Within 30 seconds after turning the ignition switch off, perform the following 9 times: Turn the ignition switch to ON then off. (End in off)

HINT:

Turning the ignition switch to ON after the procedure above has been completed will end the self-diagnostic mode.

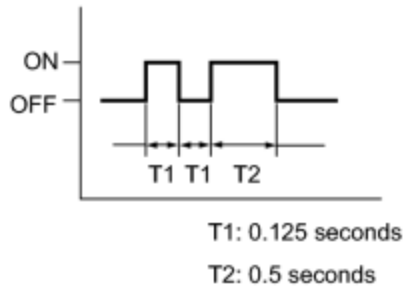
NOTICE:

If the system fails to enter self-diagnostic mode, the system will return to normal mode.



- (b) Check that the system has switched to self-diagnostic mode by checking the interior light output pattern.

Wireless Door Lock Buzzer Output:



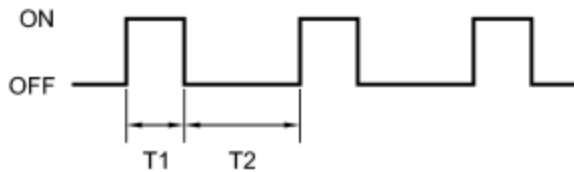
(c) Check that the system has switched to self-diagnostic mode by checking the wireless door lock buzzer output pattern.

(d) Check the diagnostic outputs when the door control transmitter module set sub-assembly switch is held down. The diagnostic outputs can be checked by the interior light and wireless door lock buzzer patterns.

Interior Light and Wireless Door Lock Buzzer Output:

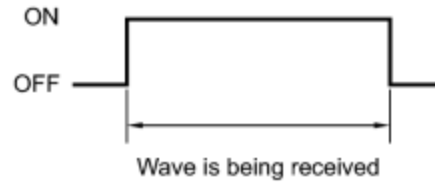
Normal Wave

(LOCK / UNLOCK / LUGGAGE OPEN / PANIC Switch):



- T1: 0.25 seconds (Interior Light)
0.125 seconds (Wireless Door Lock Buzzer)
- T2: 0.5 seconds (Interior Light)
0.25 seconds (Wireless Door Lock Buzzer)

Unmatching Recognition Code:



No Diagnostic Output:



N

Last Modified: 3-27-2012	6.4 S	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000012LR01SX
Title: DOOR LOCK: WIRELESS DOOR LOCK CONTROL SYSTEM: DIAGNOSTIC TROUBLE CODE CHART (2013 FR-S)		

DIAGNOSTIC TROUBLE CODE CHART

DTC CODE	DETECTION ITEM	TROUBLE AREA	SEE PAGE
B1242	Wireless Door Lock Tuner Circuit Malfunction	<ul style="list-style-type: none"> - Wire harness or connector - Door control receiver - Main body ECU (network gateway ECU) 	INFO

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000012M1026X
Title: DOOR LOCK: WIRELESS DOOR LOCK CONTROL SYSTEM: DTC CHECK / CLEAR (2013 FR-S)		

DTC CHECK / CLEAR

1. CHECK DTC

(a) DTC check

- (1) Connect the Techstream to the DLC3.
- (2) Turn the ignition switch to ON.
- (3) Turn the Techstream on.
- (4) Enter the following menus: Body Electrical / Main Body / Trouble Codes.
- (5) Check for DTCs.

(b) DTC clear

- (1) Connect the Techstream to the DLC3.
- (2) Turn the ignition switch to ON.
- (3) Turn the Techstream on.
- (4) Enter the following menu: Body Electrical / Main Body / Trouble Codes.
- (5) Clear the DTCs by following the directions on the Techstream display.



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XX204PX
Title: DOOR LOCK: WIRELESS DOOR LOCK CONTROL SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- The wireless door lock control system troubleshooting procedures are based on the premise that the power door lock system is operating normally. Check the power door lock system first before troubleshooting the wireless door lock control system.
- Use this procedure to troubleshoot the wireless door lock control system.
- *: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	INSPECT BATTERY VOLTAGE
-----------	--------------------------------

(a) Check the battery voltage.

Standard voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT



3.	CHECK FOR DTC*
-----------	-----------------------

(a) Check for DTCs and note any codes that are output INFO.

(b) Clear the DTCs INFO.

(c) Recheck for DTCs.

Result

RESULT	PROCEED TO
DTC is not output	A
DTC is output	B

B ► GO TO DTC CHART

A



4.	PROBLEM SYMPTOMS TABLE
-----------	-------------------------------

Result

RESULT	PROCEED TO
Fault is not listed in Problem Symptoms Table	A
Fault is listed in Problem Symptoms Table	B

B ► Go to step 6

A



5.	OVERALL ANALYSIS AND TROUBLESHOOTING*
-----------	--

- (a) Terminals of ECU INFO .
- (b) Data List/Active Test INFO .
- (c) Operation check INFO .

NEXT



6.	REPAIR OR REPLACE
-----------	--------------------------

HINT:

Register the recognition code when replacing the door control transmitter or the door control receiver.

NEXT



7.	CONFIRMATION TEST
----	-------------------

NEXT  END

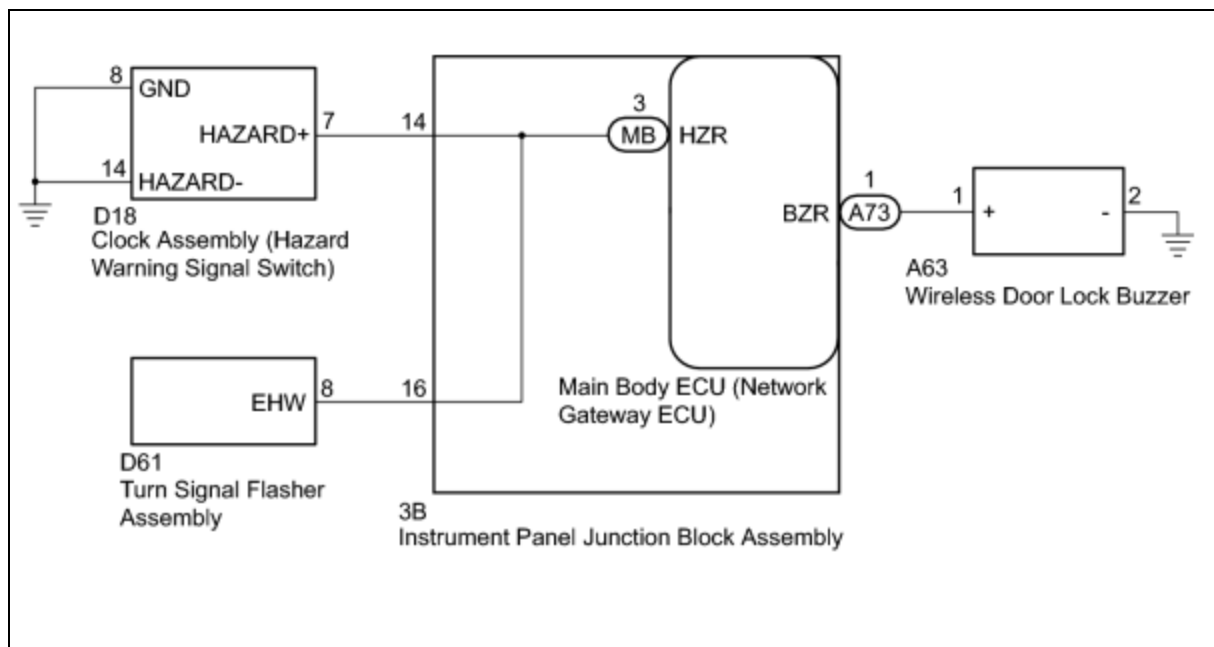
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000027Q805LX
Title: DOOR LOCK: WIRELESS DOOR LOCK CONTROL SYSTEM: No Answer-Back (2013 FR-S)		

[No Answer-Back](#)

DESCRIPTION

In some cases, wireless door lock control functions are normal but the hazard warning light and/or wireless door lock buzzer answer-back function(s) does not operate. In such cases, hazard warning light and wireless door lock buzzer signal outputs from the main body ECU (network gateway ECU) may be malfunctioning.

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	READ VALUE USING TECHSTREAM (ANSWER-BACK OPERATION)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Utility / Customize / Wireless Door Lock.

(e) Select the setting by referring to the table below.

DISPLAY	DEFAULT	CONTENT	SETTING	RELEVANT ECU
Hazard Answer Back	ON	When the doors are locked by wireless operation, the hazard warning lights flash once. When the doors are unlocked by wireless operation, the hazard warning lights flash twice.	OFF or ON	Main body ECU (network gateway ECU)
Wireless Buzzer Resp	ON	Wireless door lock buzzer response	OFF or ON	Main body ECU (network gateway ECU)
Wireless Buzzer Vol	Level 5	Wireless door lock buzzer volume	Level 7, Level 6, Level 5, Level 4, Level 3, Level 2, Level 1 or Level 0	Main body ECU (network gateway ECU)

Result:

RESULT	PROCEED TO
Both items are ON and except Level 0	A
Either item is OFF or Level 0	B

B ► **PERFORM CUSTOMIZE FUNCTION**

A



2.	CHECK WIRELESS DOOR LOCK CONTROL FUNCTIONS
-----------	---

(a) Check the wireless door lock control function using the door control transmitter module set sub-assembly.

Result:

RESULT	PROCEED TO
Wireless door lock/unlock operates normally.	A
Wireless door lock/unlock does not operate normally.	B

B ► **GO TO PROBLEM SYMPTOMS TABLE**

A



3.	CHECK WIRELESS ANSWER-BACK OPERATION
-----------	---

(a) Check the wireless answer-back operation using the door control transmitter module set sub-assembly.

Result:

RESULT	PROCEED TO
Only wireless door lock buzzer answer-back does not occur.	A
Only hazard warning light answer-back does not occur.	B

B ▶ HAZARD WARNING LIGHTS OPERATION

A
▼

4.	PERFORM ACTIVE TEST USING TECHSTREAM (WIRELESS DOOR LOCK BUZZER)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Active Test.
- (e) Perform the Active Test according to the display on the Techstream.

Main Body

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Wireless Buzzer	Turns the wireless door lock buzzer	ON/OFF	-

Result:

RESULT	PROCEED TO
Wireless door lock buzzer does not turn on/off.	A
Wireless door lock buzzer turns on/off.	B

B ▶ REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

A



5.	CHECK HARNESS AND CONNECTOR (WIRELESS DOOR LOCK BUZZER - MAIN BODY ECU)
-----------	--

- (a) Disconnect the A63 wireless door lock buzzer connector.
- (b) Disconnect the A73 main body ECU (network gateway ECU) connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A63-1 (+) - A73-1 (BZR)	Always	Below 1 Ω
A63-2 (-) - Body ground	Always	Below 1 Ω
A63-1 (+) - Body ground	Always	10 k Ω or higher

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



6.	REPLACE WIRELESS DOOR LOCK BUZZER
-----------	--

- (a) Temporarily replace the wireless door lock buzzer with a new one .

NEXT



7.	CHECK WIRELESS DOOR LOCK BUZZER OPERATION
-----------	--

- (a) Check the operation of the wireless answer-back function.

OK:

Wireless answer-back function operates normally.

NG **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

OK ► END (WIRELESS DOOR LOCK BUZZER WAS DEFECTIVE)

8. HAZARD WARNING LIGHTS OPERATION

(a) Check that the hazard warning light blinks when the hazard warning signal switch is pressed.

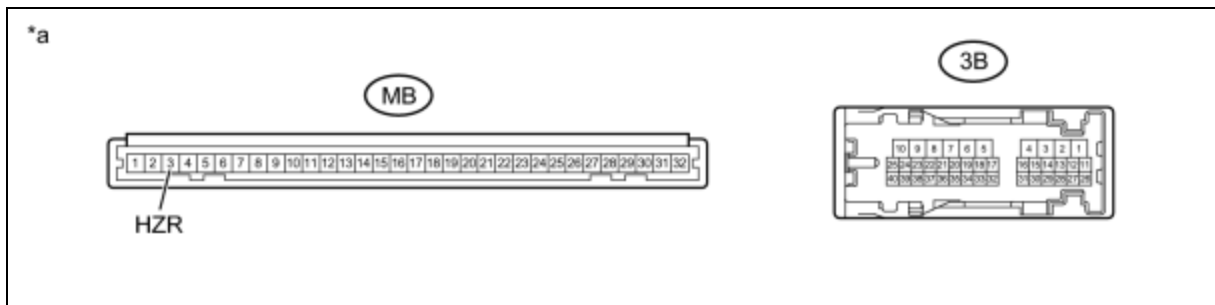
OK:
Hazard warning light signal is normally.

NG ► GO TO LIGHTING SYSTEM (PROBLEM SYMPTOMS TABLE)

OK
▼

9. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

- (a) Remove the instrument panel junction block assembly INFO.
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (c) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	---	---	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3B-14 - MB-3 (HZR)	Always	Below 1 Ω
3B-16 - MB-3 (HZR)	Always	Below 1 Ω

NG ▶ REPLACE INSTRUMENT PANEL JUNCTION
BLOCK ASSEMBLY

OK ▶ REPLACE MAIN BODY ECU (NETWORK
GATEWAY ECU)



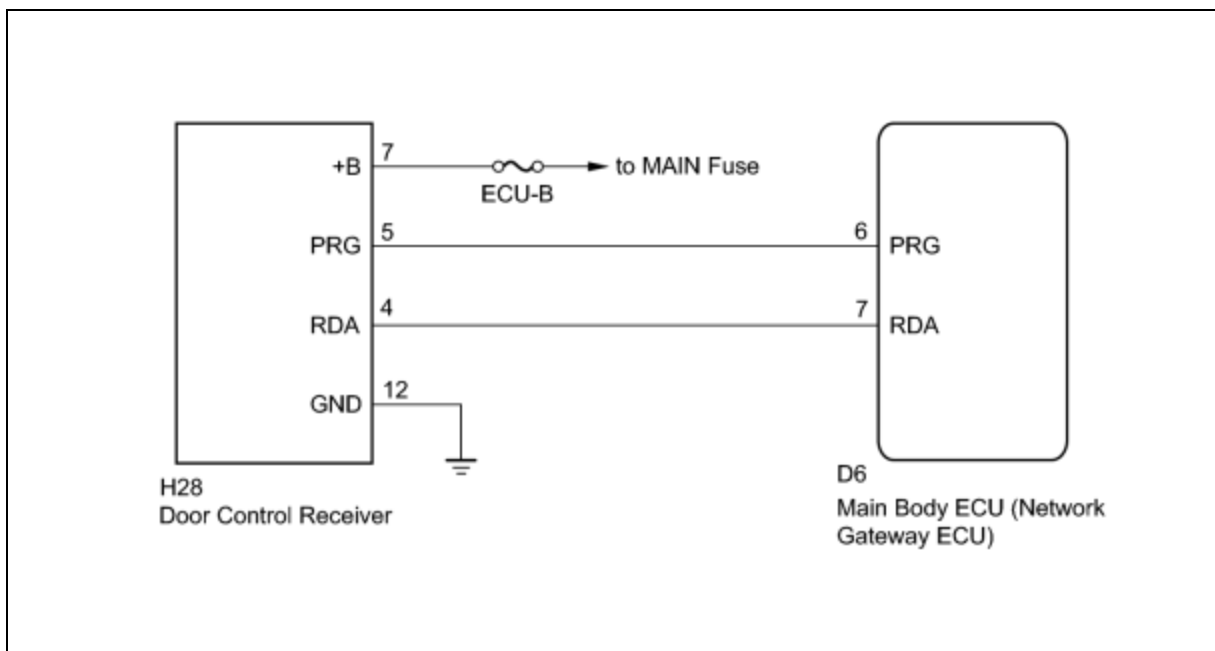
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000Z4T03ZX
Title: DOOR LOCK: WIRELESS DOOR LOCK CONTROL SYSTEM: Only Wireless Control Function is Inoperative (2013 FR-S)		

Only Wireless Control Function is Inoperative

DESCRIPTION

The door control receiver receives signals from the transmitter and sends these signals to the main body ECU (network gateway ECU). The main body ECU (network gateway ECU) then controls all doors by sending lock/unlock signals to each door.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. CHECK POWER DOOR LOCK OPERATION

(a) When the door control switch on the power window regulator master switch assembly is operated, check that the locked doors unlock INFO.

OK:


Locked doors unlock.

NG ► GO TO POWER DOOR LOCK CONTROL SYSTEM

OK



2.	CHECK KEY REMINDER WARNING SYSTEM
-----------	--

(a) Check that the key reminder warning buzzer operates normally  .

OK:

Key reminder warning buzzer operates normally.

NG ► GO TO KEY REMINDER WARNING SYSTEM

OK



3.	SWITCH TO SELF DIAGNOSTIC MODE
-----------	---------------------------------------

(a) Switch to self-diagnostic mode by operating the ignition key cylinder.

- (1) Insert the key into the ignition key cylinder and remove it.
- (2) Within 5 seconds after the key is removed, insert it into the ignition key cylinder and then turn the ignition switch to ON then off once. (End in off)
- (3) Within 30 seconds after turning the ignition switch off, perform the following 9 times:
Turn the ignition switch to ON then off. (End in off)

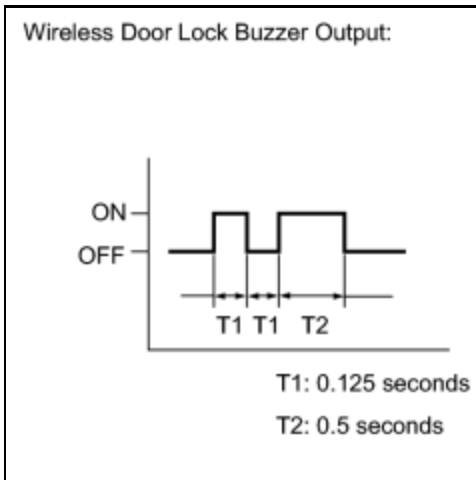
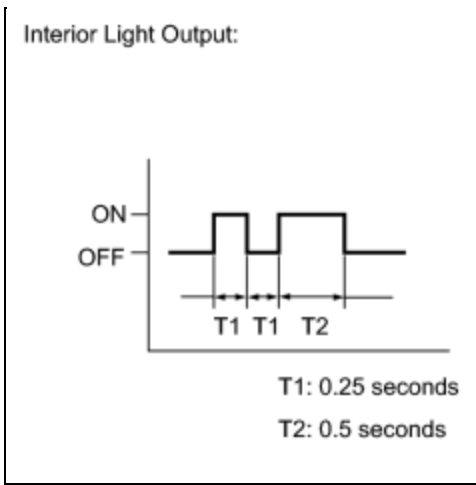
NOTICE:

If the system fails to enter self-diagnostic mode, the system will return to normal mode.

HINT:

Turning the ignition switch to ON after the procedure above has been completed will end the self-diagnostic mode.

(b) Check that the system has switched to self-diagnostic mode by checking the interior light output pattern.



(c) Check that the system has switched to self-diagnostic mode by checking the wireless door lock buzzer output pattern.

OK:
Flash pattern is same as illustration on left.

NEXT



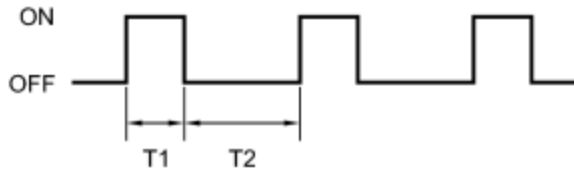
4.	CHECK BY SELF DIAGNOSTIC MODE
-----------	--------------------------------------

(a) Check the diagnostic outputs when the door control transmitter module set sub-assembly switch is held down. The diagnostic outputs can be checked by the interior light and wireless door lock buzzer patterns.

Interior Light and Wireless Door Lock Buzzer Output:

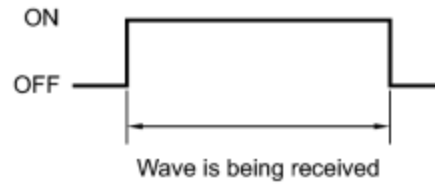
Normal Wave

(LOCK / UNLOCK / LUGGAGE OPEN / PANIC Switch):



- T1: 0.25 seconds (Interior Light)
0.125 seconds (Wireless Door Lock Buzzer)
- T2: 0.5 seconds (Interior Light)
0.25 seconds (Wireless Door Lock Buzzer)

Unmatching Recognition Code:



No Diagnostic Output:



N

Result

RESULT	PROCEED TO
Normal wave (light flash pattern and buzzer pattern) is output.	A
Unmatching recognition code is output.	B
No diagnosis outputs	C

- B** ▶ REGISTER RECOGNITION CODE
- C** ▶ CHECK RESPONSE OF DOOR CONTROL RECEIVER (RESPONSE)
- A** ▶ REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

5. REGISTER RECOGNITION CODE

(a) Check that the system can be switched to rewrite mode or add mode, and that a recognition code can be registered.

OK:

Recognition code can be registered.

- NG** ▶ REPLACE DOOR CONTROL TRANSMITTER MODULE SET SUB-ASSEMBLY

OK ► END

6. CHECK RESPONSE OF DOOR CONTROL RECEIVER (RESPONSE)

- (a) Prepare the door control transmitter from another vehicle.
- (b) Press and hold down the door control transmitter switch.
- (c) Check that an unmatching recognition code is output.

OK:

Unmatching recognition code is output.

NG ► CHECK WAVE ENVIRONMENT

OK



7. INSPECT TRANSMITTER BATTERY (VOLTAGE)



- (a) Remove the battery from the door control transmitter module that does not operate. Attach a lead wire (0.6 mm (0.0236 in.) or less in diameter including wire sheath) with tape or equivalent to the negative terminal INFO.

NOTICE:

Do not wrap the lead wire around the terminal, wedge it between terminals, or solder it. The terminal may be deformed or damaged, and the battery will not be able to be installed correctly.

Text in Illustration

*1	Lead Wire
----	-----------

- (b) Carefully pull the lead wire out from the position shown in the illustration and install the previously removed transmitter battery.

NOTICE:

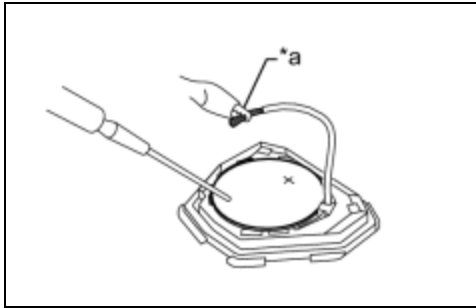
When replacing the transmitter battery, before starting work, remove any static electricity that has built up by touching, for example, the vehicle to prevent the door control transmitter

module set from being damaged.

(c) Measure the voltage according to the value(s) in the table below.

HINT:

When measuring the battery voltage, press one of the transmitter switches.



Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
Battery positive (+) - Battery negative (-)	Ignition switch off, all doors closed and lock or unlock switch pushed	2.5 to 3.2 V

Text in Illustration

*a	GND
----	-----

NG ► REPLACE TRANSMITTER BATTERY

OK ► REPLACE DOOR CONTROL TRANSMITTER MODULE SET SUB-ASSEMBLY

8.	REPLACE TRANSMITTER BATTERY
-----------	------------------------------------

(a) Replace the transmitter battery [INFO](#) .

NEXT



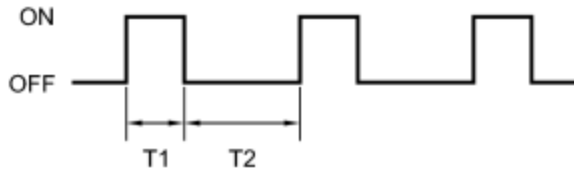
9.	CHECK BY SELF DIAGNOSTIC MODE
-----------	--------------------------------------

(a) Inspect the diagnostic outputs when the door control transmitter module set sub-assembly switch is held down. The diagnostic outputs can be checked by the flash patterns of the interior lights and the buzzer patterns of the wireless door lock buzzer.

Interior Light and Wireless Door Lock Buzzer Output:

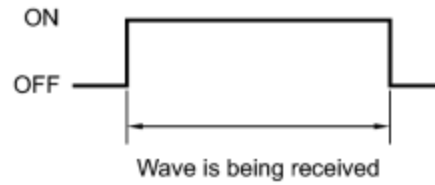
Normal Wave

(LOCK / UNLOCK / LUGGAGE OPEN / PANIC Switch):



- T1: 0.25 seconds (Interior Light)
0.125 seconds (Wireless Door Lock Buzzer)
- T2: 0.5 seconds (Interior Light)
0.25 seconds (Wireless Door Lock Buzzer)

Unmatching Recognition Code:



No Diagnostic Output:



N

Result

RESULT	PROCEED TO
Normal wave (light flash pattern and buzzer pattern) is output.	A
Unmatching recognition code is output	B
No diagnosis outputs	

B ▶ REPLACE DOOR CONTROL TRANSMITTER MODULE SET SUB-ASSEMBLY

A ▶ END (TRANSMITTER BATTERY IS DEFECTIVE)

10. CHECK WAVE ENVIRONMENT

(a) Bring the transmitter near the door control receiver, and perform a wireless operation check.

OK:
Wireless functions operate normally.

HINT:

- When the transmitter is brought near the door control receiver, the possibility of wave interference decreases, and it can be determined if wave interference is causing the problem symptom.

- If the inspection result is that the problem only occurs in certain locations or times of day, the possibility of wave interference is high. Also, added vehicle components may cause wave interference. If installed, remove them and perform the operation check.

NG  **AFFECTED BY WAVE INTERFERENCE**

OK



11.	INSPECT DOOR CONTROL RECEIVER (POWER SOURCE, GROUND)
------------	---

(a) Disconnect the H28 door control receiver connector.

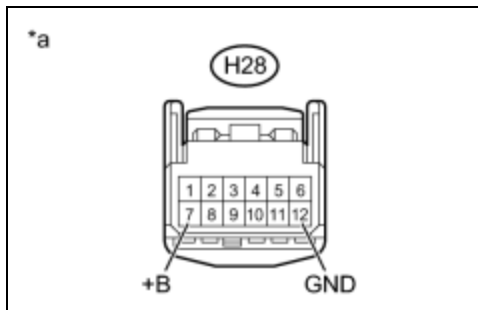
(b) Measure the resistance and voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H28-7 (+B) - Body ground	Always	11 to 14 V

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H28-12 (GND) - Body ground	Always	Below 1 Ω

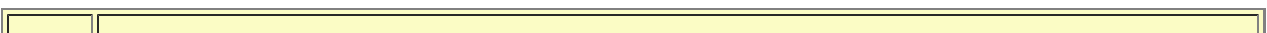


Text in Illustration

*a	Front view of wire harness connector (to Door Control Receiver)
----	---

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

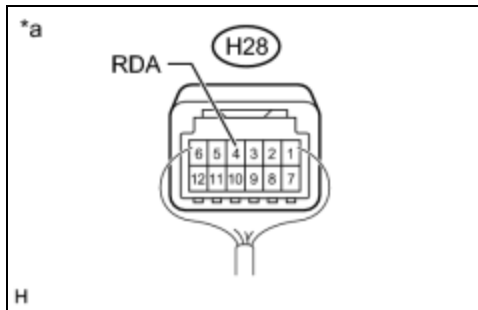
OK



12. INSPECT DOOR CONTROL RECEIVER (OUTPUT)

- Reconnect the H28 door control receiver connector.
- Measure the voltage according to the value(s) in the table below.

Standard Voltage:



TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
H28-4 (RDA) - Body ground	Ignition switch off, all doors closed and door control transmitter switch off	11 to 14 V
	Ignition switch off, all doors closed and door control transmitter switch on	pulse generation

Text in Illustration

*a	Component with harness connected (Door Control Receiver)
----	---

NG ▶ REPLACE DOOR CONTROL RECEIVER

OK



13. CHECK HARNESS AND CONNECTOR (MAIN BODY ECU (NETWORK GATEWAY ECU) - DOOR CONTROL RECEIVER)

- Disconnect the D6 main body ECU (network gateway ECU) connector.
- Disconnect the H28 door control receiver connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D6-7 (RDA) - H28-4 (RDA)	Always	Below 1 Ω
D6-6 (PRG) - H28-5 (PRG)	Always	Below 1 Ω
D6-7 (RDA) or H28-4 (RDA) - Body ground	Always	10 k Ω or higher
D6-6 (PRG) or H28-5 (PRG) - Body ground	Always	10 k Ω or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK



14.	REPLACE DOOR CONTROL RECEIVER
------------	--------------------------------------

(a) Temporarily replace the door control receiver with a new or normally functioning one

INFO .

NEXT



15.	REGISTER RECOGNITION CODE
------------	----------------------------------

(a) Perform the Registration procedures **INFO** .

NEXT



16.	CHECK DOOR CONTROL RECEIVER (OPERATION)
------------	--

(a) Check that the doors can be locked and unlocked by using the transmitter LOCK and UNLOCK switches.

OK:

Doors can be locked and unlocked with transmitter.

NG ▶ REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

OK ▶ END (DOOR CONTROL RECEIVER IS DEFECTIVE)

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003WRD00FX
Title: DOOR LOCK: WIRELESS DOOR LOCK CONTROL SYSTEM: OPERATION CHECK (2013 FR-S)		

OPERATION CHECK

1. FUNCTIONS AND OPERATING CONDITIONS

- (a) This wireless door lock control function operates only when the following 3 conditions are met:
- (1) There is no key in the ignition key cylinder.
 - (2) The power door lock system is functioning normally.
 - (3) The function is not disabled by customization.
- (b) The operating range differs depending on the situation.
- (1) The operating range differs depending on the user, the way the transmitter is held and the location.
 - (2) In certain areas, the operating range will be reduced due to the vehicle body shape and the influence of the surrounding environment.
 - (3) The transmitter's faint electric waves may be affected if the area has strong electric waves or noise. The transmitter's operating range may be reduced or the transmitter may not function.
 - (4) When the battery weakens, the operating range is reduced or the transmitter may not function.

HINT:

If the transmitter has had prolonged exposure to direct sunlight, such as being left on the instrument panel, the battery may weaken or other problems may occur.

2. CHECK WIRELESS DOOR LOCK CONTROL FUNCTIONS

HINT:

- The switches described below transmit signals and are built into the door control transmitter.
 - The transmitter's operating range must be taken into account while checks are being made.
- (a) Make sure that the vehicle is in a condition in which the wireless control functions can be operated (see above).
- (b) Check basic functions.
- (1) Check that all doors lock when lock switch is pressed.
 - (2) Check that the driver door unlocks when the unlock switch is pressed once, and unlocks all doors when pressed twice within 5 seconds.
 - (3) Check that the luggage compartment door opens when the luggage open switch is held down for 0.8 seconds or more.
- (c) Check the chattering prevention function.
- (1) When a switch is pressed, check that the corresponding operation occurs only once. When the switch is held down, check that the corresponding operation occurs only once and does not repeatedly activate. When the switch is pressed at 1-second intervals, check that the corresponding operation activates once for each press of the switch.
- (d) Check the automatic locking function.
- (1) When all doors are unlocked with the unlock switch and none of the doors are opened or

locked within 30 seconds, check that the doors are relocked automatically.

(e) Check the switch operation fail-safe function.

(1) If the key is in the ignition key cylinder, check that the doors cannot be locked by the lock switch. However, this does not apply when the system is in recognition code registration mode.

(f) Check the door ajar warning function.

(1) Check that the wireless door lock buzzer sounds for approximately 5 seconds when the lock switch is pressed with any of the doors ajar or open.

(g) Check the answer-back (hazard warning light) function.

(1) When the lock switch is pressed, check that the hazard warning lights flash once and all doors are locked.

(2) When the unlock switch is pressed, check that the hazard warning lights flash twice and all doors are unlocked.

(h) Check the answer-back (wireless door lock buzzer) function.

(1) When the lock switch is pressed, check that the buzzer sounds once simultaneously with the locking operation of all doors.

(2) When the unlock switch is pressed once, check that the buzzer sounds twice simultaneously with the unlocking operation of the driver door.

(3) When the luggage compartment door is opened by wireless operation, the wireless door lock buzzer sounds.

(i) Check the panic alarm control function

(1) Check that the horn sounds, the headlights and taillights flash and the interior lights remain on (when the light switch is turned to the door position) for 60 seconds by the theft alarm function when the panic switch is held down for 0.8 seconds or more. Also, check that the horn stops sounding and the lights stop flashing when any switch of the transmitter is pressed.

(j) Check the vehicle position sensing function

(1) If the following conditions are met 3 times within 5 seconds, the vehicle position sensing function will sound the horn once and flash the hazard warning lights 3 times.

- Ignition switch off
- Key is not inserted into the ignition key cylinder
- All doors and luggage compartment door closed
- Door control transmitter lock switch pressed

(k) Check the illuminated entry function.

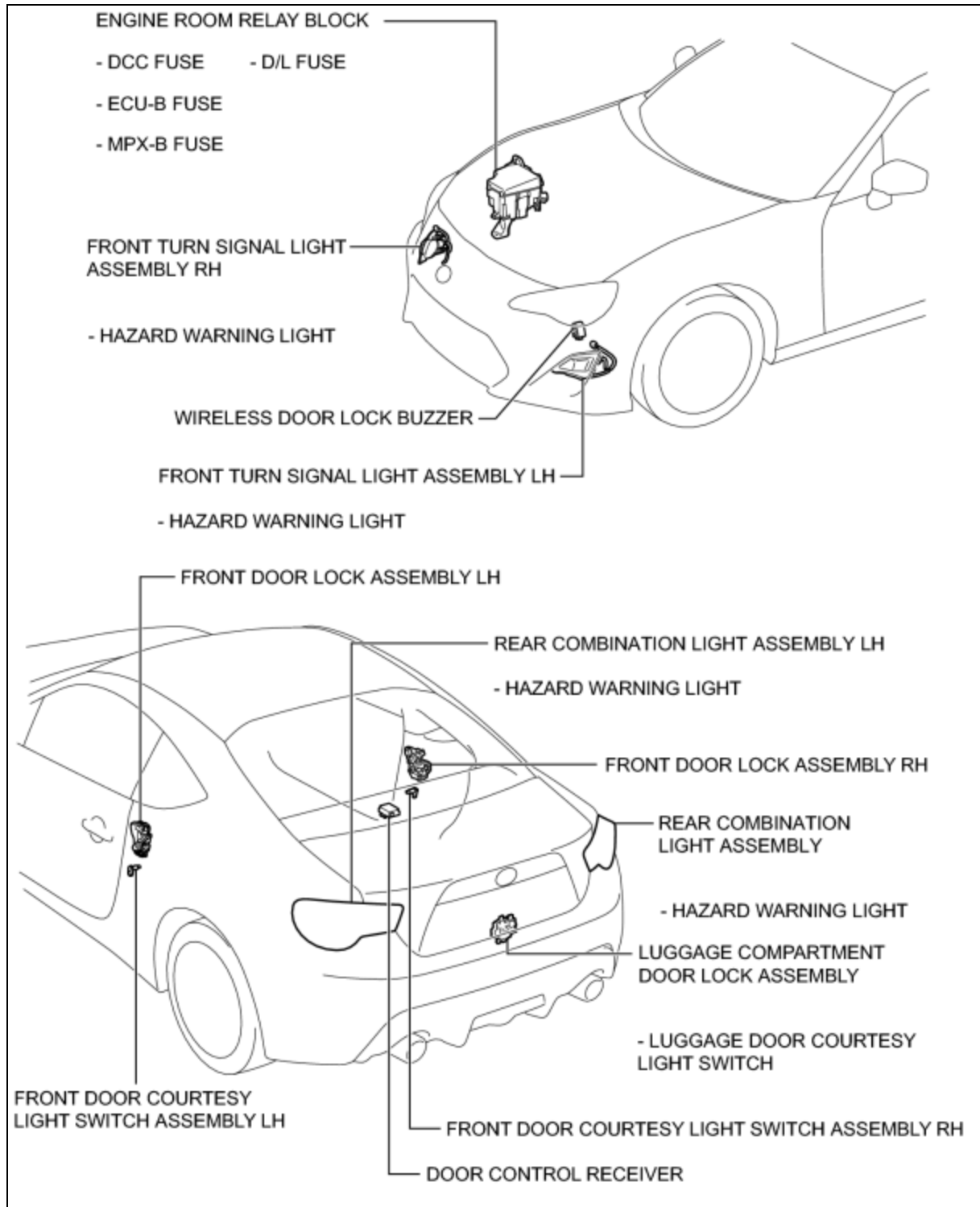
(1) When all doors are locked and the unlock switch is pressed, check that the map light illuminates (when the light switch is in the DOOR position) and all doors are unlocked.



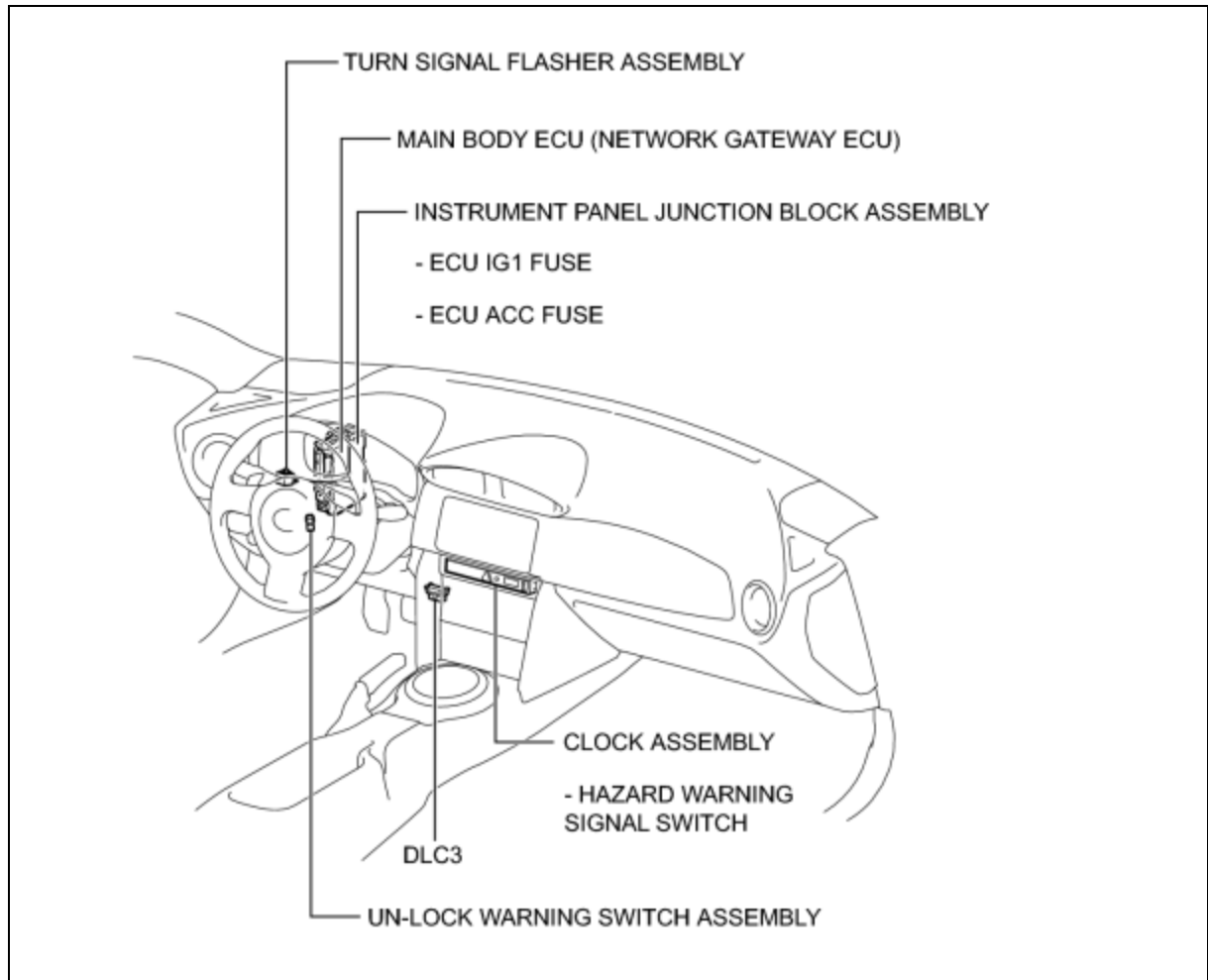
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XX302FX
Title: DOOR LOCK: WIRELESS DOOR LOCK CONTROL SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XX502MX
Title: DOOR LOCK: WIRELESS DOOR LOCK CONTROL SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Wireless Door Lock Control

SYMPTOM	SUSPECTED AREA	SEE PAGE
Only wireless control function inoperative	Proceed to "Only wireless control function inoperative"	INFO
Only answer-back function does not operate normally	Proceed to "No answer-back"	INFO
The automatic lock function does not operate normally	Perform the operation check	INFO
	Wire harness or connector	-
	Unlock warning switch circuit	INFO
	Door courtesy switch circuit	INFO
	Main body ECU (network gateway ECU)	-
	Instrument panel junction block assembly	-
The illuminated entry function only does not operate	Perform the operation check	INFO
	Wire harness or connector	-
	Lighting system	INFO
	Main body ECU (network gateway ECU)	-
	Instrument panel junction block assembly	-
Only door ajar warning function does not operate	Perform the operation check	INFO
	Door courtesy switch circuit	INFO
	Main body ECU (network gateway ECU)	-
	Instrument panel junction block assembly	-
Only panic alarm function does not operate	Perform the operation check	INFO
	Lighting system (int) (interior lights)	INFO
	Lighting system (ext) (headlights, taillights, hazard lights)	INFO
	Horn system	INFO

	Wire harness or connector (vehicle horn - main body ECU (network gateway ECU))	-
	Main body ECU (network gateway ECU)	-
	Instrument panel junction block assembly	-
Only luggage compartment door open function does not operate	Perform the operation check	INFO
	Wire harness or connector	-
	Door control transmitter module set sub-assembly	INFO
	Main body ECU (network gateway ECU)	-


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Model Year: 2013	Model: FR-S	Doc ID: RM0000023D3038X
Title: DOOR LOCK: WIRELESS DOOR LOCK CONTROL SYSTEM: REGISTRATION (2013 FR-S)		

REGISTRATION

HINT:

- Register the recognition code when replacing the door control transmitter or the door control receiver.
- The Add mode is used to retain the already registered codes while registering a new recognition codes. This mode is used when adding a transmitter. If the number of registered codes exceeds 7 the previously registered code will be cleared in order, starting from the code registered first.
- Rewrite mode is used to clear all the previously registered codes and register only new recognition codes. This mode is used when exchanging the transmitter or the door control receiver for new one.
- Confirmation mode is used to confirm how many recognition codes have already been registered before an additional registration of a recognition code.
- Prohibition mode is used to clear all the registered codes and cancel the wireless door lock function. Use this mode when the transmitter is lost.
- All of the following registration procedures must be performed in order.

1. REGISTRATION OF RECOGNITION CODE (USING TECHSTREAM)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Utility / Wireless Code Registration.
- (e) Press both lock and unlock switches within 1 to 1.5 seconds.
- (f) Press either switch for more than 1 second within 3 seconds.
- (g) Perform either of the following to complete the registration of recognition codes:
 - Use a Techstream to send a completion command.
 - Disconnect the Techstream.
- (h) Perform the following after registration is completed.
 - (1) Perform the wireless door lock control operation check  .

HINT:

If the wireless door lock control does not operate, perform the registration procedure again.



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XX8043X
Title: DOOR LOCK: WIRELESS DOOR LOCK CONTROL SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

SYSTEM DESCRIPTION

1. WIRELESS DOOR CONTROL SYSTEM DESCRIPTION

(a) This system locks and unlocks the vehicle doors remotely. The wireless control system has the following features:

- The door control receiver performs the code identification procedure and the main body ECU (network gateway ECU) operates the door lock control. A serial data link is provided for communication between the receiver and main body ECU (network gateway ECU).
- A key-integrated type transmitter is used and it contains the following 4 switches: the door lock switch, door unlock switch, luggage open switch and panic switch.

2. FUNCTION OF MAIN COMPONENTS

COMPONENT	FUNCTION
Door control transmitter module set sub-assembly	<ul style="list-style-type: none"> • Has lock, unlock, luggage open and panic switches. • Transmits weak radio waves (recognition codes and function codes) to the door control receiver. • Illuminates indicator light (LED) during transmission.
Door control receiver	Receives weak radio waves from the door control transmitter module set sub-assembly and sends them to the main body ECU (network gateway ECU).
<ul style="list-style-type: none"> • Front door courtesy light switch LH/RH • Luggage door courtesy light switch 	<ul style="list-style-type: none"> • Turns on when a door is opened and turns off when it is closed. • Outputs door status signals (open or closed) to the main body ECU (network gateway ECU).
<ul style="list-style-type: none"> • Front door lock assembly LH • Front door lock assembly RH 	Built-in motor locks or unlocks door.
Main body ECU (network gateway ECU)	Sends wireless door lock control signals in response to the code data from the door control receiver and signals from each ECU.

3. SYSTEM FUNCTION

(a) The door control transmitter module set sub-assembly has door lock switch, door unlock switch, luggage open switch and panic switch. Operating these switches activates each function. The wireless door lock control system has the following functions:

HINT:

The default setting of the functions are on. Some of these functions can be customized



FUNCTION	OUTLINE
All door lock function	Pressing the lock switch locks all doors.
All door unlock function (Unlock 2 operation)	Pressing the unlock switch twice within 5 seconds unlocks all the doors after the driver door is unlocked.
Luggage compartment door open	Pressing the luggage door open switch of the door control transmitter module set sub-assembly for longer than about 0.8 seconds opens the luggage compartment door.
Answer-back function (Hazard warning light)	Hazard warning lights flash once when doors are locked, and flash twice when doors are unlocked to indicate that the request has been completed.
Answer-back function (Wireless door lock buzzer)	Wireless door lock buzzer sound once when doors are locked, and sound twice when doors are unlocked to indicate that the request has been completed.
Panic alarm function	<p>Pressing the panic switch of the door control transmitter module set sub-assembly for longer than about 0.8 seconds causes the following alarms to activate:</p> <ul style="list-style-type: none"> • Sound the vehicle horns. • Blinks the headlights, hazard warning lights and taillights. • Illuminates the interior lights (when the interior light door switch on). <p>While the panic alarm is operating, pressing any switch of the door control transmitter cancels the alarm operation.</p>
Vehicle Position Sensing Function	The vehicle position sensing function is a function that sounds the vehicle horn and flashes the hazard warning lights by operating the door control transmitter module set sub-assembly in order to indicate the vehicle's position to the user.
Door ajar warning function	The buzzer sounds when the lock switch is pressed when any of the doors are ajar, and it sounds for 10 seconds continuously. The buzzer stops when all doors are closed or the unlock switch is pressed.
Automatic locking function	If no doors are opened within 30 seconds after being unlocked by wireless door lock control, all doors are locked again automatically.
Illuminated entry function	When all the doors are locked, pressing unlock causes the interior light to come on simultaneously with the unlock operation.
Self-diagnostic function	<p>The system enters self-diagnostic mode under the following conditions.</p> <ul style="list-style-type: none"> • If the door control receiver receives normal radio waves from the door control transmitter module set sub-assembly when the system is in diagnostic mode, it flashes the interior light in a normal pattern that corresponds to the function of each switch.
Transmitter	

recognition code registration function	Enables 4 modes for registering (writing and storing) transmitter recognition codes in EEPROM, built into door control receiver.
--	--

4. TRANSMITTER RECOGNITION CODE REGISTRATION FUNCTION

(a) The table below shows the 4 ID registration function modes by which up to 7 different codes can be registered. The codes are electronically registered (written and stored) in the EEPROM that is contained in the door control receiver.

MODE	FUNCTION
Add mode	Adds a newly received code while preserving any previously registered codes. This mode is used when adding a new transmitter. If the number of registered codes exceeds 7 the oldest registered code is cleared first.
Rewrite mode	Clears all previously registered codes and registers only newly input codes.
Confirmation mode	Confirms how many codes are currently registered. When adding a new code, this mode is used to check how many codes already are stored.
Prohibition mode	Clears all the registered codes and disables the wireless door lock function. This mode is used when the transmitter is lost.

5. CONDITIONS THAT WIRELESS FUNCTIONS DO NOT OPERATE

(a) Lock function will not operate when either of the following conditions is met:

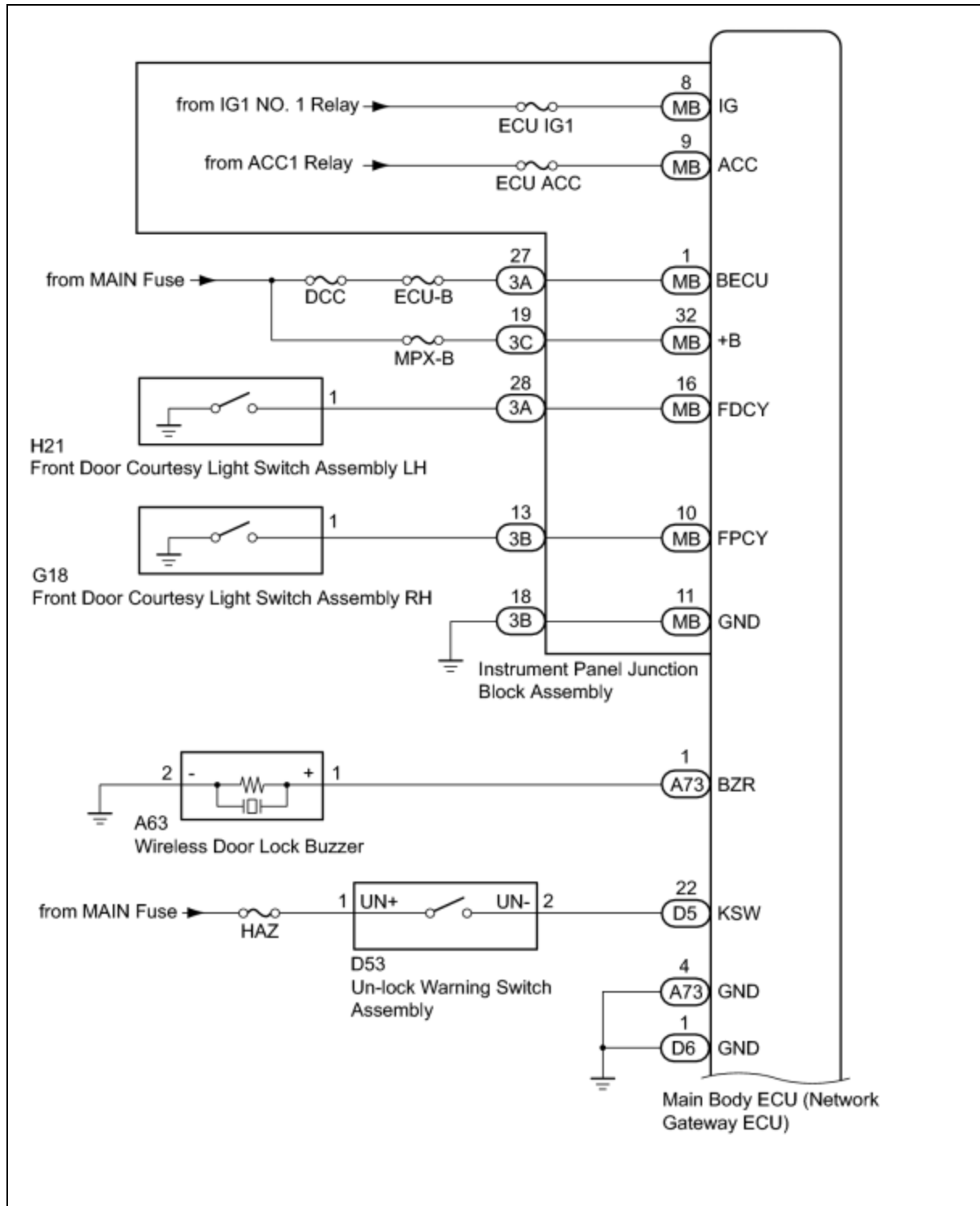
- Any of the doors is open.
- The key is inserted in the ignition key cylinder.

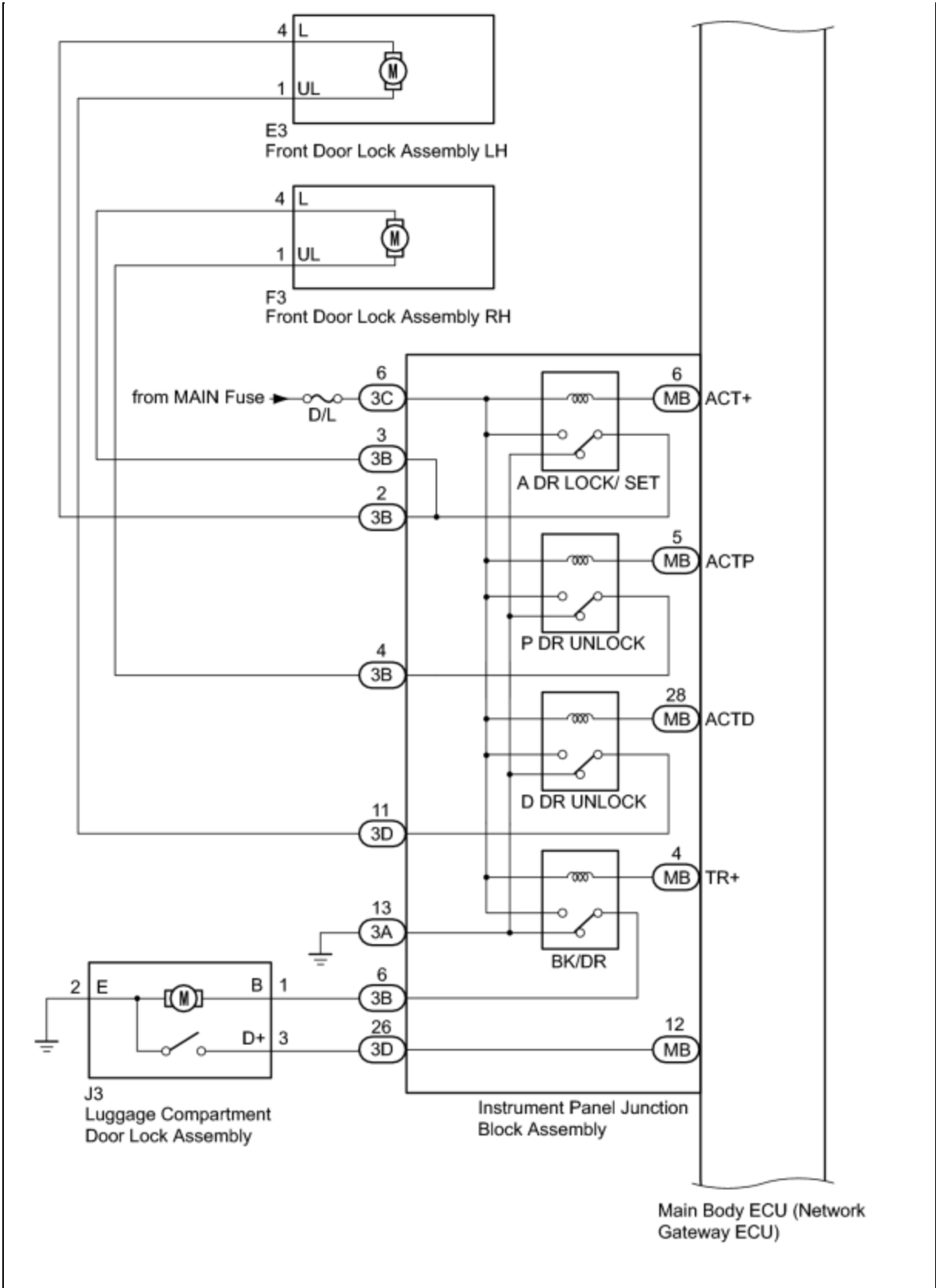
(b) Unlock function will not operate when the following condition is met:

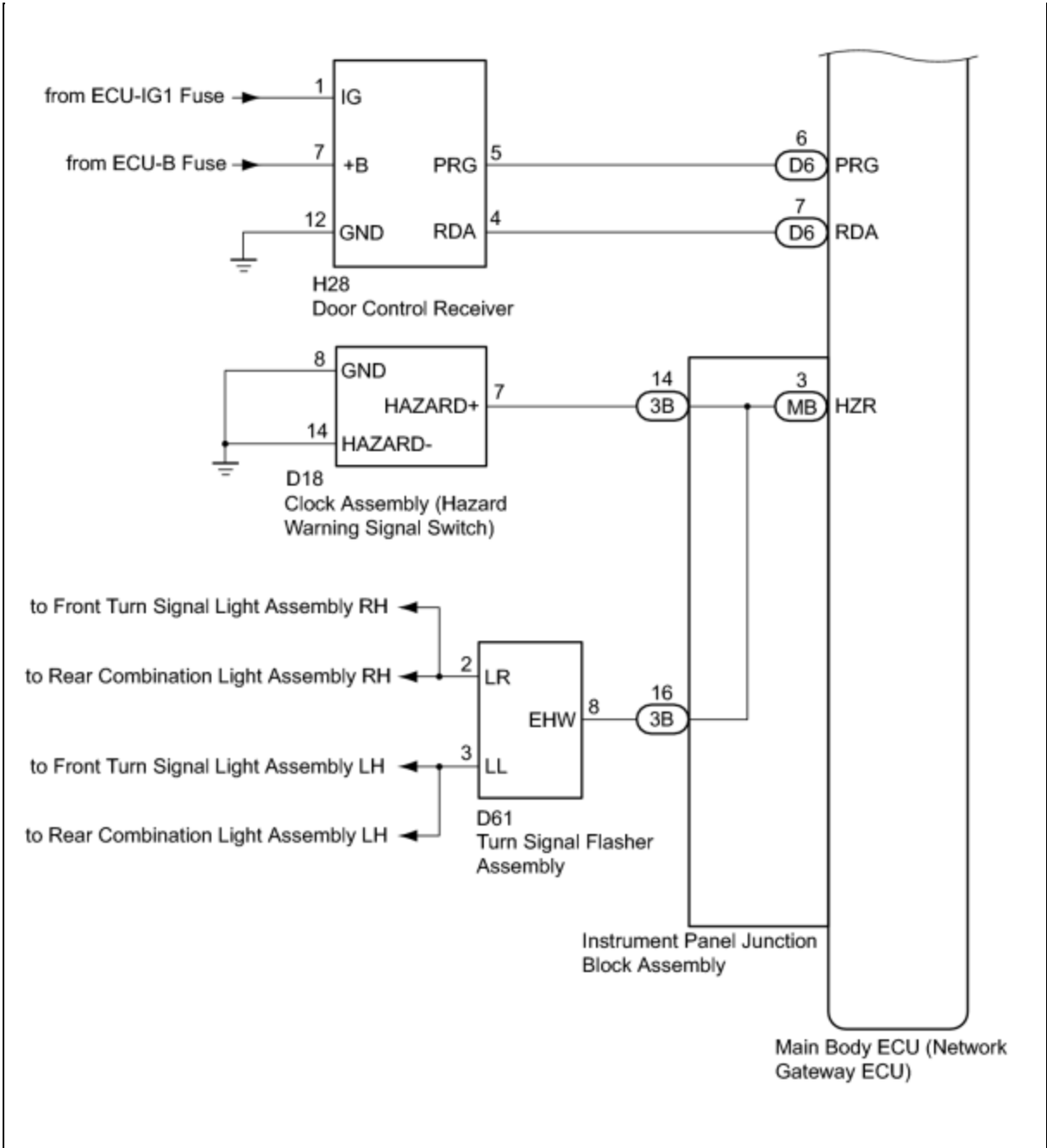
- The key is inserted in the ignition key cylinder.

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XXA039X
Title: DOOR LOCK: WIRELESS DOOR LOCK CONTROL SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM



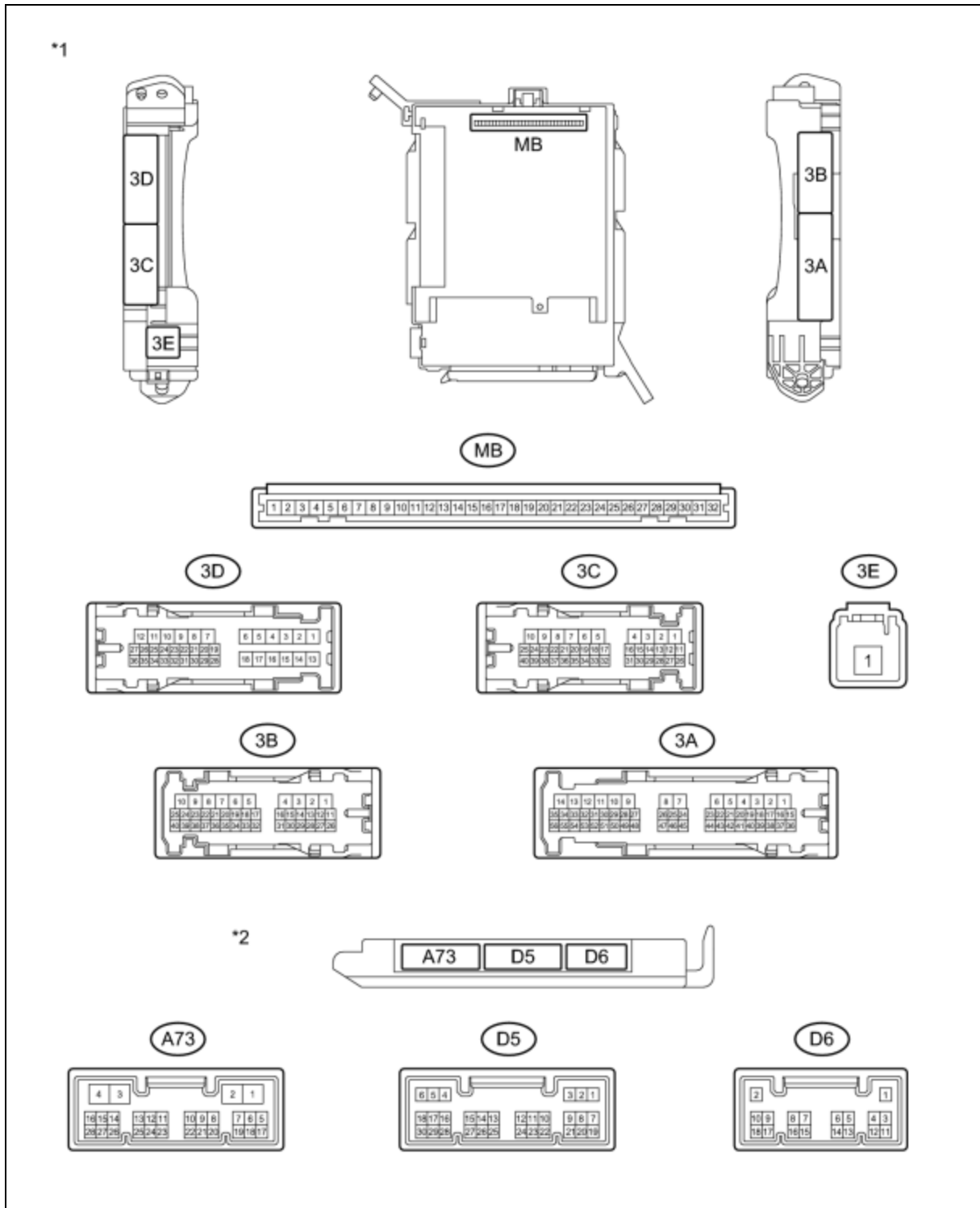




Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001MAP01XX
Title: DOOR LOCK: WIRELESS DOOR LOCK CONTROL SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. CHECK INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY AND MAIN BODY ECU (NETWORK GATEWAY ECU)



Text in Illustration

*1	Instrument Panel Junction Block Assembly	*2	Main Body ECU (Network Gateway ECU)
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- (a) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (b) Disconnect the D5, D6 and A73 main body ECU (network gateway ECU) connectors.
- (c) Measure the resistance and voltage between each terminal of the wire harness side connectors and body ground.

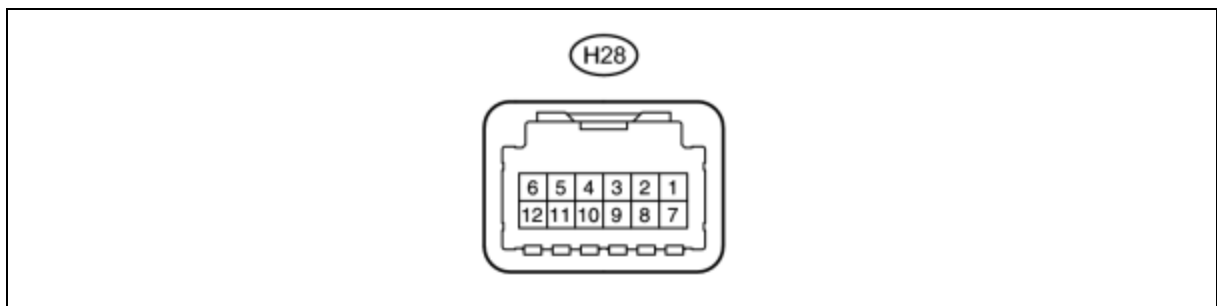
TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
MB-1 (BECU) - Body ground	None - Body ground	Battery power supply	Always	11 to 14 V
MB-8 (IG) - Body ground	None - Body ground	Ignition switch power supply	Ignition switch ON	11 to 14 V
			Ignition switch off	Below 1 V
MB-9 (ACC) - Body ground	None - Body ground	ACC power supply	Ignition switch ACC	11 to 14 V
			Ignition switch off	Below 1 V
MB-11 (GND) - Body ground	None - Body ground	Ground	Always	Below 1 Ω
MB-32 (+B) - Body ground	None - Body ground	Battery power supply	Always	11 to 14 V
D5-22 (KSW) - Body ground	BR - Body ground	Unlock warning switch input	No key in ignition key cylinder (off)	Below 1 V
			Key inserted ignition key cylinder (on)	11 to 14 V
D6-1 (GND) - Body ground	B - Body ground	Ground	Always	Below 1 Ω
A73-4 (GND) - Body ground	B-Y - Body ground	Ground	Always	Below 1 Ω

- (d) Reconnect the D5, D6 and A73 main body ECU (network gateway ECU) connectors.
- (e) Install the main body ECU (network gateway ECU) to the instrument panel junction block assembly.
- (f) Measure the voltage and resistance, according to the valve(s) in the table below.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
3A-28 - Body ground	Y - Body ground	Driver side door courtesy light switch input	Driver side door open	Below 1 V
			Driver side door closed	11 to 14 V
3B-13 - Body ground	L - Body ground	Passenger side door courtesy light switch input	Passenger side door open	Below 1 V
			Passenger side door closed	11 to 14 V
3D-26 -	SB -	Luggage compartment	Luggage compartment door open	Below 1 V

Body ground	Body ground	door courtesy light switch input	Luggage compartment door closed	11 to 14 V
3B-2 - Body ground	Y - Body ground	Door lock motor lock drive output (for driver side)	Door control switch not pushed	Below 1 V
			Lock side of door control switch pushed	11 to 14 V
3B-3 - Body ground	L - Body ground	Door lock motor lock drive output (for passenger side)	Door control switch not pushed	Below 1 V
			Lock side of door control switch pushed	11 to 14 V
3D-11 - Body ground	R-G - Body ground	Door lock motor unlock drive output (for driver side)	Door control switch not pushed	Below 1 V
			Unlock side of door control switch pushed	11 to 14 V
3B-4 - Body ground	L-W - Body ground	Door lock motor unlock drive output (for passenger side)	Door control switch not pushed	Below 1 V
			Unlock side of door control switch pushed	11 to 14 V
3B-6 - Body ground	G - Body ground	Door lock motor lock drive output (for luggage compartment door)	Luggage door open button of door control transmitter module set sub-assembly not pressed	Below 1 V
			Luggage door open button of door control transmitter module set sub-assembly pressed	11 to 14 V
A73-1 - Body ground	V - Body ground	Wireless door lock buzzer signal	Wireless door lock buzzer off	Below 1 V
			Wireless door lock buzzer on	Pulse generation
D6-6 (PRG) - Body ground	R - Body ground	Signal output to door control receiver	Key inserted in ignition key cylinder → Key pulled out of ignition key cylinder	11 to 14 V → Pulse generation → 11 to 14 V
D6-7 (RDA) - Body ground	V - Body ground	Signal input from door control receiver	Ignition switch off, all doors closed and transmitter switch not pressed	11 to 14 V
			Ignition switch off, all doors closed and transmitter switch pressed	Pulse generation

2. CHECK DOOR CONTROL RECEIVER



- (a) Disconnect the H28 door control receiver connector.
- (b) Measure the resistance and voltage according to the value(s) in the table below.

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TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
H28-1 (IG) - Body ground	W - Body ground	Ignition switch power supply	Ignition switch ON	11 to 14 V
			Ignition switch off	Below 1 V
H28-7 (+B) - Body ground	Y-R - Body ground	Battery power supply	Always	11 to 14 V
H28-12 (GND) - Body ground	B - Body ground	Ground	Always	Below 1 Ω

(c) Reconnect the H28 door control receiver connector.

(d) Measure the voltage according to the value(s) in the table below.

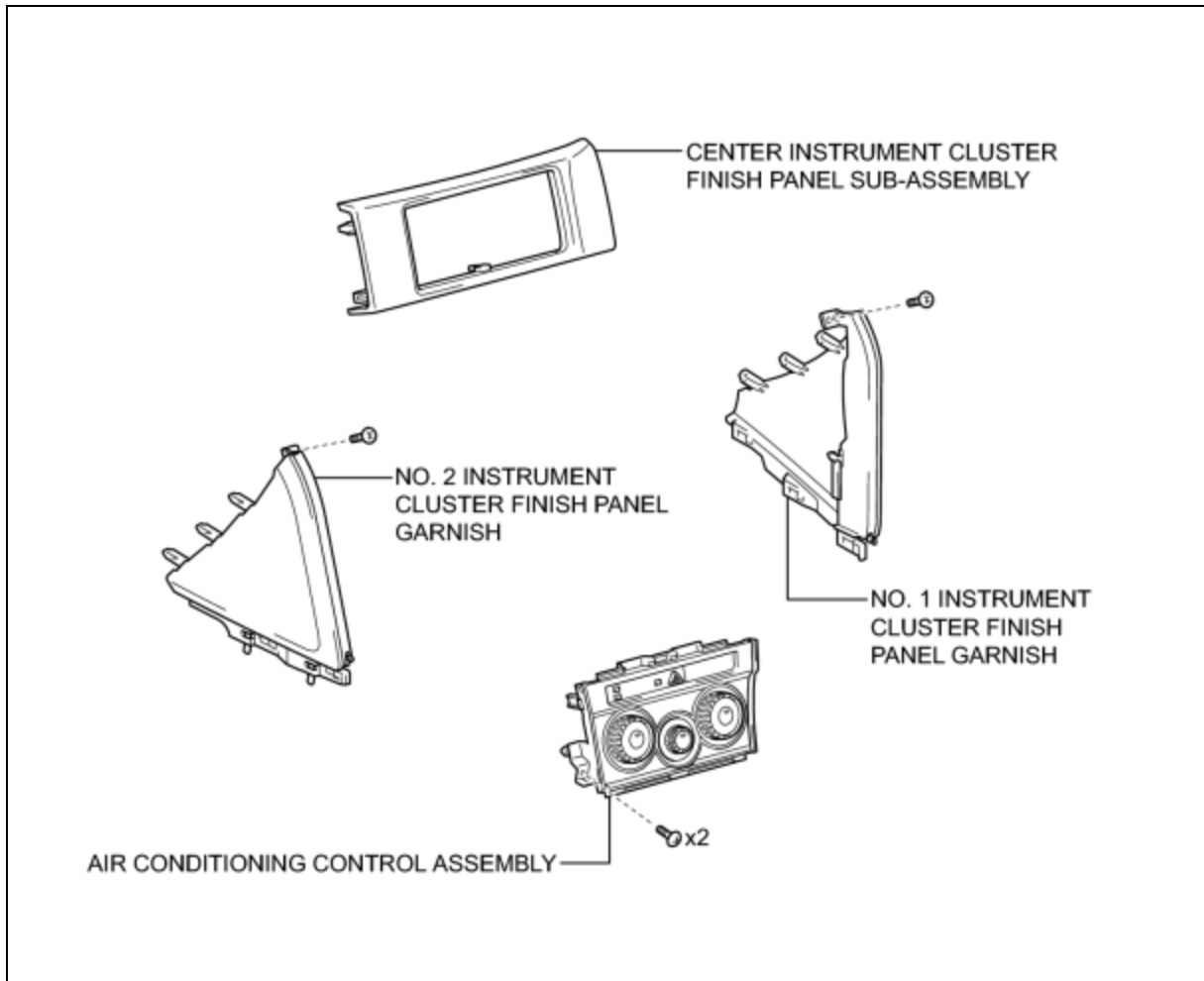
TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
H28-5 (PRG) - Body ground	P - Body ground	Signal input from main body ECU (network gateway ECU)	Key inserted in ignition key cylinder → Key pulled out of ignition key cylinder	11 to 14 V → Pulse generation → 11 to 14 V
H28-4 (RDA) - Body ground	R - Body ground	Signal output to main body ECU (network gateway ECU)	Ignition switch off, all doors closed and door control transmitter switch not pressed	11 to 14 V
			Ignition switch off, all doors closed and door control transmitter switch pressed	Pulse generation



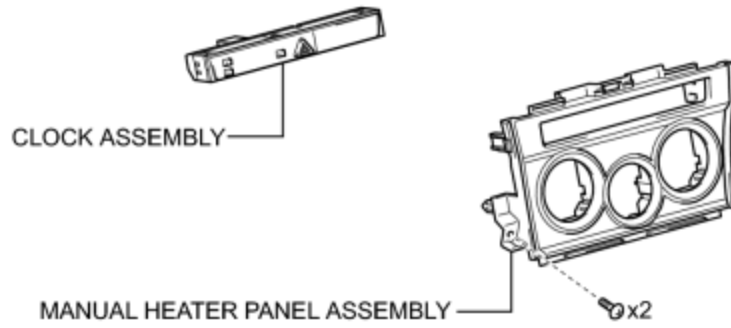
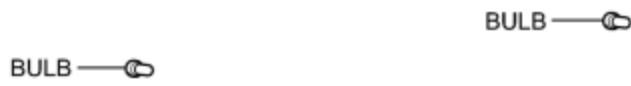
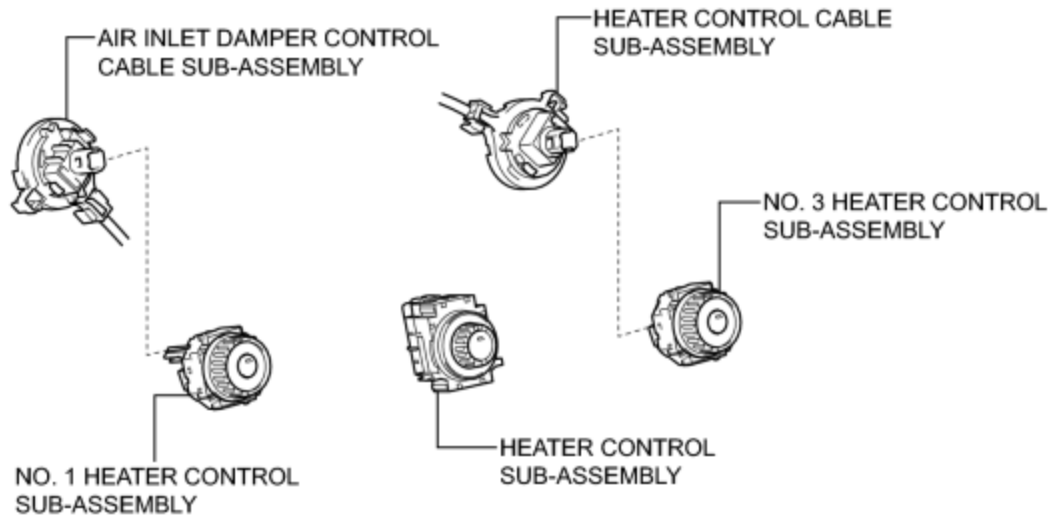
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XM100UX
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING PANEL: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION

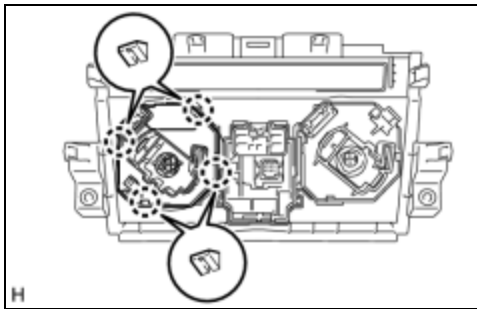


Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XM300UX
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING PANEL: DISASSEMBLY (2013 FR-S)		

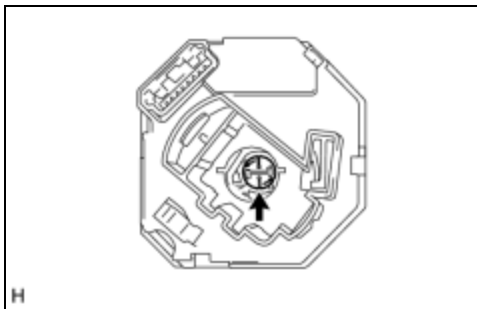
DISASSEMBLY

1. REMOVE CLOCK ASSEMBLY INFO

2. REMOVE NO. 3 HEATER CONTROL SUB-ASSEMBLY

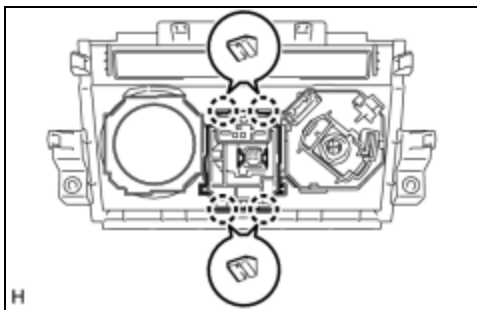


(a) Disengage the 4 claws and remove the No. 3 heater control sub-assembly.



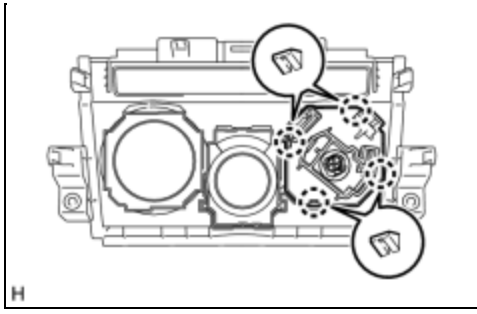
(b) Remove the bulb.

3. REMOVE HEATER CONTROL SUB-ASSEMBLY

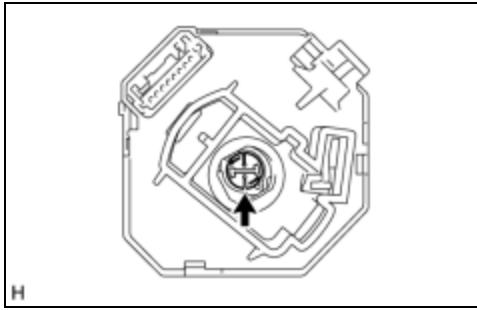


(a) Disengage the 4 claws and remove the heater control sub-assembly.

4. REMOVE NO. 1 HEATER CONTROL SUB-ASSEMBLY



(a) Disengage the 4 claws and remove the No. 1 heater control sub-assembly.

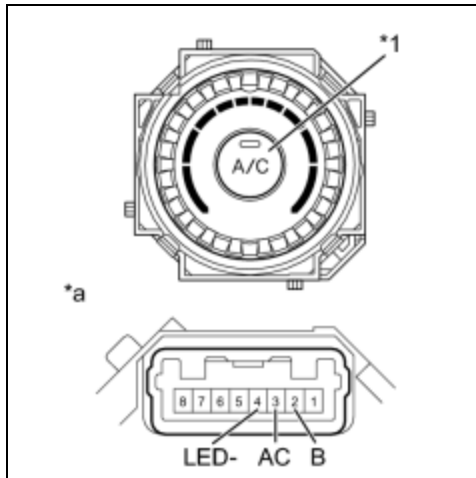


(b) Remove the bulb.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000314R02FX
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING PANEL: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT NO. 3 HEATER CONTROL SUB-ASSEMBLY



(a) Check the heater control assembly resistance.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
2(B) - 3(A/C)	A/C switch OFF	10 k Ω or higher
2(B) - 4(LED-)	A/C switch OFF	10 k Ω or higher
3(A/C) - 4(LED-)	Always	Below 1 Ω
2(B) - 3(A/C)	A/C switch ON	Below 1 Ω
2(B) - 4(LED-)	A/C switch ON	Below 1 Ω
5 - 6	Always	Below 1 Ω

Text in Illustration

*1	A/C Switch
*a	Component without harness connected (No. 3 heater control sub-assembly)

(c) Check that the A/C Switch illumination.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
Battery positive (+) → 5	

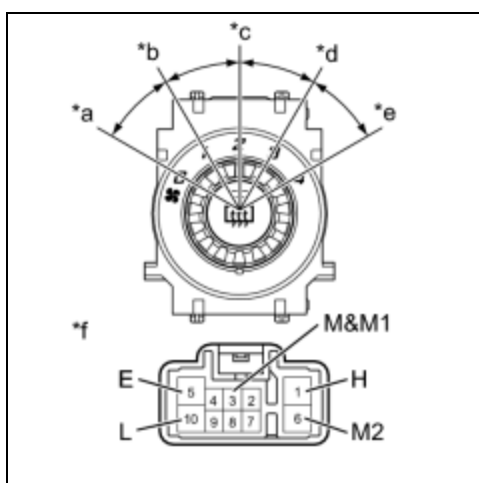
Battery negative (-) → 6	illuminates
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(d) Check that the indicator light.

Standard:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
Battery positive (+) → 2 Battery negative (-) → 4	A/C switch OFF	go out
Battery positive (+) → 2 Battery negative (-) → 4	A/C switch ON	come on

2. INSPECT HEATER CONTROL SUB-ASSEMBLY



(a) Check the heater control assembly resistance.

(b) Measure the resistance according to the value(s) in the table below.

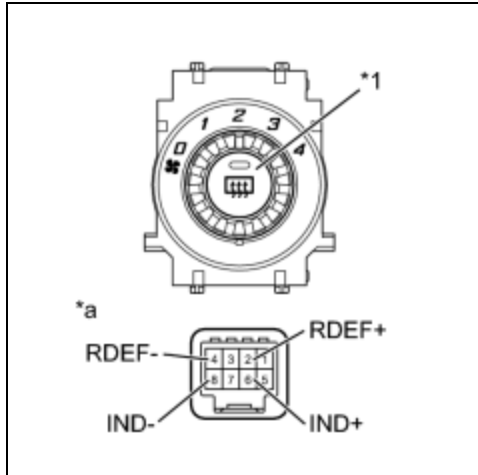
Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
each terminal - 5(E)	A/C switch OFF	10 k Ω or higher
10(L) - 5(E)	A/C switch LO	Below 1 Ω
10(L) - 5(E) - 3(M&M1)	A/C switch LO - M1	Below 1 Ω
10(L) - 5(E) - 3(M&M1)	A/C switch M1	Below 1 Ω
10(L) - 5(E) - 3(M&M1) - 6(M2)	A/C switch M1 - M2	Below 1 Ω
10(L) - 5(E) - 6(M2)	A/C switch M2	Below 1 Ω
10(L) - 5(E) - 6(M2) - 1(H)	A/C switch M2 - HI	Below 1 Ω
10(L) - 5(E) - 1(H)	A/C switch HI	Below 1 Ω

Text in Illustration

*a	OFF
*b	LO

*c	M1
*d	M2
*e	HI
*f	Component without harness connected (heater control sub-assembly)



(d) Check the heater control assembly resistance.

(e) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
2(RDEF+) - 4(RDEF-)	Rr DEF switch OFF	10 k Ω or higher
2(RDEF+) - 4(RDEF-)	Rr DEF switch ON	Below 1 Ω

Text in Illustration

*1	Rr DEF switch
*a	Component without harness connected (heater control sub-assembly)

(f) Check that the Rr DEF switch illumination.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
Battery positive (+) \rightarrow 7 Battery negative (-) \rightarrow 5	illuminates

(g) Check that the indicator light.

Standard:

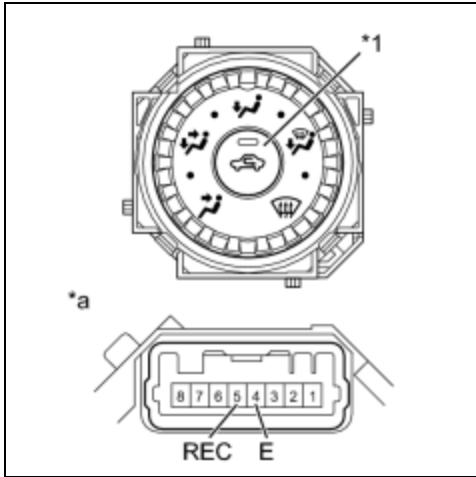
TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
Battery positive (+) \rightarrow 6(IND+) Battery negative (-) \rightarrow 8(IND-)	Rr DEF switch OFF	go out

Battery positive (+) → 6(IND+) Battery negative (-) → 8(IND-)	Rr DEF switch ON	come on
--	------------------	---------

3. INSPECT NO. 1 HEATER CONTROL SUB-ASSEMBLY

(a) Check that the FRS switch illumination.

OK:



MEASUREMENT CONDITION	SPECIFIED CONDITION
Battery positive (+) → 7 Battery negative (-) → 6	illuminates

Text in Illustration

*1	FRS switch
*a	Component without harness connected (No. 1 heater control sub-assembly)

(b) Check that the indicator light.

Standard:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
Battery positive (+) → 5(REC) Battery negative (-) → 4(E)	FRS switch OFF	go out
Battery positive (+) → 5(REC) Battery negative (-) → 4(E)	FRS switch ON	come on

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XM002AX
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING PANEL: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL AIR CONDITIONING CONTROL ASSEMBLY

- (a) After aligning with the cables, engage the 2 claws and connect the heater control cable sub-assembly. (for RH side).
- (b) After aligning with the cables, engage the 2 claws and connect the heater control cable sub-assembly. (for LH side).
- (c) Connect each connector.
- (d) Engage the 6 claws.
- (e) Install the air conditioning control assembly with the 2 screws.

2. INSTALL NO. 2 INSTRUMENT CLUSTER FINISH PANEL GARNISH [INFO](#)

3. INSTALL NO. 1 INSTRUMENT CLUSTER FINISH PANEL GARNISH [INFO](#)

4. INSTALL CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY [INFO](#)

5. INSTALL CONSOLE BOX ASSEMBLY

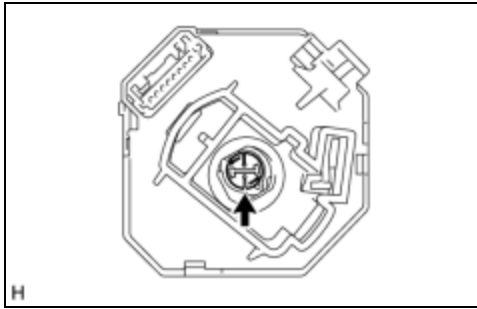
[INFO](#)



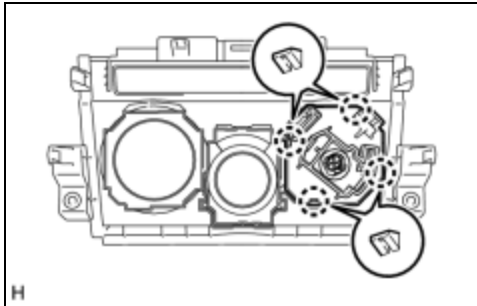
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XM400UX
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING PANEL: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL NO. 1 HEATER CONTROL SUB-ASSEMBLY

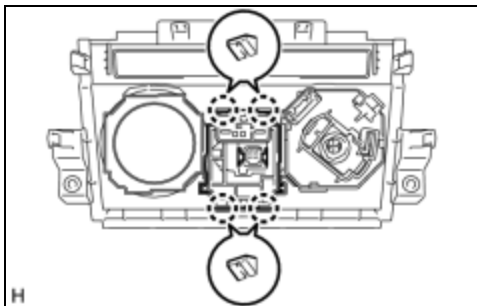


(a) Install the bulb.



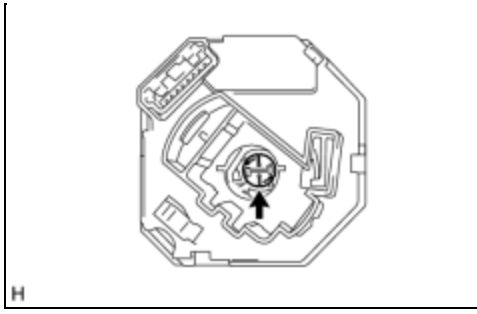
(b) Engage the 4 claws and install the No. 1 heater control sub-assembly.

2. INSTALL HEATER CONTROL SUB-ASSEMBLY

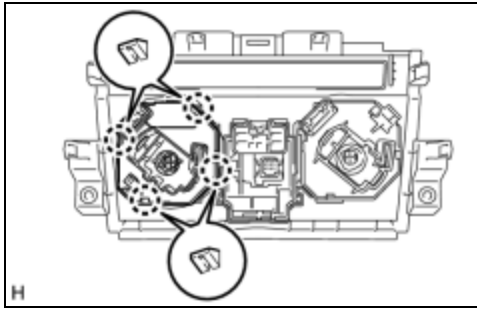


(a) Engage the 4 claws and install the heater control sub-assembly.

3. INSTALL NO. 3 HEATER CONTROL SUB-ASSEMBLY



(a) Install the bulb.



(b) Engage the 4 claws and install the No. 3 heater control sub-assembly.

4. INSTALL CLOCK ASSEMBLY INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XM202AX
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING PANEL: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE CONSOLE BOX ASSEMBLY

INFO

2. REMOVE CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY

INFO

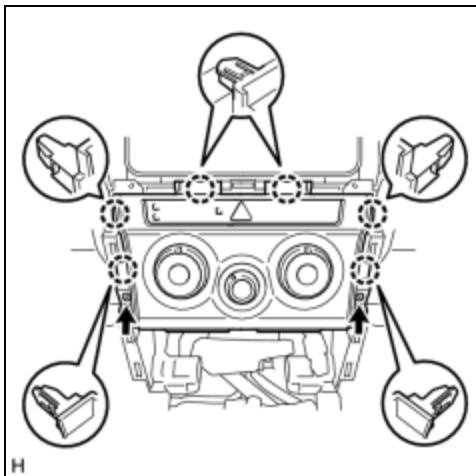
3. REMOVE NO. 2 INSTRUMENT CLUSTER FINISH PANEL GARNISH

INFO

4. REMOVE NO. 1 INSTRUMENT CLUSTER FINISH PANEL GARNISH

INFO

5. REMOVE AIR CONDITIONING CONTROL ASSEMBLY

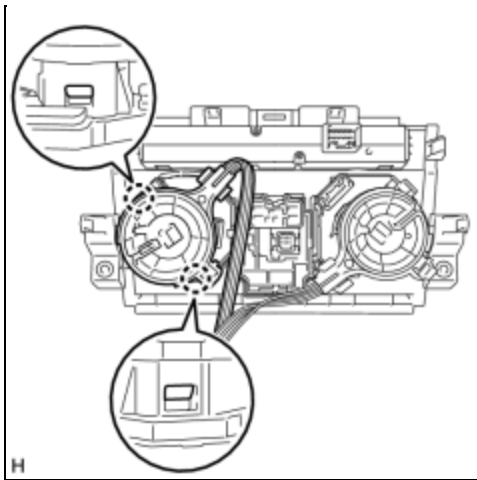


(a) Remove the 2 screws and disengage the 6 claws.



(b) Disconnect each connector and air conditioning control assembly.

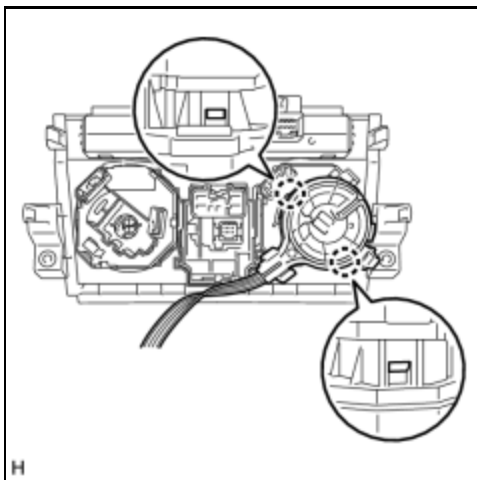
(c) Disengage the 2 claws and the cable assembly (for RH)



side).

HINT:

Setting the temperature adjustment dial to MAX HOT is useful when replacing the air conditioner unit assembly, and makes positioning easier when attaching cables.



(d) Disengage the 2 claws and the cable assembly (for LH side) and remove the air conditioning control assembly.

HINT:

Setting the blower dial to FACE is useful when replacing the air conditioner unit assembly, and makes positioning easier when attaching cables.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000202W04YX
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING PRESSURE SENSOR: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

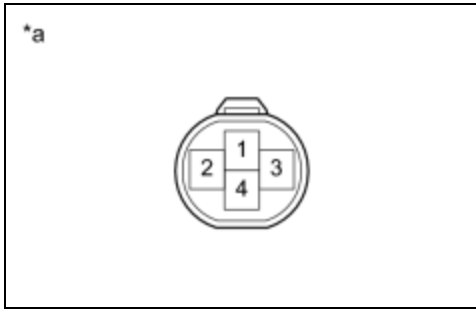
1. INSPECT AIR CONDITIONER TUBE AND ACCESSORY ASSEMBLY

(a) Check the wire harness.

(1) Disconnect the air air conditioner tube and accessory assembly connector.

(2) Using an ohmmeter, measure the resistance of the wire harness side connector.

Standard Voltage:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
2(E) - Body ground	Always	Below 1 Ω
2(E) - 4(B)	Ignition switch ON	Below 1 Ω

Text in Illustration

*a	Component without harness connected (air conditioner tube and accessory assembly)
----	--

(b) Check the air conditioning pressure sensor.

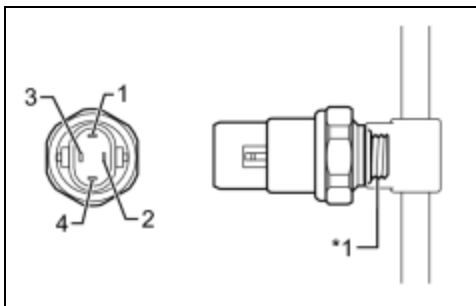
(1) Install a manifold gauge set.

(2) Apply pressure on the sensor as indicated in the table below, and check the resistance between the terminals.

Text in Illustration

*1	Sensor Part
----	-------------

Standard Voltage:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1(AC) - 4(B)	0 kPa (No Pressure applied)	10 k Ω or higher
1(AC) - 4(B)	1520 kPa (15.5 kgf/cm ² , 221 psi)	Below 1 Ω

2(E) - 3(ACP)	0 kPa (No Pressure applied)	10 kΩ or higher
2(E) - 3(ACP)	22.5 kPa (0.23 kgf/cm ² , 33.0 psi) or more and below 3140 kPa (32 kgf/cm ² , 455 psi)	Below 1 Ω
2(E) - 3(ACP)	3140 kPa (32 kgf/cm ² , 455 psi) or more	10 kΩ or higher



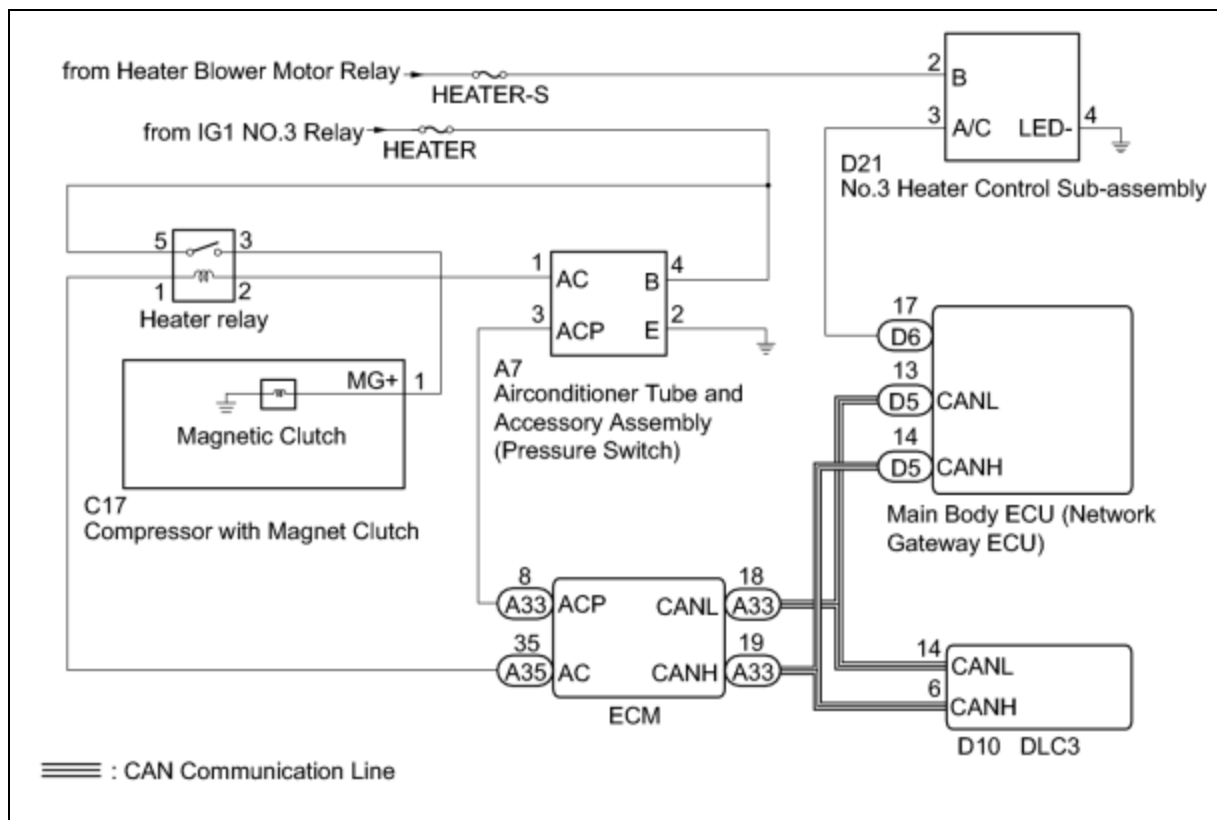
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XCQ06ZX
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM: Air Conditioning Compressor Magnetic Clutch Circuit (2013 FR-S)		

Air Conditioning Compressor Magnetic Clutch Circuit

DESCRIPTION

When the No. 3 heater control sub-assembly is turned on, a magnetic clutch on signal is sent from the AC terminal of the ECM. Then, the engine room junction block assembly turns on to operate the magnetic clutch assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	READ VALUE USING TECHSTREAM
----	------------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine and ETC / Data List.
- (e) Check the value(s) by referring to the table below.

Engine

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/C Signal	A/C switch status / ON or OFF	ON: A/C switch on OFF: A/C switch off	The air conditioning control assembly sends the A/C switch signal to the ECM via CAN communication.

OK:
The display is as specified in the normal condition column.

NG ▶ **INSPECT NO. 3 HEATER CONTROL SUB-ASSEMBLY**

OK
▼

2.	READ VALUE USING TECHSTREAM
-----------	------------------------------------

- (a) Enter the following menus: Body Electrical/ Air Conditioner/ Data List.
- (b) Check the value(s) by referring to the table below.

Air Conditioner

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Pressure Switch Operation	Pressure Switch status / Normal or Abnormal	Normal	-

OK:
The display is as specified in the normal condition column.

NG ▶ **CHECK REFRIGERANT VOLUME**

OK
▼

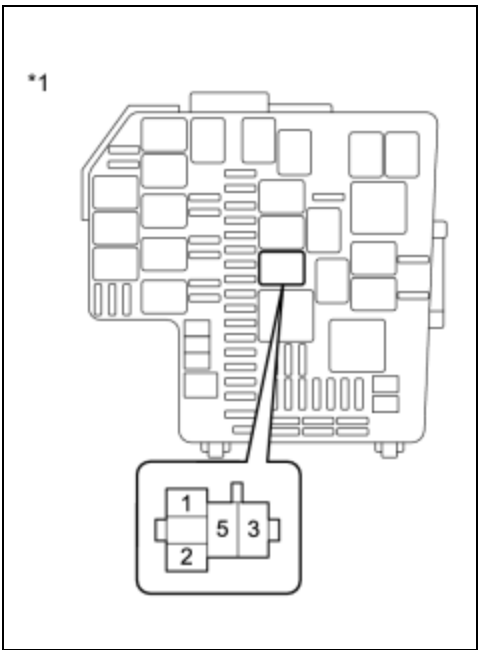
3. INSPECT HEATER RELAY

- (a) Remove the heater relay from the engine room relay block and junction block.
- (b) Inspect the heater relay NFC.

NG ▶ REPLACE HEATER RELAY

OK
▼

4. CHECK HARNESS AND CONNECTOR (HEATER RELAY - POWER SOURCE)



(a) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
5 - Body ground	Ignition switch off	Below 1 V
	Ignition switch on	11 to 14V

Text in Illustration

*1	Component without relay installed (Engine Room Relay Block)
----	---

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

5. CHECK HARNESS AND CONNECTOR (HEATER RELAY - COMPRESSOR WITH

MAGNET CLUTCH)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C17-1(MG+) - 3	Always	Below 1 Ω
C17-1(MG+) - Body ground	Always	10 k Ω or higher

NG  REPAIR OR REPLACE HARNESS OR CONNECTOR

OK



6. INSPECT COMPRESSOR WITH MAGNET CLUTCH

(a) Inspect the compressor with magnet clutch  .

NG  REPLACE COMPRESSOR WITH MAGNET CLUTCH

OK



7. CHECK HARNESS AND CONNECTOR (HEATER RELAY - AIR CONDITIONER TUBE AND ACCESSORY ASSEMBLY)

(a) Disconnect the A7 air conditioning tube and accessory assembly connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

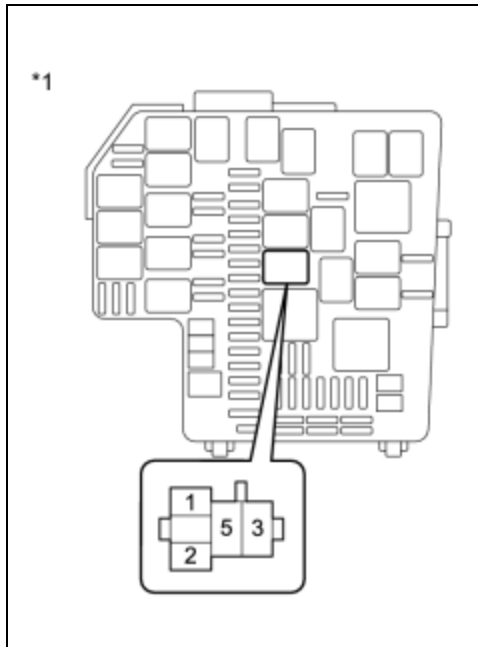
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
2 - A7-1(AC)	Always	Below 1 Ω
2 - Body ground	Always	10k Ω or higher

NG  REPAIR OR REPLACE HARNESS OR CONNECTOR

OK



8. CHECK HARNESS AND CONNECTOR (HEATER RELAY - ECM)



(a) Disconnect the A33 ECM connector.

(b) Measure the resistance according to the valve(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - A35-35(AC)	Always	Below 1 Ω
1 - Body ground	Always	10k Ω or higher

Text in Illustration

*1	Component without relay installed (Engine Room Relay Block)
----	--

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK REPLACE ECM

9.	INSPECT NO. 3 HEATER CONTROL SUB-ASSEMBLY
-----------	--

- (a) Remove the No. 3 heater control sub-assembly INFO.
- (b) Inspect the No. 3 heater control sub-assembly INFO.

NG ▶ **REPLACE NO. 3 HEATER CONTROL SUB-ASSEMBLY**

OK
▼

10.	CHECK HARNESS AND CONNECTOR (NO. 3 HEATER CONTROL SUB-ASSEMBLY - POWER SOURCE)
------------	---

- (a) Measure the voltage according to the valve(s) in the table below.
Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D21-2(B) - Body ground	<ul style="list-style-type: none"> Ignition switch on Blower switch: on 	11 to 14 V

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK
▼

11.	CHECK HARNESS AND CONNECTOR (NO. 3 HEATER CONTROL SUB-ASSEMBLY - MAIN BODY ECU (NETWORK GATEWAY ECU))
------------	--

- (a) Disconnect the D6 main body ECU (network gateway ECU) connector.
- (b) Measure the resistance according to the value(s) in the table below.
Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D6-17 - D21-3(A/C)	Always	Below 1 Ω
D6-17 - Body ground	Always	10 kΩ or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ REPLACE ECM

12.	CHECK REFRIGERANT VOLUME
------------	---------------------------------

(a) Check the refrigerant volume INFO

NG ▶ CHARGE REFRIGERANT

OK
▼

13.	CHECK HARNESS AND CONNECTOR (AIR CONDITIONER TUBE AND ACCESSORY ASSEMBLY - POWER SOURCE)
------------	---

(a) Disconnect the A7 air conditioning tube and accessory assembly connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A7-4(B) - Body ground	Ignition switch on	11 to 14 V

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

14.	CHECK HARNESS AND CONNECTOR (AIR CONDITIONER TUBE AND ACCESSORY ASSEMBLY - BODY GROUND)
------------	--

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A7-2(E) - Body ground	Always	Below 1 Ω

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



15.	CHECK HARNESS AND CONNECTOR (AIR CONDITIONER TUBE AND ACCESSORY ASSEMBLY - ECM)
------------	--

- (a) Disconnect the A33 ECM connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A7-3(ACP) - A33-8(ACP)	Always	Below 1 Ω
A7-3(ACP) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



16.	CHECK HARNESS AND CONNECTOR (AIR CONDITIONER TUBE AND ACCESSORY ASSEMBLY - HEATER RELAY)
------------	---

- (a) Remove the heater relay from the engine room relay block and junction block.
- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A7-1(AC) - 2	Always	Below 1 Ω

NG ▶ REPAIR OR REPLACE HARNESS OR
CONNECTOR

OK



17. INSPECT AIR CONDITIONER TUBE AND ACCESSORY ASSEMBLY

(a) Inspect the air conditioning tube and accessory assembly 

NG ▶ REPLACE AIR CONDITIONER TUBE AND
ACCESSORY ASSEMBLY

OK ▶ REPLACE ECM



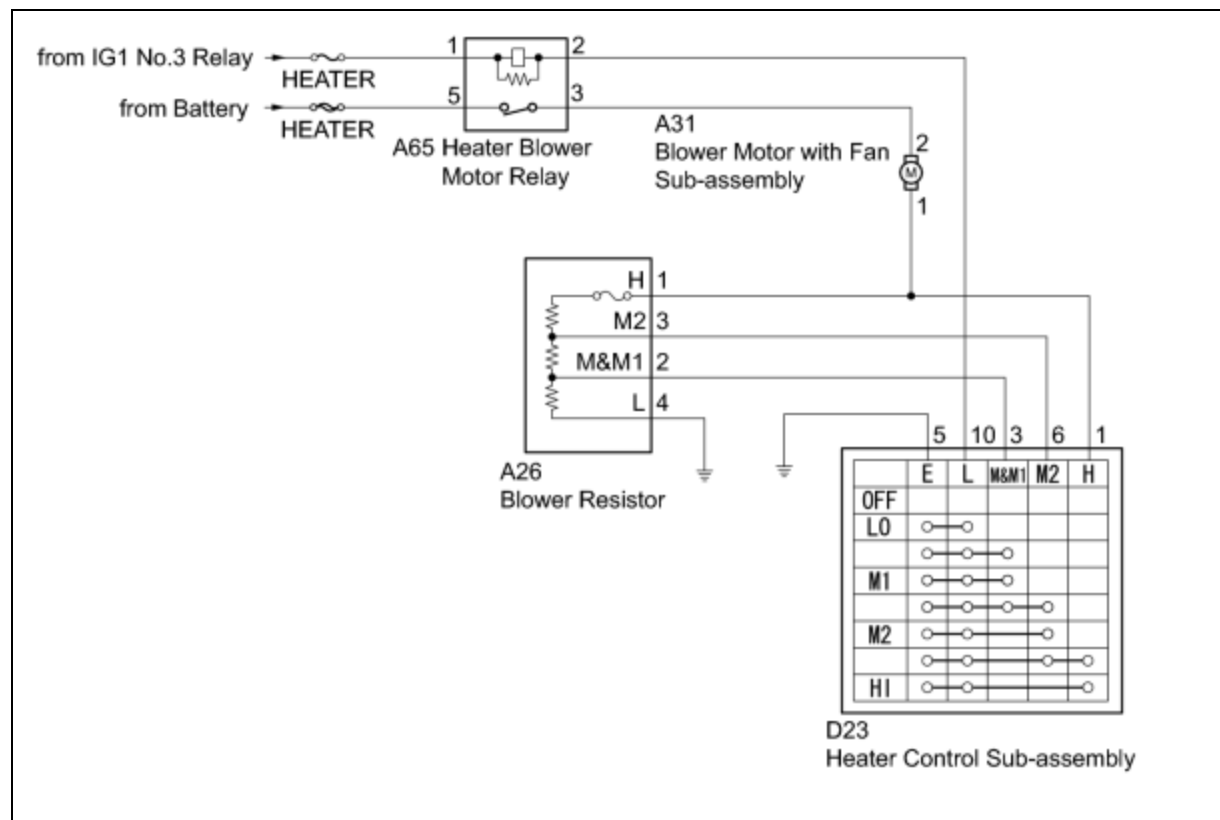
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000TS806CX
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM: Blower Motor Circuit (2013 FR-S)		

Blower Motor Circuit

DESCRIPTION

When the heater control Sub-assembly is operated, the Heater relay will turn on to allow current to flow to the blower motor and then the motor will start rotating. Operating the heater control Sub-assembly switches the current flow between the blower resistor and body ground, thus, shifting the operating speed of the blower motor.

WIRING DIAGRAM



INSPECTION PROCEDURE


NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	INSPECT HEATER BLOWER MOTOR RELAY
----	-----------------------------------

(a) Remove the heater blower motor relay.

(b) Inspect the heater blower motor relay  .


NG  **REPLACE HEATER BLOWER MOTOR RELAY**

OK



2.	INSPECT BLOWER MOTOR WITH FAN SUB-ASSEMBLY
-----------	---

(a) Disconnect the A31 blower motor with fan sub-assembly connector.

(b) Inspect the blower motor with fan sub-assembly  .

NG  **REPLACE BLOWER MOTOR WITH FAN SUB-ASSEMBLY**

OK



3.	CHECK HARNESS AND CONNECTOR (HEATER BLOWER MOTOR RELAY - BLOWER MOTOR WITH FAN SUB-ASSEMBLY)
-----------	---

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A65-3 - A31-2	Always	Below 1 Ω
A65-3 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



4.	INSPECT HEATER CONTROL SUB-ASSEMBLY
-----------	--

- (a) Remove the heater control sub-assembly  .
- (b) Inspect the heater control sub-assembly  .

NG  **REPLACE HEATER CONTROL SUB-ASSEMBLY**

OK


5.	CHECK HARNESS AND CONNECTOR (HEATER BLOWER MOTOR RELAY - HEATER CONTROL SUB-ASSEMBLY)
-----------	--

- (a) Disconnect the D23 heater control sub-assembly connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A65-2 - D23-10	Always	Below 1 Ω
A65-2 - Body ground	Always	10 kΩ or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK


6.	CHECK HARNESS AND CONNECTOR (BLOWER MOTOR WITH FAN SUB-ASSEMBLY - HEATER CONTROL SUB-ASSEMBLY)
-----------	---

- (a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A31-1 - D23-1	Always	Below 1 Ω
A31-1 - Body ground	Always	10 kΩ or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

7.	CHECK HARNESS AND CONNECTOR (HEATER CONTROL SUB-ASSEMBLY - BODY GROUND)
-----------	--

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D23-5(E) - Body ground	Always	Below 1 Ω

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

8.	INSPECT BLOWER RESISTOR
-----------	--------------------------------

(a) Remove the blower resistor INFO .

(b) Inspect the blower resistor INFO .

NG ▶ REPLACE BLOWER RESISTOR

OK
▼

9.	CHECK HARNESS OR CONNECTOR (HEATER CONTROL SUB-ASSEMBLY - BLOWER RESISTOR)
-----------	---

(a) Disconnect the A26 blower resistor connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D23-3(M&M1) - A26-2(M&M1)	Always	Below 1 Ω
D23-6(M2) - A26-3(M2)	Always	Below 1 Ω
D23-3(M&M1) - Body ground	Always	10 k Ω or higher
D23-6(M2) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



10.	CHECK HARNESS OR CONNECTOR (BLOWER MOTOR WITH FAN SUB-ASSEMBLY - BLOWER RESISTOR)
------------	--

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A31-1 - A26-1(H)	Always	Below 1 Ω
A31-1 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



11.	CHECK HARNESS AND CONNECTOR (BLOWER RESISTOR - BODY GROUND)
------------	--

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
-------------------	-----------	---------------------

A26-4(L) - Body ground	Always	Below 1 Ω
------------------------	--------	------------------

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ► PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001GFL04DX
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

DATA LIST / ACTIVE TEST

1. DATA LIST

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Main Body ECU / Data List.
- Check the value(s) by referring to the table below.

Main Body ECU

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Evaporator Fin Sensor Voltage	Evaporator temperature sensor / Min.: 0V Max.: 21.4V	Actual evaporator temperature displayed Sensor Voltage	-
A/C SW Input	A/C Switch Input OFF or ON	-	-
A/C SW Output	A/C Switch Output OFF or ON	-	-

Engine

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/C Pressure Normal SW	A/C Pressure Normal Switch OFF or ON	-	-
A/C Signal	A/C Signal / OFF or ON	A/C switch operated: ON (when switch is pressed)	-
		A/C switch not operated: OFF (when switch is not pressed)	-
A/C			

Magnetic Clutch Relay	A/C Magnetic Clutch Relay / OFF or ON	-	-
Air Conditioner FB Val	Compensation flow rate according to air conditioner load / Min.: -150 Max.: 149.99	-	For use when engine stall, starting problems or rough idle is present.

2. ACTIVE TEST

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Active Test.
- (e) Check the operation by referring to the table below.

Engine

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
A/C Magnetic Clutch Relay	A/C system operation	OFF, ON	-



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PM609FX
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedure to troubleshoot the air conditioning system.
- *: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	INSPECT BATTERY VOLTAGE
-----------	--------------------------------

(a) Inspect the battery voltage.

Standard Voltage:

11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding to the next step.

NEXT



3.	CHECK COMMUNICATION FUNCTION OF CAN COMMUNICATION SYSTEM*
-----------	--

(a) Use the Techstream to check if the CAN communication system is functioning normally.

Result:


RESULT	PROCEED TO
CAN DTC is not output	A
CAN DTC is output	B

B **GO TO CAN COMMUNICATION SYSTEM**

A




4.	PROBLEM SYMPTOMS TABLE
-----------	-------------------------------

(a) Refer to Problem Symptoms Table  .

Result:

RESULT	PROCEED TO
Fault is not listed in Problem Symptoms Table	A
Fault is listed in Problem Symptoms Table	B


B  Go to step 6

A



5.	OVERALL ANALYSIS AND TROUBLESHOOTING*
-----------	--

(a) Data List / Active Test  .

(b) Terminals of ECU  .

(c) On-vehicle Inspection.

(d) Inspection.

NEXT



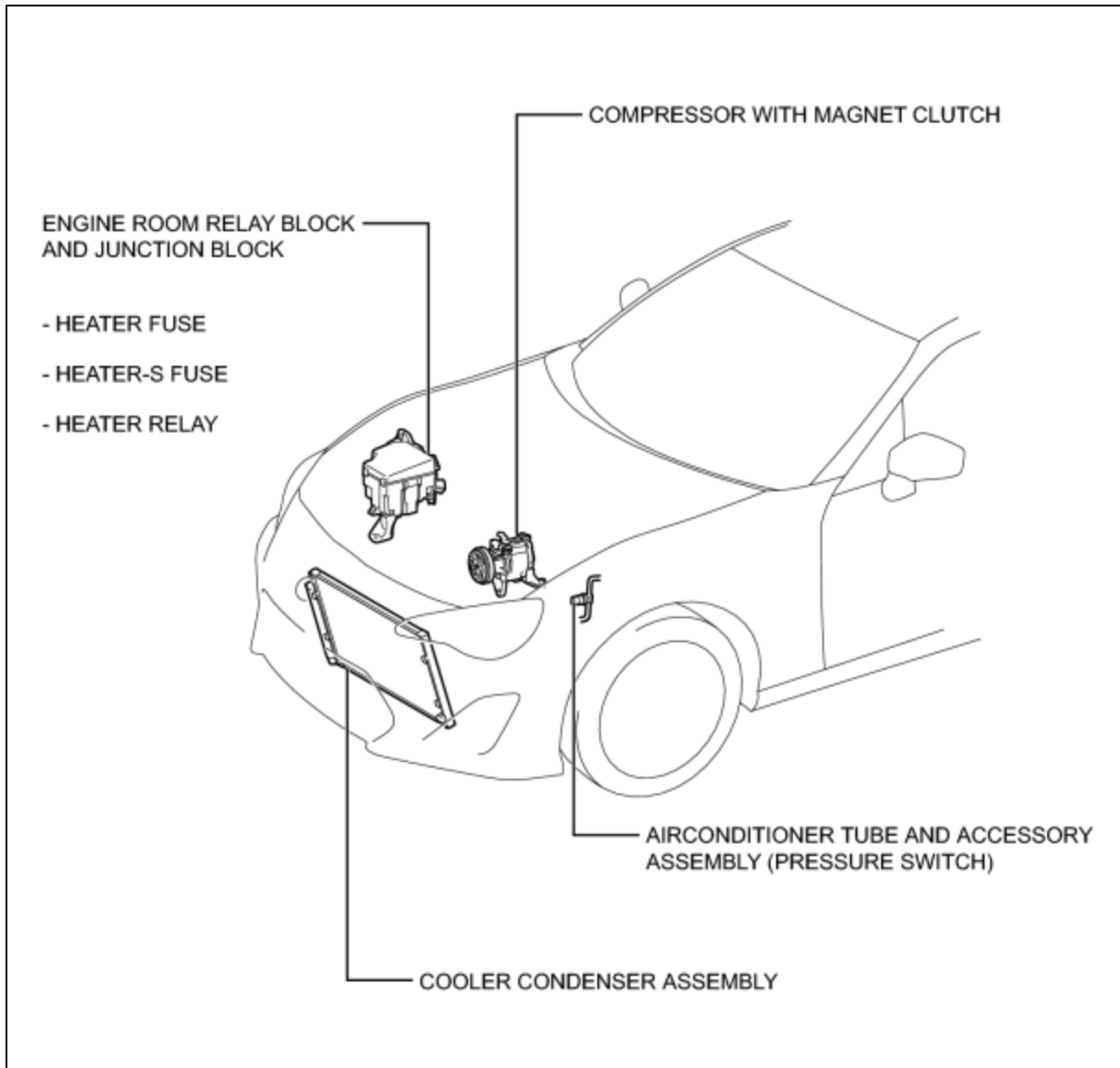
6.	ADJUST, REPAIR OR REPLACE
-----------	----------------------------------

NEXT  **END**

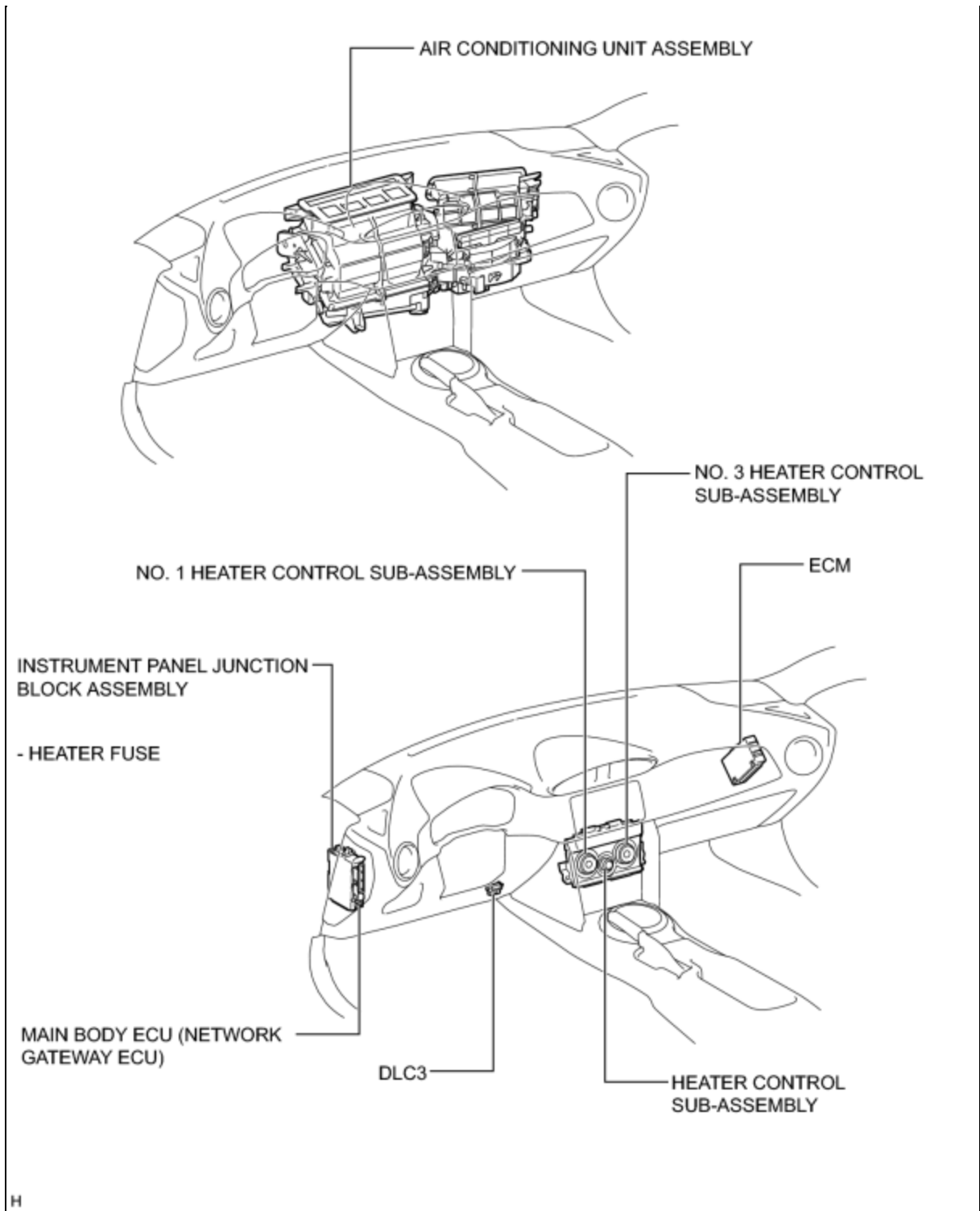
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000031BK02JX
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

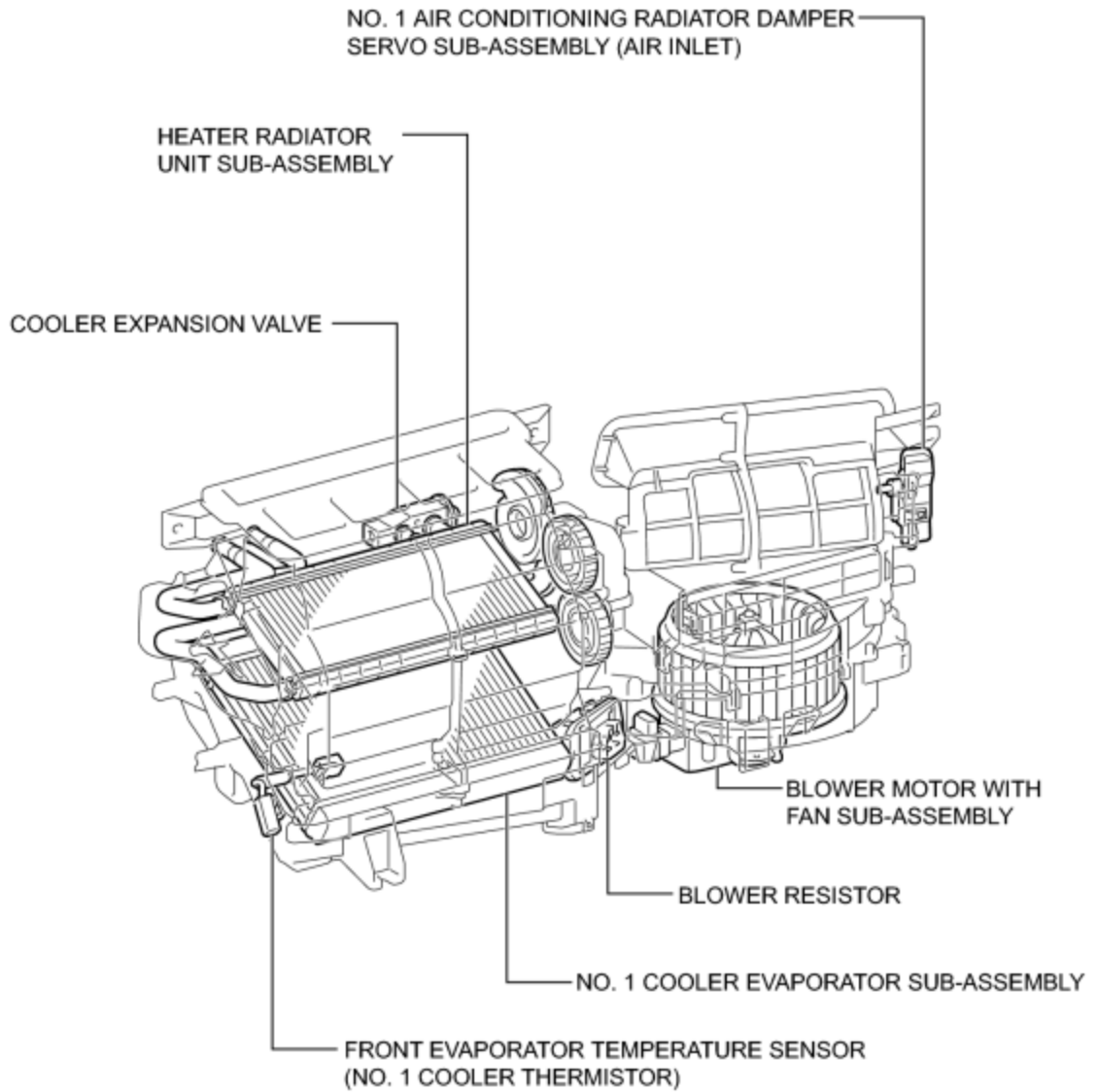
ILLUSTRATION



ILLUSTRATION



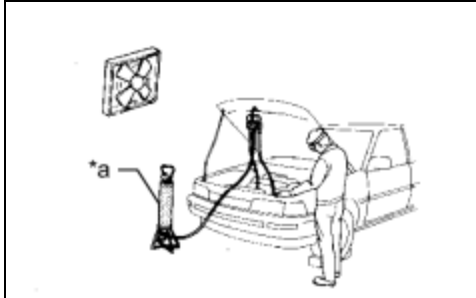
ILLUSTRATION



H

Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000Y5Q09MX
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

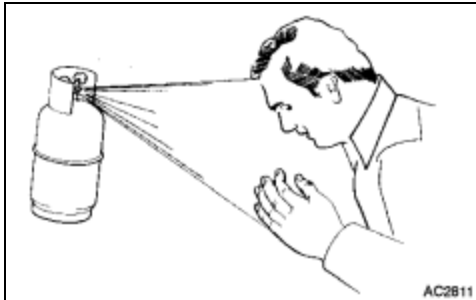


1. DO NOT HANDLE REFRIGERANT IN AN ENCLOSED AREA OR NEAR AN OPEN FLAME

Text in Illustration

*a	Charging Cylinder
----	-------------------

2. ALWAYS WEAR EYE PROTECTION



3. BE CAREFUL NOT TO GET LIQUID REFRIGERANT IN YOUR EYES OR ON YOUR SKIN

If liquid refrigerant gets in your eyes or on your skin:

- (a) Wash the area with lots of cold water.

CAUTION:

Do not rub your eyes or skin.

- (b) Apply clean petroleum jelly to the skin.
- (c) Go immediately to a hospital or see a physician for professional treatment.

4. NEVER HEAT CONTAINER OR EXPOSE THE CONTAINER TO AN OPEN FLAME

5. BE CAREFUL NOT TO DROP CONTAINER OR APPLY PHYSICAL SHOCKS TO IT

6. DO NOT OPERATE COMPRESSOR WITHOUT ENOUGH REFRIGERANT IN REFRIGERANT SYSTEM

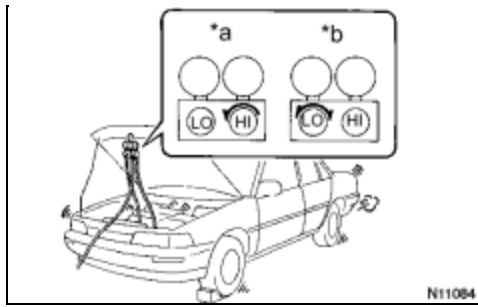
If there is not enough refrigerant in the A/C system, oil lubrication will be insufficient and the compressor may be damaged.

Necessary care should be taken to avoid this.

7. DO NOT OPEN HIGH PRESSURE MANIFOLD VALVE WHILE COMPRESSOR IS OPERATING

- (a) Open and close only the low pressure valve.

If the high pressure valve is opened, refrigerant flows in the reverse direction causing the charging cylinder to rupture.



Text in Illustration

*a	Wrong
*b	Okay

8. BE CAREFUL NOT TO OVERCHARGE SYSTEM WITH REFRIGERANT

If the system is overcharged with refrigerant, it causes problems such as insufficient cooling, poor fuel economy, engine overheating, etc.

9. DO NOT OPERATE ENGINE AND COMPRESSOR WITH NO REFRIGERANT

CAUTION:

Doing so may damage inside the compressor because the compressor parts always move regardless of whether the A/C system is turned on or off.

10. SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

- (a) This vehicle is equipped with a Supplemental Restraint System (SRS) such as the driver, front passenger, side, and curtain shield airbags. Failure to carry out service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices [INFO](#).

11. GENERAL PRECAUTION

- (a) While using the battery during inspection, do not bring the positive (+) and negative (-) tester probes too close to each other as a short circuit may occur.

Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000107X031X
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Air Conditioning System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Air flow control: No blower operation	Blower motor circuit	INFO
	Heater control sub-assembly	INFO
	No. 1 heater control sub-assembly	INFO
	No. 3 heater control sub-assembly	INFO
	Main body ECU (Network gateway ECU)	INFO
Switch operation not possible	Heater control sub-assembly	INFO
	No. 1 heater control sub-assembly	INFO
	No. 3 heater control sub-assembly	INFO
Air flow control: No blower operation	Blower motor with fan sub-assembly	INFO
	Heater control sub-assembly	INFO
	Blower motor circuit	INFO
	Blower Resistor	INFO
Air flow control: No blower control	Heater control sub-assembly	INFO
	Blower motor circuit	INFO
	Blower Resistor	INFO
Air flow control: Insufficient air flow	Blower motor circuit	INFO
Temperature control: Cooling effectiveness is poor	Refrigerant volume	INFO
	Refrigerant pressure	INFO
	Cooler expansion valve	INFO
	Compressor with magnet clutch	INFO
	Main body ECU (Network gateway ECU)	INFO
Temperature control: No cool air comes out	Refrigerant volume	INFO

	Refrigerant pressure	INFO
	Heater control sub-assembly	INFO
	Air Conditioner tube and accessory assembly	INFO
	Air conditioning compressor magnetic clutch circuit	INFO
	Compressor with magnet clutch	INFO
	Cooler expansion valve	INFO
	Main body ECU (Network gateway ECU)	INFO
No air inlet control	Heater control sub-assembly	INFO
	No. 1 air conditioning radiator damper servo sub-assembly	INFO
Temperature adjustment not possible (temperature cannot be changed)	Heater control sub-assembly	INFO
	No. 1 heater control sub-assembly	INFO
	No. 3 heater control sub-assembly	INFO
Indicator does not come on	Heater control sub-assembly	INFO
	No. 1 heater control sub-assembly	INFO
	No. 3 heater control sub-assembly	INFO



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000107U06TX
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

SYSTEM DESCRIPTION

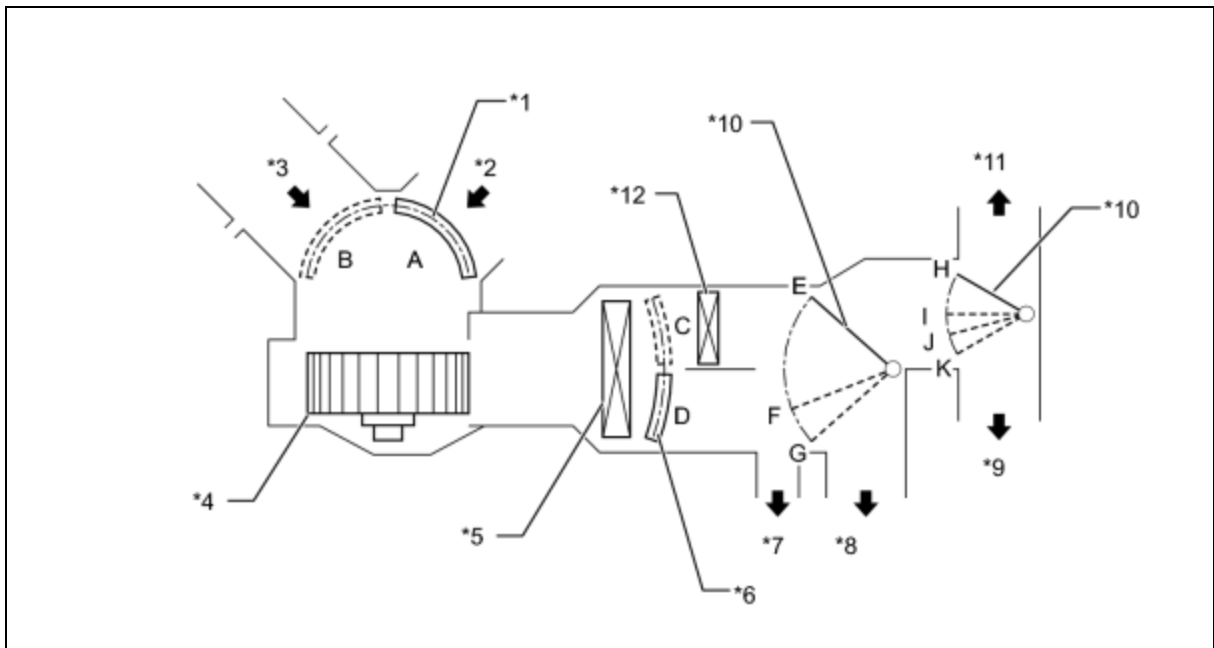
1. GENERAL

(a) The air conditioning system has the following controls.

CONTROL	OUTLINE
Manual Control	The air conditioning control assembly controls the damper positions and blower speed in accordance with the positions of the switches and dials (temperature control dial, blower switch, mode control dial and inlet control switch).
Defroster Control	Defroster control logic is used to improve defroster performance.
Diagnosis	A Diagnostic Trouble Code (DTC) is stored in memory when the air conditioning amplifier detects a problem with the air conditioning system.

2. MODE POSITION AND DAMPER OPERATION

(a) Mode Position and Damper Operation








Text in Illustration

*1	Air Inlet Control Door	*2	Recirculated Air
*3	Fresh Air	*4	Blower Motor with Fan Sub-assembly
*5	No. 1 Cooler Evaporator Sub-assembly	*6	Air Mix Control Door
*7	Side Register	*8	Center Register
*9	Footwell Register Duct	*10	Mode Control Door

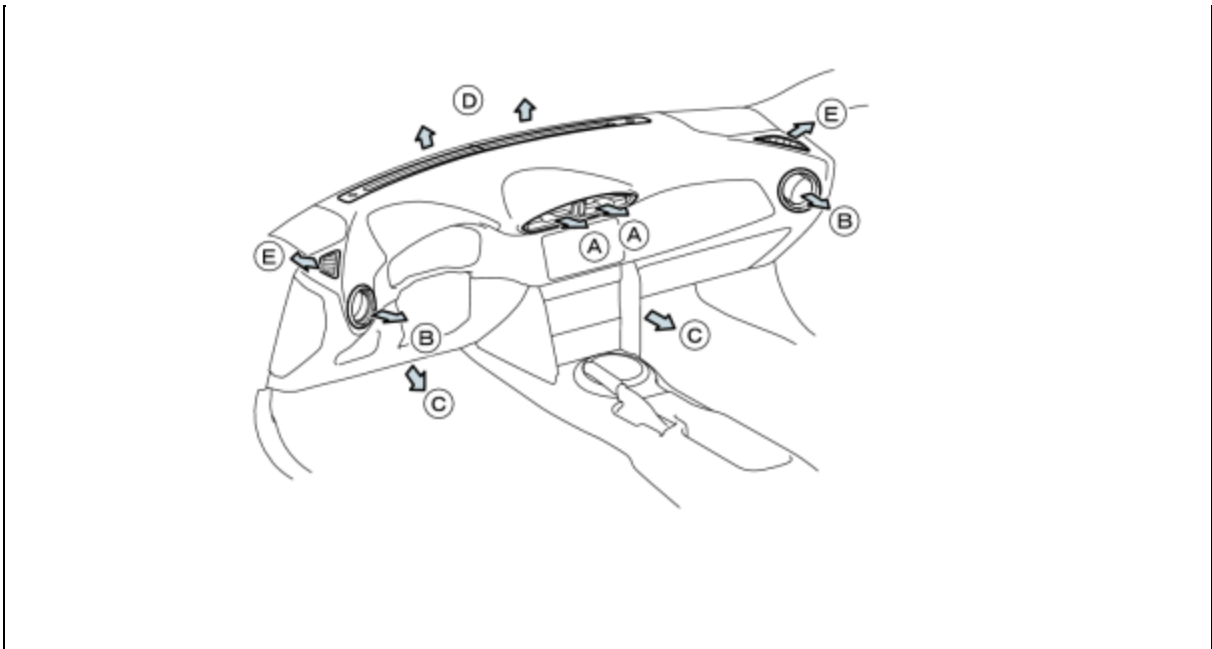
*11	Front Defroster, Side Defroster	*12	Heater Radiator Unit Sub-assembly
*13	Passenger Side	*14	Driver Side

Functions of Main Dampers:

CONTROL DAMPER	OPERATION POSITION		DAMPER POSITION	OPERATION
Air Inlet Control Damper	FRESH		A	Brings in fresh air.
	RECIRCULATION		B	Recirculates internal air.
Air Mix Control Damper	MAX COLD to MAX HOT Temperature Setting		C - D (C' - D')	Varies the mixture ratio of warm air and cool air in order to regulate the temperature continuously between hot and cold.
Mode Control Door		FACE	E, H,	Air blows out of the center register and side register ducts.
		BI-LEVEL	F, H,	Air blows out of the center register, side register and footwell register ducts.
		FOOT	G, I,	Air blows out of the footwell register and side register ducts. In addition, air blows out slightly from the front defroster and side defroster.
		FOOT AND DEFROSTER	G, J,	Defrosts the windshield through the front defroster, side defroster and side register ducts, while air is also blown out from footwell register ducts.
		DEFROSTER	G, K,	Defrosts the windshield through the front defroster, side defroster and side register ducts.

3. AIR OUTLETS AND AIRFLOW VOLUME

(a) Air Outlets and Airflow Volume



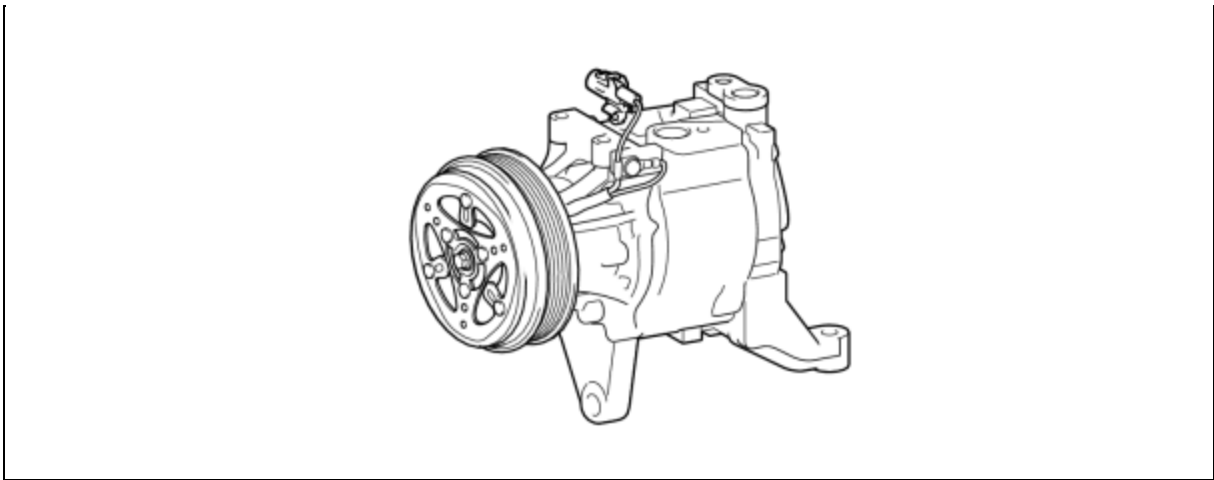
INDICATION	MODE	FACE		FOOTWELL	DEFROSTER	
		CENTER	SIDE		FRONT	SIDE
		A	B	C	D	E
	FACE	○	○	—	—	—
	BI-LEVEL	○	○	○	—	—
	FOOT	—	○	○	○	○
	FOOT AND DEFROSTER	—	○	○	○	○
	F/D	—	○	—	○	○

- The size of each circle ○ indicates the ratio of airflow volume.

4. COMPRESSOR

(a) General:

(1) A compact and high performance scroll compressor with separator has been adopted.



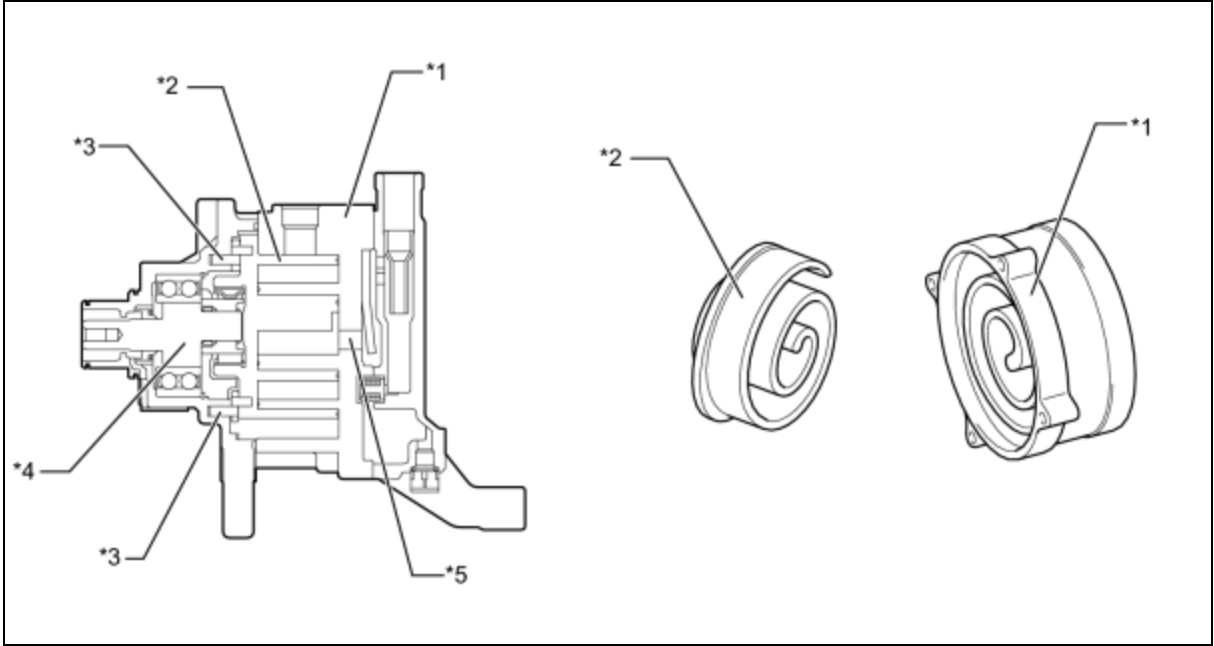
(2) The scroll compressor with oil separator consists of a spirally wound fixed scroll and rotating scroll that form a pair, and oil separator, and a magnetic clutch.

The fixed scroll is integrated with the housing. Because the rotation of the shaft causes the rotating scroll to revolve while maintaining the same posture, the volume of the space that is partitioned by both scrolls varies to perform the suction, compression, and the discharge of the refrigerant gas.

A pin is attached behind the rotating scroll to prevent the autorotation of the rotating scroll, allowing it only to revolve.

Locating the suction port directly above the scrolls enables direct suction, thus realizing improved suction efficiency.

Containing a built-in oil separator, this compressor is able to separate the compressor oil that is intermixed with the refrigerant and circulates in the refrigeration cycle, thus realizing a reduction in the oil circulation rate.

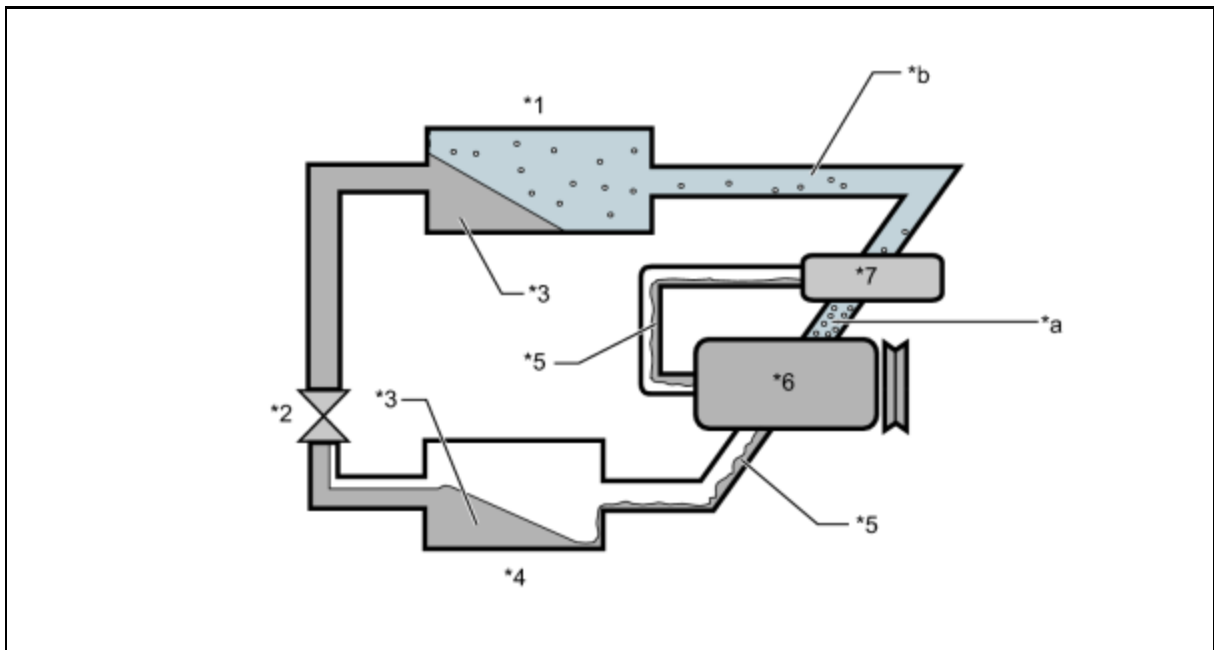


Text in Illustration

*1	Fixed Scroll	*2	Rotating Scroll
*3	Pins	*4	Shaft

- (3) A CS (Centrifugal with Shutter) type oil separator has been adopted to reduce the circulation rate of the compressor oil that is intermixed with the refrigerant and circulates in the refrigeration cycle.

This oil separator is provided with a cylindrical pipe in the separator case, enabling the refrigerant gas that has been discharged through the discharge gas inlet to be separated into refrigerant gas and oil through centrifugal force, and minimizing the outflow of the oil to the discharge service port. As a result, the oil circulation rate has been reduced and makes energy savings possible.

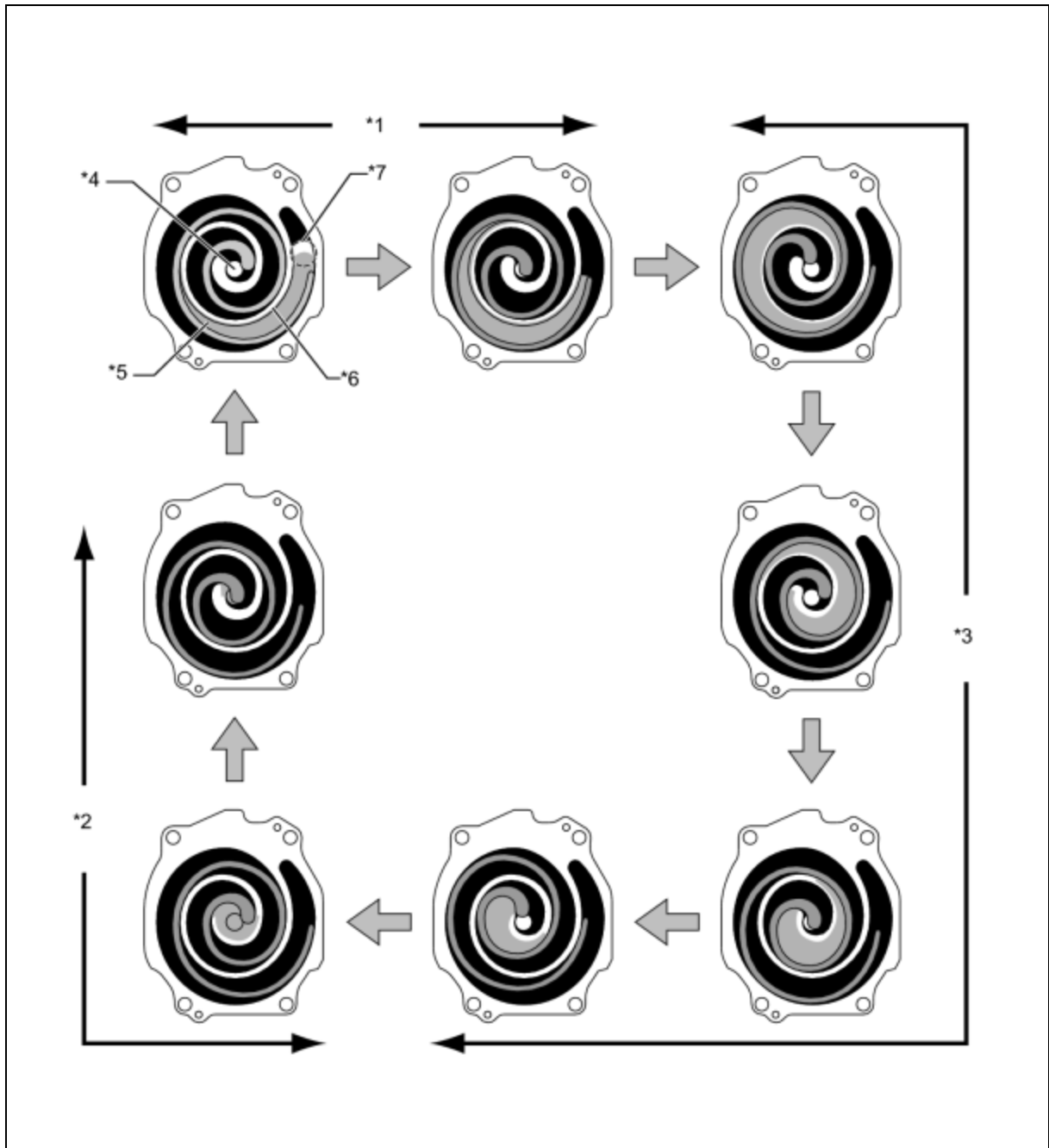


Text in Illustration

*1	Cooler Condenser Assembly and Modulator	*2	Cooler Expansion Valve
*3	Refrigerant Gas + Compressor Oil	*4	No.1 Cooler Evaporator Sub-assembly
*5	Oil	*6	Compressor Assembly
*7	Oil Separator	-	-
*a	Oil Circulation Ratio of 4%	*b	Oil Circulation Ratio of 1%

(b) Compressor with Magnet Clutch Operation

- (1) As the capacity of the compression chamber, which is created between the rotating scroll and the fixed scroll, increases in accordance with the revolution of the rotating scroll, refrigerant gas is drawn in from the intake port.
- (2) From the state at which the suction process has been completed, as the revolution of the rotating scroll advances further, the capacity of the compression chamber decreases gradually. Consequently, the refrigerant gas that has been drawn in becomes compressed gradually and is sent to the center of the fixed scroll. The compression of the refrigerant gas is completed when the rotating scroll completes approximately 2 revolutions.
- (3) When the compression of the refrigerant gas is completed and the refrigerant pressure becomes high, the refrigerant gas discharges through the discharge port located in the center of the fixed scroll by pushing the discharge valve.

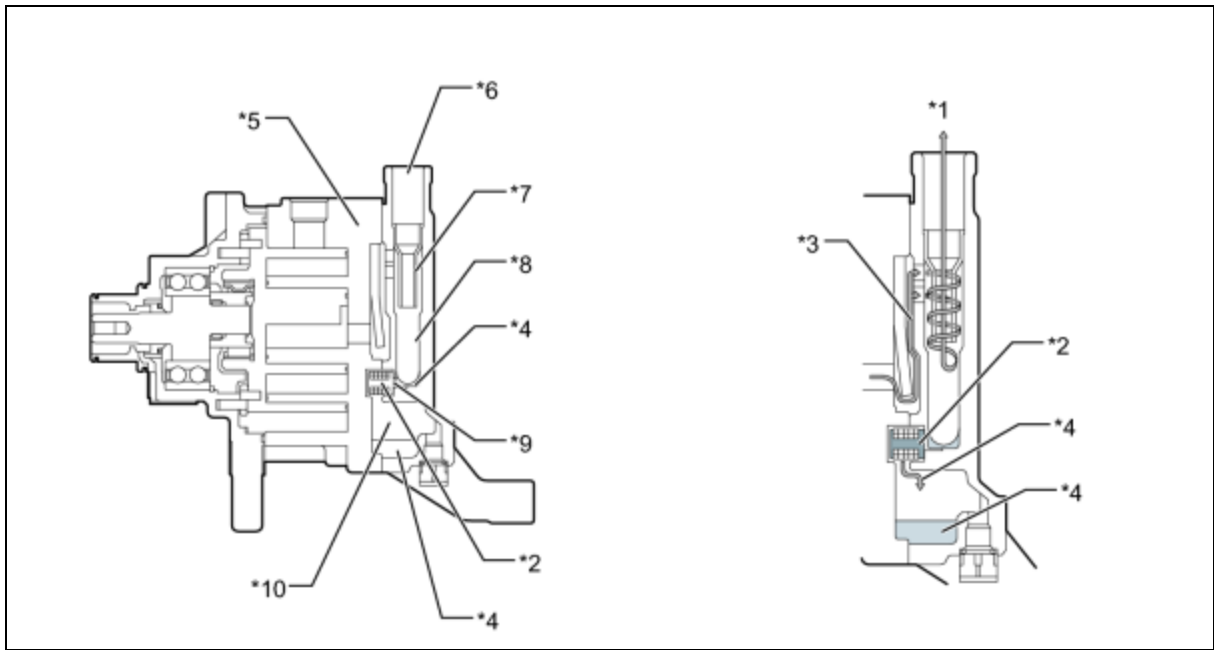


Text in Illustration

*1	Suction	*2	Discharge
*3	Compression	*4	Discharge Port
*5	Rotating Scroll	*6	Fixed Scroll
*7	Intake Port	-	-

(4) The refrigerant gas that is discharged from the discharge port flows by rotating around the cylindrical pipe in the oil separator. At this time, the centrifugal force that is created during the rotation separates the refrigerant gas and the compressor oil due to the difference in their specific gravity. The refrigerant gas with the lighter specific gravity passes through the inside of the pipe and travels from the discharge service port to the outside of the compressor. The compressor oil with the heavier specific gravity is discharged through the oil discharge hole in the shutter and is stored in the oil storage chamber. Then, the

compressor oil is fed again into the compressor and circulates inside the compressor.



Text in Illustration

*1	Refrigerant	*2	Shutter
*3	Refrigerant and Compressor Oil	*4	Compressor Oil
*5	Valve Chamber D	*6	Service Port
*7	Pipe	*8	Case
*9	Oil Discharge Hole	*10	Oil Storage Chamber

5. EVAPORATOR TEMPERATURE SENSOR (NO. 1 COOLER THERMISTOR)

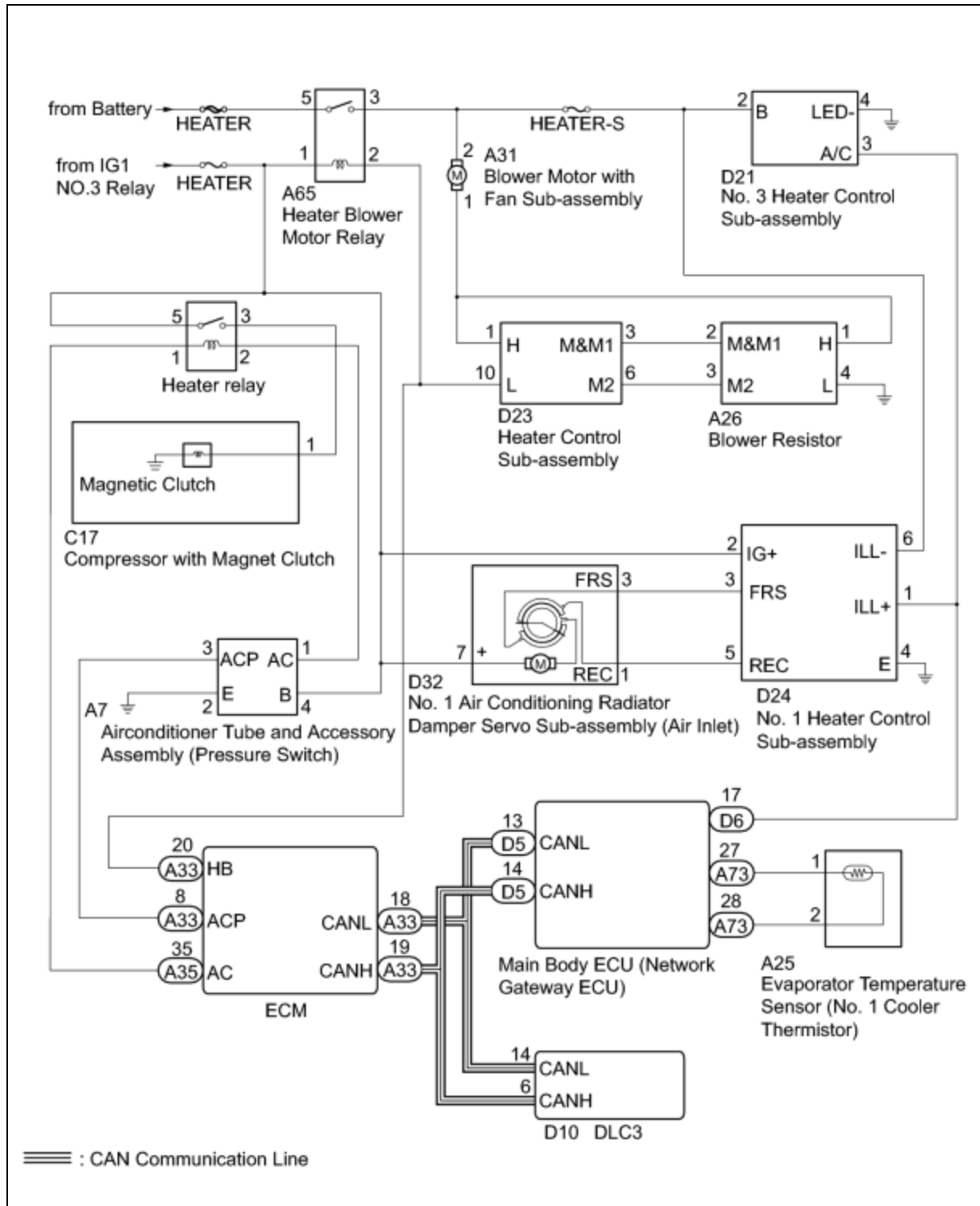
The evaporator temperature sensor (No. 1 cooler thermistor) detects the temperature of the cooled air immediately past the evaporator in the form of resistance changes, and outputs this data to the main body ECU (network gateway ECU).

6. Air Conditioning Pressure Switch (Airconditioner Tube Assembly)

The air conditioning pressure switch (airconditioner tube assembly) uses refrigerant pressure to output an on/off signal to the ECM to control the compressor with magnet clutch.

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HZL041X
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM



Communication Table

SENDER	RECEIVER	SIGNAL	COMMUNICATION
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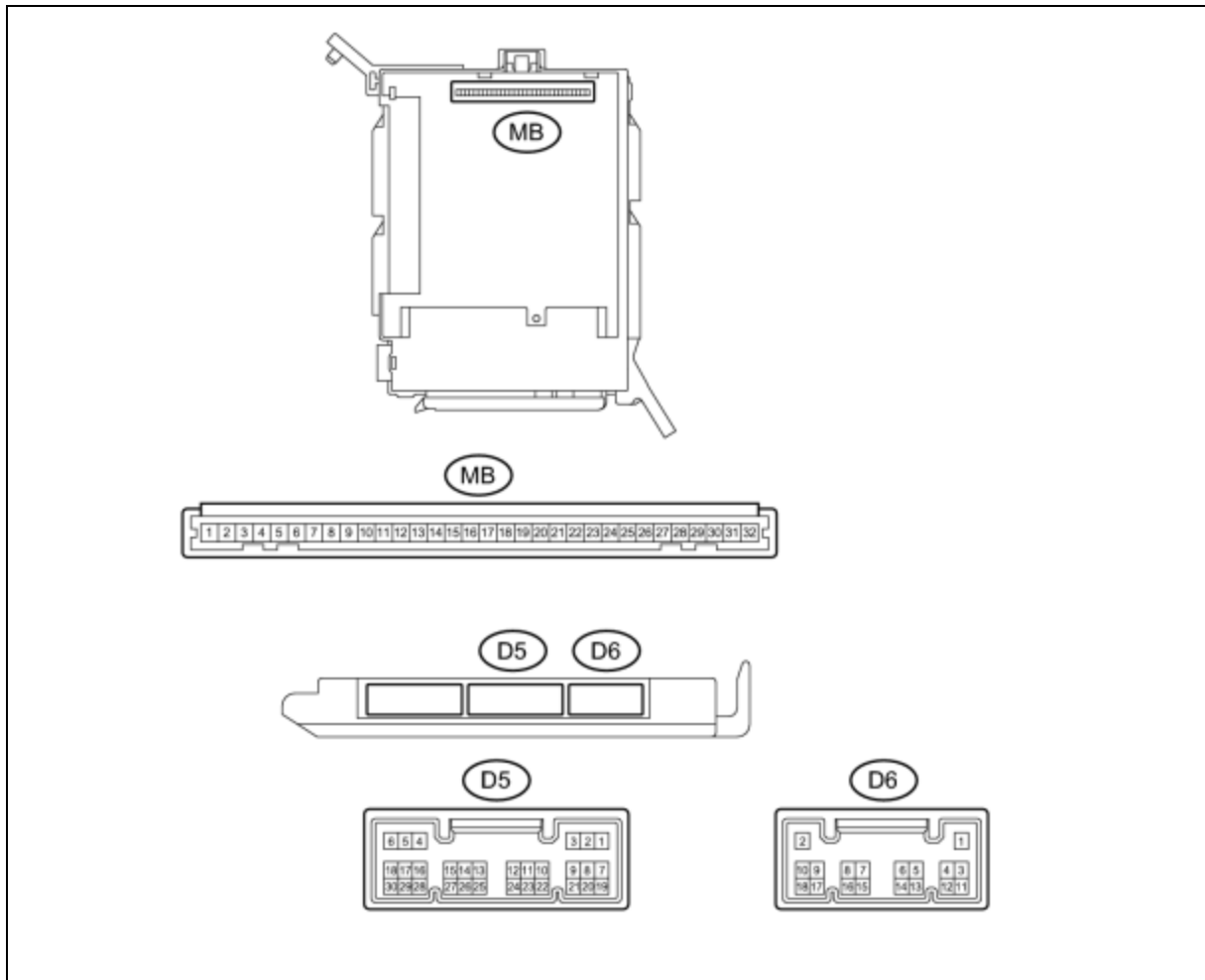
			LINE
Main body ECU (network gateway ECU)	ECM	Prior A/C control request signal	CAN



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000026DR05PX
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY, MAIN BODY ECU (NETWORK GATEWAY ECU)



- Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- Measure the values on the wire harness side with the connector disconnected.

CONNECTOR MB

TERMINAL NO. (SYMBOL)	WIRING COLOR	DESCRIPTION	CONDITION	SPECIFIED CONDITION
MB8 - Body ground	-	Power source (IG)	Ignition switch : ON	11 to 14 V
MB9 - Body ground	-	Power source (ACC)	Ignition switch : ACC	11 to 14 V

MB11 - Body ground	-	Ground for main power supply	Always	Below 1 Ω
--------------------	---	------------------------------	--------	-----------

If the result is not as specified, there may be a malfunction in the wire harness.

(c) Install the main body ECU (network gateway ECU) to the instrument panel junction block assembly.

(d) Measure the voltage and resistance according to the value(s) in the table below.

HINT:

Measure the values on the wire harness side with the connector disconnected.

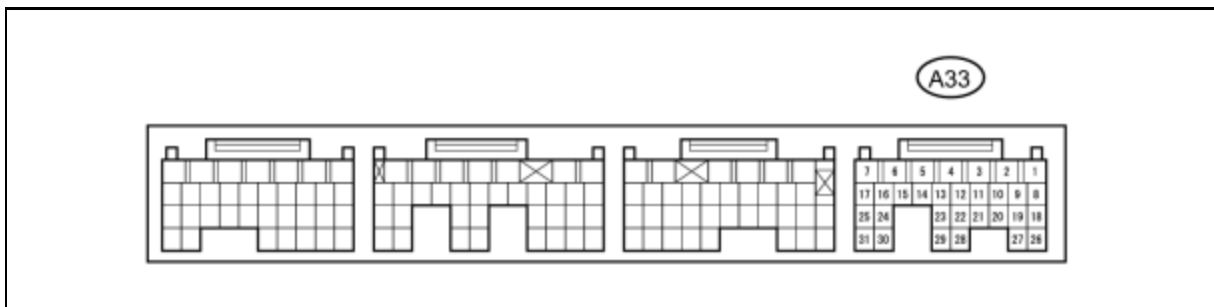
MAIN BODY ECU (NETWORK GATEWAY ECU) D5

TERMINAL NO. (SYMBOL)	WIRING COLOR	DESCRIPTION	CONDITION	SPECIFIED CONDITION
D5- 13(CANL) - D5- 14(CANH)	LG - P	CAN communication system	CAN communication circuit	Pulse generation

MAIN BODY ECU (NETWORK GATEWAY ECU) D6

TERMINAL NO. (SYMBOL)	WIRING COLOR	DESCRIPTION	CONDITION	SPECIFIED CONDITION
D6-17 - Body ground	Y - Body ground	A/C switch signal	<ul style="list-style-type: none"> Ignition switch : ON A/C switch : ON 	Below 1 Ω

2. ECM



HINT:

Check from the rear of the connector while it is connected to the Air conditioning control assembly.

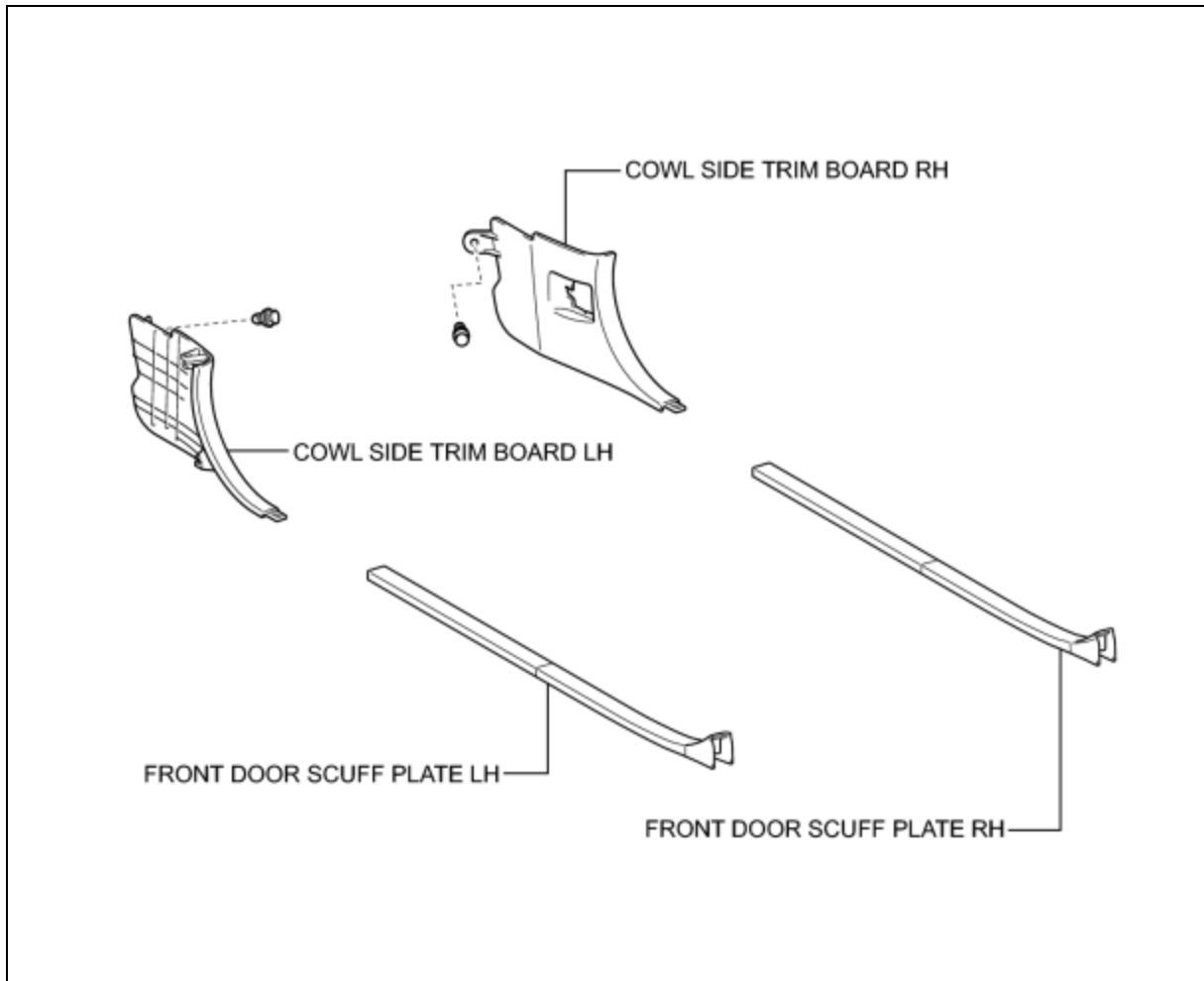
TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
			Engine running A/C system operating Refrigerant pressure: Abnormal <ul style="list-style-type: none"> pressure (more than 2980kPa) 	Below 1 V

A33-8(ACP) - Body ground	G - Body ground	Air conditioning pressure switch signal	(30.4kgf/cm ² ,438psi))	
			Engine running A/C system operating Refrigerant pressure: Abnormal <ul style="list-style-type: none"> • pressure (less than 248kPa (2.58kgf/cm²,36.5psi)) 	Below 1 V
			Engine running A/C system operating Refrigerant pressure: Normal <ul style="list-style-type: none"> • pressure (less than 2980kPa (30.4kgf/cm²,438psi) and more than 248kPa (2.53kgf/cm²,36.5psi)) 	10 to 16 V
A33- 18(CANL) - A33- 19(CANH)	B-P - O	CAN communication system	CAN communication circuit	Pulse generation

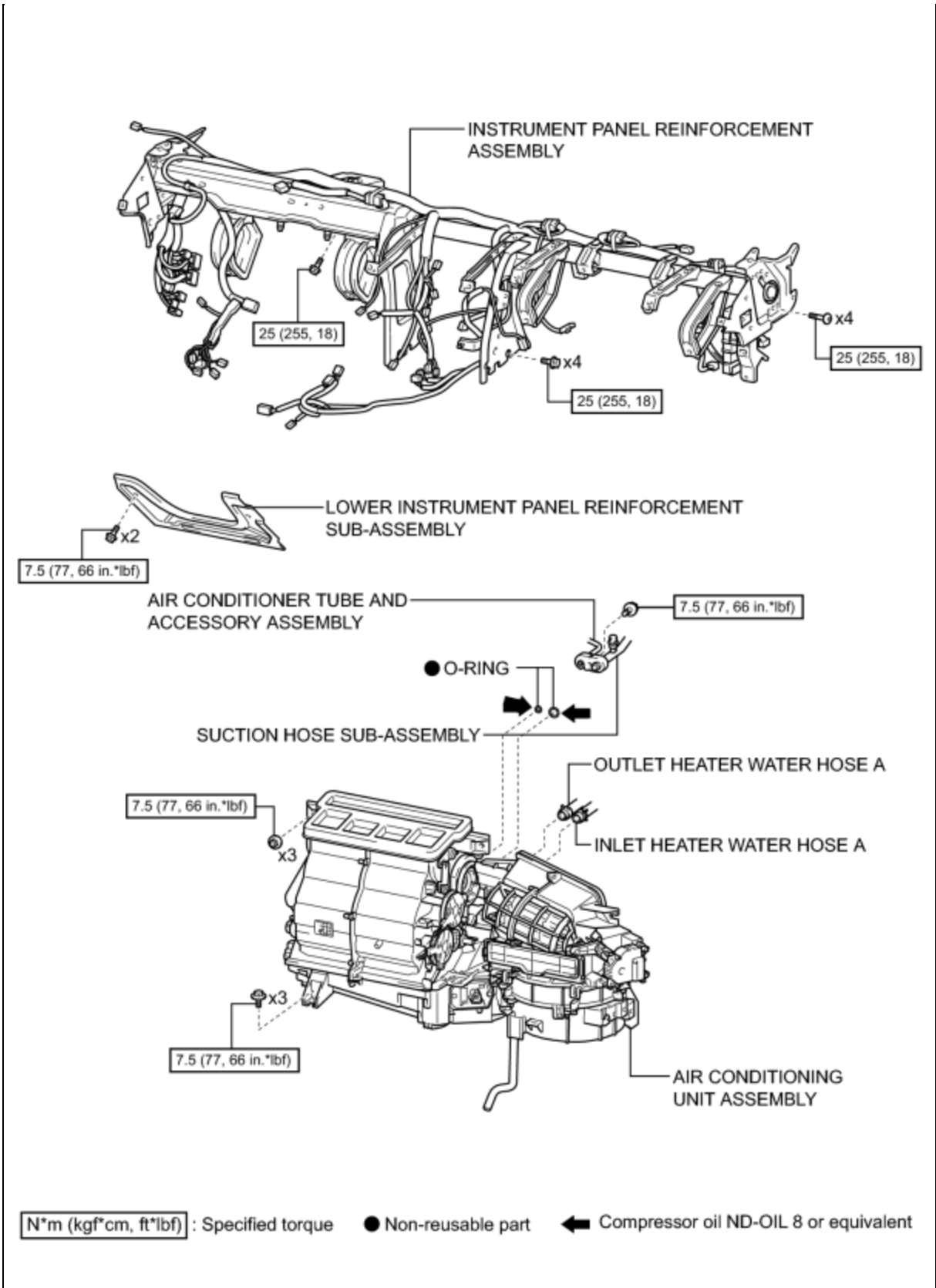
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003FXE004X
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING UNIT: COMPONENTS (2013 FR-S)		

COMPONENTS

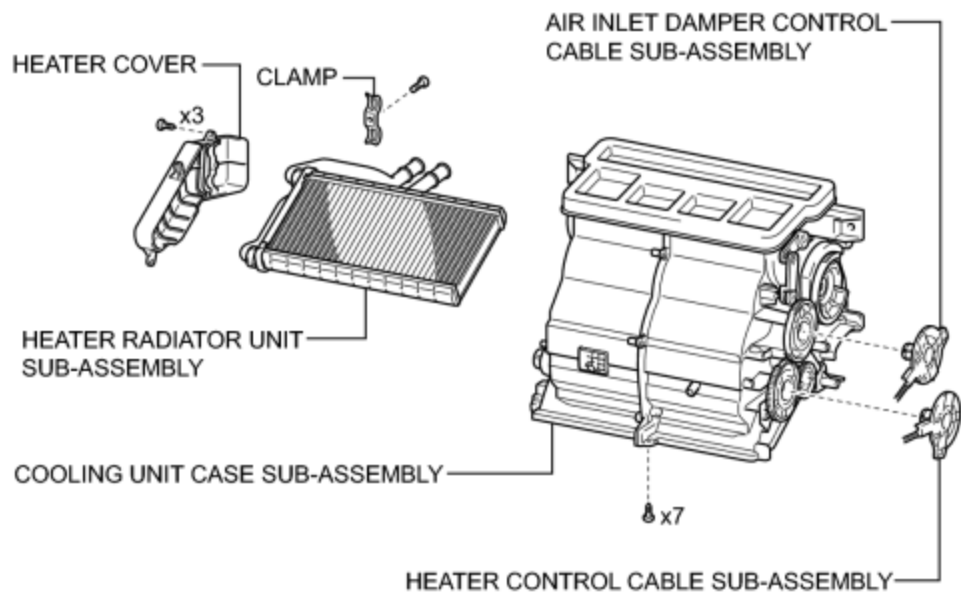
ILLUSTRATION



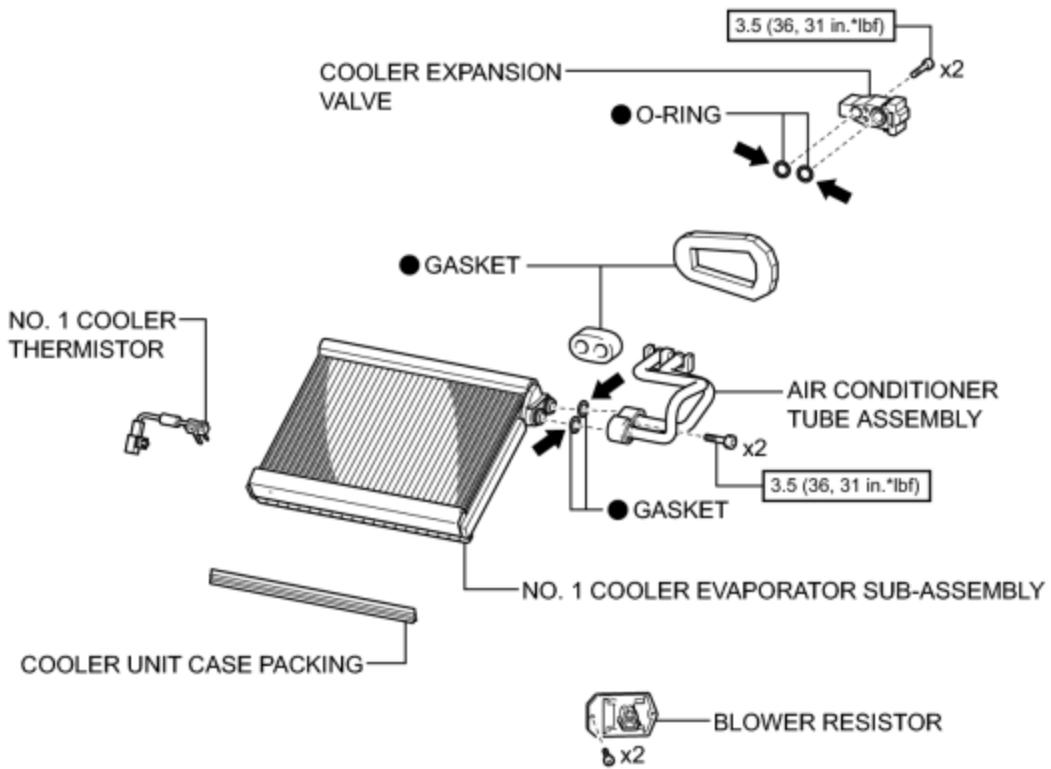
ILLUSTRATION



ILLUSTRATION



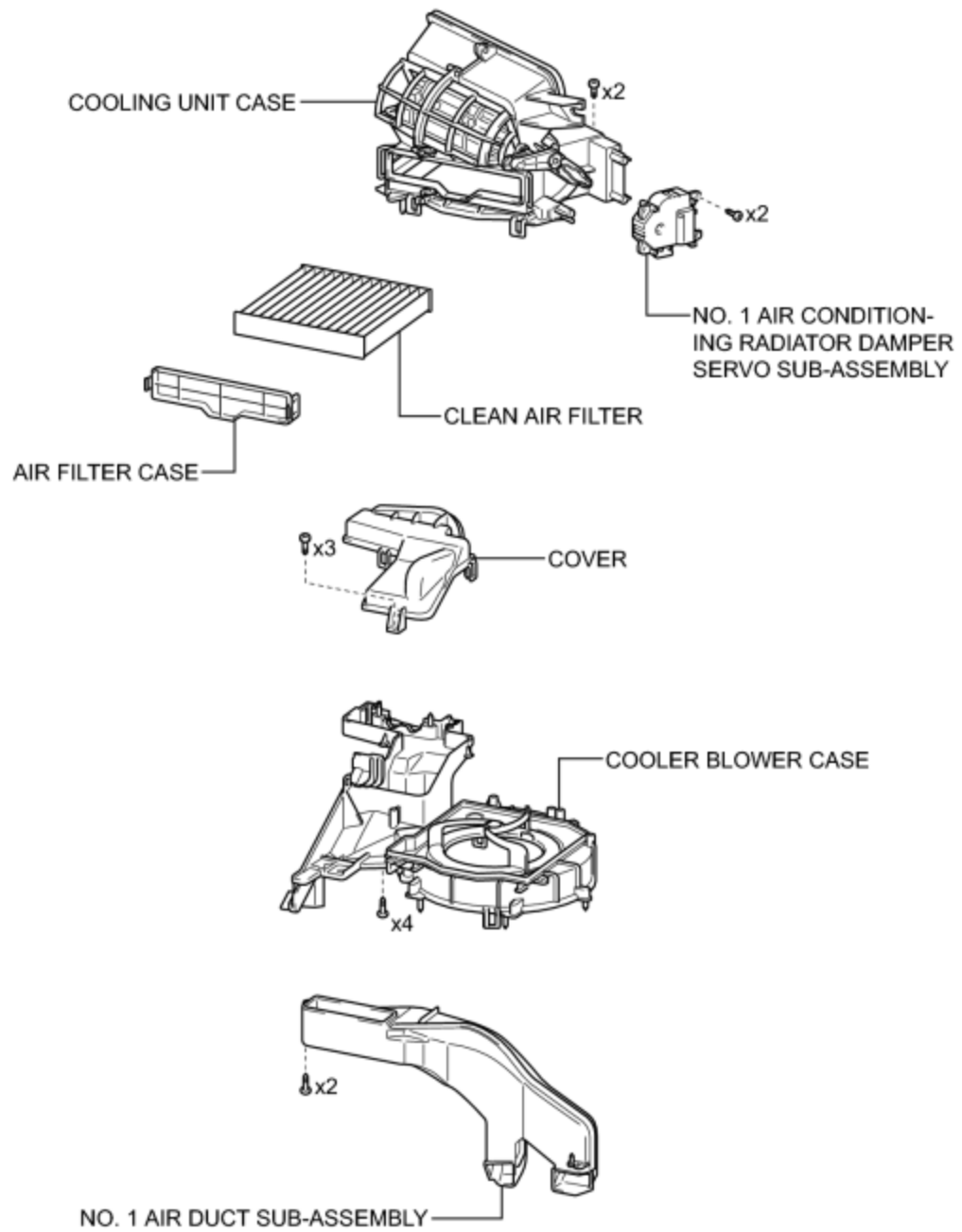
ILLUSTRATION



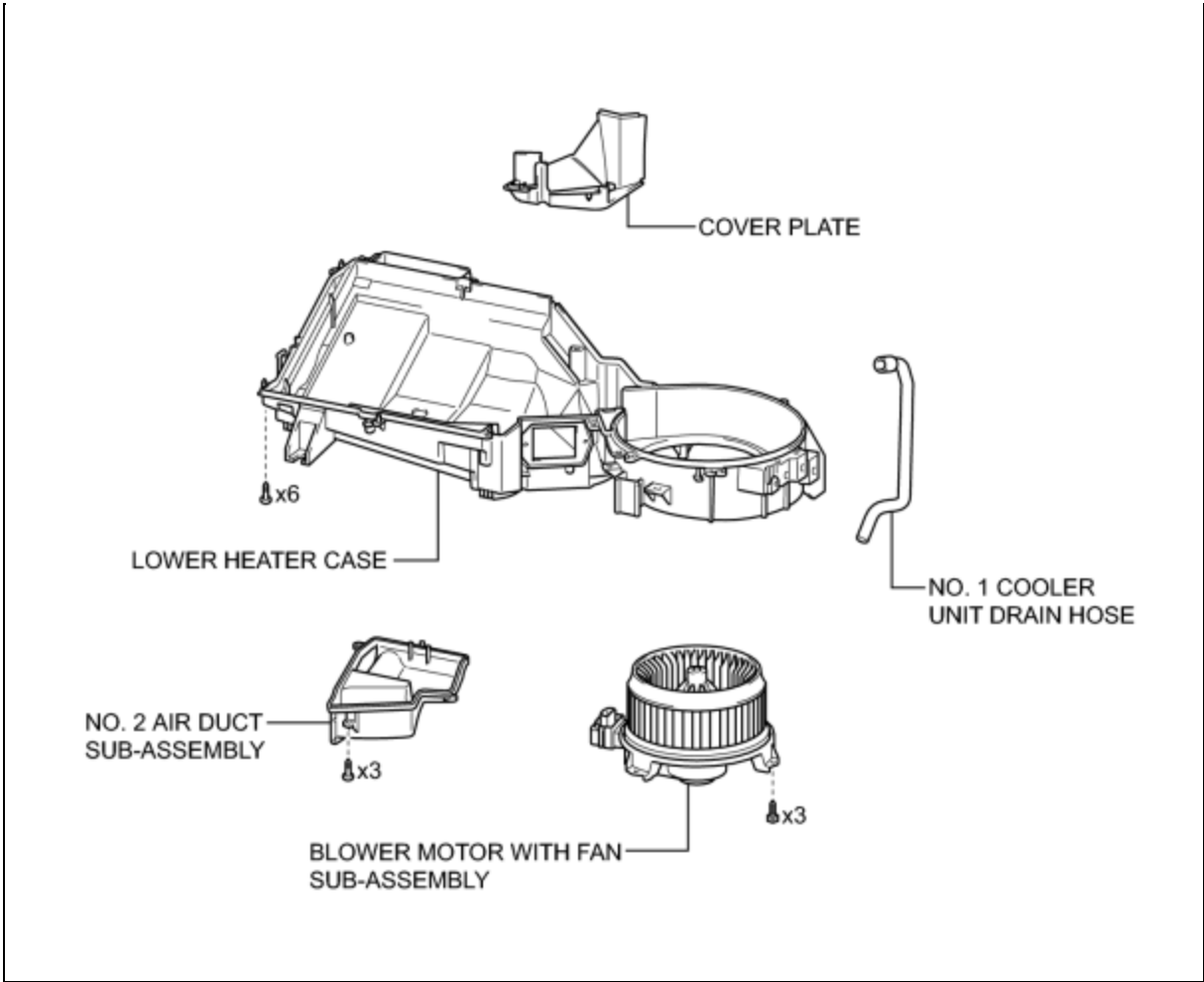
$\boxed{\text{N}^*\text{m (kgf}^*\text{cm, ft}^*\text{lbf)}}$: Specified torque ● Non-reusable part

← Compressor oil ND-OIL 8 or equivalent

ILLUSTRATION



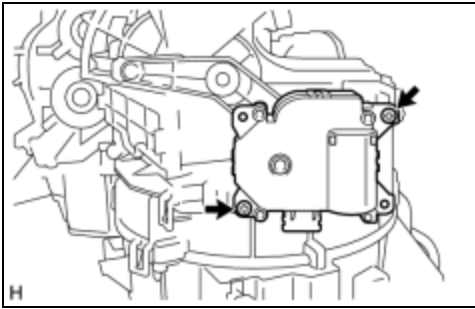
ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HLX057X
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING UNIT: DISASSEMBLY (2013 FR-S)		

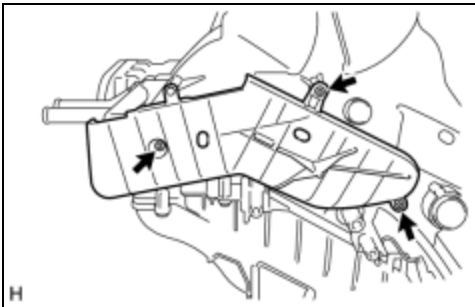
DISASSEMBLY

1. REMOVE NO. 1 AIR CONDITIONING RADIATOR DAMPER SERVO SUB-ASSEMBLY



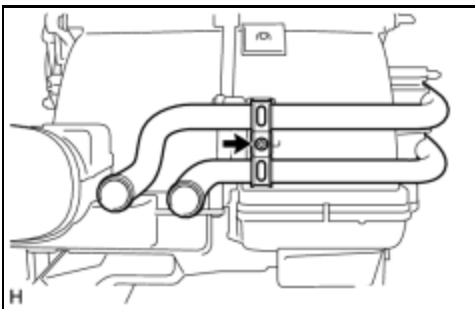
(a) Remove the 2 screws and No. 1 air conditioning radiator damper servo sub-assembly.

2. REMOVE HEATER COVER

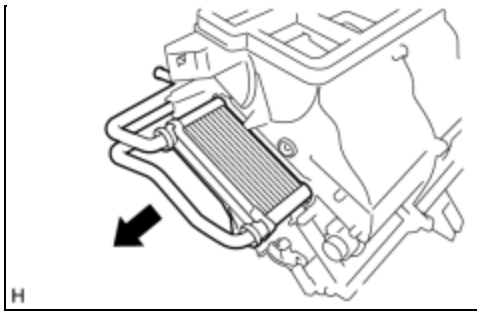


(a) Remove the 3 screws and heater cover.

3. REMOVE HEATER RADIATOR UNIT SUB-ASSEMBLY

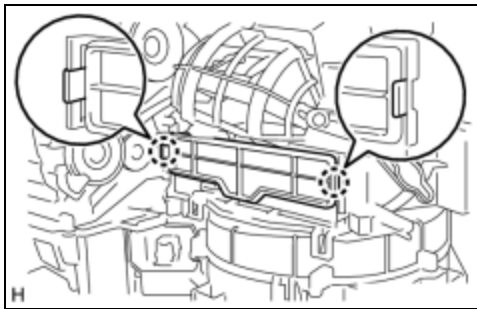


(a) Remove the screw and the clamp.



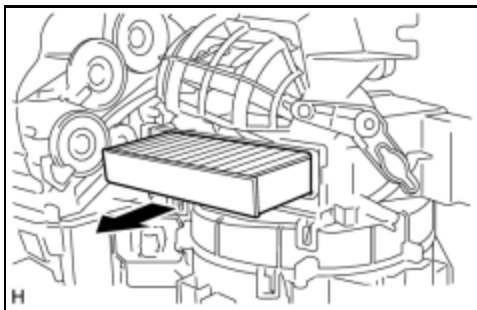
(b) Remove the heater radiator unit sub-assembly as shown in the illustration.

4. REMOVE AIR FILTER CASE



(a) Disengage the 2 claws and remove the air filter case.

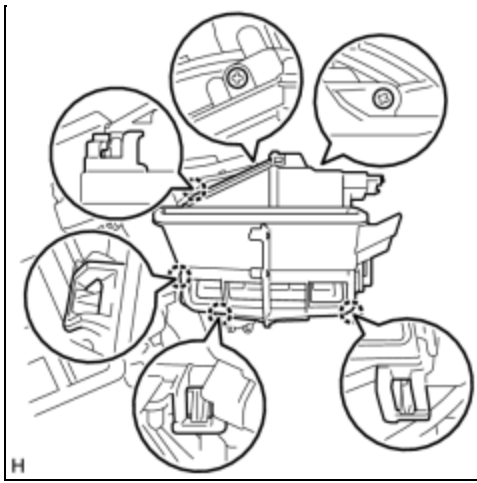
5. REMOVE CLEAN AIR FILTER



(a) Remove the clean air filter as shown in the illustration.

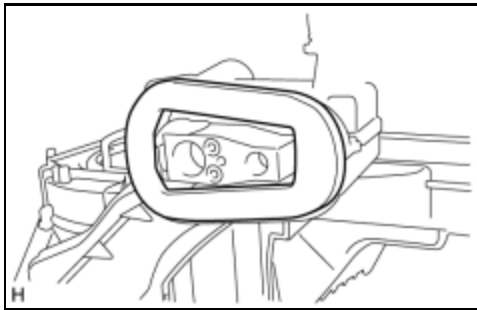
6. REMOVE COOLING UNIT CASE

(a) Remove the 2 screws.

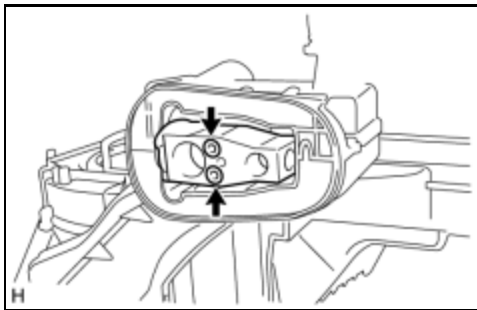


(b) Disengage the 4 claws and remove the cooling unit case.

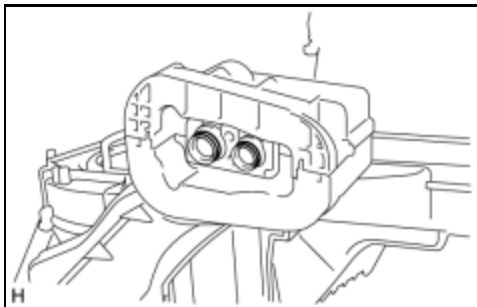
7. REMOVE COOLER EXPANSION VALVE



(a) Remove the gasket.

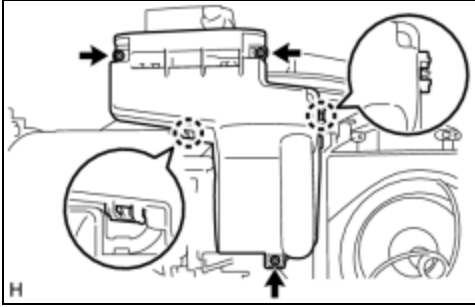


(b) Using a 4 mm hexagon socket wrench, remove the 2 hexagon bolts and cooler expansion valve.



(c) Remove the 2 O-rings from the evaporator pipe.

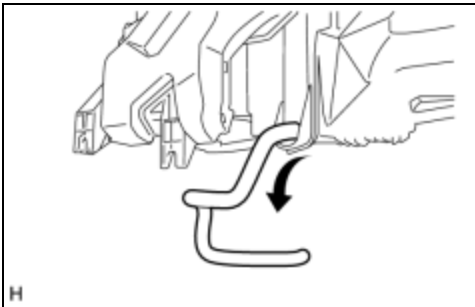
8. REMOVE COVER



(a) Remove the 3 screws.

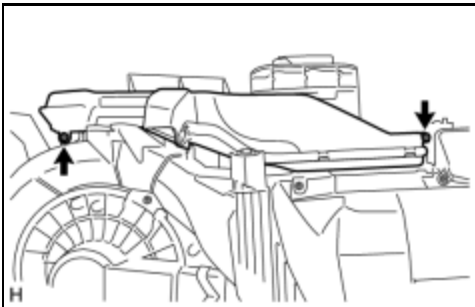
(b) Disengage the 2 claws and remove the cover.

9. REMOVE NO. 1 COOLER UNIT DRAIN HOSE



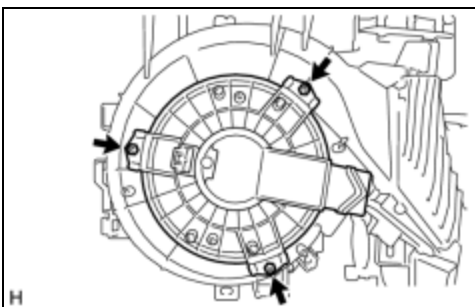
(a) Remove the No. 1 cooler unit drain hose.

10. REMOVE NO. 1 AIR DUCT SUB-ASSEMBLY



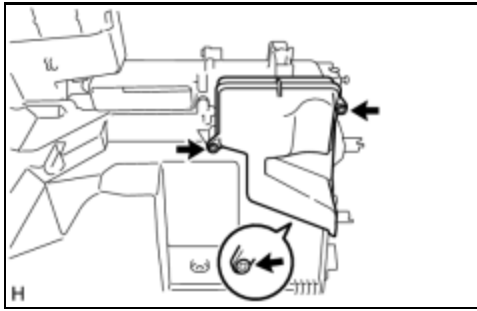
(a) Remove the 2 screws and remove the No. 1 air duct sub-assembly.

11. REMOVE BLOWER MOTOR WITH FAN SUB-ASSEMBLY



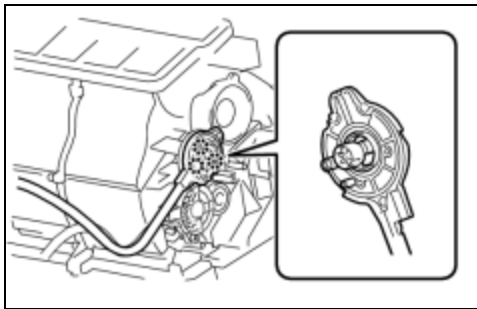
(a) Remove the 3 screws and remove the blower motor with fan sub-assembly.

12. REMOVE NO. 2 AIR DUCT SUB-ASSEMBLY



- (a) Remove the 3 screws and remove the No. 2 air duct sub-assembly.

13. REMOVE AIR INLET DAMPER CONTROL CABLE SUB-ASSEMBLY

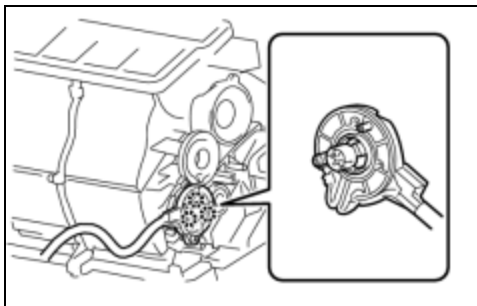


- (a) Disengage the 3 claws and remove the air inlet damper control cable sub-assembly.

NOTICE:

Hold the control cable and remove the drive gear on the unit side slowly, without pulling it.

14. REMOVE HEATER CONTROL CABLE SUB-ASSEMBLY



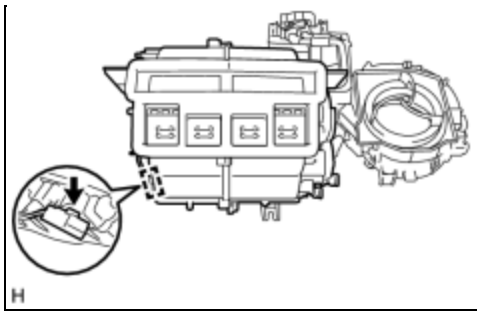
- (a) Disengage the 3 claws and remove the heater control cable sub-assembly.

NOTICE:

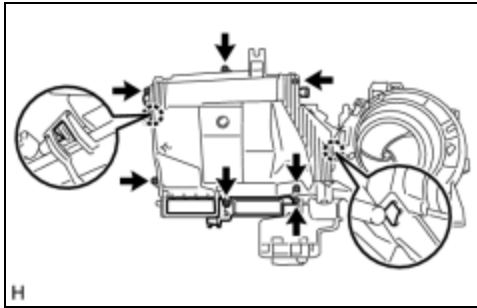
Hold the control cable and remove the drive gear on the unit side slowly, without pulling it.

15. REMOVE COOLING UNIT CASE SUB-ASSEMBLY

- (a) Disengage the clamp.



H

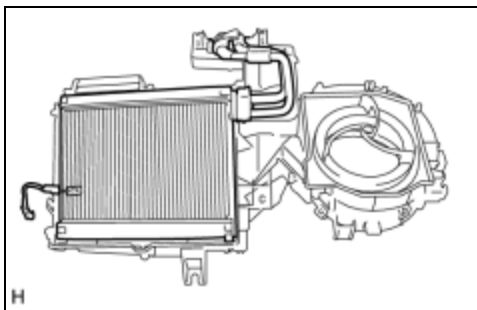


H

(b) Remove the 7 screws.

(c) Disengage the 2 claws and remove the cooling unit case sub-assembly.

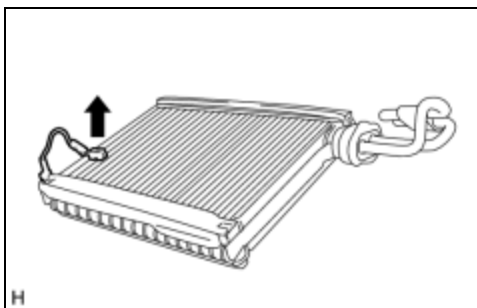
16. REMOVE NO. 1 COOLER EVAPORATOR SUB-ASSEMBLY



H

(a) Remove the No. 1 cooler evaporator sub-assembly with evaporator pipe as a unit.

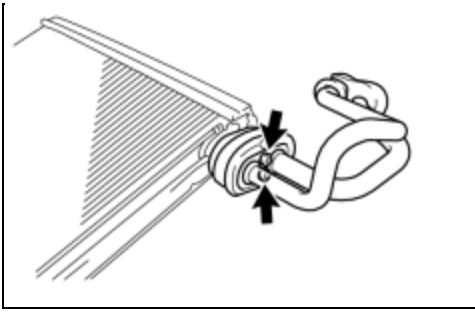
17. REMOVE NO. 1 COOLER THERMISTOR



H

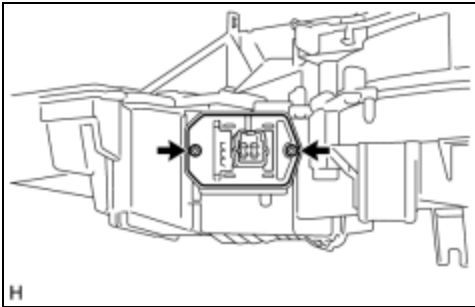
(a) Remove the No. 1 cooler thermistor.

18. REMOVE AIR CONDITIONER TUBE ASSEMBLY



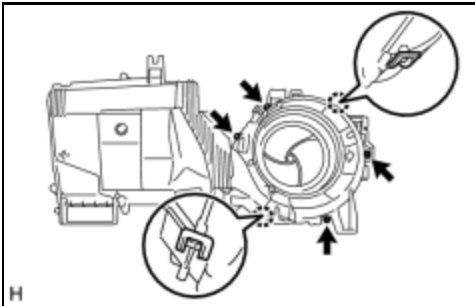
(a) Using a 4 mm hexagon socket wrench, remove the 2 hexagon bolts and air conditioner tube assembly.

19. REMOVE BLOWER RESISTOR



(a) Remove the 2 screws and remove the blower resistor.

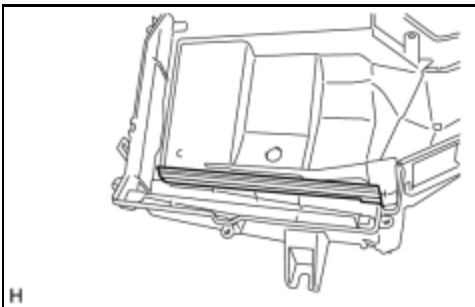
20. REMOVE COOLER BLOWER CASE



(a) Remove the 4 screws and disengage the 2 claws.

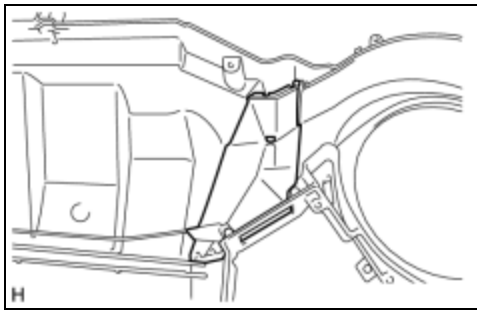
(b) Remove the cooler blower case from the lower heater case.

21. REMOVE COOLER UNIT CASE PACKING



(a) Remove the cooler unit case packing.

22. REMOVE COVER PLATE



(a) Remove the cover plate.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HLU0WYX
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING UNIT: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL AIR CONDITIONING UNIT ASSEMBLY

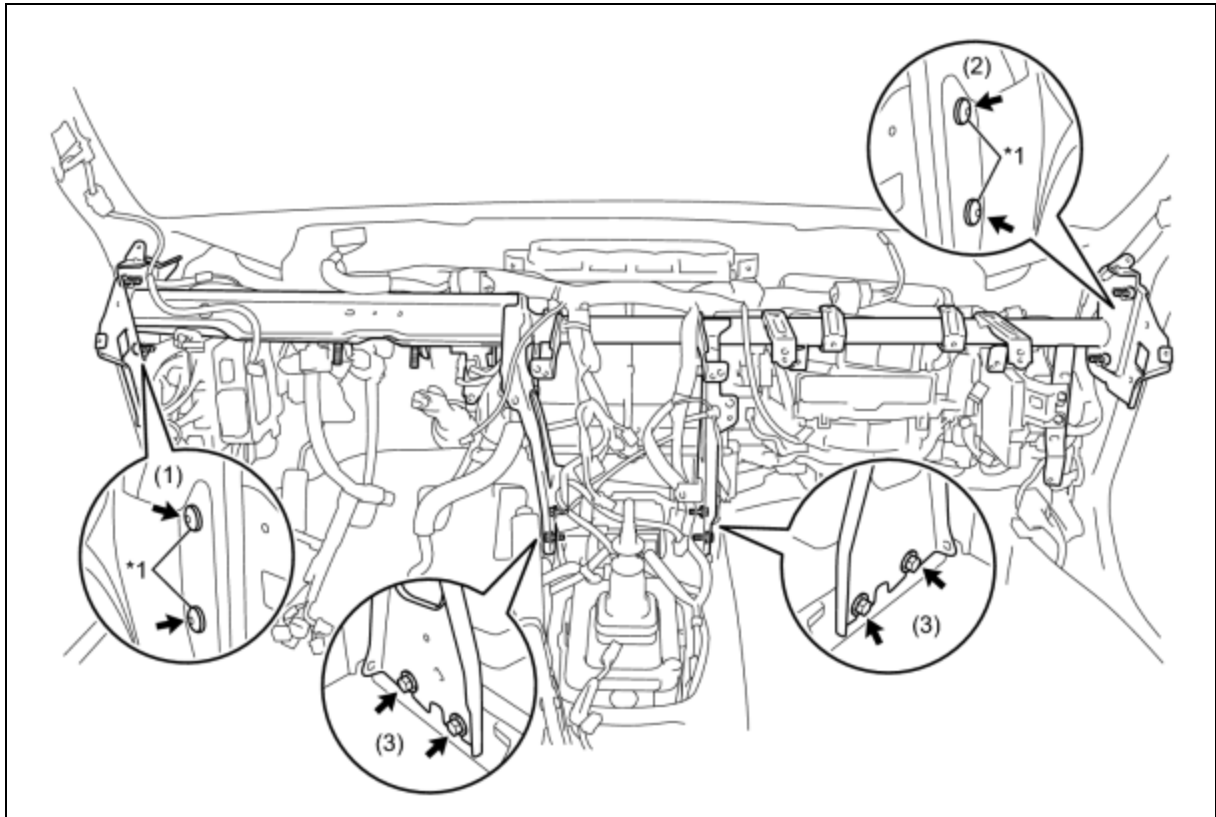
- (a) Install the 3 bolts and 3 nuts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

- (b) Engage the drain cooler hose.

- (c) Connect each connector and engage each clamp and install the air conditioning unit assembly.

2. INSTALL INSTRUMENT PANEL REINFORCEMENT ASSEMBLY



Text in Illustration

*1	"TORX" Bolt	-	-
----	-------------	---	---

- (a) Using a 4 mm "TORX" wrench, install the 4 "TORX" Bolts in the order shown in the illustration.

Torque: 25 N·m (255 kgf·cm, 18ft·lbf)

- (b) Install the instrument panel reinforcement assembly with the 5 bolts in the order shown in the illustration.

Torque: 25 N·m (255 kgf·cm, 18ft·lbf)

- (c) Connect each connector and engage each clamp.

(d) Connect the 2 earth wires with the 2 bolts.

3. INSTALL COWL SIDE TRIM BOARD LH INFO

4. INSTALL COWL SIDE TRIM BOARD RH INFO

5. INSTALL FRONT DOOR SCUFF PLATE LH INFO

6. INSTALL FRONT DOOR SCUFF PLATE RH INFO

7. INSTALL STEERING COLUMN ASSEMBLY

INFO

8. INSTALL LOWER INSTRUMENT PANEL REINFORCEMENT SUB-ASSEMBLY

(a) Install the lower instrument panel reinforcement sub-assembly with the 2 bolts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

9. INSTALL INSTRUMENT PANEL SUB-ASSEMBLY

INFO

10. CONNECT AIR CONDITIONER TUBE AND ACCESSORY ASSEMBLY

(a) Remove the vinyl tape from the pipe.

(b) Sufficiently apply compressor oil to a new O-ring and fitting surface of the air conditioner tube and accessory assembly.

Compressor oil:

for HFC-134a (R134a)

ND-OIL 8 or equivalent

(c) Install the O-ring to the air conditioner tube and accessory assembly.

(d) Install the air conditioner tube and accessory assembly.

11. CONNECT SUCTION HOSE SUB-ASSEMBLY

(a) Remove the vinyl tape from the pipe.

(b) Sufficiently apply compressor oil to a new O-ring and the fitting surface of the suction hose sub-assembly.

Compressor oil:

for HFC-134a (R134a)

ND-OIL 8 or equivalent

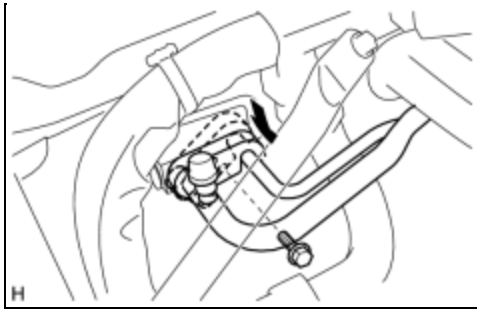
(c) Connect the O-ring to the suction hose sub-assembly.

(d) Connect the suction hose sub-assembly.

(e) Rotate the hook connector in the direction indicated by the arrow in the illustration.

(f) Insert the pipe joint into the cooler expansion valve securely and tighten the bolt.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)



12. CONNECT OUTLET HEATER WATER HOSE A

- (a) Install the outlet heater water hose A and attach the clip.

HINT:

Install the outlet heater water hose A while aligning it with the matching marks made when it was removed.

13. CONNECT INLET HEATER WATER HOSE A

- (a) Install the inlet heater water hose A and attach the clip.

HINT:

Install the inlet heater water hose A while aligning it with the matching marks made when it was removed.

14. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

15. ADD ENGINE COOLANT INFO

16. CHARGE AIR CONDITIONING SYSTEM WITH REFRIGERANT

INFO

17. INSPECT FOR COOLANT LEAK INFO

18. WARM UP ENGINE

INFO

19. INSPECT FOR REFRIGERANT LEAK

INFO

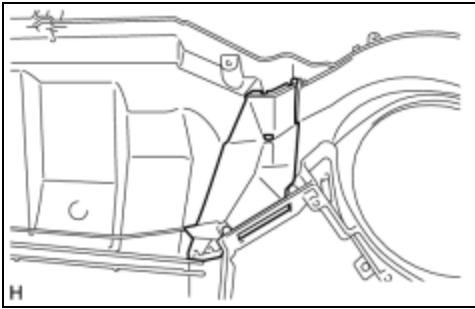
20. INSPECT SRS WARNING LIGHT

INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HLY057X
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING UNIT: REASSEMBLY (2013 FR-S)		

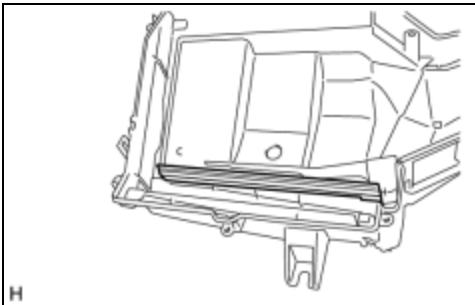
REASSEMBLY

1. INSTALL COVER PLATE



(a) Install the cover plate.

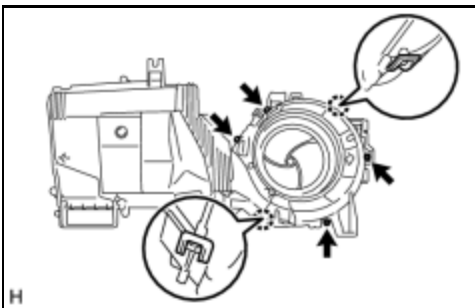
2. INSTALL COOLER UNIT CASE PACKING



(a) Install the cooler unit case packing.

3. INSTALL COOLER BLOWER CASE

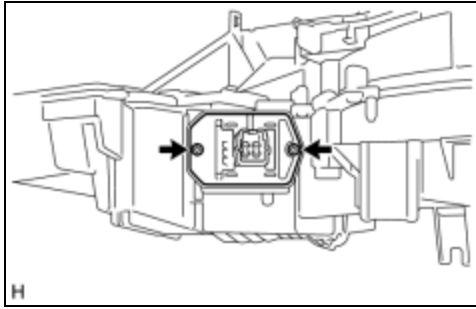
(a) Install the cooler blower case from the lower heater case.



(b) Engage the 2 claws.

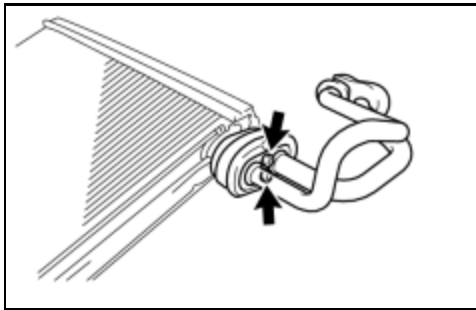
(c) Install the blower case assembly with the 4 screws.

4. INSTALL BLOWER RESISTOR



(a) Install the blower resistor with the 2 screws.

5. INSTALL AIR CONDITIONER TUBE ASSEMBLY

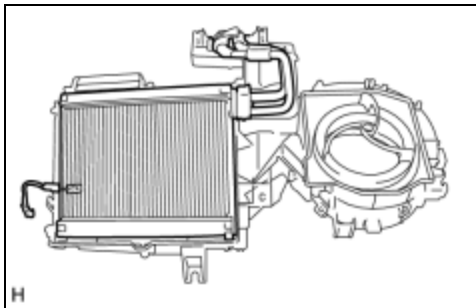


(a) Using a 4 mm hexagon wrench, install the air conditioner tube assembly with the 2 hexagon bolts.

Torque: 3.5 N·m (36 kgf·cm, 31in·lbf)

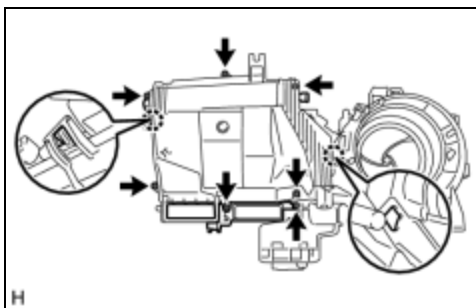
6. INSTALL NO. 1 COOLER THERMISTOR INFO

7. INSTALL NO. 1 COOLER EVAPORATOR SUB-ASSEMBLY



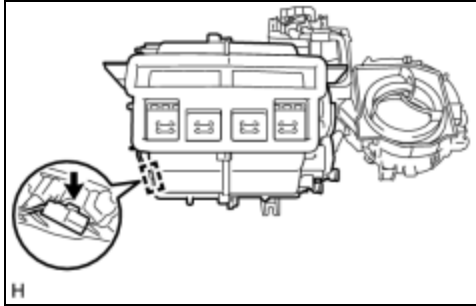
(a) Install the No. 1 cooler evaporator sub-assembly with evaporator pipe as a unit.

8. INSTALL COOLING UNIT CASE SUB-ASSEMBLY



(a) Engage the 2 claws.

(b) Install the cooling unit case sub-assembly with the 7 screws.

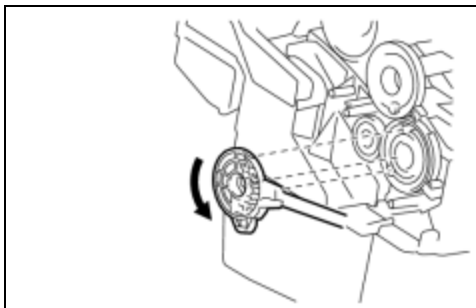


(c) Engage the clamp.

9. INSTALL HEATER CONTROL CABLE SUB-ASSEMBLY

NOTICE:

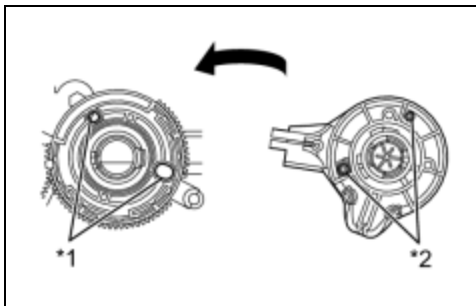
- When working, take care not to get dirt or dust in the gear grease.
- Do not hold gear sections while wearing cotton work gloves.



(a) Turn the pin on the cable side as far as possible in the direction of the arrow, and position it so that it matches the hole in the gear.

HINT:

Set the temperature adjustment dial to MAX HOT.



(b) Hold the protrusion on the drive gear, and rotate the gear until the protrusion is aligned with the cylindrical section of the case.

Text in Illustration

*1	Drive gear hole
*2	Control cable positioning pin

HINT:

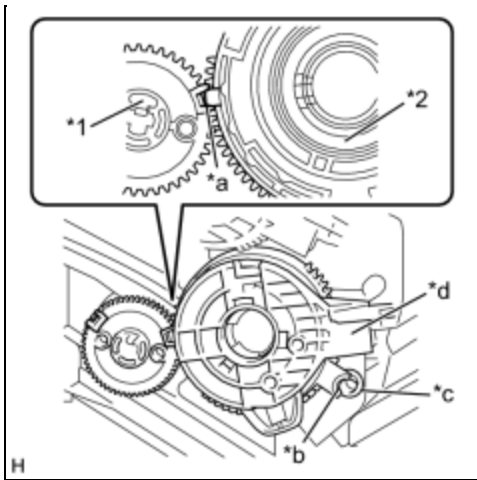
Temperature adjustment dial: MAX HOT

(c) Push the control cable positioning pin in slowly until it matches the drive gear hole, and install the heater control cable sub-assembly.

(d) Replacing the drive gear.

(1) When replacing the drive gear, pull the resin portion of the control cable forward slowly and remove it.

Text in Illustration



*1	Shaft Gear
*2	Drive Gear
*a	Reference Position
*b	Drive gear protrusion
*c	Cylindrical section of the case
*d	Resin portion of the control cable

NOTICE:

Do not pull the drive gear.

- (2) Pull the drive gear forward slowly and remove it.
- (3) Rotate the shaft gear clockwise slowly until it stops.

NOTICE:

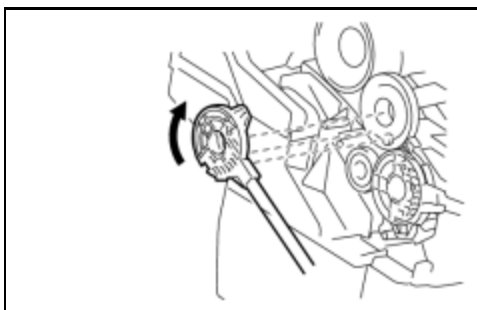
Be sure not to turn too forcefully.

- (4) Match the shaft gear and the drive gear with their specified positions, and insert the drive gear slowly into the heater case.

10. INSTALL AIR INLET DAMPER CONTROL CABLE SUB-ASSEMBLY

NOTICE:

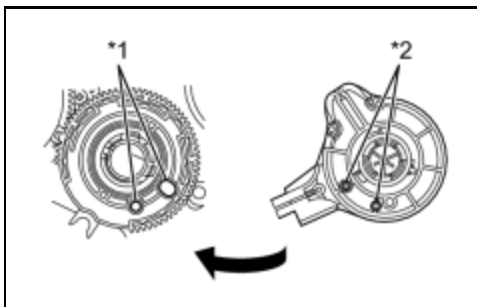
- When working, take care not to get dirt or dust in the gear grease.
- Do not hold gear sections while wearing cotton work gloves.



- (a) Turn the pin on the cable side as far as possible in the direction of the arrow, and position it so that it matches the hole in the gear.

HINT:

Set the blower dial to FACE.



- (b) Hold the protrusion on the drive gear, and rotate the gear clockwise until it stops.

Text in Illustration

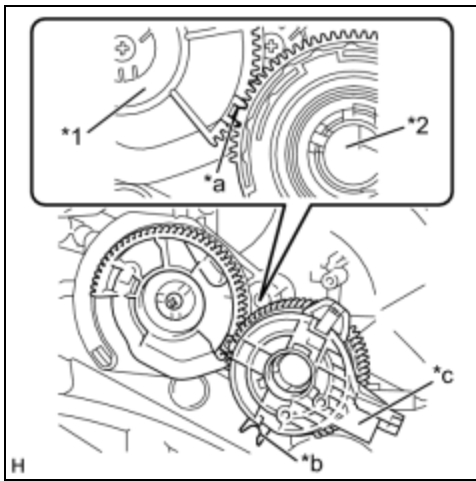
*1	Drive gear hole
*2	Control cable positioning pin

HINT:

Temperature control position: VENT

(c) Push the control cable positioning pin in slowly until it matches the drive gear hole, and install the air inlet damper control cable sub-assembly.

(d) Replacing the drive gear.



(1) When replacing the drive gear, pull the resin portion of the control cable forward slowly and remove it.

Text in Illustration

*1	Mode Main Link
*2	Drive Gear
*a	Reference Position
*b	Drive gear protrusion
*c	Resin portion of the control cable

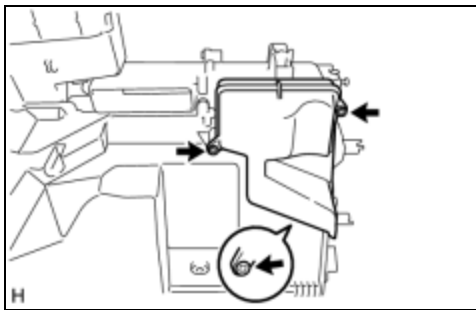
NOTICE:

Do not pull the drive gear.

(2) Pull the drive gear forward slowly and remove it.

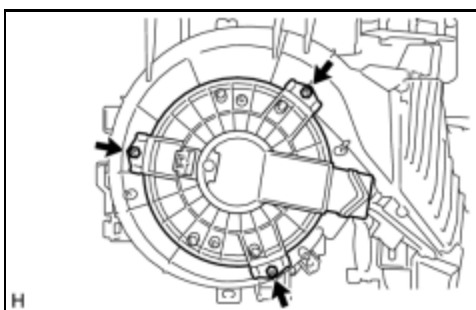
(3) Match the mode main link and the drive gear with their specified positions, and insert the drive gear slowly into the heater case.

11. INSTALL NO. 2 AIR DUCT SUB-ASSEMBLY



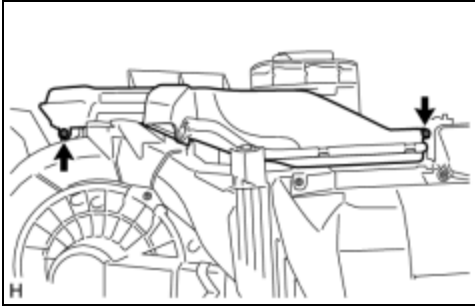
(a) Install the No. 2 air duct sub-assembly with the 3 screws.

12. INSTALL BLOWER MOTOR WITH FAN SUB-ASSEMBLY



(a) Install the blower motor with fan sub-assembly with the 3 screws.

13. INSTALL NO. 1 AIR DUCT SUB-ASSEMBLY

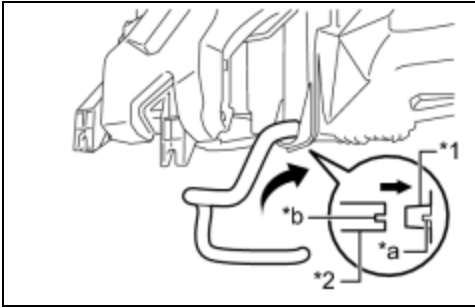


- (a) Install the No. 1 air duct sub-assembly with the 2 screws.

14. INSTALL NO. 1 COOLER UNIT DRAIN HOSE

- (a) Install the No. 1 cooler unit drain hose as shown in the illustration.

Text in Illustration

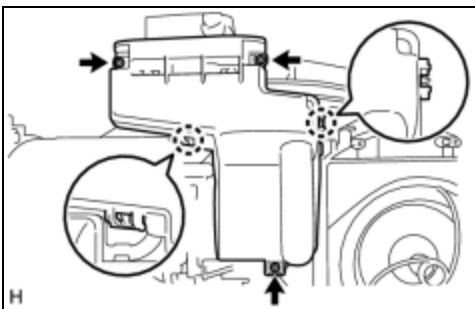


*1	Case
*2	Hose
*a	Rib
*b	Notched section

HINT:

Align the notched section of the hose with the rib on the case.

15. INSTALL COVER

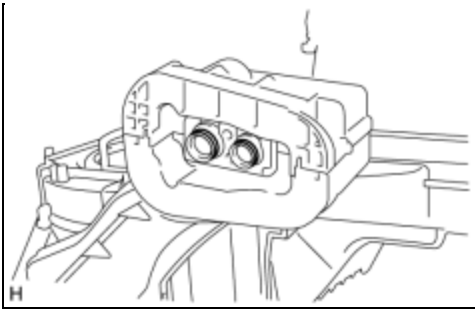


- (a) Engage the 2 claws.

- (b) Install the cover with the 3 screws.

16. INSTALL COOLER EXPANSION VALVE

- (a) Sufficiently apply compressor oil to 2 new O-rings and

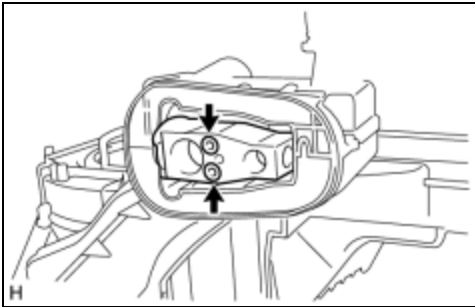


the fitting surfaces. Install the 2 O-rings to the No. 1 cooler evaporator sub-assembly.

Compressor oil:

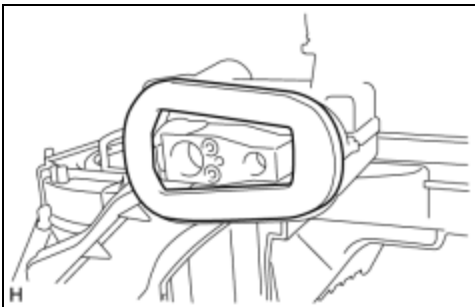
for HFC-134a (R134a)

ND-OIL 8 or equivalent



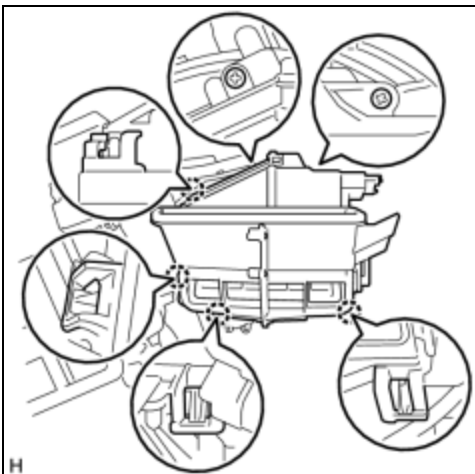
(b) Using a 4 mm hexagon wrench, install the cooler expansion valve with packing with the 2 hexagon bolts.

Torque: 3.5 N·m (36 kgf·cm, 31 in·lbf)



(c) Install the new gasket.

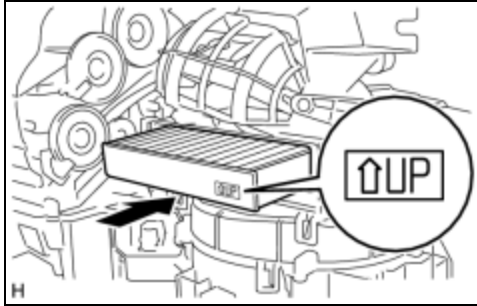
17. INSTALL COOLING UNIT CASE



(a) Engage the 4 claws.

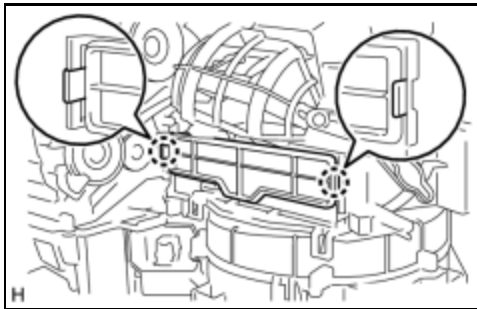
(b) Install the cooling unit case with the 2 screws.

18. INSTALL CLEAN AIR FILTER



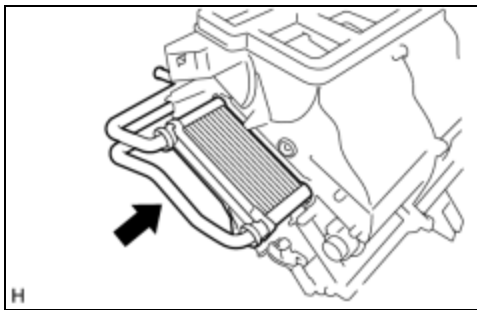
(a) Install the clean air filter as shown in the illustration.

19. INSTALL AIR FILTER CASE

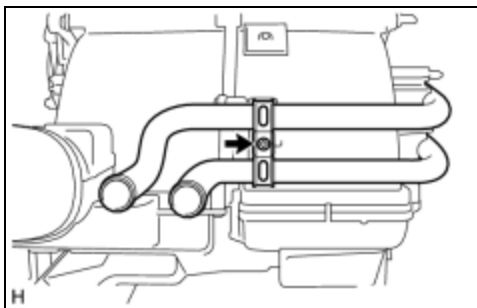


(a) Engage the 2 claws to install the air filter case.

20. INSTALL HEATER RADIATOR UNIT SUB-ASSEMBLY

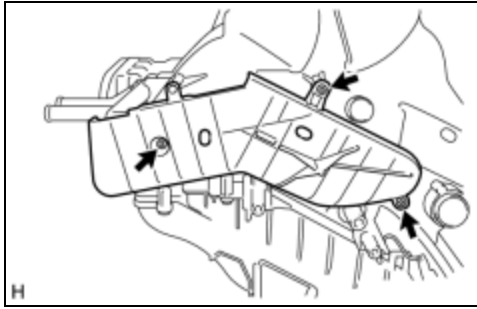


(a) Install the heater radiator unit sub-assembly as shown in the illustration.



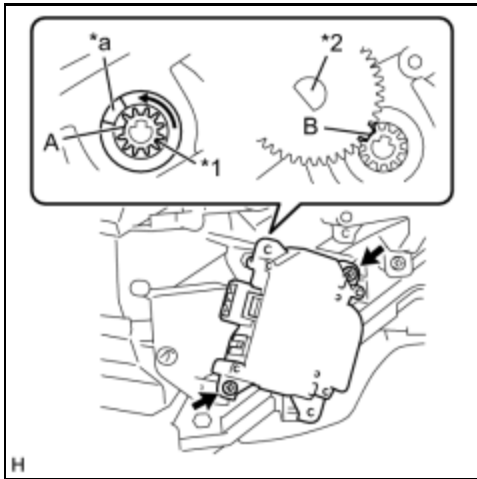
(b) Install the clamp with the screw.

21. INSTALL HEATER COVER



(a) Install the heater cover with the 3 screws.

22. INSTALL NO. 1 AIR CONDITIONING RADIATOR DAMPER SERVO SUB-ASSEMBLY



(a) Turn the air mix shaft slowly in the direction of the arrow until it stops.

Text in Illustration

*1	Air Mix Shaft
*2	Drive Gear
*a	Reference Position

NOTICE:

Be sure not to turn the air mix shaft too strongly.

(b) Turn the mix shaft so that section A of the air mix shaft matches the reference position of the case.

(c) Match the air mix damper server gear B section and the shaft gear A section.

(d) Install the No. 1 air conditioning radiator damper servo sub-assembly with the 2 screws.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HLWOW7X
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING UNIT: REMOVAL (2013 FR-S)		


REMOVAL

1. PRECAUTION

CAUTION:

Be sure to read Precaution thoroughly before servicing  .

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work  .

2. RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM



3. DRAIN ENGINE COOLANT

4. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

- The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

5. DISCONNECT INLET HEATER WATER HOSE A



- (a) Using pliers, grip the claws of the clip and slide the clip to disconnect the inlet heater water hose A.

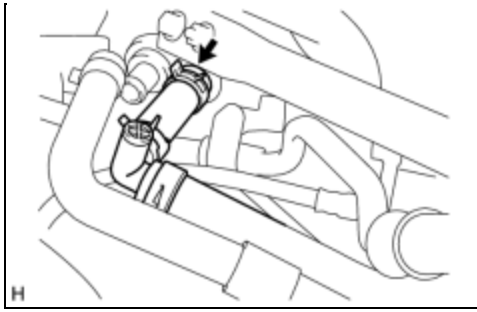
NOTICE:

- Do not apply excessive force to the inlet heater water hose A.
- Prepare a drain pan or cloth in case the coolant leaks.
- Since the inlet heater water hose A must be installed in a predefined position, apply matching marks before removing it.

6. DISCONNECT OUTLET HEATER WATER HOSE A

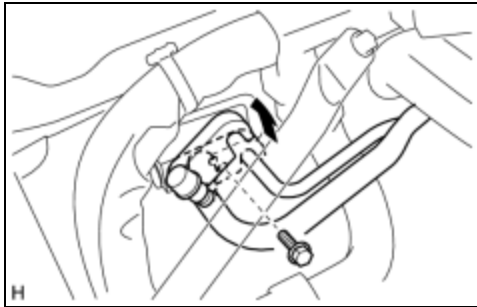
- (a) Using pliers, grip the claws of the clip and slide the clip to disconnect the outlet heater water hose A.

NOTICE:



- Do not apply excessive force to the outlet heater water hose A.
- Prepare a drain pan or cloth in case the coolant leaks.
- Since the outlet heater water hose A must be installed in a predefined position, apply matching marks before removing it.

7. DISCONNECT SUCTION HOSE SUB-ASSEMBLY



- (a) Remove the bolt and slide the hook connector.

(b) Disconnect the suction hose sub-assembly.

(c) Remove the O-ring from the suction hose sub-assembly.

NOTICE:

Seal the openings of the disconnected parts using vinyl tape to prevent entry of moisture and foreign matter.

8. DISCONNECT AIR CONDITIONER TUBE AND ACCESSORY ASSEMBLY

(a) Disconnect the air conditioner tube and accessory assembly.

(b) Remove the O-ring from the air conditioner tube and accessory assembly.

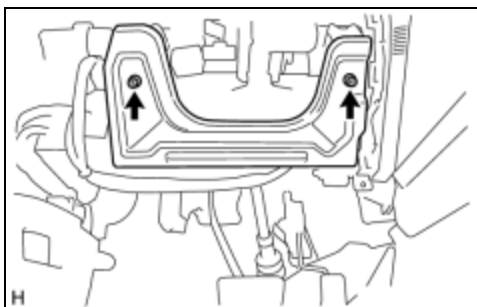
NOTICE:

Seal the openings of the disconnected parts using vinyl tape to prevent entry of moisture and foreign matter.

9. REMOVE INSTRUMENT PANEL SUB-ASSEMBLY

INFO

10. REMOVE LOWER INSTRUMENT PANEL REINFORCEMENT SUB-ASSEMBLY



- (a) Remove the 2 bolts and lower instrument panel reinforcement sub-assembly.

11. REMOVE STEERING COLUMN ASSEMBLY

INFO

12. REMOVE FRONT DOOR SCUFF PLATE LH

INFO

13. REMOVE FRONT DOOR SCUFF PLATE RH

INFO

14. REMOVE COWL SIDE TRIM BOARD LH

INFO

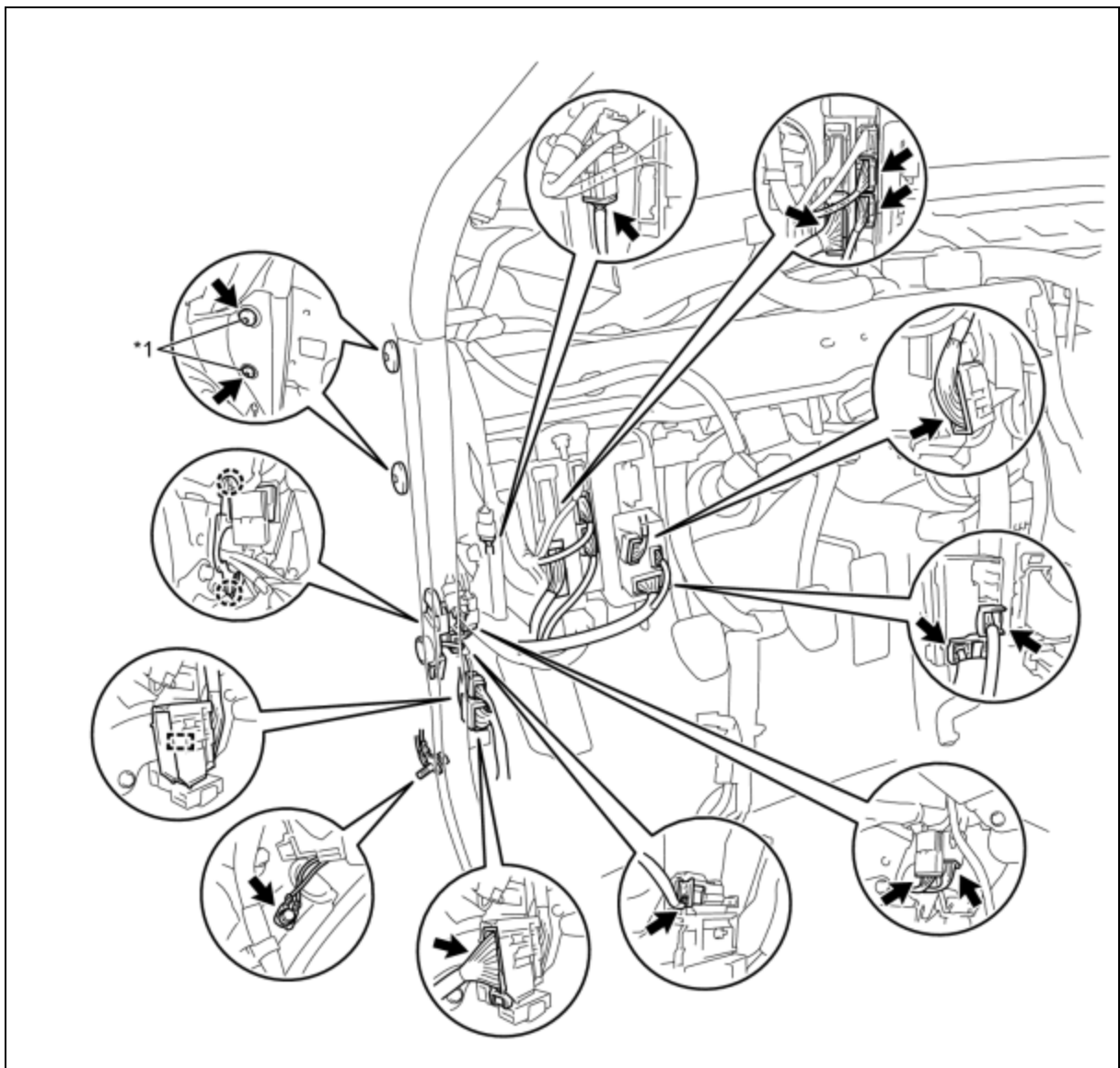
15. REMOVE COWL SIDE TRIM BOARD RH

INFO

16. REMOVE INSTRUMENT PANEL REINFORCEMENT ASSEMBLY

(a) for Driver Side

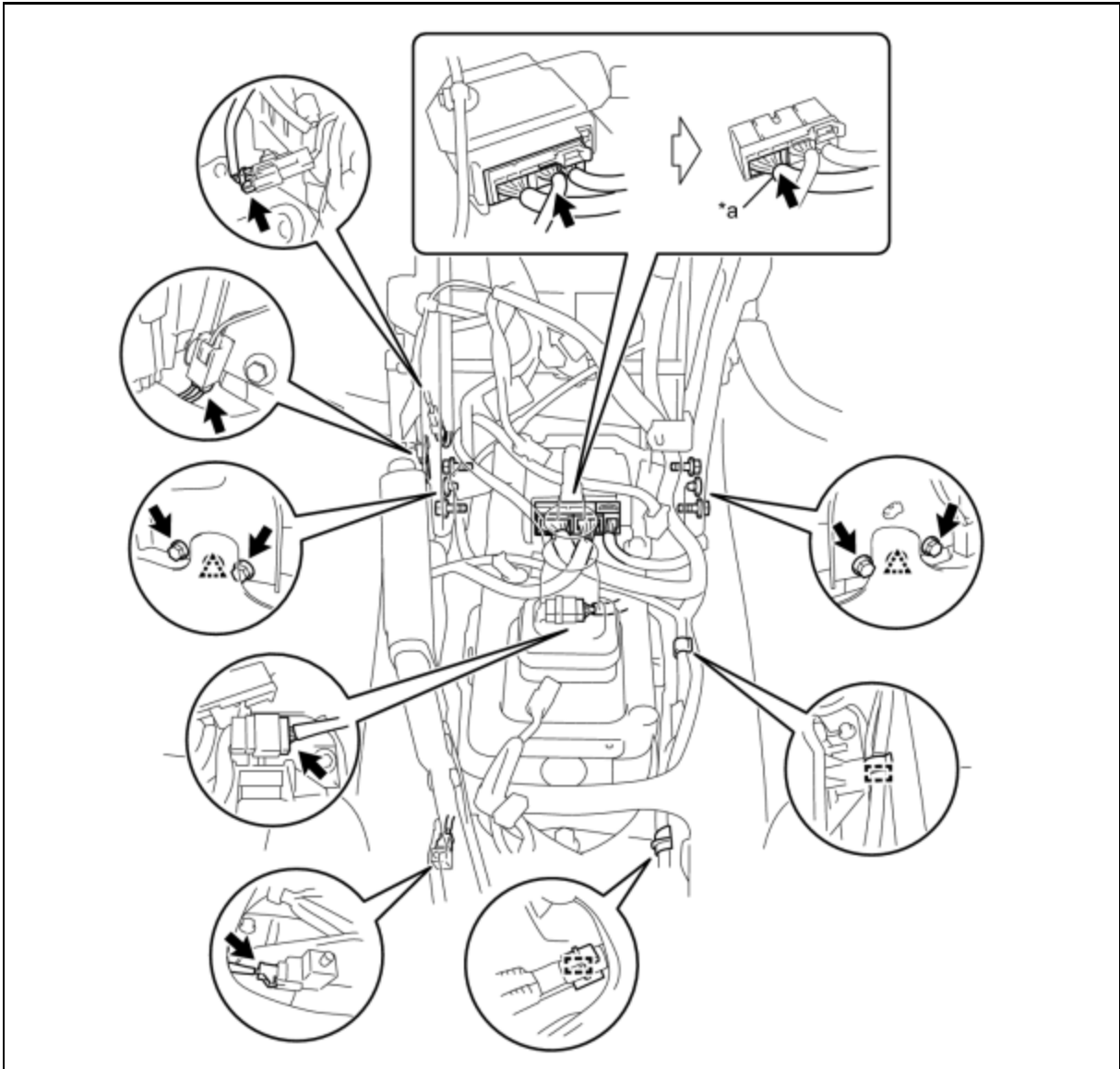
(1) Remove the each bolts.



Text in Illustration

*1	"TORX" Bolt	-	-
----	-------------	---	---

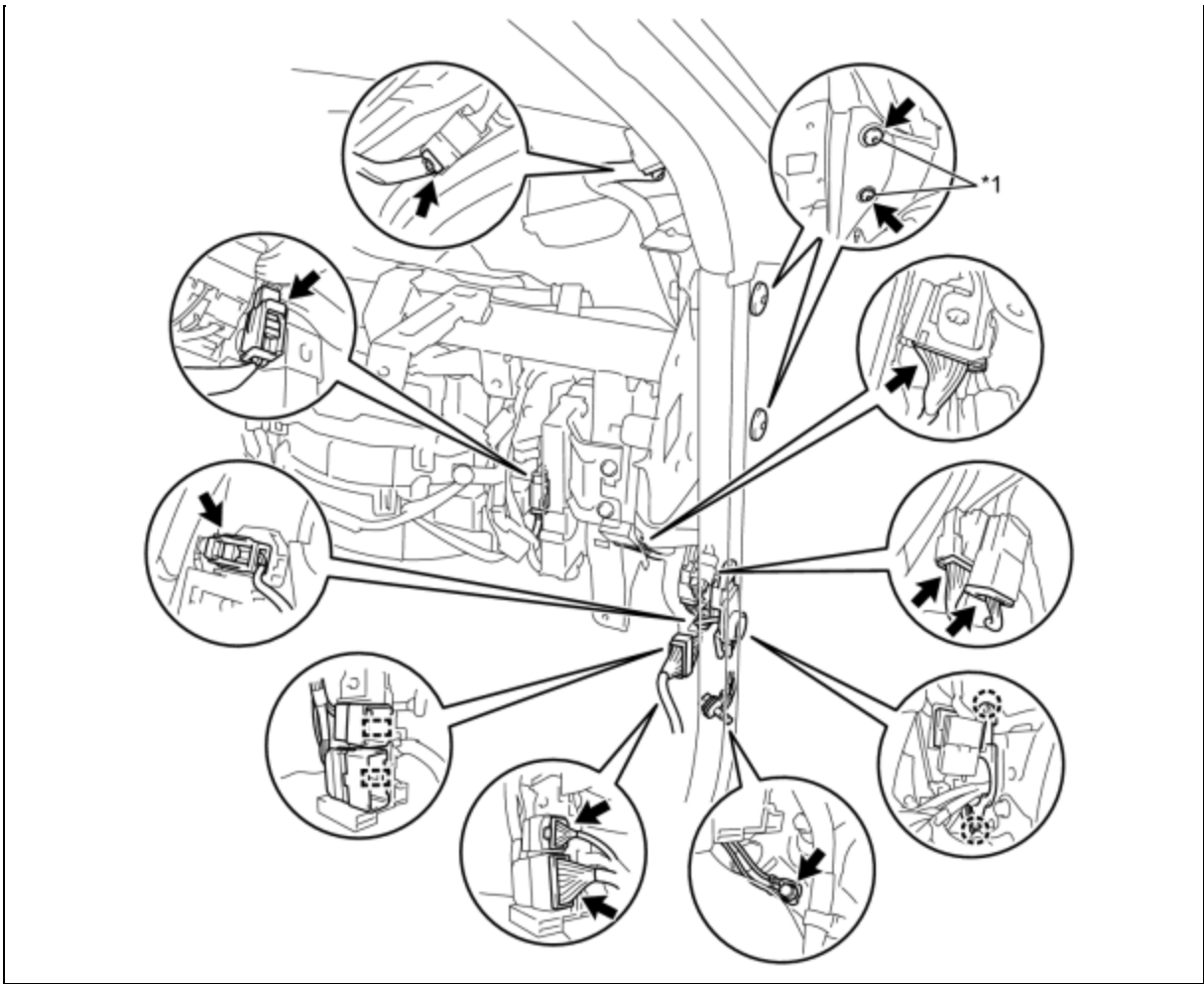
- (2) Disconnect each connector and disengage the clamp and 2 claws.
- (b) for Center Side
- (1) Remove the each bolts and disengage the clip.



Text in Illustration

*a	Disengage the lock plate and disconnect connector.	-	-
----	--	---	---

- (2) Disconnect each connector and disengage the each clamp.
- (c) for Front Passenger Side
- (1) Remove the each bolts.



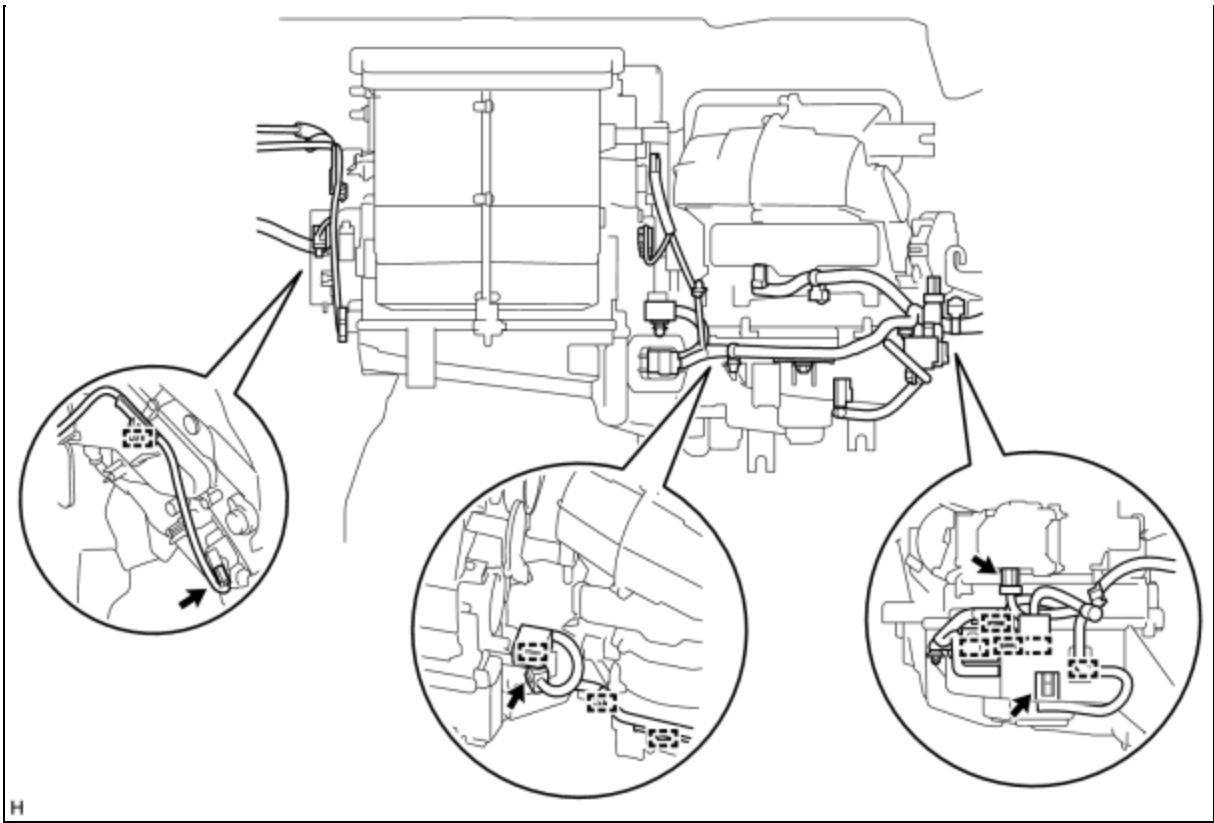
Text in Illustration

*1	"TORX" Bolt	-	-
----	-------------	---	---

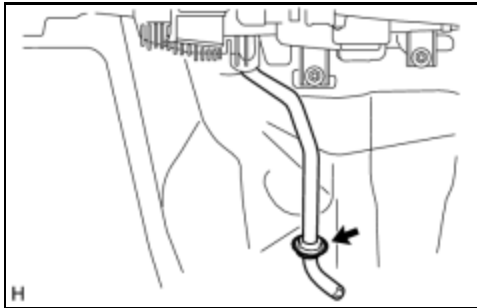
- (2) Disconnect each connector and disengage the 2 clamps and 2 claws.
- (d) Remove the instrument panel reinforcement assembly.

17. REMOVE AIR CONDITIONING UNIT ASSEMBLY

- (a) Disconnect each connector and disengage each clamp.



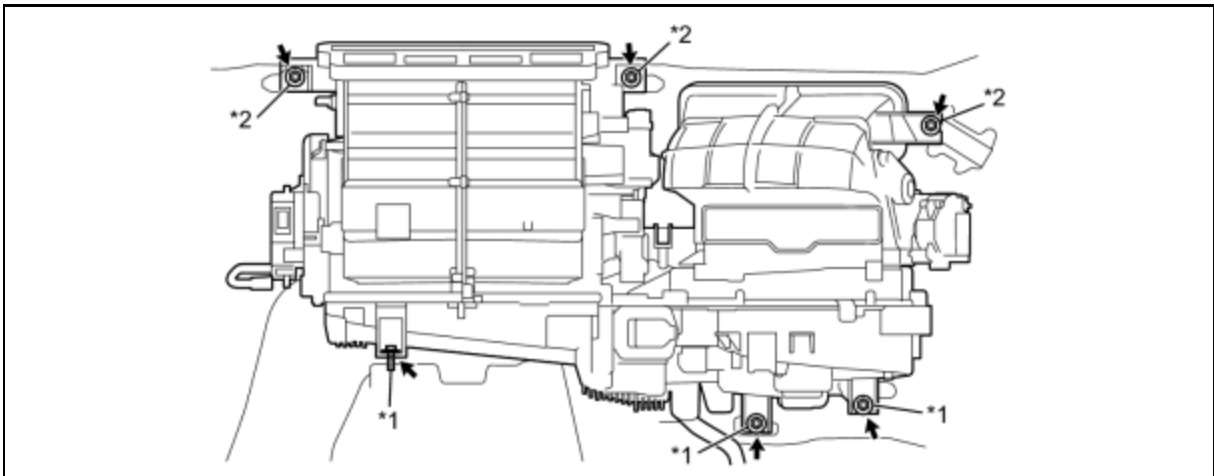
H



H

(b) Disengage the drain cooler hose.

(c) Remove the 3 bolts, 3 nuts and air conditioning unit assembly.



Text in Illustration

*1

Bolt

*2

Nut

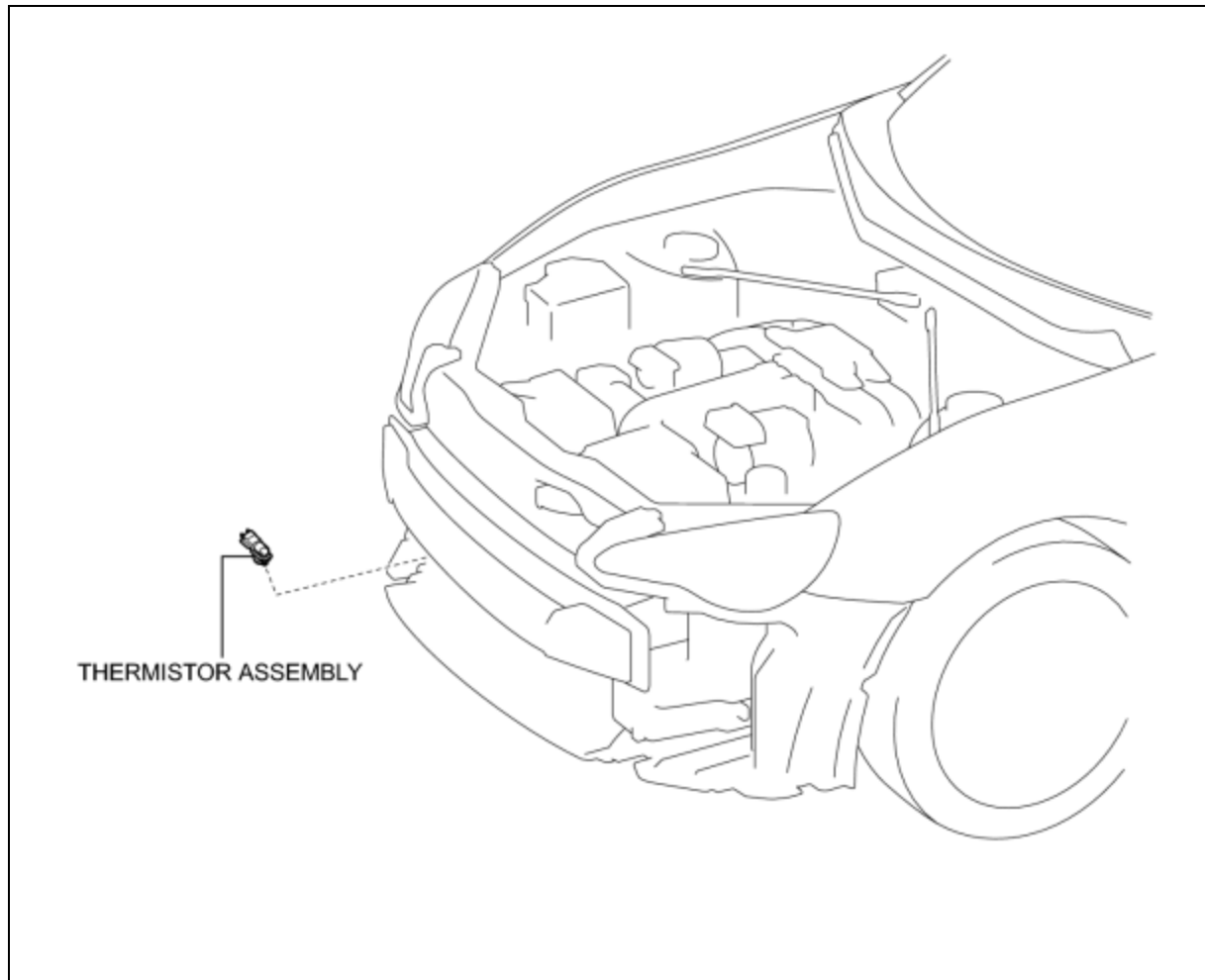


TOYOTA

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003FXQ007X
Title: HEATING / AIR CONDITIONING: AMBIENT TEMPERATURE SENSOR: COMPONENTS (2013 FR-S)		

COMPONENTS

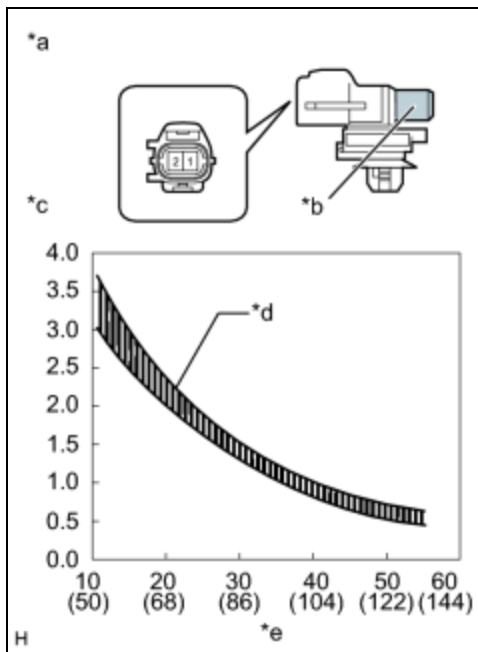
ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000201P076X
Title: HEATING / AIR CONDITIONING: AMBIENT TEMPERATURE SENSOR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT THERMISTOR ASSEMBLY



(a) Disconnect the connector from the thermistor assembly.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	10°C (50°F)	3.00 to 3.73 kΩ
	15°C (59°F)	2.45 to 2.88 kΩ
	20°C (68°F)	1.95 to 2.30 kΩ
	25°C (77°F)	1.60 to 1.80 kΩ
	30°C (86°F)	1.28 to 1.47 kΩ
	35°C (95°F)	1.00 to 1.22 kΩ
	40°C (104°F)	0.80 to 1.00 kΩ
	45°C (113°F)	0.65 to 0.85 kΩ
	50°C (122°F)	0.50 to 0.70 kΩ
	55°C (131°F)	0.44 to 0.60 kΩ
	60°C (140°F)	0.36 to 0.50 kΩ

NOTICE:

- Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.
- When measuring, the sensor temperature must be the same as the thermistor assembly.

HINT:

As the temperature increases, the resistance decreases (see the graph).

If the resistance is not as specified, replace the thermistor assembly.

Text in Illustration

*a	Component without harness connected (thermistor assembly)
*b	Sensing Portion
*c	Resistance (k Ω)
*d	Allowable Range
*e	Temperature ($^{\circ}$ C ($^{\circ}$ F))

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XMG01CX
Title: HEATING / AIR CONDITIONING: AMBIENT TEMPERATURE SENSOR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL THERMISTOR ASSEMBLY

- (a) Engage the clamp and install the thermistor assembly.
- (b) Connect the connector.

2. INSTALL FRONT BUMPER COVER

INFO



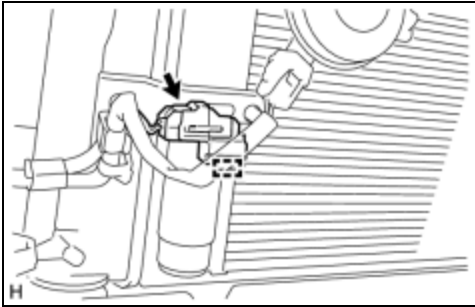
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XMI01BX
Title: HEATING / AIR CONDITIONING: AMBIENT TEMPERATURE SENSOR: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE FRONT BUMPER COVER

INFO

2. REMOVE THERMISTOR ASSEMBLY



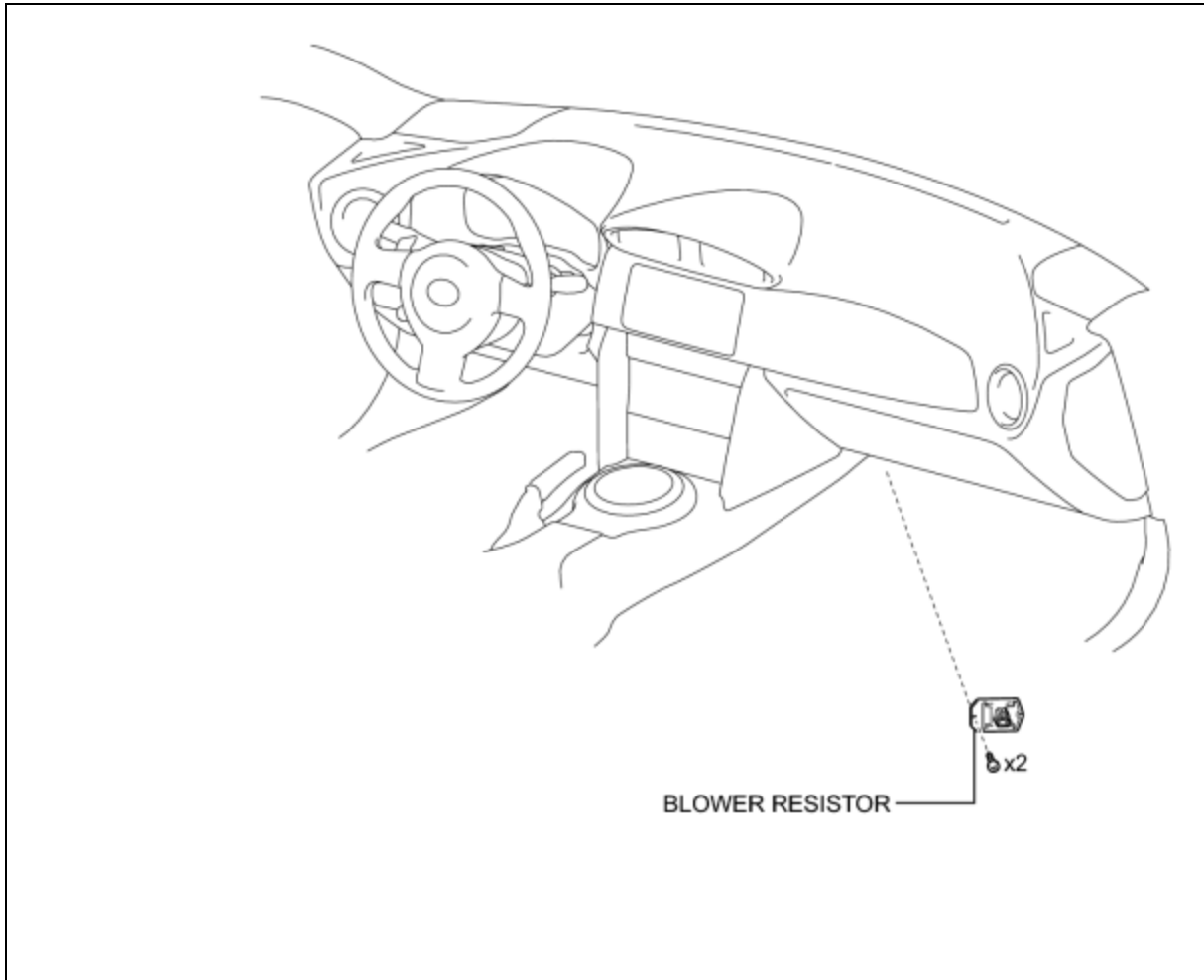
(a) Disconnect the connector.

(b) Disengage the clamp and the thermistor assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003FXK004X
Title: HEATING / AIR CONDITIONING: BLOWER RESISTOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION

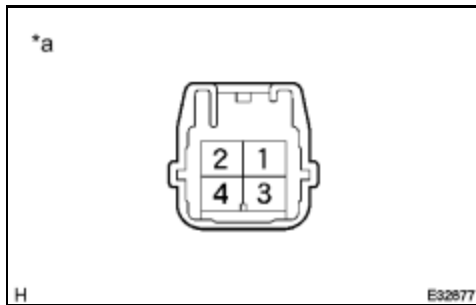


Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000314S01YX
Title: HEATING / AIR CONDITIONING: BLOWER RESISTOR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT BLOWER RESISTOR

(a) Disconnect the connector from the blower resistor.



Text in Illustration

*a	Component without harness connected (Blower Resistor)
----	--

HINT:

There is a fuse between terminals 1 and 3.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 4	Always	2.92 Ω
1 - 3	Always	0.44 Ω
1 - 2	Always	1.12 Ω

If the resistance is not as specified, replace the blower resistor.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XU1016X
Title: HEATING / AIR CONDITIONING: BLOWER RESISTOR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL BLOWER RESISTOR

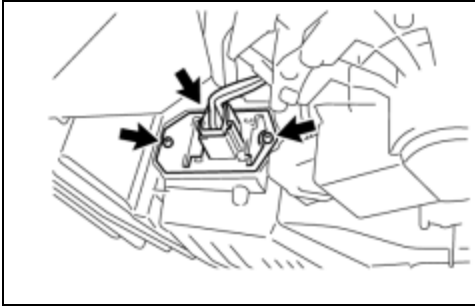
- (a) Install the blower resistor with the 2 screws.
- (b) Connect the connector.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XU3016X
Title: HEATING / AIR CONDITIONING: BLOWER RESISTOR: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE BLOWER RESISTOR



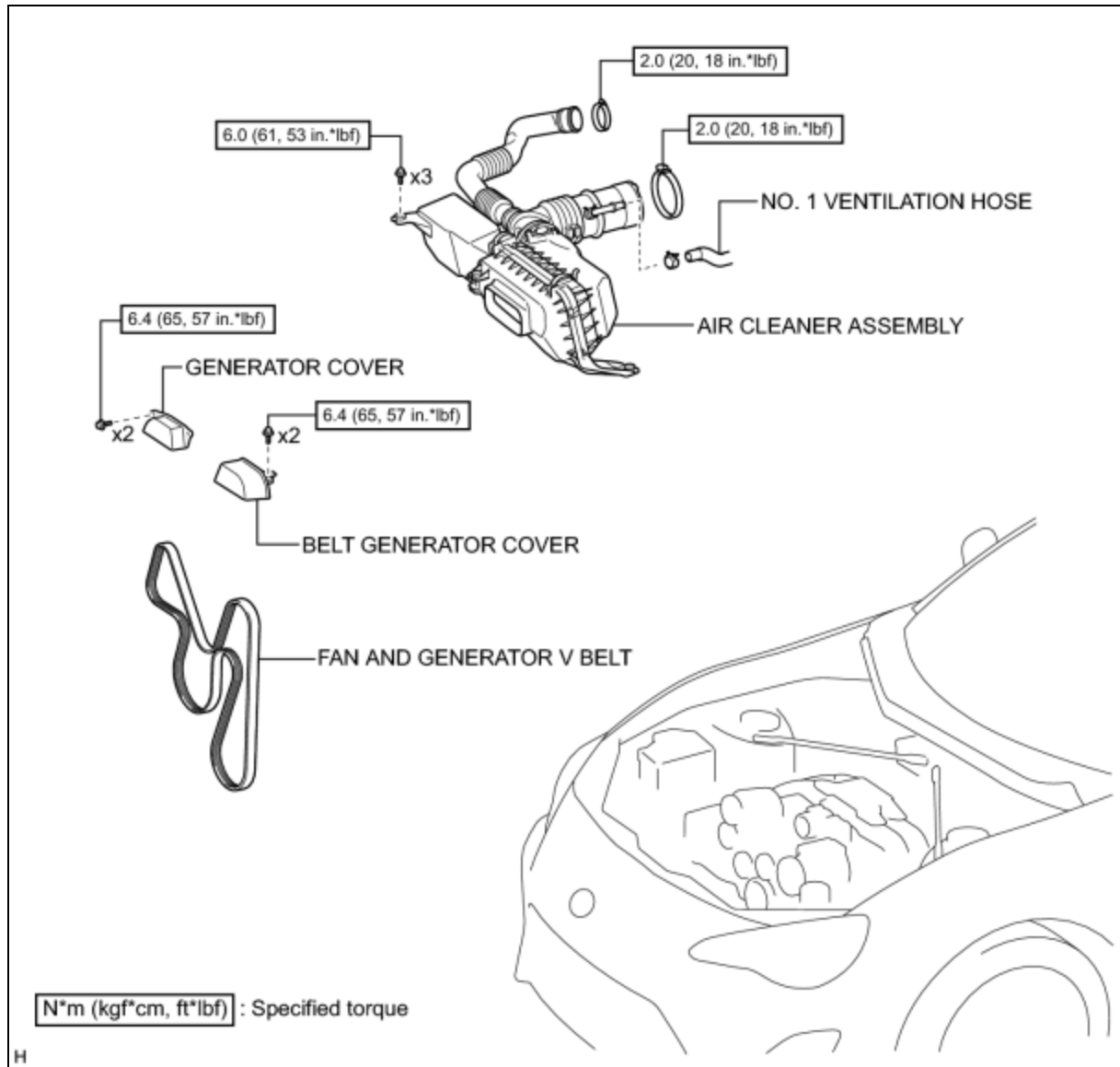
(a) Disconnect the connector.

(b) Remove the 2 screws and the blower resistor.

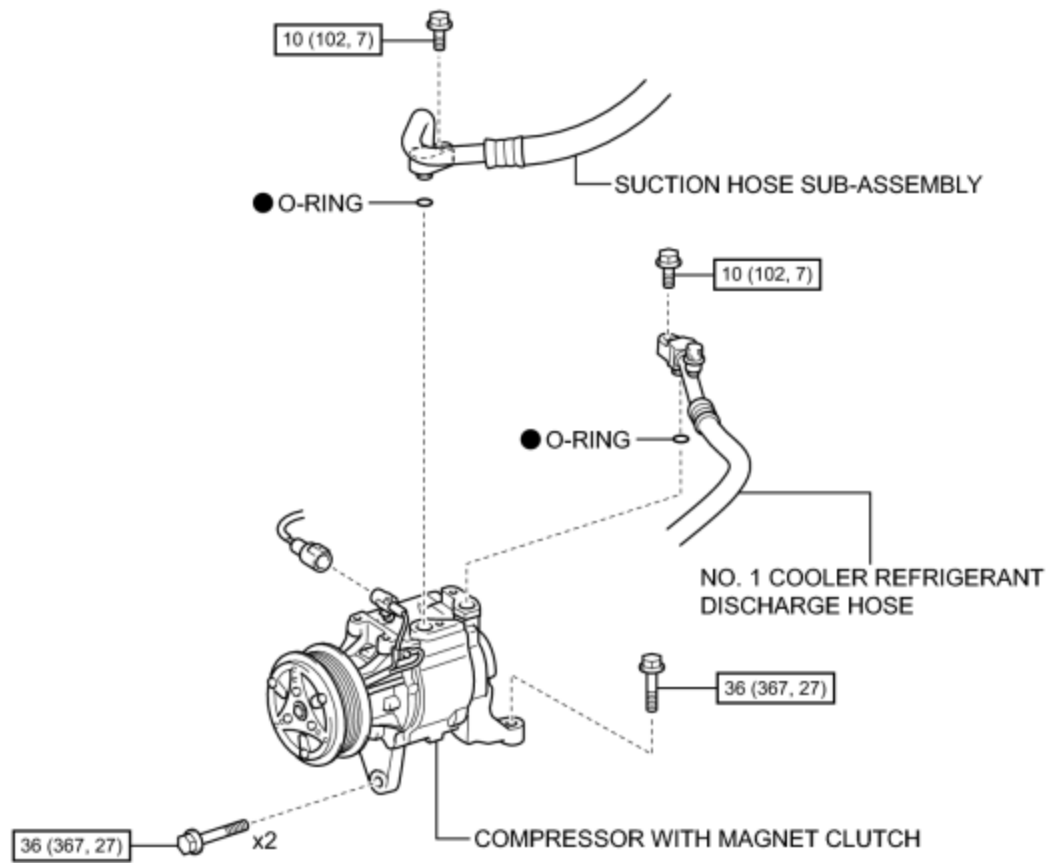
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003FXM004X
Title: HEATING / AIR CONDITIONING: COMPRESSOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



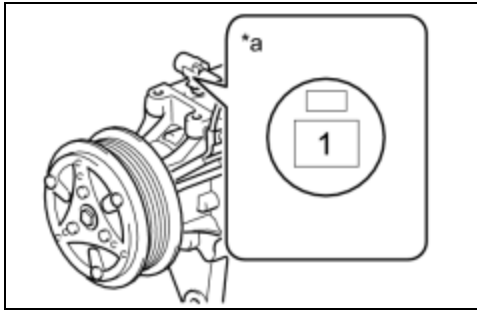
N*m (kgf*cm, ft*lb) : Specified torque ● Non-reusable part

← Compressor oil ND-OIL 8 or equivalent

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002CVX05BX
Title: HEATING / AIR CONDITIONING: COMPRESSOR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT COMPRESSOR WITH MAGNET CLUTCH



(a) Disconnect the connector from the compressor with magnet clutch.

Text in Illustration

*a	Component without harness connected (compressor with magnet clutch)
----	---

(b) Apply battery voltage to the clutch and check operation of the clutch.

Standard Resistance:

CONDITION	SPECIFIED CONDITION
Battery positive (+) → Terminal 1 Battery negative (-) → Body ground	Magnet clutch is engaged

If the result is not as specified, replace the compressor.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XUK01YX
Title: HEATING / AIR CONDITIONING: COMPRESSOR: INSTALLATION (2013 FR-S)		

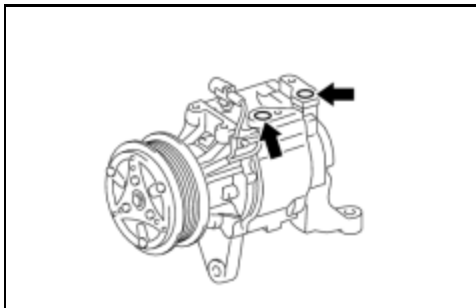
INSTALLATION

1. ADJUST COMPRESSOR OIL LEVEL

- (a) When replacing the compressor with motor assembly with a new one, gradually discharge the refrigerant gas from the service valve, and drain the following amount of oil from the new compressor with motor assembly before installation.

Standard:

Drain oil from the new compressor assembly, and then add new oil so that the amount of oil in the new compressor assembly is the same as that in the compressor assembly to be replaced.



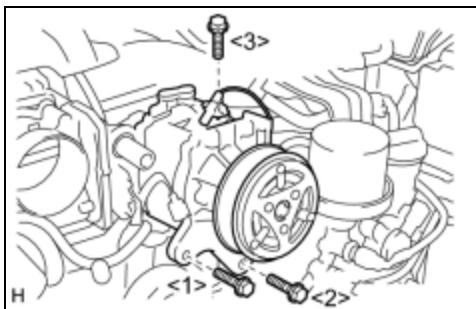
HINT:

The drain bolt and washer can be reused.

NOTICE:

- When checking the compressor oil level, observe the precautions on the cooler removal/installation.
- If a new compressor is installed without removing some oil remaining in the pipes of the vehicle, the oil amount will be excessive. This prevents heat exchange in the refrigerant cycle and causes refrigeration system failure.
- If the volume of oil remaining in the removed compressor is too small, check for oil leaks.
- Be sure to use ND-OIL 8 or equivalent for compressor oil.

2. INSTALL COMPRESSOR WITH MAGNET CLUTCH



- (a) Install the compressor with magnet clutch with the 3 bolts.

HINT:

Tighten the bolts in the order shown in the illustration.

Torque: 36 N·m (367 kgf·cm, 27ft·lbf)

(b) Connect the connector.

3. CONNECT NO. 1 COOLER REFRIGERANT DISCHARGE HOSE

(a) Remove the attached vinyl tape from the hose.

(b) Apply sufficient compressor oil to a new O-ring and the fitting surface of the compressor with magnet clutch.

Compressor oil:

for HFC-134a (R134a)

ND-OIL 8 or equivalent

(c) Install the O-ring onto the No. 1 cooler refrigerant discharge hose.

(d) Install the No. 1 cooler refrigerant discharge hose onto the compressor with magnet clutch with the bolt.

Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

4. CONNECT SUCTION HOSE SUB-ASSEMBLY

(a) Remove the attached vinyl tape from the hose.

(b) Apply sufficient compressor oil to a new O-ring and the fitting surface of the compressor with magnet clutch.

Compressor oil:

for HFC-134a (R134a)

ND-OIL 8 or equivalent

(c) Install the O-ring onto the suction hose sub-assembly.

(d) Install the suction hose sub-assembly onto the compressor with magnet clutch with the bolt.

Torque: 10 N·m (102 kgf·cm, 7ft·lbf)

5. INSTALL FAN AND GENERATOR V BELT INFO

6. INSTALL BELT GENERATOR COVER INFO

7. INSTALL GENERATOR COVER INFO

8. INSTALL AIR CLEANER ASSEMBLY INFO

9. CHARGE WITH REFRIGERANT

INFO

10. WARM UP ENGINE

INFO

11. INSPECT FOR REFRIGERANT LEAK

INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XUM01YX
Title: HEATING / AIR CONDITIONING: COMPRESSOR: REMOVAL (2013 FR-S)		

REMOVAL

1. RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM

INFO

2. REMOVE AIR CLEANER ASSEMBLY

INFO

3. REMOVE GENERATOR COVER

INFO

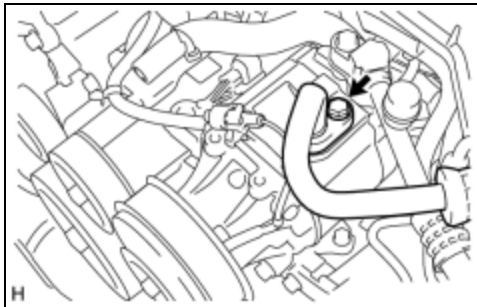
4. REMOVE BELT GENERATOR COVER

INFO

5. REMOVE FAN AND GENERATOR V BELT

INFO

6. DISCONNECT SUCTION HOSE SUB-ASSEMBLY



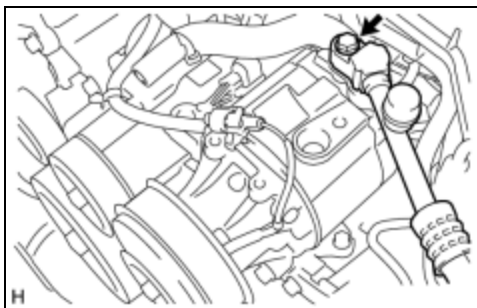
- (a) Remove the bolt and disconnect the suction hose sub-assembly from the compressor with magnet clutch.

- (b) Remove the O-ring from the suction hose sub-assembly.

NOTICE:

Seal the openings of the disconnected parts using vinyl tape to prevent entry of moisture and foreign matter.

7. DISCONNECT NO. 1 COOLER REFRIGERANT DISCHARGE HOSE



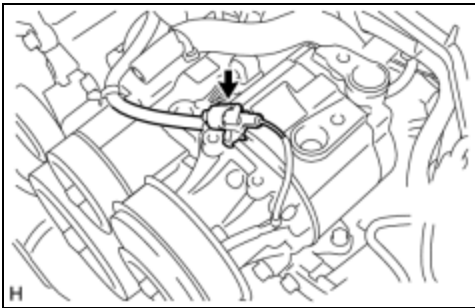
- (a) Remove the bolt and disconnect the No. 1 cooler refrigerant discharge hose from the compressor with magnet clutch.

- (b) Remove the O-ring from the No. 1 cooler refrigerant discharge hose.

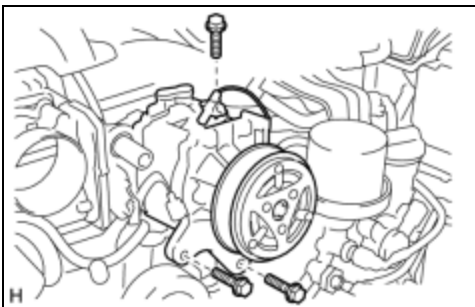
NOTICE:

Seal the openings of the disconnected parts using vinyl tape to prevent entry of moisture and foreign matter.

8. REMOVE COMPRESSOR WITH MAGNET CLUTCH



(a) Disconnect the connector.

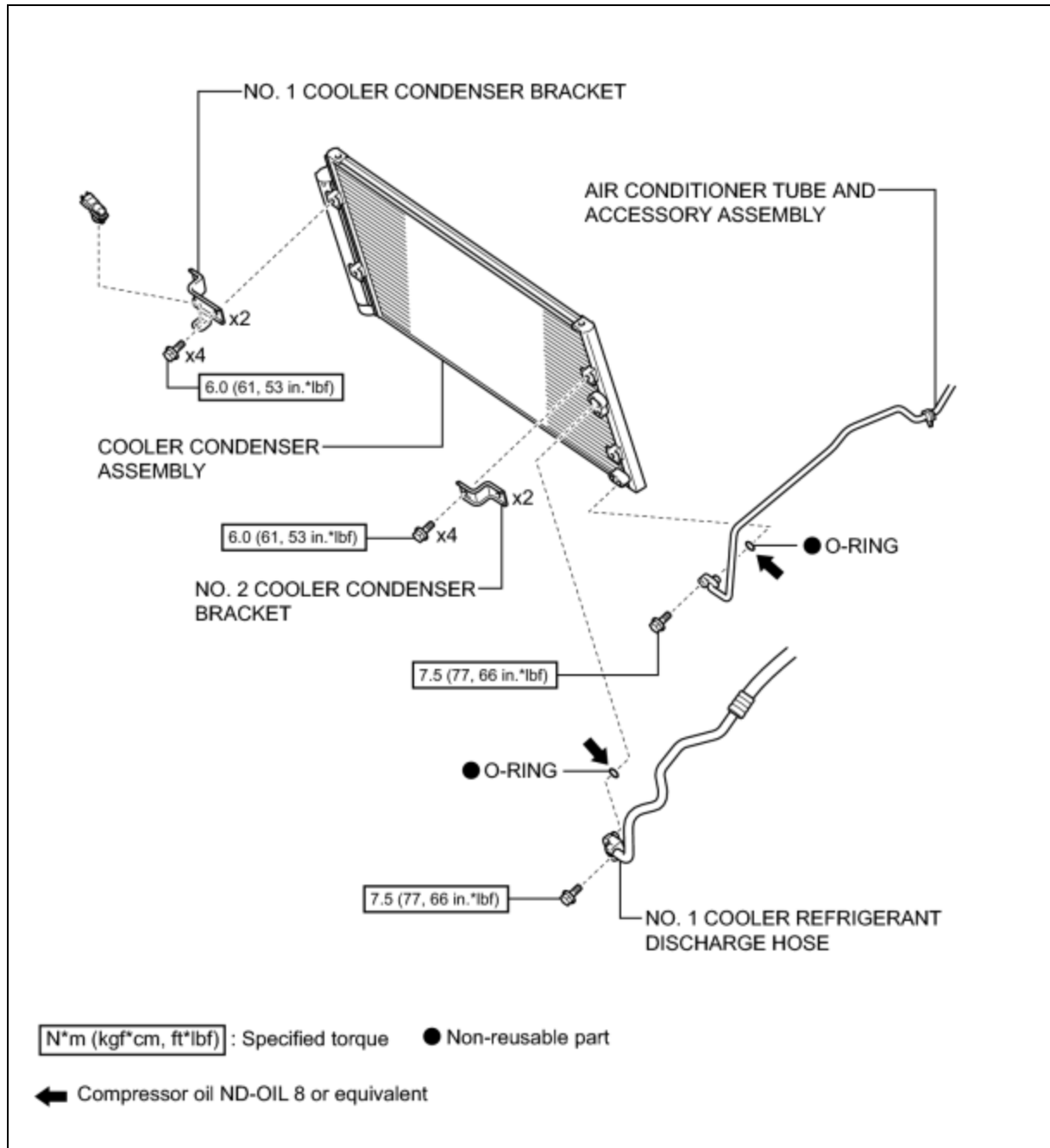


(b) Remove the 3 bolts and the compressor with magnet clutch.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003FX0004X
Title: HEATING / AIR CONDITIONING: CONDENSER: COMPONENTS (2013 FR-S)		

COMPONENTS

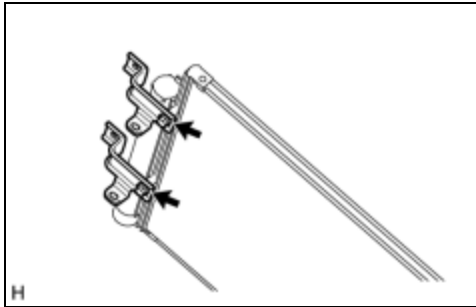
ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XLU05TX
Title: HEATING / AIR CONDITIONING: CONDENSER: DISASSEMBLY (2013 FR-S)		

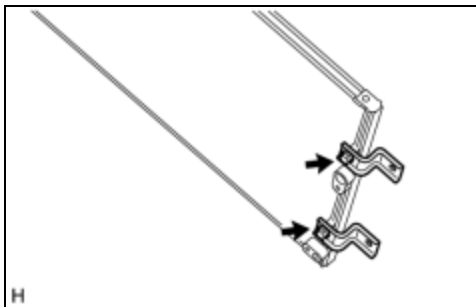
DISASSEMBLY

1. REMOVE NO. 1 COOLER CONDENSER BRACKET



(a) Remove the 2 bolts and the 2 No. 1 cooler condenser bracket.

2. REMOVE NO. 2 COOLER CONDENSER BRACKET



(a) Remove the 2 bolts and the 2 No. 2 cooler condenser bracket.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XLR04KX
Title: HEATING / AIR CONDITIONING: CONDENSER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL COOLER CONDENSER ASSEMBLY

- (a) Install the cooler condenser assembly with the 4 bolts.

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

HINT:

Do not damage the condenser or radiator when installing the condenser.

- (b) Connect the external air temperature sensor clamp and connector.

2. CONNECT AIR CONDITIONER TUBE AND ACCESSORY ASSEMBLY

- (a) Remove the attached vinyl tape from the tube and the connecting part of the cooler condenser assembly.
- (b) Sufficiently apply compressor oil to a new O-ring and the fitting surface of the tube joint.

Compressor oil:

for HFC-134a (R134a)

ND-OIL 8 or equivalent

- (c) Install the O-ring on the air conditioner tube and accessory assembly.
- (d) Install the air conditioner tube and accessory assembly on the cooler condenser assembly with the bolt.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

3. CONNECT NO. 1 COOLER REFRIGERANT DISCHARGE HOSE

- (a) Remove the attached vinyl tape from the pipe and the connecting part of the cooler condenser assembly.
- (b) Sufficiently apply compressor oil to a new O-ring and the fitting surface of the pipe joint.

Compressor oil:

for HFC-134a (R134a)

ND-OIL 8 or equivalent

- (c) Install the O-ring on the No. 1 cooler refrigerant discharge hose.
- (d) Install the No. 1 cooler refrigerant discharge hose on the cooler condenser assembly with the bolt.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

4. CHARGE WITH REFRIGERANT

INFO

5. WARM UP ENGINE

INFO

6. INSPECT FOR REFRIGERANT LEAK



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000012UU039X
Title: HEATING / AIR CONDITIONING: CONDENSER: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT COOLER CONDENSER ASSEMBLY

- (a) If the cooler condenser assembly fins are dirty, clean them with water and dry with compressed air.

NOTICE:

Do not damage the condenser assembly fins.

- (b) If any cooler condenser assembly fins are bent, straighten them using a screwdriver or pliers.

2. INSPECT FOR REFRIGERANT LEAK

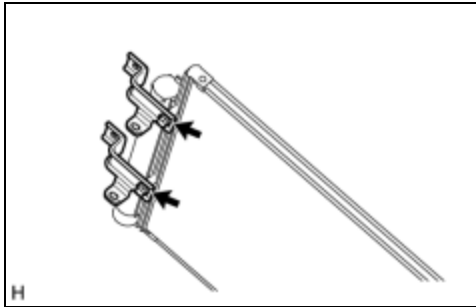
- (a) Using a halogen leak detector, check pipe joints for refrigerant leakage.
- (b) If refrigerant leakage is detected in a joint, check the torque of the joint.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XLV05TX
Title: HEATING / AIR CONDITIONING: CONDENSER: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL NO. 1 COOLER CONDENSER BRACKET



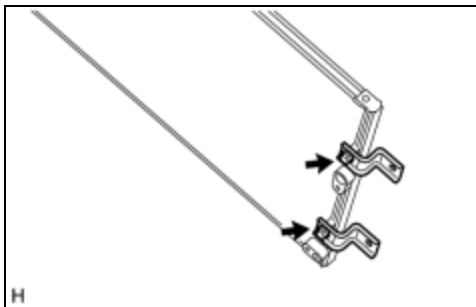
(a) Install the 2 No. 1 cooler condenser bracket with the 2 bolts.

- Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

HINT:

Install the bracket in parallel (horizontally).

2. INSTALL NO. 2 COOLER CONDENSER BRACKET



(a) Install the 2 No. 2 cooler condenser bracket with the 2 bolts.

- Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

HINT:

Install the bracket in parallel (horizontally).

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XLT04IX
Title: HEATING / AIR CONDITIONING: CONDENSER: REMOVAL (2013 FR-S)		

REMOVAL

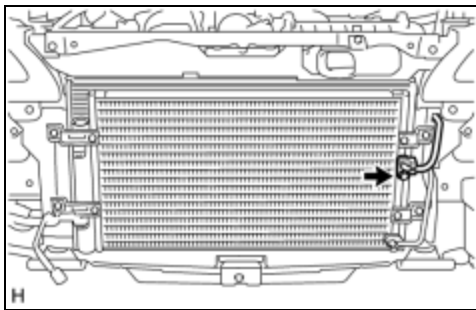
1. RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM

INFO

2. REMOVE FRONT BUMPER COVER

INFO

3. DISCONNECT NO. 1 COOLER REFRIGERANT DISCHARGE HOSE



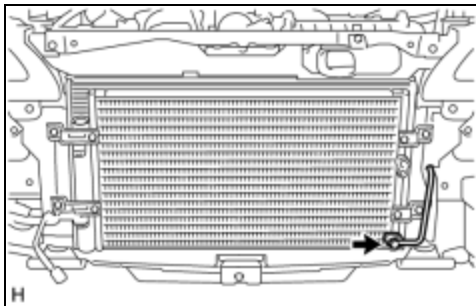
- (a) Remove the bolt and disconnect the No. 1 cooler refrigerant discharge hose from the condenser.

- (b) Remove the O-ring from the No. 1 cooler refrigerant discharge hose.

NOTICE:

Seal the openings of the disconnected parts using vinyl tape to prevent entry of moisture and foreign matter.

4. DISCONNECT AIR CONDITIONER TUBE AND ACCESSORY ASSEMBLY



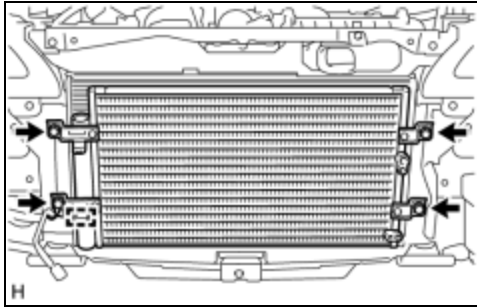
- (a) Remove the bolt and disconnect the air conditioning tube and accessory assembly from the condenser.

- (b) Remove the O-ring from the air conditioning tube and accessory assembly.

NOTICE:

Seal the openings of the disconnected parts using vinyl tape to prevent entry of moisture and foreign matter.

5. REMOVE COOLER CONDENSER ASSEMBLY



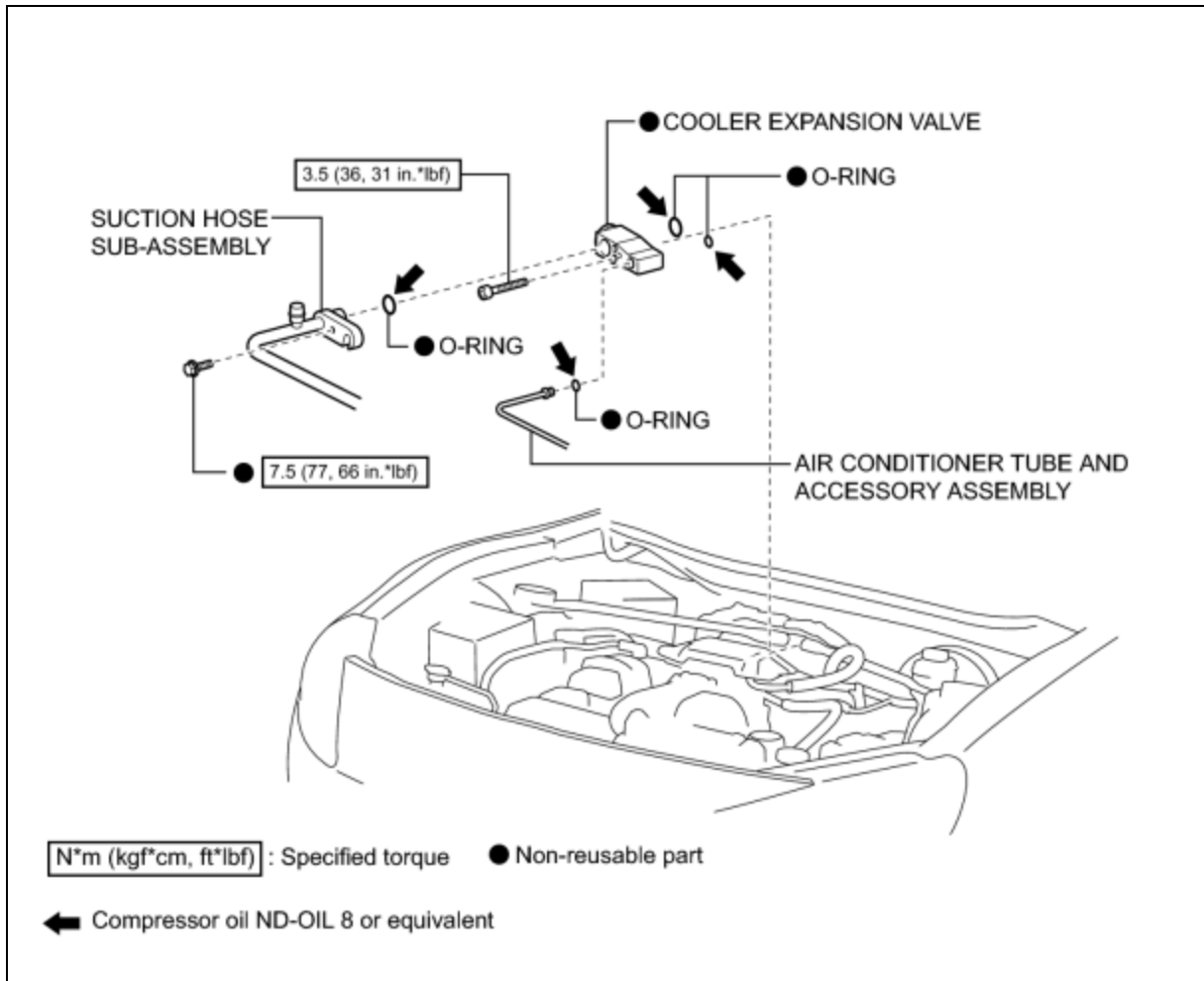
(a) Disconnect the connector.

(b) Remove the 4 bolts and the cooler condenser assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004N9800RX
Title: HEATING / AIR CONDITIONING: COOLER EXPANSION VALVE: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004N9700LX
Title: HEATING / AIR CONDITIONING: COOLER EXPANSION VALVE: INSTALLATION (2013 FR-S)		

INSTALLATION

NOTICE:

When removing the cooler expansion valve by itself, be sure to install a new cooler expansion valve and new bolt for suction hose sub-assembly.

1. INSTALL COOLER EXPANSION VALVE

- (a) Apply sufficient compressor oil to 2 new O-rings and the fitting surfaces of the cooler expansion valve.

Compressor oil:

for HFC-134a (R134a)

ND-OIL 8 or equivalent

- (b) Install the 2 new O-rings onto the No. 1 cooler evaporator sub-assembly.
- (c) Using a 4 mm hexagon wrench, install the new cooler expansion valve with the new 2 hexagon bolts.

Torque: 3.5 N·m (36 kgf·cm, 31in·lbf)

2. INSTALL AIR CONDITIONER TUBE AND ACCESSORY ASSEMBLY INFO

3. INSTALL SUCTION HOSE SUB-ASSEMBLY INFO

4. CHARGE REFRIGERANT

INFO

5. WARM UP ENGINE

INFO

6. INSPECT FOR REFRIGERANT LEAK

INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004N9900LX
Title: HEATING / AIR CONDITIONING: COOLER EXPANSION VALVE: REMOVAL (2013 FR-S)		

REMOVAL

NOTICE:

When removing the cooler expansion valve by itself, be sure to install a new cooler expansion valve and new bolt for suction tube sub-assembly.

1. RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM

INFO

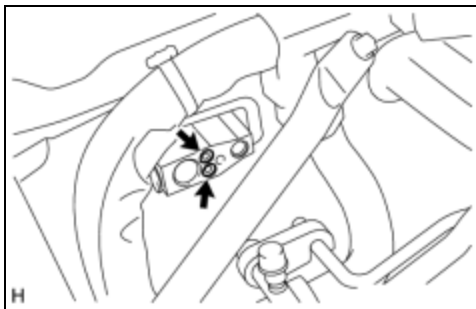
2. SEPARATE SUCTION HOSE SUB-ASSEMBLY

INFO

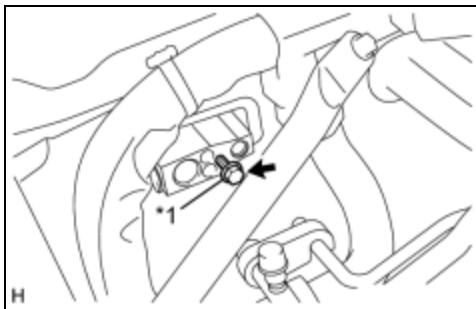
3. SEPARATE AIR CONDITIONER TUBE AND ACCESSORY ASSEMBLY

INFO

4. REMOVE COOLER EXPANSION VALVE



- (a) Using a 4 mm hexagon wrench, remove the 2 hexagon bolts.

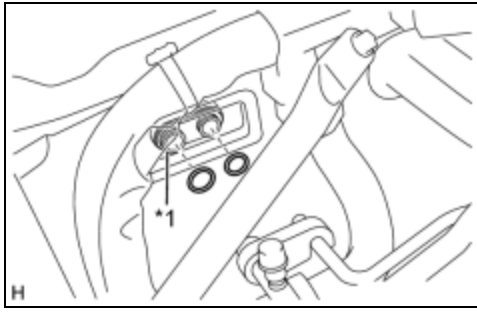
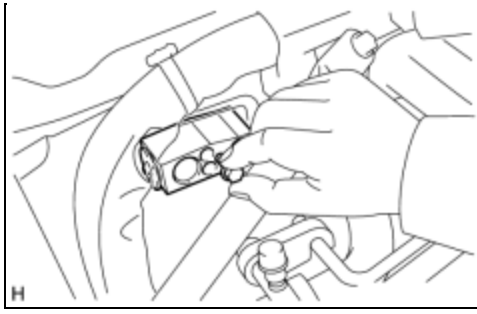


- (b) Temporarily install the bolt for the suction hose sub-assembly halfway to the cooler expansion valve.

Text in Illustration

*1	Bolt For The Suction Tube Sub-assembly
----	--

- (c) Hold the bolt and pull it to remove the cooler expansion valve as shown in the illustration.



(d) Remove the 2 O-rings from the evaporator pipe.

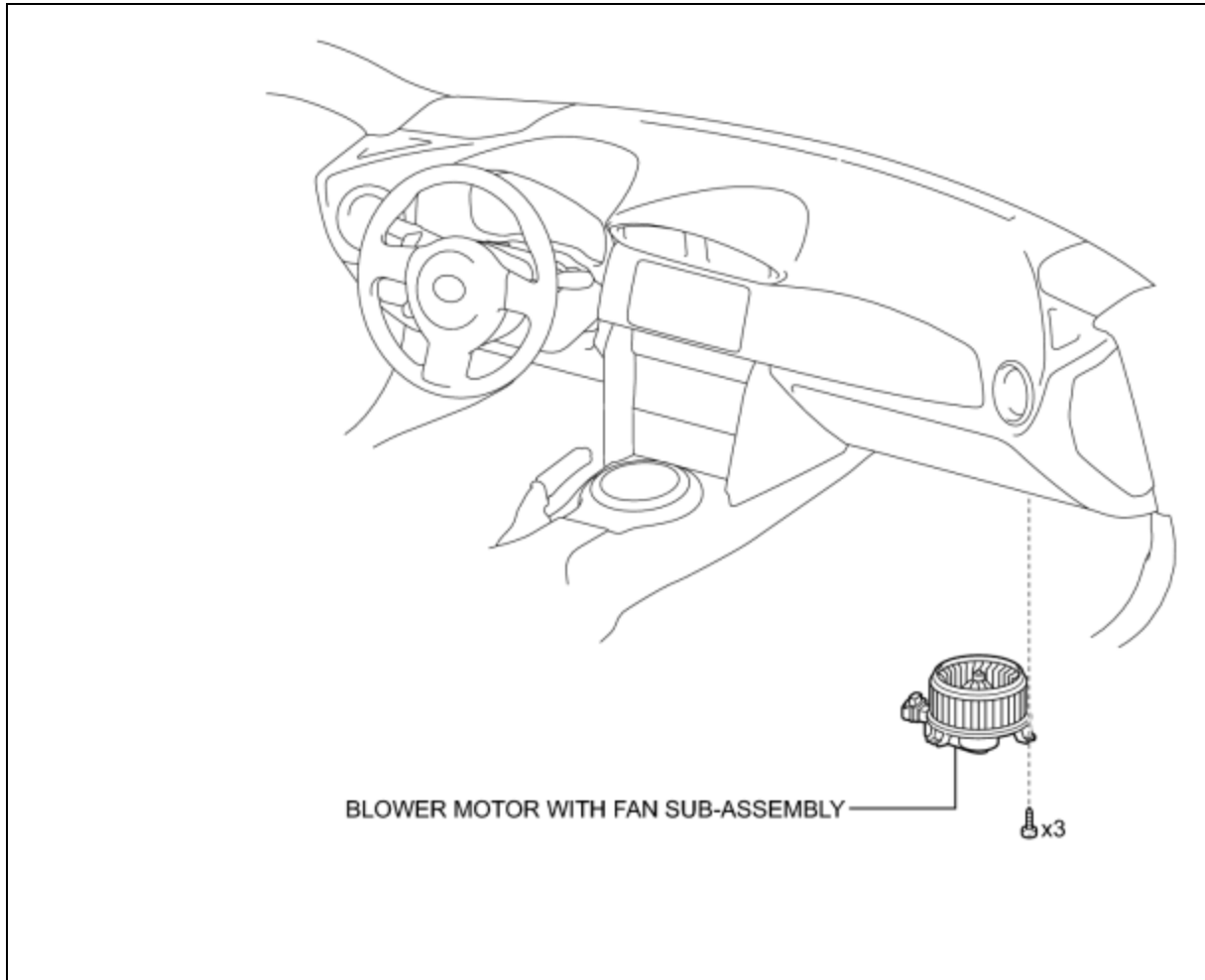
Text in Illustration

*1	Evaporator Pipe
----	-----------------

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003FXI004X
Title: HEATING / AIR CONDITIONING: FRONT BLOWER MOTOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



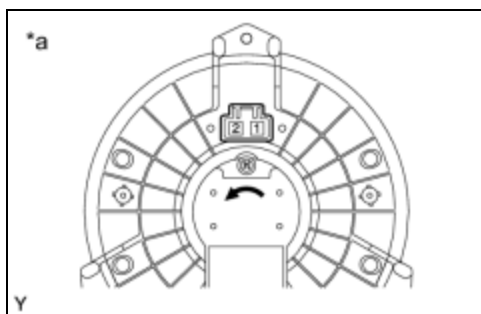
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000314T027X
Title: HEATING / AIR CONDITIONING: FRONT BLOWER MOTOR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT BLOWER MOTOR

(a) Disconnect the connector from the blower motor.

Text in Illustration



*a	Component without harness connected (Blower Motor)
----	---

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
Battery positive (+) → 2 Battery negative (-) → 1	The blower motor operates smoothly

If the result is not as specified, replace the blower motor.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XU7017X
Title: HEATING / AIR CONDITIONING: FRONT BLOWER MOTOR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL BLOWER MOTOR WITH FAN SUB-ASSEMBLY

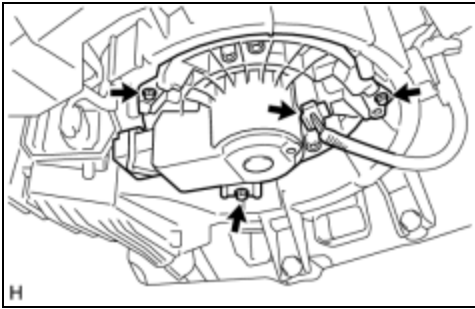
- (a) Install the blower motor with fan sub-assembly with the 3 screws.
- (b) Connect the connector.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002XU9017X
Title: HEATING / AIR CONDITIONING: FRONT BLOWER MOTOR: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE BLOWER MOTOR WITH FAN SUB-ASSEMBLY



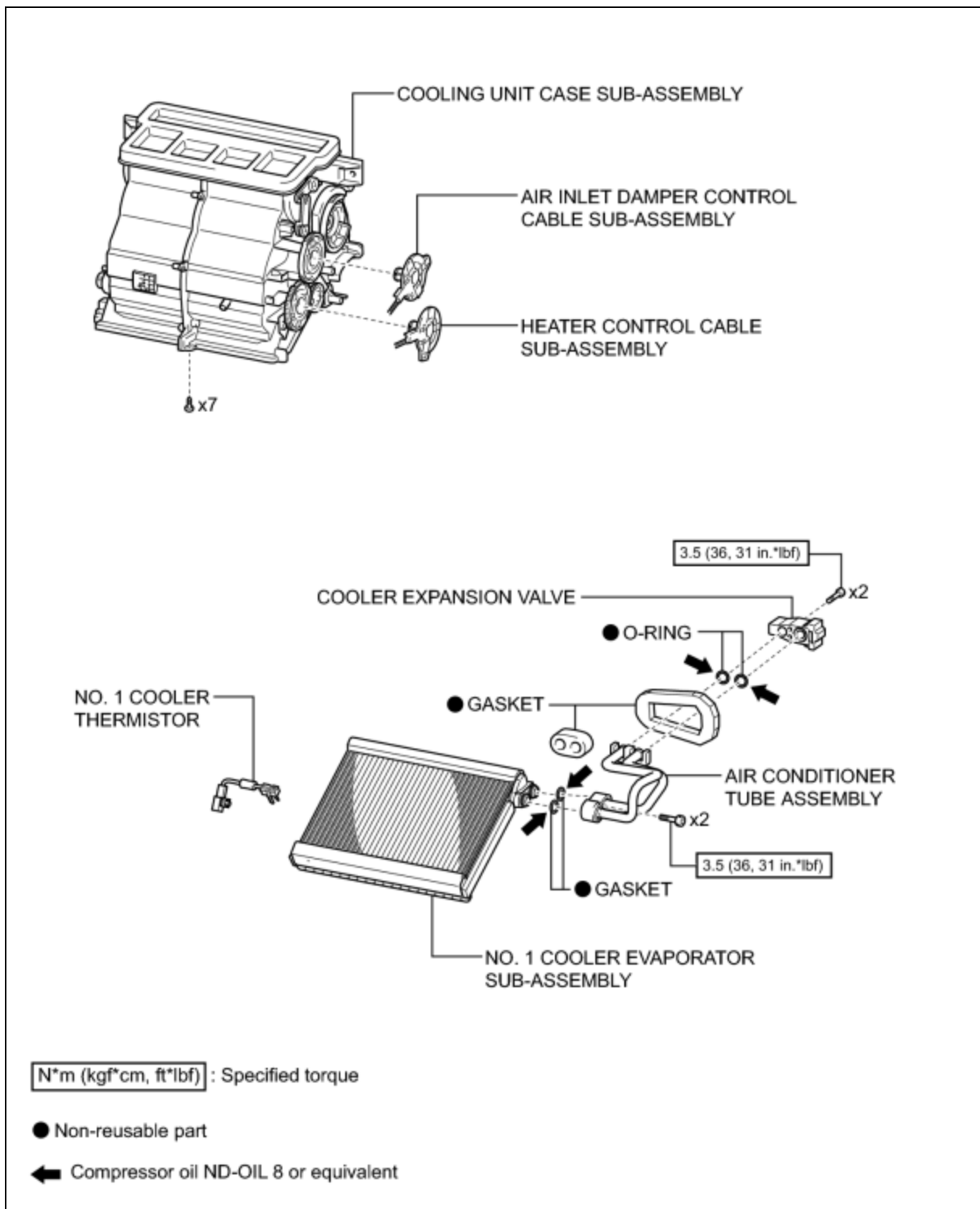
(a) Disconnect the connector.

(b) Remove the 3 screws and the blower motor with fan sub-assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003FXR004X
Title: HEATING / AIR CONDITIONING: FRONT EVAPORATOR TEMPERATURE SENSOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



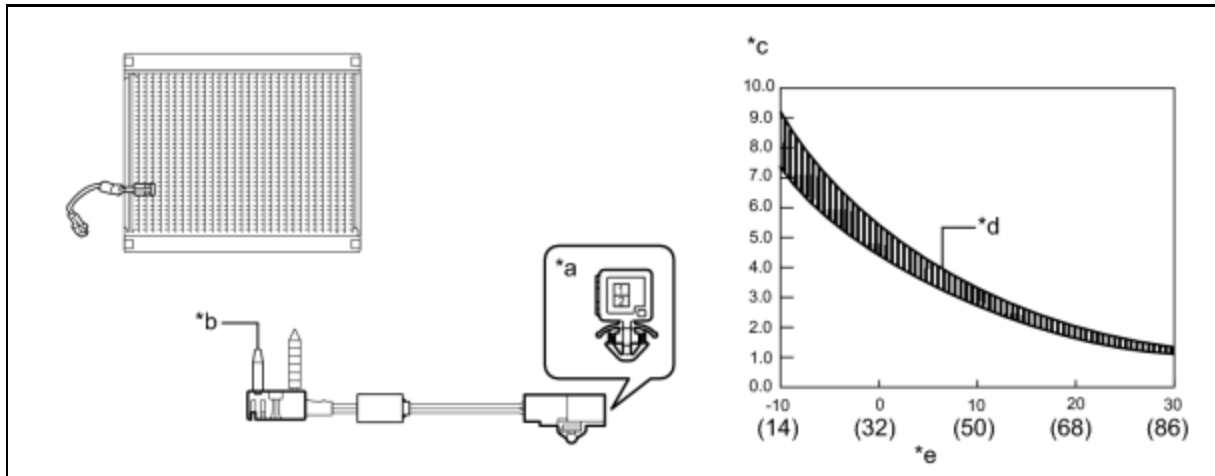


Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000202X050X
Title: HEATING / AIR CONDITIONING: FRONT EVAPORATOR TEMPERATURE SENSOR: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT NO. 1 COOLER THERMISTOR

(a) Disconnect the connector from the No. 1 cooler thermistor.



Text in Illustration

*a	Component without harness connected (No. 1 cooler thermistor)	*b	Sensing Portion
*c	Resistance (kΩ)	*d	Allowable Range
*e	Temperature (°C (°F))	-	-

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	-10°C (14°F)	7.30 to 9.10 kΩ
	-5°C (23°F)	5.65 to 6.95 kΩ
	0°C (32°F)	4.40 to 5.35 kΩ
	5°C (41°F)	3.40 to 4.15 kΩ
	10°C (50°F)	2.70 to 3.25 kΩ
	15°C (59°F)	2.14 to 2.58 kΩ
	20°C (68°F)	1.71 to 2.05 kΩ
	25°C (77°F)	1.38 to 1.64 kΩ
	30°C (86°F)	1.11 to 1.32 kΩ

NOTICE:

- Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.
- When measuring, the sensor temperature must be the same as the ambient temperature.

HINT:

As the temperature increases, the resistance decreases (see the graph).

If the resistance is not as specified, replace the No. 1 cooler thermistor.

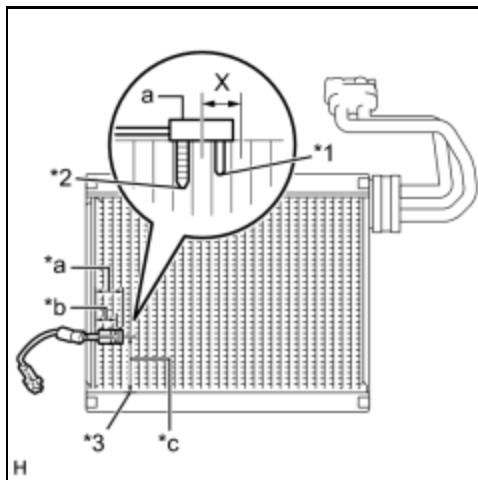


Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HLU0WZX
Title: HEATING / AIR CONDITIONING: FRONT EVAPORATOR TEMPERATURE SENSOR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL NO. 1 COOLER THERMISTOR

- (a) Install the No. 1 cooler thermistor as shown in the illustration.



PART	LENGTH
*a	34.3 mm
*b	27.6 mm
*c	50 mm

Text in Illustration

*1	Sensor Part
*2	Fixed Part
*3	from Tank

NOTICE:

- Be sure to insert the thermistor only once because reinserting it will not allow it to be firmly secured.
- When reusing the evaporator, insert the thermistor one row next to the one that has been used previously (X in the illustration).
- After inserting the thermistor, do not apply excessive force to the wire.
- Directly insert the thermistor until the edge of plastic case "a" comes into contact with evaporator "b".

2. INSTALL AIR CONDITIONER TUBE ASSEMBLY [INFO](#)

3. INSTALL NO. 1 COOLER EVAPORATOR SUB-ASSEMBLY [INFO](#)

4. INSTALL COOLING UNIT CASE SUB-ASSEMBLY [INFO](#)

5. INSTALL COOLER EXPANSION VALVE [INFO](#)

6. INSTALL HEATER CONTROL CABLE SUB-ASSEMBLY [INFO](#)

7. INSTALL AIR INLET DAMPER CONTROL CABLE SUB-ASSEMBLY [INFO](#)

8. INSTALL AIR CONDITIONING UNIT ASSEMBLY

INFO

9. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

10. ADD ENGINE COOLANT

INFO

11. CHARGE WITH REFRIGERANT

INFO

12. INSPECT FOR COOLANT LEAK

INFO

13. WARM UP ENGINE

INFO

14. INSPECT FOR REFRIGERANT LEAK

INFO

15. INSPECT SRS WARNING LIGHT

INFO



TOYOTA

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001HLWOW8X
Title: HEATING / AIR CONDITIONING: FRONT EVAPORATOR TEMPERATURE SENSOR: REMOVAL (2013 FR-S)		

REMOVAL

1. PRECAUTION

CAUTION:

Be sure to read Precaution thoroughly before servicing. INFO

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

- The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

3. REMOVE AIR CONDITIONING UNIT ASSEMBLY

INFO

4. REMOVE AIR INLET DAMPER CONTROL CABLE SUB-ASSEMBLY INFO

5. REMOVE HEATER CONTROL CABLE SUB-ASSEMBLY INFO

6. REMOVE COOLER EXPANSION VALVE INFO

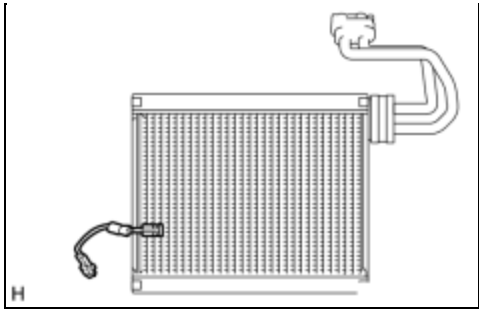
7. REMOVE COOLING UNIT CASE SUB-ASSEMBLY INFO

8. REMOVE NO. 1 COOLER EVAPORATOR SUB-ASSEMBLY INFO

9. REMOVE AIR CONDITIONER TUBE ASSEMBLY INFO

10. REMOVE NO. 1 COOLER THERMISTOR

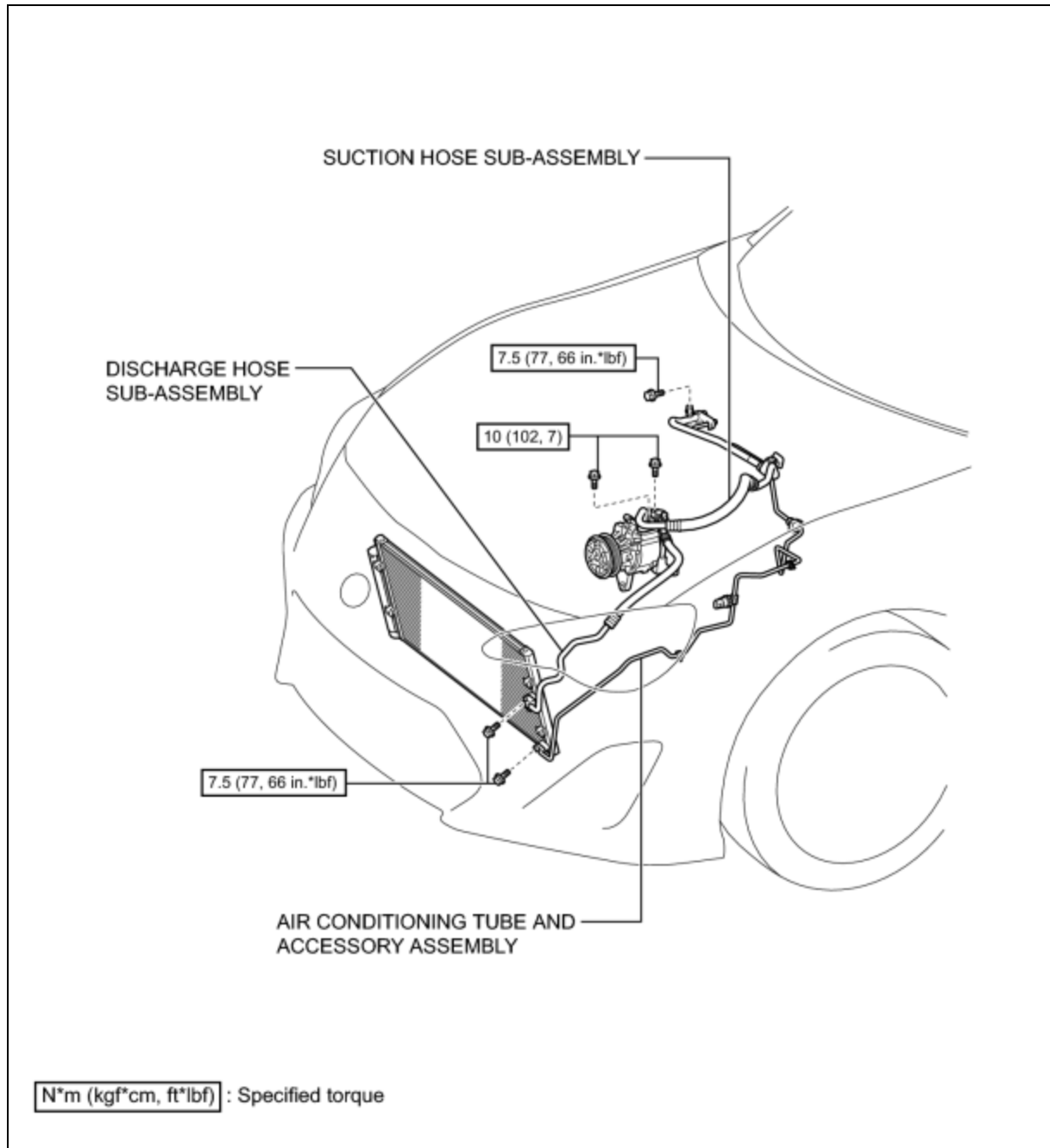
- (a) Remove the No. 1 cooler thermistor from the No. 1 cooler evaporator sub-assembly.



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003FXC004X
Title: HEATING / AIR CONDITIONING: REFRIGERANT LINE: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001R8Z030X
Title: HEATING / AIR CONDITIONING: REFRIGERANT: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

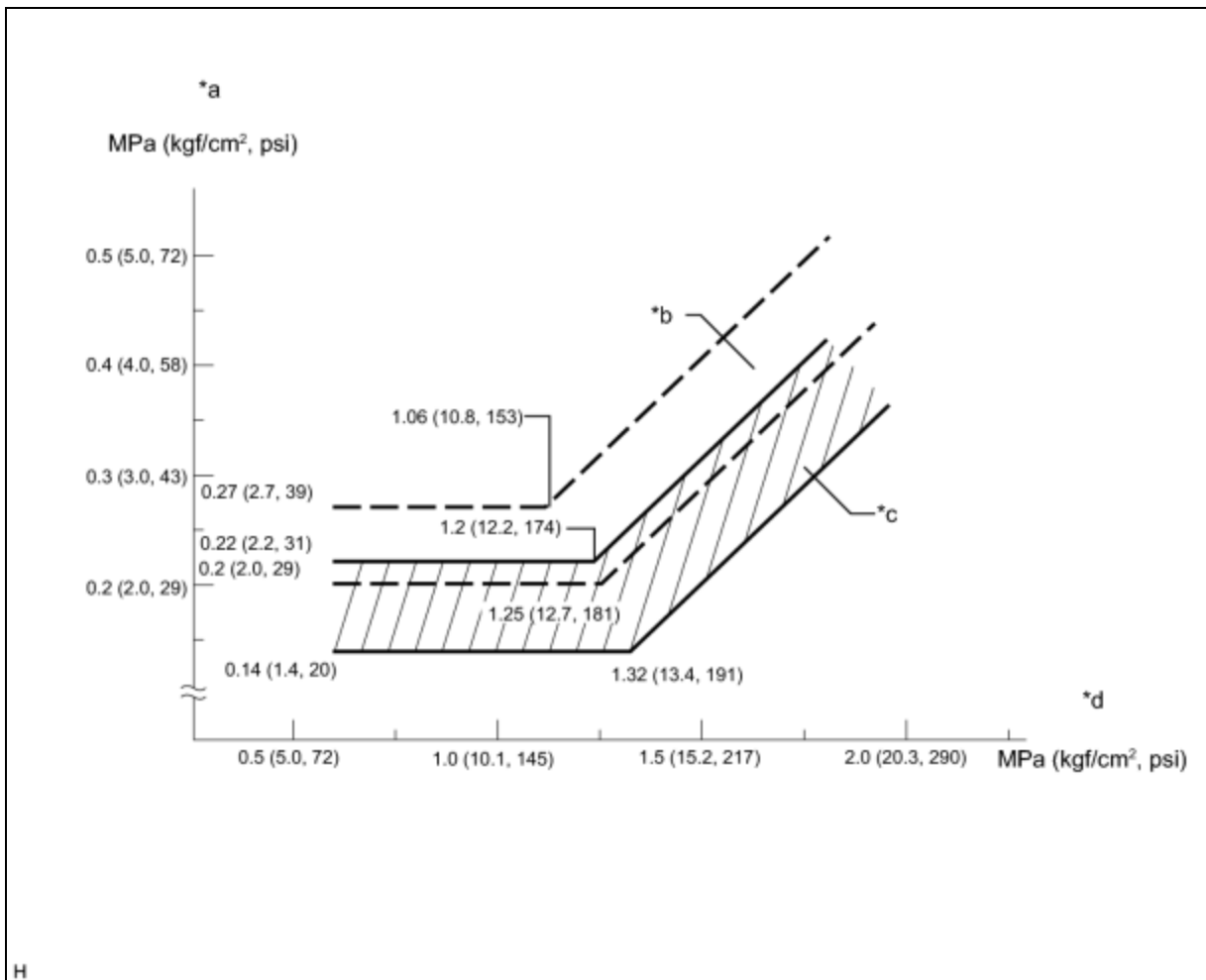
1. INSPECT REFRIGERANT PRESSURE WITH MANIFOLD GAUGE SET

(a) This method uses a manifold gauge set to locate problem areas. Read the manifold gauge pressure when the test conditions are established.

Test conditions:

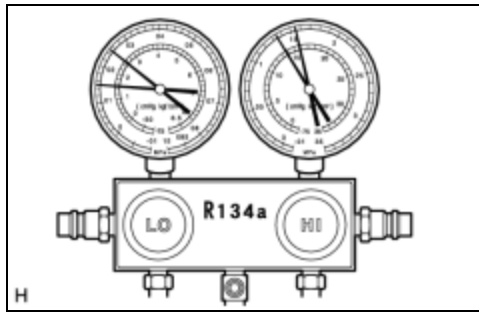
- Temperature at the air inlet with the air recirculation switch set at RECIRC is 30 to 35°C (86 to 95°F).
- Engine is running at 1500 rpm.
- All doors are fully open.
- Blower speed control switch is set to HI.
- A/C switch is on.

Gauge readings (Reference):



Text in Illustration

*a	Pressure on low-pressure side	*b	Blower HI Zone
*c	Blower LO Zone	*d	Pressure on high-pressure side

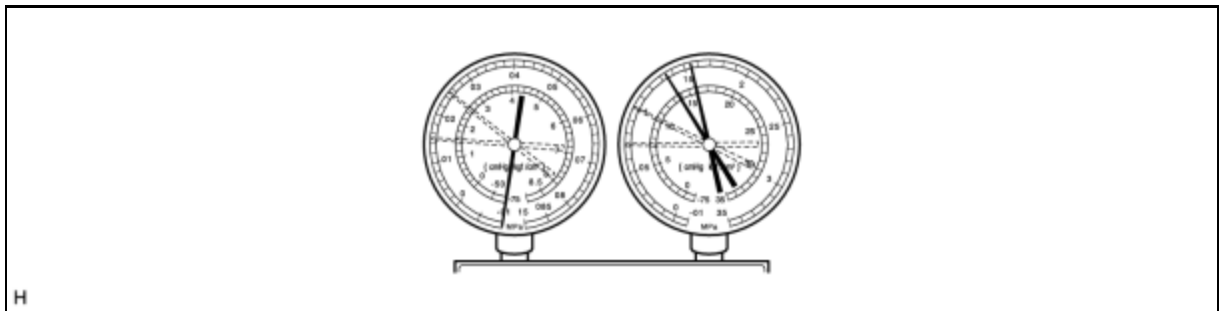


(1) Normally functioning refrigeration system.

Gauge Reading:

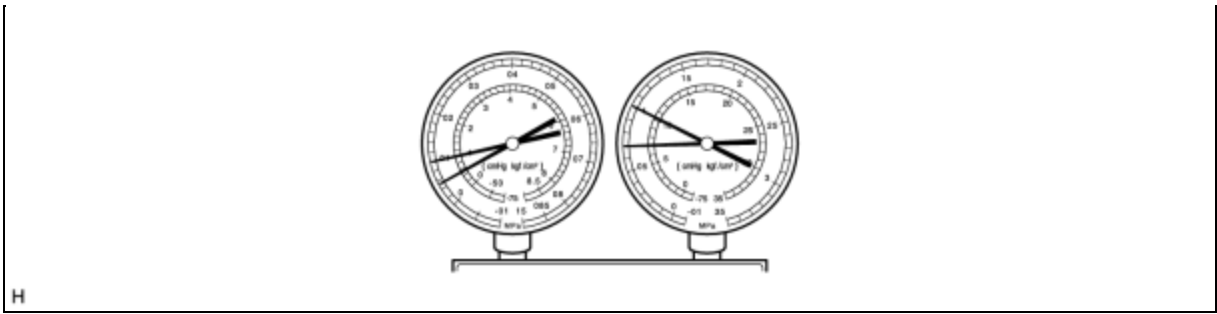
PRESSURE SIDE	REFRIGERANT VOLUME
Low	0.15 to 0.25 MPa (1.5 to 2.5 kgf/cm ²)
High	1.37 to 1.57 MPa (14 to 16 kgf/cm ²)

(2) The A/C system periodically changes between normal and improper function due to moisture in the refrigerant system.



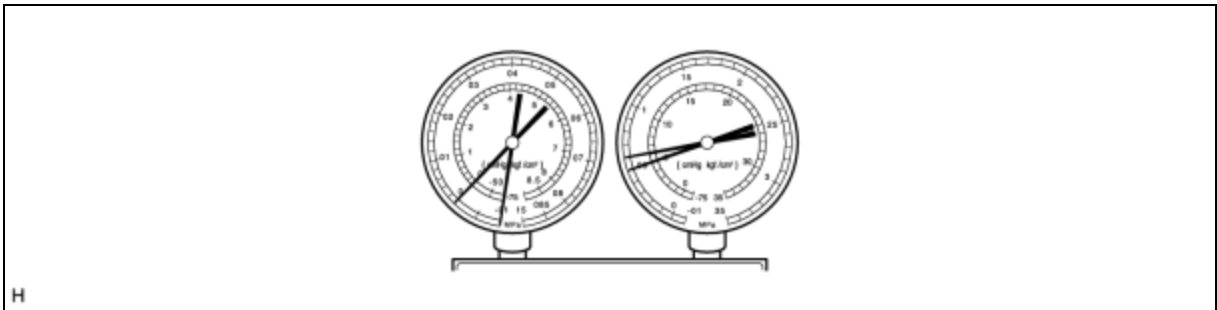
SYMPTOM	PROBABLE CAUSE	DIAGNOSIS	CORRECTIVE ACTION
During operation, pressure on low pressure side cycles between normal and vacuum	Moisture in refrigeration system freezes at expansion valve orifice, causing temporary stop of cycle. However, when melted, normal state is restored.	<ul style="list-style-type: none"> • Dryer is overly saturated • Moisture in refrigeration system freezes at expansion valve orifice and blocks refrigerant circulation 	<ol style="list-style-type: none"> 1. Replace cooler dryer 2. Remove moisture from cycle by repeatedly evacuating air 3. Supply appropriate volume of new refrigerant

(3) The A/C system does not function effectively due to insufficient refrigerant.



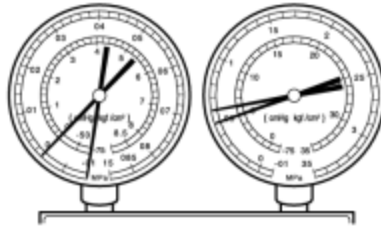
SYMPTOM	PROBABLE CAUSE	DIAGNOSIS	CORRECTIVE ACTION
<ul style="list-style-type: none"> • Pressure low on both low and high pressure sides • Cooling performance insufficient 	Gas leakage from refrigeration system	<ul style="list-style-type: none"> • Insufficient refrigerant • Refrigerant leakage 	<ol style="list-style-type: none"> 1. Check for gas leakage and repair if necessary 2. Supply appropriate volume of new refrigerant 3. If indicated pressure value close to 0 with gauge connected, create vacuum after inspecting and repairing location of leakage

(4) The A/C system does not function effectively due to poor circulation of the refrigerant.



SYMPTOM	PROBABLE CAUSE	DIAGNOSIS	CORRECTIVE ACTION
<ul style="list-style-type: none"> • Pressure low on both low and high pressure sides • Frost exists on piping from condenser to A/C unit 	Refrigerant flow obstructed by dirt in condenser	Condenser clogged	Replace condenser

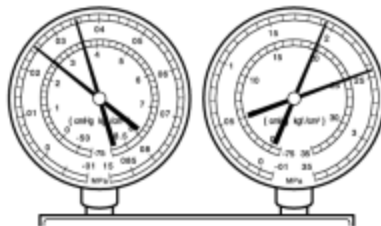
(5) The A/C system does not function or functions intermittently because the refrigerant does not circulate.



H

SYMPTOM	PROBABLE CAUSE	DIAGNOSIS	CORRECTIVE ACTION
<ul style="list-style-type: none"> • Vacuum indicated on low pressure side, and extremely low pressure indicated on high pressure side • Frost or condensation seen on piping on both sides of condenser or expansion valve 	<ul style="list-style-type: none"> • Refrigerant flow obstructed by moisture or dirt in refrigeration system • Refrigerant flow obstructed by gas leakage from expansion valve 	<p>Refrigerant does not circulate</p>	<ol style="list-style-type: none"> 1. Check expansion valve refrigerant 2. Clean expansion valve using compressed air 3. Replace condenser 4. Evacuate air and charge system with appropriate volume of new refrigerant 5. For gas leakage from expansion valve, replace expansion valve

(6) The A/C system does not function effectively due to the system being overcharged with refrigerant or insufficient cooling of the condenser.



H

SYMPTOM	PROBABLE CAUSE	DIAGNOSIS	CORRECTIVE ACTION
			<ol style="list-style-type: none"> 1. Clean condenser

Pressure extremely high on both low and high-pressure sides	<ul style="list-style-type: none"> Excessive refrigerant Cooling performance of condenser insufficient 	<ul style="list-style-type: none"> Condenser is dirty Condenser fan motor is malfunctioning Excessive refrigerant 	<ol style="list-style-type: none"> Check condenser fan motor operation If actions taken in 1 and 2 do not solve problem, check amount of refrigerant and adjust amount of refrigerant to appropriate amount
---	--	--	---

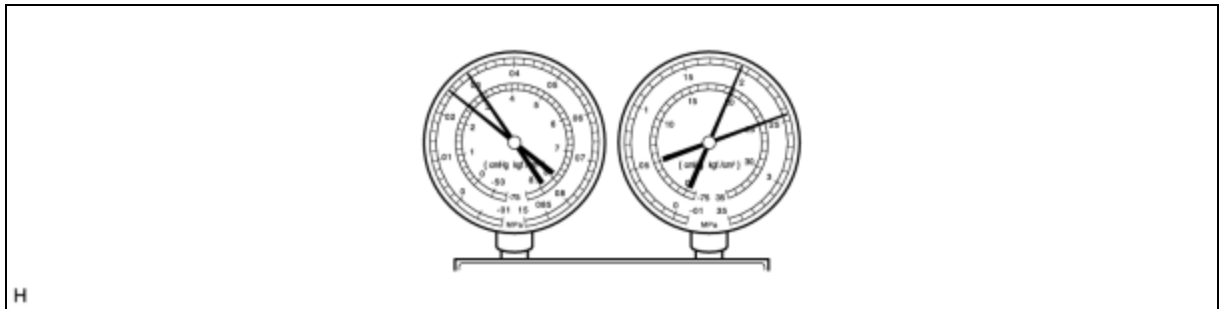
(7) The A/C system does not function due to air in the refrigeration system.

CAUTION:

The low-pressure piping may be very hot and cause serious burns.

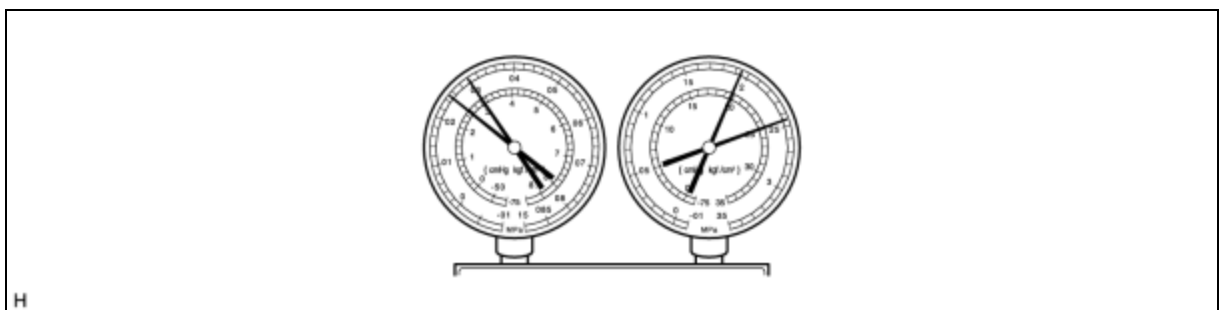
NOTICE:

These gauge indications occur when the refrigeration system opens and the system is charged with refrigerant without vacuum purging.



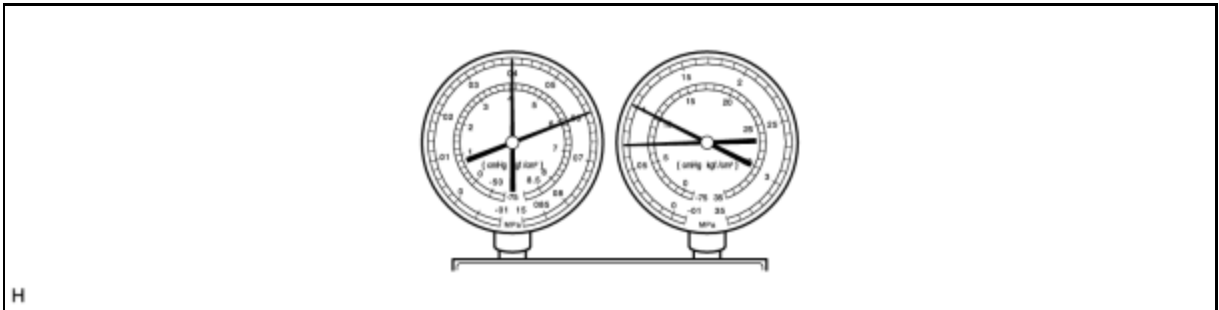
SYMPTOM	PROBABLE CAUSE	DIAGNOSIS	CORRECTIVE ACTION
<ul style="list-style-type: none"> Pressure extremely high on both low and high-pressure sides Low-pressure piping is too hot to touch 	Air in refrigeration system	<ul style="list-style-type: none"> Air in refrigeration system Vacuum purging insufficient 	<ol style="list-style-type: none"> Check if compressor oil is dirty or insufficient Evacuate air and charge system with new refrigerant

(8) The A/C system does not function effectively due to an expansion valve malfunction.



SYMPTOM	PROBABLE CAUSE	DIAGNOSIS	CORRECTIVE ACTION
<ul style="list-style-type: none"> • Pressure extremely high on both low and high-pressure sides • Frost or condensation on piping on low-pressure side 	Problem with expansion valve	<ul style="list-style-type: none"> • Excessive refrigerant in low pressure piping • Expansion valve open too widely 	Replace expansion valve

(9) The A/C system does not function due to a defective compressor.



SYMPTOM	PROBABLE CAUSE	DIAGNOSIS	CORRECTIVE ACTION
<ul style="list-style-type: none"> • Pressure extremely high on both low and high-pressure sides • Pressure extremely low on high pressure side 	Internal leakage in compressor	<ul style="list-style-type: none"> • Compression failure • Leakage from damaged valve or broken sliding parts 	Repair or replace compressor

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001R8Y033X
Title: HEATING / AIR CONDITIONING: REFRIGERANT: REPLACEMENT (2013 FR-S)		

REPLACEMENT

1. RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM

- (a) Start the engine.
- (b) Operate the cooler compressor under the conditions shown below:

ITEM	CONDITION
Engine Speed	Idling
Operating Time	3 minutes or more
A/C Switch Status	On
Blower Switch Status	HI
Set Temperature	MAX COOL

This causes most of the compressor oil from the various components of the A/C system to collect in the A/C compressor.

NOTICE:

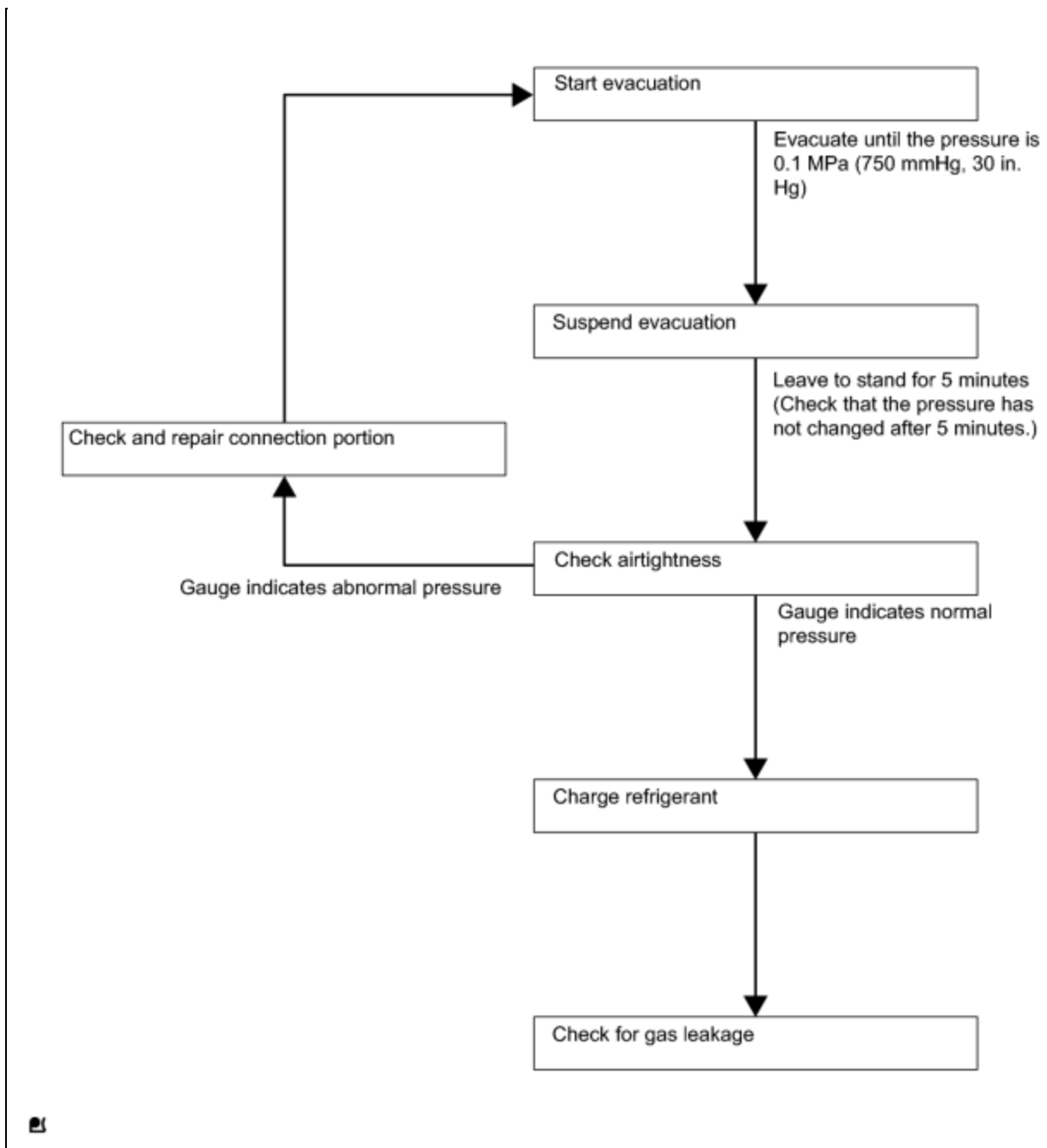
It is not necessary to operate the cooler compressor if the A/C does not operate because of compressor lock, etc.

- (c) Stop the engine.
- (d) Recover the refrigerant from the A/C system using a refrigerant recovery unit.

HINT:

Use the refrigerant recovery unit in accordance with the manufacturer's instruction manual.

2. CHARGE REFRIGERANT



HINT:

Charge refrigerant in accordance with the equipment manual.

- (a) Perform vacuum purging using a vacuum pump.
- (b) Charge refrigerant HFC-134a (R134a).

SST: 09985-20010

09985-02130

09985-02150

09985-02090

09985-02110

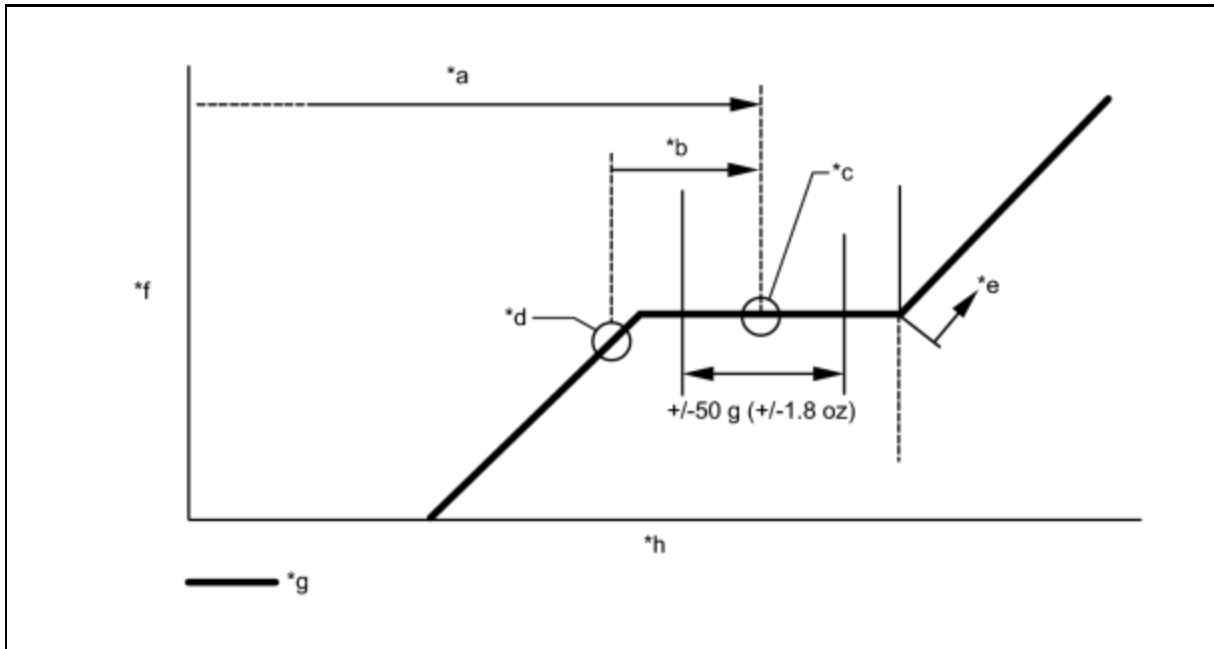
09985-02010

09985-02050

09985-02060

09985-02070

Standard:
390 +/-50 g (13.8 +/-1.8 oz)



Text in Illustration

*a	Amount to be charged	*b	Charge 100 g (3.53 oz)
*c	Mean value in proper range	*d	Point where bubbles disappear
*e	Overcharged	*f	Pressure
*g	Sub-cool system	*h	Refrigerant amount

NOTICE:

- Do not operate the cooler compressor before charging refrigerant as the cooler compressor will not work properly without any refrigerant, and will overheat.
- The system may need to be charged with approximately 100 g (3.53 oz) of refrigerant after bubbles disappear. The refrigerant amount should be checked by measuring its quantity, and not with the sight glass.

3. WARM UP ENGINE

(a) Warm up the engine at less than 1640 rpm for 2 minutes or more after charging the refrigerant.

NOTICE:

Be sure to warm up the compressor by turning the A/C switch on after removing and installing the cooler refrigerant lines (including the compressor) to prevent damage to the compressor.

4. CHECK FOR REFRIGERANT GAS LEAK

(a) After recharging the refrigerant, check for refrigerant gas leakage using a halogen leak detector.

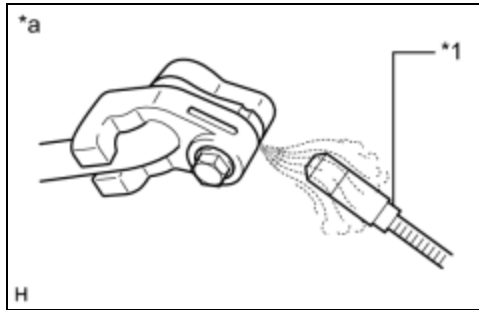
(1) Perform the operation observing the following instructions:

- Stop the engine.
- Secure good ventilation (the halogen leak detector may react to volatile gases other than refrigerant, such as evaporated gasoline or exhaust gas).
- Repeat the test 2 or 3 times.

- Make sure that some refrigerant remains in the refrigeration system.

HINT:

When the compressor is off: approximately 392 to 588 kPa (4.0 to 6.0 kgf/cm² , 57 to 85 psi).



(2) Using a halogen leak detector, check the refrigerant line for leakage.

(3) If a gas leak is not detected from the drain hose, remove the blower motor control (blower resistor) from the cooling unit. Insert the halogen leak detector sensor into the unit and check for gas leakage.

(4) Disconnect the pressure switch connector and wait for approximately 20 minutes. Bring the halogen leak detector close to the pressure switch and check for gas leakage.

Text in Illustration

*1	Halogen Leak Detector
*a	Check for Leakage

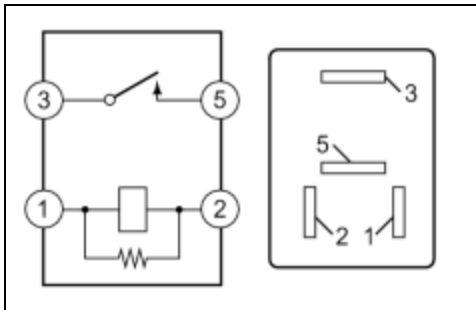
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003WXB00GX
Title: HEATING / AIR CONDITIONING: RELAY: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT HEATER RELAY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



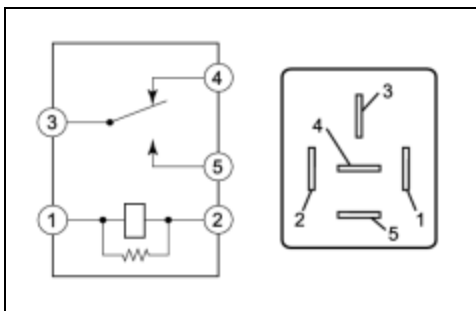
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 5	Battery voltage not applied	10 k Ω or higher
3 - 5	Battery voltage applied to terminals 1 and 2	Below 1 Ω

If the result is not as specified, replace the heater relay.

2. INSPECT HEATER BLOWER MOTOR RELAY ASSEMBLY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



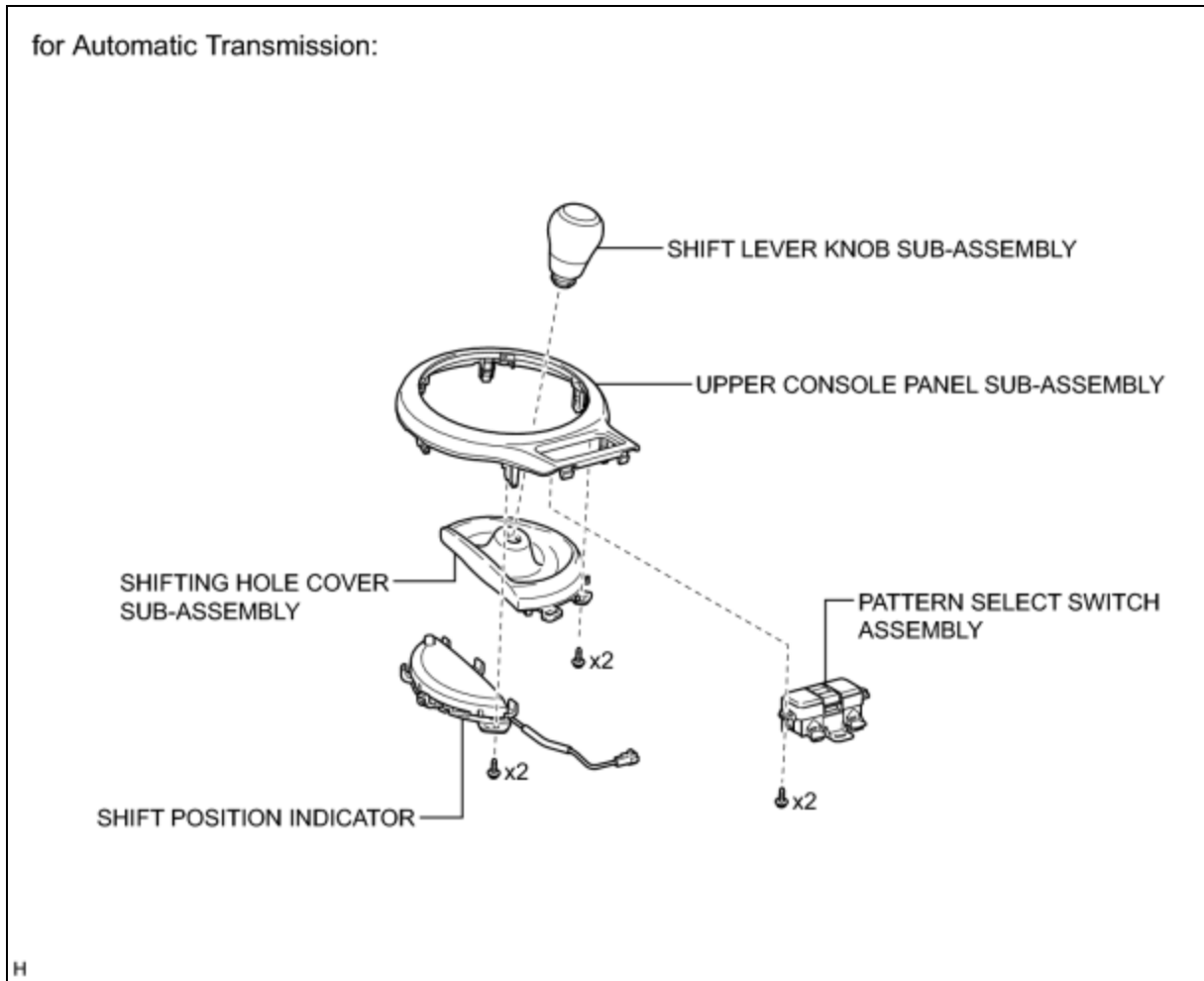
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 - 4	Battery voltage not applied	Below 1 Ω
3 - 4	Battery voltage applied to terminals 1 and 2	10 k Ω or higher
3 - 5	Battery voltage not applied	10 k Ω or higher
3 - 5	Battery voltage applied to terminals 1 and 2	Below 1 Ω

If the result is not as specified, replace the heater relay.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003NEB011X
Title: INTERIOR PANELS / TRIM: FRONT CONSOLE BOX: COMPONENTS (2013 FR-S)		

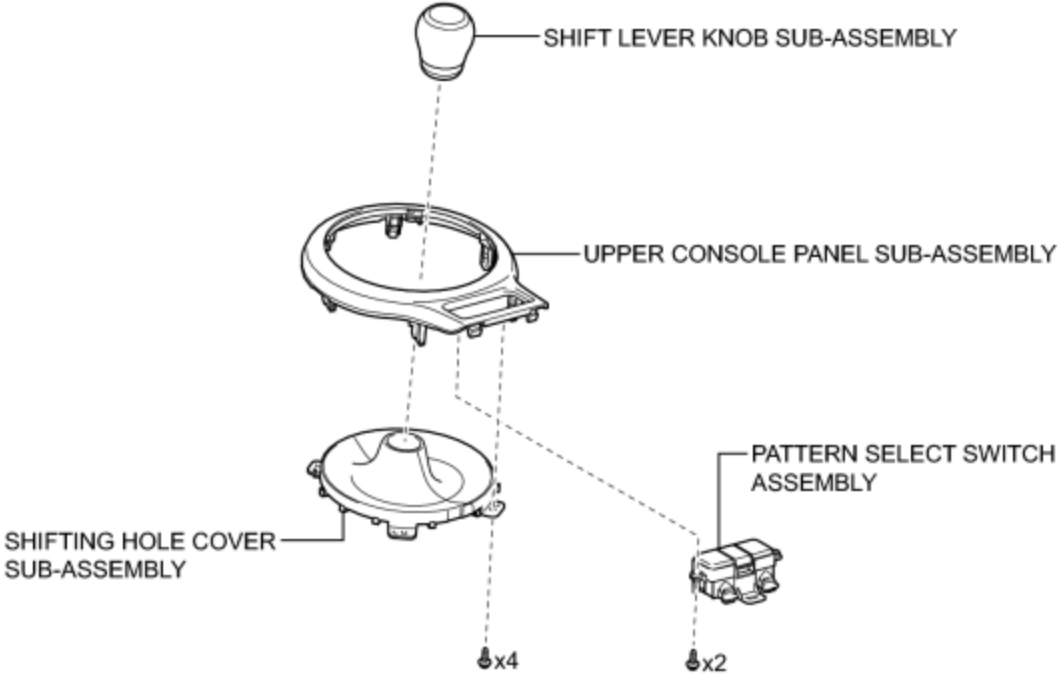
COMPONENTS

ILLUSTRATION



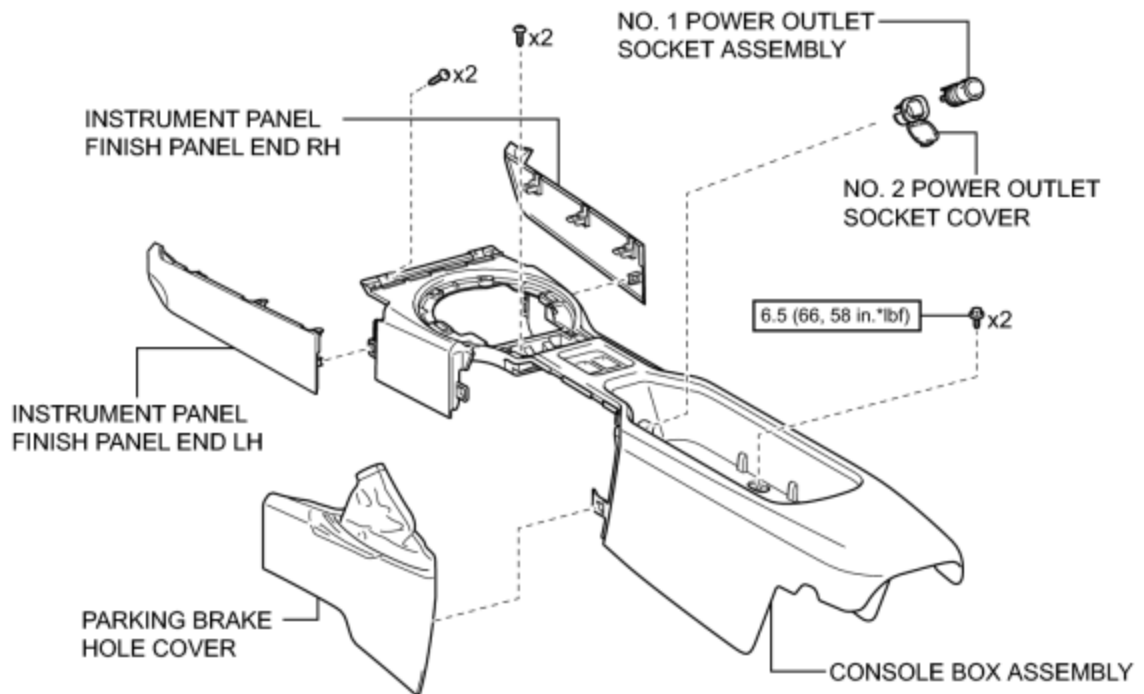
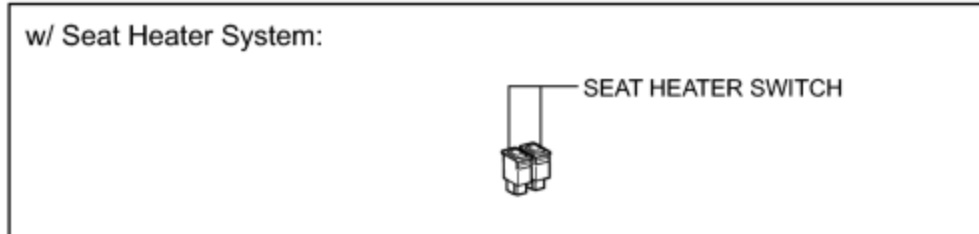
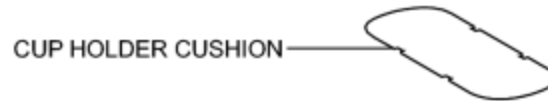
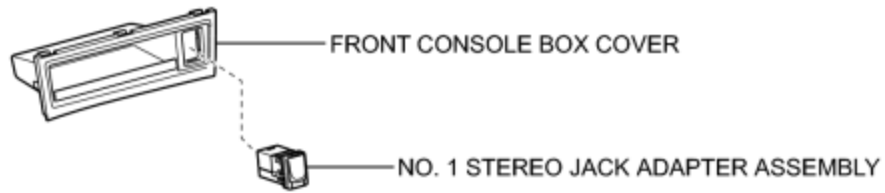
ILLUSTRATION

for Manual Transmission:



H

ILLUSTRATION



N·m (kgf·cm, ft·lbf) : Specified torque

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004R0J003X
Title: INTERIOR PANELS / TRIM: FRONT CONSOLE BOX: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. REMOVE NO. 1 POWER OUTLET SOCKET ASSEMBLY [INFO](#)
2. REMOVE NO. 2 POWER OUTLET SOCKET COVER [INFO](#)
3. REMOVE SEAT HEATER SWITCH (w/ Seat Heater System) [INFO](#)



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003NEA016X
Title: INTERIOR PANELS / TRIM: FRONT CONSOLE BOX: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL CONSOLE BOX ASSEMBLY

- (a) Connect the connector.
- (b) Install the console box assembly with the 4 screws and 2 bolts.

Bolt - Torque: 6.5 N·m (66 kgf·cm, 58in·lbf)

2. INSTALL INSTRUMENT PANEL FINISH PANEL END LH

- (a) Engage the 4 claws to install the instrument panel finish panel end LH.

3. INSTALL INSTRUMENT PANEL FINISH PANEL END RH

HINT:

Use the same procedure as for the LH side.

4. INSTALL PARKING BRAKE HOLE COVER

- (a) Engage the 5 claws to install the parking brake hole cover.

5. INSTALL CUP HOLDER CUSHION

- (a) Install the cup holder cushion.

6. INSTALL INSTRUMENT PANEL CUP HOLDER

- (a) Install the instrument panel cup holder.

7. INSTALL PATTERN SELECT SWITCH ASSEMBLY (for Manual Transmission)

INFO

8. INSTALL SHIFTING HOLE COVER SUB-ASSEMBLY (for Manual Transmission)

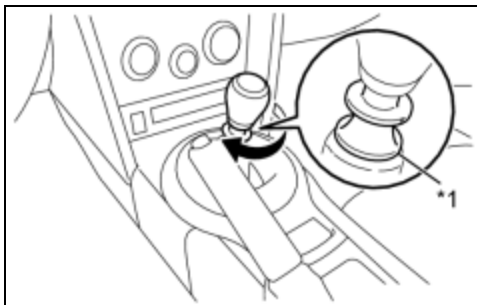
- (a) Install the shifting hole cover sub-assembly with the 4 screws.

9. INSTALL UPPER CONSOLE PANEL SUB-ASSEMBLY (for Manual Transmission)

- (a) Connect the connector.
- (b) Engage the 2 clips and 4 claws to install the upper console panel sub-assembly.

10. INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transmission)

- (a) Turn the knob clockwise to install the shift lever knob sub-assembly.



Text in Illustration

*1

Pull collar

NOTICE:

- Tighten the shift lever knob until the tightening on the shift lever knob stiffens.

Check that the transmission moves into reverse when the pull collar is pulled.

11. INSTALL PATTERN SELECT SWITCH ASSEMBLY (for Automatic Transmission)

INFO

12. INSTALL SHIFTING HOLE COVER SUB-ASSEMBLY (for Automatic Transmission)

- (a) Engage the claw.
- (b) Install the shifting hole cover sub-assembly with the 2 screws.

13. INSTALL SHIFT POSITION INDICATOR (for Automatic Transmission)

- (a) Engage the clamp.
- (b) Install the shift position indicator with the 2 screws.

14. INSTALL UPPER CONSOLE PANEL SUB-ASSEMBLY (for Automatic Transmission)

- (a) Connect the connector.
- (b) Engage the 2 clips and 4 claws to install the upper console panel sub-assembly.

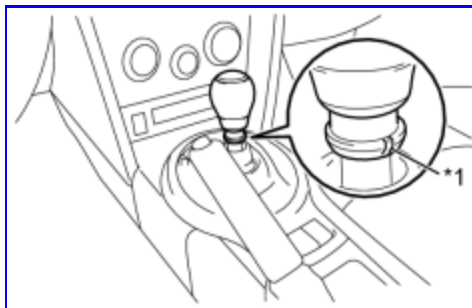
15. INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (for Automatic Transmission)

- (a) Turn the knob clockwise to install the shift lever knob sub-assembly.



NOTICE:

- Tighten the shift lever knob until the tightening on the shift lever knob stiffens.
- Face the groove on the shift lever knob toward the rear of the vehicle.



Text in Illustration

*1

Groove

16. INSTALL NO. 1 STEREO JACK ADAPTER ASSEMBLY

INFO

17. INSTALL FRONT CONSOLE BOX COVER

- (a) Engage the 6 claws to install the front console box cover.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004R0K003X
Title: INTERIOR PANELS / TRIM: FRONT CONSOLE BOX: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL SEAT HEATER SWITCH (w/ Seat Heater System) [INFO](#)
2. INSTALL NO. 2 POWER OUTLET SOCKET COVER [INFO](#)
3. INSTALL NO. 1 POWER OUTLET SOCKET ASSEMBLY [INFO](#)

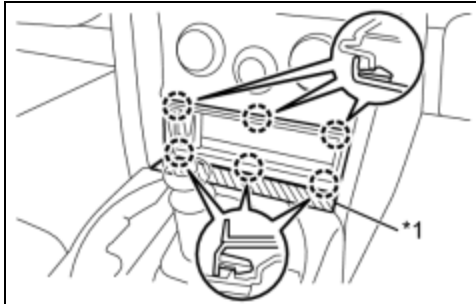


Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003NEC016X
Title: INTERIOR PANELS / TRIM: FRONT CONSOLE BOX: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE FRONT CONSOLE BOX COVER

(a) Move the shift lever to N.



(b) Apply protective tape to the area shown in the illustration.

Text in Illustration

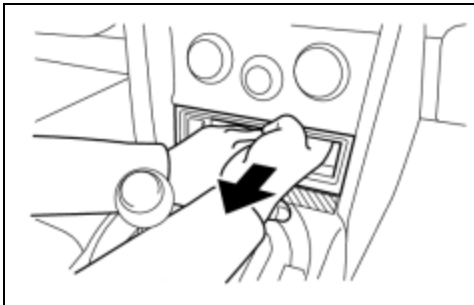
*1

Protective Tape

(c) Disengage the 6 claws and remove the front console box cover.

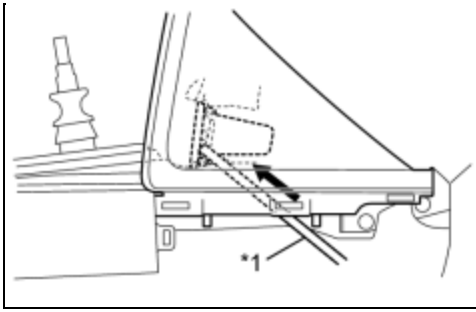
HINT:

Hold the inside of the pocket with your hand, and pull off the front console box cover.



HINT:

Remove the instrument panel finish panel end RH, and then push the reverse side of the front console box cover with a bar (tool handle, etc.) to remove it.



Text in Illustration

*1	Bar
----	-----

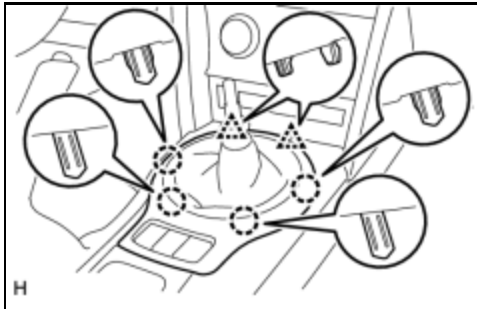
2. REMOVE NO. 1 STEREO JACK ADAPTER ASSEMBLY (w/ Stereo Jack Adapter) INFO

3. REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (for Automatic Transmission)



(a) Turn the knob counterclockwise and remove the shift lever knob sub-assembly.

4. REMOVE UPPER CONSOLE PANEL SUB-ASSEMBLY (for Automatic Transmission)

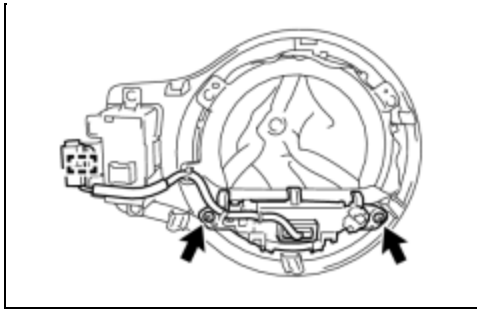


(a) Disengage the 2 clips and 4 claws.

(b) Disconnect each connector and remove the upper console panel sub-assembly.

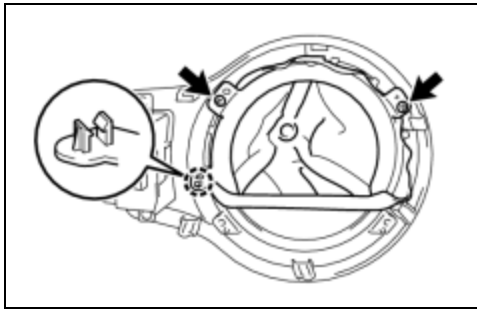
5. REMOVE SHIFT POSITION INDICATOR (for Automatic Transmission)

(a) Remove the 2 screws.



(b) Disengage the clamp to remove the shift position indicator.

6. REMOVE SHIFTING HOLE COVER SUB-ASSEMBLY (for Automatic Transmission)



(a) Remove the 2 screws.

(b) Disengage the claw to remove the shifting hole cover sub-assembly.

7. REMOVE PATTERN SELECT SWITCH ASSEMBLY (for Automatic Transmission)

INFO

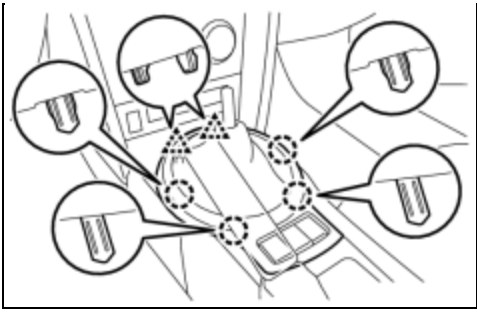
8. REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transmission)



(a) Turn the knob counterclockwise and remove the shift lever knob sub-assembly.

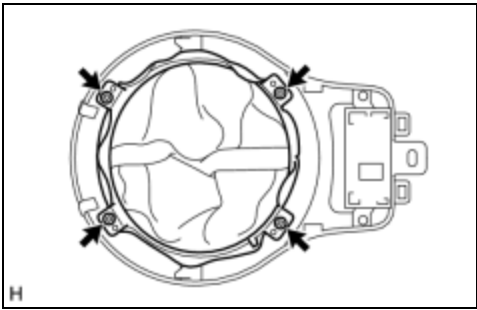
9. REMOVE UPPER CONSOLE PANEL SUB-ASSEMBLY (for Manual Transmission)

(a) Disengage the 2 clips and 4 claws.



(b) Disconnect each connector and remove the upper console panel sub-assembly.

10. REMOVE SHIFTING HOLE COVER SUB-ASSEMBLY (for Manual Transmission)

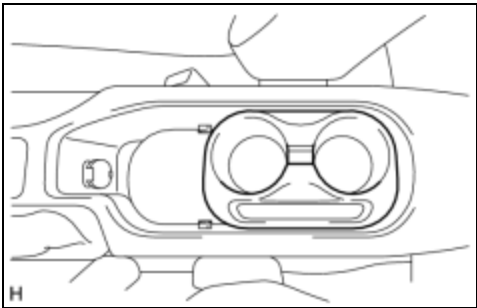


(a) Remove the 4 screws and the shifting hole cover sub-assembly.

11. REMOVE PATTERN SELECT SWITCH ASSEMBLY (for Manual Transmission)

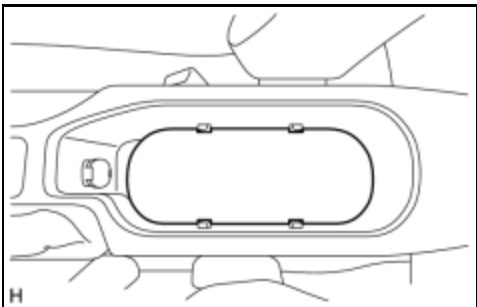
INFO

12. REMOVE INSTRUMENT PANEL CUP HOLDER



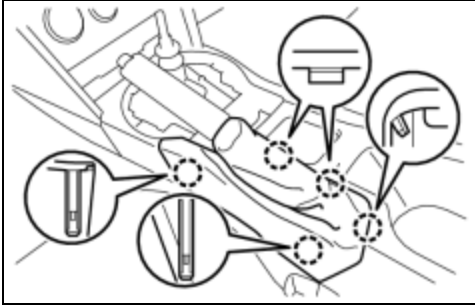
(a) Remove the instrument panel cup holder.

13. REMOVE CUP HOLDER CUSHION



(a) Remove the cup holder cushion.

14. REMOVE PARKING BRAKE HOLE COVER

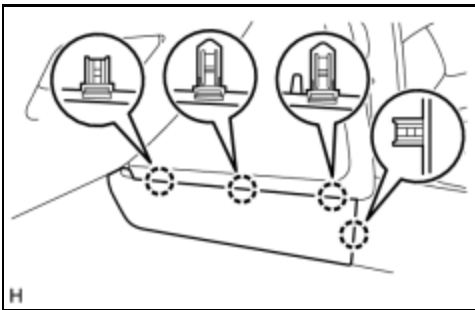


- (a) Disengage the 5 claws to remove the parking brake hole cover.

NOTICE:

Remove the parking brake hole cover by pulling straight it up to disengage the claws, If not claws may be broken.

15. REMOVE INSTRUMENT PANEL FINISH PANEL END LH



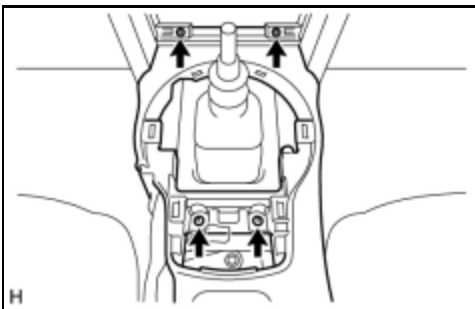
- (a) Disengage the 4 claws to remove the instrument panel finish panel end LH.

16. REMOVE INSTRUMENT PANEL FINISH PANEL END RH

HINT:

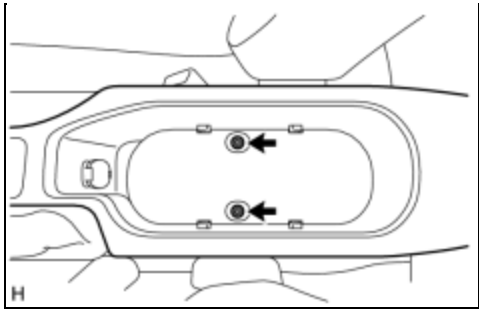
Use the same procedure described for the LH side.

17. REMOVE CONSOLE BOX ASSEMBLY



- (a) Remove the 4 screws.

- (b) Remove the 2 bolts.

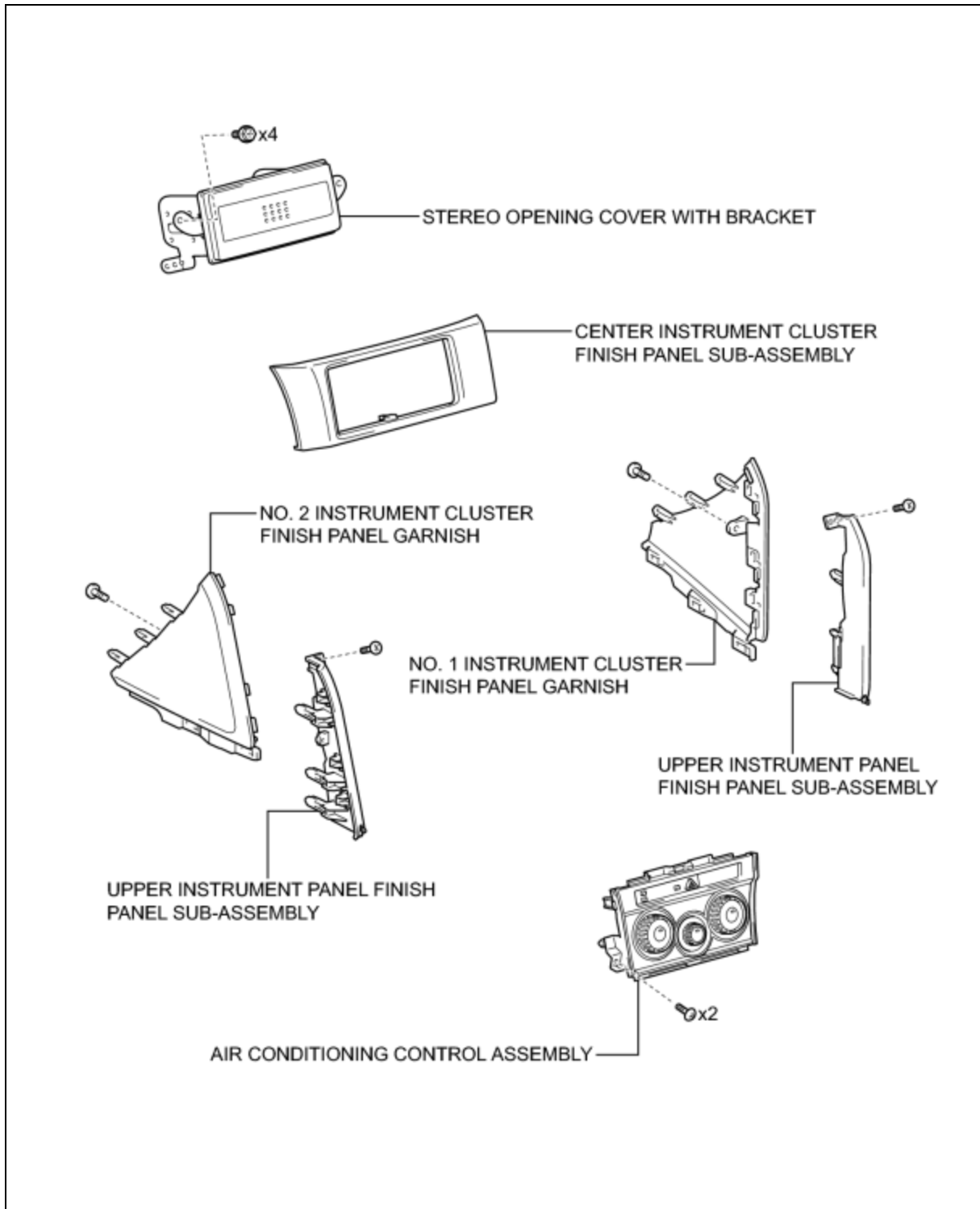


(c) Disconnect each connector and remove the console box assembly.

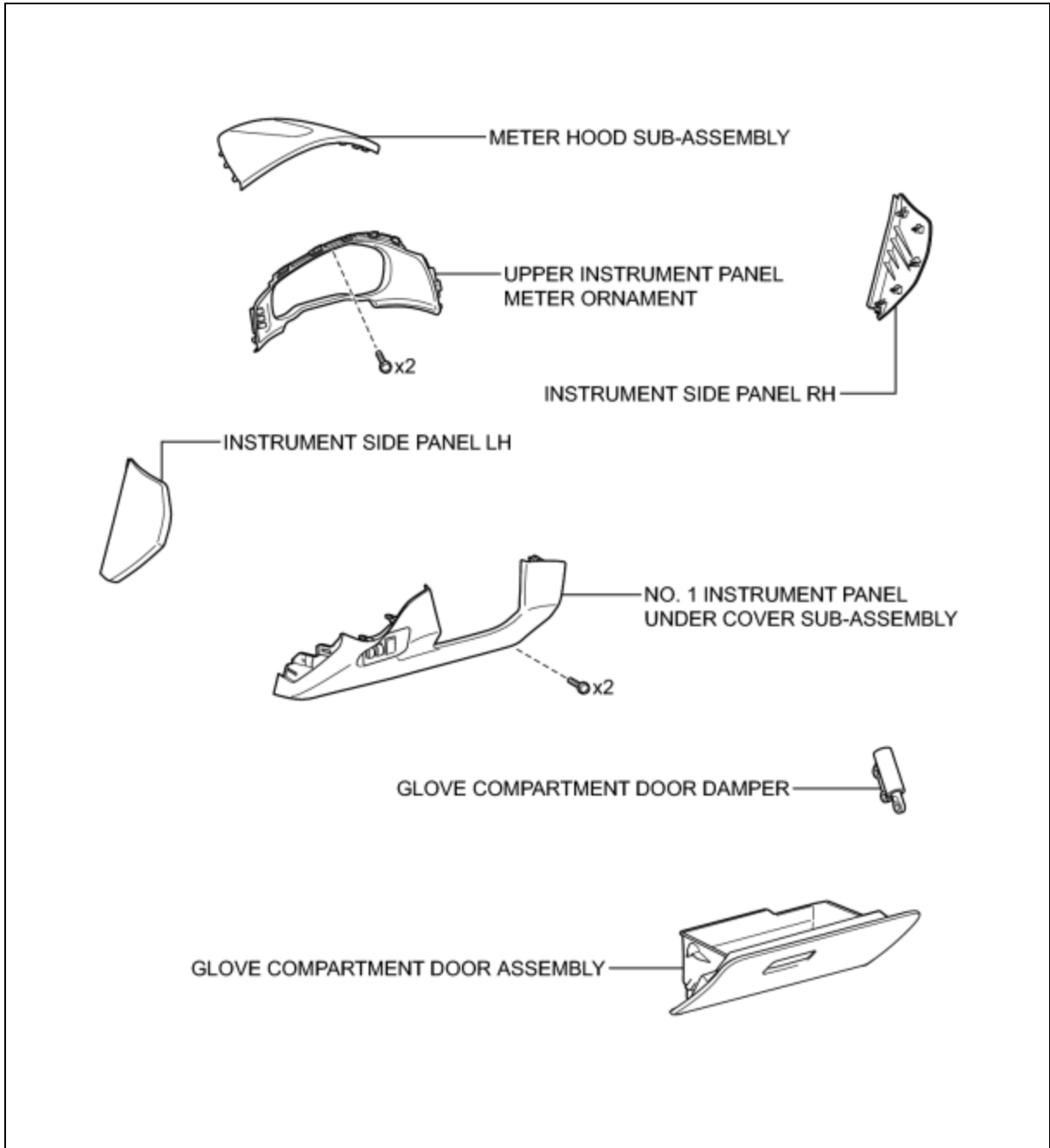
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003O2P00GX
Title: INTERIOR PANELS / TRIM: LOWER INSTRUMENT PANEL: COMPONENTS (2013 FR-S)		

COMPONENTS

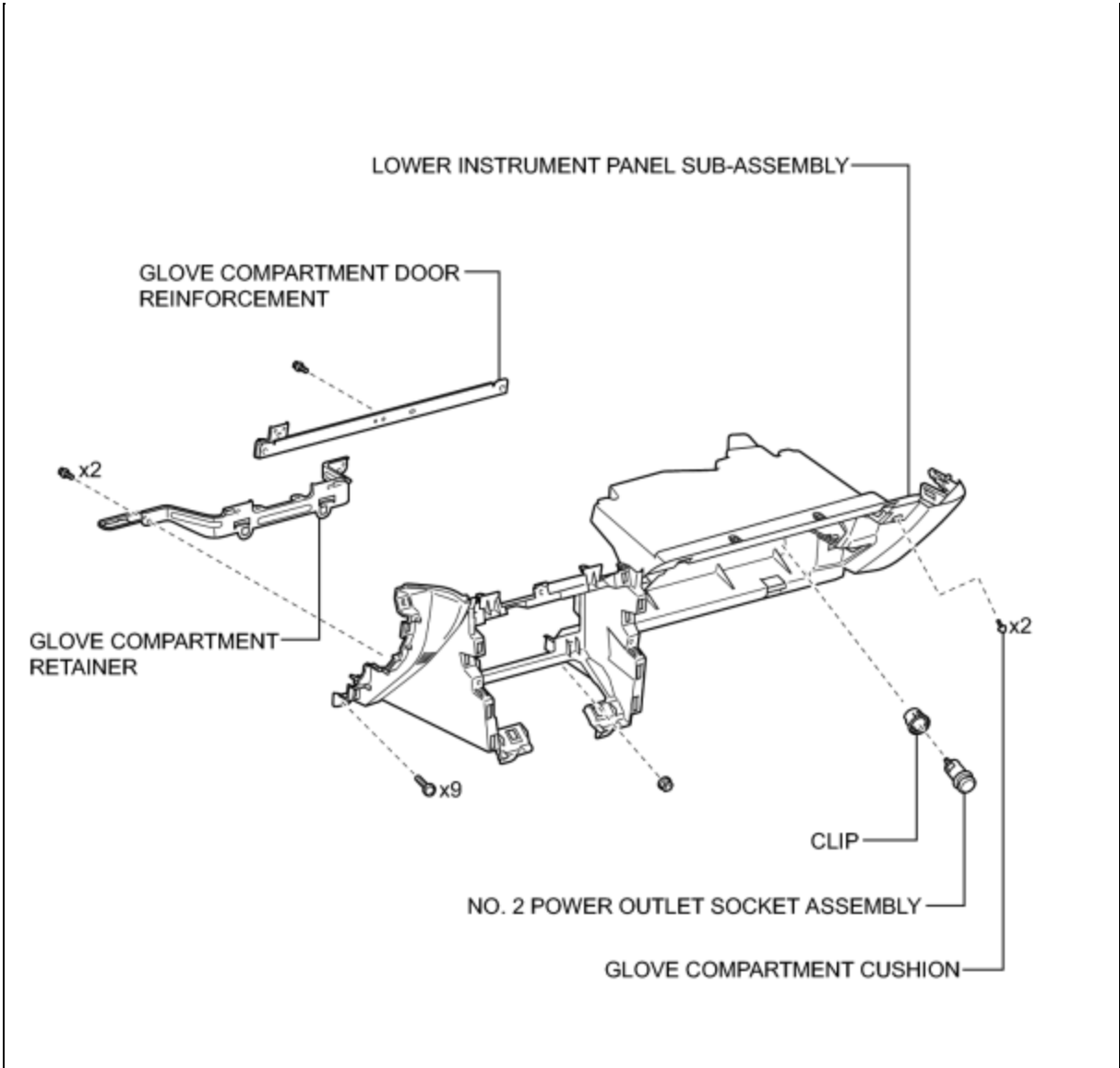
ILLUSTRATION



ILLUSTRATION



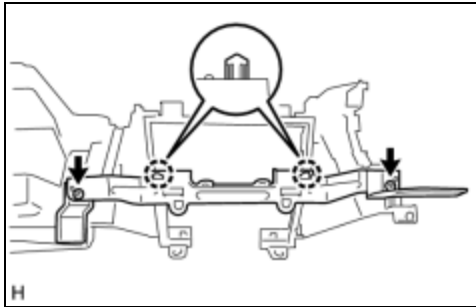
ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003O1V000X
Title: INTERIOR PANELS / TRIM: LOWER INSTRUMENT PANEL: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

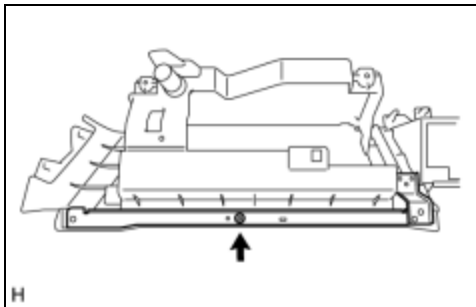
1. REMOVE GLOVE COMPARTMENT RETAINER



(a) Remove the 2 screws.

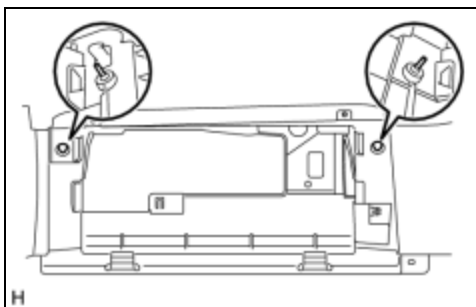
(b) Disengage the 2 claws to remove the glove compartment retainer.

2. REMOVE GLOVE COMPARTMENT DOOR REINFORCEMENT



(a) Remove the screw and the glove compartment door reinforcement.

3. REMOVE GLOVE COMPARTMENT CUSHION



(a) Remove the 2 glove compartment cushions.

4. REMOVE NO. 2 POWER OUTLET SOCKET ASSEMBLY [INFO](#)

5. REMOVE CLIP [INFO](#)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003O2M00GX
Title: INTERIOR PANELS / TRIM: LOWER INSTRUMENT PANEL: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL LOWER INSTRUMENT PANEL SUB-ASSEMBLY

- (a) Connect the connectors.
- (b) Engage the 12 claws.
- (c) Install the lower instrument panel sub-assembly with the 2 screws and nut.

2. INSTALL GLOVE COMPARTMENT DOOR DAMPER

- (a) Engage the claw to install the glove compartment door damper.

3. INSTALL GLOVE COMPARTMENT DOOR ASSEMBLY

- (a) Horizontally engage the 2 hinges of the outer glove compartment door.

NOTICE:

Make sure to install the glove compartment door assembly hinges horizontally.

- (b) Engage the 2 stoppers to install the glove compartment door assembly.
- (c) Engage the claw to install the glove compartment door damper.

4. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

INFO

5. INSTALL UPPER INSTRUMENT PANEL METER ORNAMENT

- (a) Connect the connector.
- (b) Engage the 2 claws that are holding the upper instrument panel meter ornament and steering column cover together.
- (c) Engage the 2 clips and 6 claws.
- (d) Install the upper instrument panel meter ornament with the screw.

6. INSTALL METER HOOD SUB-ASSEMBLY

- (a) Engage the 12 claws.
- (b) Install the meter hood sub-assembly with the screw.

7. INSTALL INSTRUMENT SIDE PANEL RH

- (a) Engage the 4 clips and claw to install the instrument side panel RH.

8. INSTALL INSTRUMENT SIDE PANEL LH

HINT:

Use the same procedure as for the RH side.

9. INSTALL AIR CONDITIONING CONTROL ASSEMBLY

INFO

10. INSTALL UPPER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY (for LH Side)

- (a) Engage the 3 claws.

(b) Install the upper instrument panel finish panel sub-assembly with the screw.

11. INSTALL NO. 2 INSTRUMENT CLUSTER FINISH PANEL GARNISH

(a) Engage the 6 claws.

(b) Install the No. 1 instrument cluster finish panel garnish with the screw.

12. INSTALL UPPER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY (for RH Side)

HINT:

Use the same procedure as for the LH side.

13. INSTALL NO. 1 INSTRUMENT CLUSTER FINISH PANEL GARNISH

HINT:

Use the same procedure as for the LH side.

14. INSTALL STEREO OPENING COVER WITH BRACKET

(a) Install the stereo opening cover with bracket with the 4 screws.

15. INSTALL CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY

(a) Engage the 4 clips and 2 claws to install the center instrument cluster finish panel sub-assembly.

16. INSTALL CONSOLE BOX ASSEMBLY

INFO

17. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL


Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)



Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003QLG02RX
Title: INTERIOR PANELS / TRIM: LOWER INSTRUMENT PANEL: PRECAUTION (2013 FR-S)		

PRECAUTION

1. PRECAUTION FOR VEHICLE WITH AIRBAG

- (a) Some operations in this section may affect the airbag. Prior to performing the corresponding operations, read the SRS Precaution  .



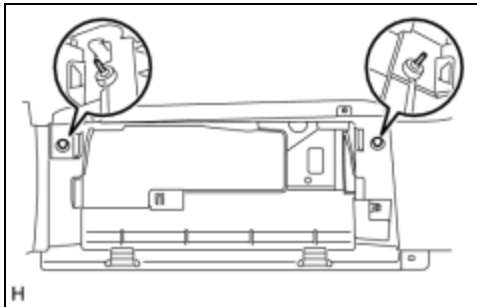
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003O2U00GX
Title: INTERIOR PANELS / TRIM: LOWER INSTRUMENT PANEL: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL CLIP INFO

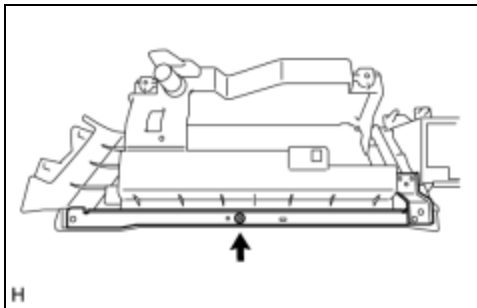
2. INSTALL NO. 2 POWER OUTLET SOCKET ASSEMBLY INFO

3. INSTALL GLOVE COMPARTMENT CUSHION



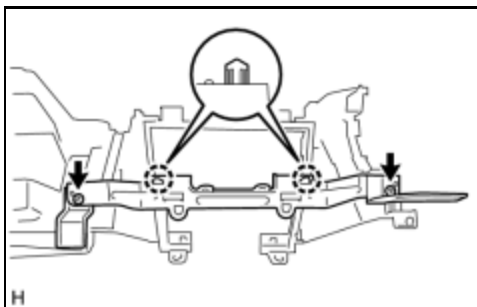
(a) Install the 2 glove compartment cushions.

4. INSTALL GLOVE COMPARTMENT DOOR REINFORCEMENT



(a) Install the glove compartment door reinforcement with the screw.

5. INSTALL GLOVE COMPARTMENT RETAINER



(a) Engage the 2 claws.

(b) Install the glove compartment retainer with the 2 screws.





Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003O1U00PX
Title: INTERIOR PANELS / TRIM: LOWER INSTRUMENT PANEL: REMOVAL (2013 FR-S)		

REMOVAL

1. TABLE OF BOLT, SCREW AND NUT

- (a) All bolts, screws and nuts relevant to installing and removing the instrument panel are shown along with an alphabetical code in the table.

Code	Shape	Code	Shape
<A>	 <p>$\varphi=11.5$ (0.453 in) Length=16 (0.630 in)</p>		 <p>$\varphi=10$ (0.394 in) Length=7 (0.276 in)</p>

2. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

3. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

4. REMOVE CONSOLE BOX ASSEMBLY

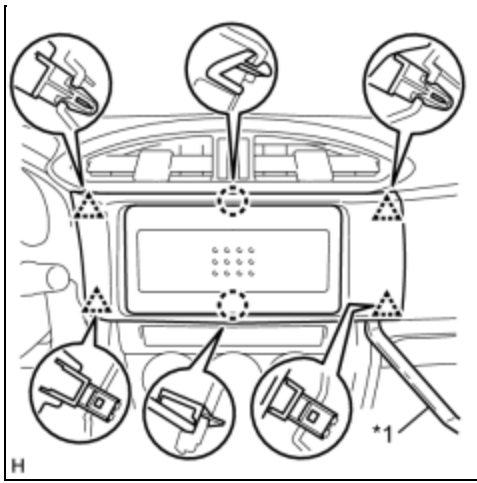
INFO

5. REMOVE CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY

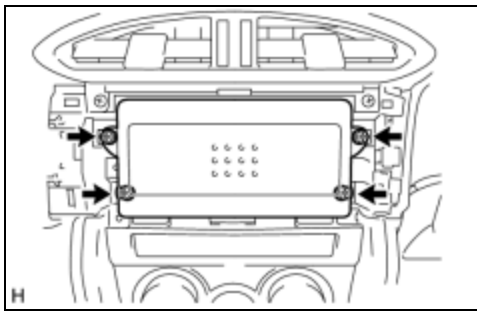
- (a) Using a moulding remover, disengage the 2 claws and 4 clips to remove the center instrument cluster finish panel sub-assembly.

Text in Illustration

*1	Moulding Remover
----	------------------

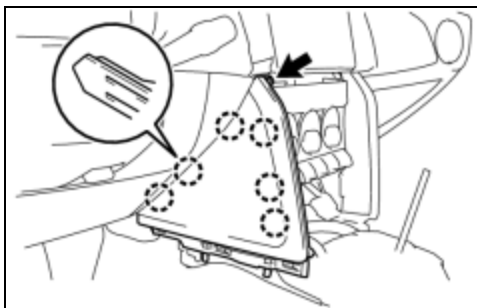


6. REMOVE STEREO OPENING COVER WITH BRACKET



(a) Remove the 4 screws to remove the stereo opening cover with bracket.

7. REMOVE NO. 2 INSTRUMENT CLUSTER FINISH PANEL GARNISH

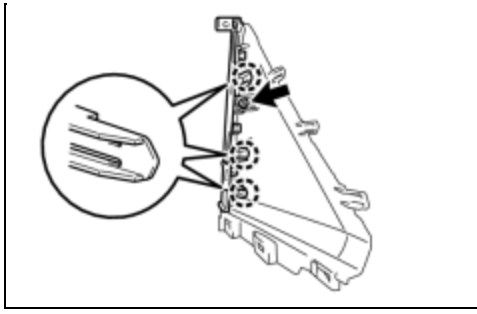


(a) Remove the screw.

(b) Disengage the 6 claws to remove the No. 2 instrument cluster finish panel garnish.

8. REMOVE UPPER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY (for LH Side)

(a) Remove the screw.



(b) Disengage the 3 claws to remove the upper instrument panel finish panel sub-assembly.

9. REMOVE NO. 1 INSTRUMENT CLUSTER FINISH PANEL GARNISH

HINT:

Use the same procedure as for the LH side.

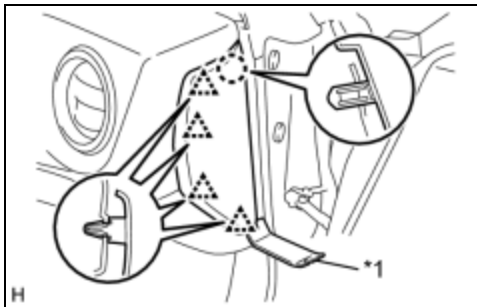
10. REMOVE UPPER INSTRUMENT PANEL FINISH PANEL SUB-ASSEMBLY (for RH Side)

HINT:

Use the same procedure as for the LH side.

11. REMOVE AIR CONDITIONING CONTROL ASSEMBLY INFO

12. REMOVE INSTRUMENT SIDE PANEL RH



(a) Using a moulding remover, disengage the claw and 4 clips and remove the instrument side panel RH.

Text in Illustration

*1	Moulding Remover
----	------------------

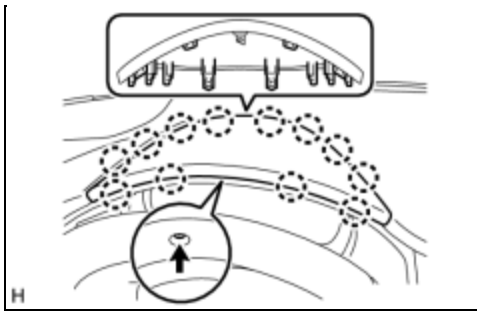
13. REMOVE INSTRUMENT SIDE PANEL LH

HINT:

Use the same procedure as for the RH side.

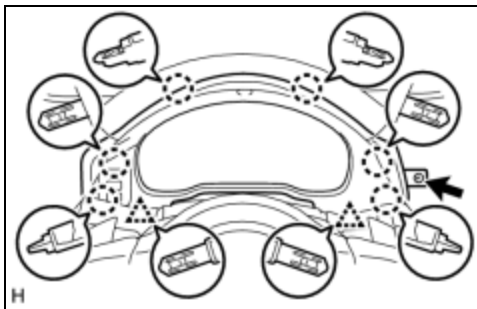
14. REMOVE METER HOOD SUB-ASSEMBLY

(a) Remove the screw.



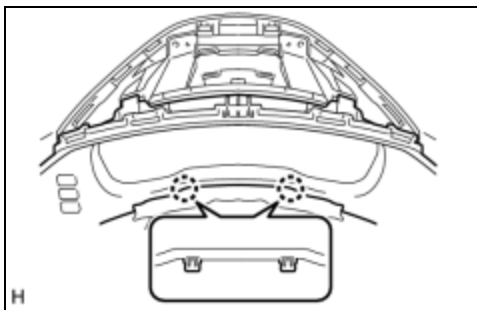
- (b) Disengage the 12 claws, and then pull out the meter hood sub-assembly diagonally upwards to remove it.

15. REMOVE UPPER INSTRUMENT PANEL METER ORNAMENT



- (a) Remove the screw.

- (b) Disengage the 6 claws and 2 clips.



- (c) Disengage the 2 claws that are holding the upper instrument panel meter ornament and steering column cover together.

- (d) Disconnect the connector and remove the upper instrument panel meter ornament.

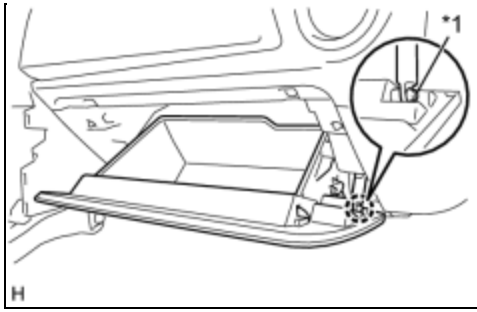
16. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY INFO

17. REMOVE GLOVE COMPARTMENT DOOR ASSEMBLY

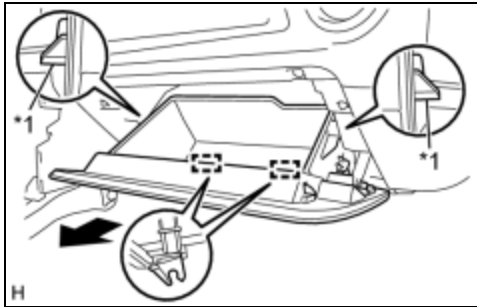
- (a) Disengage the claw and release the glove compartment door damper.

Text in Illustration

*1	Glove Compartment Door Damper
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- (b) Release the 2 stoppers and open the glove compartment door assembly until it is horizontal.

Text in Illustration

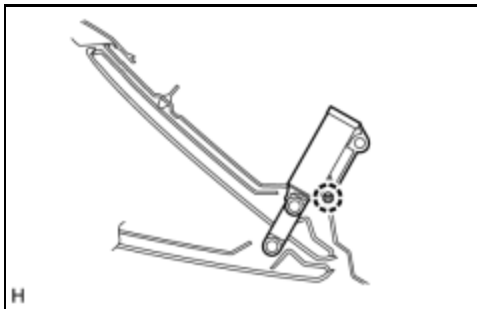
*1	Stopper
----	---------

- (c) Pull the glove compartment door assembly horizontally backward to disengage the 2 hinges and remove the glove compartment door assembly.

NOTICE:

Be sure to pull the glove compartment door assembly horizontally to remove it.

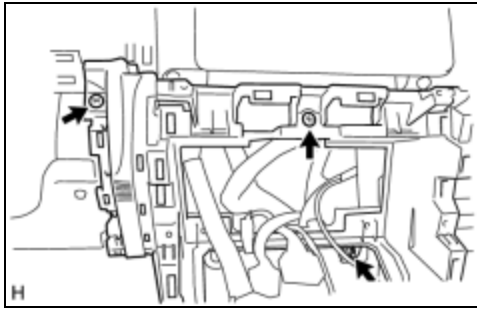
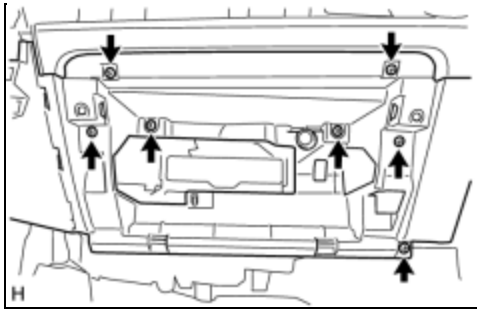
18. REMOVE GLOVE COMPARTMENT DOOR DAMPER



- (a) Disengage the claw and remove the glove compartment door damper.

19. REMOVE LOWER INSTRUMENT PANEL SUB-ASSEMBLY

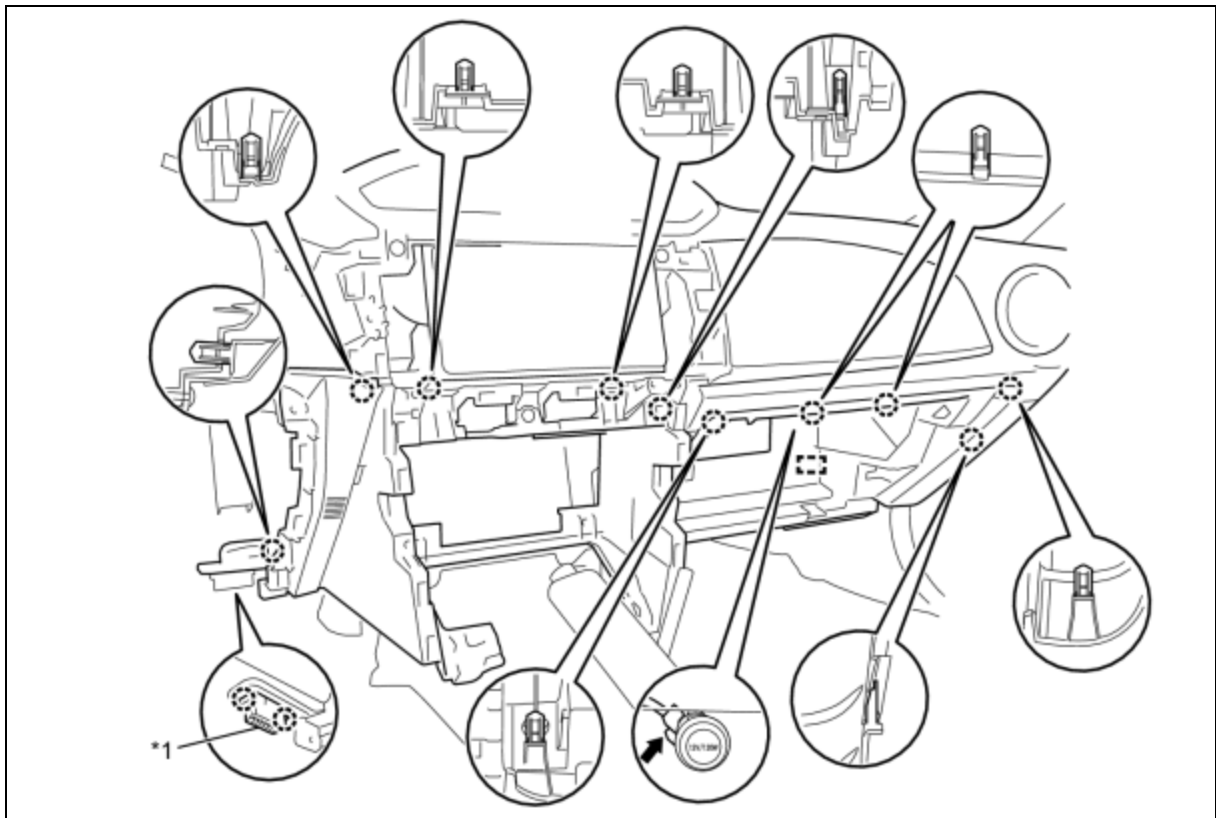
- (a) Remove the 7 screws.



(b) Remove the 2 screws and nut.

(c) Disconnect the connectors.

(d) Disengage the 12 claws to remove the lower instrument panel sub-assembly.



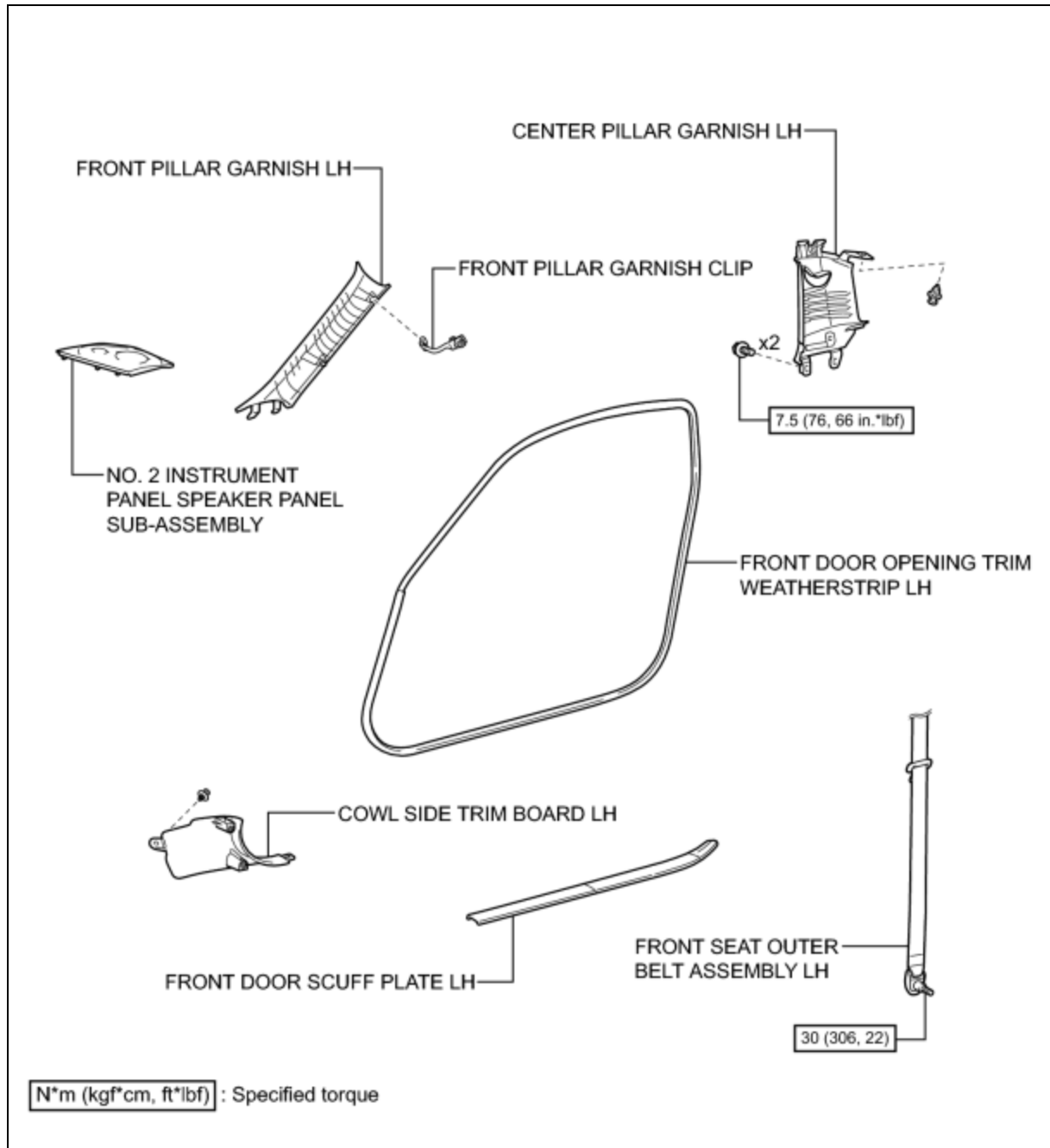
Text in Illustration

*1	DLC3	-	-
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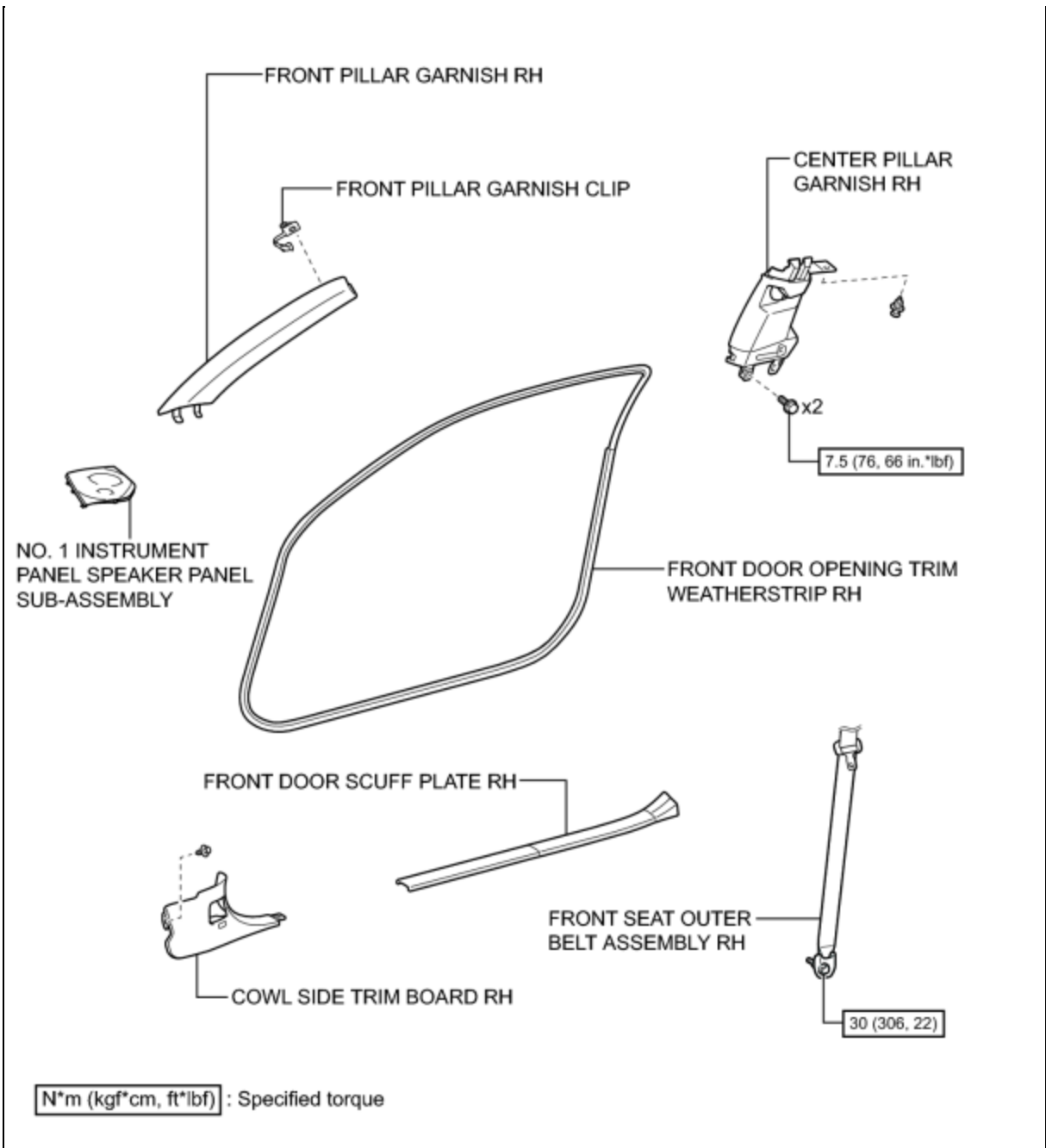
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000300W00NX
Title: INTERIOR PANELS / TRIM: ROOF HEADLINING: COMPONENTS (2013 FR-S)		

COMPONENTS

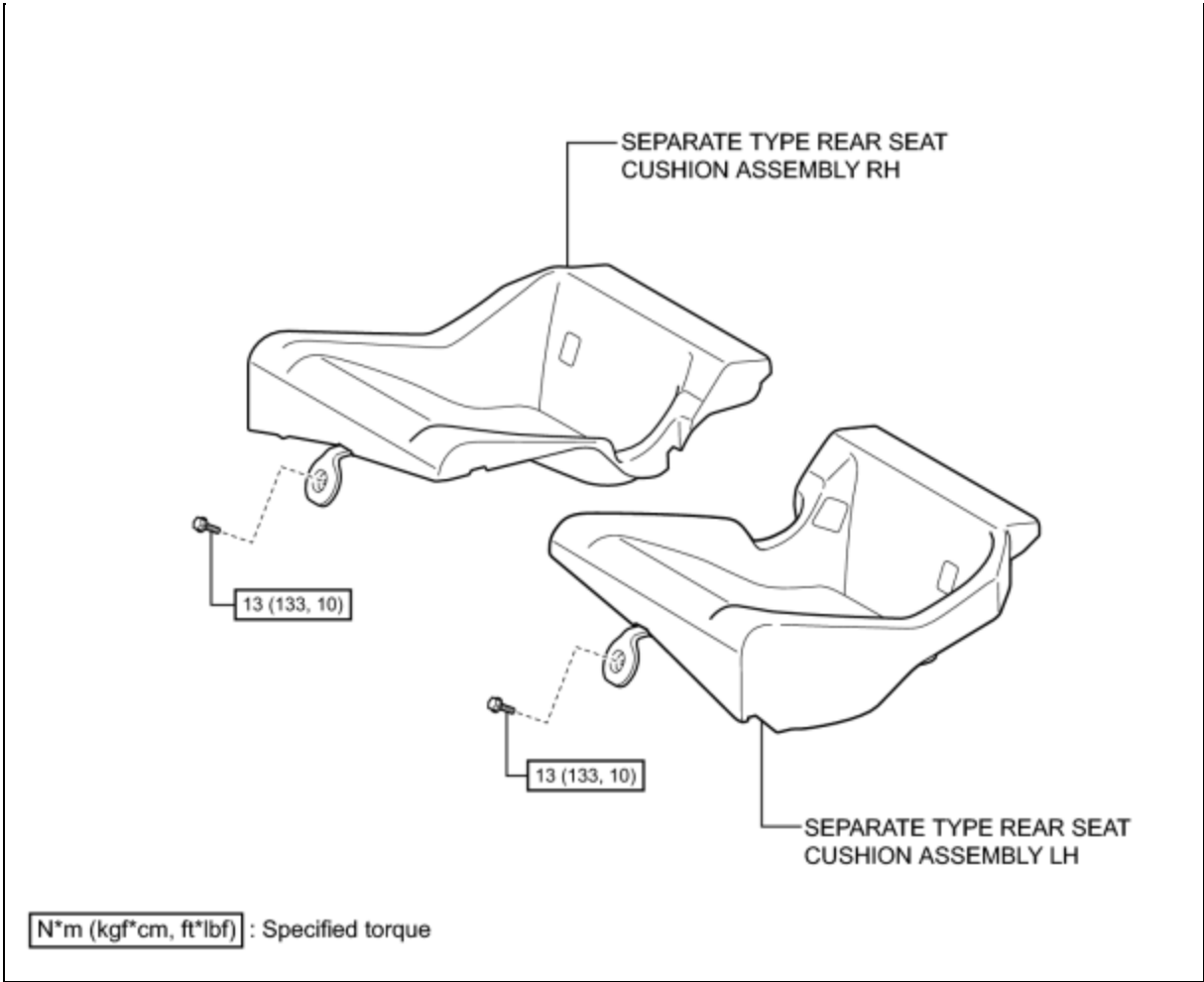
ILLUSTRATION



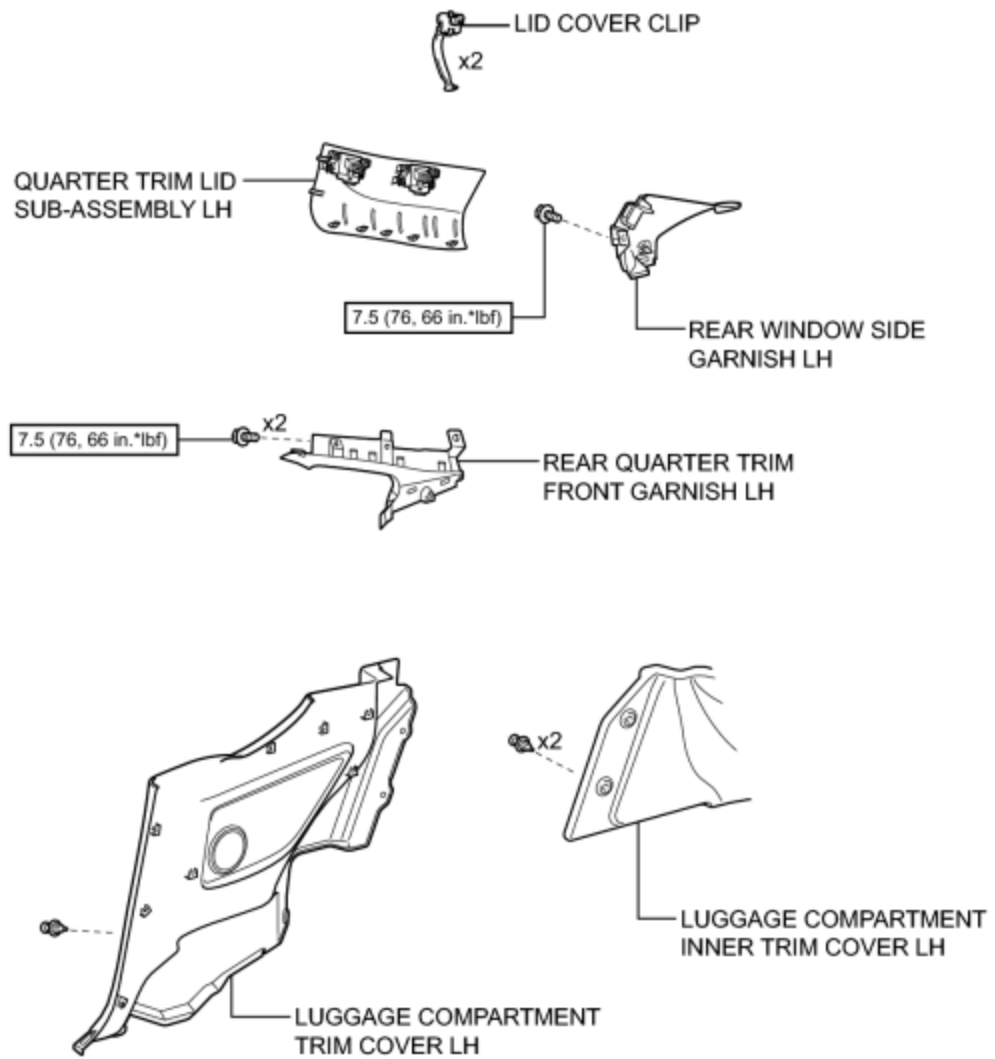
ILLUSTRATION



ILLUSTRATION

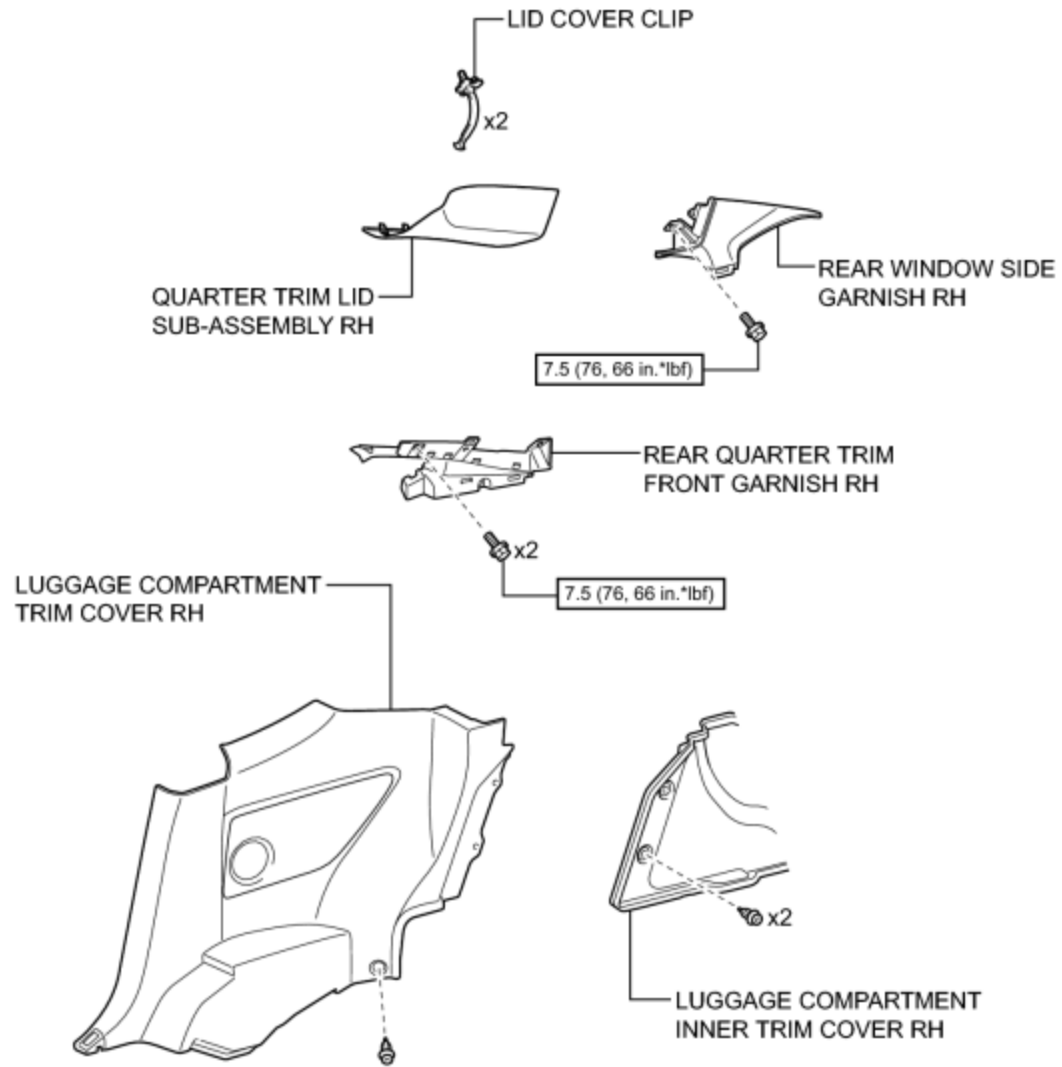


ILLUSTRATION



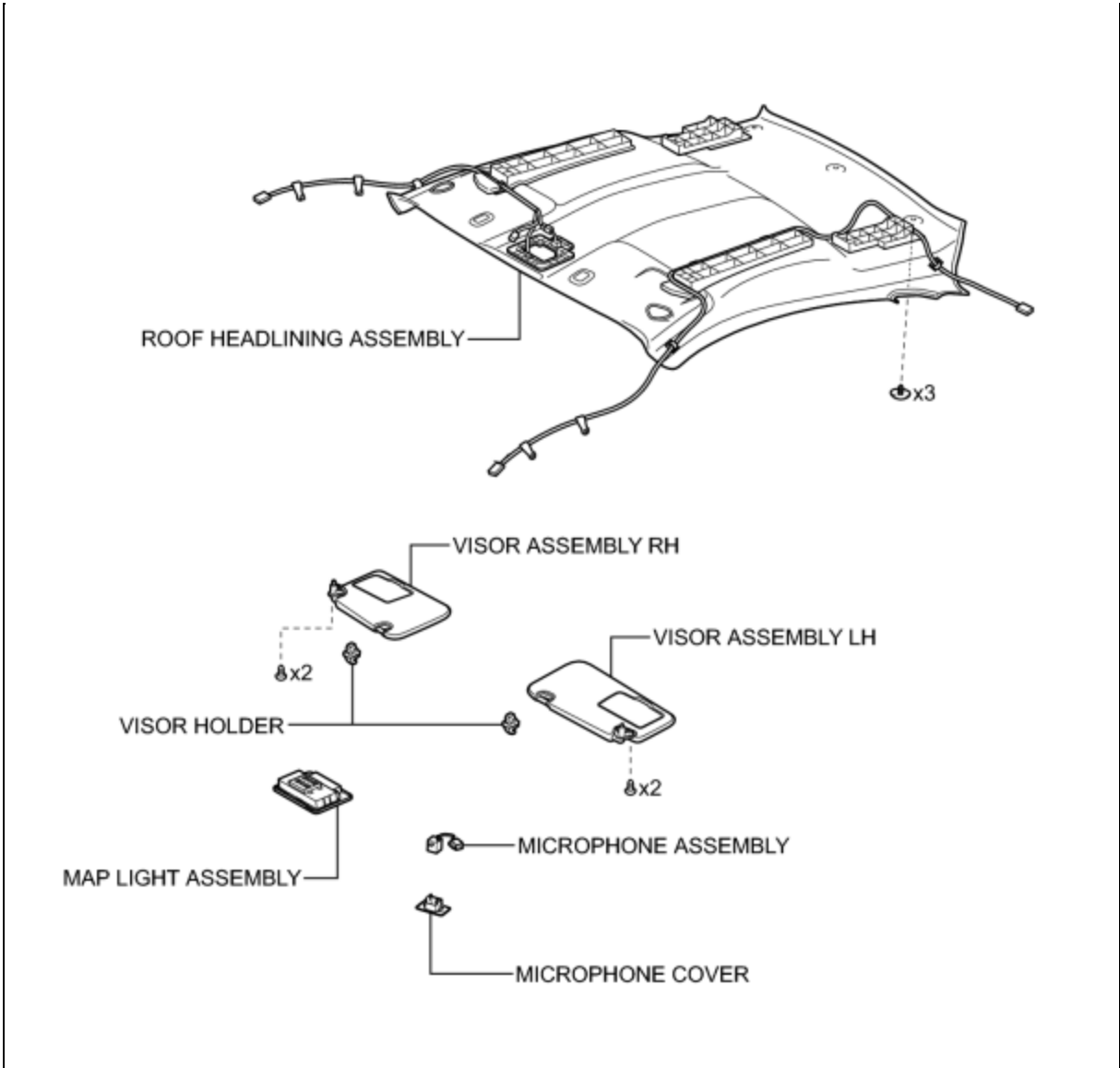
N*m (kgf*cm, ft*lbf) : Specified torque

ILLUSTRATION

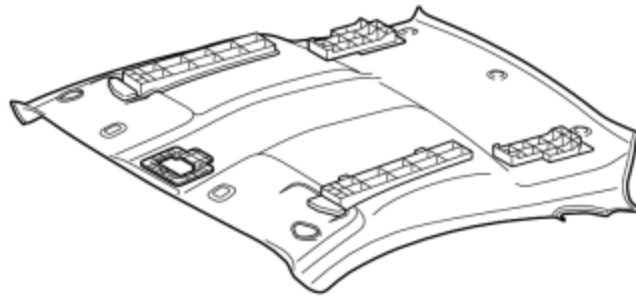
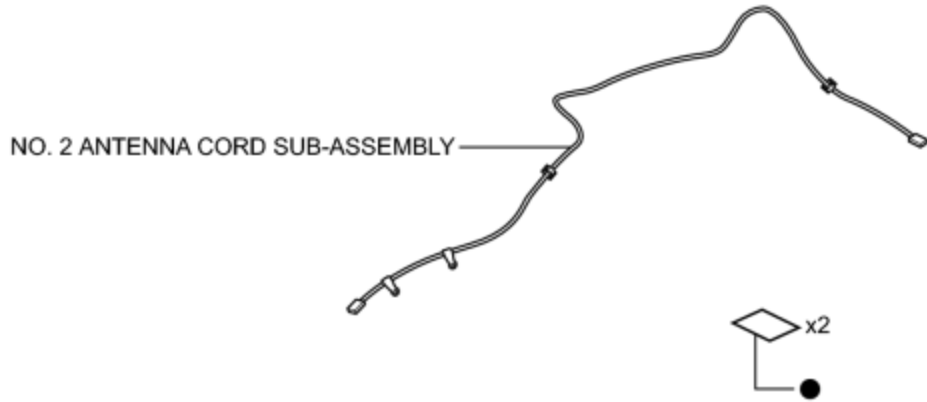


N*m (kgf*cm, ft*lbf) : Specified torque

ILLUSTRATION



ILLUSTRATION



● Non-reusable part

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004R0R00BX
Title: INTERIOR PANELS / TRIM: ROOF HEADLINING: DISASSEMBLY (2013 FR-S)		

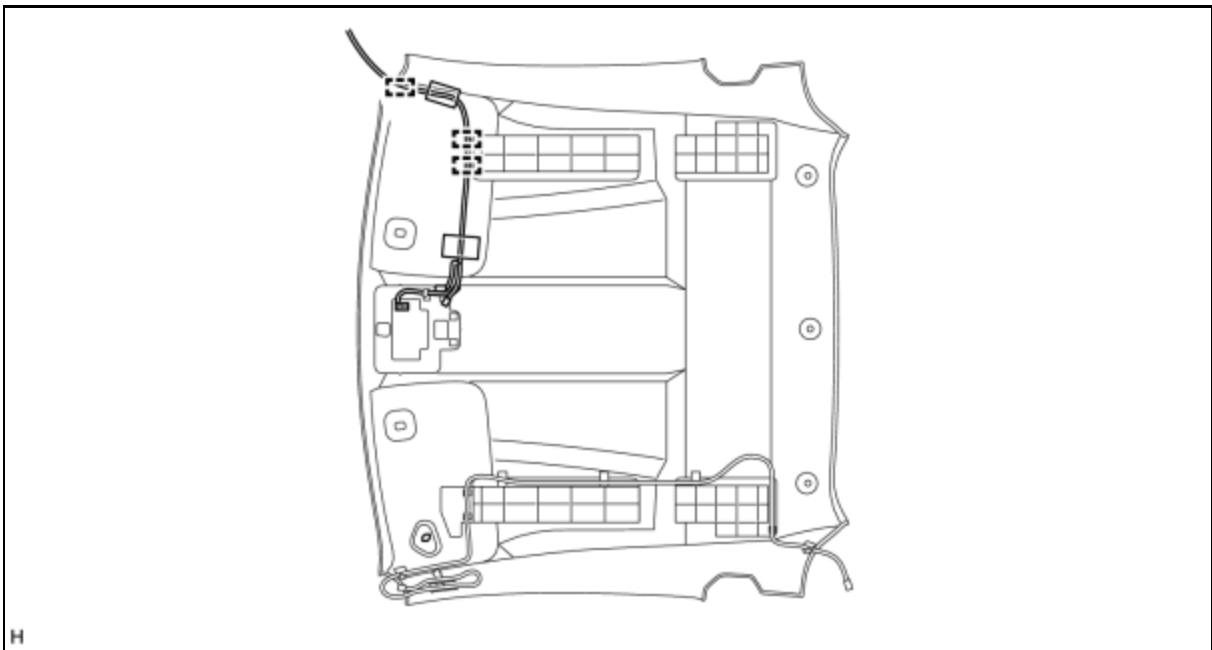
DISASSEMBLY

1. REMOVE MICROPHONE ASSEMBLY [INFO](#)


2. REMOVE MICROPHONE COVER [INFO](#)

3. REMOVE NO. 1 ROOF WIRE

(a) Remove the adhesive tape from the roof headlining.



Text in Illustration

	Tape	-	-
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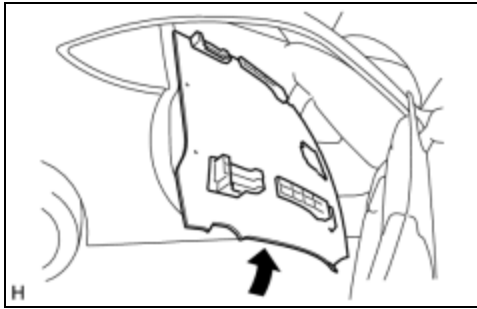
(b) Disengage the 3 guides remove the No. 1 roof wire from the roof headlining.

4. REMOVE NO. 2 ANTENNA CORD SUB-ASSEMBLY [INFO](#)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001JVP00VX
Title: INTERIOR PANELS / TRIM: ROOF HEADLINING: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL ROOF HEADLINING ASSEMBLY



- (a) Put the roof headlining assembly into the vehicle through the front passenger side door.

NOTICE:

Do not damage the roof headlining assembly or body interior.

- (b) Engage the clip at the front of the roof headlining, and install the roof headlining assembly.
(c) Connect the antenna cord sub-assembly connectors.
(d) Install the 3 clips at the rear of the roof headlining.
(e) Engage the 2 clamps and connect the connector from the front pillar LH.
(f) Engage the 3 clamps and connect the connector from the front pillar RH.

2. INSTALL VISOR HOLDER

- (a) Engage the 2 claws install the 2 visor holders.

3. INSTALL VISOR ASSEMBLY LH

- (a) Install the visor assembly LH with the 2 screws.

4. INSTALL VISOR ASSEMBLY RH

HINT:

Use the same procedure as for the LH side.

5. INSTALL MAP LIGHT ASSEMBLY INFO

6. INSTALL CENTER PILLAR GARNISH LH

- (a) Engage the 2 guides and clip.
(b) Install the center pillar garnish LH with the 2 bolts and clip.

Torque: 7.5 N·m (76 kgf·cm, 66in·lbf)

7. INSTALL CENTER PILLAR GARNISH RH

HINT:

Use the same procedure as for the LH side.

8. INSTALL REAR QUARTER TRIM FRONT GARNISH LH

- (a) Engage the claw and clip.
- (b) Install the rear quarter trim front garnish LH with the 2 bolts.

Torque: 7.5 N·m (76 kgf·cm, 66in·lbf)

9. INSTALL REAR QUARTER TRIM FRONT GARNISH RH

HINT:

Use the same procedure as for the LH side.

10. INSTALL REAR WINDOW SIDE GARNISH LH

- (a) Engage the guide and 2 clips.
- (b) Install the rear window side garnish LH with the bolt.

Torque: 7.5 N·m (76 kgf·cm, 66in·lbf)

11. INSTALL REAR WINDOW SIDE GARNISH RH

HINT:

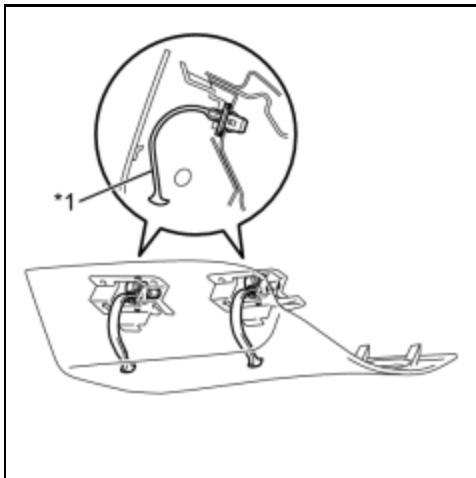
Use the same procedure as for the LH side.

12. INSTALL QUARTER TRIM LID SUB-ASSEMBLY LH

- (a) Install the 2 lid cover clips from the quarter trim lid sub-assembly LH.

NOTICE:

If there is any damage, be sure to replace the lid cover clip with a new one.



- (b) Engage the 2 guides and 6 claws and install the quarter trim lid sub-assembly LH.

Text in Illustration

*1	Lid Cover Clip
----	----------------

13. INSTALL QUARTER TRIM LID SUB-ASSEMBLY RH

HINT:

Use the same procedure as for the LH side.

14. INSTALL LUGGAGE COMPARTMENT TRIM COVER LH

- (a) Engage the 7 clips install the quarter trim panel assembly LH.
- (b) Install the clip.

15. INSTALL LUGGAGE COMPARTMENT TRIM COVER RH

HINT:

Use the same procedure as for the for LH side.

16. INSTALL LUGGAGE COMPARTMENT INNER TRIM COVER LH

- (a) Fold down the rear seatback assembly.
- (b) Engage the 2 clips install the luggage compartment inner trim cover LH.

17. INSTALL LUGGAGE COMPARTMENT INNER TRIM COVER RH

HINT:

Use the same procedure as for the LH side.

18. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY LH INFO

19. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY RH INFO

20. INSTALL FRONT SEAT OUTER BELT ASSEMBLY LH INFO

21. INSTALL FRONT SEAT OUTER BELT ASSEMBLY RH INFO

22. INSTALL COWL SIDE TRIM BOARD LH

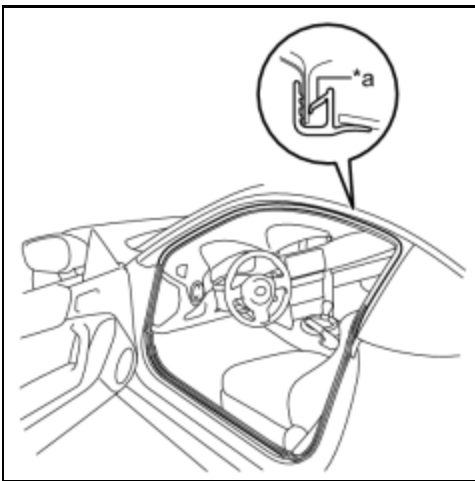
- (a) Engage the 2 clips install the cowl side trim board LH.
- (b) Install the clip.

23. INSTALL COWL SIDE TRIM BOARD RH

HINT:

Use the same procedure as for the LH side.

24. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP LH



- (a) Align the alignment mark on the weatherstrip with the protruding portion on the body indicated by the arrow in the illustration, and install the front door opening trim weatherstrip LH.

Text in Illustration

*a

Alignment Mark

NOTICE:

After installation, check that the corners fit correctly.

25. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP RH

HINT:

Use the same procedure as for the LH side.

26. INSTALL FRONT DOOR SCUFF PLATE LH

- (a) Engage the 6 claws install the front door scuff plate LH.

27. INSTALL FRONT DOOR SCUFF PLATE RH

HINT:

Use the same procedure as for the LH side.

28. INSTALL FRONT PILLAR GARNISH LH [INFO](#)

29. INSTALL FRONT PILLAR GARNISH RH [INFO](#)

30. INSTALL NO. 2 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY [INFO](#)

31. INSTALL NO. 1 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY [INFO](#)

32. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)



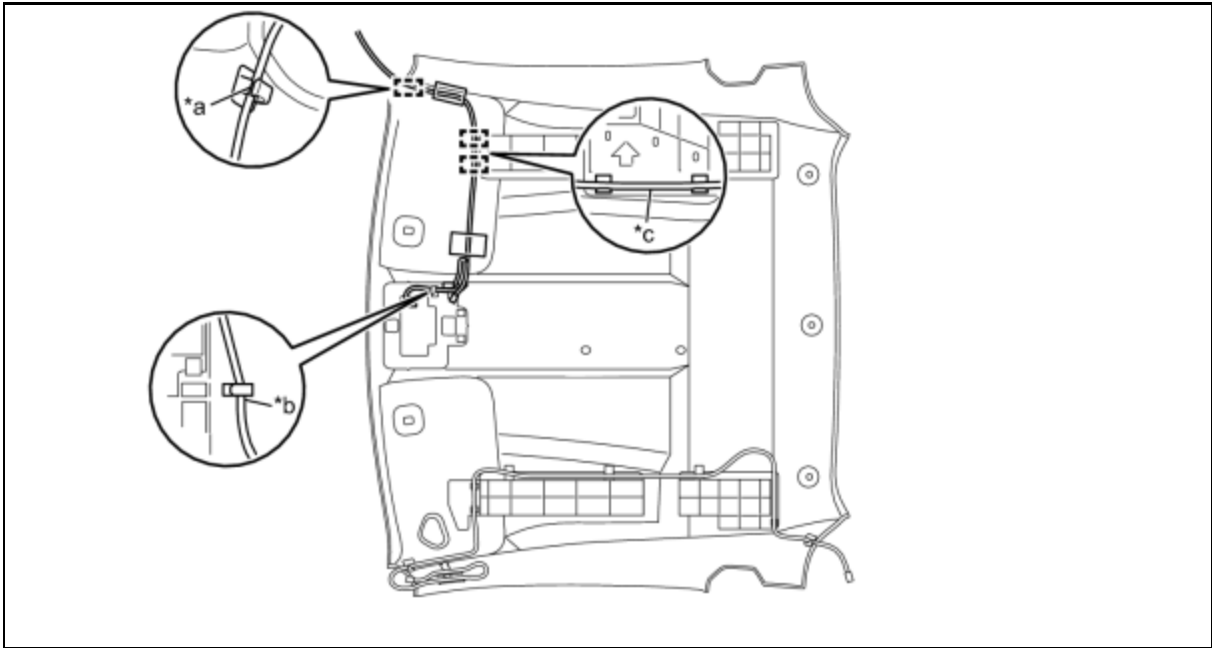
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004R0S00BX
Title: INTERIOR PANELS / TRIM: ROOF HEADLINING: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL NO. 2 ANTENNA CORD SUB-ASSEMBLY INFO

2. INSTALL NO. 1 ROOF WIRE


(a) Engage the 2 guides and position the No. 1 roof wire as shown in the illustration.



NOTICE:

Make sure that the No. 1 roof wire is not twisted and that the marking line (white) faces up.

Text in Illustration

*a	Align the center of the white tape on the wire with the edge of the trim, and fix the wire in place.	*b	Align the white tape on the wire with the clip, and fix the wire in place.
*c	Align the white tape on the wire with the clamp, and fix the wire in place.	-	-
	Tape	-	-

(b) Apply the tape as shown in the illustration.

3. INSTALL MICROPHONE COVER INFO

4. INSTALL MICROPHONE ASSEMBLY INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001JVR00VX
Title: INTERIOR PANELS / TRIM: ROOF HEADLINING: REMOVAL (2013 FR-S)		

REMOVAL

1. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL INFO

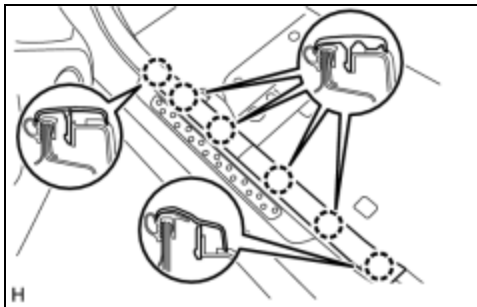
3. REMOVE NO. 2 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY INFO

4. REMOVE NO. 1 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY INFO

5. REMOVE FRONT PILLAR GARNISH LH INFO

6. REMOVE FRONT PILLAR GARNISH RH INFO

7. REMOVE FRONT DOOR SCUFF PLATE LH



(a) Disengage the 6 claws and remove the front door scuff plate LH.

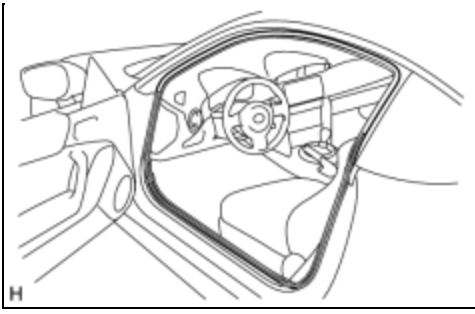
8. REMOVE FRONT DOOR SCUFF PLATE RH

HINT:

Use the same procedure described for the LH side.

9. REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP LH

(a) Remove the front door opening trim weatherstrip LH.

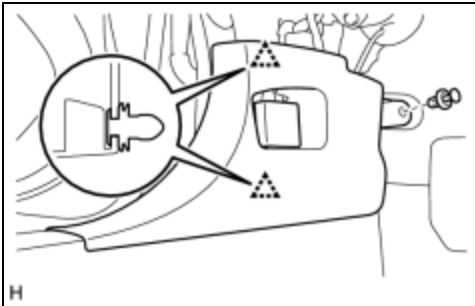


10. REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP RH

HINT:

Use the same procedure described for the LH side.

11. REMOVE COWL SIDE TRIM BOARD LH



(a) Remove the clip.

(b) Disengage the 2 clips and remove the cowl side trim board LH.

12. REMOVE COWL SIDE TRIM BOARD RH

HINT:

Use the same procedure described for the LH side.

13. SEPARATE FRONT SEAT OUTER BELT ASSEMBLY LH

INFO

14. SEPARATE FRONT SEAT OUTER BELT ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

15. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY LH

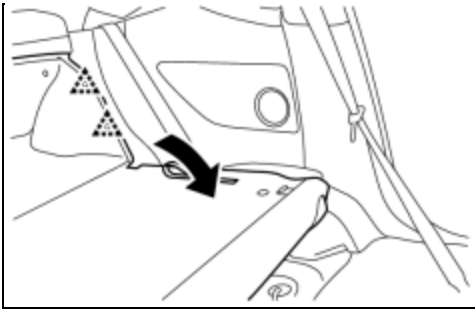
INFO

16. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY RH

INFO

17. REMOVE LUGGAGE COMPARTMENT INNER TRIM COVER LH

(a) Fold down the bench type rear seatback assembly.



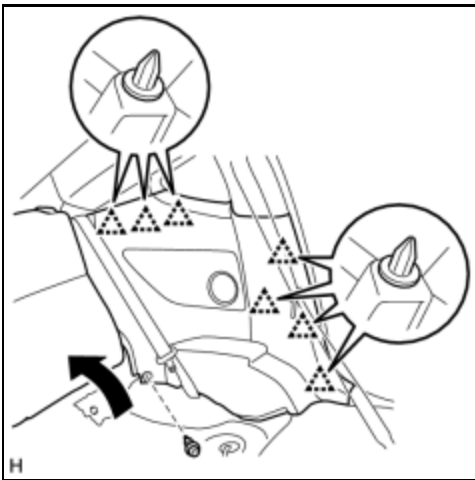
(b) Disengage the 2 clips and disconnect the luggage compartment inner trim cover LH.

18. REMOVE LUGGAGE COMPARTMENT INNER TRIM COVER RH

HINT:

Use the same procedure described for the LH side.

19. REMOVE LUGGAGE COMPARTMENT TRIM COVER LH



(a) Pull up the rear seatback assembly.

(b) Remove the clip.

(c) Disengage the 7 clips and remove the luggage compartment trim cover LH.

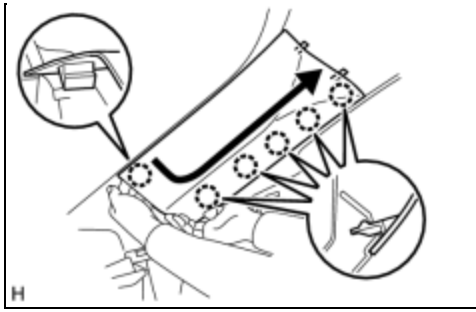
20. REMOVE LUGGAGE COMPARTMENT TRIM COVER RH

HINT:

Use the same procedure described for the LH side.

21. REMOVE QUARTER TRIM LID SUB-ASSEMBLY LH

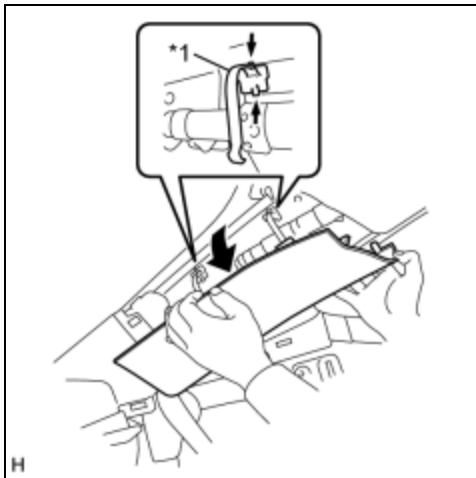
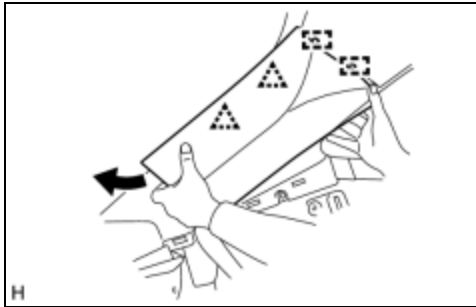
(a) Along the arrow in the illustration, disengage the 6 claws.



(b) Disengage the 2 clips and 2 guides.

HINT:

Make the quarter trim lid sub-assembly LH hang down from the lid cover clip.



(c) Push the lid cover clip knobs in the direction of the arrow to remove the 2 lid cover clips along with the quarter trim lid sub-assembly LH.

Text in Illustration

*1	Lid Cover Clip
----	----------------

(d) Remove the 2 lid cover clips from the lid cover LH.

NOTICE:

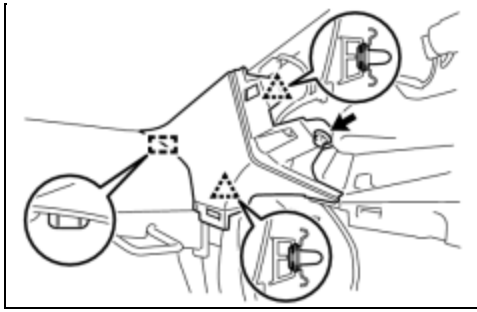
If there is any damage, be sure to replace the lid cover clip with a new one.

22. REMOVE QUARTER TRIM LID SUB-ASSEMBLY RH

HINT:

Use the same procedure described for the LH side.

23. REMOVE REAR WINDOW SIDE GARNISH LH



(a) Remove the bolt.

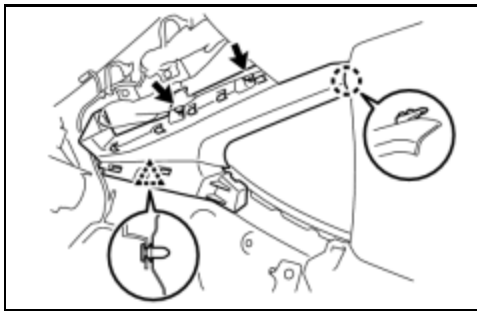
(b) Disengage the 2 clips and guide remove the rear window side garnish LH.

24. REMOVE REAR WINDOW SIDE GARNISH RH

HINT:

Use the same procedure described for the LH side.

25. REMOVE REAR QUARTER TRIM FRONT GARNISH LH



(a) Remove the 2 bolts.

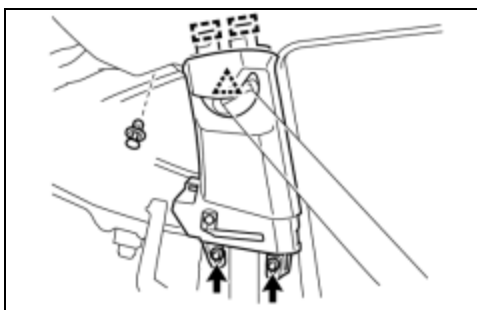
(b) Disengage the clip and claw remove the rear quarter trim front garnish LH.

26. REMOVE REAR QUARTER TRIM FRONT GARNISH RH

HINT:

Use the same procedure described for the LH side.

27. REMOVE CENTER PILLAR GARNISH LH



(a) Remove the 2 bolts and clip.

(b) Disengage the clips and 2 guides remove the center pillar garnish LH.

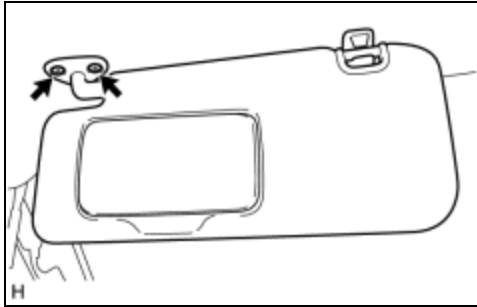
28. REMOVE CENTER PILLAR GARNISH RH

HINT:

Use the same procedure described for the LH side.

29. REMOVE MAP LIGHT ASSEMBLY INFO

30. REMOVE VISOR ASSEMBLY LH



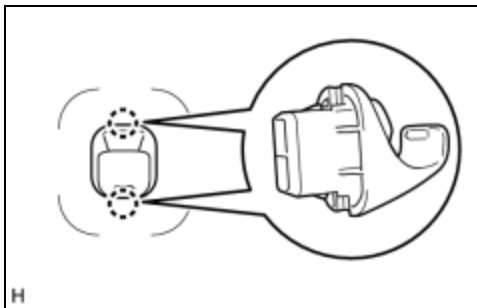
(a) Remove the 2 screws.

31. REMOVE VISOR ASSEMBLY RH

HINT:

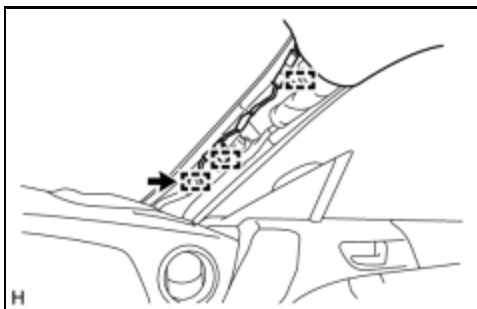
Use the same procedure described for the LH side.

32. REMOVE VISOR HOLDER

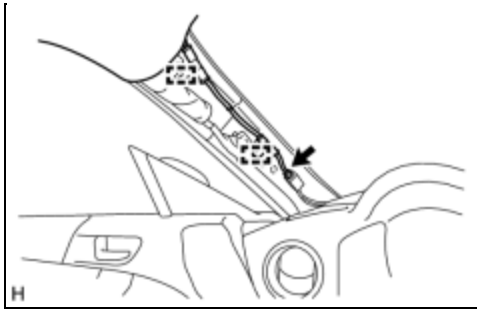


(a) Disengage the 2 claws remove the 2 visor holders.

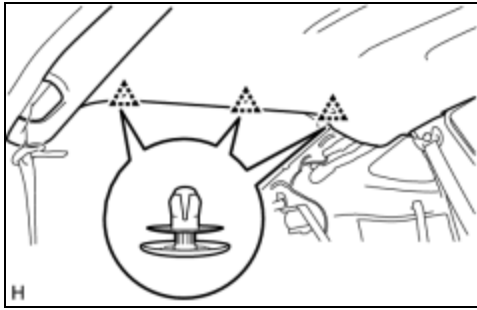
33. REMOVE ROOF HEADLINING ASSEMBLY



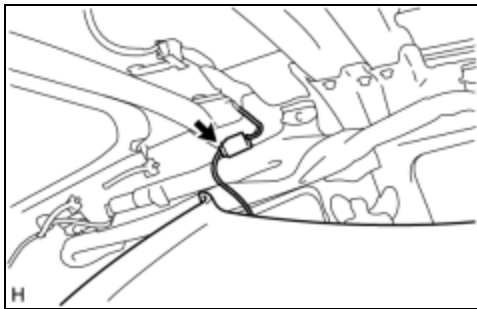
(a) Disengage the 3 clamps and disconnect the connector from the front pillar RH.



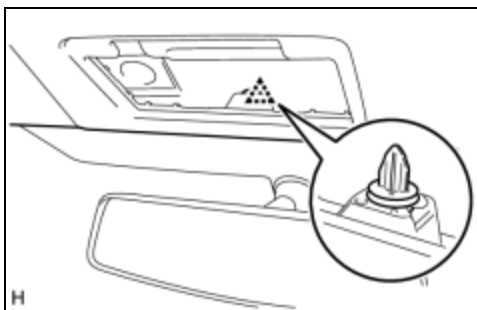
(b) Disengage the 2 clamps and disconnect the connector from the front pillar LH.



(c) Remove the 3 clips at the rear of the roof headlining.



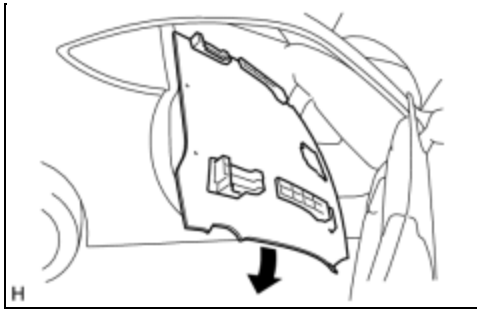
(d) Disconnect the antenna cord sub-assembly connector.



(e) Disengage the clip at the front of the roof headlining, and remove the roof headlining assembly.

(f) Remove the roof headlining assembly from the vehicle through the front passenger side door.

NOTICE:

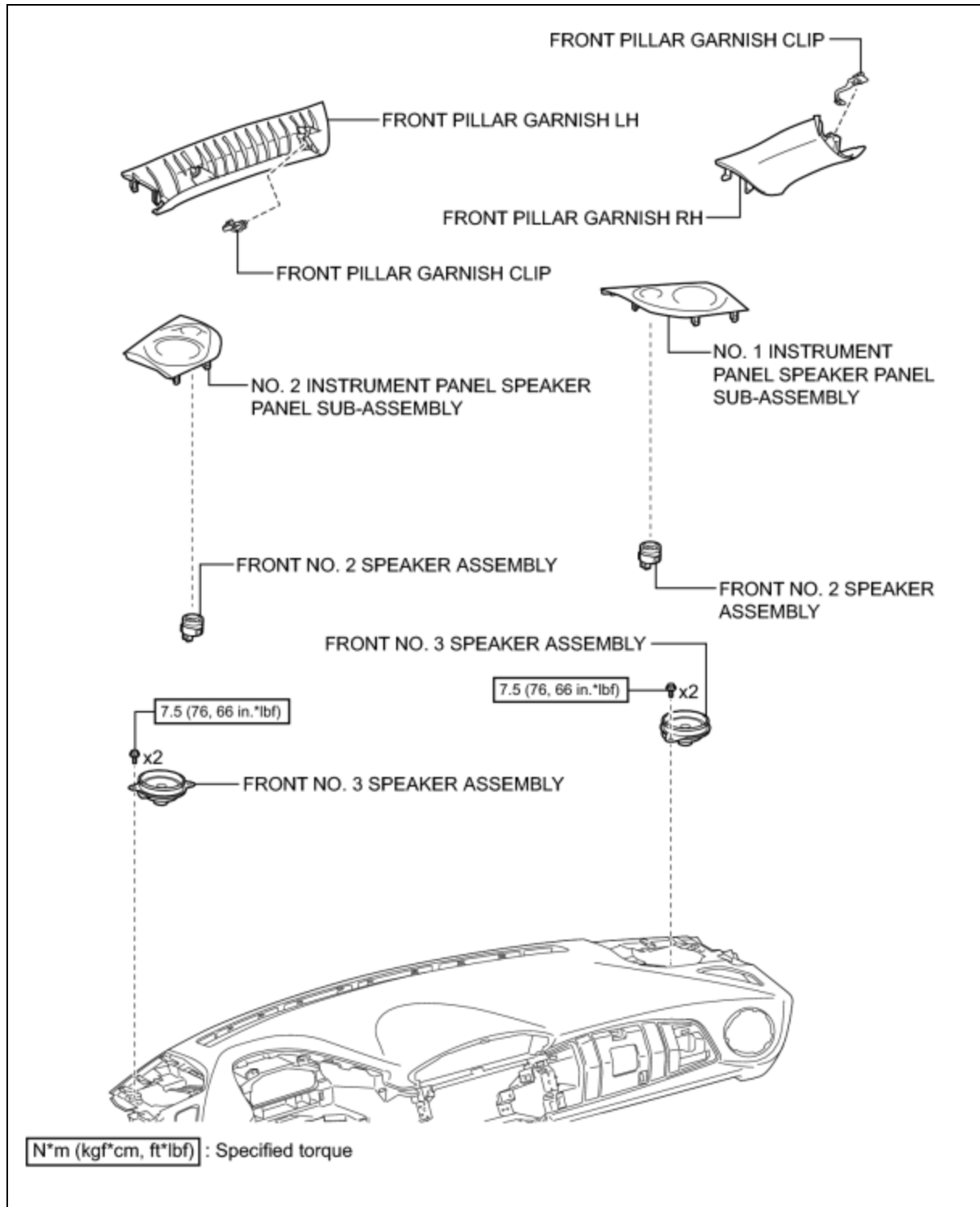


Do not damage the roof headlining assembly or body interior.

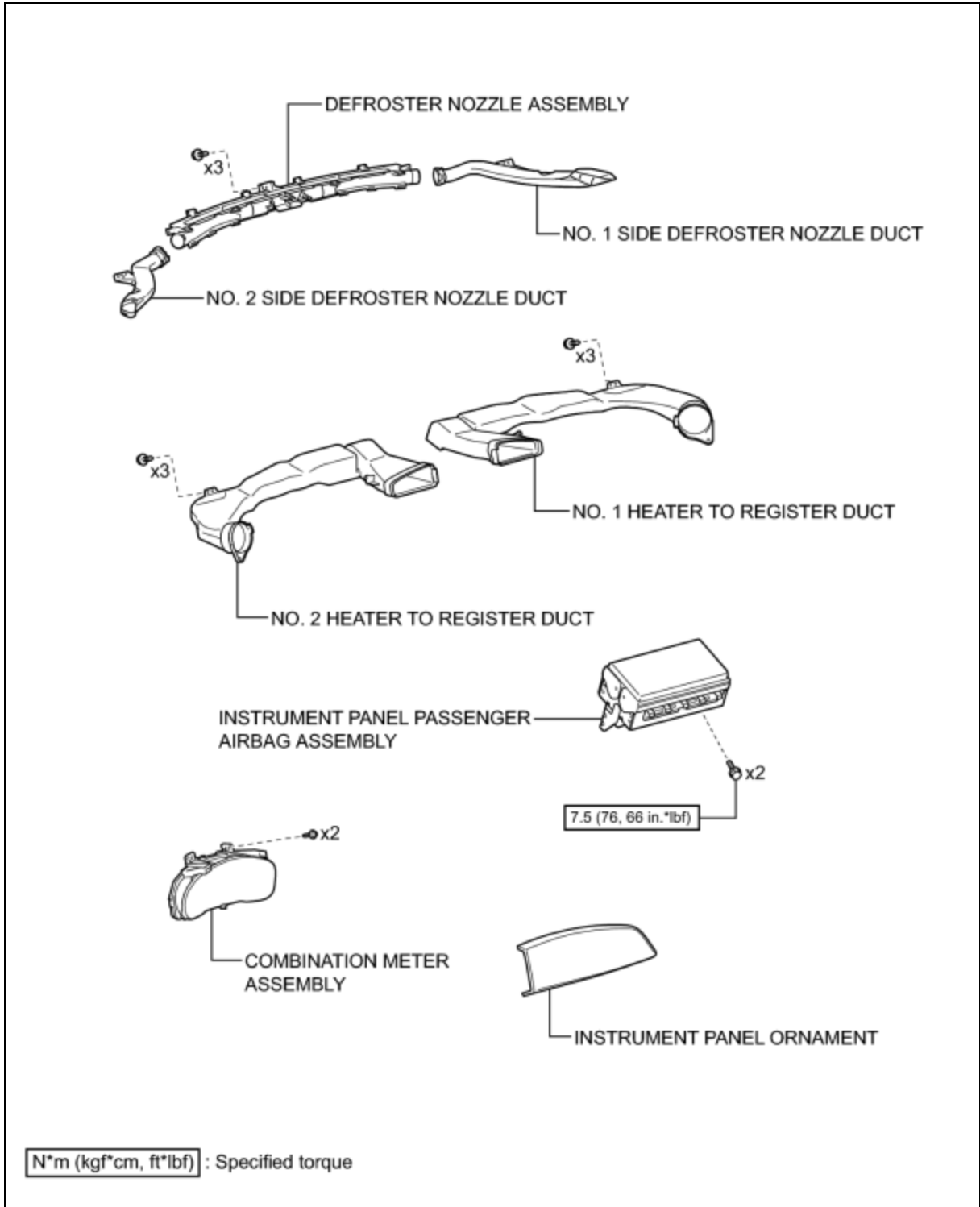
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003O2O00DX
Title: INTERIOR PANELS / TRIM: UPPER INSTRUMENT PANEL: COMPONENTS (2013 FR-S)		

COMPONENTS

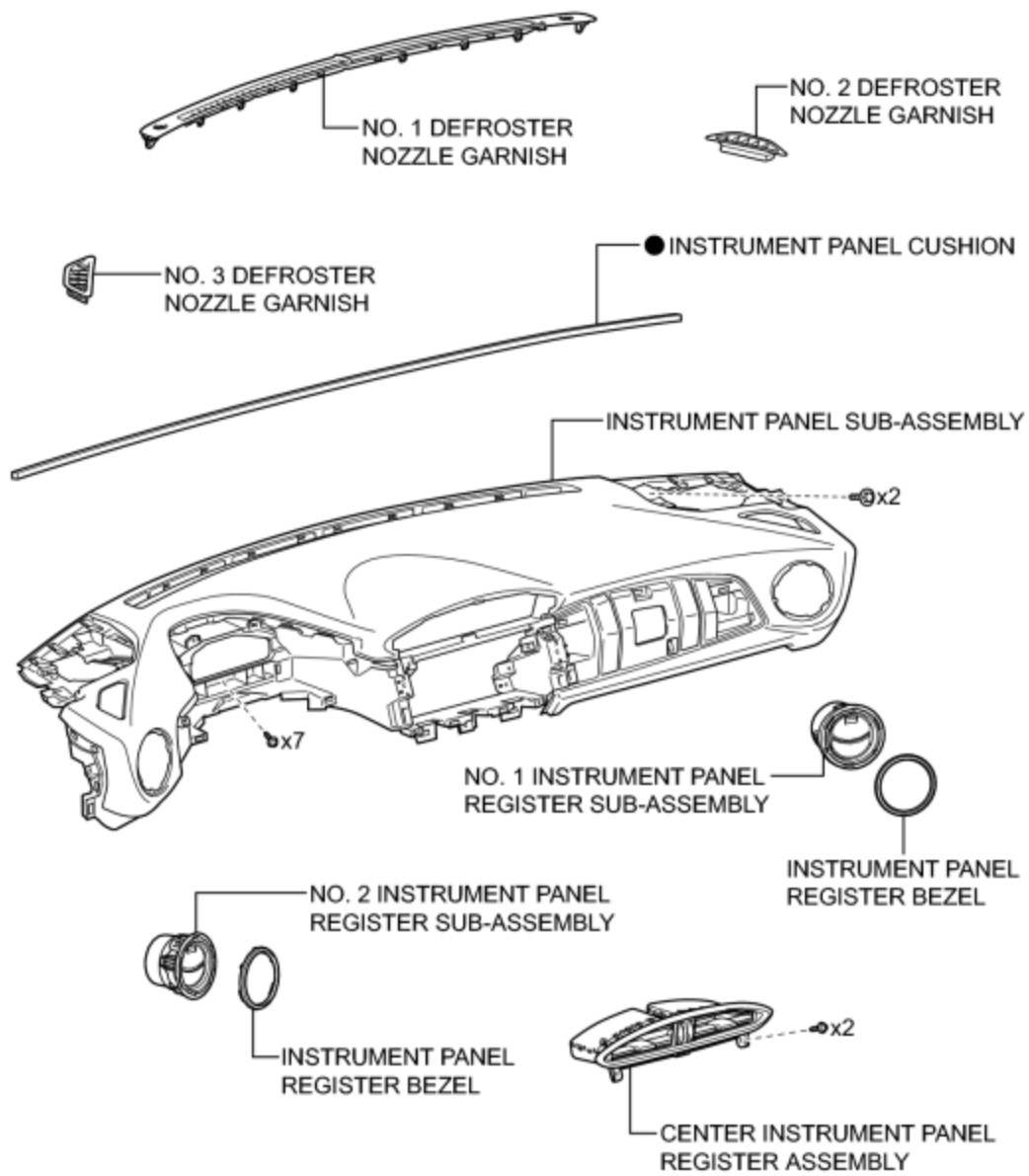
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION

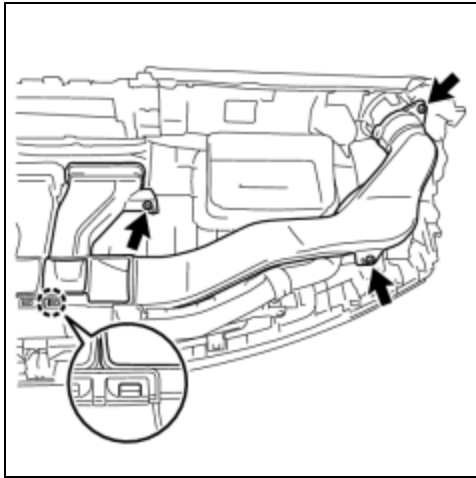


● Non-reusable part

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003O1100LX
Title: INTERIOR PANELS / TRIM: UPPER INSTRUMENT PANEL: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. REMOVE NO. 2 HEATER TO REGISTER DUCT



(a) Remove the 3 screws.

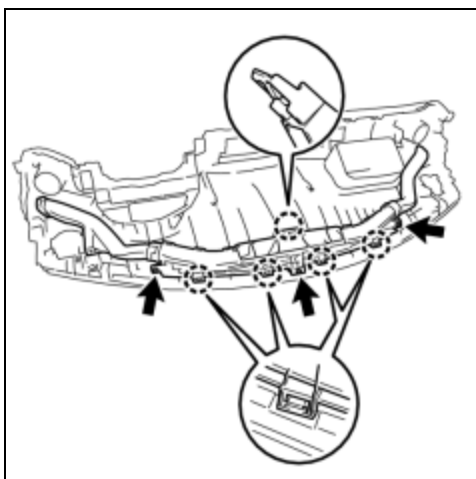
(b) Disengage the claw to remove the No. 2 heater to register duct.

2. REMOVE NO. 1 HEATER TO REGISTER DUCT

HINT:

Use the same procedure as for the No. 2 heater to register duct.

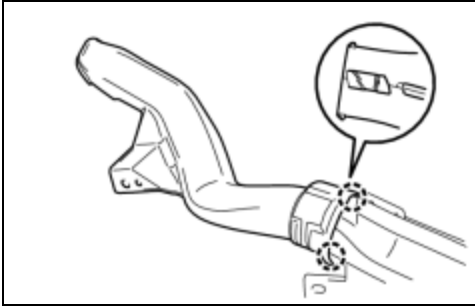
3. REMOVE DEFROSTER NOZZLE ASSEMBLY



(a) Remove the 3 screws.

(b) Disengage the 5 claws and remove the defroster nozzle assembly, No. 2 side defroster nozzle duct, and No. 1 side defroster nozzle duct as a single unit.

4. REMOVE NO. 2 SIDE DEFROSTER NOZZLE DUCT



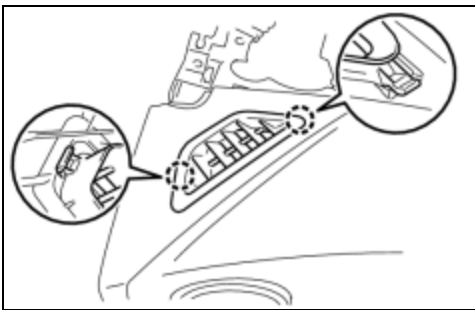
- (a) Disengage the 2 claws to remove the No. 2 side defroster nozzle duct.

5. REMOVE NO. 1 SIDE DEFROSTER NOZZLE DUCT

HINT:

Use the same procedure as for the No. 2 side defroster nozzle duct.

6. REMOVE NO. 3 DEFROSTER NOZZLE GARNISH



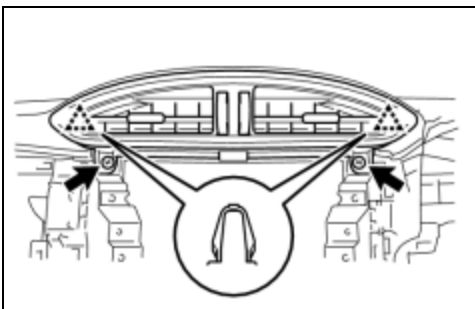
- (a) Disengage the 2 claws to remove the No. 3 defroster nozzle garnish.

7. REMOVE NO. 2 DEFROSTER NOZZLE GARNISH

HINT:

Use the same procedure as for the No. 3 defroster nozzle garnish.

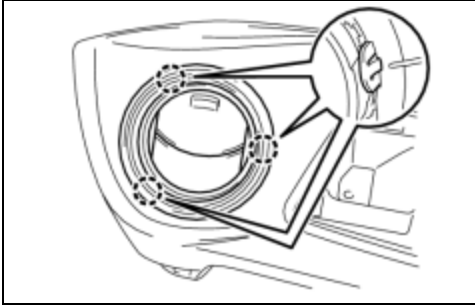
8. REMOVE CENTER INSTRUMENT PANEL REGISTER ASSEMBLY



- (a) Remove the 2 screws.

- (b) Disengage the 2 clips to remove the center instrument panel register assembly.

9. REMOVE NO. 2 INSTRUMENT PANEL REGISTER SUB-ASSEMBLY



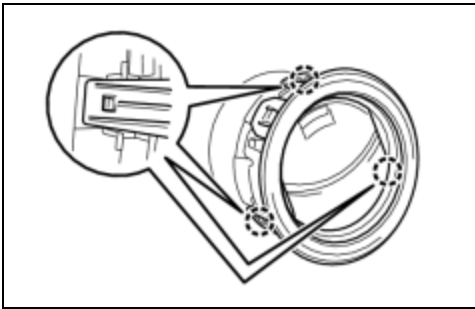
- (a) Disengage the 3 claws to remove the No. 2 instrument panel register sub-assembly.

10. REMOVE NO. 1 INSTRUMENT PANEL REGISTER SUB-ASSEMBLY

HINT:

Use the same procedure as for the No. 2 instrument panel register sub-assembly.

11. REMOVE INSTRUMENT PANEL REGISTER BEZEL (for LH Side)



- (a) Disengage the 3 claws to remove the instrument panel register bezel.

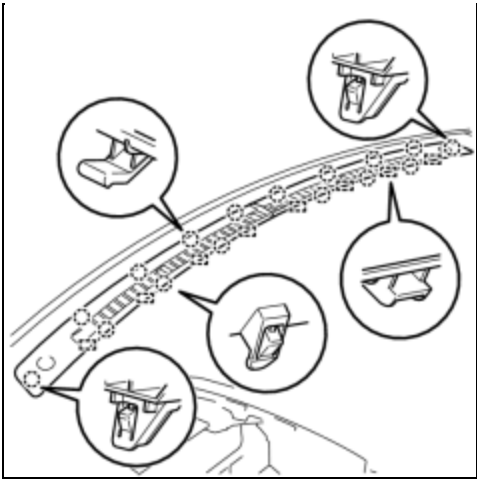
12. REMOVE INSTRUMENT PANEL REGISTER BEZEL (for RH Side)

HINT:

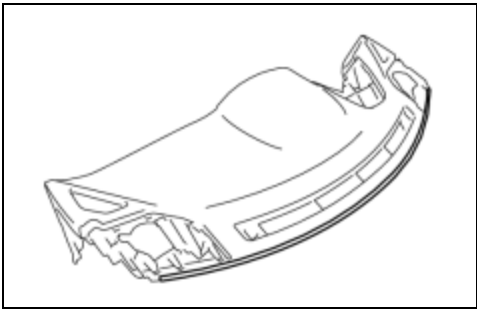
Use the same procedure as for the LH side.

13. REMOVE NO. 1 DEFROSTER NOZZLE GARNISH

- (a) Disengage the 16 claws and 8 guides to remove the No. 1 defroster nozzle garnish.



14. REMOVE INSTRUMENT PANEL CUSHION



(a) Remove the instrument panel cushion.

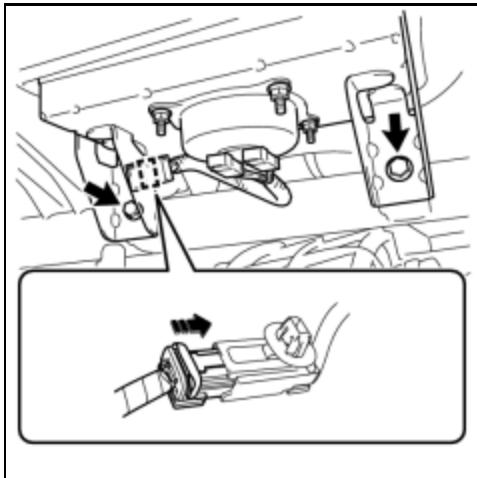
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003O2K00HX
Title: INTERIOR PANELS / TRIM: UPPER INSTRUMENT PANEL: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL INSTRUMENT PANEL SUB-ASSEMBLY

- (a) Install the instrument panel sub-assembly with the 7 screws and 2 bolts.

2. INSTALL INSTRUMENT PANEL PASSENGER AIRBAG ASSEMBLY



- (a) Install the instrument panel passenger airbag assembly with the 2 bolts.

Torque: 7.5 N·m (76 kgf·cm, 66in·lbf)

- (b) Connect the passenger airbag connector.

- (c) Engage the clamp.

3. INSTALL INSTRUMENT PANEL ORNAMENT

- (a) Engage the 3 claws and 3 clips and install the instrument panel ornament.

4. INSTALL COMBINATION METER ASSEMBLY INFO

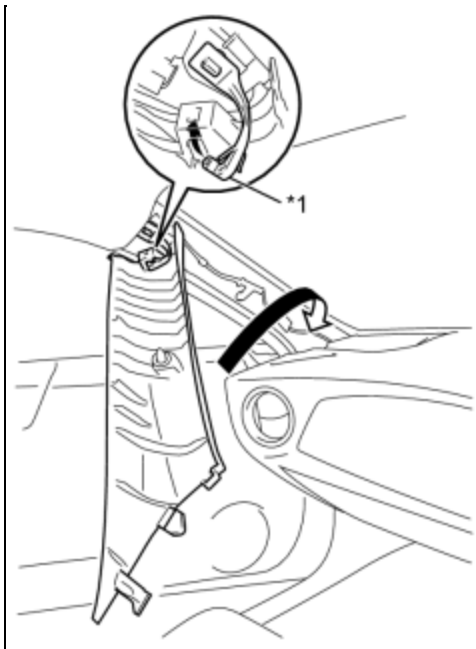
5. INSTALL FRONT PILLAR GARNISH LH

- (a) Remove the protective cover (w/curtain shield airbag).
 (b) Make sure that the front pillar garnish clip is not damaged.

NOTICE:

If there is any damage, replace the front pillar garnish clip with a new one.

- (c) Hook the tip of the front pillar garnish clip on the front

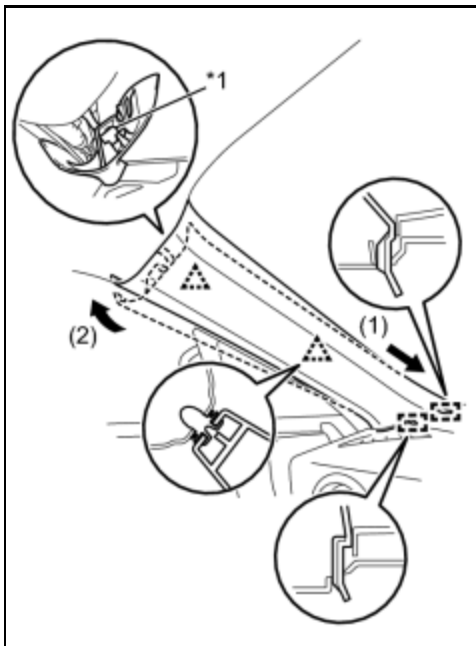


pillar garnish LH as shown in the illustration.

Text in Illustration

*1	Front Pillar Garnish Clip
----	---------------------------

(d) Turn the front pillar garnish LH in the direction of the arrow.



(e) Insert the 2 guides in the direction of the arrow (1).

(f) Engage the 2 clips and the front pillar garnish clip in the direction of the arrow, and install the front pillar garnish LH.

Text in Illustration

*1	Front Pillar Garnish Clip
----	---------------------------

6. INSTALL FRONT PILLAR GARNISH RH

HINT:

Use the same procedure as for the LH side.

7. INSTALL FRONT NO. 3 SPEAKER ASSEMBLY (for LH Side) **INFO**

8. INSTALL FRONT NO. 2 SPEAKER ASSEMBLY (for LH Side) **INFO**

9. INSTALL NO. 1 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY

(a) Connect connector.

(b) Engage the 6 claws to install the No. 1 instrument panel speaker panel sub-assembly.

10. INSTALL FRONT NO. 3 SPEAKER ASSEMBLY (for RH Side) **INFO**

11. INSTALL FRONT NO. 2 SPEAKER ASSEMBLY (for RH Side) **INFO**

12. INSTALL NO. 2 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY

HINT:

Use the same procedure as for the LH side.

13. INSTALL LOWER INSTRUMENT PANEL SUB-ASSEMBLY

INFO

14. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)


15. CHECK SRS WARNING LIGHT

INFO

Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003QLG02QX
Title: INTERIOR PANELS / TRIM: UPPER INSTRUMENT PANEL: PRECAUTION (2013 FR-S)		

PRECAUTION

1. PRECAUTION FOR VEHICLE WITH AIRBAG

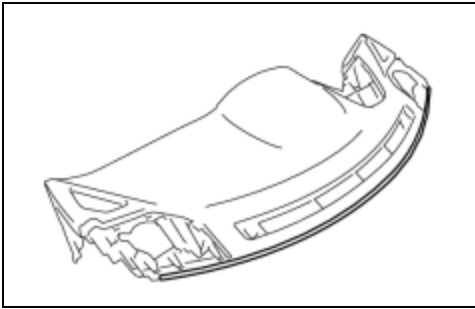
- (a) Some operations in this section may affect the airbag. Prior to performing the corresponding operations, read the SRS Precaution  .



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003O3E00GX
Title: INTERIOR PANELS / TRIM: UPPER INSTRUMENT PANEL: REASSEMBLY (2013 FR-S)		

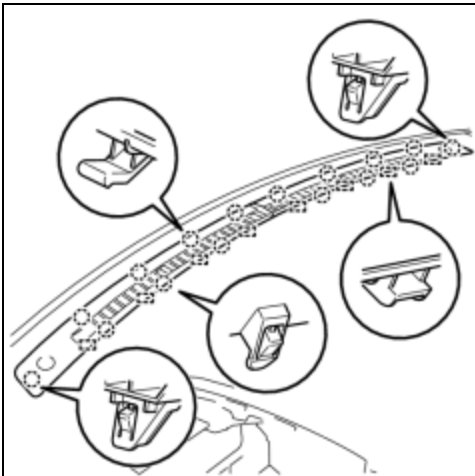
REASSEMBLY

1. INSTALL INSTRUMENT PANEL CUSHION



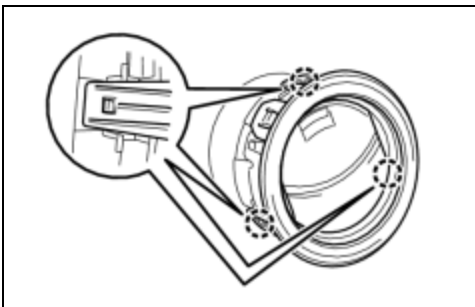
(a) Install a new instrument panel cushion.

2. INSTALL NO. 1 DEFROSTER NOZZLE GARNISH



(a) Engage the 16 claws and 8 guides to install the No. 1 defroster nozzle garnish .

3. INSTALL INSTRUMENT PANEL REGISTER BEZEL (for LH Side)



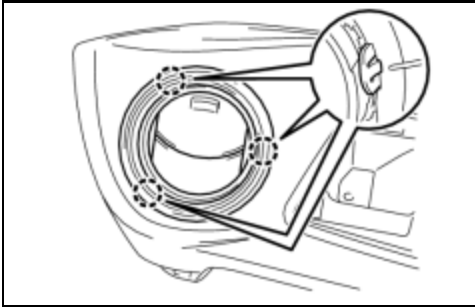
(a) Engage the 3 claws to install the instrument panel register bezel.

4. INSTALL INSTRUMENT PANEL REGISTER BEZEL (for RH Side)

HINT:

Use the same procedure as for the LH side.

5. INSTALL NO. 2 INSTRUMENT PANEL REGISTER SUB-ASSEMBLY



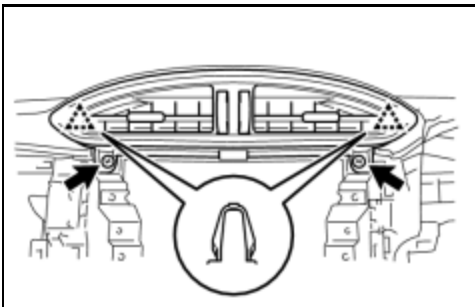
(a) Engage the 3 claws to install the No. 2 instrument panel register sub-assembly.

6. INSTALL NO. 1 INSTRUMENT PANEL REGISTER SUB-ASSEMBLY

HINT:

Use the same procedure as for the No. 2 instrument panel register sub-assembly.

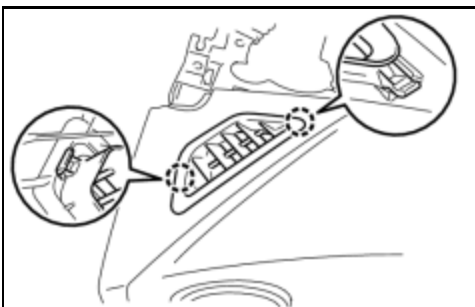
7. INSTALL CENTER INSTRUMENT PANEL REGISTER ASSEMBLY



(a) Engage the 2 clips.

(b) Install the center instrument panel register assembly with the 2 screws.

8. INSTALL NO. 3 DEFROSTER NOZZLE GARNISH



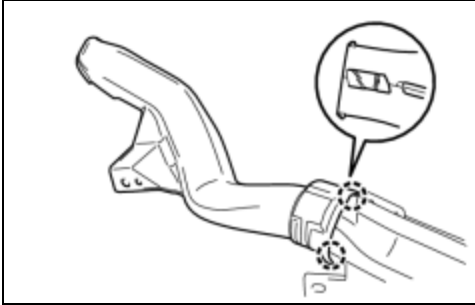
(a) Engage the 2 claws to install the No. 3 defroster nozzle garnish.

9. INSTALL NO. 2 DEFROSTER NOZZLE GARNISH

HINT:

Use the same procedure as for the No. 3 defroster nozzle garnish.

10. INSTALL NO. 2 SIDE DEFROSTER NOZZLE DUCT



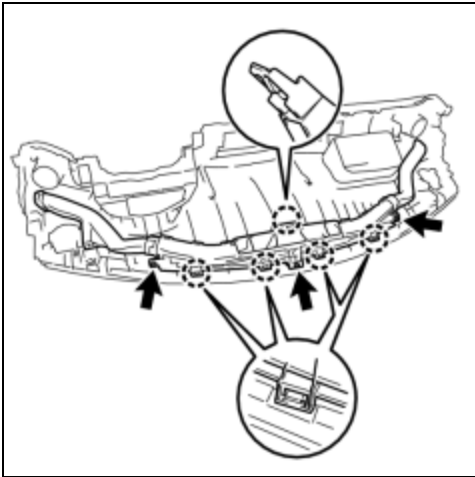
(a) Engage the 2 claws to install the No. 2 side defroster nozzle duct.

11. INSTALL NO. 1 SIDE DEFROSTER NOZZLE DUCT

HINT:

Use the same procedure as for the No. 2 side defroster nozzle duct.

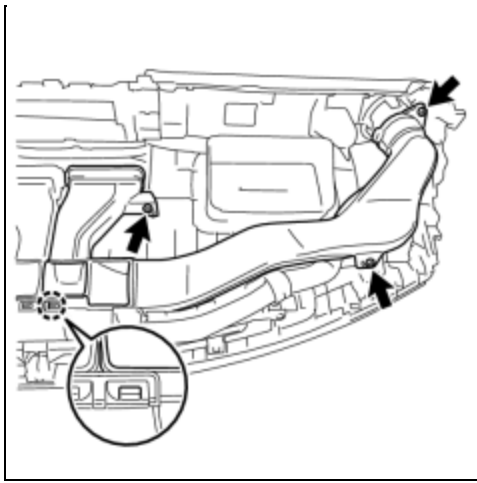
12. INSTALL DEFROSTER NOZZLE ASSEMBLY



(a) Engage the 5 claws.

(b) Install the defroster nozzle assembly, No. 2 side defroster nozzle duct, and No. 1 side defroster nozzle duct as a single unit with the screws.

13. INSTALL NO. 2 HEATER TO REGISTER DUCT



(a) Engage the claw.

(b) Install the No. 2 heater to register duct with the 3 screws.

14. INSTALL NO. 1 HEATER TO REGISTER DUCT

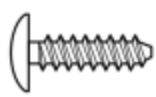
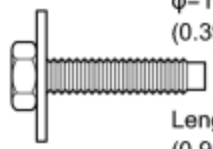
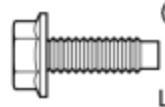
HINT:

Use the same procedure as for the No. 2 heater to register duct.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003O1000MX
Title: INTERIOR PANELS / TRIM: UPPER INSTRUMENT PANEL: REMOVAL (2013 FR-S)		

REMOVAL

1. TABLE OF BOLT, SCREW AND NUT

Code	Shape	Code	Shape	Code	Shape
<A>	 <p>$\varphi=11.5$ (0.453 in) Length=16 (0.630 in)</p>		 <p>$\varphi=10$ (0.394 in) Length=25 (0.984 in)</p>	<C>	 <p>$\varphi=10$ (0.394 in) Length=16 (0.630 in)</p>

(a) All bolts, screws and nuts relevant to installing and removing the instrument panel are shown along with their alphabetical code in the table.

2. PRECAUTION

CAUTION:

Be sure to read Precaution thoroughly before servicing.

INFO

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work.

INFO

3. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

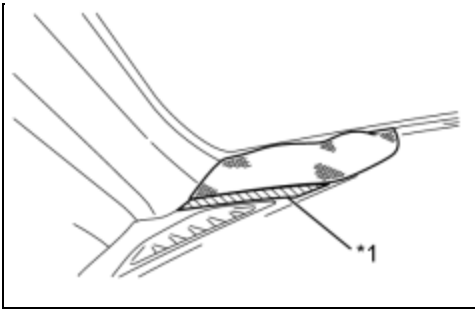
NOTICE:

- The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

4. REMOVE LOWER INSTRUMENT PANEL SUB-ASSEMBLY

INFO

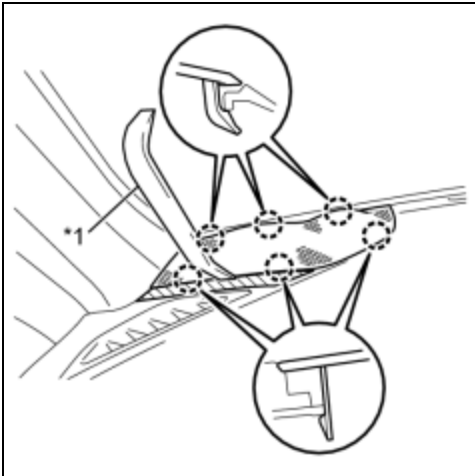
5. REMOVE NO. 2 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY



(a) Apply protective tape to the area shown in the illustration.

Text in Illustration

*1	Protective Tape
----	-----------------



(b) Using a moulding remover, disengage the 6 claws and remove the No. 2 instrument panel speaker panel sub-assembly.

Text in Illustration

*1	Moulding Remover
----	------------------

(c) Disconnect the connector.

6. REMOVE FRONT NO. 2 SPEAKER ASSEMBLY (for LH Side) INFO

7. REMOVE FRONT NO. 3 SPEAKER ASSEMBLY (for LH Side) INFO

8. REMOVE NO. 1 INSTRUMENT PANEL SPEAKER PANEL SUB-ASSEMBLY

HINT:

Use the same procedure described for the LH side.

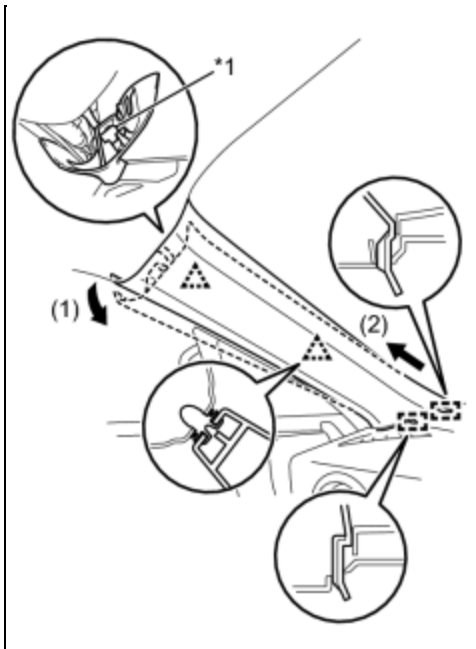
9. REMOVE FRONT NO. 2 SPEAKER ASSEMBLY (for RH Side) INFO

10. REMOVE FRONT NO. 3 SPEAKER ASSEMBLY (for RH Side) INFO

11. REMOVE FRONT PILLAR GARNISH LH

(a) Pull the upper part of the front pillar garnish LH in the direction of the arrow (1), and disengage the 2 clips and the front pillar garnish clip.

Text in Illustration

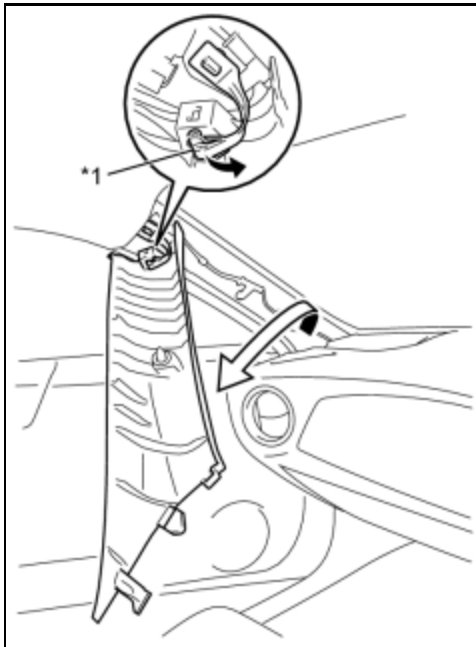


*1	Front Pillar Garnish Clip
----	---------------------------

HINT:

The front pillar garnish clip should be remained on the front pillar garnish LH.

(b) Pull the front pillar garnish LH in the direction of the arrow (2) and disengage the 2 guides.



(c) Turn the front pillar garnish LH in the direction of the arrow.

NOTICE:

While turning, be careful not to damage the curtain shield airbag.

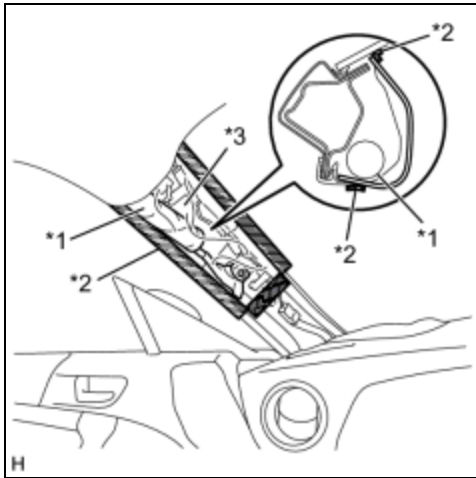
(d) Disengage the tip of the front pillar garnish clip and remove the front pillar garnish LH.

NOTICE:

- Do not use any tools to disengage the tip of the front pillar garnish clip.
- Be careful not to damage the front pillar garnish clip.

Text in Illustration

*1	front pillar garnish clip
----	---------------------------



(e) Protect the curtain shield airbag assembly (w/curtain shield airbag).

Text in Illustration

*1	Curtain Shield Airbag Assembly
*2	Adhesive Tape
*3	Protective Cover

(f) Cover the airbag with a piece of cloth or nylon and secure the edges of the cover with tape as shown in the illustration.

NOTICE:

Cover the curtain shield airbag with a protective cover as soon as the front pillar garnish LH is removed.

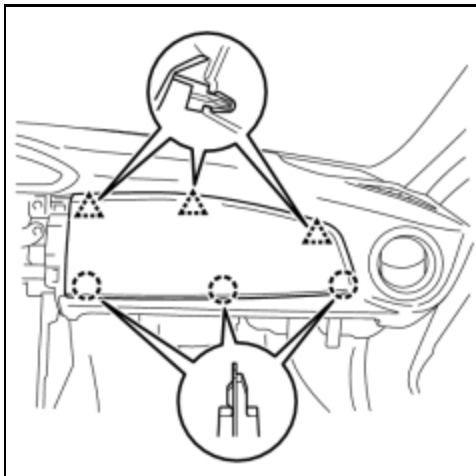
12. REMOVE FRONT PILLAR GARNISH RH

HINT:

Use the same procedure described for the LH side.

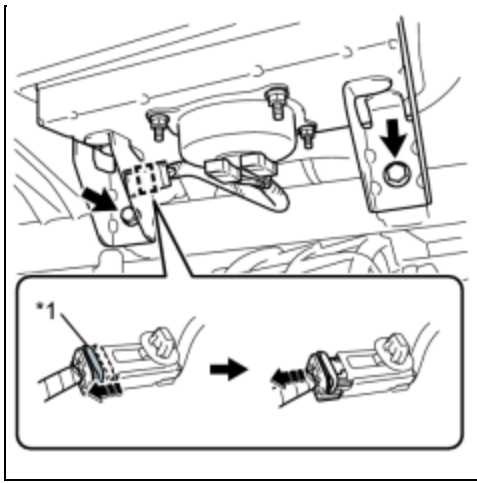
13. REMOVE COMBINATION METER ASSEMBLY INFO

14. REMOVE INSTRUMENT PANEL ORNAMENT



(a) Disengage the 3 clips and 3 claws to remove the instrument panel ornament.

15. REMOVE INSTRUMENT PANEL PASSENGER AIRBAG ASSEMBLY



(a) Disengage the clamp.

(b) Slide the slider and disconnect the passenger airbag connector.

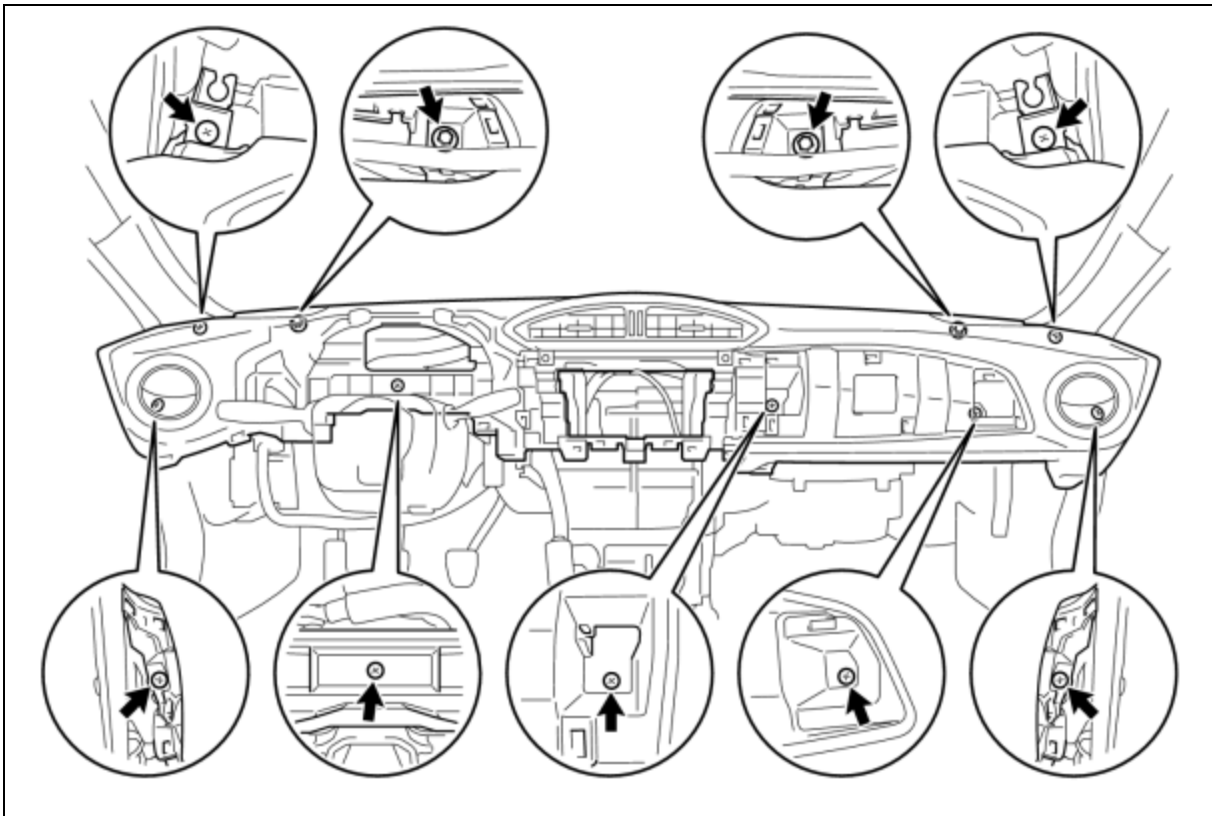
Text in Illustration

*1	Slider
----	--------

(c) Remove the 2 bolts and the instrument panel passenger airbag assembly.

16. REMOVE INSTRUMENT PANEL SUB-ASSEMBLY

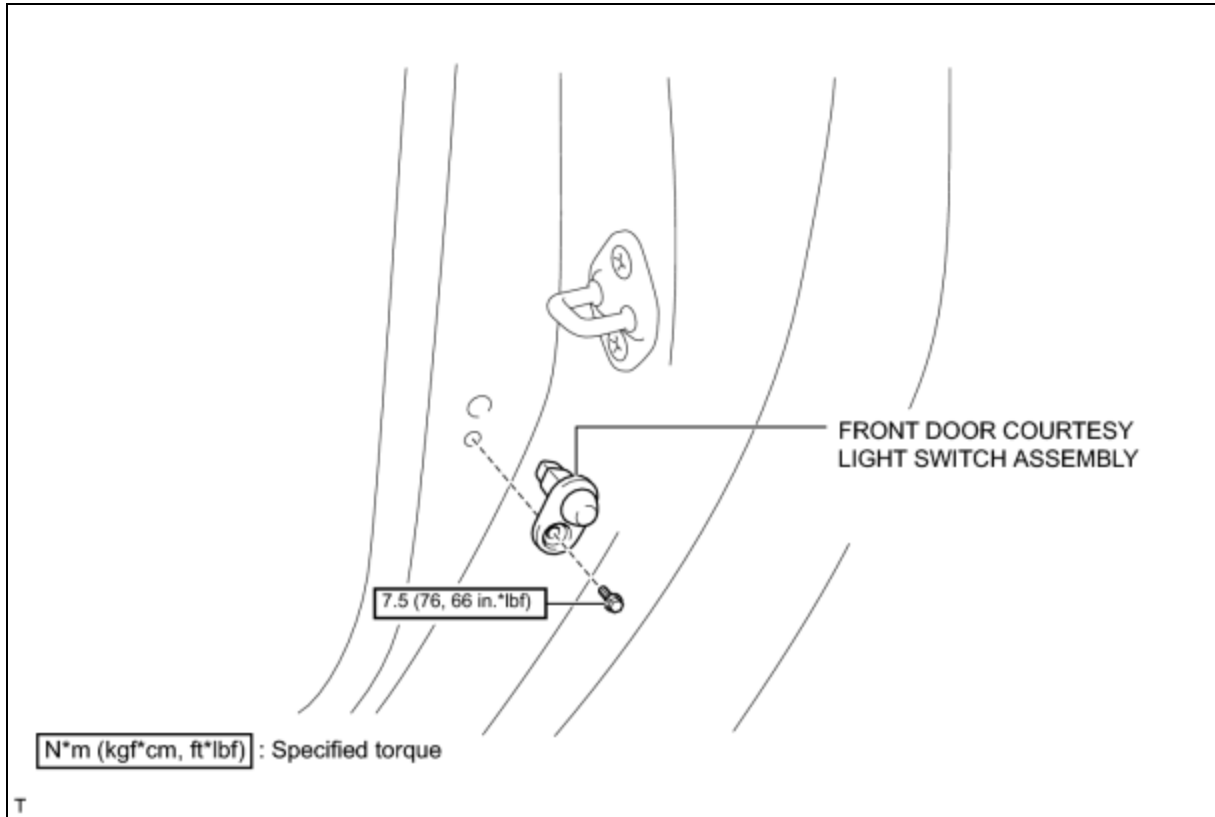
(a) Remove the 2 bolts and 7 screws to remove the instrument panel sub-assembly.



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MUF01NX
Title: LIGHTING (INT): FRONT DOOR COURTESY SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



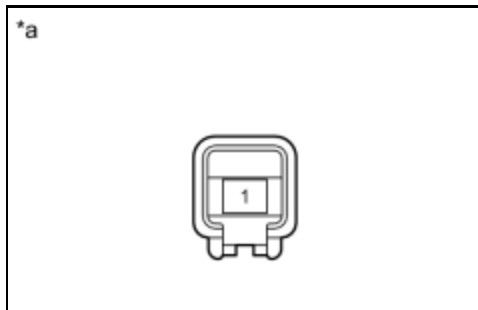
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000202N035X
Title: LIGHTING (INT): FRONT DOOR COURTESY SWITCH: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY

- (a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 - Switch body	Not pushed	Below 1 Ω
1 - Switch body	Pushed	10 k Ω or higher

Text in Illustration

^{*a}	Component without harness connected (Front Door Courtesy Light Switch Assembly)
---------------	--

If the result is not as specified, replace the front door courtesy switch assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MUW021X
Title: LIGHTING (INT): FRONT DOOR COURTESY SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

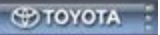
HINT:

- Use the same procedure for the RH and LH sides.
- The procedure described below is for the LH side.

1. INSTALL FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY

- (a) Connect the connector.
- (b) Install the front door courtesy light switch assembly with the bolt.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)



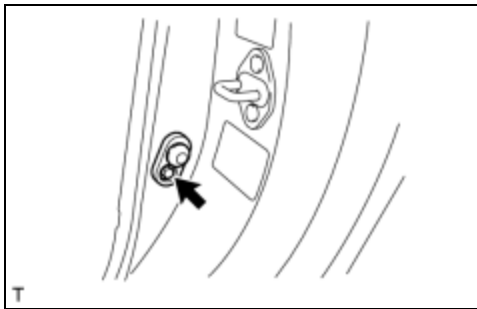
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MUX01XX
Title: LIGHTING (INT): FRONT DOOR COURTESY SWITCH: REMOVAL (2013 FR-S)		

REMOVAL

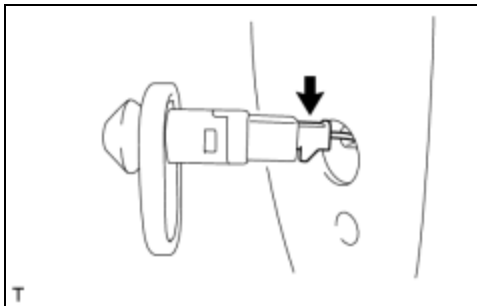
HINT:

- Use the same procedure for the RH and LH sides.
- The procedure described below is for the LH side.

1. REMOVE FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY



(a) Remove the bolt.

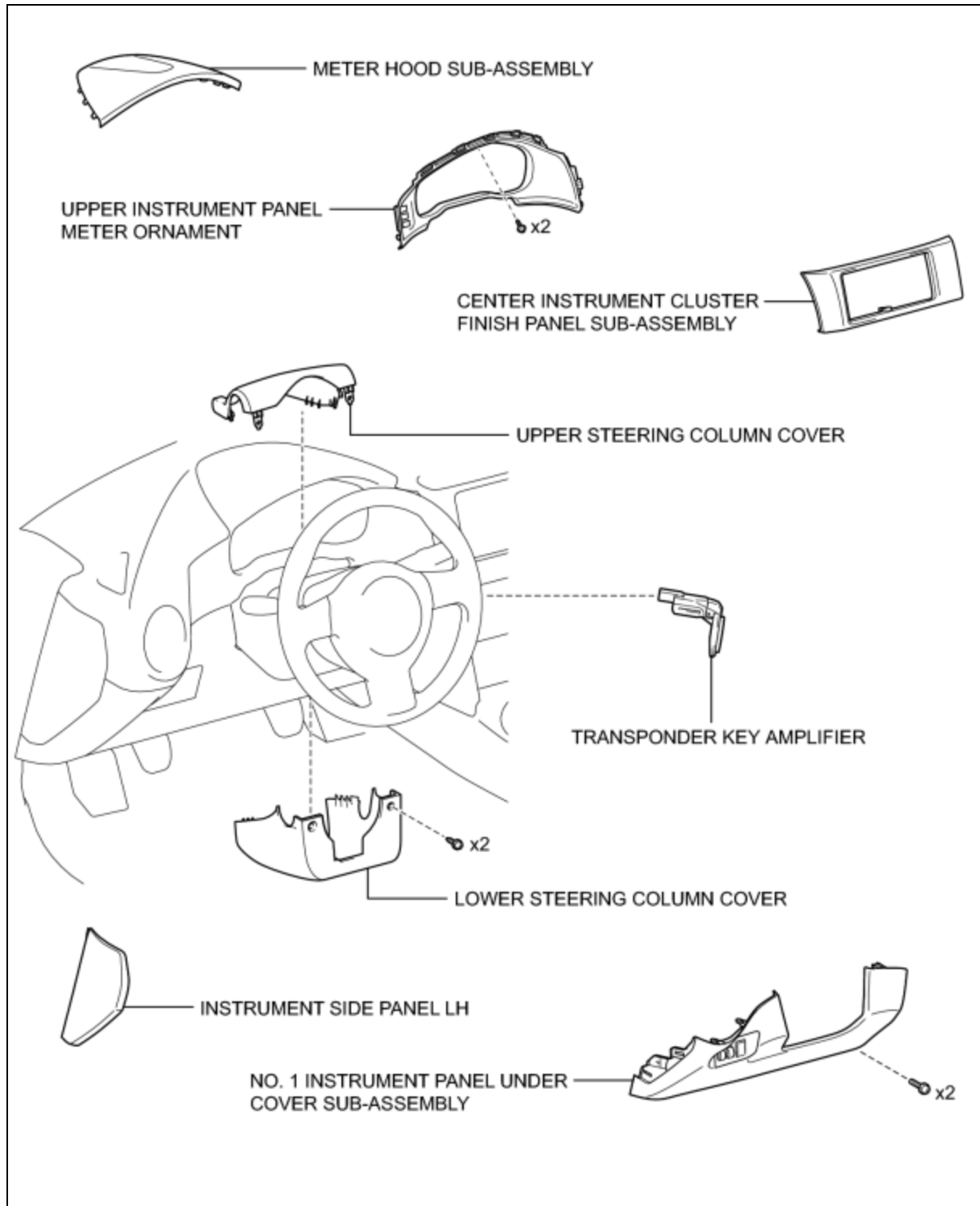


(b) Disconnect the connector and remove the front door courtesy light switch assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003Y0000TX
Title: LIGHTING (INT): IGNITION KEY CYLINDER LIGHT: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



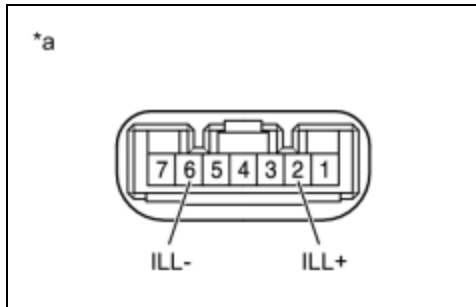
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003YNZ00VX
Title: LIGHTING (INT): IGNITION KEY CYLINDER LIGHT: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT TRANSPONDER KEY AMPLIFIER

(a) Apply battery voltage to the connector and check the light comes on.

OK:



CONDITION	SPECIFIED CONDITION
Battery positive (+) → 2 (ILL+)	Light comes on
Battery negative (-) → 6 (ILL-)	

If the result is not as specified, replace the transponder key amplifier.

Text in Illustration

*a	Component without harness connected (Transponder Key Amplifier)
----	---

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003YNY00XX
Title: LIGHTING (INT): IGNITION KEY CYLINDER LIGHT: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL TRANSPONDER KEY AMPLIFIER

- (a) Connect the connector.
- (b) Engage the 2 claws to install the transponder key amplifier.

2. INSTALL UPPER STEERING COLUMN COVER [INFO](#)

3. INSTALL LOWER STEERING COLUMN COVER [INFO](#)

4. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)

5. INSTALL UPPER INSTRUMENT PANEL METER ORNAMENT [INFO](#)

6. INSTALL METER HOOD SUB-ASSEMBLY

7. INSTALL CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY [INFO](#)

8. INSTALL INSTRUMENT SIDE PANEL LH [INFO](#)

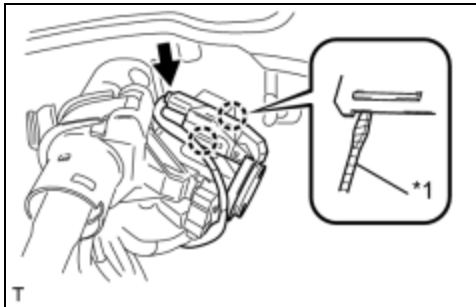


Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003YO100XX
Title: LIGHTING (INT): IGNITION KEY CYLINDER LIGHT: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE INSTRUMENT SIDE PANEL LH [INFO](#)
2. REMOVE CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY [INFO](#)
3. REMOVE METER HOOD SUB-ASSEMBLY [INFO](#)
4. REMOVE UPPER INSTRUMENT PANEL METER ORNAMENT [INFO](#)
5. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)
6. REMOVE LOWER STEERING COLUMN COVER [INFO](#)
7. REMOVE UPPER STEERING COLUMN COVER [INFO](#)
8. REMOVE TRANSPONDER KEY AMPLIFIER

(a) Disconnect the connector.



(b) Using a screwdriver with its tip wrapped with protective tape, disengage the 2 claws and remove the transponder key amplifier.

Text in illustration

*1

Protective Tape

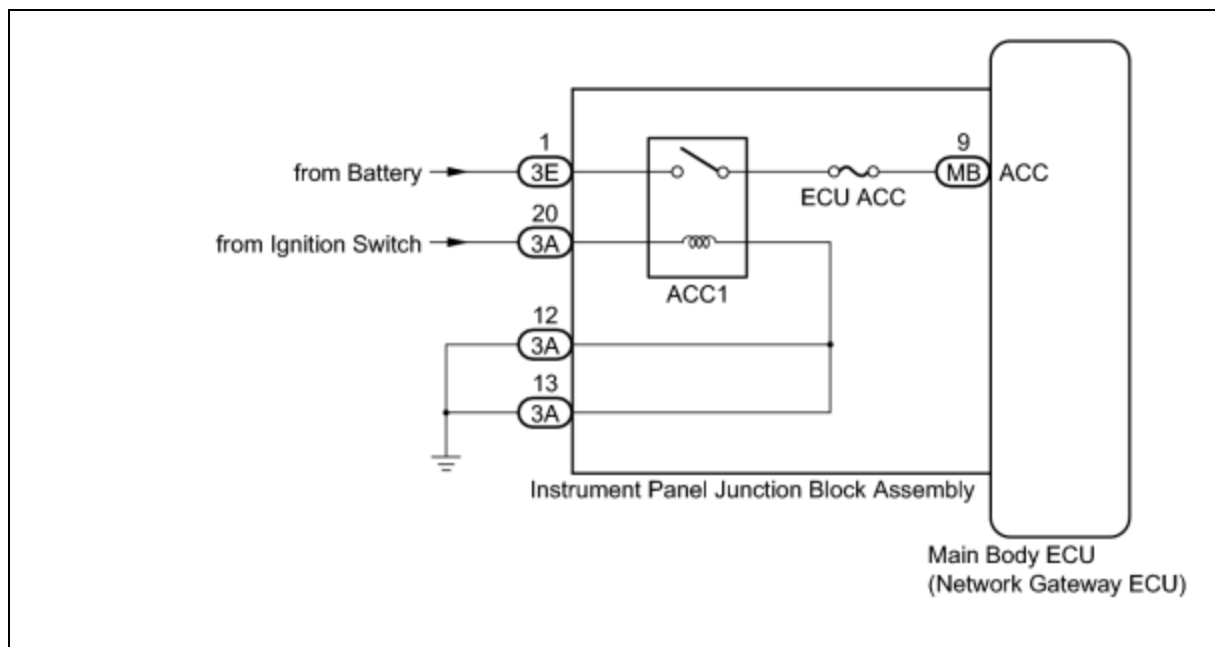
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011SQ09FX
Title: LIGHTING (INT): LIGHTING SYSTEM: ACC Signal Circuit (2013 FR-S)		

ACC Signal Circuit

DESCRIPTION

This circuit detects the ignition switch ACC or off condition, and sends it to the main body ECU (network gateway ECU).

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	READ VALUE USING TECHSTREAM
-----------	------------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Data List.

(e) Read the display on the Techstream.

OK:

Normal conditions listed above are displayed.

Main Body

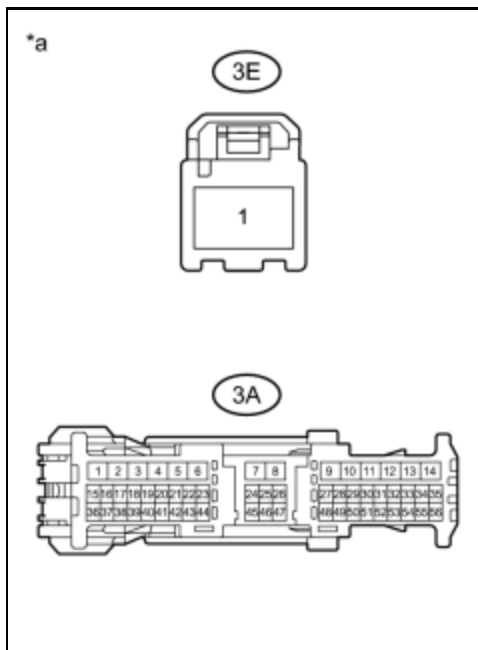
TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
ACC SW	Ignition switch ACC signal/ON or OFF	ON: Ignition switch ACC OFF: Ignition switch off	-

NG ► **CHECK HARNESS AND CONNECTOR (INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY - BATTERY AND BODY GROUND)**

OK ► **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

2.	CHECK HARNESS AND CONNECTOR (INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY - BATTERY AND BODY GROUND)
-----------	---

(a) Disconnect the 3A and 3E instrument panel junction block assembly connectors.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3E-1 - Body ground	Always	11 to 14 V
3A-20 - Body ground	Ignition switch ACC	11 to 14 V

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3A-12 - Body ground	Always	Below 1 Ω

3A-13 - Body ground	Always	Below 1 Ω
---------------------	--------	-----------

Text in Illustration

*a	Front view of wire harness connector (to instrument panel junction block assembly)
----	---

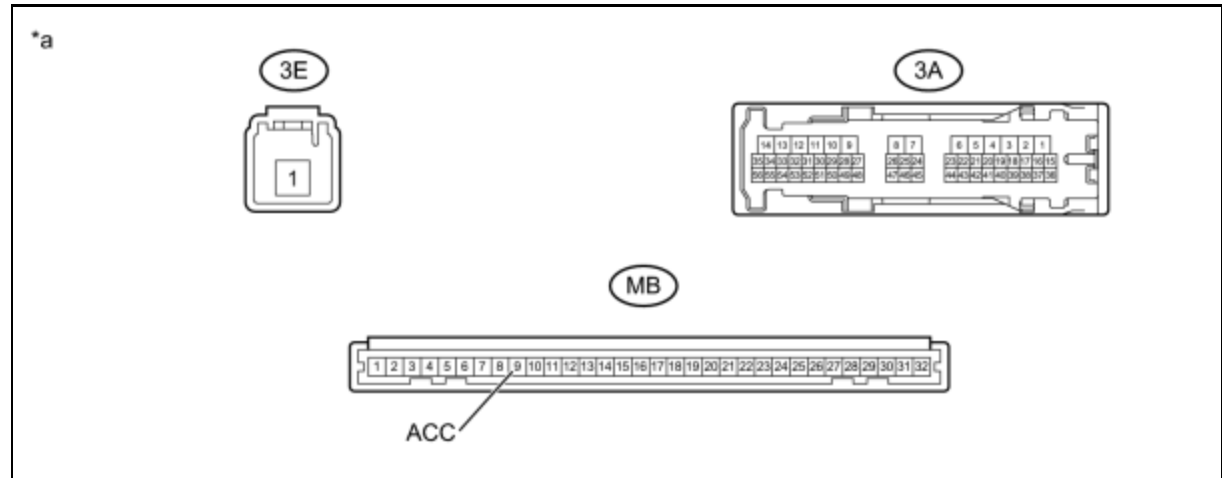
NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK



3. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY (ACC1 RELAY)

- (a) Remove the instrument panel junction block assembly **INFO** .
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (c) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Instrument panel junction block assembly)	-	-
----	---	---	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3E-1 - MB-9 (ACC)	Always	10 kΩ or higher
	Battery positive (+) → 3A-20	

3E-1 - MB-9 (ACC)

Battery negative (-) → 3A-12 or 3A-13

Below 1 Ω

NG ▶ REPLACE INSTRUMENT PANEL JUNCTION
BLOCK ASSEMBLY

OK ▶ REPLACE MAIN BODY ECU (NETWORK
GATEWAY ECU)



TOYOTA

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004PIC00IX
Title: LIGHTING (INT): LIGHTING SYSTEM: CUSTOMIZE PARAMETERS (2013 FR-S)		

CUSTOMIZE PARAMETERS

1. CUSTOMIZE LIGHTING SYSTEM (INT)

(a) Customizing using the Techstream

HINT:

The following items can be customized.

NOTICE:

- When the customer requests a change in a function, first make sure that the function can be customized.
- Be sure to make a note of the current settings before customizing.
- When troubleshooting a function, first make sure that the function is set to the default setting.

- (1) Connect the Techstream to the DLC3.
- (2) Turn the ignition switch to ON.
- (3) Turn the Techstream on.
- (4) Enter the following menus: Customize Setting / Illuminated Entry.
- (5) Select the setting by referring to the table below.

Illuminated Entry

TESTER DISPLAY	DEFAULT	CONTENT	SETTING	RELEVANT ECU
Lighting Time	15 s	Changes the lighting time after closing all of the doors. (It will fade out immediately in case of turning the ignition switch from off to ACC or ON.)	7.5 s, 15 s or 30 s	Main body ECU (Network gateway ECU)
I/L when ACC OFF	ON	Lights up the ignition key cylinder light and map light when the ignition switch is turned from ACC or ON to off.	ON or OFF	
I/L ON W/Door Key Unlock	ON	Lights up the ignition key cylinder light and map light when doors are unlocked using a mechanical key or door control transmitter.	ON or OFF	
Interior Light Control	ON	Lights up the ignition key cylinder light and map light when the illuminated entry function is operating.	ON or OFF	



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PKVOA8X
Title: LIGHTING (INT): LIGHTING SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the following table, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- Connect the Techstream to the DLC3.
- Turn the ignition switch ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Main Body / Data List.
- Read the Data List according to the display on the Techstream.

Main Body

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
D Door Courtesy SW	Driver side door courtesy light switch signal/ON or OFF	ON: Driver side door closed OFF: Driver side door open	-
P Door Courtesy SW	Passenger side door courtesy light switch signal/ON or OFF	ON: Passenger side door closed OFF: Passenger side door open	-
Luggage Courtesy SW	Luggage compartment door courtesy switch signal/ON or OFF	ON: Luggage compartment door open OFF: Luggage compartment door closed	-
IG SW	Ignition switch ON signal/ON or OFF	ON: Ignition switch ON OFF: Ignition switch off	-
ACC SW	Ignition switch ACC signal/ON or OFF	ON: Ignition switch ACC OFF: Ignition	-

		switch off	
Room Light Output	Map light assembly output signal/ON or OFF	ON: Map light assembly on OFF: Map light assembly off	-
Key Illumination Output	Ignition key cylinder light output signal/ON or OFF	ON: Ignition key cylinder light on OFF: Ignition key cylinder light off	-
Lighting Time	Lighting time of the delay control function (illuminated entry system)/15s, 7.5s or 30s	15s: 15 seconds 7.5s: 7.5 seconds 30s: 30 seconds	Customized value is displayed
I/L when ACC OFF	Function that lights up the interior lights when the ignition switch is turned from on (ACC or IG) to off/OFF or ON	OFF: Function disabled ON: Function enabled	Customized value is displayed
I/L ON W/Door Key Unlock	Function that lights up the interior lights when the doors are unlocked/OFF or ON	OFF: Function disabled ON: Function enabled	Customized value is displayed
Interior Light Control	Operation of the illuminated entry system/OFF or ON	OFF: System not operated ON: System operated	Customized value is displayed

2. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Active Test.
- (e) Perform the Active Test according to the display on the Techstream.

Main Body

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Illuminated Entry System	<ul style="list-style-type: none"> • Map light assembly • Ignition key cylinder light 	ON/OFF	Map light assembly switch in DOOR position

Key Ring Light	Ignition key cylinder light	ON/OFF	-
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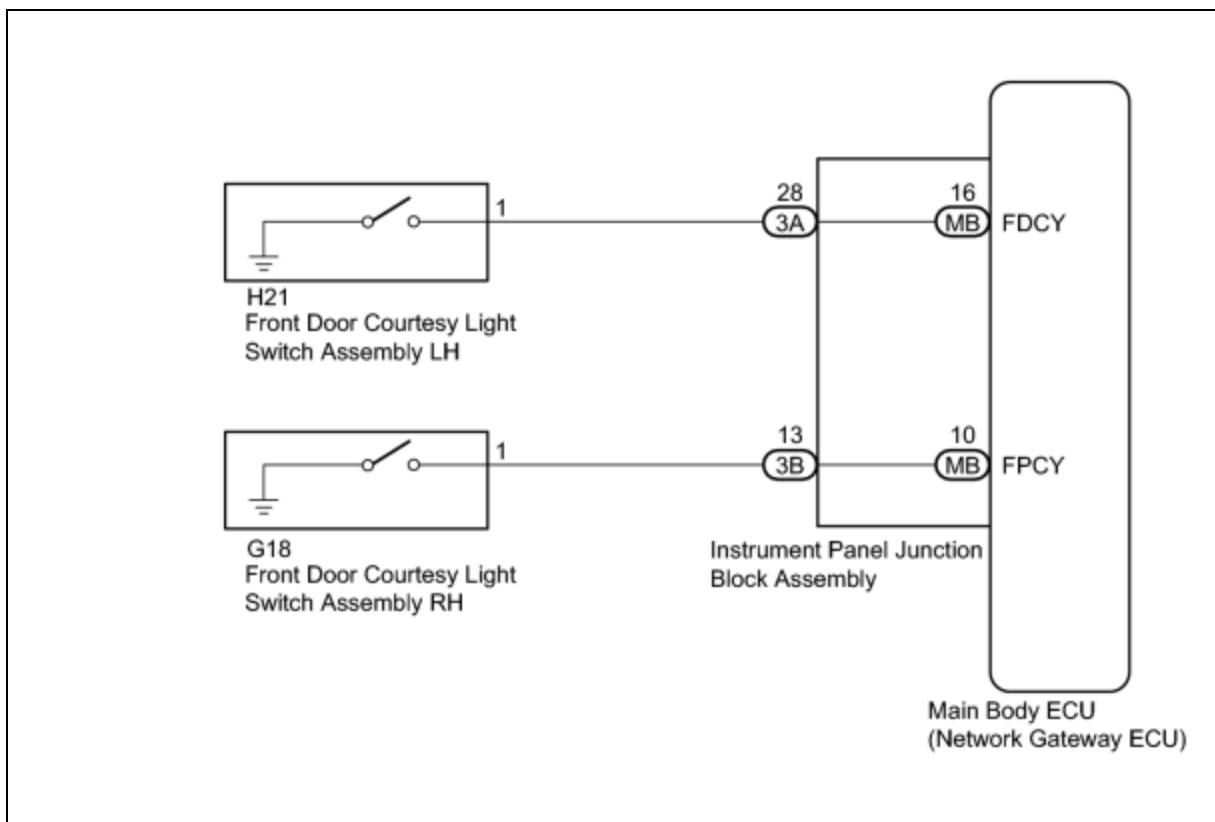
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011T306TX
Title: LIGHTING (INT): LIGHTING SYSTEM: Door Courtesy Switch Circuit (2013 FR-S)		

Door Courtesy Switch Circuit

DESCRIPTION

The main body ECU (network gateway ECU) detects the condition of the front door courtesy light switch assembly using this circuit.

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	READ VALUE USING TECHSTREAM
-----------	------------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.

(d) Enter the following menus: Body Electrical / Main Body / Data List.

(e) Read the display on the Techstream.

OK:

Normal conditions listed above are displayed.

Main Body

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
D Door Courtesy SW	Driver side door courtesy light switch signal/ON or OFF	ON: Driver side door closed OFF: Driver side door open	-
P Door Courtesy SW	Passenger side door courtesy light switch signal/ON or OFF	ON: Passenger side door closed OFF: Passenger side door open	-

Result:

RESULT	PROCEED TO
OK	A
Driver side door courtesy light switch or passenger side door courtesy light switch does not operate	B

B ▶ **INSPECT FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY (LH OR RH)**

A ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

2.	INSPECT FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY (LH OR RH)
-----------	---

(a) Remove the front door courtesy light switch assembly INFO .

(b) Inspect the front door courtesy light switch assembly INFO .

OK:

Front door courtesy light switch assembly is normal.

Result:

RESULT	PROCEED TO
OK (for Front LH)	A
OK (for Front RH)	B
NG	C

B ▶ CHECK HARNESS AND CONNECTOR (FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY RH - INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY)

C ▶ REPLACE FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY

A



3.	CHECK HARNESS AND CONNECTOR (FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY LH - INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY)
-----------	--

- (a) Disconnect the 3A instrument panel junction block assembly connector.
- (b) Disconnect the H21 front door courtesy light switch assembly LH connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H21 - 1 - 3A-28	Always	Below 1 Ω
H21 - 1 - Body ground	Always	10 k Ω or higher

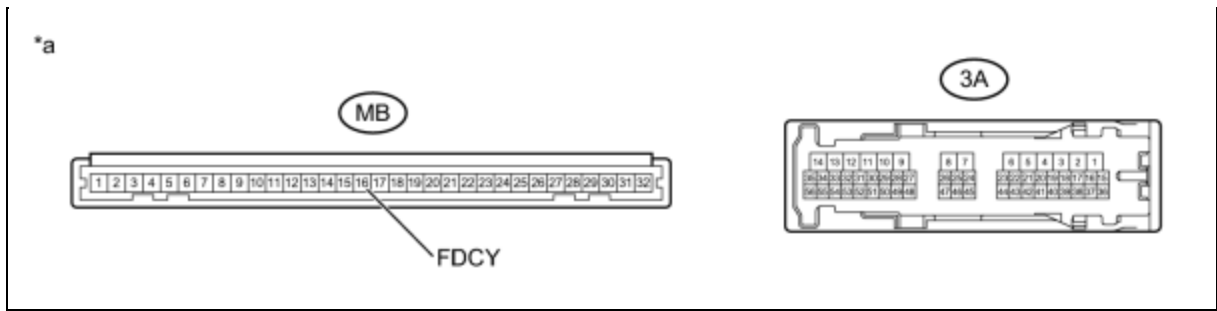
NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK



4.	INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY
-----------	---

- (a) Remove the instrument panel junction block assembly INFO.
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (c) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	---	---	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3A-28 - MB-16 (FDCY)	Always	Below 1 Ω

NG ► REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

OK ► REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

5. CHECK HARNESS AND CONNECTOR (FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY RH - INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY)

- (a) Disconnect the 3B instrument panel junction block assembly connector.
- (b) Disconnect the G18 front door courtesy light switch assembly RH connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

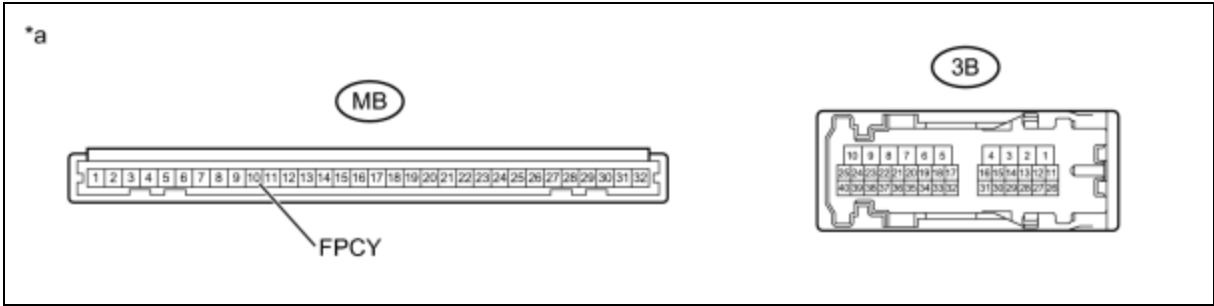
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G18-1 - 3B-13	Always	Below 1 Ω
G18-1 - Body ground	Always	10 k Ω or higher

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

6. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

- (a) Remove the instrument panel junction block assembly INFO.
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (c) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	---	---	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3B-13 - MB-10 (FPCY)	Always	Below 1 Ω

NG ► REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

OK ► REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PKJ0DFX
Title: LIGHTING (INT): LIGHTING SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedure to troubleshoot the lighting system.
- *: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	CUSTOMER PROBLEM ANALYSIS AND SYMPTOM CHECK
-----------	--

NEXT



3.	INSPECT BATTERY VOLTAGE
-----------	--------------------------------

(a) Measure the battery voltage with the ignition switch off.

Standard Voltage:

11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding to the next step.

NEXT



4.	PROBLEM SYMPTOMS TABLE
-----------	-------------------------------

Result:

RESULT	PROCEED TO
Fault is not listed in Problem Symptoms Table.	A

B ▶ Go to step 6

A



5.	OVERALL ANALYSIS AND TROUBLESHOOTING*
-----------	--

(a) Data List / Active Test [INFO](#)

(b) Terminals of ECU [INFO](#)

NEXT



6.	ADJUST, REPAIR OR REPLACE
-----------	----------------------------------

NEXT



7.	CONFIRMATION TEST
-----------	--------------------------

NEXT ▶ **END**



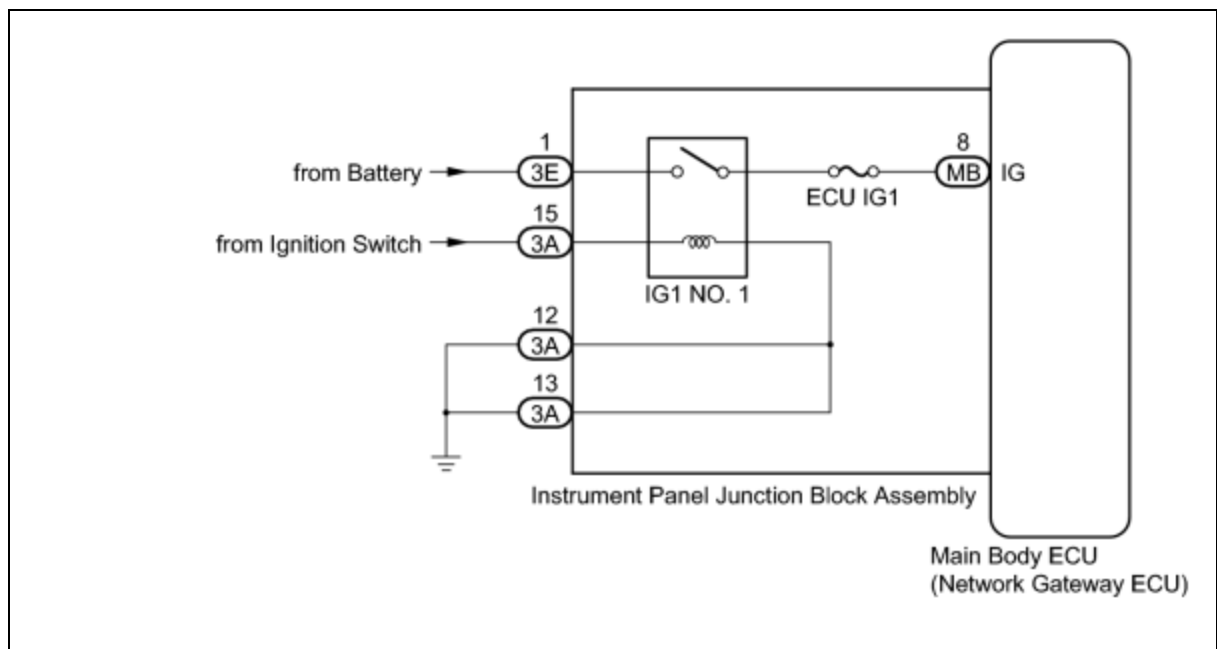
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011SQ09EX
Title: LIGHTING (INT): LIGHTING SYSTEM: IG Signal Circuit (2013 FR-S)		

IG Signal Circuit

DESCRIPTION

This circuit detects the ignition switch ON or off condition, and sends it to the main body ECU (network gateway ECU).

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	READ VALUE USING TECHSTREAM
-----------	------------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Data List.

(e) Read the display on the Techstream.

OK:

Normal conditions listed above are displayed.

Main Body

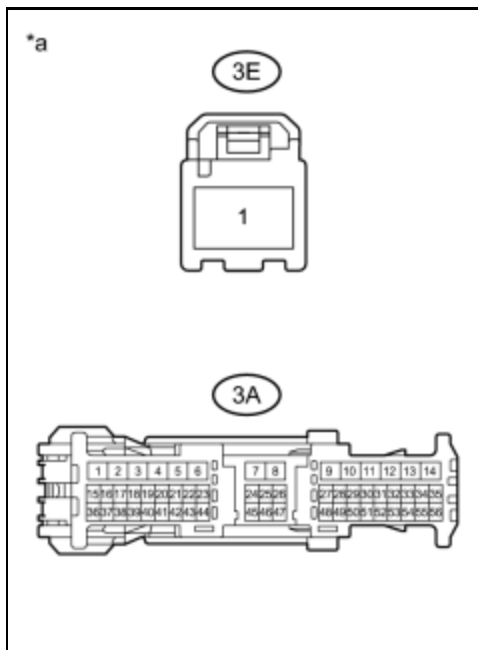
TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
IG SW	Ignition switch ON signal/ON or OFF	ON: Ignition switch ON OFF: Ignition switch off	-

NG ► **CHECK HARNESS AND CONNECTOR (INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY - BATTERY AND BODY GROUND)**

OK ► **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

2.	CHECK HARNESS AND CONNECTOR (INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY - BATTERY AND BODY GROUND)
-----------	---

(a) Disconnect the 3A and 3E instrument panel junction block assembly connectors.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3E-1 - Body ground	Always	11 to 14 V
3A-15 - Body ground	Ignition switch ON	11 to 14 V

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3A-12 - Body ground	Always	Below 1 Ω

3A-13 - Body ground	Always	Below 1 Ω
---------------------	--------	-----------

Text in Illustration

*a	Front view of wire harness connector (to instrument panel junction block assembly)
----	---

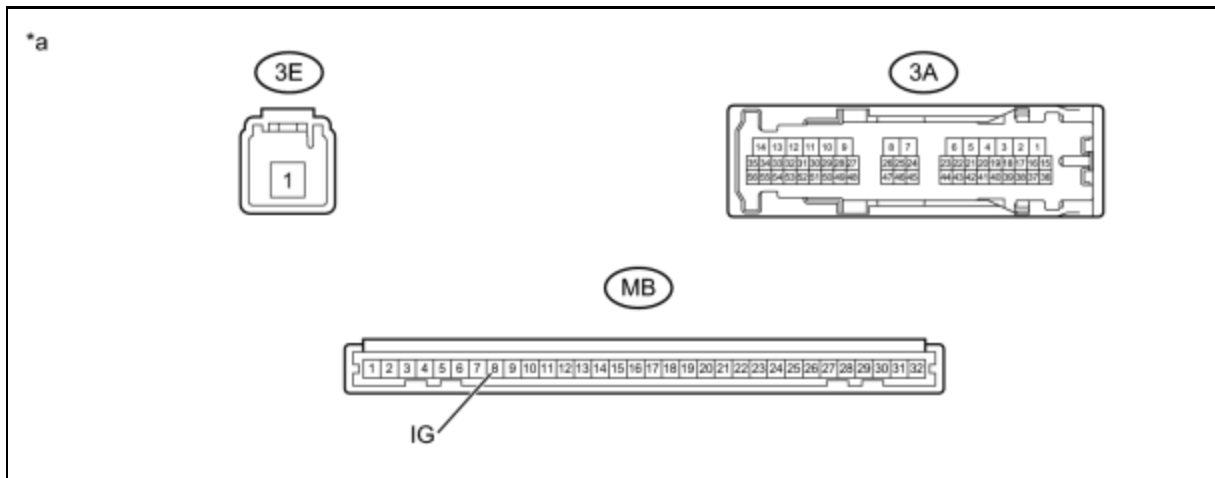
NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK



3. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY (IG1 NO. 1 RELAY)

- (a) Remove the instrument panel junction block assembly **INFO** .
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (c) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Instrument panel junction block assembly)	-	-
----	---	---	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3E-1 - MB-8 (IG)	Always	10 kΩ or higher
	Battery positive (+) → 3A-15	

3E-1 - MB-8 (IG)

Battery negative (-) → 3A-12 or 3A-13

Below 1 Ω

NG ▶ REPLACE INSTRUMENT PANEL JUNCTION
BLOCK ASSEMBLY

OK ▶ REPLACE MAIN BODY ECU (NETWORK
GATEWAY ECU)



TOYOTA

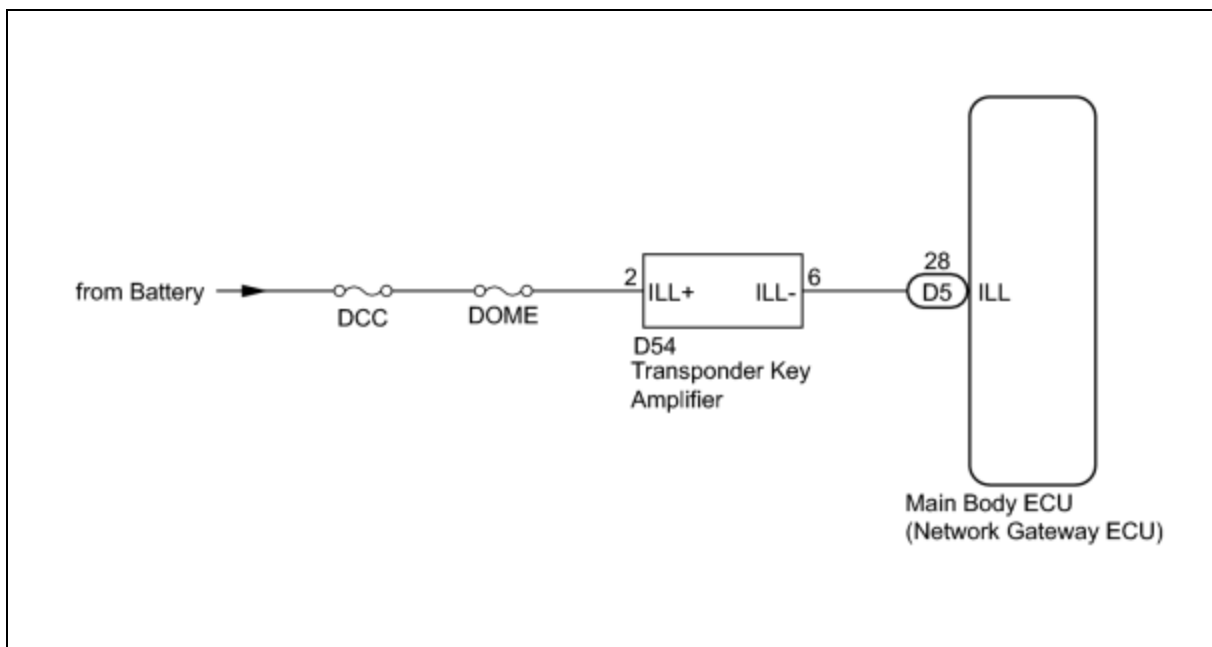
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000055AM000X
Title: LIGHTING (INT): LIGHTING SYSTEM: Ignition Key Cylinder Light Circuit (2013 FR-S)		

Ignition Key Cylinder Light Circuit

DESCRIPTION

The main body ECU (network gateway ECU) controls the operation of the transponder key amplifier (ignition key cylinder light).

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. PERFORM ACTIVE TEST USING TECHSTREAM

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Active Test.

(e) Check that the light operates.

ON:

Ignition key cylinder light comes on

Main Body

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Key Ring Light	Ignition key cylinder light	ON/OFF	-

NG ▶ **INSPECT TRANSPONDER KEY AMPLIFIER**

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

2. INSPECT TRANSPONDER KEY AMPLIFIER

(a) Remove the transponder key amplifier **INFO** .

(b) Inspect the transponder key amplifier **INFO** .

OK:

Transponder key amplifier is normal.

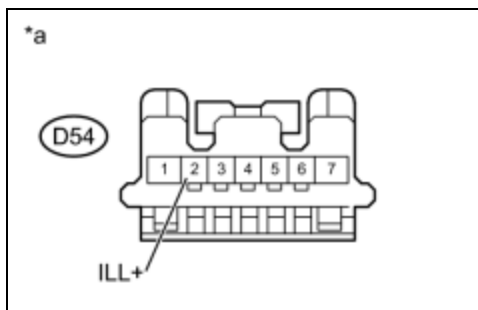
NG ▶ **REPLACE TRANSPONDER KEY AMPLIFIER**

OK



3. CHECK HARNESS AND CONNECTOR (TRANSPONDER KEY AMPLIFIER - BATTERY)

(a) Disconnect the D54 transponder key amplifier connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D54-2 (ILL+) - Body ground	Always	11 to 14 V

Text in Illustration

Front view of wire harness connector

*a (to transponder key amplifier)

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

4. CHECK HARNESS AND CONNECTOR (TRANSPONDER KEY AMPLIFIER - MAIN BODY ECU (NETWORK GATEWAY ECU))

- (a) Disconnect the D54 transponder key amplifier connector.
- (b) Disconnect the D5 main body ECU (network gateway ECU) connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D54-6 (ILL-) - D5-28 (ILL)	Always	Below 1 Ω
D5-28 (ILL) - Body ground	Always	10 k Ω or higher

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ► REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

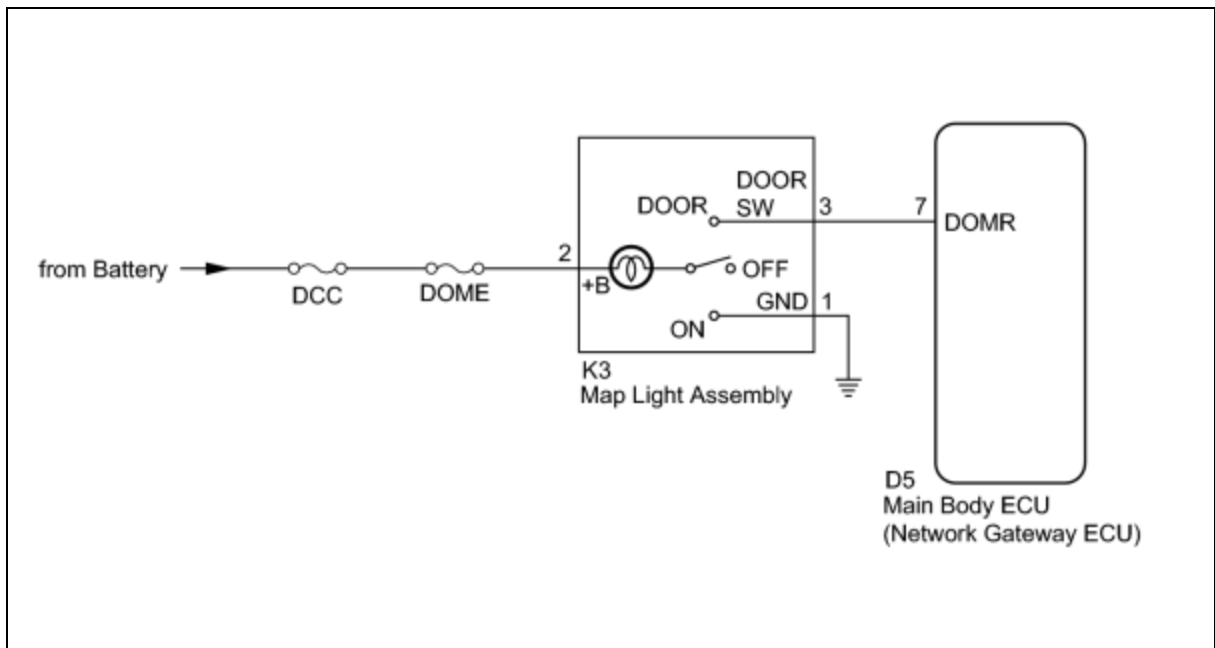
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001T9V05MX
Title: LIGHTING (INT): LIGHTING SYSTEM: Interior Light Circuit (2013 FR-S)		

Interior Light Circuit

DESCRIPTION

The main body ECU (network gateway ECU) controls the operation of the map light assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	PERFORM ACTIVE TEST USING TECHSTREAM
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Active Test.

(e) Check that the lights operate.

OK:

Map light fades in.

Main Body

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Illuminated Entry System	Map light assembly	ON/OFF	-

NG ► INSPECT MAP LIGHT ASSEMBLY

OK ► PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE

2. INSPECT MAP LIGHT ASSEMBLY

(a) Remove the map light assembly **INFO** .

(b) Inspect the map light assembly **INFO** .

OK:

Map light assembly is normal.

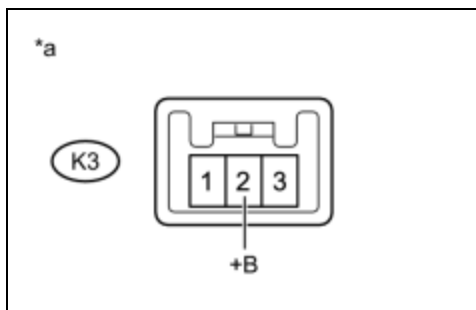
NG ► REPLACE MAP LIGHT ASSEMBLY

OK



3. CHECK HARNESS AND CONNECTOR (BATTERY - MAP LIGHT ASSEMBLY)

(a) Disconnect the K3 map light assembly connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
K3-2 (+B) - Body ground	Always	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to map light assembly)
----	--

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

4. CHECK HARNESS AND CONNECTOR (MAP LIGHT ASSEMBLY - MAIN BODY ECU (NETWORK GATEWAY ECU))

- (a) Disconnect the K3 map light assembly connector.
- (b) Disconnect the D5 main body ECU (network gateway ECU) connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
K3-3 (DOOR SW) - D5-7 (DOMR)	Always	Below 1 Ω
D5-7 (DOMR) - Body ground	Always	10 k Ω or higher

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

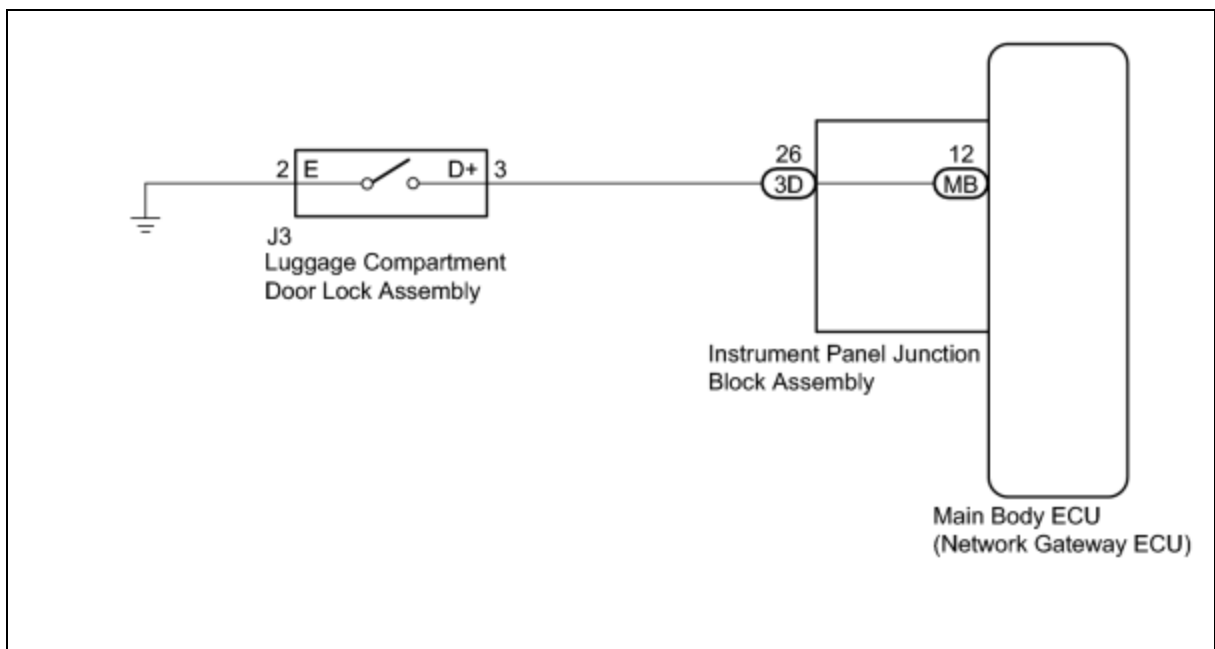
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011T306SX
Title: LIGHTING (INT): LIGHTING SYSTEM: Luggage Compartment Door Courtesy Switch Circuit (2013 FR-S)		

Luggage Compartment Door Courtesy Switch Circuit

DESCRIPTION

The main body ECU (network gateway ECU) detects the condition of the luggage compartment door lock assembly using this circuit.

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	READ VALUE USING TECHSTREAM
-----------	------------------------------------

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Data List.
- (e) Read the display on the Techstream.

OK:

Normal conditions listed above are displayed.

Main Body

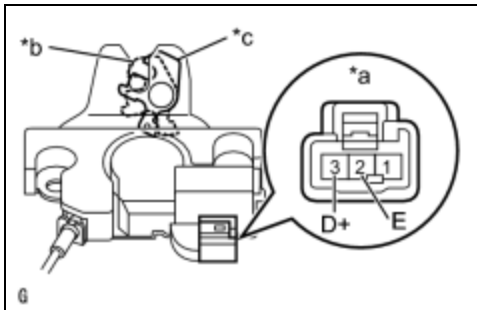
TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Luggage Courtesy SW	Luggage compartment door courtesy switch signal/ON or OFF	ON: Luggage compartment door open OFF: Luggage compartment door closed	-

NG ▶ **INSPECT LUGGAGE COMPARTMENT DOOR LOCK ASSEMBLY**

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

2. INSPECT LUGGAGE COMPARTMENT DOOR LOCK ASSEMBLY

(a) Remove the luggage compartment door lock assembly **INFO** .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	DOOR LOCK CONDITION	SPECIFIED CONDITION
3 (D+) - 2 (E)	Open (Unlock)	Below 1 Ω
3 (D+) - 2 (E)	Close (Lock)	10 kΩ or higher

Text in Illustration

*a	Component without harness connected (Luggage Compartment Door Lock Assembly)
*b	Close (Lock)
*c	Open (Unlock)

NG ▶ **REPLACE LUGGAGE COMPARTMENT DOOR LOCK ASSEMBLY**

OK
▼

3. CHECK HARNESS AND CONNECTOR (LUGGAGE COMPARTMENT DOOR LOCK ASSEMBLY - INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY)

- (a) Disconnect the 3D instrument panel junction block assembly connector.
- (b) Disconnect the J3 luggage compartment door lock assembly connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

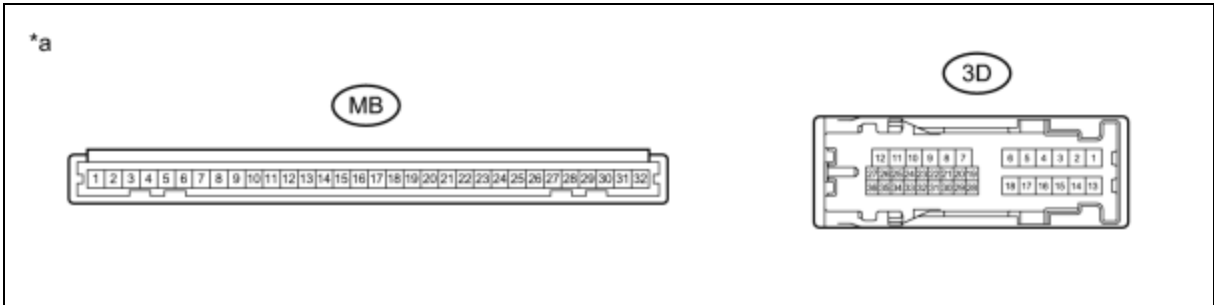
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
J3-3 (D+) - 3D-26	Always	Below 1 Ω
J3-3 (D+) - Body ground	Always	10 kΩ or higher
J3-2 (E) - Body ground	Always	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

- (a) Remove the instrument panel junction block assembly **INFO**.
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (c) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	--	---	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3D-26 - MB-12	Always	Below 1 Ω

NG ► REPLACE INSTRUMENT PANEL JUNCTION
BLOCK ASSEMBLY

OK ► REPLACE MAIN BODY ECU (NETWORK
GATEWAY ECU)



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002R6C02ZX
Title: LIGHTING (INT): LIGHTING SYSTEM: OPERATION CHECK (2013 FR-S)		

OPERATION CHECK

1. INSPECT INTERIOR LIGHT CONTROL OPERATION

NOTICE:

Perform this inspection with the customize parameters at the initial settings.

HINT:

The interior light control illuminates the lights below.

- Ignition Key Cylinder Light
- Map Light

(a) The operation and conditions of this control are described below.

OPERATION	CONDITION
Fade in and illuminate constantly	Any door is opened when all doors are closed.
Illuminate for 15 seconds, and then fade out	When any of the following conditions is met, the lights illuminate for 15 seconds, and then fade out: <ul style="list-style-type: none"> • Any door is unlocked when the ignition switch is off with all doors closed and locked. • The ignition switch is turned from ON to off when all doors are closed. • All doors are closed after any door is opened and the ignition switch off.
Fade out immediately	When any of the following conditions is met, the lights fade out immediately: <ul style="list-style-type: none"> • The ignition switch is turned from off to ACC when all doors are closed. • All doors are locked when the ignition switch is off, all doors are closed and any door is unlocked. • All doors are locked again when all doors are already closed and locked.

2. BATTERY SAVING CONTROL OPERATION

NOTICE:

Perform this inspection with the customize parameters at the initial settings.

HINT:

The lights controlled by battery saving control are as follows:

- Ignition Key Cylinder Light
- Map Light
- Luggage Compartment Light

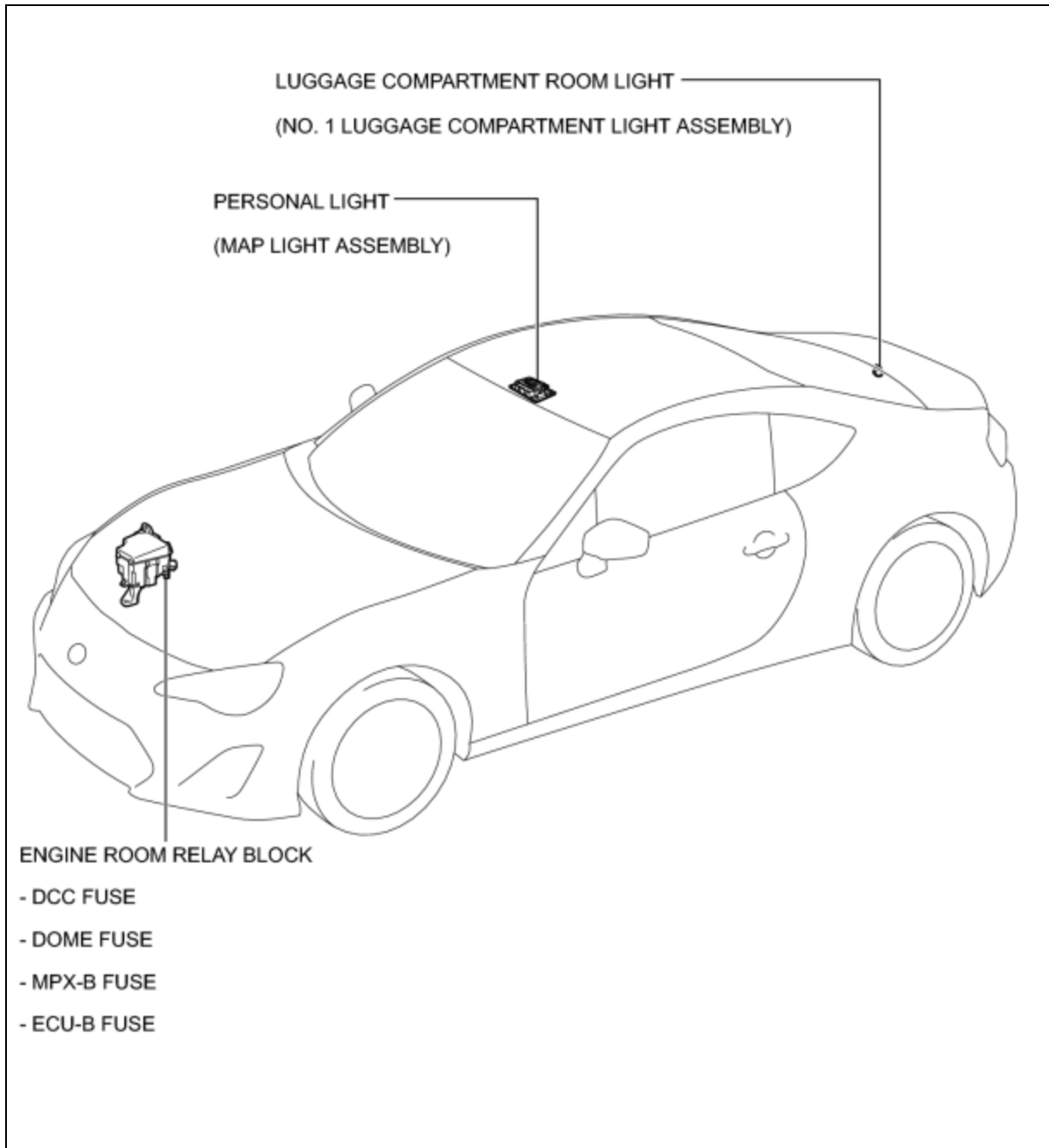
(a) The operation and conditions of this control are described below.

OPERATION	CONDITION
Battery saving	<p>When 20 minutes elapse after the ignition switch is turned from ACC or ON to off and the lights that operate remain on, the lights are turned off.</p> <p>HINT:</p> <p>Battery saving control is canceled when any of the following operations is performed before the lights are turned off by battery saving control. After the operation is performed, the lights remain on for another 20 minutes and then the lights are turned off.</p> <ul style="list-style-type: none">• The ignition switch is turned ACC or ON• Any door is opened and closed• The luggage compartment door is opened and closed• Any door is unlocked

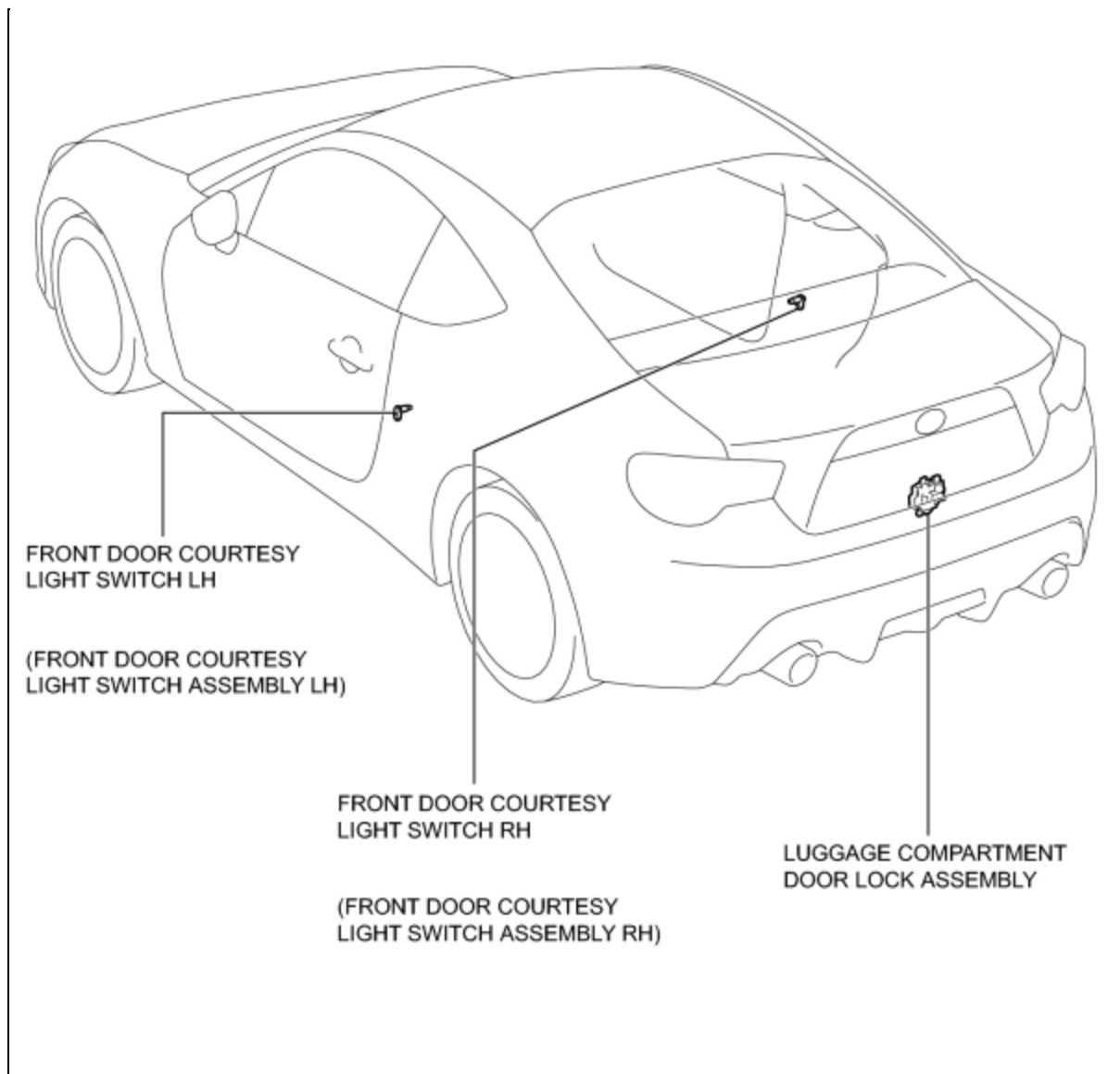
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000PKL05UX
Title: LIGHTING (INT): LIGHTING SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

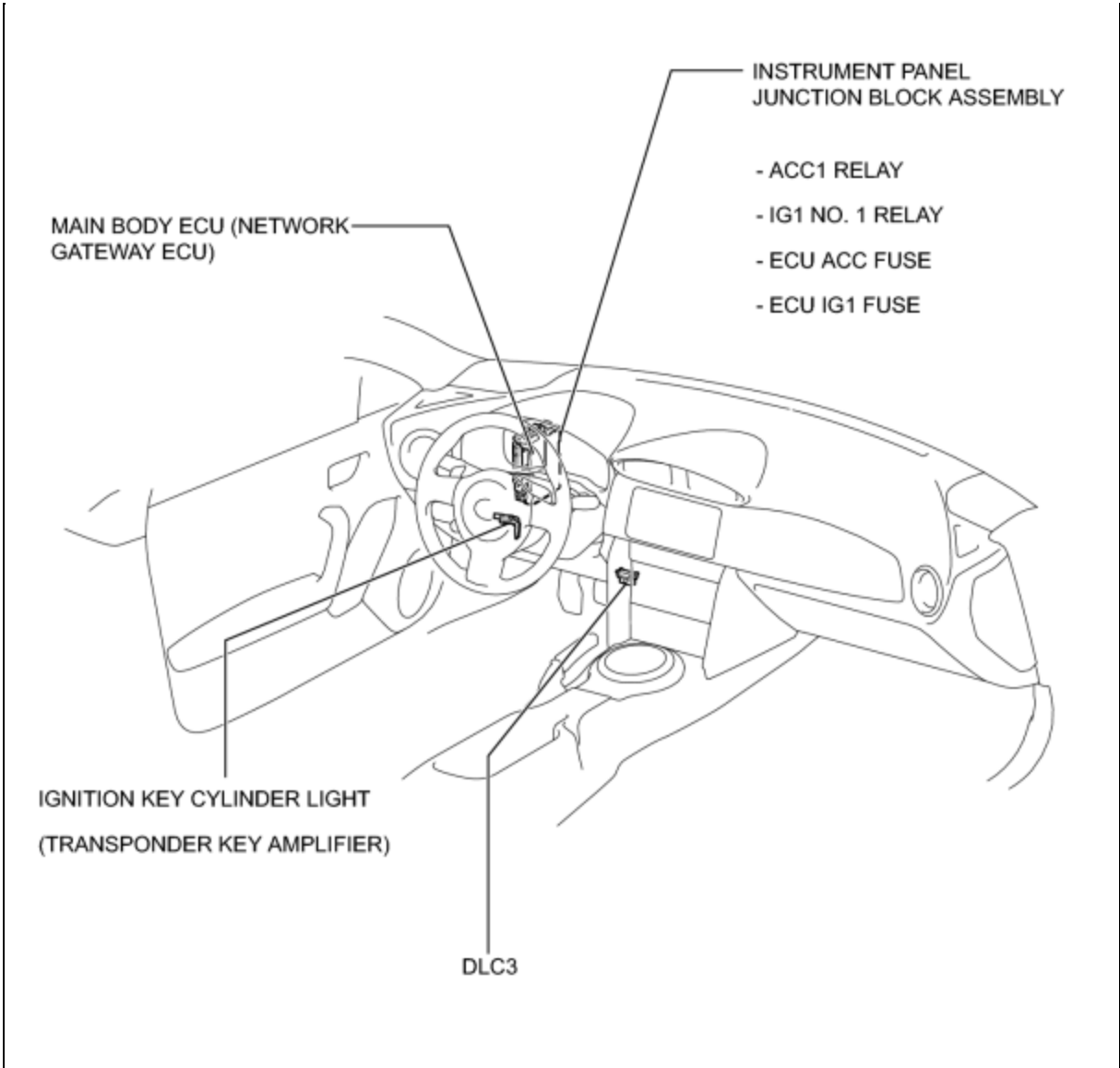
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004PDO00PX
Title: LIGHTING (INT): LIGHTING SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

1. PRECAUTIONS WHEN USING TECHSTREAM

(a) When using the Techstream with the ignition switch off to troubleshoot:

Connect the Techstream to the vehicle, and turn the courtesy light switch on and off at 1.5-second intervals until communication between the Techstream and the vehicle begins.

(b) After all DTCs are cleared, check if the trouble occurs again 6 seconds after the ignition switch is turned to ON.



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002CE20B4X
Title: LIGHTING (INT): LIGHTING SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

Illuminated Entry System (Interior Light Control)

SYMPTOM	SUSPECTED AREA	SEE PAGE
Illuminated entry system does not operate.	Interior light circuit	INFO
	Main body ECU (Network gateway ECU)	INFO
	Harness or connector	-
Illuminated entry system does not operate with door opening or closing operation.	Door courtesy switch circuit	INFO
	Main body ECU (Network gateway ECU)	INFO
	Harness or connector	-
Illuminated entry system does not operate with door lock or unlock operation.	Main body ECU (Network gateway ECU)	INFO
	Harness or connector	-
Illuminated entry system does not operate with ignition switch operation.	IG signal circuit	INFO
	ACC signal circuit	INFO
	Main body ECU (Network gateway ECU)	INFO
	Harness or connector	-

Map Light

SYMPTOM	SUSPECTED AREA	SEE PAGE
Map light assembly does not illuminate.	Bulb	-
	Map light assembly	INFO
	Harness or connector	-

Battery Saving Control

SYMPTOM	SUSPECTED AREA	SEE PAGE
Battery saving function does not operate.	IG signal circuit	

		INFO
	ACC signal circuit	INFO
	Door courtesy switch circuit	INFO
	Main body ECU (Network gateway ECU)	INFO

Ignition Key Cylinder Light

SYMPTOM	SUSPECTED AREA	SEE PAGE
Ignition Key Cylinder Light does not illuminate.	Ignition key cylinder light (Transponder key amplifier)	INFO
	Ignition key cylinder light circuit	INFO
	Main body ECU (Network gateway ECU)	INFO
	Harness or connector	-

Luggage Compartment Room Light

SYMPTOM	SUSPECTED AREA	SEE PAGE
Luggage compartment room light does not illuminate.	Bulb	-
	No. 1 luggage compartment light assembly	INFO
	Luggage compartment door courtesy switch circuit	INFO
	Harness or connector	-
	Instrument panel junction block assembly	INFO
	Main body ECU (Network gateway ECU)	INFO

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002CDY04JX
Title: LIGHTING (INT): LIGHTING SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

SYSTEM DESCRIPTION

1. ILLUMINATED ENTRY SYSTEM

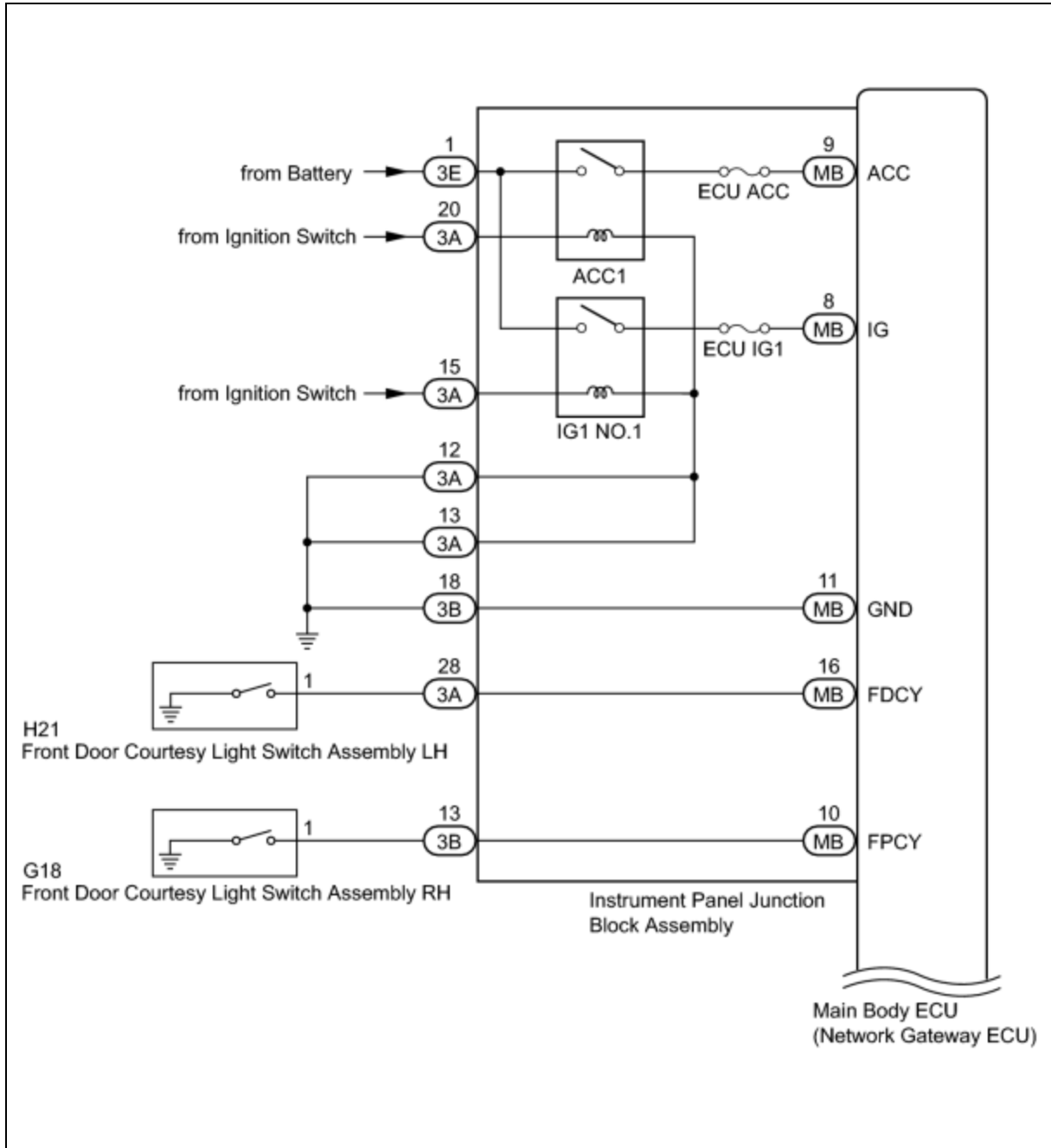
(a) The illuminated entry system has the following control functions:

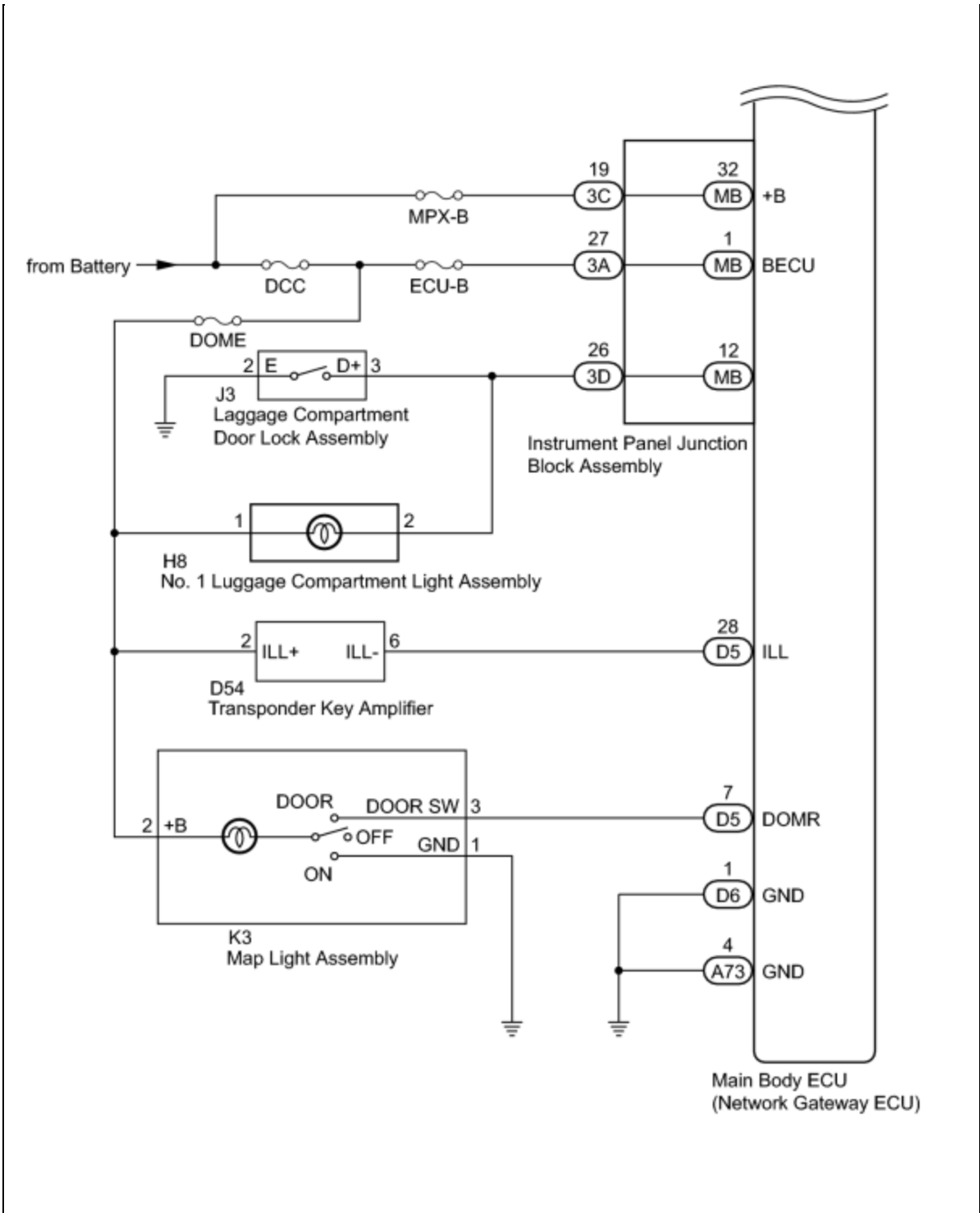
CONTROL	OUTLINE	LIGHTS THAT OPERATE
Door Lock/Unlock- linked	When any door is unlocked, the lights that operate turn on.	<ul style="list-style-type: none"> • Ignition Key Cylinder Light • Map Light
	When all doors are locked, the lights that operate turn off.	
Door Open/Close- linked	When any door is opened, the lights that operate turn on.	<ul style="list-style-type: none"> • Ignition Key Cylinder Light • Map Light
	When all doors are closed, the lights that operate turn off.	
Ignition Switch- linked	When the ignition switch is turned from ON or ACC to off, the lights that operate turn on.	<ul style="list-style-type: none"> • Ignition Key Cylinder Light • Map Light
	When the ignition switch is turned from off to ON or ACC, the lights that operate turn off.	
Delay	<p>When approximately 15 seconds elapse after any of the following conditions is met, the lights that operate turn off:</p> <ul style="list-style-type: none"> • The door unlock-linked function is active. • Any door is opened and then all doors are closed when the ignition switch is off. 	<ul style="list-style-type: none"> • Ignition Key Cylinder Light • Map Light
Battery Saving	<p>When 20 minutes elapse after the ignition switch is turned from ACC or ON to off and the lights that operate remain on, the lights are turned off.</p> <p>HINT:</p> <p>Battery saving control is canceled when any of the following operations is performed before the lights are turned off by battery saving control. After the operation is performed, the lights remain on for another 20 minutes and then the lights are turned off.</p> <ul style="list-style-type: none"> • The ignition switch is turned ACC or ON • Any door is opened and closed • The luggage compartment door is opened and closed • Any door is unlocked 	<ul style="list-style-type: none"> • Ignition Key Cylinder Light • Map Light • Luggage Compartment Light



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000351Z02PX
Title: LIGHTING (INT): LIGHTING SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM

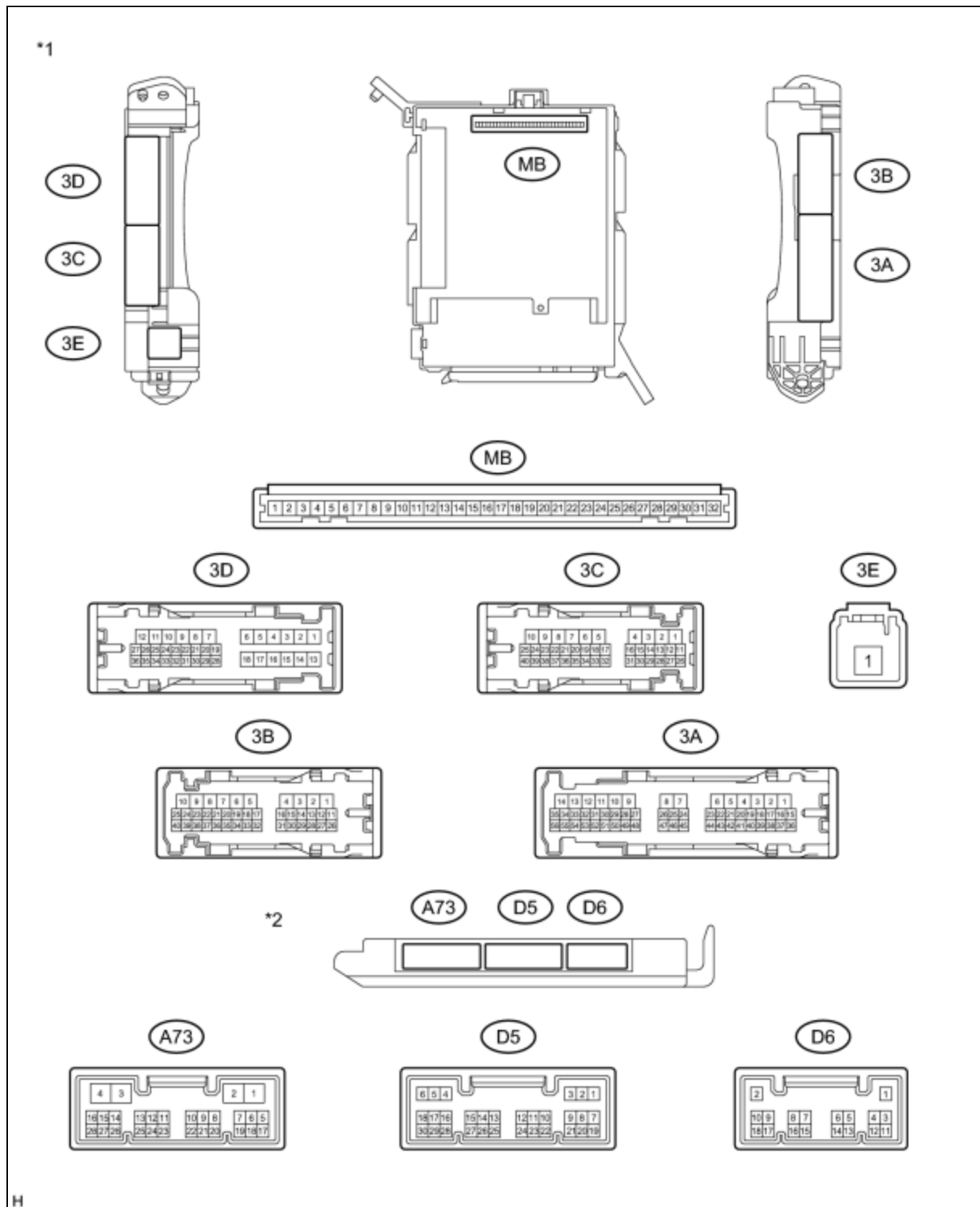




Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000026E702JX
Title: LIGHTING (INT): LIGHTING SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. CHECK INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY AND MAIN BODY ECU (NETWORK GATEWAY ECU)



Text in Illustration

*1	Instrument Panel Junction Block Assembly	*2	Main Body ECU (Network Gateway ECU)
----	--	----	-------------------------------------

(a) Disconnect the 3A, 3C, 3E, A73 and D6 instrument panel junction block assembly and main body ECU (network gateway ECU) connectors.

(b) Measure the voltage according to the value(s) in the table below.

TERMINAL NO.	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
3A-15 - Body ground	W - Body ground	IG power supply	Ignition switch ON	11 to 14 V
			Ignition switch off	Below 1 V
3A-20 - Body ground	SB - Body ground	ACC power supply	Ignition switch ACC	11 to 14 V
			Ignition switch off	Below 1 V
3A-27 - Body ground	G-R - Body ground	Battery power supply	Always	11 to 14 V
3C-19 - Body ground	L-R - Body ground	Battery power supply	Always	11 to 14 V
3E-1 - Body ground	B-R - Body ground	Battery power supply	Always	11 to 14 V

If the result is not as specified, there may be a malfunction in the wire harness.

(c) Measure the resistance according to the value(s) in the table below.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
3A-12 - Body ground	B - Body ground	Ground	Always	Below 1 Ω
3A-13 - Body ground	B - Body ground	Ground	Always	Below 1 Ω
A73-4 (GND) - Body ground	B-Y - Body ground	Ground	Always	Below 1 Ω
D6-1 (GND) - Body ground	B - Body ground	Ground	Always	Below 1 Ω

If the result is not as specified, there may be a malfunction in the wire harness.

(d) Reconnect the 3A, 3C, 3E, A73 and D6 instrument panel junction block assembly and main body ECU (network gateway ECU) connectors.

(e) Measure the voltage and check for pulses according to the value(s) in the table below.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
3A-28 - Body	V - Body	Front door courtesy	Front door LH open	Below 1 V

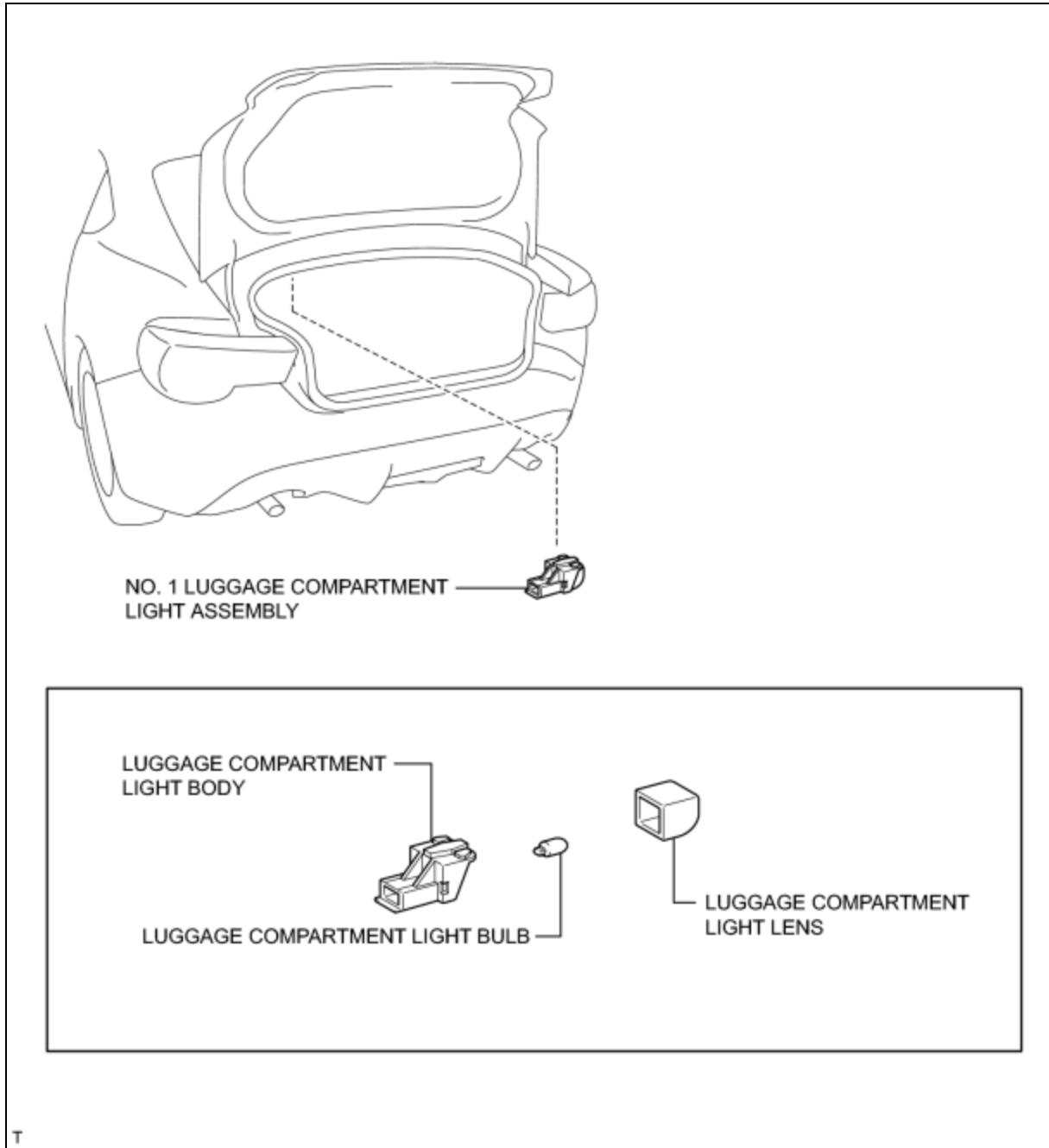
ground	ground	light switch LH input	Front door LH closed	11 to 14 V
3B-13 - Body ground	GR - Body ground	Front door courtesy light switch RH input	Front door RH open	Below 1 V
			Front door RH closed	11 to 14 V
3D-26 - Body ground	SB - Body ground	Luggage compartment door courtesy light switch input	Luggage compartment door open	Below 1 V
			Luggage compartment door closed	11 to 14 V
D5-7 (DOMR) - Body ground	L - Body ground	Illuminated entry drive output (to map light assembly)	Map light switch in DOOR position and map light assembly on	Below 1 V
			Map light switch in DOOR position and map light assembly off	11 to 14 V
D5-28 (ILL) - Body ground	Y - Body ground	Ignition key cylinder light drive output	Ignition switch off, ignition key cylinder light off (when operated by illuminated entry system)	11 to 14 V
			Ignition switch off, ignition key cylinder light on (when operated by illuminated entry system)	Below 1 V

If the result is not as specified, the main body ECU (network gateway ECU) or instrument panel junction block assembly may have a malfunction.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MUB01PX
Title: LIGHTING (INT): LUGGAGE COMPARTMENT ROOM LIGHT: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



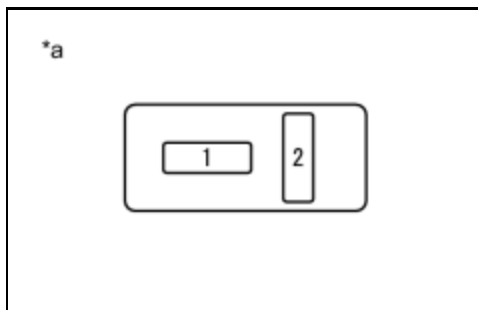
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000198305RX
Title: LIGHTING (INT): LUGGAGE COMPARTMENT ROOM LIGHT: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT NO. 1 LUGGAGE COMPARTMENT LIGHT ASSEMBLY

- (a) Apply battery voltage to the terminals and check that the light comes on.

OK:



CONDITION	SPECIFIED CONDITION
Battery positive (+) - Terminal 1	Luggage compartment light Comes on
Battery negative (-) - Terminal 2	

If the result is not specified, replace the bulb or the No. 1 luggage compartment light assembly.

Text in Illustration

*a	Component without harness connected (No. 1 Luggage Compartment Light Assembly)
----	---

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MU001RX
Title: LIGHTING (INT): LUGGAGE COMPARTMENT ROOM LIGHT: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL LUGGAGE COMPARTMENT LIGHT BULB

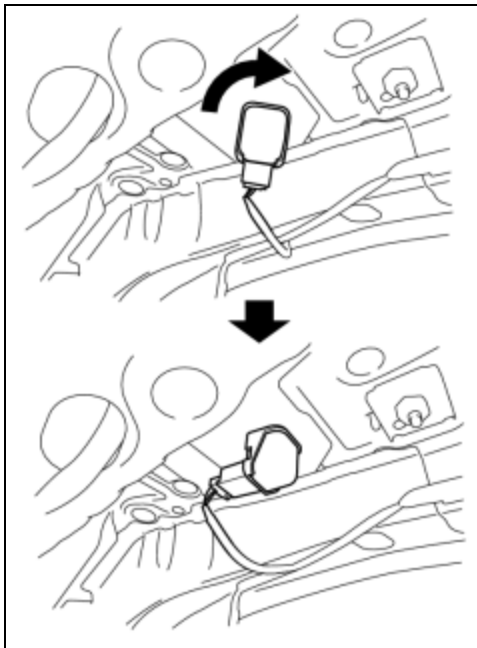
(a) Install the luggage compartment light bulb to the luggage compartment light body.

2. INSTALL LUGGAGE COMPARTMENT LIGHT LENS

(a) Engage the 2 claws to install the luggage compartment light lens.

3. INSTALL NO. 1 LUGGAGE COMPARTMENT LIGHT ASSEMBLY

(a) Connect the connector.

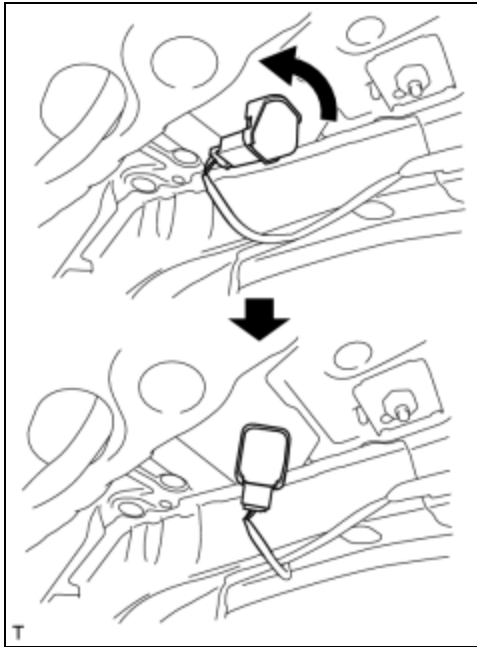


(b) Turn the No. 1 luggage compartment light assembly in the direction indicated by the arrow in the illustration, and install it.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MUP01RX
Title: LIGHTING (INT): LUGGAGE COMPARTMENT ROOM LIGHT: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE NO. 1 LUGGAGE COMPARTMENT LIGHT ASSEMBLY



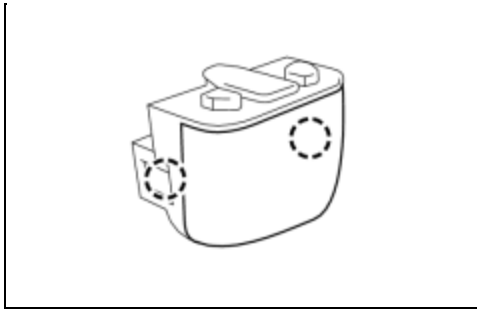
- (a) Turn the No. 1 luggage compartment light assembly in the direction indicated by the arrow in the illustration, and disconnect it.



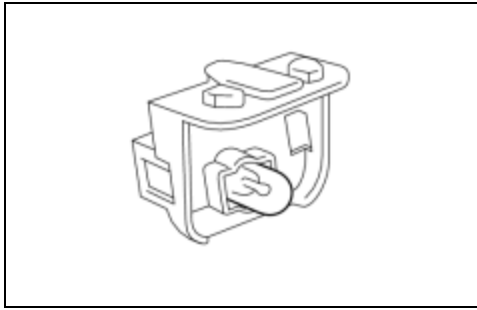
- (b) Disconnect the connector and remove the No. 1 luggage compartment light assembly.

2. REMOVE LUGGAGE COMPARTMENT LIGHT LENS

- (a) Disengage the 2 claws and remove the luggage compartment light lens.



3. REMOVE LUGGAGE COMPARTMENT LIGHT BULB

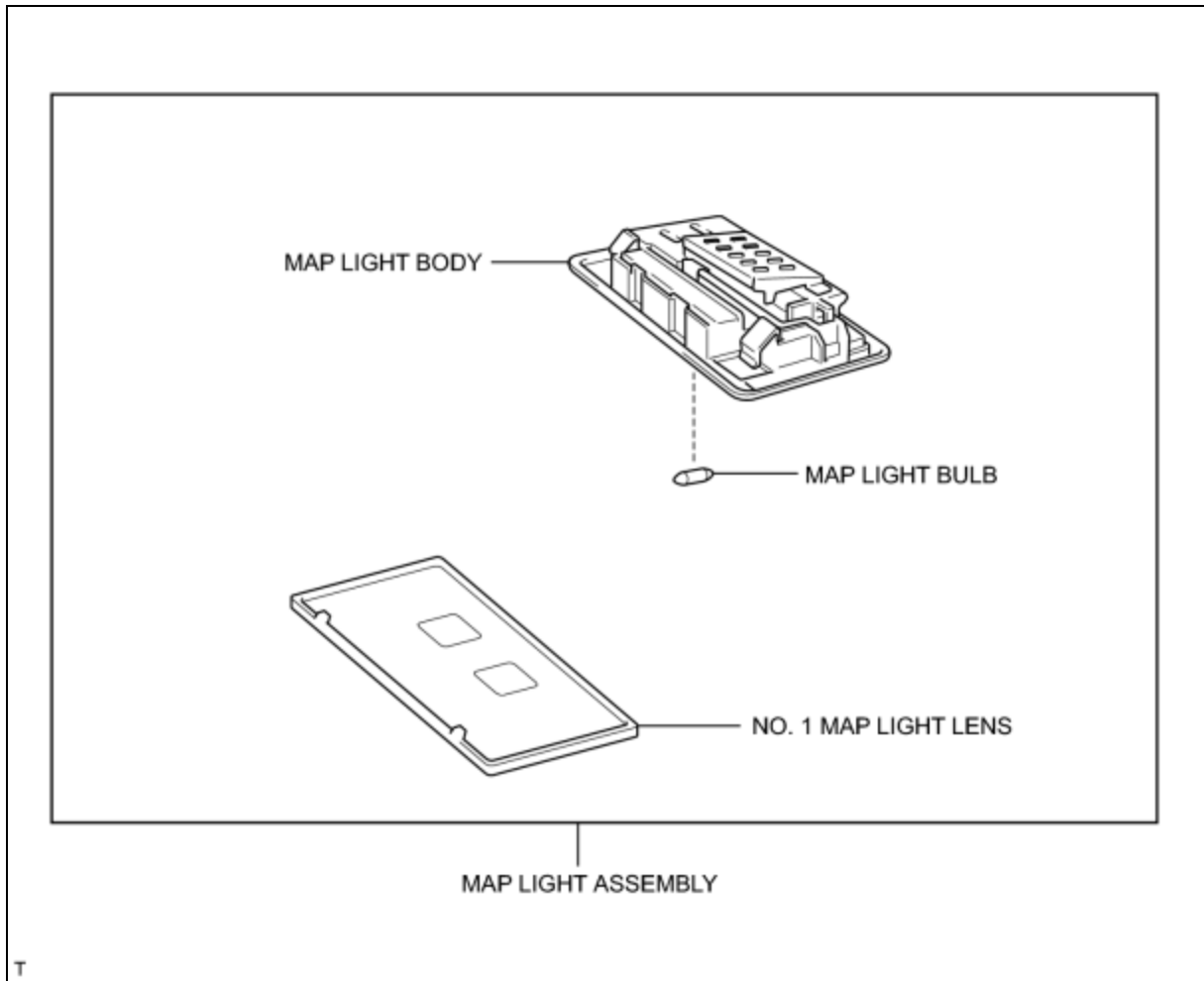


- (a) Remove the luggage compartment light bulb from the luggage compartment light body.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MU9020X
Title: LIGHTING (INT): PERSONAL LIGHT: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000017LP009X
Title: LIGHTING (INT): PERSONAL LIGHT: INSPECTION (2013 FR-S)		

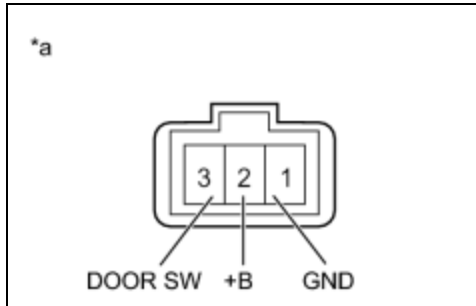
INSPECTION

1. INSPECT MAP LIGHT ASSEMBLY

(a) Check the map light assembly operation.

(1) Apply battery voltage to the terminals and check that the light comes on.

OK:



CONDITION	SWITCH CONDITION	SPECIFIED CONDITION
Battery positive (+) - 2 (+B) Battery negative (-) - 1 (GND)	Map light switch ON	Map light comes on
Battery positive (+) - 2 (+B) Battery negative (-) - 3 (DOOR SW)	Map light switch DOOR	Map light comes on

If the result is not specified, replace the map light bulb or map light assembly.

Text in Illustration

*a	Component without harness connected (Map Light Assembly)
----	--

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MUK026X
Title: LIGHTING (INT): PERSONAL LIGHT: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL MAP LIGHT BULB

- (a) Install the map light bulb to the map light assembly.

2. INSTALL NO. 1 MAP LIGHT LENS

- (a) Engage the 2 claws to install the No. 1 map light lens.

3. INSTALL MAP LIGHT ASSEMBLY

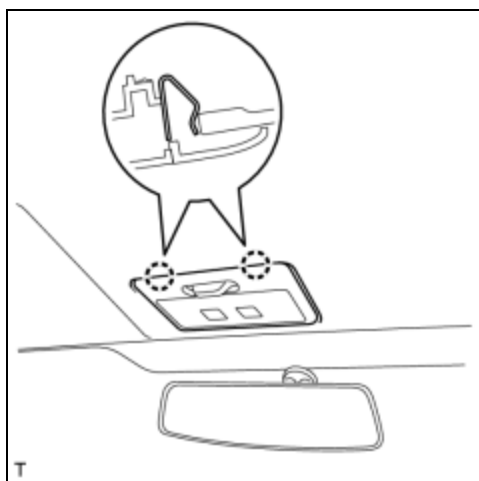
- (a) Connect each connector.
- (b) Engage the 2 guides.
- (c) Engage the 2 claws and install the map light assembly.



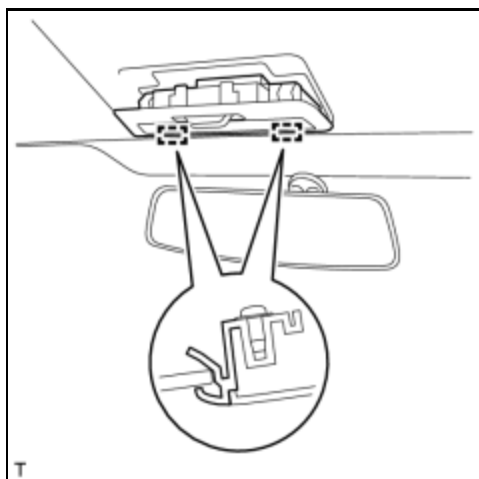
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003MUL026X
Title: LIGHTING (INT): PERSONAL LIGHT: REMOVAL (2013 FR-S)		

REMOVAL

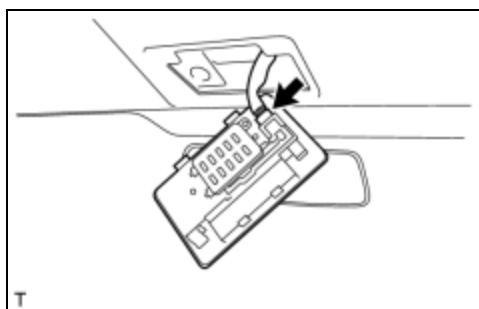
1. REMOVE MAP LIGHT ASSEMBLY



(a) Disengage the 2 claws.

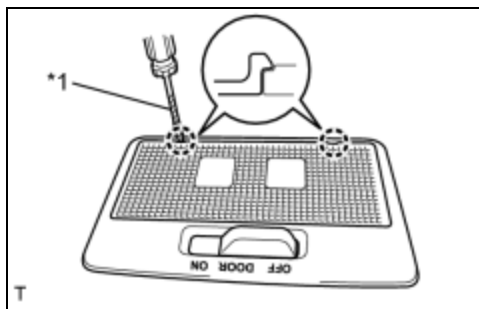


(b) Disengage the 2 guides and disconnect the map light assembly.



(c) Disconnect the connector and remove the map light assembly.

2. REMOVE NO. 1 MAP LIGHT LENS



- (a) Using a screwdriver with its tip wrapped in protective tape, disengage the 2 claws and remove the No. 1 map light lens.

Text in illustration

*1	Protective Tape
----	-----------------

3. REMOVE MAP LIGHT BULB

- (a) Remove the map light bulb from the map light body.

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002NJF01AX
Title: METER / GAUGE / DISPLAY: CLOCK SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

- Use these procedures to troubleshoot the clock system.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	INSPECT BATTERY VOLTAGE
-----------	--------------------------------

Standard voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT



3.	PROBLEM SYMPTOMS TABLE
-----------	-------------------------------

(a) Refer to Problem Symptoms Table [INFO](#) .

NEXT

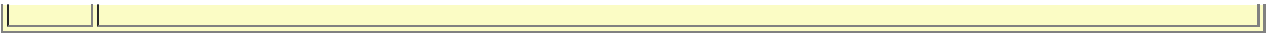


4.	ADJUST, REPAIR OR REPLACE
-----------	----------------------------------

NEXT



5.	CONFIRMATION TEST
-----------	--------------------------



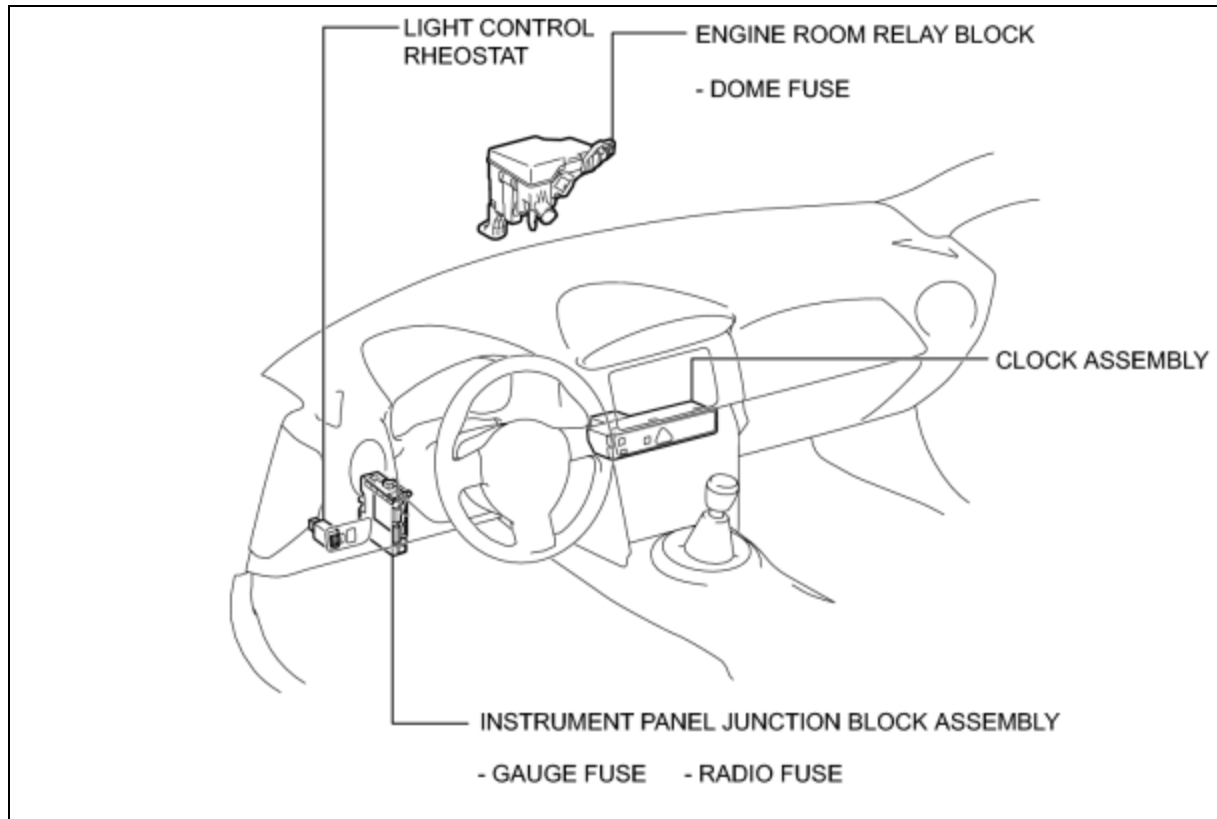
NEXT  END



Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002NJG00YX
Title: METER / GAUGE / DISPLAY: CLOCK SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002NJI017X
Title: METER / GAUGE / DISPLAY: CLOCK SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

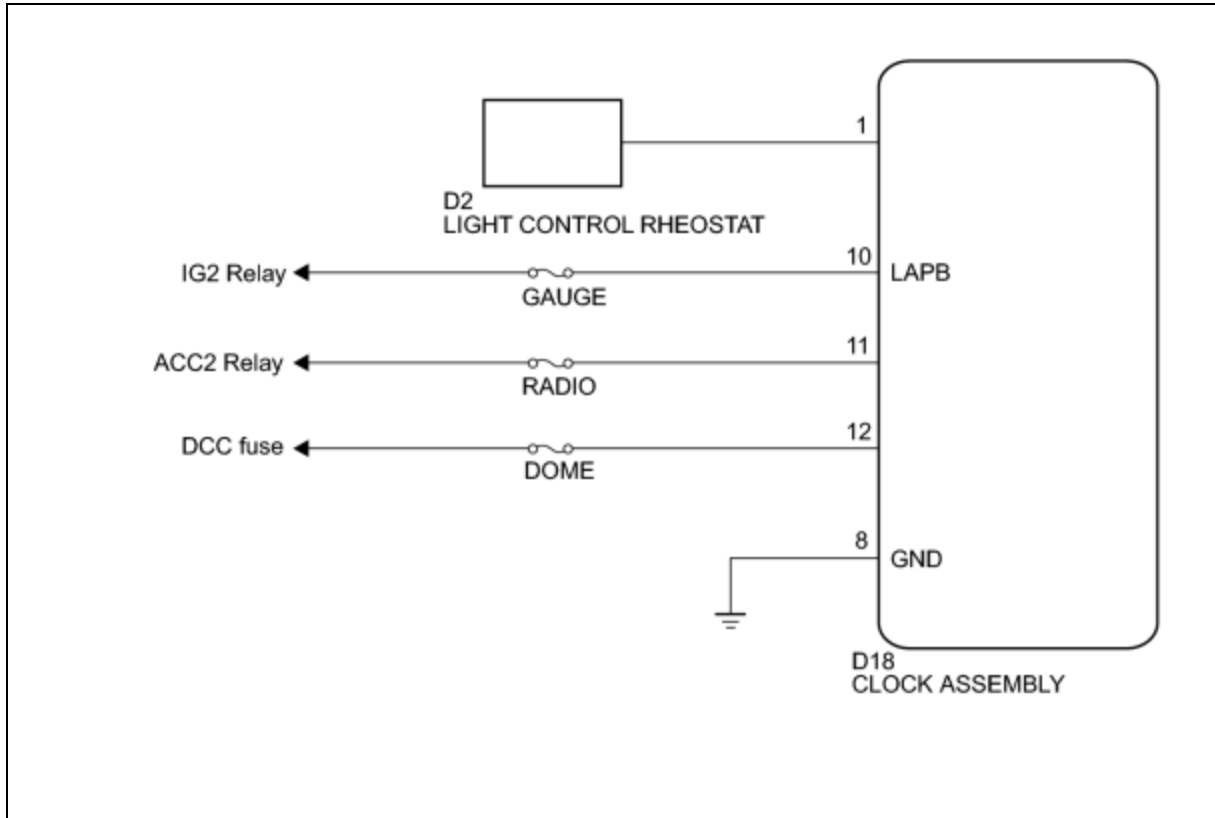
- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Clock System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Clock is not displayed	Clock power source circuit	INFO
Clocks time is very incorrect	Clock loses or gains time	-
	Clock assembly	INFO
Clocks nighttime illumination does not operate	Perform data list (Outside Light)	INFO
	Operating Light Control Rheostat does not Change Light Brightness	INFO
	Harness or connector	-
	Combination meter assembly	INFO
	Clock assembly	INFO

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002NJL015X
Title: METER / GAUGE / DISPLAY: CLOCK SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

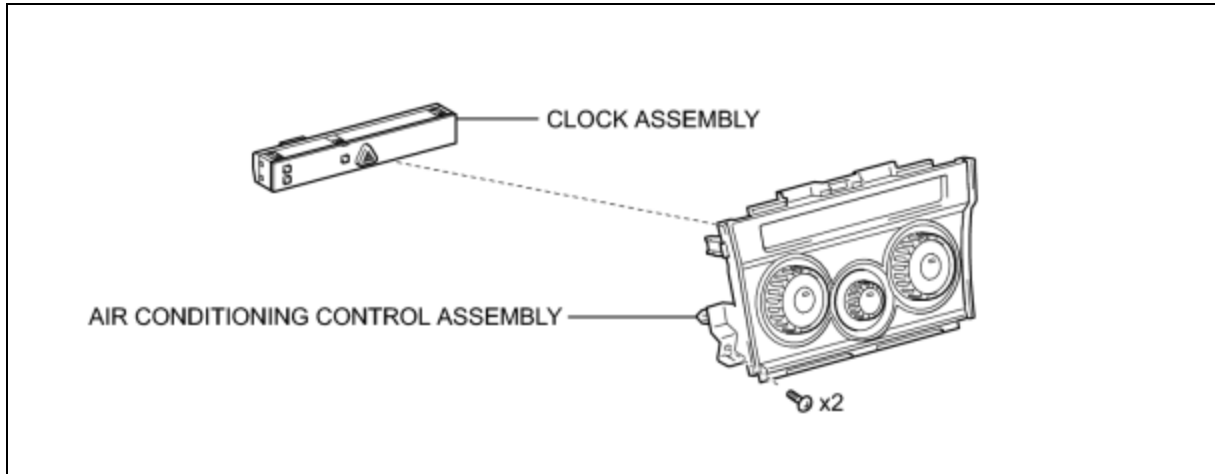
SYSTEM DIAGRAM



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004HHY003X
Title: METER / GAUGE / DISPLAY: CLOCK: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004HHX004X
Title: METER / GAUGE / DISPLAY: CLOCK: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL CLOCK ASSEMBLY

- (a) Engage the 4 claws to install the clock assembly.

2. INSTALL AIR CONDITIONING CONTROL ASSEMBLY

INFO

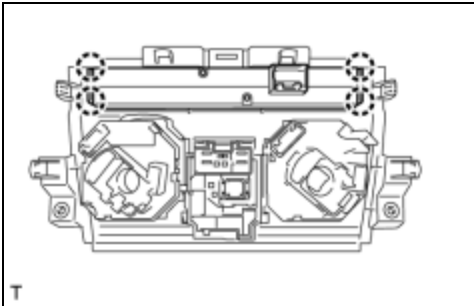


Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004HHZ004X
Title: METER / GAUGE / DISPLAY: CLOCK: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE AIR CONDITIONING CONTROL ASSEMBLY

INFO



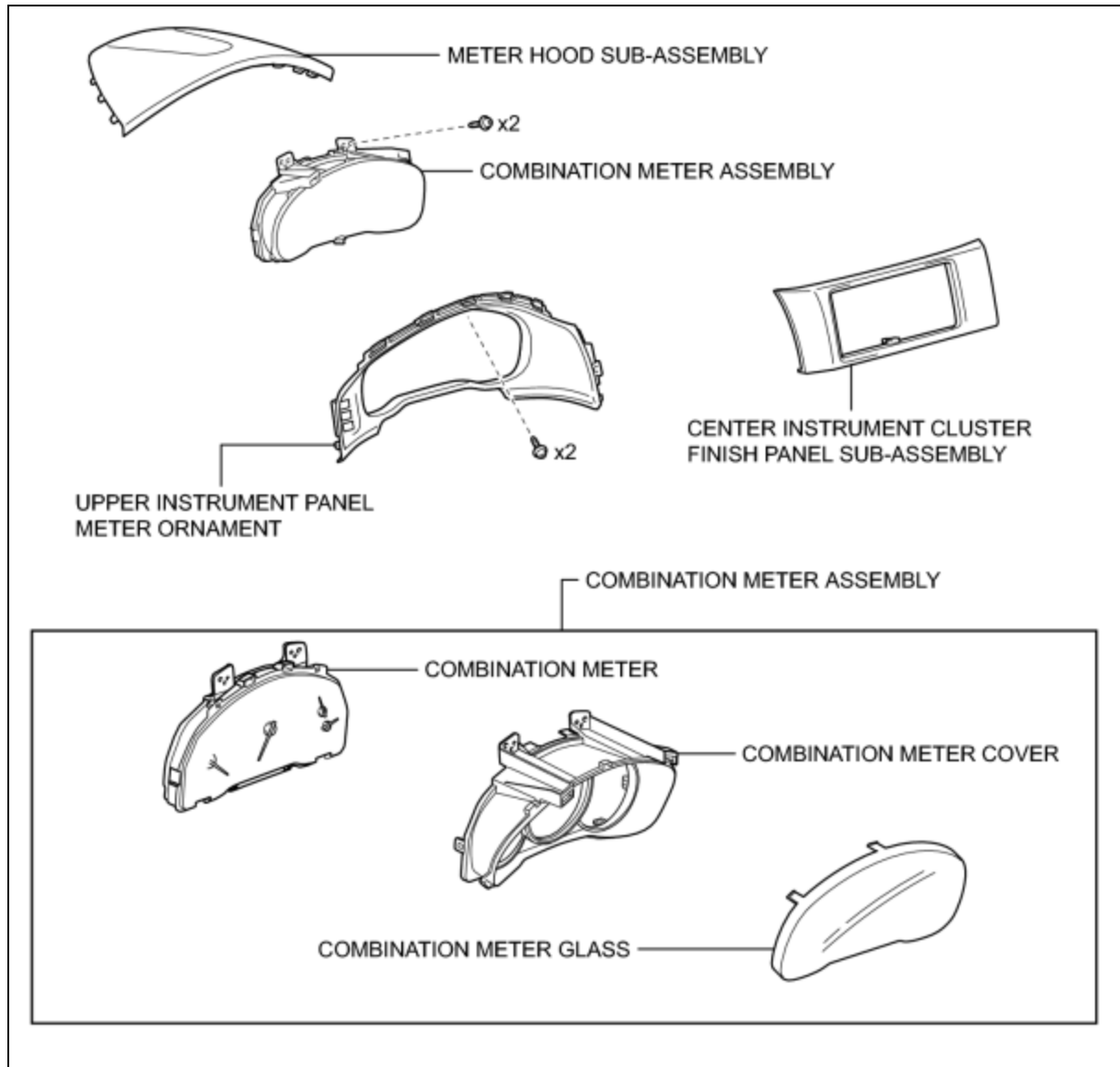
2. REMOVE CLOCK ASSEMBLY

- (a) Disengage the 4 claws and remove the clock assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004HHV003X
Title: METER / GAUGE / DISPLAY: COMBINATION METER: COMPONENTS (2013 FR-S)		

COMPONENTS

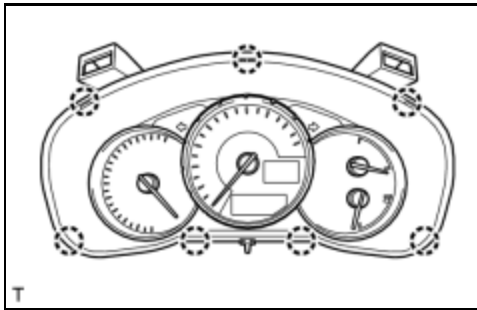
ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004KXX003X
Title: METER / GAUGE / DISPLAY: COMBINATION METER: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. REMOVE COMBINATION METER GLASS

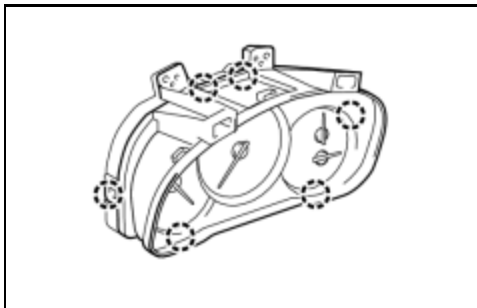


- (a) Disengage the 7 claws and remove the combination meter glass.

NOTICE:

- Do not touch the pointer and the dial plate when removing the combination meter glass and combination meter cover.
- Do not allow any dirt (fingerprints, grease, etc.) to adhere to the combination meter glass or meter display panel. If they are dirty, wipe them clean with a soft cloth.

2. REMOVE COMBINATION METER COVER



- (a) Disengage the 6 claws and remove the combination meter cover.

NOTICE:

Do not touch the pointer and the dial plate when removing the combination meter glass and combination meter cover.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004HHU004X
Title: METER / GAUGE / DISPLAY: COMBINATION METER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL COMBINATION METER ASSEMBLY

- (a) Connect the connector.
- (b) Engage the 2 clips to install the combination meter assembly.
- (c) Install the 2 screws.

2. INSTALL UPPER INSTRUMENT PANEL METER ORNAMENT [INFO](#)

3. INSTALL METER HOOD SUB-ASSEMBLY [INFO](#)

4. INSTALL CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY [INFO](#)

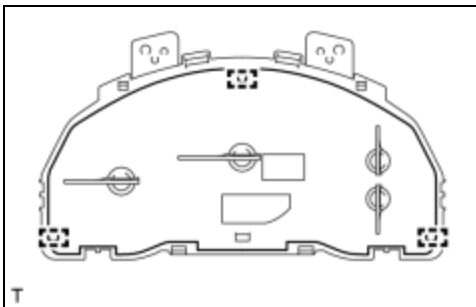
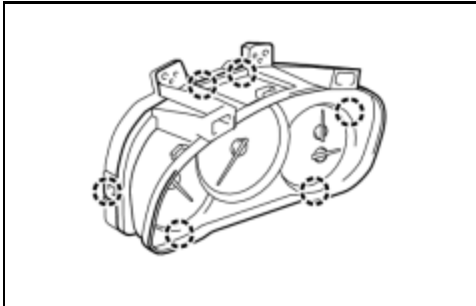


Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004KXY003X
Title: METER / GAUGE / DISPLAY: COMBINATION METER: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL COMBINATION METER COVER

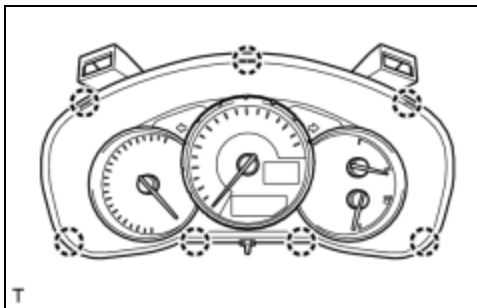
- (a) Engage the 6 claws to install the combination meter cover.



NOTICE:

Make sure that the meter dial plate is securely installed to the locating tabs when the combination meter cover is installed.

2. INSTALL COMBINATION METER GLASS



- (a) Engage the 7 claws to install the combination meter glass.

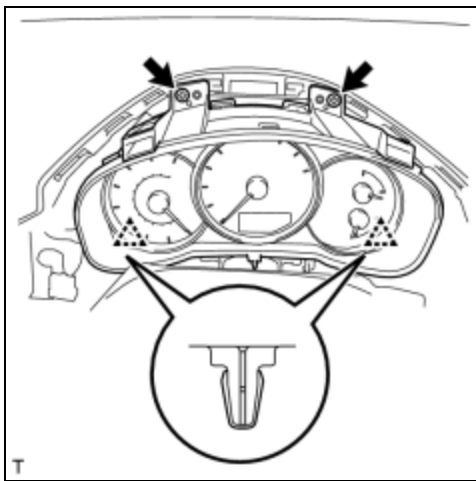
NOTICE:

Do not allow any dirt (fingerprints, grease, etc.) to adhere to the combination meter glass or meter display panel. If they are dirty, wipe them clean with a soft cloth.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004HHW004X
Title: METER / GAUGE / DISPLAY: COMBINATION METER: REMOVAL (2013 FR-S)		

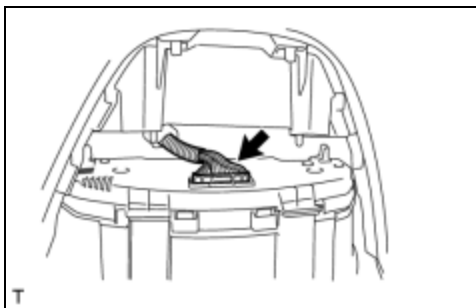
REMOVAL

1. REMOVE CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY [INFO](#)
2. REMOVE METER HOOD SUB-ASSEMBLY [INFO](#)
3. REMOVE UPPER INSTRUMENT PANEL METER ORNAMENT [INFO](#)
4. REMOVE COMBINATION METER ASSEMBLY



(a) Remove the 2 screws.

(b) Disengage the 2 clips.

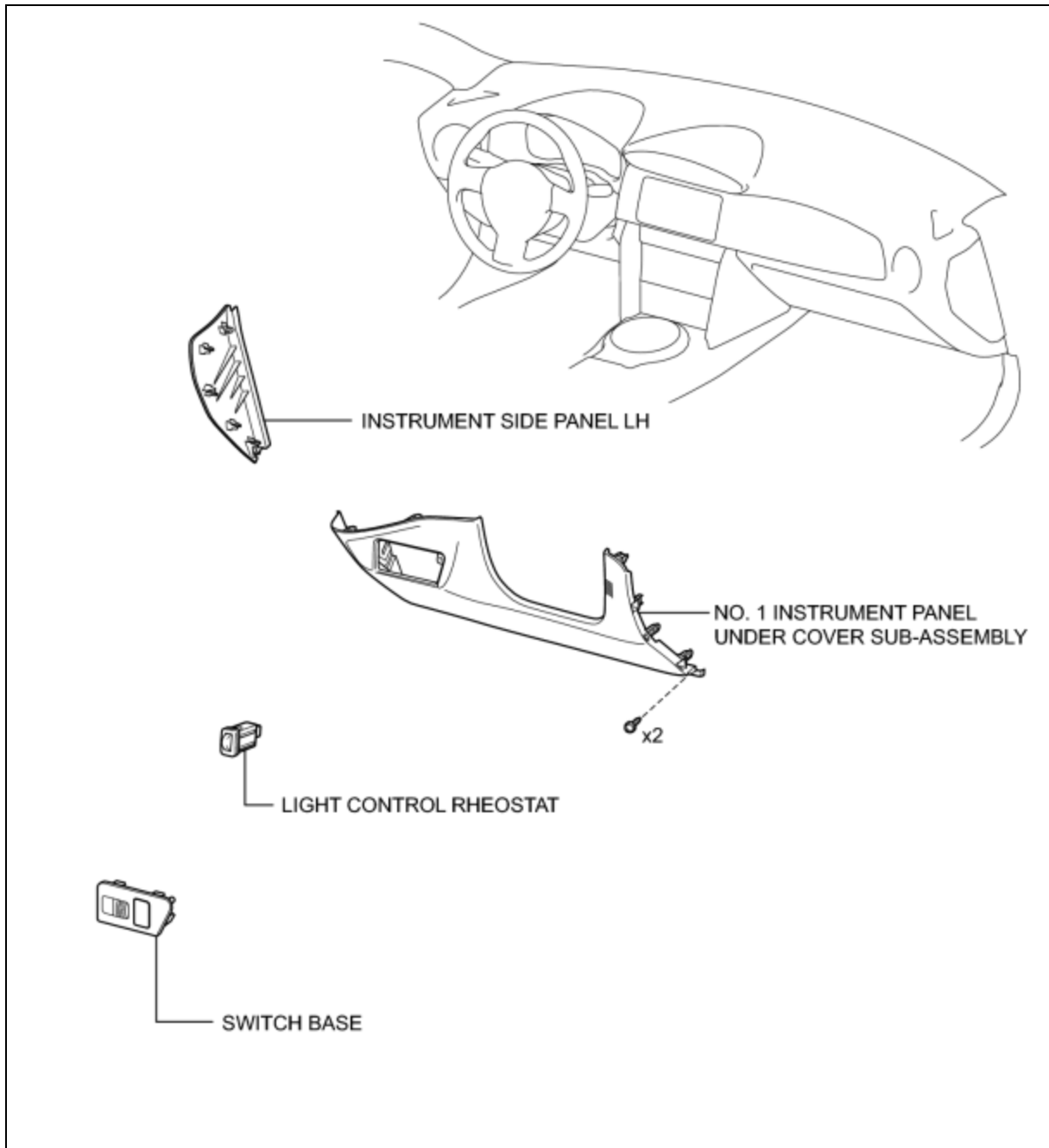


(c) Disconnect the connector and remove the combination meter assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000042TI00DX
Title: METER / GAUGE / DISPLAY: LIGHT CONTROL RHEOSTAT: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000042TH00BX
Title: METER / GAUGE / DISPLAY: LIGHT CONTROL RHEOSTAT: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL LIGHT CONTROL RHEOSTAT

- (a) Engage the 2 claws to install the light control rheostat.

2. INSTALL SWITCH BASE

- (a) Engage the 4 claws to install the switch base.

3. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

- (a) Connect each connector.
- (b) Engage the 4 claws.
- (c) Engage the 4 clips to install the No. 1 instrument panel under cover sub-assembly.
- (d) Install the 2 screws.

4. INSTALL INSTRUMENT SIDE PANEL LH INFO

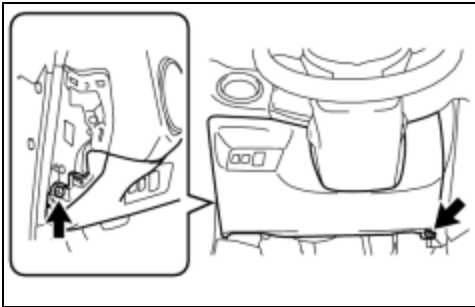


Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000042TJ00BX
Title: METER / GAUGE / DISPLAY: LIGHT CONTROL RHEOSTAT: REMOVAL (2013 FR-S)		

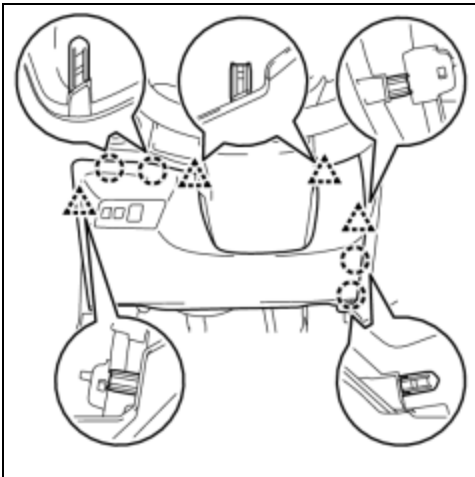
REMOVAL

1. REMOVE INSTRUMENT SIDE PANEL LH INFO

2. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY



(a) Remove the 2 screws.



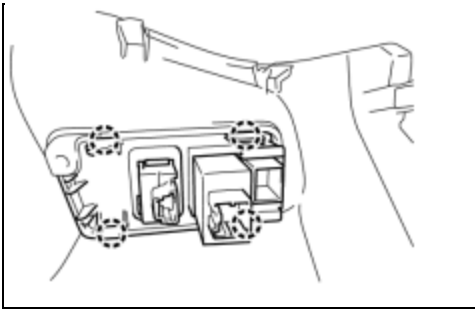
(b) Disengage the 4 clips.

(c) Disengage the 4 claws and separate the No. 1 instrument panel under cover sub-assembly.

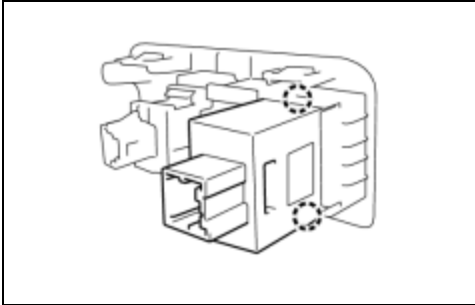
(d) Disconnect each connector and remove the No. 1 instrument panel under cover sub-assembly.

3. REMOVE SWITCH BASE

(a) Disengage the 4 claws and remove the switch base.



4. REMOVE LIGHT CONTROL RHEOSTAT



(a) Disengage the 2 claws to remove the light control rheostat.

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000032UZ000X
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: B1500: Fuel Sender Open Detected (2013 FR-S)		

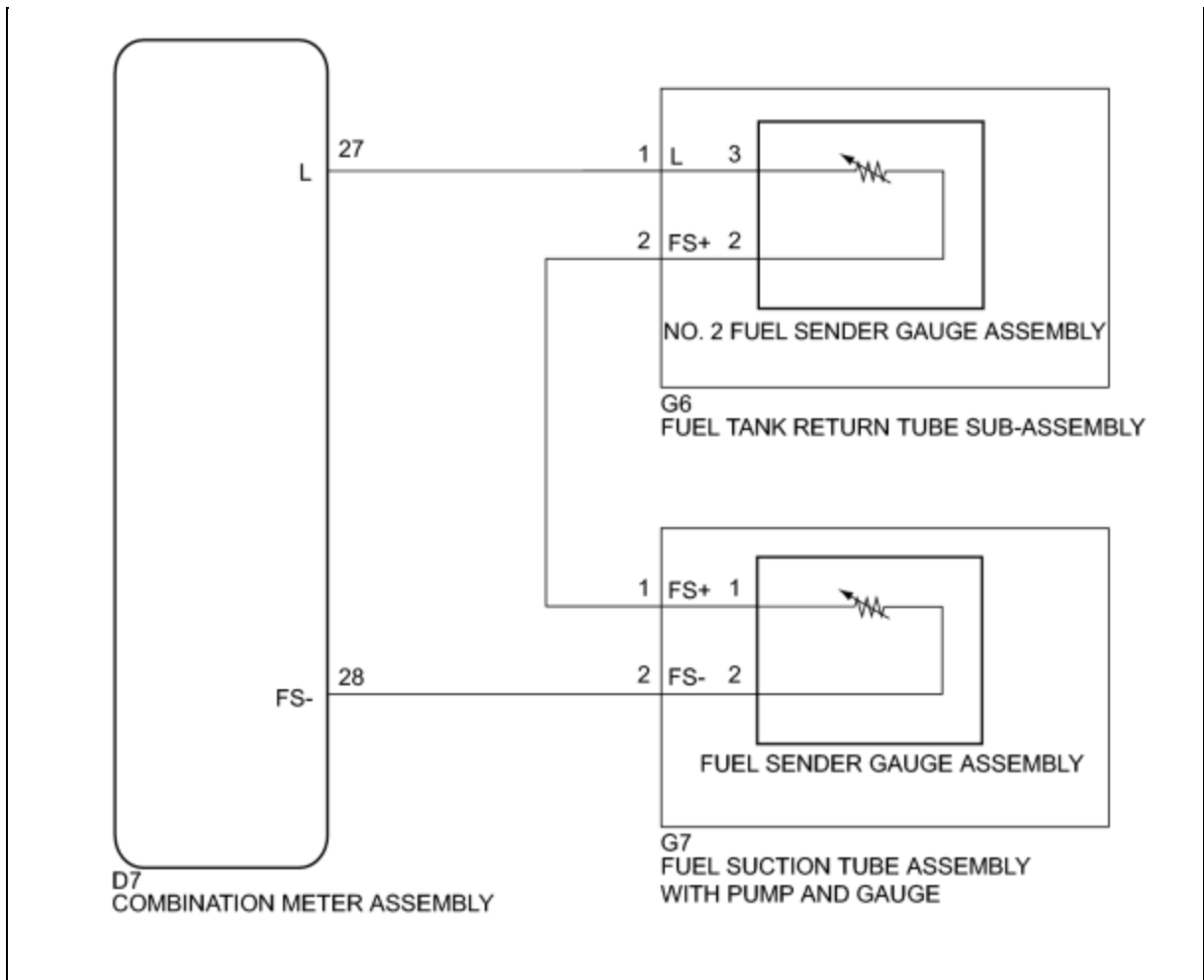
DTC	B1500	Fuel Sender Open Detected
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DESCRIPTION

This DTC is stored when the combination meter detects the fuel sender gauge malfunction.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1500	When combination meter detects fuel sender gauge malfunction	<ul style="list-style-type: none"> • Harness or connector • Combination meter assembly • Fuel sender gauge assembly • No. 2 fuel sender gauge assembly • Fuel suction tube assembly with pump and gauge • Fuel tank return tube sub-assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	READ VALUE USING TECHSTREAM (FUEL INPUT)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Combination Meter / Data List.
- (e) According to the display on the tester, read the Data List.

Combination Meter

ITEM	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Fuel Input	Fuel sender gauge input Min.: 0 Max.: 127.5	Fuel sender input value	Unit: Liter

OK:

Fuel input signal displayed on the tester is approximately the same as the fuel receiver gauge indication.

NG ▶ **INSPECT FUEL SENDER GAUGE ASSEMBLY**

OK ▶ **REPAIR OR REPLACE COMBINATION METER ASSEMBLY**

2. INSPECT FUEL SENDER GAUGE ASSEMBLY

(a) Remove the fuel sender gauge assembly **INFO** .

(b) Inspect the fuel sender gauge assembly **INFO** .

NG ▶ **REPLACE FUEL SENDER GAUGE ASSEMBLY**

OK
▼

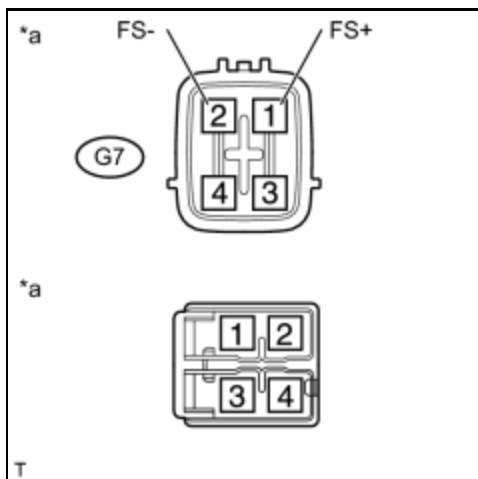
3. INSPECT FUEL SUCTION TUBE ASSEMBLY WITH PUMP AND GAUGE

(a) Remove the fuel suction tube assembly with pump and gauge **INFO** .

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTOR	CONDITION	SPECIFIED CONDITION
G7-1 (FS+) - 1	Always	Below 1 Ω
G7-2 (FS-) - 2	Always	Below 1 Ω



Text in Illustration

*a	Component without harness connected (Fuel Suction Tube Assembly with Pump and Gauge)
----	---

NG ▶ **REPLACE FUEL SUCTION TUBE ASSEMBLY WITH PUMP AND GAUGE**

OK



4. INSPECT NO. 2 FUEL SENDER GAUGE ASSEMBLY

- (a) Remove the No. 2 fuel sender gauge assembly INFO .
- (b) Inspect the No. 2 fuel sender gauge assembly INFO .

NG ▶ **REPLACE NO. 2 FUEL SENDER GAUGE ASSEMBLY**

OK



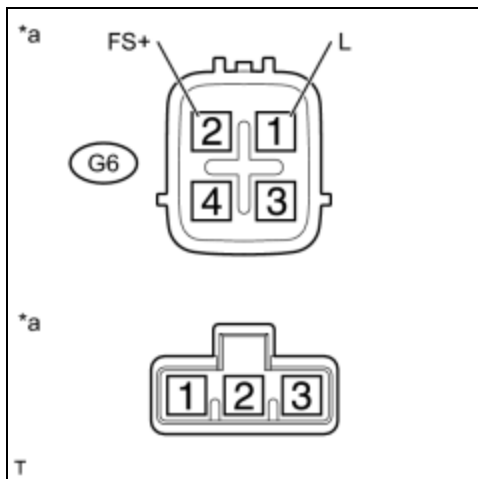
5. INSPECT FUEL TANK RETURN TUBE SUB-ASSEMBLY

- (a) Remove the fuel tank return tube sub-assembly INFO .

- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTOR	CONDITION	SPECIFIED CONDITION
G6-1 (L) - 3	Always	Below 1 Ω
G6-2 (FS+) - 2	Always	Below 1 Ω

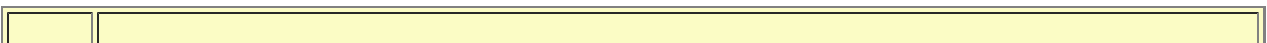


Text in Illustration

*a	Component without harness connected (Fuel Tank Return Tube Sub-assembly)
----	---

NG ▶ **REPLACE FUEL TANK RETURN TUBE SUB-ASSEMBLY**

OK



6. CHECK HARNESS AND CONNECTOR (COMBINATION METER ASSEMBLY - FUEL SUCTION TUBE ASSEMBLY WITH PUMP AND GAUGE)

- (a) Disconnect the D7 combination meter assembly connector.
- (b) Disconnect the G7 fuel suction tube assembly with pump and gauge connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTOR	CONDITION	SPECIFIED CONDITION
D7-28 (FS-) - G7-2 (FS-)	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTOR	CONDITION	SPECIFIED CONDITION
D7-28 (FS-) or G7-2 (FS-) - Body ground	Always	10 kΩ or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK


7. CHECK HARNESS AND CONNECTOR (FUEL SUCTION TUBE ASSEMBLY WITH PUMP AND GAUGE - FUEL TANK RETURN TUBE SUB-ASSEMBLY)

- (a) Disconnect the G7 fuel suction tube assembly with pump and gauge connector.
- (b) Disconnect the G6 fuel tank return tube sub-assembly connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTOR	CONDITION	SPECIFIED CONDITION
D7-1 (FS+) - G6-2 (FS+)	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTOR	CONDITION	SPECIFIED CONDITION
D7-1 (FS+) or G6-2 (FS+) - Body ground	Always	10 kΩ or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



8.	CHECK HARNESS AND CONNECTOR (COMBINATION METER ASSEMBLY - FUEL TANK RETURN TUBE SUB-ASSEMBLY)
-----------	--

- (a) Disconnect the D7 combination meter assembly connector.
- (b) Disconnect the G6 fuel tank return tube sub-assembly connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTOR	CONDITION	SPECIFIED CONDITION
D7-27 (L) - G6-1 (L)	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTOR	CONDITION	SPECIFIED CONDITION
D7-27 (L) or G6-1 (L) - Body ground	Always	10 k Ω or higher

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK **REPLACE COMBINATION METER ASSEMBLY**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002LJ403UX
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: B1509: Open in Ambient Temperature Sensor Circuit (2013 FR-S)		

DTC	B1509	Open in Ambient Temperature Sensor Circuit
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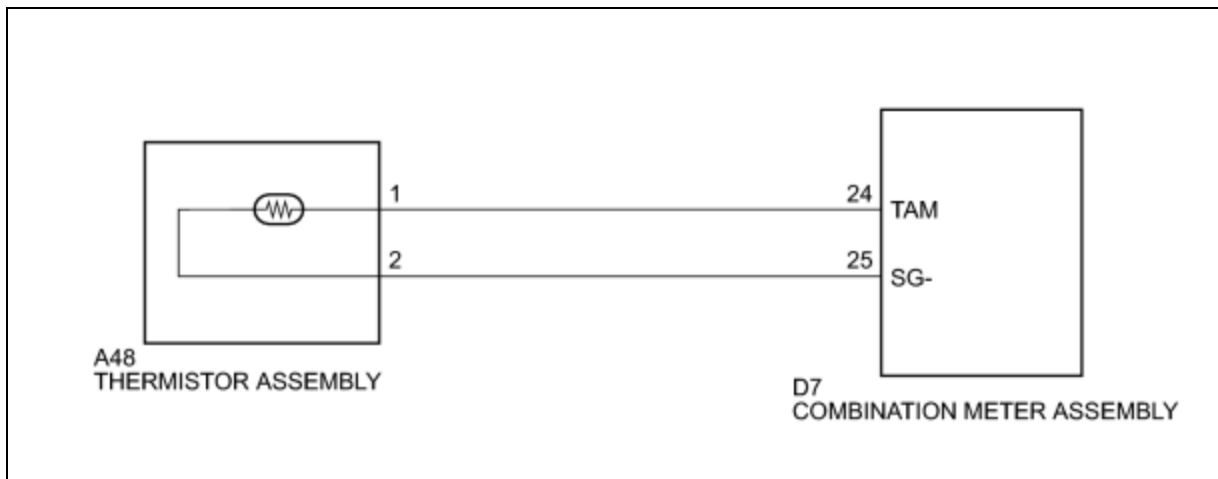
DESCRIPTION

The thermistor assembly is installed in the front part of the cooler condenser assembly to display the ambient temperature on the multi-information display in the combination meter assembly and to control the air conditioning auto mode. As the temperature decreases, the resistance increases. As the temperature increases, the resistance decreases.

The air conditioning amplifier assembly applies a voltage (5 V) to the thermistor assembly and reads the voltage changes as changes in the resistance of the thermistor assembly.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1509	An open or short in the thermistor assembly circuit.	<ul style="list-style-type: none"> • Thermistor assembly • Harness or connector • Combination meter assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	READ VALUE USING TECHSTREAM (AMBIENT TEMPERATURE SENSOR)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Combination Meter / Data List.
- (e) According to the display on the Techstream, read the Data List.

Combination Meter

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Ambient Temperature	Thermistor assembly / Min: -40.0°C (-40.0°F) Max: 87.5°C (189.5°F)	Actual ambient temperature displayed	Open in the circuit: -40.0°C (-40.0°F) Short in the circuit: 87.5°C (189.5°F)

OK:

The display is as specified in the normal condition column.

Result

RESULT	PROCEED TO
OK (When troubleshooting according to the DTC)	A
OK (When troubleshooting according to problem symptoms table)	B
NG	C

B ▶ PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE

C ▶ INSPECT THERMISTOR ASSEMBLY

A
▼

2.	CHECK FOR DTC
-----------	----------------------

(a) Clear the DTCs INFO .

(b) Check for DTCs INFO .



OK:

DTC B1509 is not output

NG ▶ REPLACE COMBINATION METER

OK ► END

3. INSPECT THERMISTOR ASSEMBLY

- (a) Remove the thermistor assembly  .
- (b) Inspect the thermistor assembly  .

NG ► REPLACE THERMISTOR ASSEMBLY

OK

**4. CHECK HARNESS AND CONNECTOR (THERMISTOR ASSEMBLY - COMBINATION METER ASSEMBLY)**

- (a) Disconnect the A48 thermistor assembly connector.
- (b) Disconnect the D7 combination meter assembly connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A48-1 - D7-24 (TAM)	Always	Below 1 Ω
A48-2 - D7-25 (SG-)	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A48-1 - Body ground	Always	10 k Ω or higher
A48-2 - Body ground	Always	10 k Ω or higher

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ► REPLACE COMBINATION METER ASSEMBLY



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004NOP00DX
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: CUSTOMIZE PARAMETERS (2013 FR-S)		

CUSTOMIZE PARAMETERS

1. CUSTOMIZE METER / GAUGE SYSTEM

(a) Customizing with the Techstream

- (1) Connect the Techstream to the DLC3.
- (2) Turn the ignition switch to ON.
- (3) Turn the Techstream on.
- (4) Enter the following menus: Customize Setting / Combination Meter / Warning.
- (5) Select the setting by referring to the table below.

NOTICE:

Be sure to record the current value before customizing.

Warning

TESTER DISPLAY	DEFAULT	CONTENT	SETTING	RELEVANT ECU
Key Remind Sound	NORMAL	Function to change the frequency of the key reminder buzzer.	NORMAL, FAST or SLOW	Combination meter assembly
Tail Remind Buzzer	ON	Function to change the Tail Remind Buzzer.	ON or OFF	Combination meter assembly
Driver Side Seatbelt Warning Buzzer*	ON	Function to turn on/off the seat belt warning buzzer	ON or OFF	Combination meter assembly
Front Passenger Side Seatbelt Warning Buzzer*	ON	Function to change the seat-belt warning buzzer.	ON or OFF	Combination meter assembly

*: This setting is only valid for the buzzer which sounds at 20 km/h (12 mph) or more

- (6) Connect the Techstream to the DLC3.
- (7) Turn the ignition switch to ON.
- (8) Turn the Techstream on.
- (9) Enter the following menus: Customize Setting / Combination Meter / Air Conditioner.
- (10) Select the setting by referring to the table below.

NOTICE:

Be sure to record the current value before customizing.

Air Conditioner

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TESTER DISPLAY	DEFAULT	CONTENT	SETTING	RELEVANT ECU
Ambient Temperature Adjustment	0C (0F)	Function to change the display temperature to match the actual temperature.	+3C (+5.4F) +2C (+3.6F), +1C (+1.8F), 0C (0F), -1C (-1.8F), -2C (-3.6F) or 3C (-5.4F)	Combination meter assembly



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001F8Q01DX
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

[DATA LIST / ACTIVE TEST](#)

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Combination Meter / Data List.
- (e) According to the display on the tester, read the Data List.

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
ODO/TRIP Change SW	ODO/TRIP change switch ON or OFF	ON: ODO/TRIP switch pushed OFF: ODO/TRIP switch not pushed	-
Tail Cancel SW	Light control rheostat switch (cancel switch) ON or OFF	ON: Light control rheostat switch (cancel switch) → TAIL OFF: Light control rheostat switch (cancel switch) → OFF	-
P-Seatbelt Buckle SW	Buckle switch (Front passenger side) ON or OFF	ON: Front passenger side seat belt is fastened OFF: Front passenger side seat belt is unfastened	-
Multi Display Select Switch	Multi Display Select Switch ON or OFF	ON: DISP switch pushed OFF: DISP switch not pushed	-
+B Voltage Value	+B voltage Min.: 0 Max.: 25.5	Below 1 to 14	Unit: V
Vehicle Speed Meter	Vehicle speed Min.: 0 (0) Max.: 255 (158)	Approximately same as actual vehicle speed (When vehicle is being driven)	Unit: km/h (mph)
Engine Rpm	Engine speed Min.: 0 Max.: 12750	Approximately same as actual engine speed (when engine is running)	Unit: rpm
	Engine coolant		

Coolant Temperature	temperature Min.: 0 Max.: 127.5	After warming up: 80 to 108 (176 to 226)	Unit: °C (°F)
Fuel Input	Fuel sender gauge input Min.: 0 Max.: 127.5	Fuel sender input value	Unit: Liter
Ambient Temperature	Ambient temperature Min.: -40 (-40) Max.: 87.5 (189.5)	Same as outside temperature	Unit: °C (°F)
Rheostat value	Light control rheostat switch input Min.: 0 Max.: 100	Displays rheostat volume figure 0 to 100	Unit: %
Quantity of Outside Light	Light control rheostat switch output Min.: 0 Max.: 100	Displays rheostat volume figure 0 to 100	Unit: %
Key Remind Sound	Key remind sound FAST, NORMAL or SLOW	Display key reminder buzzer speed setting	-
Tail Remind Buzzer	Tail remind buzzer ON or OFF	ON: Tail remind buzzer ON OFF: Tail remind buzzer OFF	-
Driver Side Seatbelt Warning Buzzer	Driver seat belt warning buzzer ON or OFF	ON: Driver side seat belt warning buzzer ON OFF: Driver side seat belt warning buzzer OFF	-
P-Seatbelt Warning Buzzer	Front passenger seat belt warning buzzer ON or OFF	ON: Front passenger side seat belt warning buzzer ON OFF: Front passenger side seat belt warning buzzer OFF	-
Number of Trouble Code	The DTC number which is currently output	-	-

HINT:

Items for which there are no settings do not appear on the Techstream, or do not operate.

2. PERFORM ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.

(d) Enter the following menus: Body Electrical / Combination Meter / Active Test.

(e) According to the display on the tester, perform the Active Test.

Combination Meter

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Speed Meter Operation	Speedometer	0, 40, 80, 120, 160, 200, 240 km/h	-
Tachometer Operation	Tachometer	0, 1000, 2000, 3000, 4000, 5000, 6000, 7000 rpm	-
Fuel Meter Operation	Fuel gauge	EMPTY, 1/2, FULL	-
A/T Indicator Operation 1	A/T shift indicator light	P, R, N, D, 4 (M), 3 (M), 2, L	-
A/T Indicator Operation 2	A/T shift indicator light	5, 6, M	-
A/T Indicator Operation 3	A/T shift indicator light	D	-
Meter Display 1	Drive monitor display	6, 5, 4, 3, 2, 1, 0, All	Vehicle is stopped and engine is idling
Meter Display 2	Drive monitor display	9, 8, 7	Vehicle is stopped and engine is idling
Indicat. Lamp Beam	Hi-beam indicator light	OFF/ON	Vehicle is stopped and engine is idling
Indicat. Lamp Fr FOG	Front fog indicator light	OFF/ON	Vehicle is stopped and engine is idling
Indicat. Lamp Rr FOG	Rear fog indicator light	OFF/ON	Vehicle is stopped and engine is idling
Indicat. Lamp Airbag	Airbag warning light	OFF/ON	Vehicle is stopped and engine is idling
Driver Side Seat Belt	Driver side seat belt warning light	OFF/ON	Vehicle is stopped and engine is idling
Front Passenger Side Seat Belt	Front passenger seat belt warning light	OFF/ON	Vehicle is stopped and engine is idling
Indicat. Lamp Doors All Open	Door warning light	OFF/ON	Vehicle is stopped and engine is idling
Indicat.Lamp Fuel	Low fuel warning light	OFF/ON	Vehicle is stopped and engine is idling
Indicat. Lamp ABS	ABS warning light	OFF/ON	Vehicle is stopped and engine is idling
Indicat. Lamp Slip	SLIP indicator light	OFF/ON	Vehicle is stopped and engine is idling
VSC TRC Indicator	TRC OFF/TRAC OFF indicator light	OFF/ON	Vehicle is stopped and engine is idling
Indicat. Tire Pressure Warning System	TPMS warning light	OFF/ON	Vehicle is stopped and engine is idling

Indicat. Lamp Brake	Brake warning light	OFF/ON	Vehicle is stopped and engine is idling
SPORT Indicator	Sport indicator light	OFF/ON	Vehicle is stopped and engine is idling
Indicat. Lamp ECT SNOW	Snow indicator light	OFF/ON	Vehicle is stopped and engine is idling
A/T Oil Temperature Operation	A/T oil temperature warning light	OFF/ON	Vehicle is stopped and engine is idling
Indicat. EPS	EPS warning light	OFF/ON	Vehicle is stopped and engine is idling
Indicat. Lamp Cruise	Cruise indicator light (green)	OFF/ON	Vehicle is stopped and engine is idling
Indicat. SIL (Up)	Shift up indicator light	OFF/ON	Vehicle is stopped and engine is idling
Indicat. SIL (Down)	Shift down indicator light	OFF/ON	Vehicle is stopped and engine is idling
Indicat. SET	SET indicator light	OFF/ON	Vehicle is stopped and engine is idling
Indicat. VSC OFF	VSC OFF indicator light	OFF/ON	Vehicle is stopped and engine is idling
Cruise Warning	Cruise warning light (yellow)	OFF/ON	Vehicle is stopped and engine is idling
Smart System Indicator	Smart system indicator light (green)	OFF/ON	Vehicle is stopped and engine is idling
Smart System Warning	Smart system warning light (yellow)	OFF/ON	Vehicle is stopped and engine is idling
Check Engine Warning	Check engine warning light	OFF/ON	Vehicle is stopped and engine is idling
Water Temperature Meter Operation	Water temperature gauge	LOW, NORMAL, HIGH	Vehicle is stopped and engine is idling

HINT:

- Items for which there are no settings do not appear on the Techstream, or do not operate.
- Telltales for which there are no settings do not operate.
- When not functioning normally, there may be a combination meter assembly malfunction.

Last Modified: 3-27-2012	6.4 S	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001O81015X
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: DIAGNOSTIC TROUBLE CODE CHART (2013 FR-S)		

DIAGNOSTIC TROUBLE CODE CHART

DTC CODE	DETECTION ITEM	SEE PAGE
B1500	Fuel Sender Open Detected	INFO
B1509	Open in Ambient Temperature Sensor Circuit	INFO
U0073	Control Module Communication Bus "A" Off	INFO
U0100	Lost Communication with ECM / PCM "A"	INFO
U0131	Lost Communication with Power Steering Control Module	INFO
U0122	Lost Communication with Vehicle Dynamics Control Module	INFO
U0140	Lost Communication with Body Control Module	INFO
U0151	Lost Communication with Restraints Control Module	INFO

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001Q77012X
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: DTC CHECK / CLEAR (2013 FR-S)		

DTC CHECK / CLEAR

1. CHECK DTC

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Combination Meter / DTC.
- (e) Check DTCs and then write them down.

HINT:

Refer to the Techstream operator's manual for further details.

- (f) Confirm the details of the DTCs.

2. CLEAR DTC

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON (do not start the engine).
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Combination Meter / DTC / Clear.

HINT:

Refer to the Techstream operator's manual for further details.

- (e) Clear DTCs by pressing the YES button on the tester.

HINT:

Refer to the Techstream operator's manual for further details.



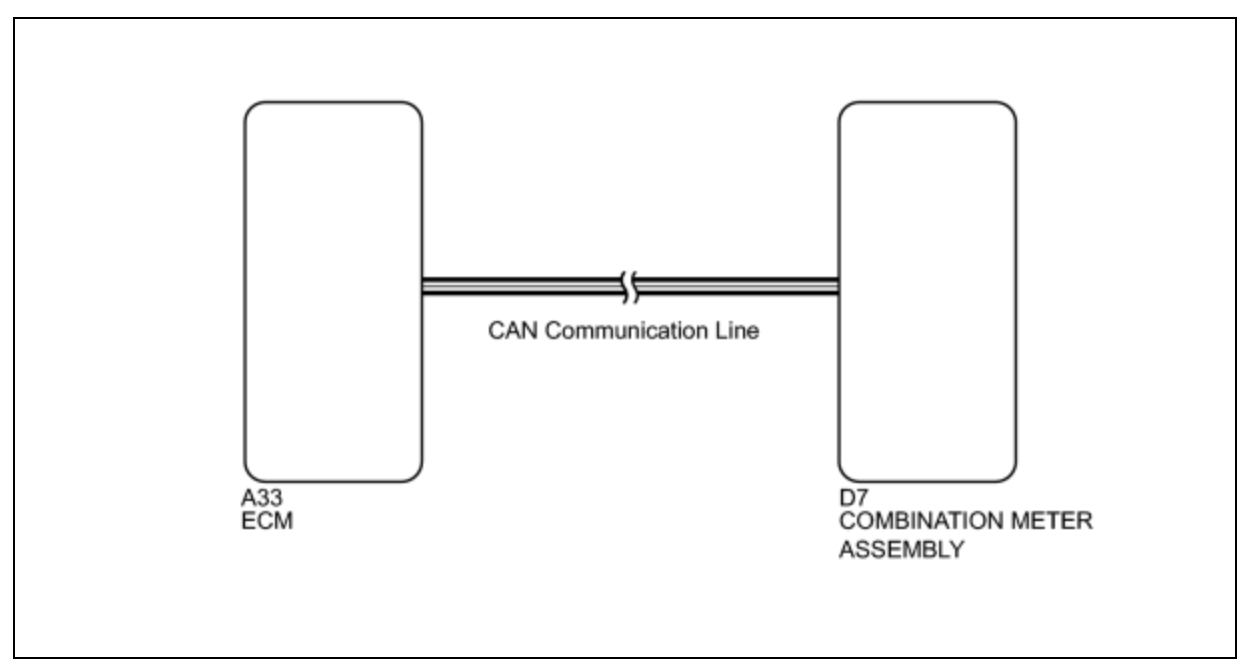
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001Y0001TX
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: Engine Coolant Temperature Receiver Gauge Malfunction (2013 FR-S)		

Engine Coolant Temperature Receiver Gauge Malfunction

DESCRIPTION

The combination meter assembly controls the engine coolant temperature receiver gauge in accordance with the engine coolant temperature sensor signals from the ECM through the CAN communication system.

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	CHECK CAN COMMUNICATION SYSTEM
-----------	---------------------------------------

(a) Check if CAN communication DTCs are output INFO.

Result

RESULT	PROCEED TO
DTCs are not output	A
DTCs are output	B

A



2.	PERFORM ACTIVE TEST USING TECHSTREAM (WATER TEMPERATURE METER OPERATION)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Combination Meter / Active Test.
- (e) According to the display on the tester, perform the Active Test.

Combination Meter

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Water Temperature Meter Operation	Water temperature gauge	LOW, NORMAL, HIGH	Vehicle is stopped and engine is idling

OK:
The value selected during Active Test is displayed.

NG ► REPLACE COMBINATION METER ASSEMBLY

OK



3.	READ VALUE USING TECHSTREAM (COOLANT TEMPERATURE)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Combination Meter / Data List.
- (e) According to the display on the tester, read the Data List.

Combination Meter

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Coolant Temperature	Engine coolant temperature Min.: 0 (0) Max.: 127.5 (261.5)	After warming up: 80 to 108 (176 to 226)	Unit: °C (°F)

OK:

The vehicle's coolant temperature and tester value are the same.

NG ► **REPLACE COMBINATION METER ASSEMBLY**

OK



4.	CHECK SFI SYSTEM
-----------	-------------------------

(a) Check if the SFI system outputs DTCs INFO.

Result

RESULT	PROCEED TO
DTCs are not output	A
DTCs are output	B

B ► **GO TO SFI SYSTEM**

A



5.	READ VALUE USING TECHSTREAM (COOLANT TEMP)
-----------	---

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Data List.

(e) According to the display on the tester, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Coolant Temp	Coolant temperature Min.: -40 (-40) Max.: 215 (419)	After warming up: 75 to 100 (167 to 212)	Unit: °C (°F)

OK:

The vehicle's coolant temperature and tester value are the same.

B ► GO TO SFI SYSTEM

A



6.	REPLACE COMBINATION METER ASSEMBLY
-----------	---

(a) Replace the combination meter assembly with a new or a normal one  .

NG ► REPLACE ECM

OK ► END

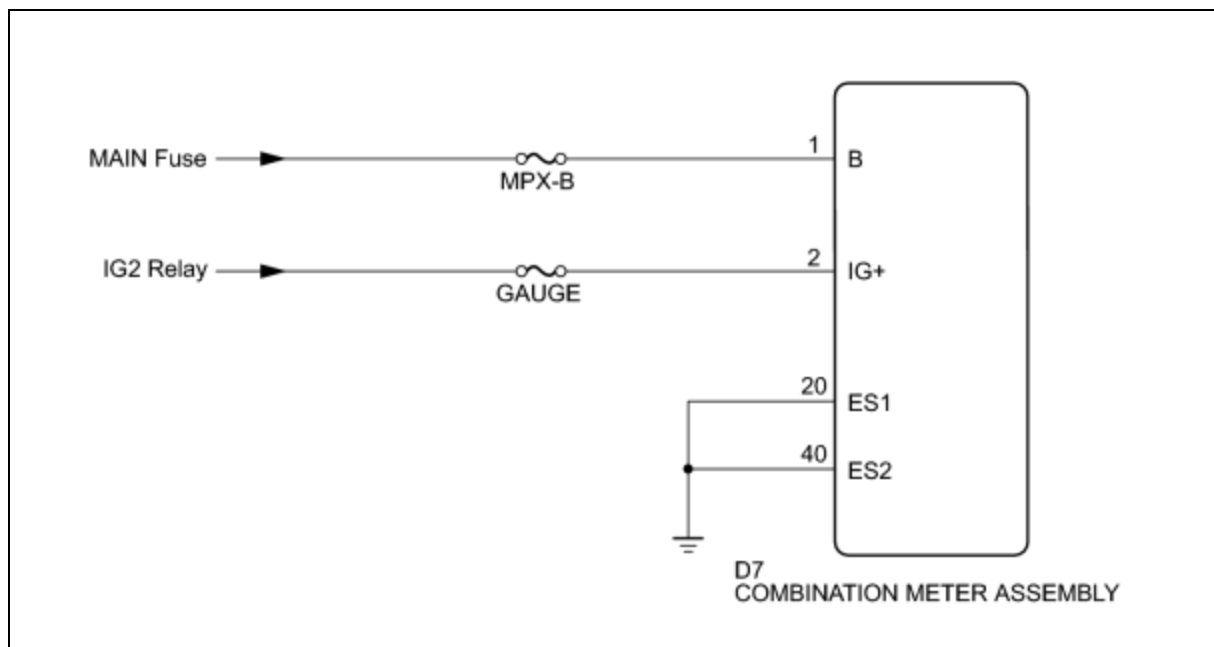
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001XSZ017X
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: Entire Combination Meter does not Operate (2013 FR-S)		

Entire Combination Meter does not Operate

DESCRIPTION

This circuit is the power source circuit for the combination meter assembly.

WIRING DIAGRAM



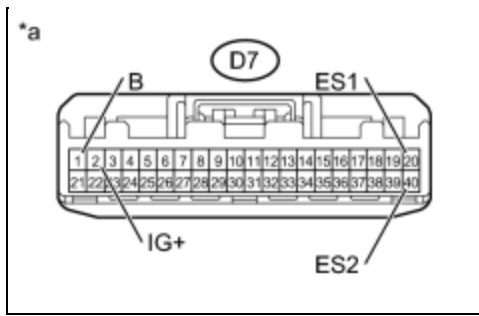
INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CHECK HARNESS AND CONNECTOR (COMBINATION METER ASSEMBLY - BATTERY AND BODY GROUND)
----	---



(a) Disconnect the D7 combination meter assembly connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
D7-1 (B) - Body ground	Always	11 to 14 V
D7-2 (IG+) - Body ground	Ignition switch ON	11 to 14 V

(c) Measure the resistance according to the value in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D7-20 (ES1) - Body ground	Always	Below 1 Ω
D7-40 (ES2) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Combination Meter Assembly)
----	---

(d) Reconnect the D7 combination meter assembly connector.

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ► REPLACE COMBINATION METER ASSEMBLY

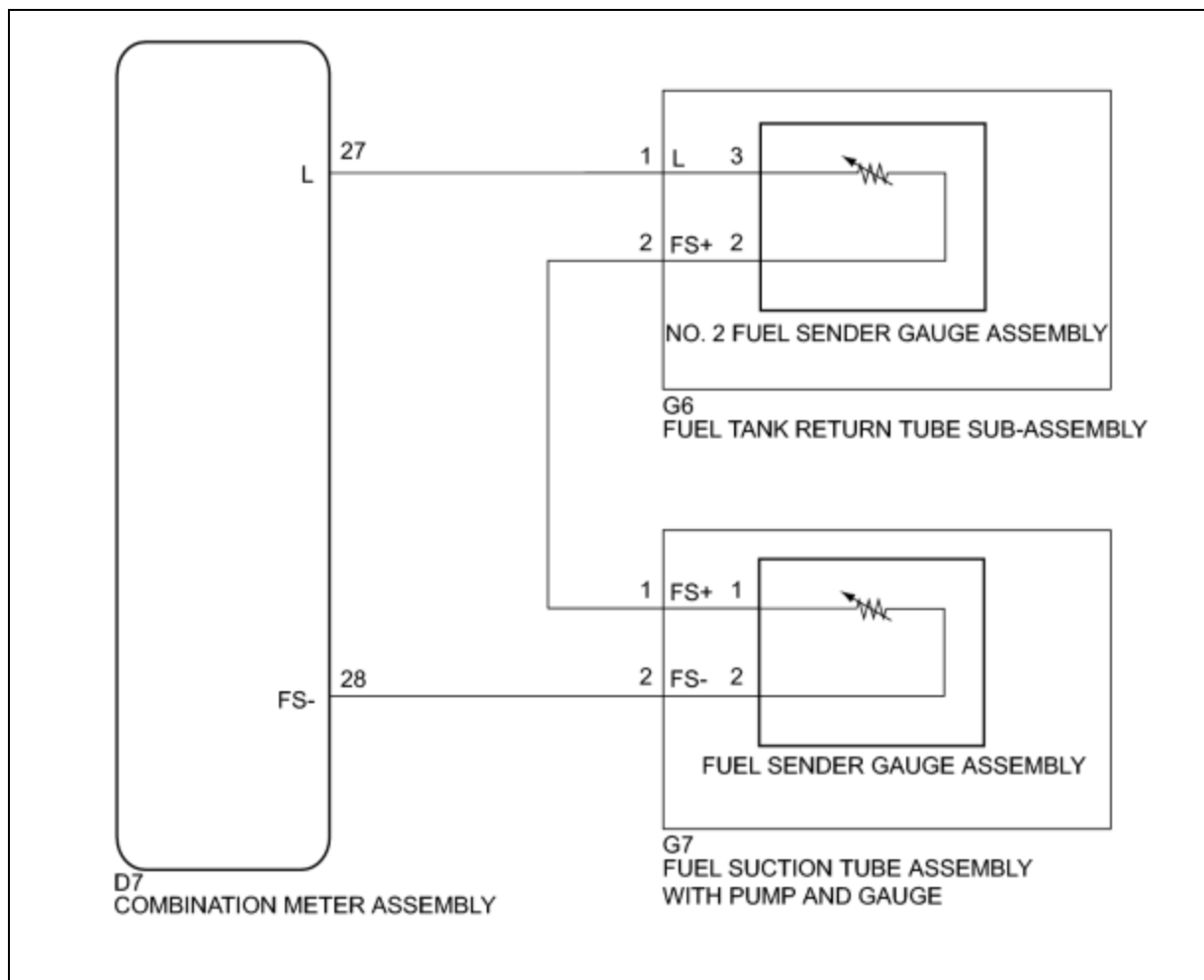
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001F8K01IX
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: Fuel Gauge Malfunction (2013 FR-S)		

Fuel Gauge Malfunction

DESCRIPTION

The combination meter assembly controls the fuel receiver gauge in accordance with the resistance of the fuel sender gauge, which varies depending on the amount of fuel remaining in the fuel tank.

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	CONFIRM DTC OUTPUT
----	--------------------

(a) Check DTC INFO .

Result

RESULT	PROCEED TO
DTC B1500 is not output	A
DTC B1500 is output	B

B ► [GO TO DIAGNOSTIC TROUBLE CODE CHART](#)

A



2.	PERFORM ACTIVE TEST USING TECHSTREAM (FUEL METER OPERATION)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Combination Meter / Active Test.
- (e) According to the display on the tester, perform the Active Test.

Combination Meter

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Fuel Meter Operation	Fuel gauge	EMPTY, 1/2, FULL	-

NG ► [REPLACE COMBINATION METER ASSEMBLY](#)

OK



3.	READ VALUE USING TECHSTREAM (FUEL INPUT) INFO
-----------	--

NG ► [INSPECT FUEL SENDER GAUGE ASSEMBLY](#)

OK ► [REPLACE COMBINATION METER ASSEMBLY](#)

4.	INSPECT FUEL SENDER GAUGE ASSEMBLY INFO
----	---

B ▶ REPLACE FUEL SENDER GAUGE ASSEMBLY

A
▼

5.	INSPECT FUEL SUCTION TUBE ASSEMBLY WITH PUMP AND GAUGE INFO
----	---

B ▶ REPLACE FUEL SUCTION TUBE ASSEMBLY WITH PUMP AND GAUGE

A
▼

6.	REPLACE NO. 2 FUEL SENDER GAUGE ASSEMBLY INFO
----	---

B ▶ REPLACE NO. 2 FUEL SENDER GAUGE ASSEMBLY

A
▼

7.	REPLACE FUEL TANK RETURN TUBE SUB-ASSEMBLY INFO
----	---

B ▶ REPLACE FUEL TANK RETURN TUBE SUB-ASSEMBLY

A
▼

--	--

8.	CHECK HARNESS AND CONNECTOR (COMBINATION METER ASSEMBLY - FUEL SUCTION TUBE ASSEMBLY WITH PUMP AND GAUGE) INFO
----	--

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

9.	CHECK HARNESS AND CONNECTOR (FUEL SUCTION TUBE ASSEMBLY WITH PUMP AND GAUGE - FUEL TANK RETURN TUBE SUB-ASSEMBLY) INFO
----	--

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

10.	CHECK HARNESS AND CONNECTOR (COMBINATION METER ASSEMBLY - FUEL TANK RETURN TUBE SUB-ASSEMBLY) INFO
-----	--

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ REPLACE COMBINATION METER ASSEMBLY

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001F8D01HX
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use these procedures to troubleshoot the combination meter.
- *: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	INSPECT BATTERY VOLTAGE
-----------	--------------------------------

Standard voltage:

11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT



3.	CHECK CAN COMMUNICATION SYSTEM*
-----------	--

(a) Use a Techstream to check if the CAN communication system is functioning normally.

Result

RESULT	PROCEED TO
CAN DTC is not output	A
CAN DTC is output	B

B **GO TO CAN COMMUNICATION SYSTEM**

A



4.	PROBLEM SYMPTOMS TABLE
-----------	-------------------------------

Result

RESULT	PROCEED TO
Fault is not listed in Problem Symptoms Table	A
Fault is listed in Problem Symptoms Table	B

B ▶ Go to step 6

A



5.	OVERALL ANALYSIS AND TROUBLESHOOTING*
-----------	--

(a) Data List/Active Test INFO .

(b) Terminals of ECU INFO .

(c) On-vehicle Inspection INFO .

NEXT



6.	ADJUST, REPAIR OR REPLACE
-----------	----------------------------------

NEXT



7.	CONFIRMATION TEST*
-----------	---------------------------

NEXT ▶ **END**

Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003A3400JX
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: Odo/Trip Switch Malfunction (2013 FR-S)		

Odo/Trip Switch Malfunction

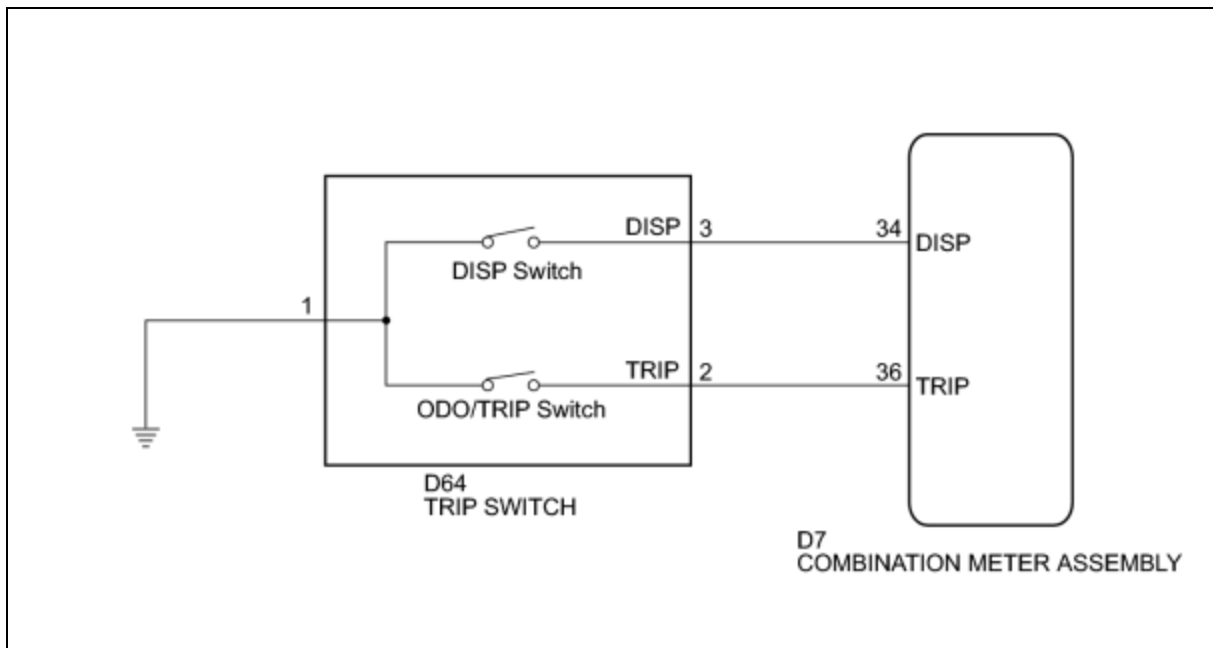
DESCRIPTION

The ODO/TRIP display of the combination meter changes each time the trip switch is pressed.

HINT:

For more information about switching between displays, refer to the owner's manual.

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	READ VALUE USING TECHSTREAM (MULTI DISPLAY SELECT SWITCH, ODO/TRIP CHANGE SW)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.

(d) Enter the following menus: Body Electrical / Combination Meter / Data List.

(e) According to the display on the tester, read the Data List.

Combination Meter

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
ODO/TRIP Change SW	ODO/TRIP switch / OFF or ON	OFF: ODO/TRIP switch not pushed	-
		ON: ODO/TRIP switch pushed	
Multi Display Select Switch	Multi Display Select Switch / OFF or ON	OFF: DISP switch not pushed	-
		ON: DISP switch pushed	

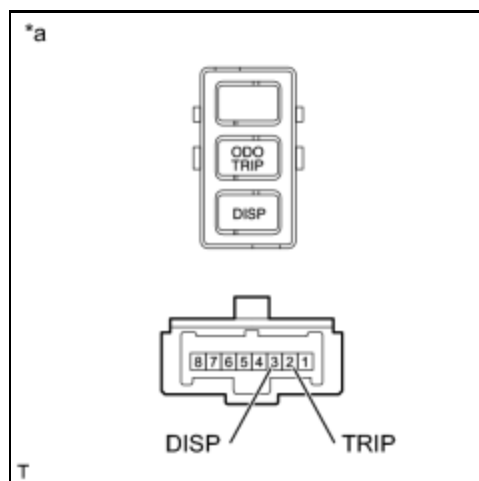
OK:

The value displayed on the Techstream changes in accordance with the actual ODO/TRIP change switch and multi display select switch operation.

NG ▶ **INSPECT TRIP SWITCH**

OK ▶ **REPLACE COMBINATION METER ASSEMBLY**

2. INSPECT TRIP SWITCH



(a) Remove the trip switch INFO.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
2 (TRIP) - 1	ODO/TRIP switch on (pushed)	Below 1 Ω

2 (TRIP) - 1	ODO/TRIP switch off (not pushed)	10 k Ω or higher
3 (DISP) - 1	DISP switch on (pushed)	Below 1 Ω
3 (DISP) - 1	DISP switch off (not pushed)	10 k Ω or higher

Text in Illustration

*a	Component without harness connected (Trip Switch)
----	--

NG  **REPLACE TRIP SWITCH**

OK



3.	CHECK HARNESS AND CONNECTOR (COMBINATION METER - TRIP SWITCH AND BODY GROUND)
-----------	--

- (a) Disconnect the D7 combination meter assembly connector.
- (b) Disconnect the D64 trip switch connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D7-34 (DISP) - D64-3 (DISP)	Always	Below 1 Ω
D7-36 (TRIP) - D64-2 (TRIP)	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D7-34 (DISP) or D64-3 (DISP) - Body ground	Always	10 k Ω or higher
D7-36 (TRIP) or D64-2 (TRIP) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **REPLACE COMBINATION METER ASSEMBLY**



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000014WB07ZX
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

1. INSPECT SPEEDOMETER

(a) Check the operation.

- (1) Using a speedometer tester (calibrated chassis dynamometer), check the speedometer indication according to the table below.

Indicator Type: km/h

CHASSIS DYNAMOMETER INDICATION (KM/H)	ACCEPTABLE RANGE (KM/H)
20	19.3 to 22.7
40	39.1 to 42.9
60	58.8 to 63.2
80	78.8 to 83.2
100	98.8 to 103.2
120	118.8 to 123.2
140	138.8 to 143.2
160	158.8 to 163.2
180	178.8 to 183.2
200	198.8 to 203.2
220	218.8 to 223.2
240	238.8 to 243.2

Indicator Type: MPH

CHASSIS DYNAMOMETER INDICATION (MPH)	ACCEPTABLE RANGE (MPH)
20	19.4 to 21.8
40	39.3 to 41.9
60	59.3 to 61.9
80	79.3 to 81.9
100	99.3 to 101.9
120	119.3 to 121.9
140	139.3 to 141.9

NOTICE:

Tire wear, over inflation, or under inflation will cause errors.

- (2) Check the deviation from the acceptable range of the speedometer indication.

Reference:
Less than 0.5 km/h (0.3 mph)

HINT:

If the indication is not as specified, go to the problem symptoms table  .

2. INSPECT TACHOMETER

- (a) Connect a tune-up tachometer, and start the engine.
- (b) Compare the test results with the tachometer indications.

TUNE-UP TACHOMETER INDICATION (RPM)	ACCEPTABLE RANGE (RPM)
1000	933 to 1067
2000	1923 to 2077
3000	2913 to 3088
4000	3913 to 4088
5000	4913 to 5088
6000	5913 to 6088
7000	6913 to 7088
8000	7913 to 8088

HINT:

If the indication is not as specified, go to the Problem Symptoms Table  .

3. INSPECT INDICATOR AND WARNING LIGHTS

- (a) Check the illumination function of the warning or indicator lights listed below when turning the ignition switch to ON.

OK:

WARNING OR INDICATOR LIGHT	SPECIFIED CONDITION
LOW FUEL	Warning or indicator light comes on for about 2 seconds after turning the ignition switch to ON.
A/T OIL TEMP*	Warning or indicator light comes on for about 2 or 3 seconds after turning the ignition switch to ON.
TPMS	Warning or indicator light comes on for about 3 seconds after turning the ignition switch to ON.
Brake	
TRAC OFF	
VSC OFF	
VSC SPORT	
SRS	Warning light comes on for about 6 seconds after turning the ignition switch to ON.
Charge	
Oil pressure	

MIL (Check engine warning light)	The light goes off right after the engine starts.
EPS	
SLIP	The light goes off 3 minutes after starting the engine.
ABS	

*: for Automatic Transmission System



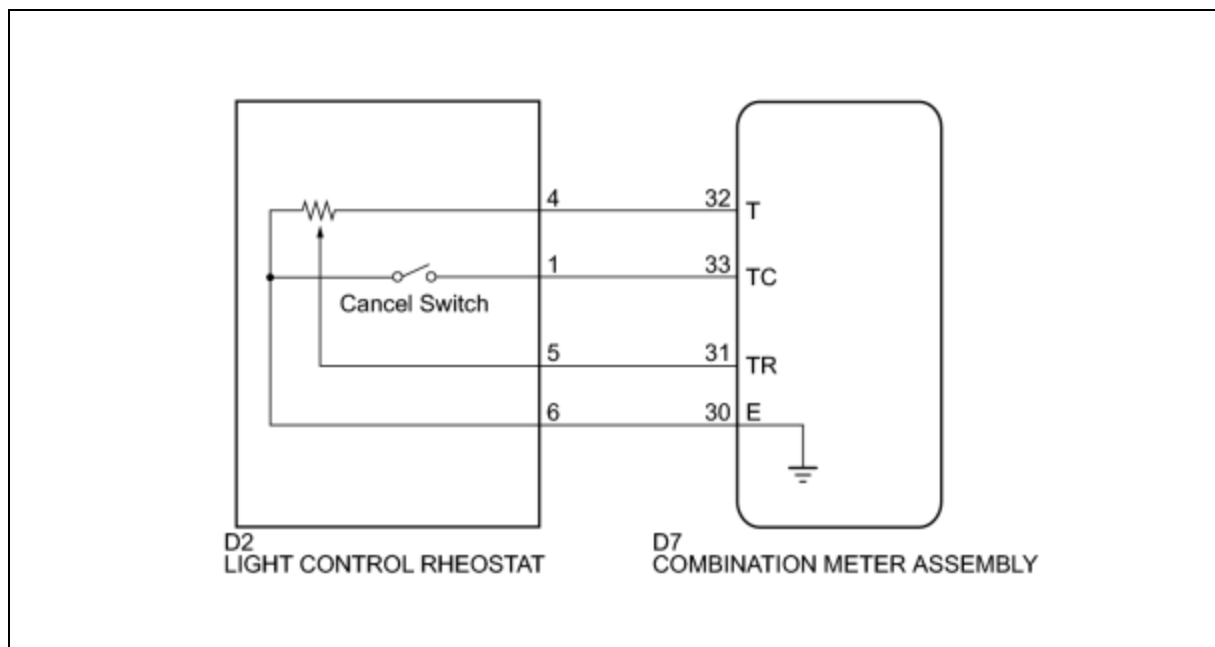
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003A3200GX
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: Operating Light Control Rheostat does not Change Light Brightness (2013 FR-S)		

[Operating Light Control Rheostat does not Change Light Brightness](#)

DESCRIPTION

The brightness of the combination meter assembly is controlled by rotating the light control rheostat knob in upward and downward.

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	READ VALUE USING TECHSTREAM (RHEOSTAT SWITCH)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Combination Meter / Data List.
- (e) According to the display on the tester, read the Data List.

Combination Meter

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Tail Cancel SW	Taillight relay / OFF or ON	OFF: Headlight dimmer switch (Light control switch) → OFF	-
		ON: Headlight dimmer switch (Light control switch) → TAIL	
Rheostat value	Light control rheostat switch input / Min.: 0 Max.: 100	The volume value of the rheostat is displayed. 0 to 100	-

OK:

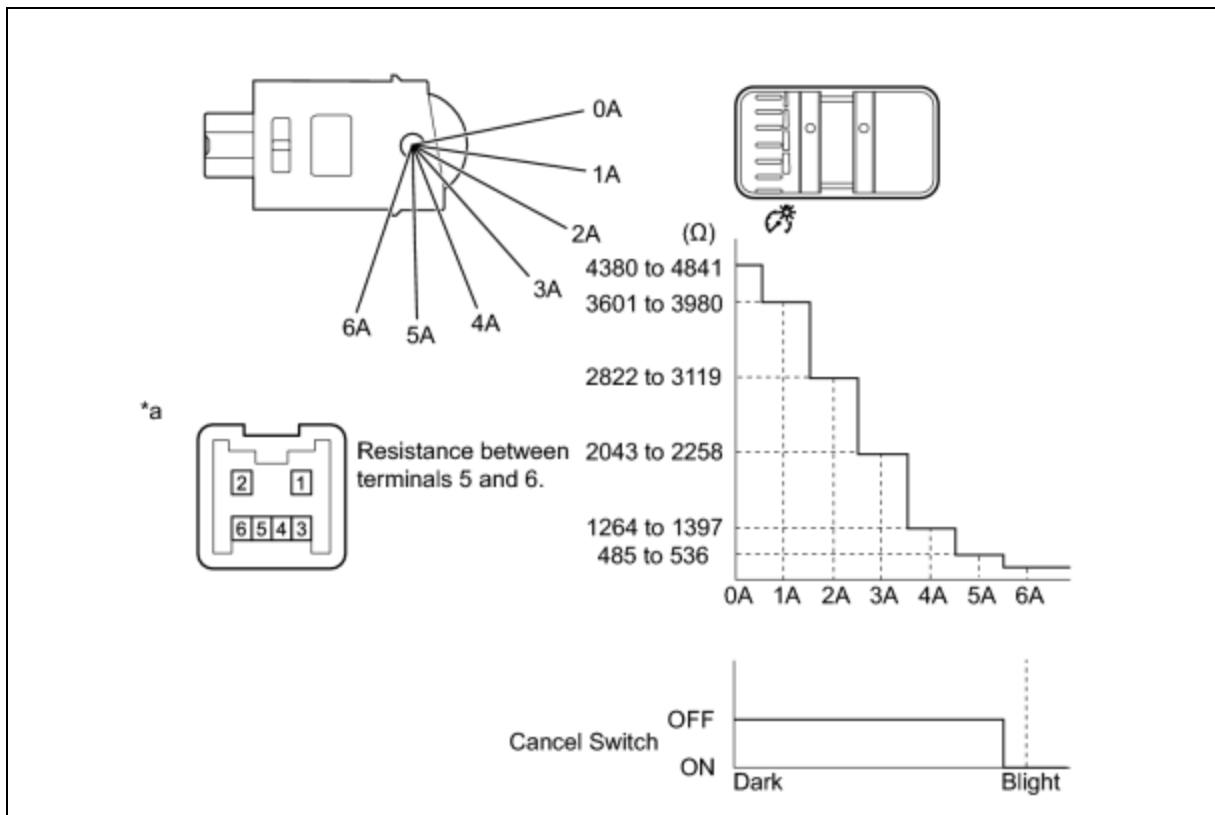
The value displayed on the Techstream changes in accordance with the actual rheostat switch operation.

NG ▶ **INSPECT LIGHT CONTROL RHEOSTAT**

OK ▶ **REPLACE COMBINATION METER ASSEMBLY**

2. INSPECT LIGHT CONTROL RHEOSTAT

(a) Remove the light control rheostat INFO.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 - 6	Cancel switch off → on	10 kΩ or higher → Below 1 Ω
4 - 6	Always	4475 to 4946 Ω
5 - 6	Light control rheostat fully up → Light control rheostat fully down	485 to 536 Ω → 4380 to 4841 Ω

Text in Illustration

*a	Component without harness connected (Light Control Rheostat)
----	---

NG  **REPLACE LIGHT CONTROL RHEOSTAT**

OK



3.	CHECK HARNESS AND CONNECTOR (COMBINATION METER ASSEMBLY - LIGHT CONTROL RHEOSTAT)
-----------	--

(a) Disconnect the D7 combination meter assembly connector.

(b) Disconnect the D2 light control rheostat connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D7-30 (E) - D2-6	Always	Below 1 Ω
D7-31 (TR) - D2-5	Always	Below 1 Ω
D7-32 (T) - D2-4	Always	Below 1 Ω
D7-33 (TC) - D2-1	Always	Below 1 Ω

Standard Resistance (Check for Short):

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D7-30 (E) or D2-6 - Body ground	Always	10 kΩ or higher
D7-31 (TR) or D2-5 - Body ground	Always	10 kΩ or higher

D7-32 (T) or D2-4 - Body ground	Always	10 k Ω or higher
D7-33 (TC) or D2-1 - Body ground	Always	10 k Ω or higher

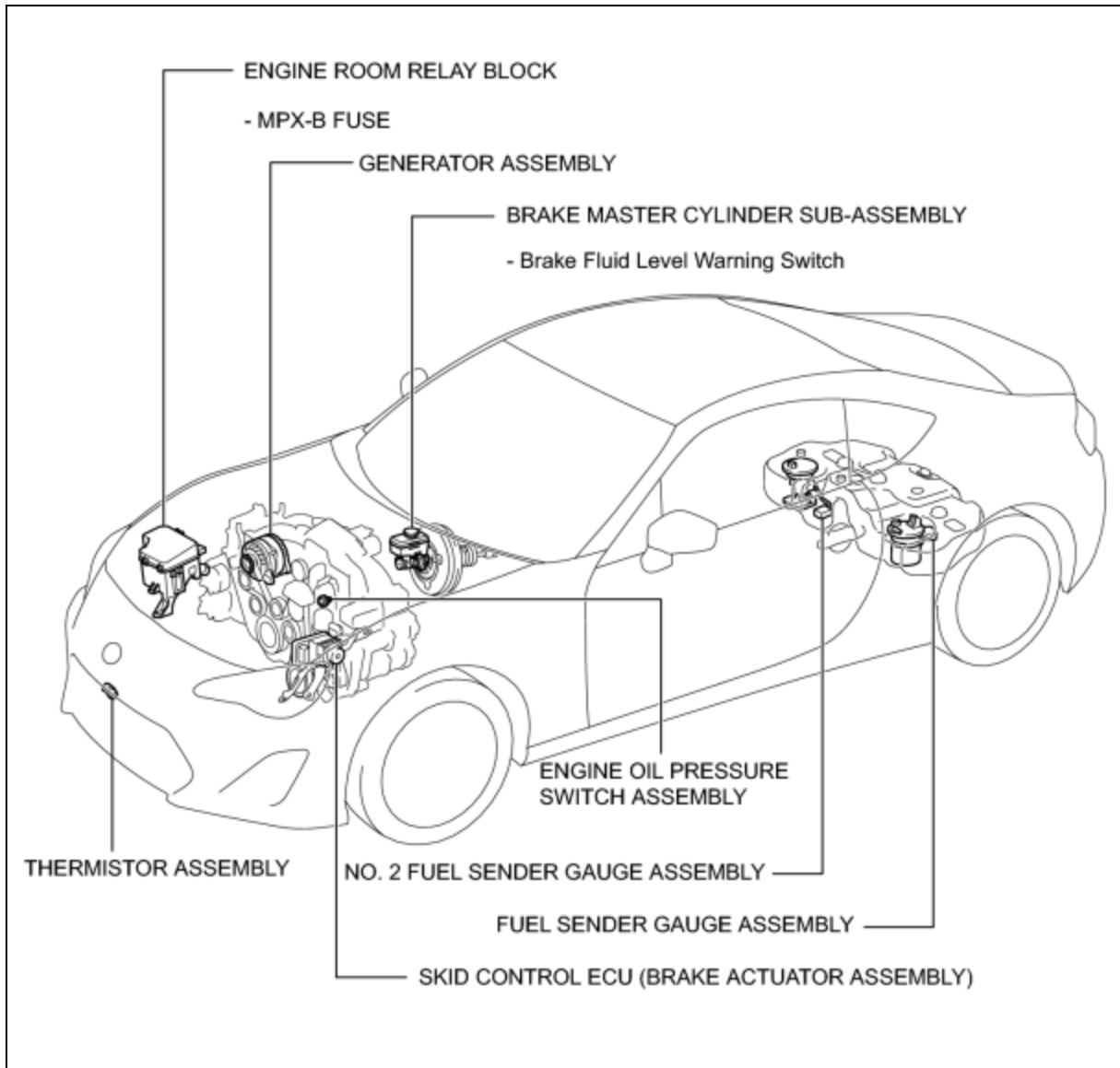
NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ REPLACE COMBINATION METER ASSEMBLY

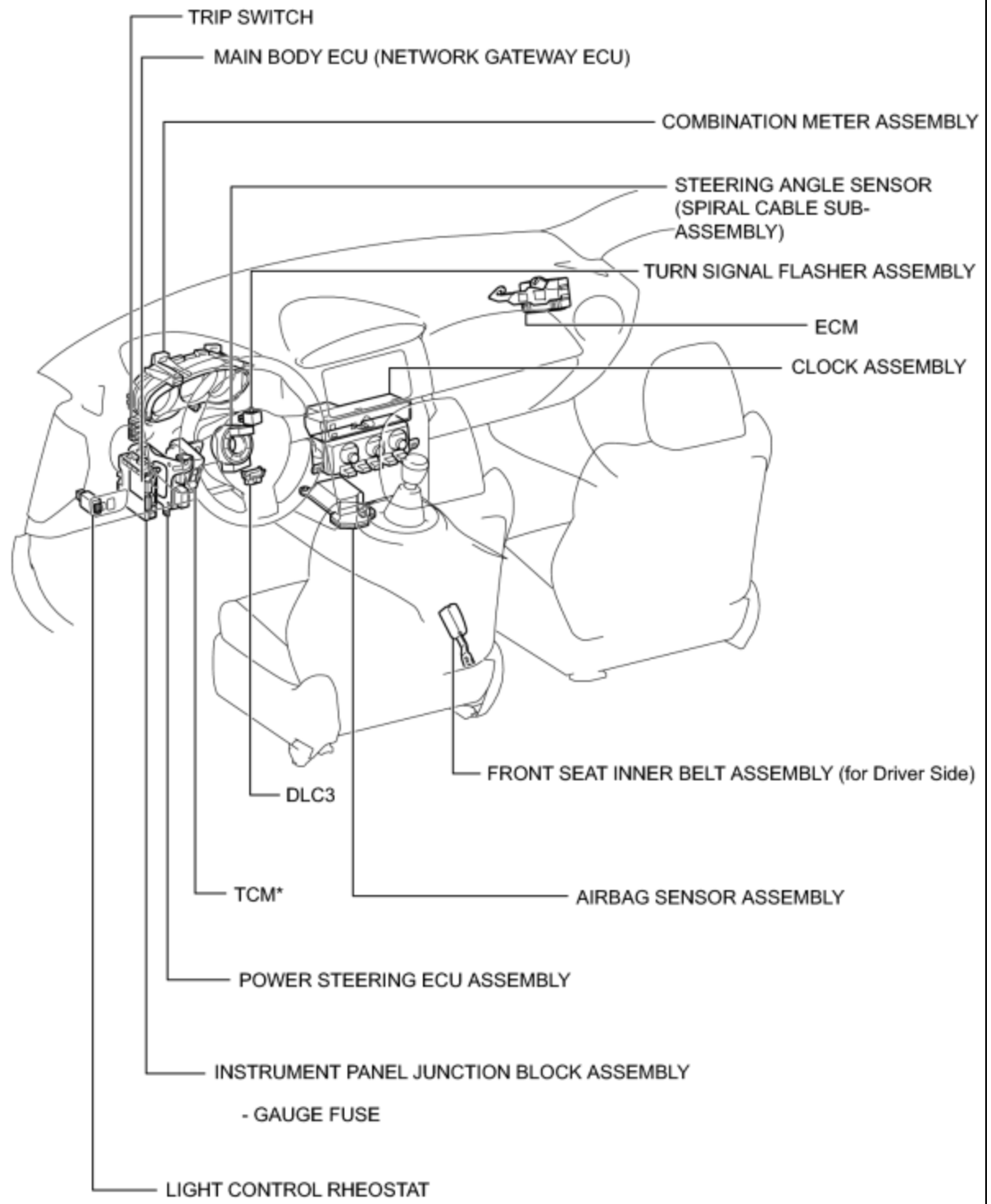
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003UUR00AX
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



ILLUSTRATION



*:for Automatic Transmission System

Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003UUS00HX
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Malfunction System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Entire combination meter does not operate	Entire combination meter does not operate	INFO

Meter/Gauge

SYMPTOM	SUSPECTED AREA	SEE PAGE
Speedometer malfunction	Speedometer circuit	INFO
Tachometer malfunction	Tachometer circuit	INFO
Fuel gauge malfunction	Fuel gauge circuit	INFO
Engine coolant temperature receiver gauge malfunction	Engine coolant temperature receiver gauge circuit	INFO
ODO/TRIP switch malfunction	ODO/TRIP switch circuit	INFO
Operating light control rheostat does not change light brightness	Light control rheostat circuit	INFO

Warning/Indicator Light

SYMPTOM	SUSPECTED AREA	SEE PAGE
Turn indicator light does not come on	Headlight dimmer switch	INFO
	Harness or connector	-
	Combination meter assembly	INFO
SET indicator light does not come on*1	Perform active test (Indicat. SET)	INFO
	Cruise SET Indicator Light Circuit	INFO
	Combination meter assembly	INFO
CRUISE indicator light does not come on (green)*1	Perform active test (Indicat. Lamp Cruise)	INFO
	Cruise Main Indicator Light Circuit	

		INFO
	Combination meter assembly	INFO
CRUISE warning light does not come on (yellow)*1	Perform active test (Cruise Warning)	INFO
	Cruise Main Indicator Light Circuit	INFO
	Combination meter assembly	INFO
Open door warning light does not come on	Perform active test (Indicat. Lamp Doors All Open)	INFO
	CAN communication system	INFO
	Door courtesy switch	INFO
	Harness or connector	-
	Main body ECU (network gateway ECU)	INFO
	Combination meter assembly	INFO
Beam indicator light does not come on	Perform active test (Indicat. Lamp Beam)	INFO
	Lighting (EXT) - Lighting system	INFO
	Combination meter assembly	INFO
TPMS indicator light does not come on	Perform active test (Indicat. Tire Pressure Warning System)	INFO
	Tire Pressure Warning Light Circuit	INFO
	Combination meter assembly	INFO
Security indicator light does not come on	Security Indicator Light Does not Blink	INFO
	Combination meter assembly	INFO
REV indicator light does not come on*2	System description - Multi information display flow chart	INFO
	Trip switch	INFO
	Harness or connector	-
	Combination meter assembly	INFO
SLIP indicator light does not come on	Perform active test (Indicat. Lamp Slip)	INFO
	Slip Indicator Light does not Come ON	INFO
	Combination meter assembly	INFO
ABS warning light does not come on	Perform active test (Indicat. Lamp ABS)	INFO
	ABS Warning Light does not Come ON	INFO
	Combination meter assembly	INFO
Driver side seat belt warning light does not come on	Perform active test (Driver Side Seat Belt)	INFO
	Driver Side Seat Belt Warning Light does not Operate	INFO
	Combination meter assembly	INFO
Charge warning light does not come on	LED check	INFO

	Battery / charging - Charging system	INFO
	Harness or connector	-
	Combination meter assembly	INFO
Engine oil pressure warning light does not come on	LED check	INFO
	Engine oil pressure switch assembly	INFO
	Harness or connector	-
	Combination meter assembly	INFO
MIL does not come on	LED check	INFO
	Perform active test (Check Engine Warning)	INFO
	MIL circuit	INFO
	Combination meter assembly	INFO
SPORT indicator light does not come on*3	Perform active test (SPORT Indicator)	INFO
	Automatic transmission / transaxle - Automatic transmission system	INFO
	Combination meter assembly	INFO
SNOW indicator light does not come on*3	Perform active test (Indicat. Lamp ECT SNOW)	INFO
	Automatic transmission / transaxle - Automatic transmission system	INFO
	Combination meter assembly	INFO
A/T OIL TEMP warning light does not come on*3	LED check	INFO
	Perform active test (A/T Oil Temperature Operation)	INFO
	Automatic transmission / transaxle - Automatic transmission system	INFO
	Combination meter assembly	INFO
Brake warning light does not come on	LED check	INFO
	Perform active test (Indicat. Lamp Brake)	INFO
	Brake Warning Light does not Come ON	INFO
	Combination meter assembly	INFO
TRAC OFF indicator light does not come on	LED check	INFO
	Perform active test (VSC TRC Indicator)	INFO
	TRC OFF Indicator Light does not Come ON	INFO
	Combination meter assembly	INFO
VSC OFF indicator light does not come on	LED check	INFO
	Perform active test (Indicat. VSC OFF)	INFO
	VSC OFF Indicator Light does not Come ON	INFO
	Combination meter assembly	

		INFO
VSC SPORT indicator light does not come on	LED check	INFO
	VSC SPORT Indicator Light does not Come ON	INFO
	Combination meter assembly	INFO
Airbag warning light does not come on	LED check	INFO
	Perform active test (Indicat. Lamp Airbag)	INFO
	SRS Warning Light does not Come ON	INFO
	Combination meter assembly	INFO
EPS warning light does not come on	LED check	INFO
	Perform active test (Indicat. EPS)	INFO
	EPS Warning Light Circuit	INFO
	Combination meter assembly	INFO
Low fuel warning light does not come on	LED check	INFO
	Perform active test (Indicat. Lamp Fuel)	INFO
	Fuel sender gauge assembly	INFO
	No. 2 fuel sender gauge assembly	INFO
	Harness or connector	-
	Combination meter assembly	INFO

*1: w/ Cruise Control System

*2: w/ Digital Speedometer

*3: for Automatic Transmission System

Buzzer

SYMPTOM	SUSPECTED AREA	SEE PAGE
No buzzers sound	Harness or connector	-
	Combination meter assembly	INFO
Seat belt warning buzzer does not sound (driver seat) (driver side seat belt warning light is normal)	Combination meter assembly	INFO
EPS buzzer does not sound (EPS warning light is normal)	Combination meter assembly	INFO
Key reminder warning buzzer does not sound	Key Reminder Buzzer does not Sound	INFO
Immobilizer key identification completion notice buzzer (buzzer that sounds once) does not sound	Theft deterrent / keyless entry - engine immobiliser system	INFO
	Combination meter assembly	INFO

Sports reject buzzer does not sound (driving system operates normally)*1	Combination meter assembly	INFO
REV buzzer does not sound*2	System description - Multi information display flow chart	INFO
	Combination meter assembly	INFO
Light reminder warning buzzer does not sound (lighting system operates normally, door warning light comes on when a door is opened)	Combination meter assembly	INFO

*1: for Automatic Transmission System

*2: w/ Digital Speedometer

Multi--Information Display

SYMPTOM	SUSPECTED AREA	SEE PAGE
Cannot switch between ODO/TRIP displays, or cannot reset TRIP	Trip switch	INFO
	Harness or connector	-
	Combination meter assembly	INFO
Display fault (no display, figures do not change)	Combination meter assembly	INFO
ODO/TRIP display does not come on.	Perform active test (Meter Display 1 - 6, 5, 4, 3, 2, 1, 0 and all)	INFO
	Perform active test (Meter Display 2 - 9, 8, 7)	INFO
	Combination meter assembly	INFO
Shift indicator light does not come on.*1	Perform active test (A/T Indicator Operation 1 - L, 2, 3, 4, D, N, R and P)	INFO
	Perform active test (A/T Indicator Operation 2 - 5, 6 and M)	INFO
	Perform active test (A/T Indicator Operation 3 - D)	INFO
	Combination meter assembly	INFO
Shift indicator light does not come on (display is normal after clutch release)*2	System description - Multi information display flow chart	INFO
	Trip switch	INFO
	Perform active test (A/T Indicator Operation 1 - L, 2, 3, 4, D, N, R and P)	INFO
	Perform active test (A/T Indicator Operation 2 - 5, 6 and M)	INFO
	Perform active test (A/T Indicator Operation 3 - D)	INFO
	Combination meter assembly	INFO

Ambient temperature not displayed	Thermistor assembly	INFO
	Harness or connector	-
	Combination meter assembly	INFO
Significant error in average fuel consumption display (speedometer, tachometer are normal)	Combination meter assembly	INFO
Significant error in instantaneous fuel consumption display (speedometer, tachometer are normal)	Combination meter assembly	INFO
Digital speedometer display fault (no display, figures do not change)*3	Combination meter assembly	INFO

*1: for Automatic Transmission System

*2: for Manual Transmission System

*3: w/ Digital Speedometer

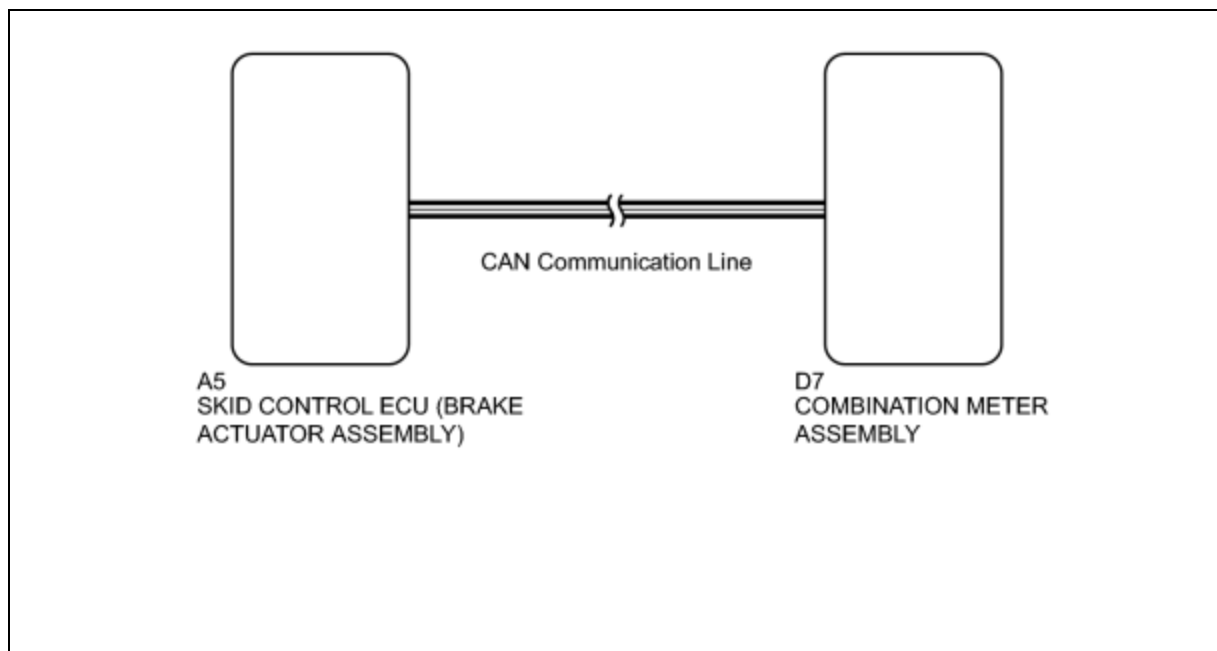
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001YNX01BX
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: Speedometer Malfunction (2013 FR-S)		

Speedometer Malfunction

DESCRIPTION

The combination meter assembly controls the speedometer in accordance with the vehicle speed signals from the skid control ECU (brake actuator assembly) through the CAN communication system.

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	CHECK CAN COMMUNICATION SYSTEM
-----------	---------------------------------------

(a) Check if CAN communication DTCs are output INFO.

Result

RESULT	PROCEED TO
DTCs are not output.	A
DTCs are output.	B

A



2.	PERFORM ACTIVE TEST USING TECHSTREAM (SPEED METER OPERATION)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Combination Meter / Active Test.
- (e) According to the display on the tester, perform the Active Test.

Combination Meter

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Speed Meter Operation	Speedometer	0, 40, 80, 120, 160, 200, 240 km/h	-

OK:

The vehicle speed displayed on the tester is approximately the same as that of the speedometer reading.

NG  **REPLACE COMBINATION METER ASSEMBLY**

OK



3.	READ VALUE USING TECHSTREAM (VEHICLE SPEED METER)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Combination Meter / Data List.
- (e) According to the display on the tester, read the Data List.

Combination Meter


TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE

Vehicle Speed Meter	Vehicle speed / Min.: 0 (0) Max.: 255 (158)	Approximately same as actual vehicle speed (when vehicle is being driven)	Unit km/h (mph)
---------------------	---	---	--------------------

OK:

The vehicle speed displayed on the tester is approximately the same as the actual vehicle speed.

NOTICE:


Determine whether the value displayed on the tester is within the acceptable range by referring to the reference values described in "On-Vehicle Inspection"  .

NG  **REPLACE COMBINATION METER ASSEMBLY**

OK



4.	CHECK VEHICLE STABILITY CONTROL SYSTEM
-----------	---

(a) Check if the vehicle stability control system outputs DTCs  .

Result

RESULT	PROCEED TO
DTCs are not output.	A
DTCs are output.	B

B  **GO TO VEHICLE STABILITY CONTROL SYSTEM**

A



5.	READ VALUE USING TECHSTREAM (VEHICLE SPEED)
-----------	--

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Chassis / ABS/VSC/TRAC / Data List.

(e) According to the display on the tester, read the Data List.


Combination Meter

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Vehicle Speed	Vehicle speed / Min.: 0 (0) Max.: 326.4 (202.8)	Approximately same as actual vehicle speed (when vehicle is being driven)	Unit km/h (mph)

OK:

The vehicle speed displayed on the tester is approximately the same as the actual vehicle speed.

NOTICE:

Determine whether the value displayed on the tester is within the acceptable range by referring to the reference values described in "On-Vehicle Inspection" .

B ▶ **GO TO VEHICLE STABILITY CONTROL SYSTEM**

A



6.	REPLACE COMBINATION METER ASSEMBLY
-----------	---

(a) Replace the combination meter assembly with a new or a normal one .

OK:

The operation of the speedometer returns to normal.

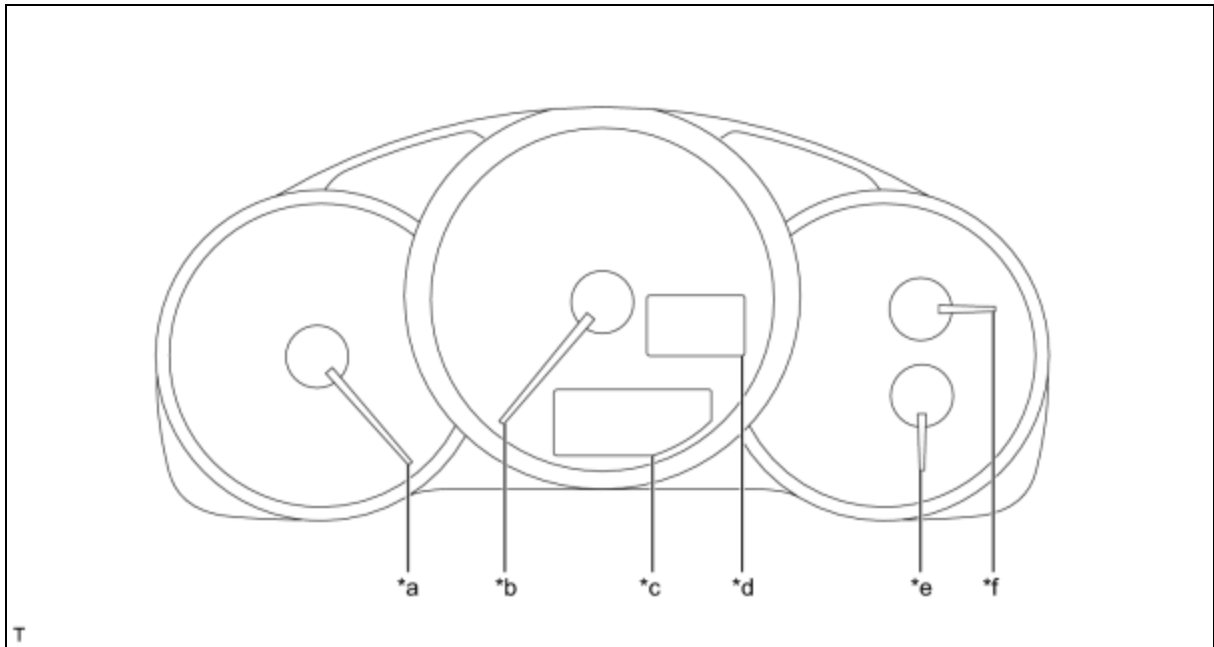
NG ▶ **REPLACE SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY)**

OK ▶ **END**

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001F8N01HX
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

SYSTEM DESCRIPTION

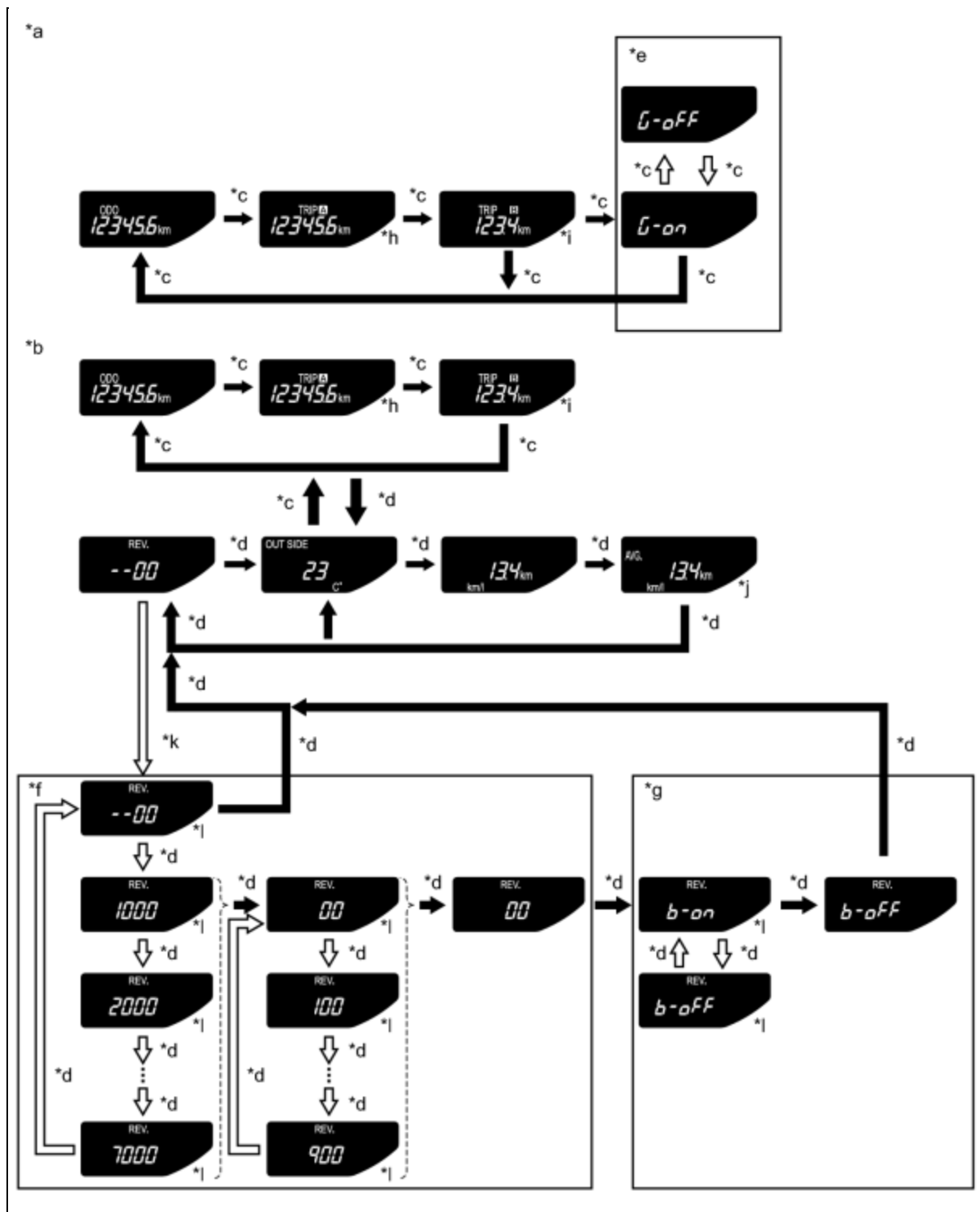
1. OUTLINE OF COMBINATION METER SUB-ASSEMBLY



Text in Illustration



*a	Speedometer	*b	Tachometer
*c	Multi-information display	*d	Digital speedometer
*e	Engine coolant temperature receiver gauge	*f	Fuel receiver gauge

2. MULTI - INFORMATION DISPLAY FLOW CHART

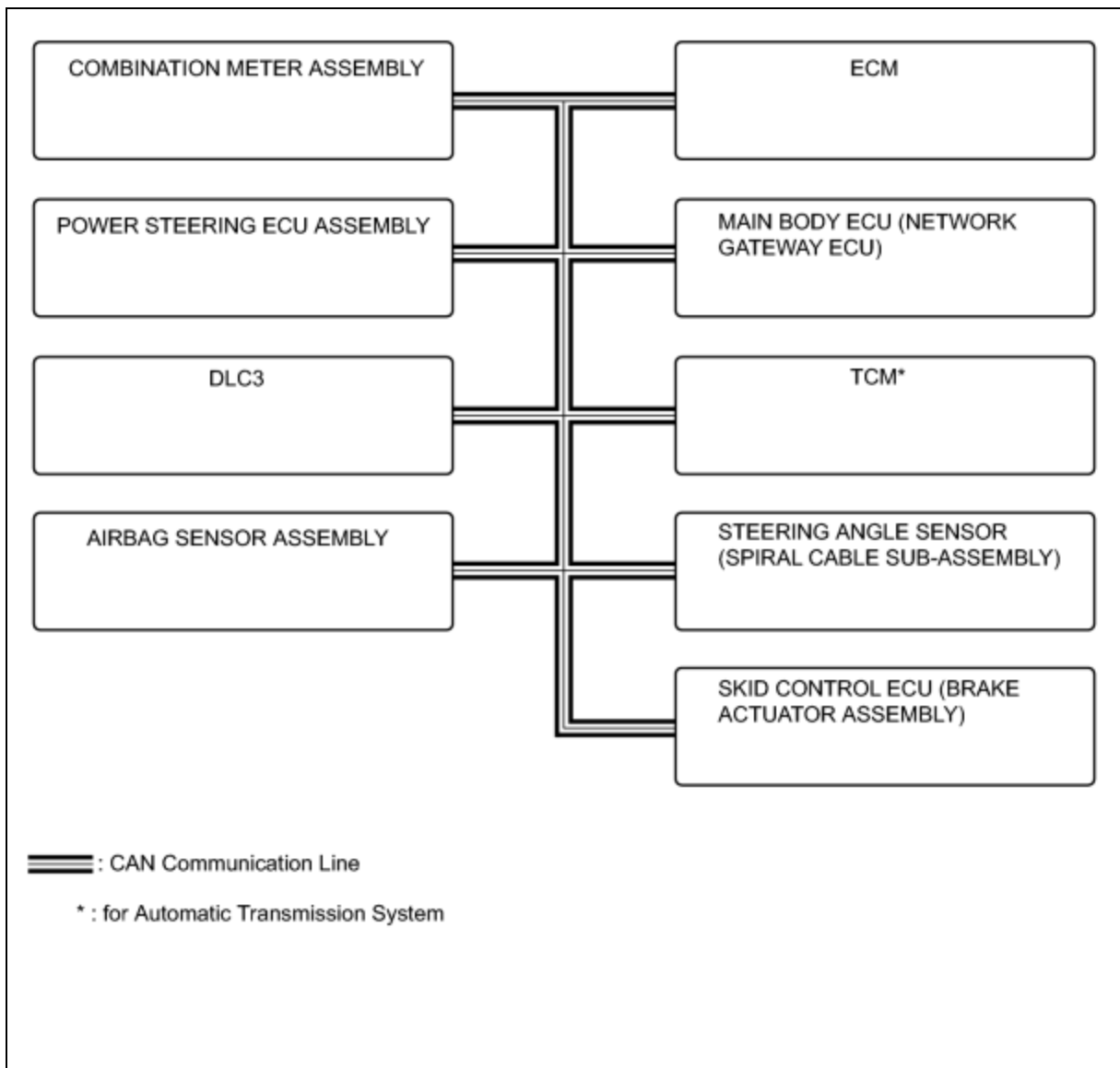


Text in Illustration

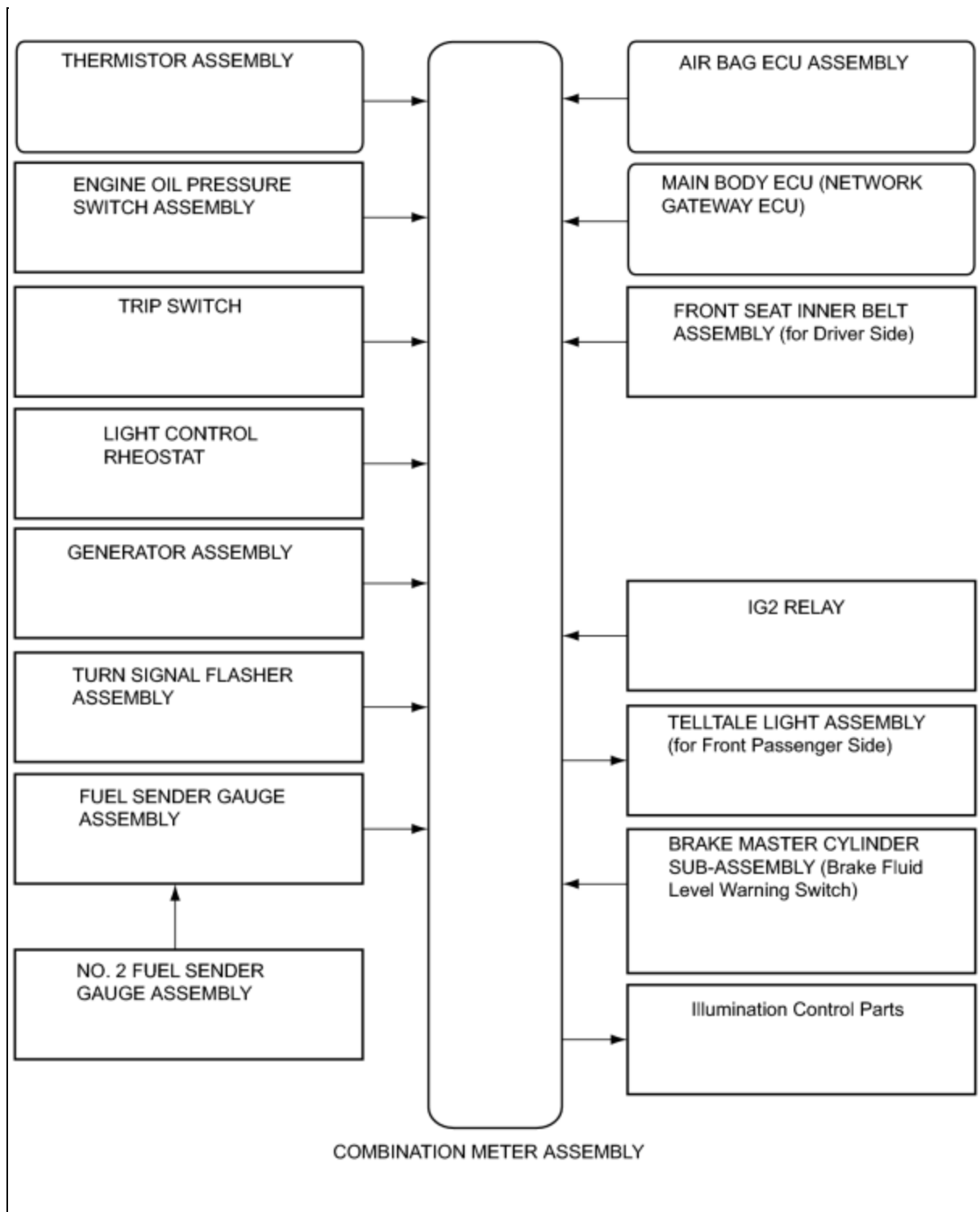
*a	Screen transition while the ignition switch is off	*b	Screen transition while the ignition switch is ON
*c	ODO/TRIP switch	*d	DISP switch
*e	MT shift display setting (for manual transmission system)	*f	RPM setting
*g	Buzzer sound ON/OFF setting	*h	Long pressing the "ODO/TRIP" switch resets the trip meter A to 0.0
	Long pressing the "ODO/TRIP" switch		Long pressing the "DISP" switch resets the

*i	resets the trip meter B to 0.0	*j	average fuel consumption to 0.0
*k	Pressing the "DISP" switch when vehicle speed is 0 km/h	*l	The "REV." display blinks
	Short press		Long press

3. CAN SIGNAL



4. DIRECT LINE SIGNAL



5. METER GAUGE AND WARNING INDICATOR

Meter/Gauge

ITEM	SIGNAL DESCRIPTION
Speedometer	Indicates the vehicle speed based on signals received from the skid control ECU (brake actuator assembly) and the gauge needle operates (CAN).
Tachometer	Indicates the engine speed based on signals from ECM and the gauge needle operates (CAN).
	Indicates the fuel level in accordance with signals received from fuel sender

Fuel Gauge	gauge assembly and the gauge needle operates (Direct line).
Engine coolant temperature gauge	The combination meter assembly receives an engine coolant temperature signal from the ECM and the gauge needle operates (CAN).

Warning/Indicator

ITEM	SIGNAL DESCRIPTION
TURN	Receives turn signal from turn signal flasher assembly (Direct line).
SET*1	Receives cruise control switch signal from the ECM (CAN).
CRUISE (green)*1	Receives cruise control switch signal from the ECM (CAN).
CRUISE (yellow)*1	Receives cruise control switch signal from the ECM (CAN).
DOOR	Open door indicator illuminates when receiving signal from main body ECU (network gateway ECU) (CAN).
HI BEAM	Receives high beam signal from main body ECU (network gateway ECU) (CAN).
TPMS	Receives TPMS signal from main body ECU (network gateway ECU) (CAN).
SECURITY	Receives security signal from main body ECU (network gateway ECU) (CAN).
REV*2	Receives engine speed signal from the ECM (CAN).
SLIP	Receives VSC control signal or malfunction signal from brake actuator assembly (skid control ECU) (CAN).
ABS	Receives malfunction signal from brake actuator assembly (skid control ECU) (CAN).
D SEAT BELT	Receives driver seat belt warning signal (unfastened) from main body ECU (network gateway ECU) (Direct line).
CHARGE	Receives malfunction signal from generator assembly (Direct line).
OIL PRESSURE	Receives engine oil pressure warning signal from engine oil pressure switch assembly (Direct line).
MIL	Receives malfunction check engine warning signal from ECM (CAN).
SPORT*3	Receives sport indicator signal from TCM (CAN).
SNOW*3	Receives snow indicator signal from TCM (CAN).
AT OIL TEMP*3	Receives malfunction signal from TCM (CAN).
BRAKE	<ul style="list-style-type: none"> Receives brake fluid level warning signal from brake level switch (Direct line). Receives parking brake switch signal from main body ECU (network gateway ECU) (CAN). Receives malfunction signal from brake actuator assembly (skid control ECU) (CAN).
TRAC OFF	Receives TRAC control off signal from brake actuator assembly (skid control ECU) (CAN).
VSC OFF	Receives VSC control off signal from brake actuator assembly (skid control ECU)

	(CAN).
VSC SPORT	Receives VSC sport signal from brake actuator assembly (skid control ECU) (CAN).
AIRBAG	Receives malfunction signal from airbag sensor assembly (CAN).
EPS	Receives malfunction signal from power steering ECU assembly (CAN).
LOW FUEL	Receives low fuel signal from fuel sender gauge assembly (Direct line).

*1: w/ Cruise Control System

*2: w/ Digital Speedometer

*3: for Automatic Transmission System

Buzzer

ITEM	SIGNAL DESCRIPTION
SEAT BELT (driver seat belt)	Buzzer ON: When ignition switch is ON, driver seat belt is unfastened, and vehicle speed is 20 km/h (12.4 mph) or more.
EPS	Buzzer ON: Receives malfunction signal from the power steering ECU assembly.
KEY REMINDER	Buzzer ON: Receives signal from main body ECU (network gateway ECU).
IMMOBILISER	Buzzer ON: Receives signal from main body ECU (network gateway ECU).
SPORTS SHIFT REJECT*1	Buzzer ON: Receives signal from the ECM.
REV*2	Buzzer ON: Receives engine speed signal from the ECM.
LIGHT REMINDER	Buzzer ON: When ignition switch is off, receives signal from main body ECU (network gateway ECU).

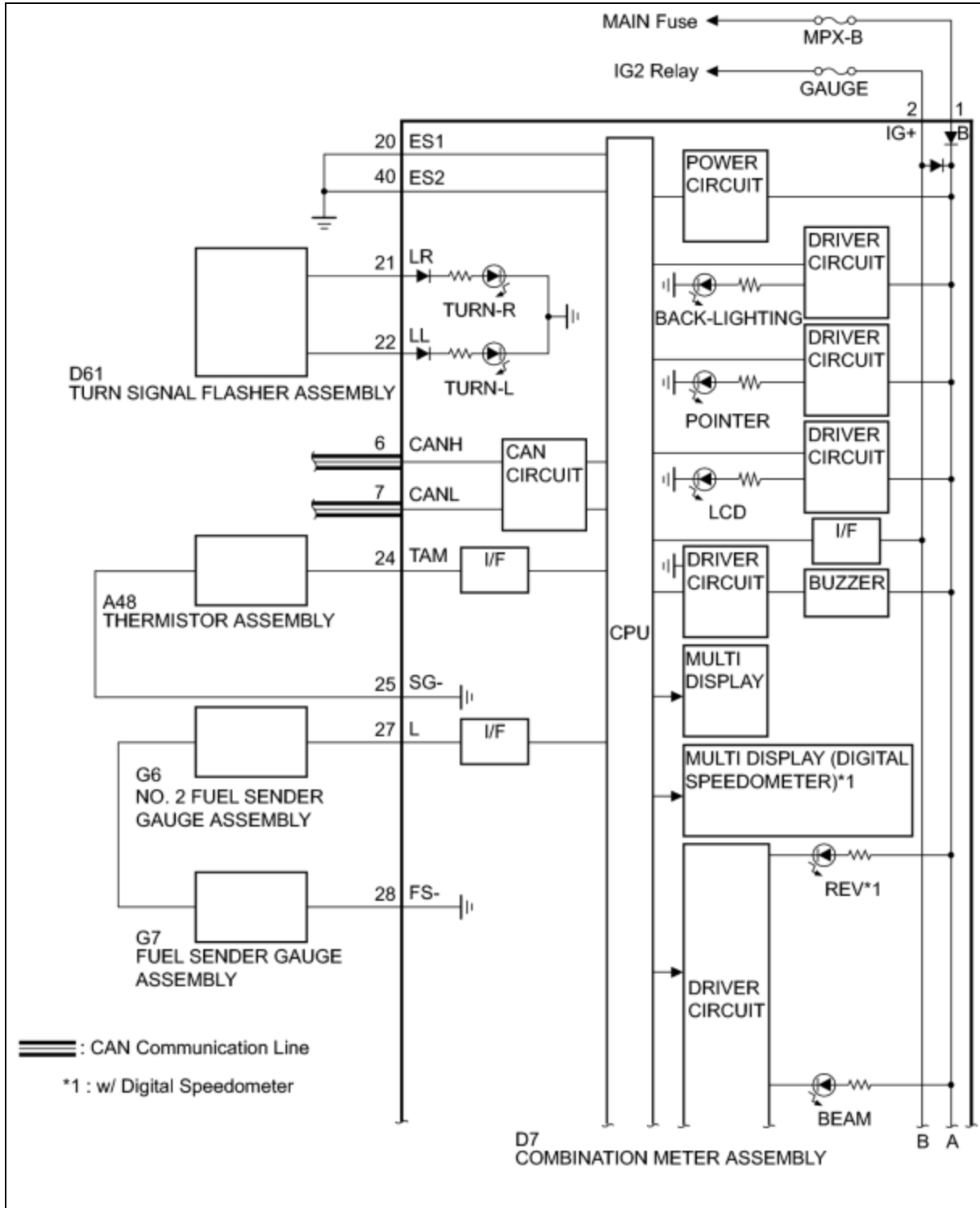
*1: for Automatic Transmission System

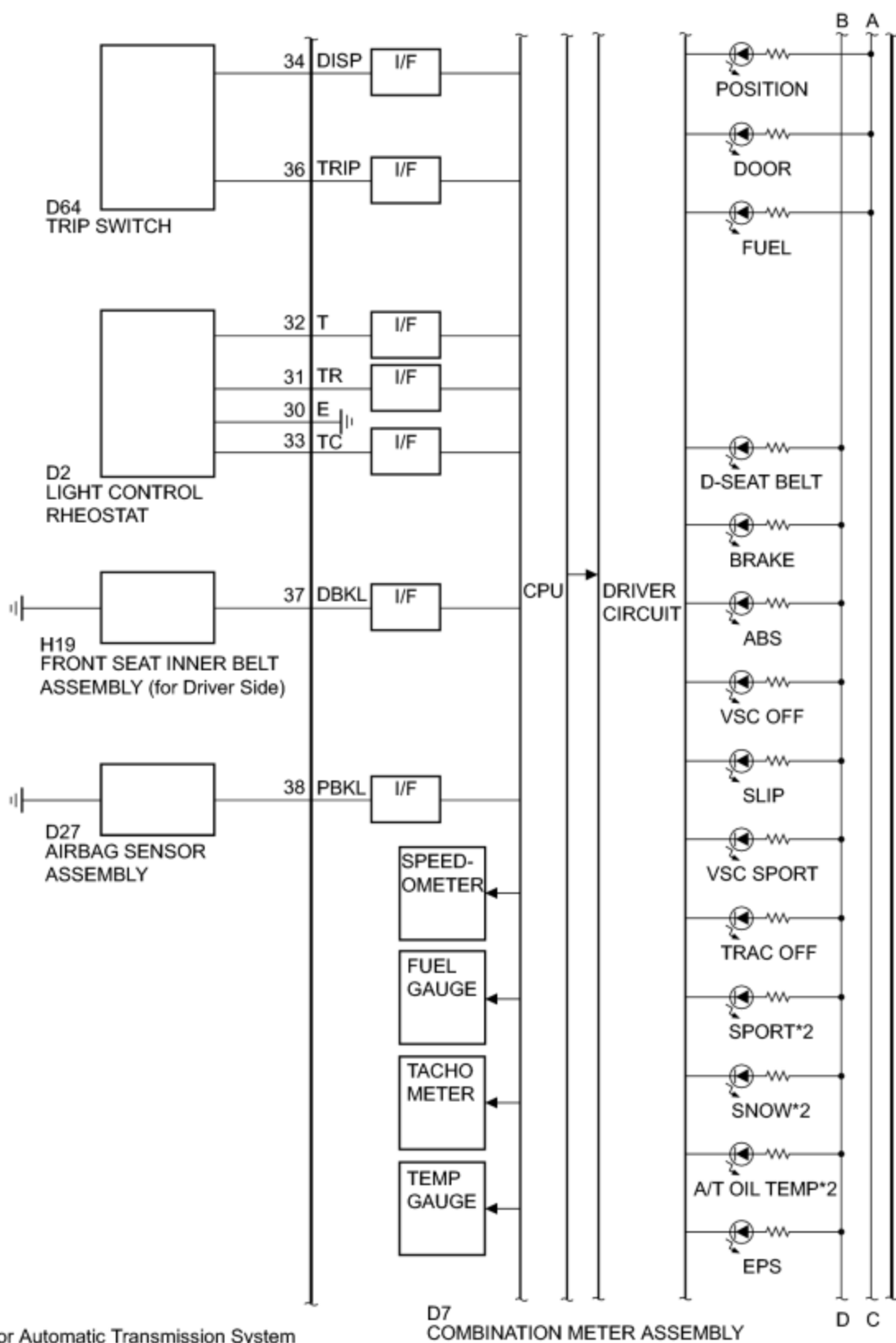
*2: w/ Digital Speedometer



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001F8P015X
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

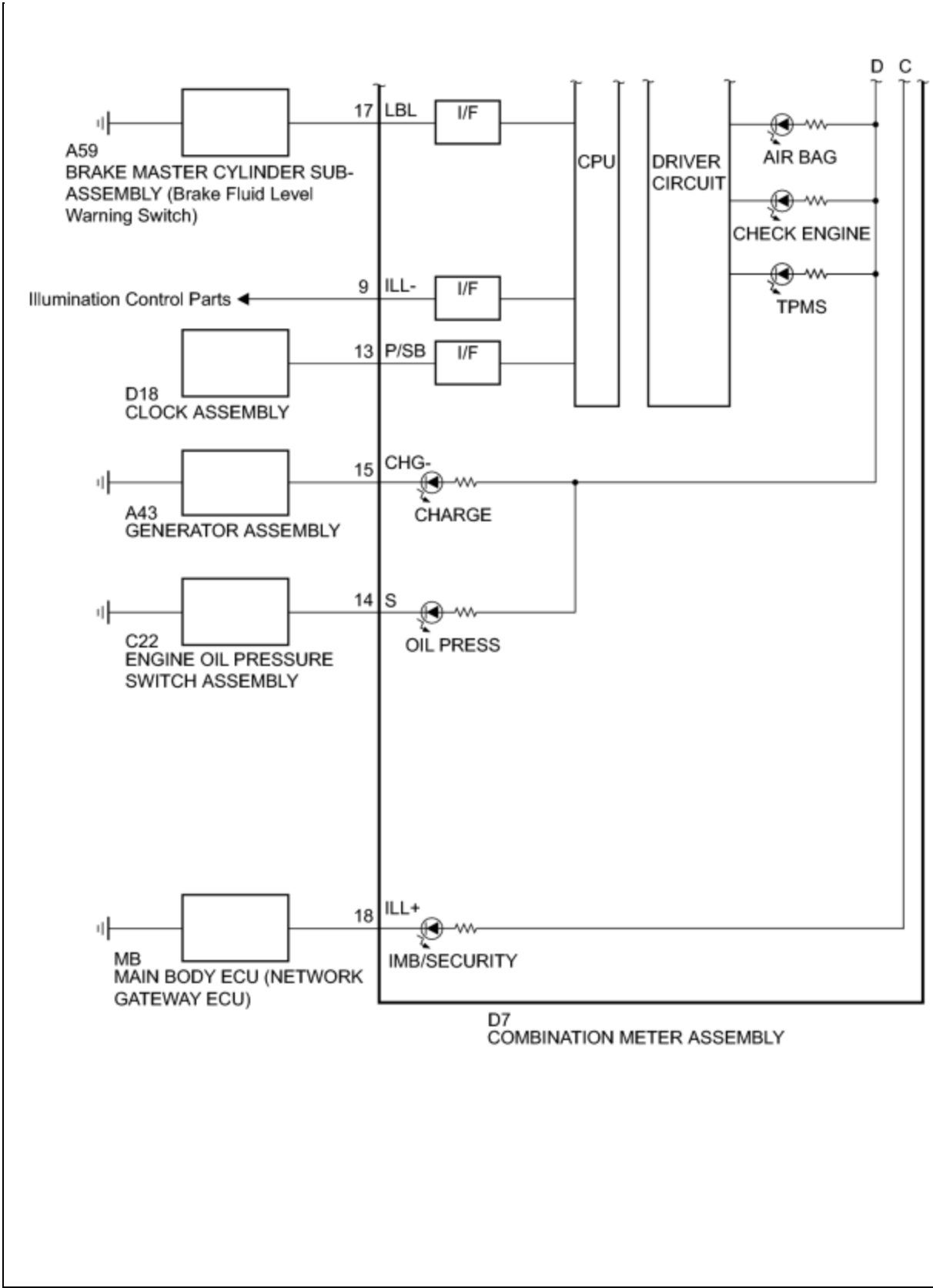
SYSTEM DIAGRAM





*2 : for Automatic Transmission System

D7 COMBINATION METER ASSEMBLY



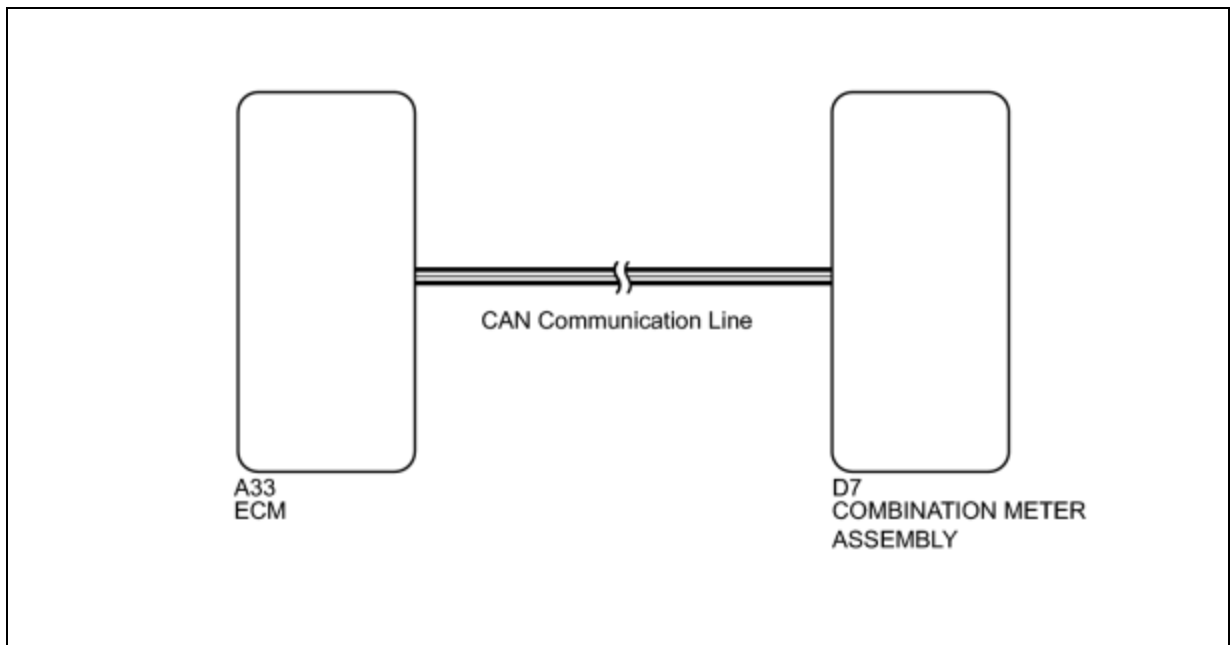
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001YNY01SX
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: Tachometer Malfunction (2013 FR-S)		

Tachometer Malfunction

DESCRIPTION

The combination meter assembly controls the tachometer in accordance with the engine speed signals from the ECM through the CAN communication system.

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	CHECK CAN COMMUNICATION SYSTEM
-----------	---------------------------------------

(a) Check if CAN communication DTCs are output INFO .

Result

RESULT	PROCEED TO
DTCs are not output	A
DTCs are output	B

A



2.	PERFORM ACTIVE TEST USING TECHSTREAM (TACHOMETER OPERATION)
-----------	--

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Combination Meter / Active Test.
- (e) According to the display on the tester, perform the Active Test.

Combination Meter

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Tachometer Operation	Tachometer	0, 1000, 2000, 3000, , 4000, 5000, 6000, 7000 rpm	-

OK:

The engine speed displayed on the tester is approximately the same as that of the tachometer reading.

NG  **REPLACE COMBINATION METER ASSEMBLY**

OK



3.	READ VALUE USING TECHSTREAM (ENGINE RPM)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Start the engine.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Combination Meter / Data List.
- (e) According to the display on the tester, read the Data List.

Combination Meter


--	--	--	--

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Engine Rpm	Engine speed Min.: 0 Max.: 12750	Approximately same as actual engine speed (when engine is running)	Unit: rpm

OK:

The engine speed displayed on the tester is approximately the same as that displayed on the combination meter assembly.

NOTICE:

Determine whether the value displayed on the tester is within the acceptable range by referring to the reference values described in "On-Vehicle Inspection"  .

NG  **REPLACE COMBINATION METER ASSEMBLY**

OK



4.	CHECK SFI SYSTEM
-----------	-------------------------

(a) Check if the SFI system outputs DTCs  .

Result

RESULT	PROCEED TO
DTCs are not output	A
DTCs are output	B

B  **GO TO SFI SYSTEM**

A



5.	READ VALUE USING TECHSTREAM (ENGINE SPEED)
-----------	---

(a) Connect the Techstream to the DLC3.

(b) Start the engine.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine / Data List.

(e) According to the display on the tester, read the Data List.


Combination Meter

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Engine Speed	Engine speed Min.: 0 Max.: 16383.75	Approximately same as actual engine speed (when engine is running)	Unit: rpm

OK:

The engine speed displayed on the tester is approximately the same as that displayed on the combination meter assembly.

NOTICE:

Determine whether the value displayed on the tester is within the acceptable range by referring to the reference values described in "On-Vehicle Inspection" .

B  **GO TO SFI SYSTEM**

A



6.	REPLACE COMBINATION METER ASSEMBLY
-----------	---

(a) Replace the combination meter assembly with a new or a normal one .

NG  **REPLACE ECM**

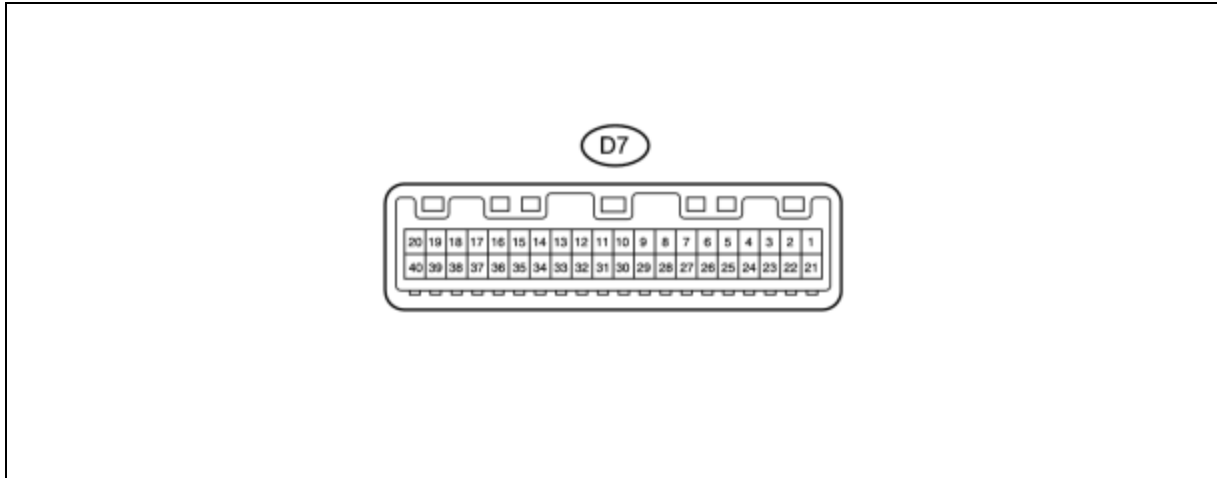
OK  **END**



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001F8F014X
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. CHECK COMBINATION METER ASSEMBLY



(a) Measure the voltage and resistance of the wire harness side connector.

TERMINALS NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
D7-1 (B) - Body ground	R-W - Body ground	Battery	Always	11 to 14 V
D7-2 (IG+) - Body ground	W-G - Body ground	Ignition switch signal	Ignition switch off → ON	Below 1 V → 11 to 14 V
D7-6 (CANH) - Body ground	BR - Body ground	CAN communication line	Ignition switch ON	Pulse generation
D7-7 (CANL) - Body ground	BR-W - Body ground	CAN communication line	Ignition switch ON	Pulse generation
D7-9 (ILL-) - Body ground	B-W - Body ground	Light control rheostat output signal	Ignition switch ON Light control rheostat all top open → all bottom open	Below 1 V → 11 to 14 V
D7-13 (P/SB) - Body ground	BR-R - Body ground	Front passenger seat inner belt output signal	Front passenger seat is occupied and its seat belt unfastened → fastened	Below 1 V → 11 to 14 V
D7-14 (S) - Body ground	LG - Body ground	Engine oil pressure signal	Engine oil pressure warning light ON → OFF	Below 1 V → 11 to 14 V

D7-15 (CHG-) - Body ground	G - Body ground	Charge warning light signal	Engine start Charge warning light ON → OFF	Below 1 V → 11 to 14 V
D7-17 (LBL) - Body ground	W-L - Body ground	Brake fluid level warning light signal	Ignition switch ON Brake fluid level warning light ON → OFF	Below 1 V → 11 to 14 V
D7-18 (ILL+) - Body ground	V - Body ground	Security warning light signal	Ignition switch ON Security warning light blink → OFF	Below 1 V ↔ 11 to 14 V → 11 to 14 V
D7-20 (ES1) - Body ground	B-Y - Body ground	Ground	Always	Below 1 Ω
D7-21 (LR) - Body ground	GR - Body ground	Right turn signal	Ignition switch ON Right turn indicator light blink → OFF	Below 1 V ↔ 11 to 14 V → 11 to 14 V
D7-22 (LL) - Body ground	W-R - Body ground	Left turn signal	Ignition switch ON Left turn indicator light blink → OFF	Below 1 V ↔ 11 to 14 V → 11 to 14 V
D7-24 (TAM) - D7-25 (SG-)	L - W	Ambient temperature sensor signal	Ignition switch ON at 25°C (77°F)	1.35 to 1.75 V
D7-27 (L) - D7-28 (FS-)	LG - L	Fuel level signal	Fuel level is FULL → EMPTY	Below 1 V → 4.5 to 9.0 V
D7-30 (E) - Body ground	L-R - Body ground	Light control rheostat ground	Always	Below 1 Ω
D7-31 (TR) - Body ground	Y - Body ground	Light control rheostat input signal	Light control rheostat all top open → all bottom open	510 Ω → 100 Ω
D7-32 (T) - Body ground	G-W - Body ground	Ignition switch signal	Ignition switch off → ON	Below 1 V → 3.6 to 4.6 V
D7-33 (TC) - Body ground	BR - Body ground	Light control rheostat signal	Light control rheostat all top open → Light control rheostat (cancel switch) ON	10 kΩ or higher → Below 1 Ω
D7-34 (DISP) - Body ground	R - Body ground	DISP switch signal	DISP switch ON → OFF	Below 1 Ω → 10 kΩ or higher
D7-36 (TRIP) - Body ground	P - Body ground	ODO/TRIP switch signal	ODO/TRIP switch ON → OFF	Below 1 Ω → 10 kΩ or higher
D7-37 (DBKL) - Body ground	R-B - Body ground	Driver seat inner belt input signal	Driver seat is seat belt unfastened → fastened	Below 1 V → 11 to 14 V
D7-38 (PBKL) - Body ground	R-G - Body ground	Airbag sensor assembly input signal	Front passenger seat is occupied and its seat belt unfastened → fastened	Below 1 V → 11 to 14 V

D7-40 (ES2) - Body ground	B-Y - Body ground	Ground	Always	Below 1 Ω
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If the result is not as specified, the combination meter assembly may have a malfunction.



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003UOJ00MX
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: U0073,U0100,U0122,U0131,U0140,U0151: Control Module Communication Bus "A" Off (2013 FR-S)		

DTC	U0073	Control Module Communication Bus "A" Off
------------	--------------	---

DTC	U0100	Lost Communication with ECM / PCM "A"
------------	--------------	--

DTC	U0122	Lost Communication with Vehicle Dynamics Control Module
------------	--------------	--

DTC	U0131	Lost Communication with Power Steering Control Module
------------	--------------	--

DTC	U0140	Lost Communication with Body Control Module
------------	--------------	--

DTC	U0151	Lost Communication with Restraints Control Module
------------	--------------	--

DESCRIPTION

The combination meter communicates with the ECM, skid control ECU (brake actuator assembly), power steering ECU assembly, main body ECU (network gateway ECU) and airbag sensor assembly via the CAN communication system.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
U0073	Lost Communication with Each ECU	CAN communication system
U0100	ECM communication error	<ul style="list-style-type: none"> • CAN communication system • ECM
U0122	Skid control ECU (brake actuator assembly) communication error	<ul style="list-style-type: none"> • CAN communication system • Skid control ECU (brake actuator assembly)
U0131	Power steering ECU assembly communication error	<ul style="list-style-type: none"> • CAN communication system • Power steering ECU assembly
U0140	Main body ECU (network gateway ECU) communication error	<ul style="list-style-type: none"> • CAN communication system • Main body ECU (network gateway ECU)

U0151	Airbag sensor assembly communication error	<ul style="list-style-type: none"> • CAN communication system • Airbag sensor assembly
-------	--	--

INSPECTION PROCEDURE

PROCEDURE

1.	CONFIRM DTC OUTPUT
-----------	---------------------------

(a) Check DTC  .

RESULT	PROCEED TO
CAN communication DTC is not output	A
CAN communication DTC is output	B

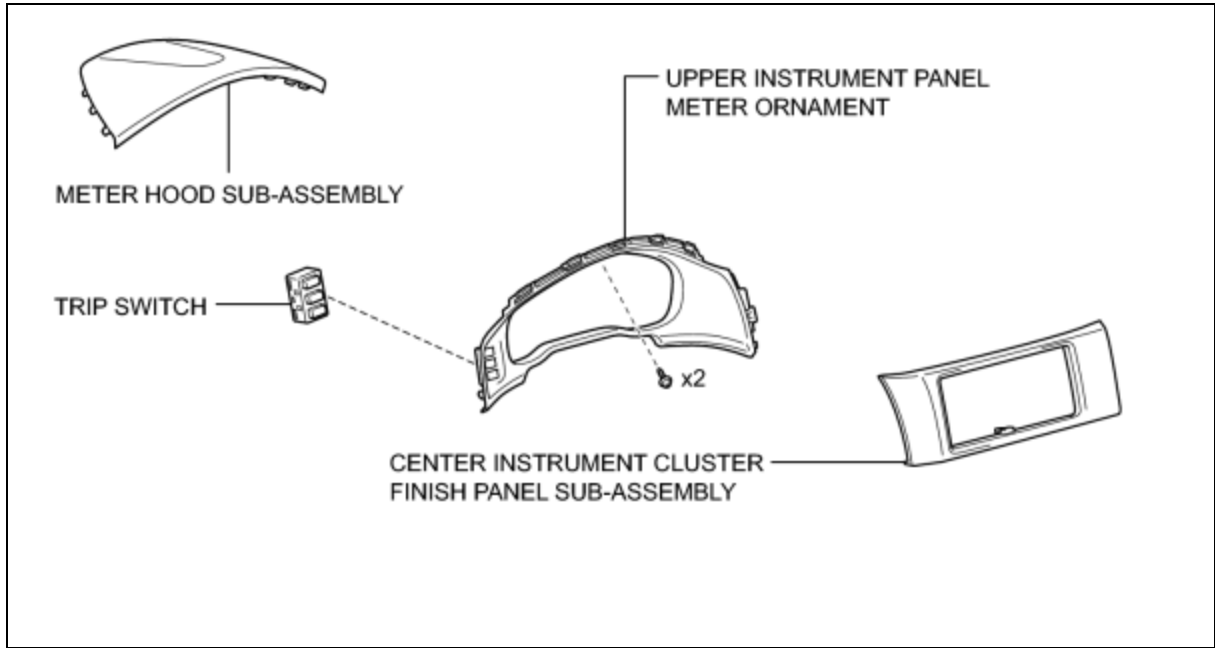
B ► **GO TO CAN COMMUNICATION SYSTEM**

A ► **USE SIMULATION METHOD TO CHECK**

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000042TF004X
Title: METER / GAUGE / DISPLAY: TRIP SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



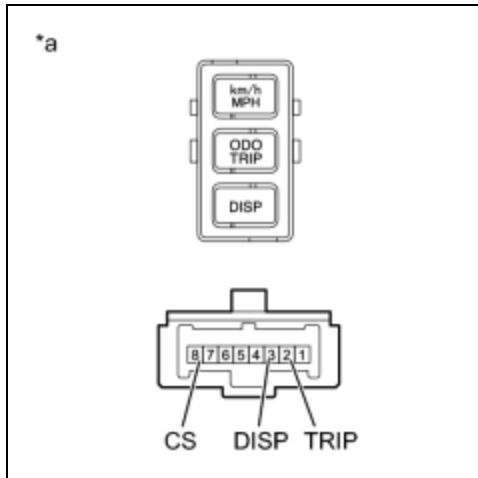
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001862038X
Title: METER / GAUGE / DISPLAY: TRIP SWITCH: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT TRIP SWITCH

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
2 (TRIP) - 1	Trip switch off	10 k Ω or higher
	Trip switch on	Below 1 Ω
3 (DISP) - 1	Display switch off	10 k Ω or higher
	Display switch on	Below 1 Ω
8 (CS) - 1	Unit switch off	10 k Ω or higher
	Unit switch on	Below 1 Ω

Text in Illustration

*a	Component without harness connected (Trip Switch)
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Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000042TE004X
Title: METER / GAUGE / DISPLAY: TRIP SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL TRIP SWITCH

(a) Engage the 2 claws to install the trip switch.

2. INSTALL UPPER INSTRUMENT PANEL METER ORNAMENT [INFO](#)

3. INSTALL METER HOOD SUB-ASSEMBLY [INFO](#)

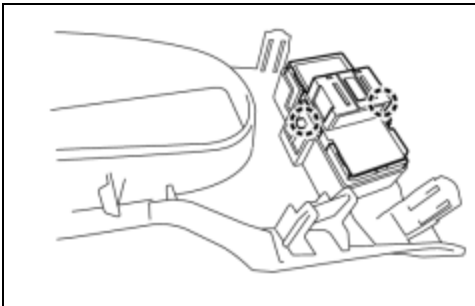
4. INSTALL CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY [INFO](#)



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000042TG004X
Title: METER / GAUGE / DISPLAY: TRIP SWITCH: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY [INFO](#)
2. REMOVE METER HOOD SUB-ASSEMBLY [INFO](#)
3. REMOVE UPPER INSTRUMENT PANEL METER ORNAMENT [INFO](#)
4. REMOVE TRIP SWITCH

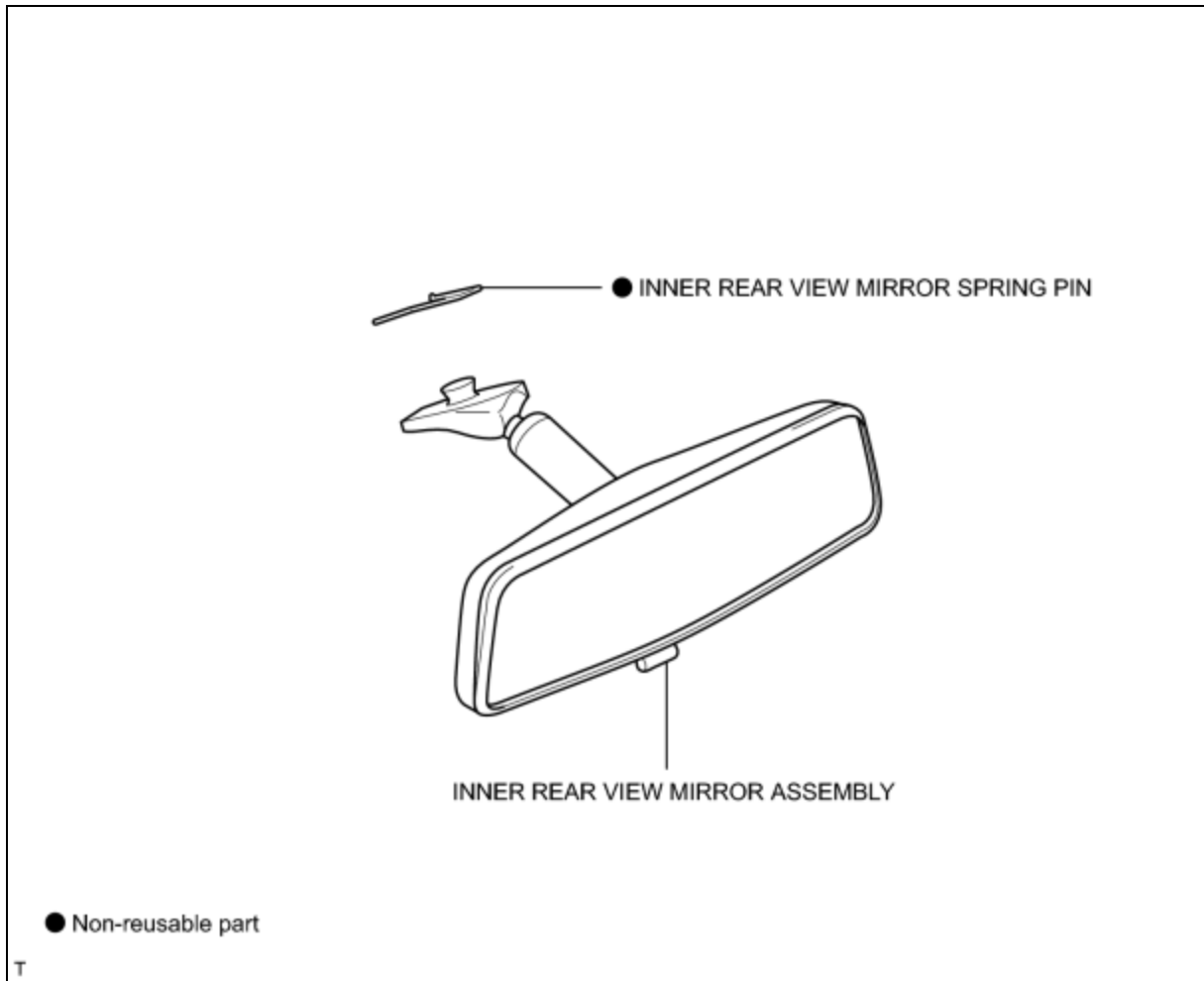


(a) Disengage the 2 claws to remove the trip switch.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000411L003X
Title: MIRROR (INT): INNER REAR VIEW MIRROR: COMPONENTS (2013 FR-S)		

COMPONENTS

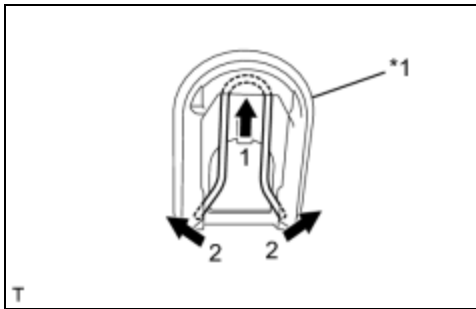
ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000411K003X
Title: MIRROR (INT): INNER REAR VIEW MIRROR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL INNER REAR VIEW MIRROR SPRING PIN

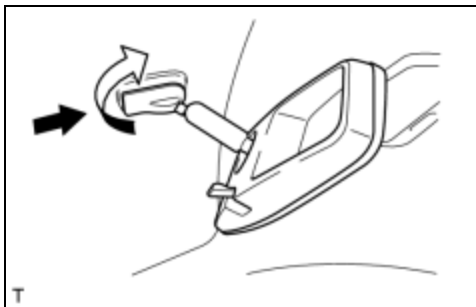


- (a) Install the new inner rear view mirror spring pin to the mirror base in the order as shown in the illustration.

Text in illustration

*1	Mirror base
----	-------------

2. INSTALL INNER REAR VIEW MIRROR ASSEMBLY



- (a) Slide and install the inner rear view mirror as shown in the illustration.

- (b) Turn the inner rear view mirror assembly in the direction indicated by the arrow in the illustration.

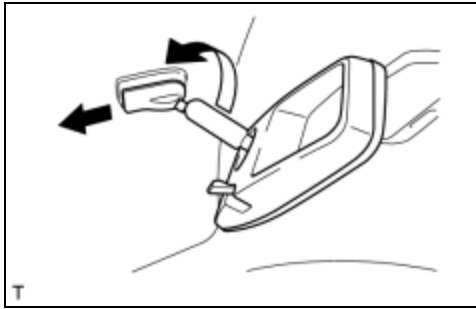
HINT:

Turning direction can be either right or left.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000411M003X
Title: MIRROR (INT): INNER REAR VIEW MIRROR: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE INNER REAR VIEW MIRROR ASSEMBLY



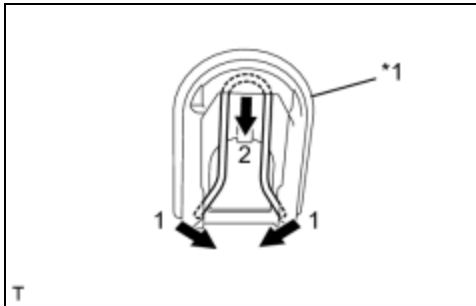
- (a) Turn the inner rear view mirror assembly in the direction indicated by the arrow in the illustration.

HINT:

Turning direction can be either right or left.

- (b) Slide the inner rear view mirror assembly forward and remove it.

2. REMOVE INNER REAR VIEW MIRROR SPRING PIN



- (a) Remove the inner rear view mirror spring pin from mirror base in the order as shown in the illustration.

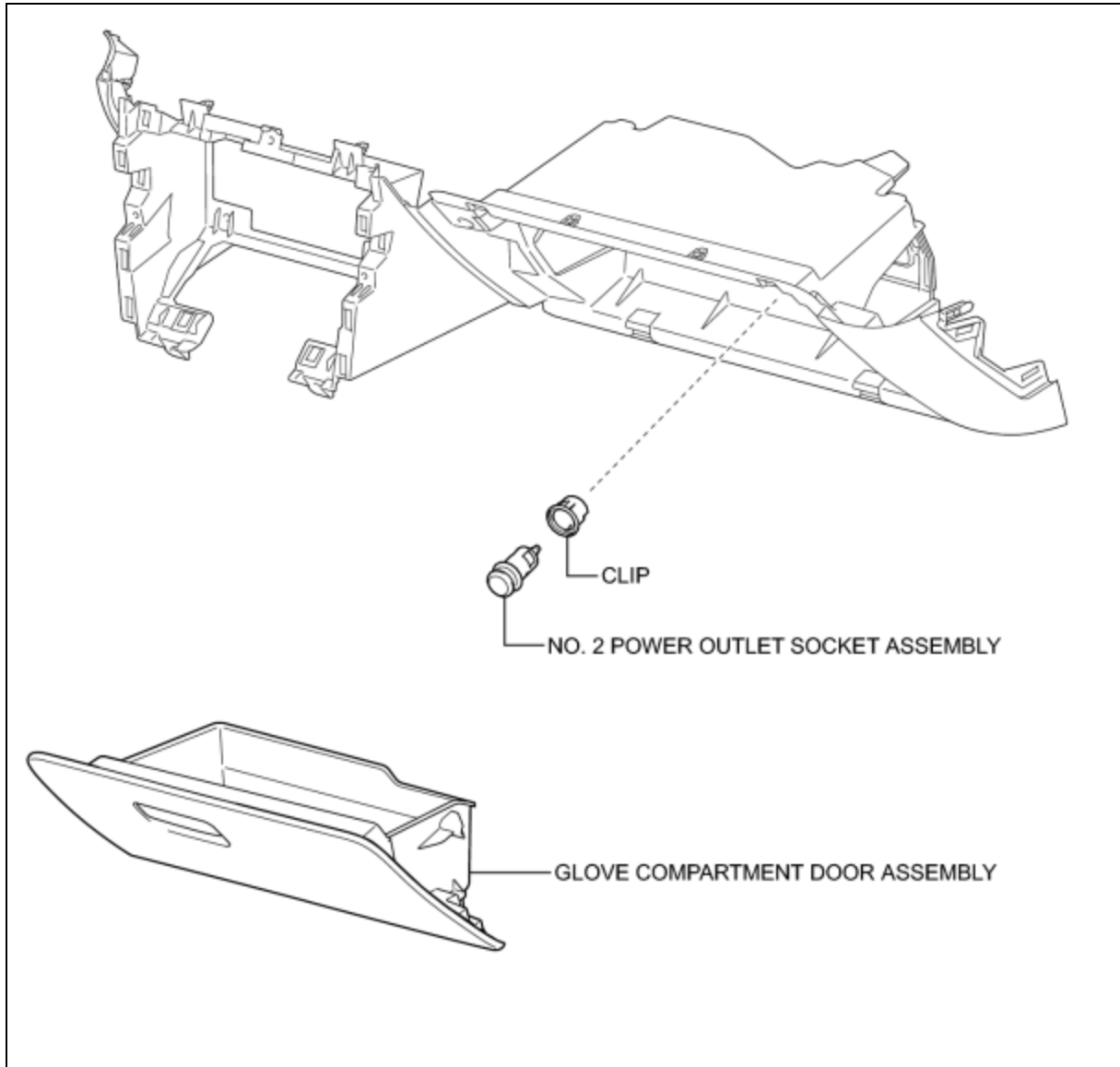
Text in illustration

*1	Mirror base
----	-------------

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001OZA01JX
Title: POWER OUTLETS (INT): POWER OUTLET SOCKET: COMPONENTS (2013 FR-S)		

COMPONENTS

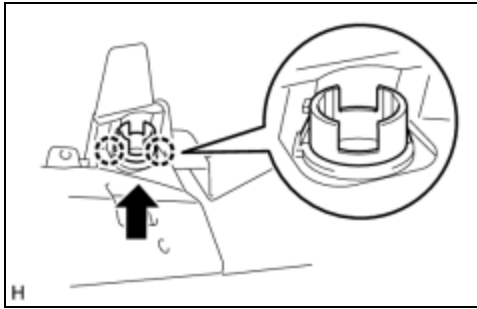
ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000S6O00VX
Title: POWER OUTLETS (INT): POWER OUTLET SOCKET: INSTALLATION (2013 FR-S)		

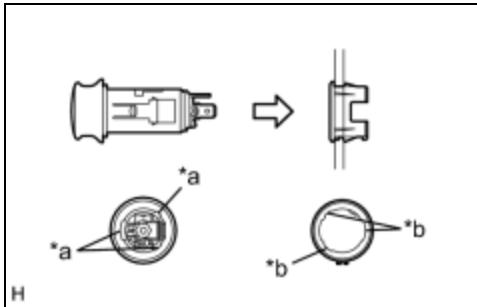
INSTALLATION

1. INSTALL CLIP



(a) Engage the 2 claws to install the clip.

2. INSTALL NO. 2 POWER OUTLET SOCKET ASSEMBLY



(a) Align the grooves in the clip with the No. 2 power outlet socket assembly ribs, and then attach the No. 2 power outlet socket assembly as shown in the illustration.

Text in Illustration

*a	Rib
*b	Groove

3. INSTALL GLOVE COMPARTMENT DOOR ASSEMBLY

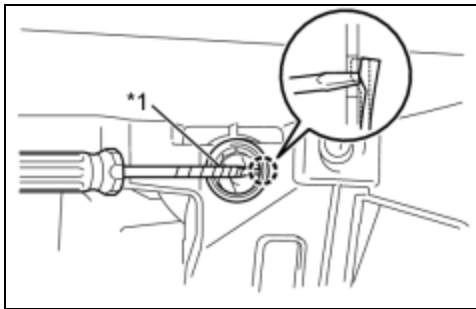
INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000S6Q00VX
Title: POWER OUTLETS (INT): POWER OUTLET SOCKET: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE GLOVE COMPARTMENT DOOR ASSEMBLY INFO

2. REMOVE NO. 2 POWER OUTLET SOCKET ASSEMBLY



- (a) Using a screw driver with its tip wrapped in protective tape, remove the No. 2 power outlet socket assembly while pressing the inside claw.

Text in Illustration

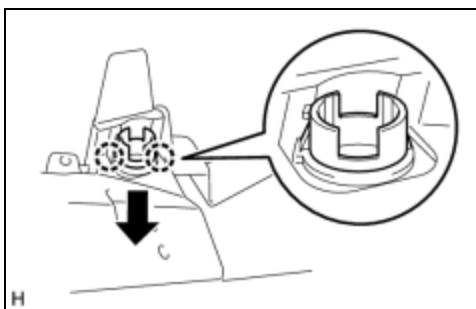
*1	Protective Tape
----	-----------------

- (b) Disconnect the connector and remove the No. 2 power outlet socket assembly.

HINT:

If it is difficult to remove the No. 2 power outlet socket assembly, remove the lower instrument panel sub-assembly first and disengage the claw in the back.

3. REMOVE CLIP



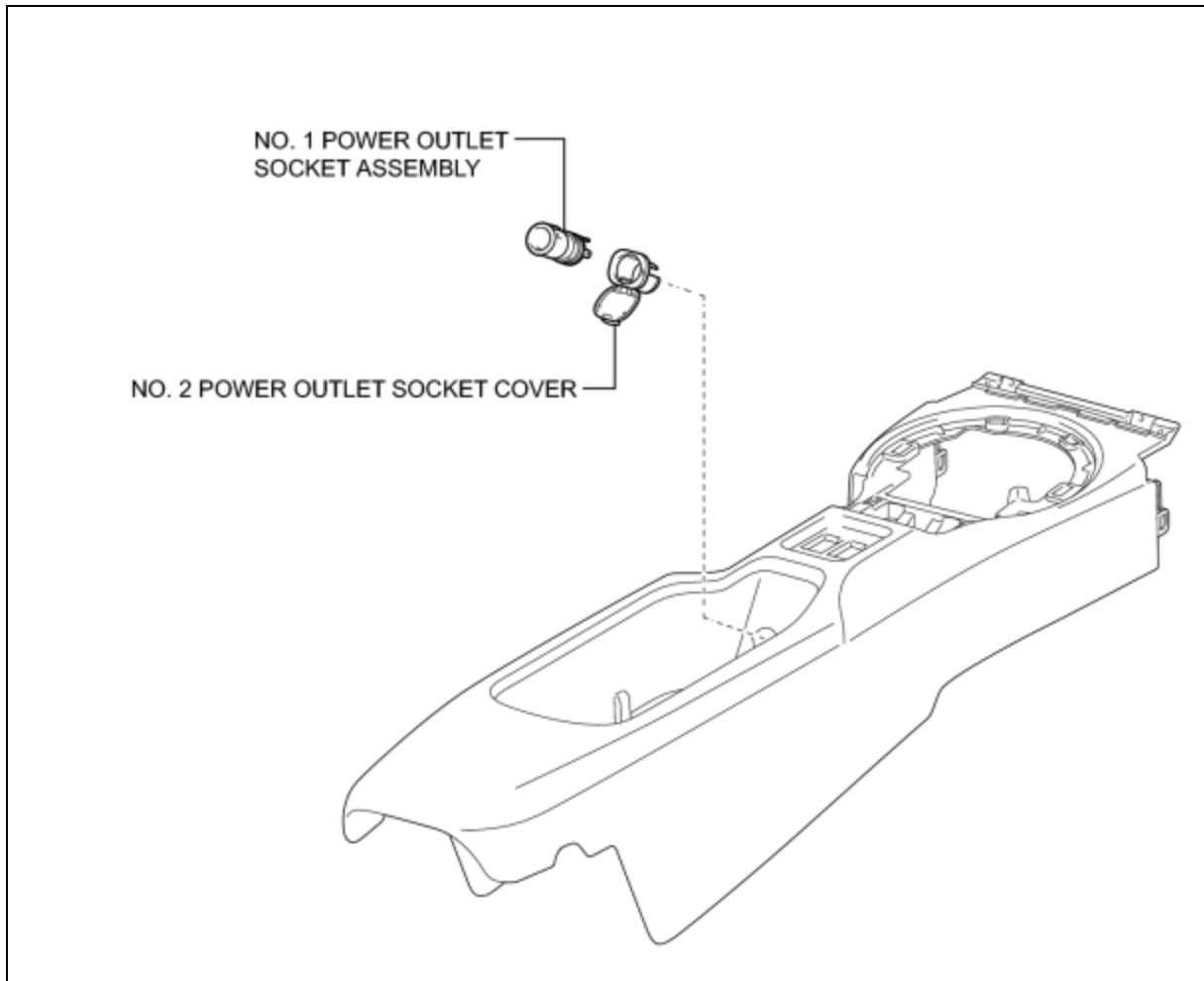
- (a) Disengage the 2 claws and remove the clip.



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000041P3007X
Title: POWER OUTLETS (INT): REAR POWER OUTLET SOCKET: COMPONENTS (2013 FR-S)		

COMPONENTS

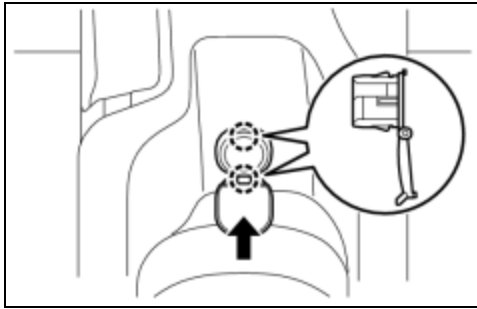
ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000023QZ027X
Title: POWER OUTLETS (INT): REAR POWER OUTLET SOCKET: INSTALLATION (2013 FR-S)		

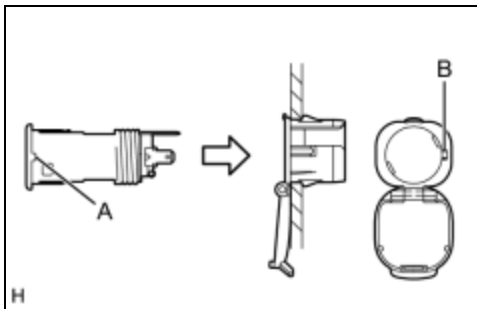
INSTALLATION

1. INSTALL NO. 2 POWER OUTLET SOCKET COVER



(a) Engage the 2 claws to install the No. 2 power outlet socket cover.

2. INSTALL NO. 1 POWER OUTLET SOCKET ASSEMBLY



(a) Align the No. 1 power outlet socket assembly A section with the No. 2 power outlet socket cover B section, as shown in the illustration.

(b) Engage the claw to install the No. 1 power outlet socket assembly.

3. INSTALL CONSOLE BOX ASSEMBLY

INFO

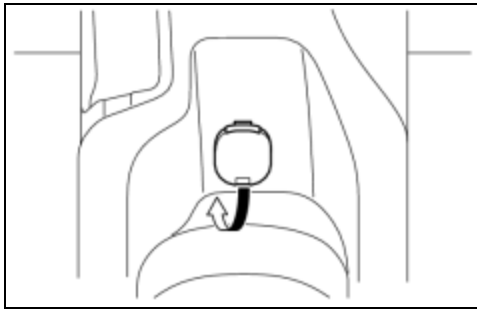
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000023QZ028X
Title: POWER OUTLETS (INT): REAR POWER OUTLET SOCKET: REMOVAL (2013 FR-S)		

REMOVAL

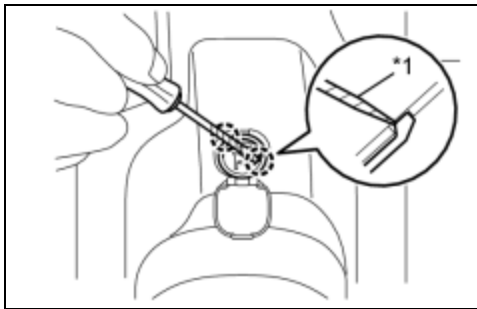
1. REMOVE CONSOLE BOX ASSEMBLY

INFO

2. REMOVE NO. 1 POWER OUTLET SOCKET ASSEMBLY



(a) Open the cap of the No. 2 power outlet socket cover.



(b) Using a screwdriver, disengage the claw and remove the No. 1 power outlet socket assembly.

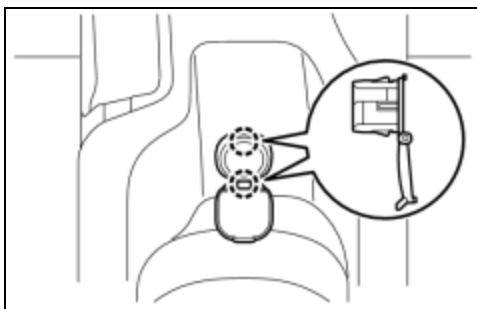
Text in Illustration

*1	Protective Tape
----	-----------------

HINT:

Tape the screwdriver tip before use.

3. REMOVE NO. 2 POWER OUTLET SOCKET COVER

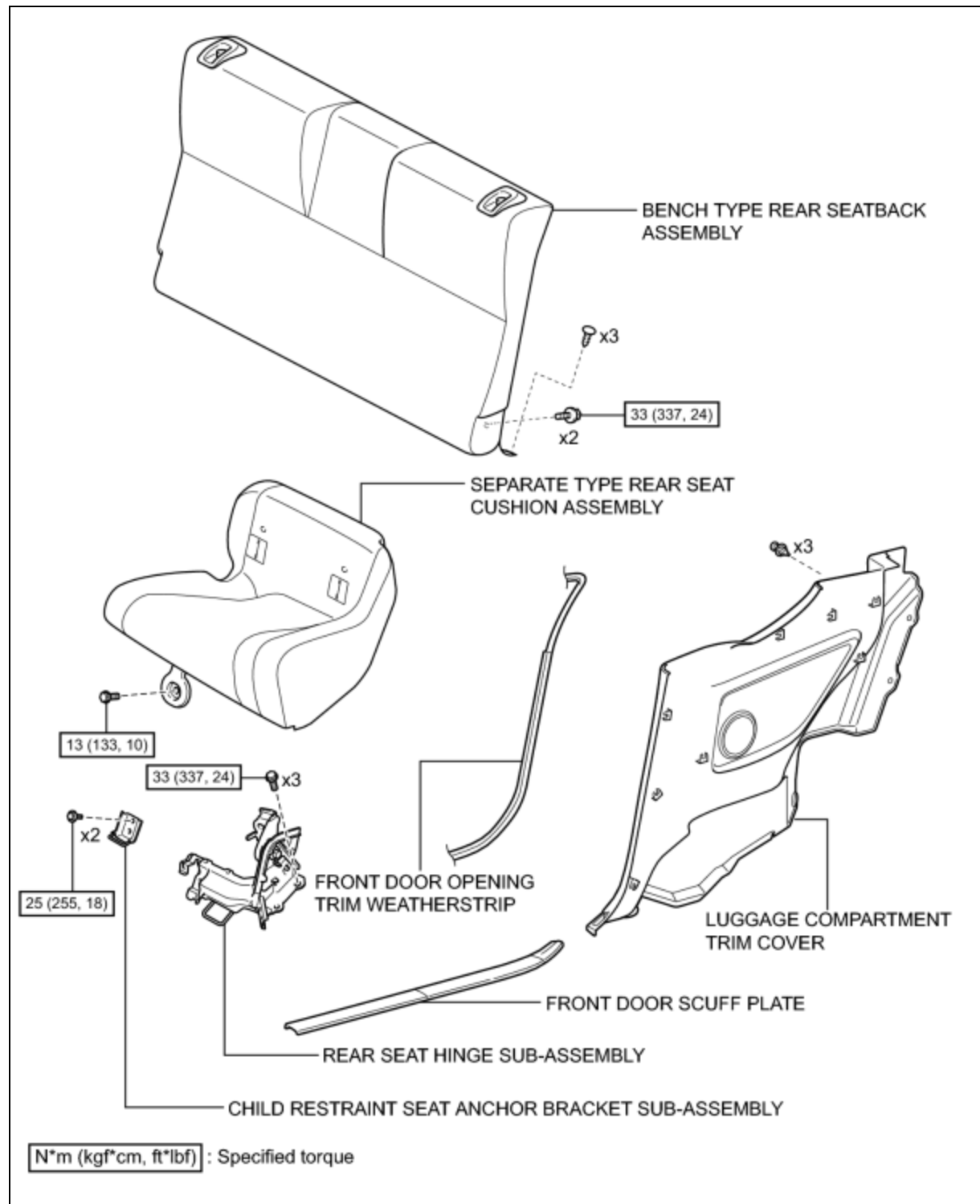


(a) Disengage the 2 claws and remove the No. 2 power outlet socket cover.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004S24006X
Title: SEAT BELT: CHILD RESTRAINT SEAT ANCHOR BRACKET: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004S23007X
Title: SEAT BELT: CHILD RESTRAINT SEAT ANCHOR BRACKET: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL REAR SEAT HINGE SUB-ASSEMBLY

- (a) Install the rear seat hinge sub-assembly with the 3 bolts.

Torque: 33 N·m (337 kgf·cm, 24ft·lbf)

2. INSTALL LUGGAGE COMPARTMENT TRIM COVER [INFO](#)

3. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP [INFO](#)

4. INSTALL FRONT DOOR SCUFF PLATE [INFO](#)

5. INSTALL CHILD RESTRAINT SEAT ANCHOR BRACKET SUB-ASSEMBLY

- (a) Install the child restraint seat anchor bracket sub-assembly with the 2 bolts.

Torque: 25 N·m (255 kgf·cm, 18ft·lbf)

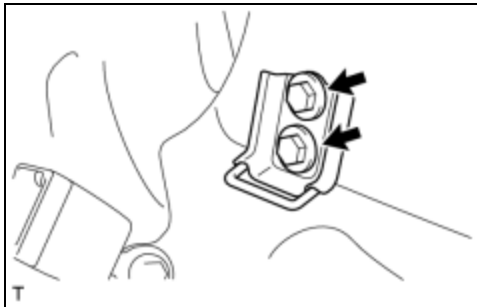
6. INSTALL BENCH TYPE REAR SEATBACK ASSEMBLY [INFO](#)

7. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY [INFO](#)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004S25007X
Title: SEAT BELT: CHILD RESTRAINT SEAT ANCHOR BRACKET: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY [INFO](#)
2. REMOVE BENCH TYPE REAR SEATBACK ASSEMBLY [INFO](#)
3. REMOVE CHILD RESTRAINT SEAT ANCHOR BRACKET SUB-ASSEMBLY



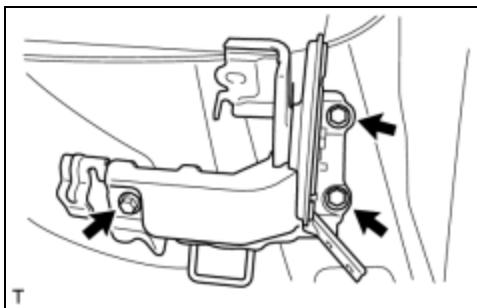
(a) Remove the 2 bolts and child restraint seat anchor bracket sub-assembly.

4. REMOVE FRONT DOOR SCUFF PLATE [INFO](#)
5. DISCONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP

HINT:

Disconnect the front door opening trim weatherstrip to the extent that allows the removal of the luggage compartment trim cover.

6. REMOVE LUGGAGE COMPARTMENT TRIM COVER [INFO](#)
7. REMOVE REAR SEAT HINGE SUB-ASSEMBLY

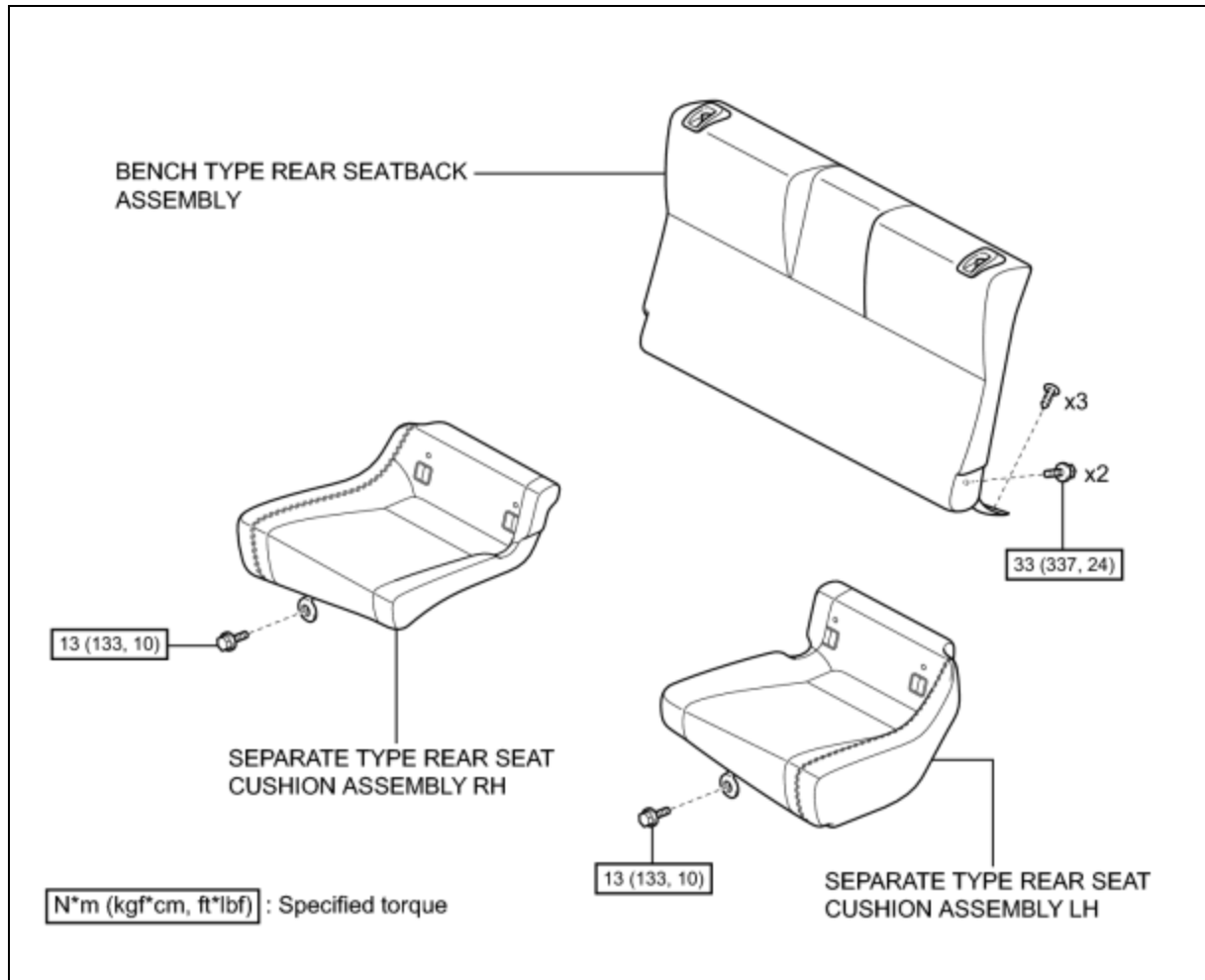


(a) Remove the 3 bolts and rear seat hinge sub-assembly.

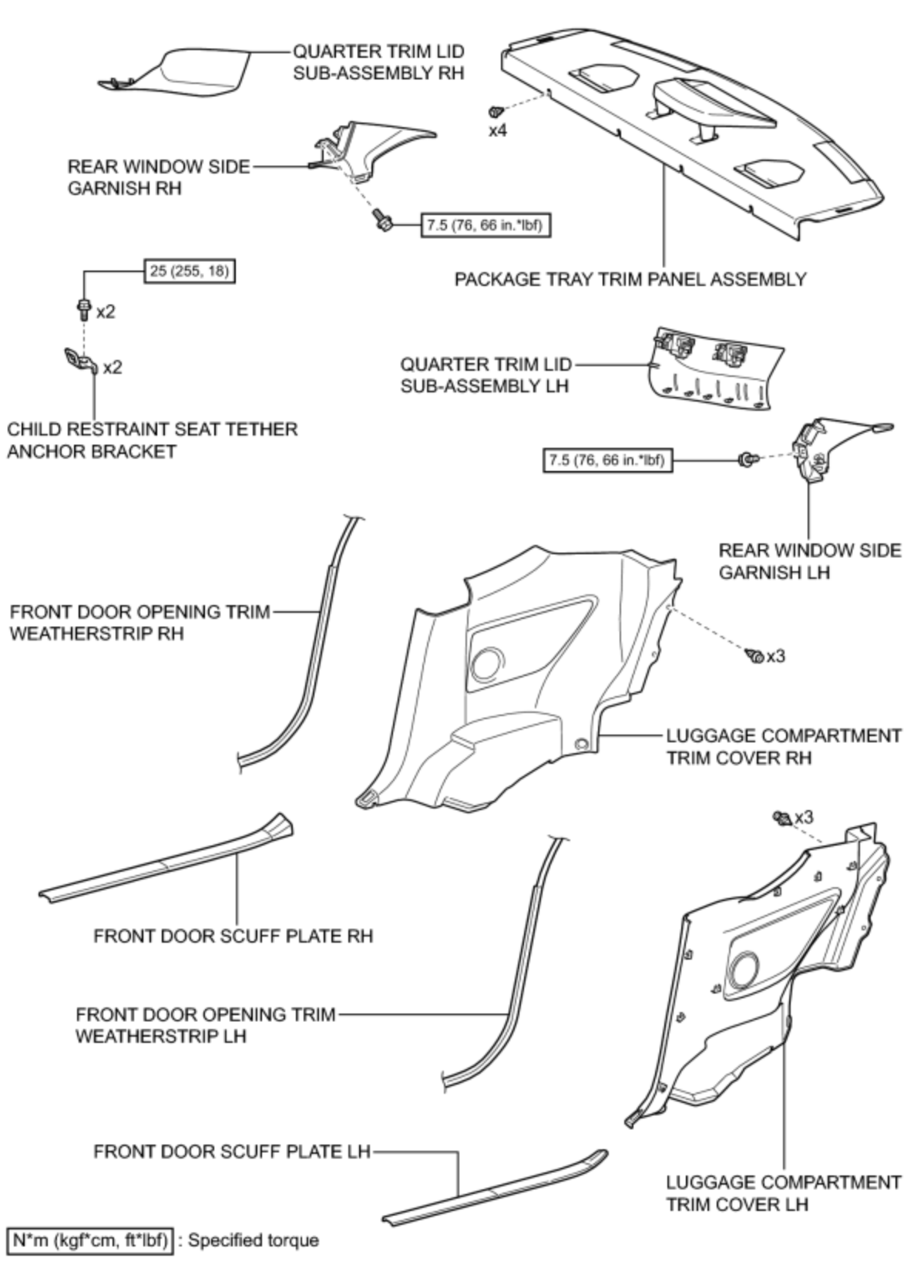
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004S21009X
Title: SEAT BELT: CHILD RESTRAINT SEAT TETHER ANCHOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004S20009X
Title: SEAT BELT: CHILD RESTRAINT SEAT TETHER ANCHOR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL CHILD RESTRAINT SEAT TETHER ANCHOR BRACKET

(a) Engage the hook and install the child restraint seat tether anchor bracket with the bolt.

Torque: 25 N·m (255 kgf·cm, 18ft·lbf)

HINT:

Use the same procedure for the 2 child restraint seat tether anchor brackets.

2. INSTALL PACKAGE TRAY TRIM PANEL ASSEMBLY INFO

3. INSTALL REAR WINDOW SIDE GARNISH LH INFO

4. REMOVE REAR WINDOW SIDE GARNISH RH

HINT:

Use the same procedure as for the LH side.

5. INSTALL QUARTER TRIM LID SUB-ASSEMBLY LH INFO

6. INSTALL QUARTER TRIM LID SUB-ASSEMBLY RH

HINT:

Use the same procedure as for the LH side.

7. INSTALL LUGGAGE COMPARTMENT TRIM COVER LH INFO

8. INSTALL LUGGAGE COMPARTMENT TRIM COVER RH

HINT:

Use the same procedure as for the LH side.

9. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP LH INFO

10. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP RH

HINT:

Use the same procedure as for the LH side.

11. INSTALL FRONT DOOR SCUFF PLATE LH INFO

12. INSTALL FRONT DOOR SCUFF PLATE RH

HINT:

Use the same procedure as for the LH side.

13. INSTALL BENCH TYPE REAR SEATBACK ASSEMBLY

14. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY LH INFO

15. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY RH

HINT:

Use the same procedure as for the LH side.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004S22009X
Title: SEAT BELT: CHILD RESTRAINT SEAT TETHER ANCHOR: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY LH INFO

2. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY RH

HINT:

Use the same procedure as for the LH side.

3. REMOVE BENCH TYPE REAR SEATBACK ASSEMBLY INFO

4. REMOVE FRONT DOOR SCUFF PLATE LH INFO

5. REMOVE FRONT DOOR SCUFF PLATE RH

HINT:

Use the same procedure as for the LH side.

6. DISCONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP LH

HINT:

Disconnect the front door opening trim weatherstrip to the extent that allows the removal of the luggage compartment trim cover.

7. DISCONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP RH

HINT:

Use the same procedure as for the LH side.

8. REMOVE LUGGAGE COMPARTMENT TRIM COVER LH INFO

9. REMOVE LUGGAGE COMPARTMENT TRIM COVER RH

HINT:

Use the same procedure as for the LH side.

10. REMOVE QUARTER TRIM LID SUB-ASSEMBLY LH INFO

11. REMOVE QUARTER TRIM LID SUB-ASSEMBLY RH

HINT:

Use the same procedure as for the LH side.

12. REMOVE REAR WINDOW SIDE GARNISH LH INFO

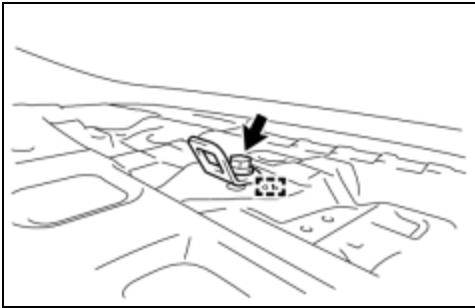
13. REMOVE REAR WINDOW SIDE GARNISH RH

HINT:

Use the same procedure as for the LH side.

14. REMOVE PACKAGE TRAY TRIM PANEL ASSEMBLY INFO

15. REMOVE CHILD RESTRAINT SEAT TETHER ANCHOR BRACKET



- (a) Remove the bolt and disengage the hook to remove the child restraint seat tether anchor bracket.

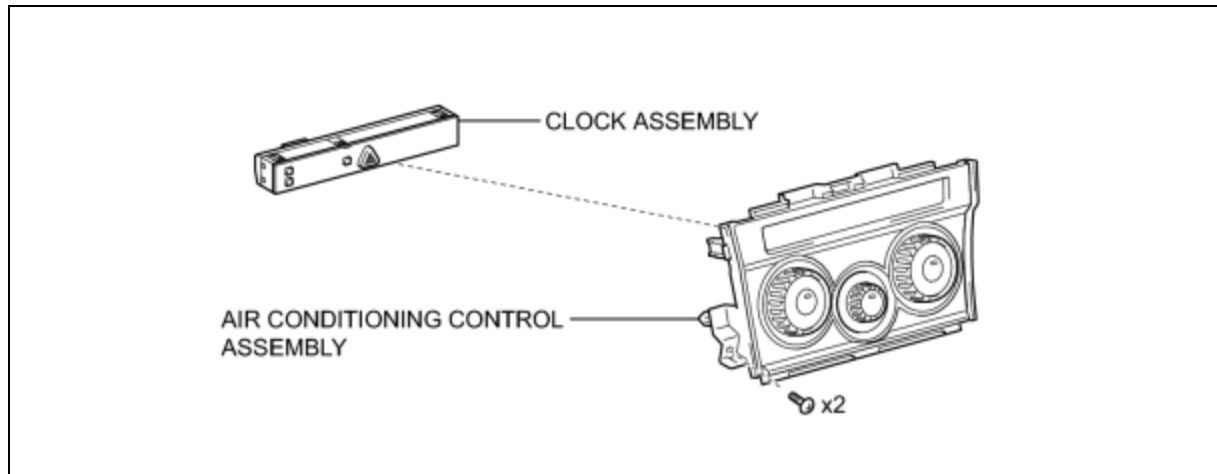
HINT:

Use the same procedure for the 2 child restraint seat tether anchor brackets.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003WZK007X
Title: SEAT BELT: FRONT PASSENGER SEAT BELT WARNING LIGHT: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



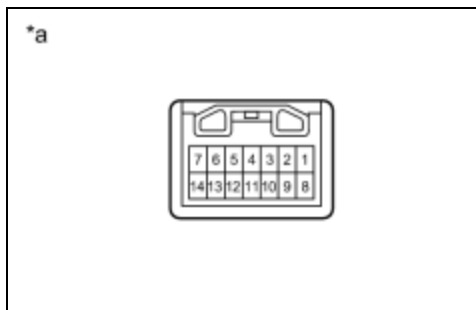
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003WZJ00JX
Title: SEAT BELT: FRONT PASSENGER SEAT BELT WARNING LIGHT: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT CLOCK ASSEMBLY

(a) Apply battery voltage to the connector and check the LED illumination condition.

OK:



CONDITION	SPECIFIED CONDITION
Battery positive (+) → 10 Battery negative (-) → 6	Front passenger side seat belt warning light comes on

Text in Illustration

*a	Component without harness connected (Clock Assembly)
----	---

If the result is not as specified, replace the clock assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003WZI00DX
Title: SEAT BELT: FRONT PASSENGER SEAT BELT WARNING LIGHT: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL CLOCK ASSEMBLY

- (a) Attach the 4 claws to install the clock assembly.

2. INSTALL AIR CONDITIONING CONTROL ASSEMBLY

INFO



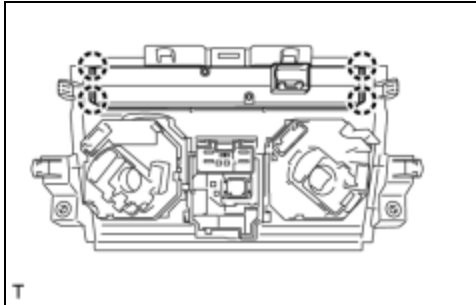
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003WZL00DX
Title: SEAT BELT: FRONT PASSENGER SEAT BELT WARNING LIGHT: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE AIR CONDITIONING CONTROL ASSEMBLY

INFO

2. REMOVE CLOCK ASSEMBLY

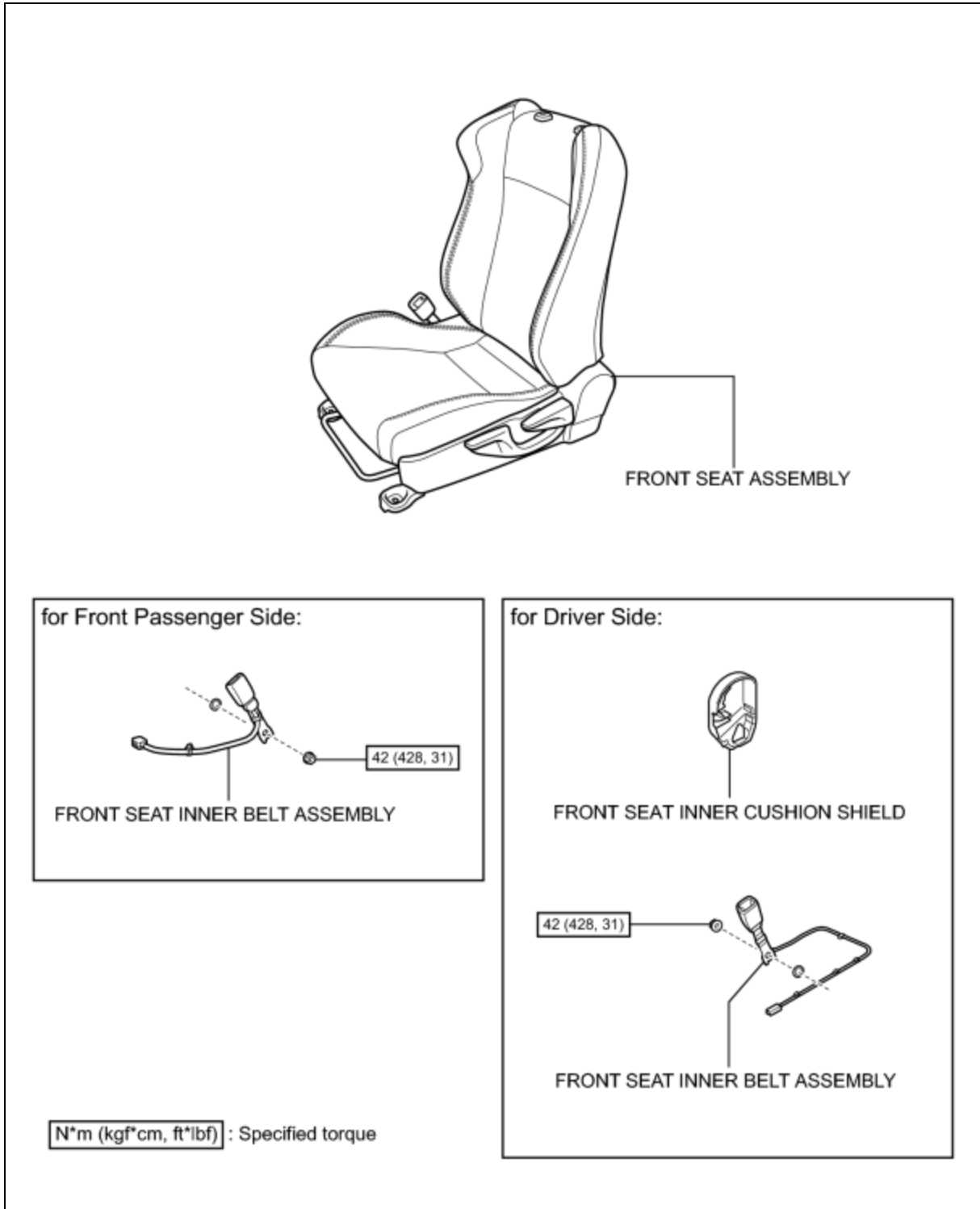


(a) Detach the 4 claws and remove the clock assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004SCP002X
Title: SEAT BELT: FRONT SEAT INNER BELT ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



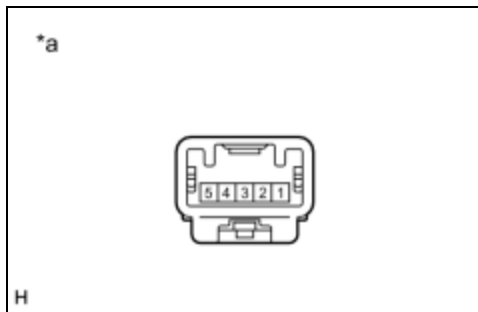
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000129306PX
Title: SEAT BELT: FRONT SEAT INNER BELT ASSEMBLY: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT FRONT SEAT INNER BELT ASSEMBLY (for Driver Side)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	Driver seat belt unfastened	Below 1 Ω
1 - 2	Driver seat belt fastened	10 k Ω or higher

Text in Illustration

*a	Component without harness connected (Front Seat Inner Belt Assembly (for Driver Side))
----	---

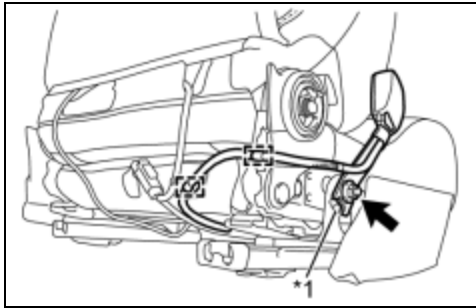
If the result is not as specified, replace the front seat inner belt assembly (for Driver Side).



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004SCO002X
Title: SEAT BELT: FRONT SEAT INNER BELT ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL FRONT SEAT INNER BELT ASSEMBLY (for Driver Side)



- (a) Install the front seat inner belt assembly with the nut and washer.

Torque: 42 N·m (428 kgf·cm, 31ft·lbf)

NOTICE:

Do not allow the anchor part of the front seat inner belt assembly to overlap the protruding part of the separate type front seat cushion spring assembly.

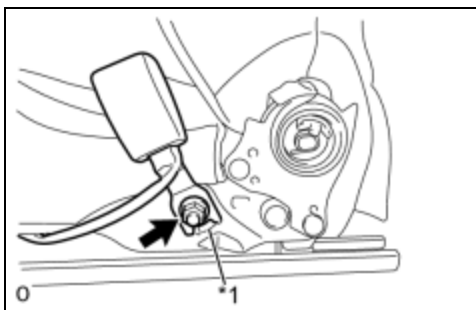
Text in Illustration

*1	Protruding Part
----	-----------------

- (b) Engage the 2 clamps.
(c) Engage the claw and 3 clamps under the front seat assembly.
(d) Connect the rubber band of the separate type front seatback cover.

2. INSTALL FRONT SEAT INNER CUSHION SHIELD (for Driver Side) INFO

3. INSTALL FRONT SEAT INNER BELT ASSEMBLY (for Front Passenger Side)



- (a) Install the front seat inner belt assembly with the nut and washer.

Torque: 42 N·m (428 kgf·cm, 31ft·lbf)

NOTICE:

Do not allow the anchor part of the front seat inner belt assembly to overlap the protruding part of the separate type front seat cushion spring assembly.

Text in Illustration

*1	Protruding Part
----	-----------------

- (b) Engage the clamp.
(c) Connect the connector.

4. INSTALL FRONT SEAT ASSEMBLY

INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004SCQ002X
Title: SEAT BELT: FRONT SEAT INNER BELT ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

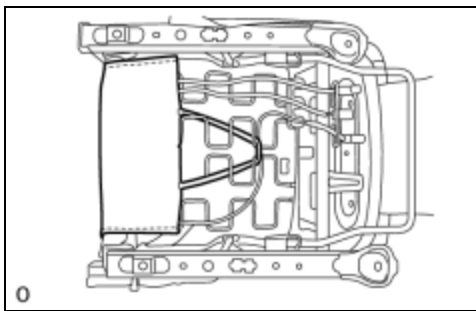
1. REMOVE FRONT SEAT ASSEMBLY

INFO

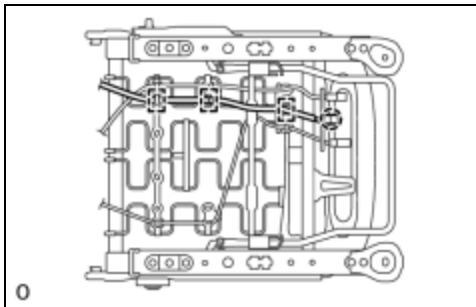
2. REMOVE FRONT SEAT INNER CUSHION SHIELD (for Driver Side)

INFO

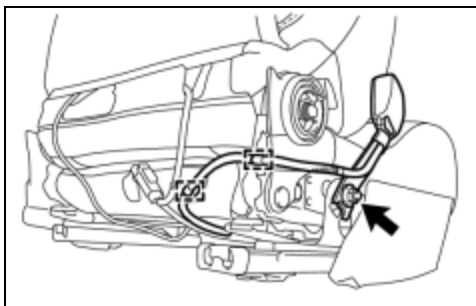
3. REMOVE FRONT SEAT INNER BELT ASSEMBLY (for Driver Side)



(a) Disconnect the rubber band of the separate type front seatback cover.



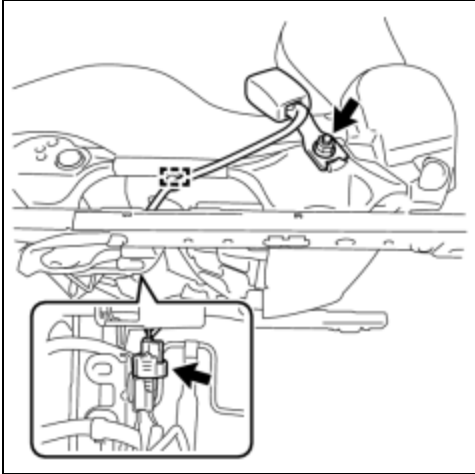
(b) Disengage the claw and the 3 clamps under the front seat assembly.



(c) Disengage the 2 clamps.

(d) Remove the nut, washer and front seat inner belt assembly.

4. REMOVE FRONT SEAT INNER BELT ASSEMBLY (for Front Passenger Side)



(a) Disconnect the connector.

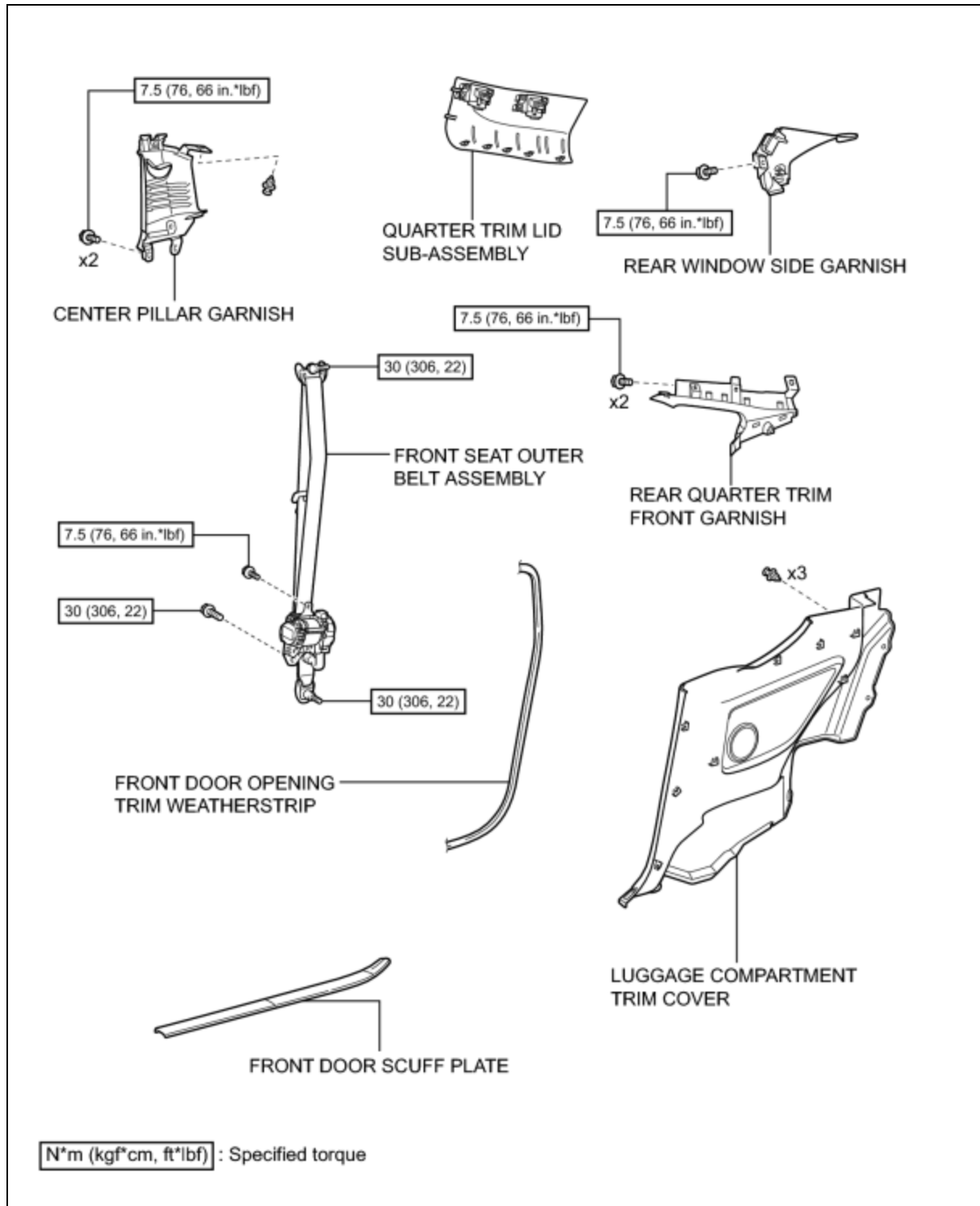
(b) Disengage the clamp.

(c) Remove the nut, washer and front seat inner belt assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000209Q031X
Title: SEAT BELT: FRONT SEAT OUTER BELT ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011CX05FX
Title: SEAT BELT: FRONT SEAT OUTER BELT ASSEMBLY: DISPOSAL (2013 FR-S)		

DISPOSAL

CAUTION:

Before performing pre-disposal deployment of any SRS component, review and closely follow all applicable environmental and hazardous material regulations. Pre-disposal deployment may be considered hazardous material treatment.

HINT:

When scrapping vehicles equipped with a seat belt pretensioner or disposing of a front seat outer belt assembly (with a seat belt pretensioner), always deploy the procedures described below. If any abnormality occurs during deployment of the seat belt pretensioner, contact the SERVICE DEPARTMENT of TOYOTA MOTOR SALES, U.S.A., INC.

1. DISPOSE OF FRONT SEAT OUTER BELT ASSEMBLY (When Installed in Vehicle)

CAUTION:


- Use gloves and safety glasses when handling a front seat outer belt assembly with a deployed pretensioner.
- Always wash your hands with water after completing the operation.
- Do not apply water, etc. to a front seat outer belt assembly with a deployed pretensioner.
- When deploying a seat belt pretensioner, always use the specified SST (SRS airbag deployment tool). Perform the operation in a place away from electrical interference.
- When disposing of a front seat outer belt assembly with a pretensioner, never deploy the pretensioner in the customer's vehicle.


NOTICE:

- Never dispose of a front seat outer belt assembly with a pretensioner that has not been deployed.
- The front seat outer belt assembly produces an exploding sound when the pretensioner deploys, so perform the operation outdoors where it will not disturb local residents.
- When deploying a seat belt pretensioner, perform the operation at least 10 m (32.8 ft.) away from the front seat outer belt assembly.
- Be sure to follow the procedure listed below when deploying a seat belt pretensioner.

(a) Disconnect the seat belt pretensioner connector.

(1) Disconnect the cable from the negative (-) battery terminal.

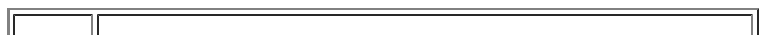
(2) Remove the front door scuff plate  .

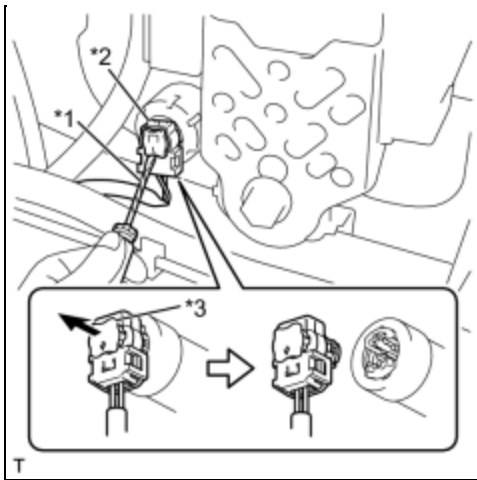
(3) Disconnect the front door opening trim weatherstrip  .

(4) Remove the quarter trim panel  .

(5) Using a screwdriver with the tip wrapped with protective tape, release the pretensioner connector lock and disconnect the pretensioner connector.

Text in Illustration



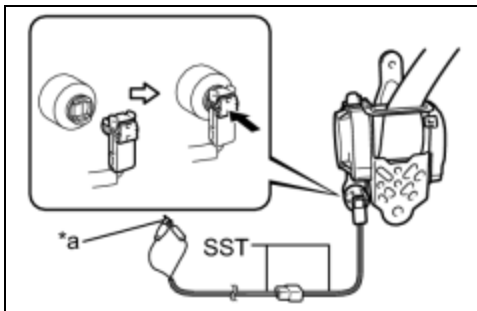


*1	Protective Tape
*2	Pretensioner Connector
*3	Pretensioner Connector Lock

HINT:

Tape the screwdriver tip before use.

(b) Connect SST.



(1) Short the clip and terminal of SST.

SST: 09082-18010

SST: 09082-18020

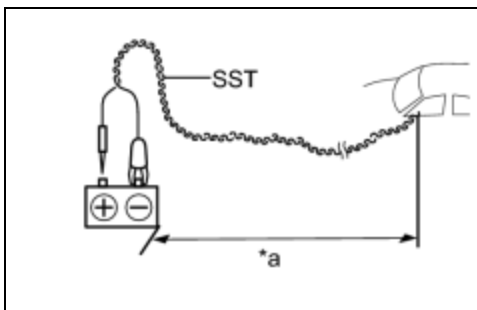
Text in Illustration

*a	Short the clip and terminal
----	-----------------------------

(2) Connect 2 SST, and then connect them to the seat belt pretensioner.

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the pretensioner connector.



(3) Move SST at least 10 m (32.8 ft.) away from the front of the vehicle.

Text in Illustration

*a	10 m or more
----	--------------

(4) Close all the doors and windows of the vehicle.

NOTICE:

Do not damage the SST wire harness.

(c) Deploy the seat belt pretensioner.

(1) Confirm that no one is inside the vehicle or within a 10 m (32.8 ft.) radius of the vehicle.

(2) Connect the clip of SST to the battery positive (+) terminal.

- (3) Connect the terminal of SST to the battery (-) terminal to the deploy the seat belt pretensioner.
- (d) Dispose of the front seat outer belt assembly.
 - (1) Remove the front seat outer belt assembly and SST.
 - (2) Place the front seat outer belt assembly in a plastic bag, tie the end tightly, and dispose of it in the same way as other general parts.

CAUTION:

- The front seat outer belt assembly becomes very hot when the pretensioner is deployed, so leave it untouched for at least 40 minutes after the pretensioner is deployed.
- Use gloves and safety glasses when handling a front seat outer belt assembly with a deployed pretensioner.
- Always wash your hands with water after completing the operation.
- Do not apply water, etc. to a front seat outer belt assembly with a deployed pretensioner.

HINT:

When scrapping a vehicle, deploy the seat belt pretensioner, and then scrap the vehicle with the front seat outer belt assembly installed.

2. DISPOSE OF FRONT SEAT OUTER BELT ASSEMBLY (When not Installed in Vehicle)

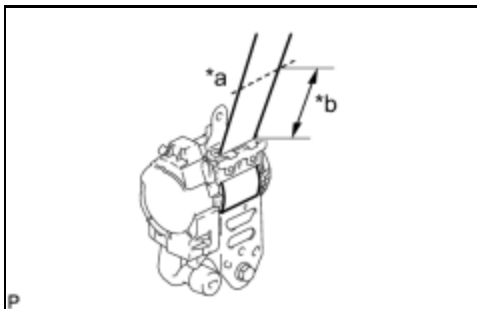
CAUTION:

- Use gloves and safety glasses when handling a front seat outer belt assembly with a deployed pretensioner.
- Always wash your hands with water after completing the operation.
- Do not apply water, etc. to a front seat outer belt assembly with a deployed pretensioner.
- When deploying a seat belt pretensioner, always use the specified SST (SRS airbag deployment tool). Perform the operation in a place away from electrical interference.

NOTICE:

- When disposing of a front seat outer belt assembly with a pretensioner, never deploy the pretensioner in the customer's vehicle.
- Never dispose of a front seat outer belt assembly with a pretensioner that has not been deployed.
- The front seat outer belt assembly produces an exploding sound when the pretensioner deploys, so perform the operation outdoors where it will not disturb local residents.
- When deploying a seat belt pretensioner, perform the operation at least 10 m (32.8 ft.) away from the front seat outer belt assembly.
- Be sure to follow the procedure listed below when deploying a seat belt pretensioner.

- (a) Remove the front seat outer belt assembly INFO.



- (b) Wind the seat belt webbing with the retractor.

Text in Illustration

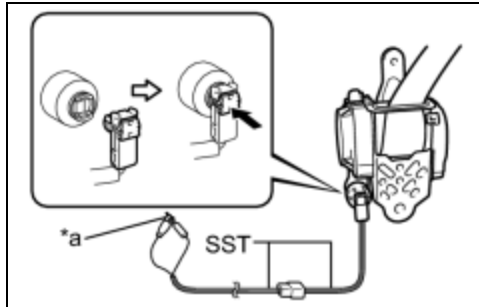
*a	Cut
*b	100 mm

- (c) When the seat belt webbing is sufficiently wound, cut the seat belt webbing approximately 100 mm (3.94 in.) from the retractor, as shown in the illustration.

HINT:

The retractor resistance increases in correlation with how much the seat belt webbing is wound.

- (d) Connect SST.



- (1) Short the clip and terminal of SST.

SST: 09082-18010

SST: 09082-18020

Text in Illustration

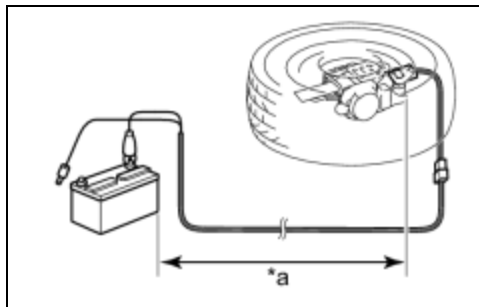
*a	Short the clip and terminal
----	-----------------------------

- (2) Connect 2 SST, and then connect them to the seat belt pretensioner.

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the pretensioner connector.

- (3) Place the front seat outer belt assembly on the ground and cover it with a tire and wheel assembly.



Text in Illustration

*a	10 m or more
----	--------------

NOTICE:

- Position the front seat outer belt assembly as shown in the illustration.
- Use a scrap tire and wheel assembly when disposing of a seat belt pretensioner.

- (4) Position and hold SST at least 10 m (32.8 ft.) away from the wheel.

NOTICE:

Do not damage the SST wire harness.

- (e) Deploy the seat belt pretensioner.

- (1) Check that no one is within a 10 m (32.8 ft.) radius of the wheel.

- (2) Connect the clip of SST to the battery positive (+) terminal.

- (3) Connect the terminal of SST to the battery (-) terminal to the deploy the seat belt pretensioner.

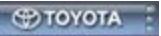
- (f) Dispose of the front seat outer belt assembly.

- (1) Remove the tire and wheel assembly and SST.

- (2) Place the front seat outer belt assembly in a plastic bag, tie the end tightly, and dispose of it in the same way as other general parts.

CAUTION:

- The front seat outer belt assembly becomes very hot when the pretensioner is deployed, so leave it untouched for at least 40 minutes after the pretensioner is deployed.
- Use gloves and safety glasses when handling a front seat outer belt assembly with a deployed pretensioner.
- Always wash your hands with water after completing the operation.
- Do not apply water, etc. to a front seat outer belt assembly with a deployed pretensioner.



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000U9903RX
Title: SEAT BELT: FRONT SEAT OUTER BELT ASSEMBLY: INSPECTION (2013 FR-S)		

INSPECTION

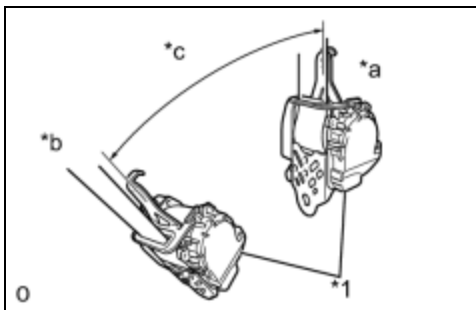
1. INSPECT FRONT SEAT OUTER BELT ASSEMBLY

- (a) Before installing the front seat outer belt assembly, check the ELR function.

NOTICE:

Do not disassemble the retractor.

- (1) When the inclination of the retractor is 12° or less, check that the belt can be pulled from the retractor. When the inclination of the retractor is over 27°, check that the belt locks.



Text in Illustration

*1	Retractor
*a	Unlocked
*b	Locked
*c	27°

If the result is not as specified, replace the front seat outer belt assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000120906OX
Title: SEAT BELT: FRONT SEAT OUTER BELT ASSEMBLY: INSTALLATION (2013 FR-S)		

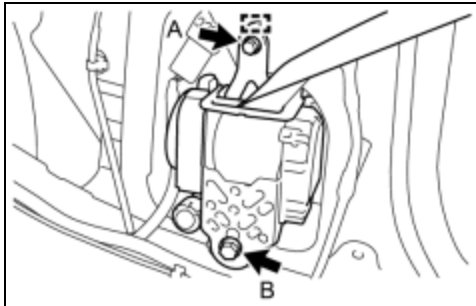
INSTALLATION

HINT:

- Use the same procedure for the RH side and LH side.
- The procedure listed below is for the LH side.

1. INSPECT FRONT SEAT OUTER BELT ASSEMBLY INFO

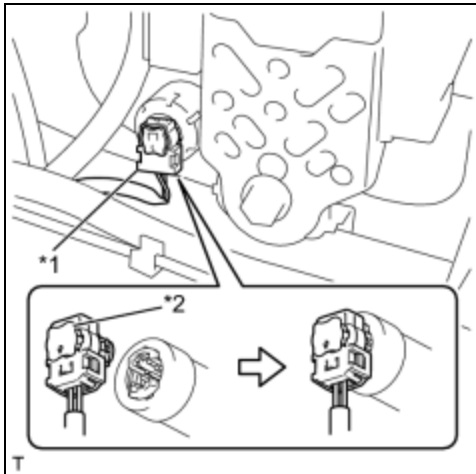
2. INSTALL FRONT SEAT OUTER BELT ASSEMBLY



- (a) Engage the hook and install the front seat outer belt assembly with the 2 bolts.

Bolt A - Torque: 7.5 N·m (76 kgf·cm, 66in·lbf)

Bolt B - Torque: 30 N·m (306 kgf·cm, 22ft·lbf)



- (b) Connect the pretensioner connector.

Text in Illustration

*1	Pretensioner Connector
*2	Pretensioner Connector Lock

NOTICE:

When connecting any pretensioner connector, take care not to damage the pretensioner wire harness.

- (c) Push in the lock to install the pretensioner connector.
- (d) Install the shoulder anchor of the front seat outer belt assembly with the bolt.

Torque: 30 N·m (306 kgf·cm, 22ft·lbf)

3. INSTALL CENTER PILLAR GARNISH INFO

4. CONNECT FRONT SEAT OUTER BELT ASSEMBLY

(a) Install the floor anchor of the front seat outer belt assembly with the bolt.

Torque: 30 N·m (306 kgf·cm, 22ft·lbf)

(b) Check if the ELR locks.

NOTICE:

The check should be performed with the front seat outer belt assembly installed.

(1) With the front seat outer belt assembly installed, check that the belt locks when it is pulled out quickly.

(c) Install the floor anchor cover.

5. INSTALL REAR QUARTER TRIM FRONT GARNISH INFO

6. INSTALL REAR WINDOW SIDE GARNISH INFO

7. INSTALL QUARTER TRIM LID SUB-ASSEMBLY INFO

8. INSTALL LUGGAGE COMPARTMENT TRIM COVER INFO

9. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP INFO

10. INSTALL FRONT DOOR SCUFF PLATE INFO

11. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

12. INSPECT SRS WARNING LIGHT

INFO


Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WYH065X
Title: SEAT BELT: FRONT SEAT OUTER BELT ASSEMBLY: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

CAUTION:

Be sure to correctly follow the removal and installation procedures for the front seat outer belt assembly.

1. INSPECT FRONT SEAT OUTER BELT ASSEMBLY (for Vehicle not Involved in Collision)

- (a) Perform a diagnostic system check  .
- (b) Visually check for defects with the front seat outer belt assembly installed on the vehicle.
- (1) The defects are as follows:
- Cuts on the front seat outer belt assembly
 - Small cracks on the front seat outer belt assembly
 - Significant discoloration on the front seat outer belt assembly


OK:

No defects are found.

HINT:

If any of the defects is found, replace the front seat outer belt assembly with a new one.

2. INSPECT FRONT SEAT OUTER BELT ASSEMBLY (for Vehicle Involved in Collision)

- (a) Perform a diagnostic system check  .
- (b) Visually check for defects with the front seat outer belt assembly removed from the vehicle.
- (1) The defects are as follows:
- Cuts on the front seat outer belt assembly
 - Small cracks on the front seat outer belt assembly
 - Significant discoloration on the front seat outer belt assembly
 - Cracks or other damage to the connector

OK:

No defects are found.

HINT:

If any of the defects is found, replace the front seat outer belt assembly with a new one.

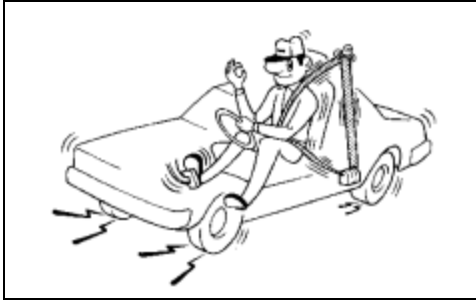


Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001228064X
Title: SEAT BELT: FRONT SEAT OUTER BELT ASSEMBLY: PRECAUTION (2013 FR-S)		

PRECAUTION

CAUTION:

Replace any faulty parts of the seat belt systems (outer belt, inner belt, bolts, nuts, tether anchor hardware and other related parts). When inspecting a vehicle that was in a collision, be sure to check all of the seat belt systems regardless of whether or not the system was activated in the collision. Replace any damaged or malfunctioning systems.



1. ROAD TEST (IN SAFE AREA)

CAUTION:

Conduct this test in a safe area.

- (a) Fasten the front seat belts.
- (b) Drive the vehicle at 16 km/h (10 mph) and firmly depress the brake pedal. Check that the belts lock and cannot be extended at this time.

If a belt does not lock, replace the seat belt assembly [INFO](#) .

HINT:

Inspect the seat belt assembly before installing it [INFO](#) .

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000120B06LX
Title: SEAT BELT: FRONT SEAT OUTER BELT ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

1. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

HINT:

- Use the same procedure for the RH side and LH side.
- The procedure listed below is for the LH side.

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

3. REMOVE FRONT DOOR SCUFF PLATE INFO

4. DISCONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP

HINT:

Disconnect the front door opening trim weatherstrip to the extent that allows the removal of the luggage compartment trim cover.

5. REMOVE LUGGAGE COMPARTMENT TRIM COVER INFO

6. REMOVE QUARTER TRIM LID SUB-ASSEMBLY INFO

7. REMOVE REAR WINDOW SIDE GARNISH INFO

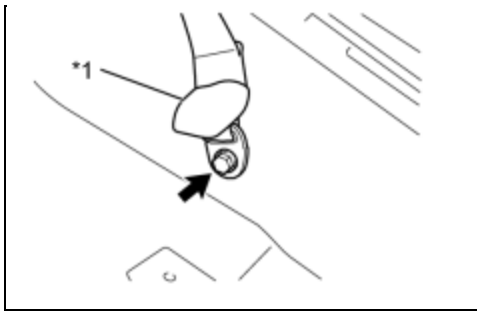
8. REMOVE REAR QUARTER TRIM FRONT GARNISH INFO

9. DISCONNECT FRONT SEAT OUTER BELT ASSEMBLY

(a) Turn back the floor anchor cover.

Text in Illustration

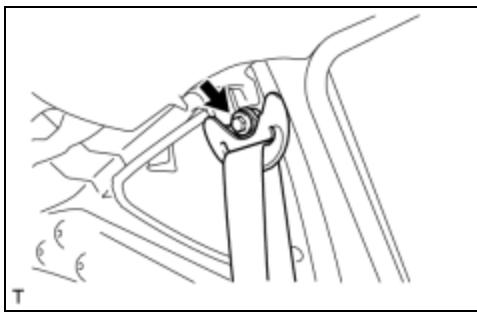
*1	Floor Anchor Cover
----	--------------------



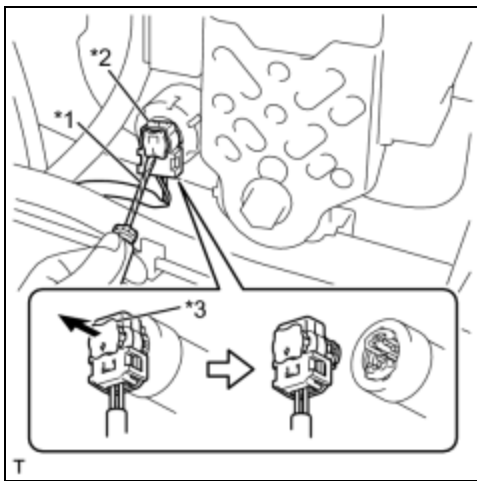
(b) Loosen the bolt and disconnect the floor anchor of the front seat outer belt assembly.

10. REMOVE CENTER PILLAR GARNISH INFO

11. REMOVE FRONT SEAT OUTER BELT ASSEMBLY



(a) Loosen the bolt and disconnect the shoulder anchor of the front seat outer belt assembly.



(b) Using a screwdriver with the tip wrapped with protective tape, release the pretensioner connector lock and disconnect the pretensioner connector.

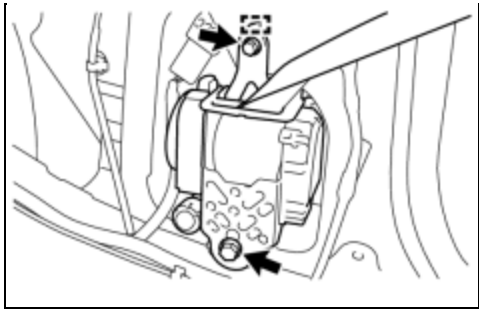
Text in Illustration

*1	Protective Tape
*2	Pretensioner Connector
*3	Pretensioner Connector Lock

HINT:

Tape the screwdriver tip before use.

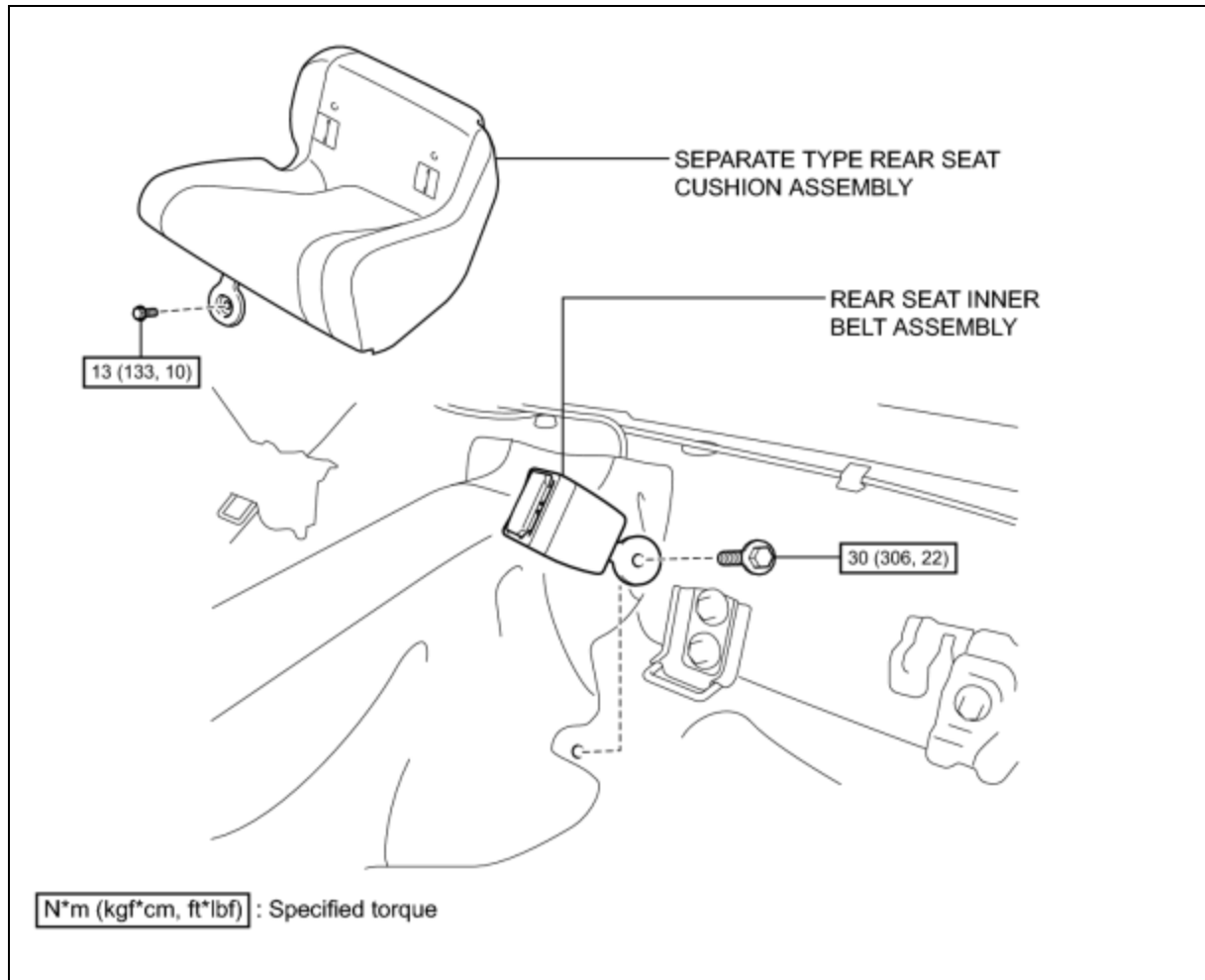
(c) Remove the 2 bolts and disengage the hook to remove the front seat outer belt assembly.



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004S1V00HX
Title: SEAT BELT: REAR SEAT INNER BELT ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



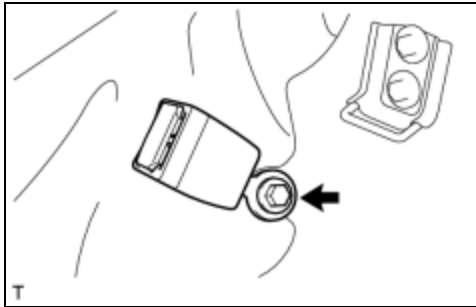
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003WKC01CX
Title: SEAT BELT: REAR SEAT INNER BELT ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for the RH side and LH side.
- The procedure listed below is for the LH side.

1. INSTALL REAR SEAT INNER BELT ASSEMBLY



- (a) Install the rear seat inner belt assembly with the bolt in the direction of the illustration.

Torque: 30 N·m (306 kgf·cm, 22ft·lbf)

2. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY

[INFO](#)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003WKE01CX
Title: SEAT BELT: REAR SEAT INNER BELT ASSEMBLY: REMOVAL (2013 FR-S)		

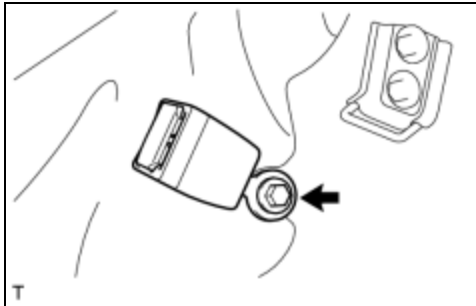
REMOVAL

HINT:

- Use the same procedure for the RH side and LH side.
- The procedure listed below is for the LH side.

1. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY INFO

2. REMOVE REAR SEAT INNER BELT ASSEMBLY

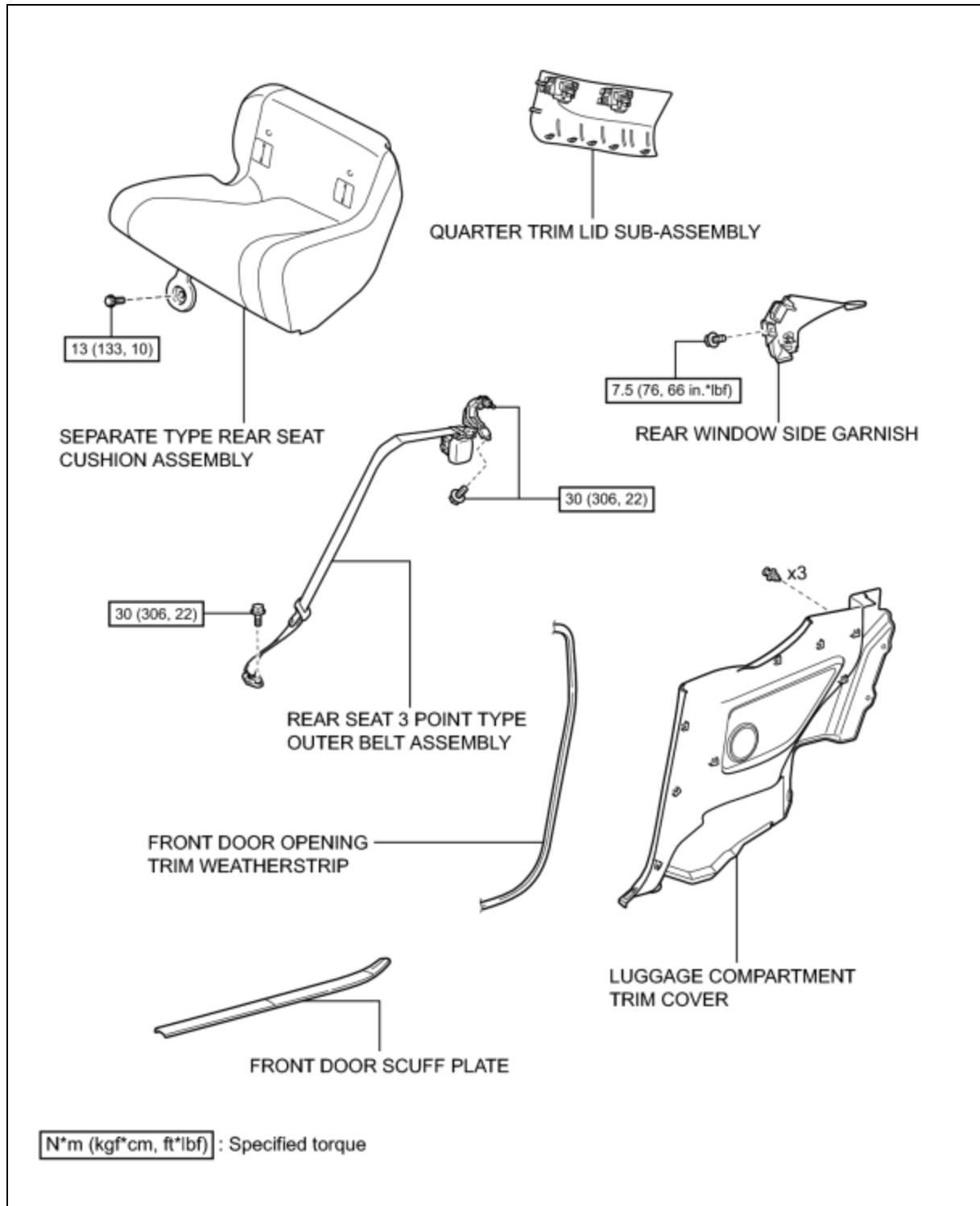


(a) Remove the bolt and rear seat inner belt assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004S1Y00HX
Title: SEAT BELT: REAR SEAT OUTER BELT ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000U9903TX
Title: SEAT BELT: REAR SEAT OUTER BELT ASSEMBLY: INSPECTION (2013 FR-S)		

INSPECTION

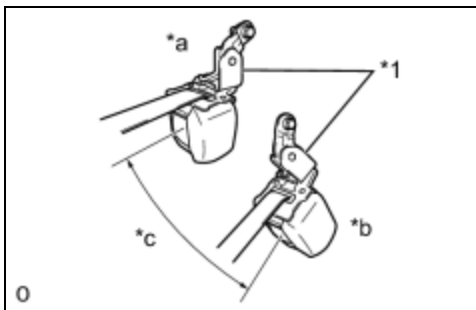
1. INSPECT REAR SEAT 3 POINT TYPE OUTER BELT ASSEMBLY

- (a) Before installing the rear seat 3 point type outer belt assembly, check the ELR function.

NOTICE:

Do not disassemble the retractor.

- (1) When the inclination of the retractor is 12° or less, check that the belt can be pulled from the retractor. When the inclination of the retractor is over 27° , check that the belt locks.



Text in Illustration

*1	Retractor
*a	Unlocked
*b	Locked
*c	27°

If the result is not as specified, replace the rear seat 3 point type outer belt assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003WKG01DX
Title: SEAT BELT: REAR SEAT OUTER BELT ASSEMBLY: INSTALLATION (2013 FR-S)		

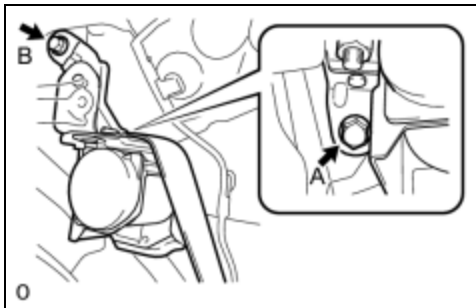
INSTALLATION

HINT:

- Use the same procedure for the RH side and LH side.
- The procedure listed below is for the LH side.

1. INSPECT REAR SEAT 3 POINT TYPE OUTER BELT ASSEMBLY INFO

2. INSTALL REAR SEAT 3 POINT TYPE OUTER BELT ASSEMBLY



- (a) Tighten the bolt B to install the rear seat 3 point type outer belt assembly.

Torque: 30 N·m (306 kgf·cm, 22ft·lbf)

- (b) Install the bolt A.

Torque: 30 N·m (306 kgf·cm, 22ft·lbf)

- (c) Check if the ELR locks.

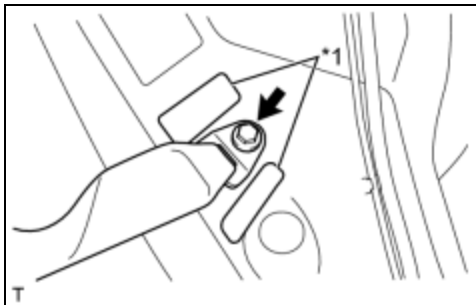
NOTICE:

The check should be performed with the rear seat 3 point type outer belt assembly installed.

- (1) With the rear seat 3 point type outer belt assembly installed, check that the belt locks when it is pulled out quickly.

- (d) Connect the floor anchor of the rear seat 3 point type outer belt assembly with the bolt.

Text in Illustration



*1	Protruding Part
----	-----------------

Torque: 30 N·m (306 kgf·cm, 22ft·lbf)

NOTICE:

Do not allow the anchor part of the rear seat 3 point type outer belt assembly to overlap the protruding parts of the floor panel.

3. INSTALL REAR WINDOW SIDE GARNISH INFO

4. INSTALL QUARTER TRIM LID SUB-ASSEMBLY [INFO](#)

5. INSTALL LUGGAGE COMPARTMENT TRIM COVER [INFO](#)

6. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP [INFO](#)

7. INSTALL FRONT DOOR SCUFF PLATE [INFO](#)

8. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY [INFO](#)



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000WYH067X
Title: SEAT BELT: REAR SEAT OUTER BELT ASSEMBLY: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

CAUTION:

Be sure to correctly follow the removal and installation procedures for the rear seat 3 point type outer belt assembly.

1. INSPECT REAR SEAT 3 POINT TYPE OUTER BELT ASSEMBLY (for Vehicle not Involved in Collision)

(a) Visually check for defects with the rear seat 3 point type outer belt assembly installed on the vehicle.

(1) The defects are as follows:

- Cuts on the rear seat 3 point type outer belt assembly
- Small cracks on the rear seat 3 point type outer belt assembly
- Significant discoloration on the rear seat 3 point type outer belt assembly

OK:

No defects are found.

HINT:

If any of the defects is found, replace the rear seat 3 point type outer belt assembly with a new one.

2. INSPECT REAR SEAT 3 POINT TYPE OUTER BELT ASSEMBLY (for Vehicle Involved in Collision)

(a) Visually check for defects with the rear seat 3 point type outer belt assembly removed from the vehicle.

(1) The defects are as follows:

- Cuts on the rear seat 3 point type outer belt assembly
- Small cracks on the rear seat 3 point type outer belt assembly
- Significant discoloration on the rear seat 3 point type outer belt assembly
- Cracks or other damage to the connector

OK:

No defects are found.

HINT:

If any of the defects is found, replace the rear seat 3 point type outer belt assembly with a new one.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003WKI01CX
Title: SEAT BELT: REAR SEAT OUTER BELT ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

- Use the same procedure for the RH side and LH side.
- The procedure listed below is for the LH side.

1. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY INFO

2. REMOVE FRONT DOOR SCUFF PLATE INFO

3. DISCONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP

HINT:

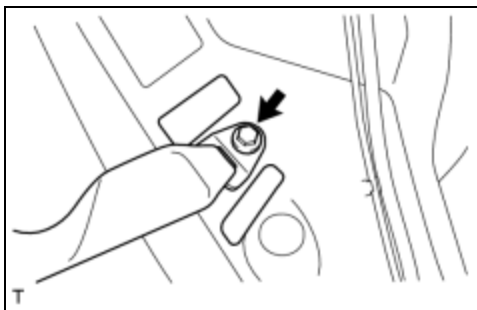
Disconnect the front door opening trim weatherstrip to the extent that allows the removal of the luggage compartment trim cover.

4. REMOVE LUGGAGE COMPARTMENT TRIM COVER INFO

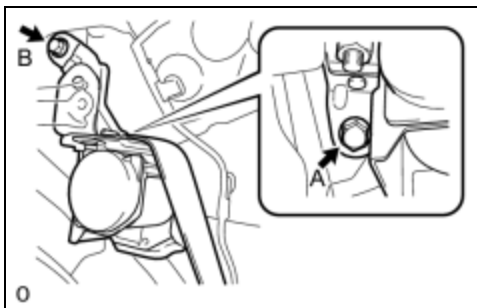
5. REMOVE QUARTER TRIM LID SUB-ASSEMBLY INFO

6. REMOVE REAR WINDOW SIDE GARNISH INFO

7. REMOVE REAR SEAT 3 POINT TYPE OUTER BELT ASSEMBLY



- (a) Remove the bolt and disconnect the floor anchor of the rear seat 3 point type outer belt assembly.



- (b) Remove the bolt A.

(c) Loosen the bolt B and remove the rear seat 3 point type outer belt assembly.



TOYOTA

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004N7R00UX
Title: SEAT BELT: SEAT BELT WARNING SYSTEM: CUSTOMIZE PARAMETERS (2013 FR-S)		

CUSTOMIZE PARAMETERS

1. CUSTOMIZE SEAT BELT WARNING SYSTEM

HINT:

The following items can be customized.

NOTICE:

- When the customer requests a change in a function, first make sure that the function can be customized.
- Be sure to make a note of the current settings before customizing.
- When troubleshooting a function, first make sure that the function is set to the default setting.
- These buzzers should be ON for safe driving. Perform this procedure only if it is necessary to set the buzzer to OFF (disabled).

(a) Customizing with the Techstream

- (1) Connect the Techstream to the DLC3.
- (2) Turn the ignition switch to ON.
- (3) Turn the Techstream on.
- (4) Enter the following menus: Customize Setting / Warning.
- (5) Select the setting by referring to the table below.

Warning

DISPLAY	DEFAULT	CONTENT	SETTING	RELEVANT ECU
Driver Side Seatbelt Warning Buzzer	ON	Function to sound the driver seat belt warning buzzer	ON/OFF	Combination meter assembly
Front Passenger Side Seatbelt Warning Buzzer	ON	Function to sound the front passenger seat belt warning buzzer	ON/OFF	

HINT:

This setting is only valid when the vehicle is driven at 20 km/h (12 mph) or more.



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000012G70C1X
Title: SEAT BELT: SEAT BELT WARNING SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the following table, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Combination Meter, Occupant Detection or SRS Airbag / Data List.
- (e) Read the Data List according to the display on the Techstream.

Combination Meter (Combination Meter Assembly)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Driver Side Seatbelt Warning Buzzer	Driver seat belt warning buzzer/ON or OFF	Customized value displayed	-
P-Seatbelt Warning Buzzer	Front passenger seat belt warning buzzer/ON or OFF	Customized value displayed	-

Occupant Detection (Occupant Detection ECU)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Status of Passenger Side Buckle SW	Front passenger buckle switch/ON or OFF	Unset: Seat belt not fastened Set: Seat belt fastened NG: Data is not determined	-

SRS Airbag (Airbag ECU Assembly)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE

Driver Buckle SW	Driver buckle switch/Unset, Set or NG	Unset: Seat belt not fastened Set: Seat belt fastened NG: Data is not determined	-
------------------	---------------------------------------	--	---

2. ACTIVE TEST

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Combination Meter / Active Test.
- (e) Perform the Active Test according to the display on the Techstream.

Combination Meter (Combination Meter Assembly)

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Driver Side Seat Belt	Seat belt warning light	OFF/ON	-
Front passenger Side Seat Belt	Seat belt warning light	OFF/ON	-



Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000014DK0AGX
Title: SEAT BELT: SEAT BELT WARNING SYSTEM: Driver Side Seat Belt Warning Light does not Operate (2013 FR-S)		

Driver Side Seat Belt Warning Light does not Operate

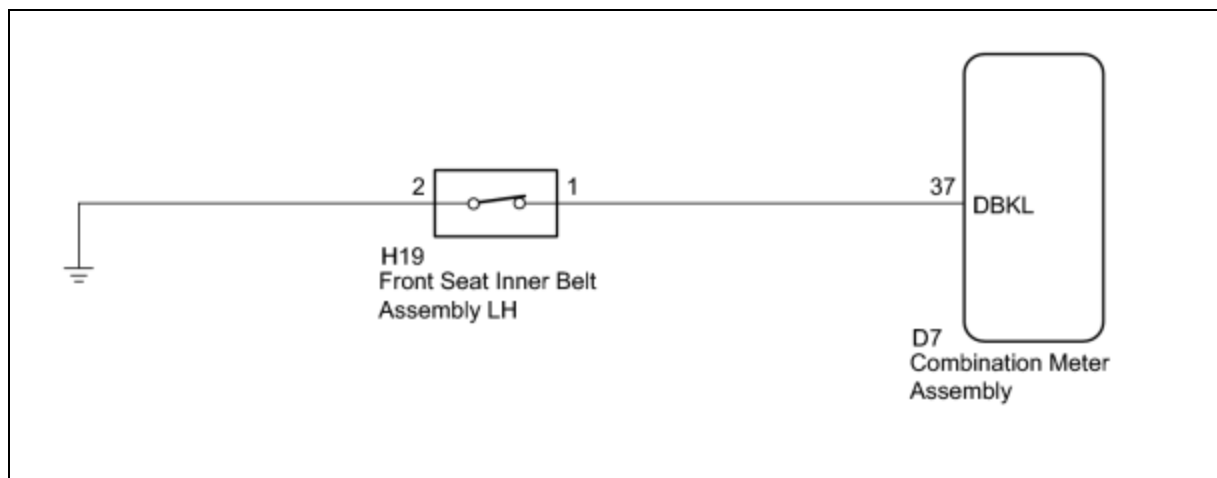
DESCRIPTION

The combination meter assembly illuminates, blinks or turns off the seat belt warning light on the combination meter assembly in accordance with the state of the front seat inner belt assembly LH.

HINT:

The seat belt warning light on the combination meter assembly is used for both the driver seat and front passenger seat.

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	PERFORM ACTIVE TEST USING TECHSTREAM (DRIVER SIDE SEAT BELT WARNING LIGHT)
-----------	---

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Combination Meter / Active Test.
- (e) Perform the Active Test according to the display on the Techstream.

OK:

Driver side seat belt warning light condition can be switched by Active Test.

Combination Meter

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Driver Side Seat Belt	Driver side seat belt warning light	ON/OFF	-

NG ▶ REPLACE COMBINATION METER ASSEMBLY

OK



2.	INSPECT FRONT SEAT INNER BELT ASSEMBLY LH
-----------	--

(a) Remove the front seat inner belt assembly LH .

(b) Inspect the front seat inner belt assembly LH .

NG ▶ REPLACE FRONT SEAT INNER BELT ASSEMBLY LH

OK



3.	CHECK HARNESS AND CONNECTOR (FRONT SEAT INNER BELT ASSEMBLY LH - COMBINATION METER ASSEMBLY - BODY GROUND)
-----------	---

(a) Disconnect the H19 front seat inner belt assembly LH connector.

(b) Disconnect the D7 combination meter assembly connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D7-37 (DBKL) - H19-1	Always	Below 1 Ω
H19-1 - Body ground	Always	10 k Ω or higher
H19-2 - Body ground	Always	Below 1 Ω

REPAIR OR REPLACE HARNESS OR CONNECTOR

NG ▶

OK ▶ REPLACE COMBINATION METER
ASSEMBLY



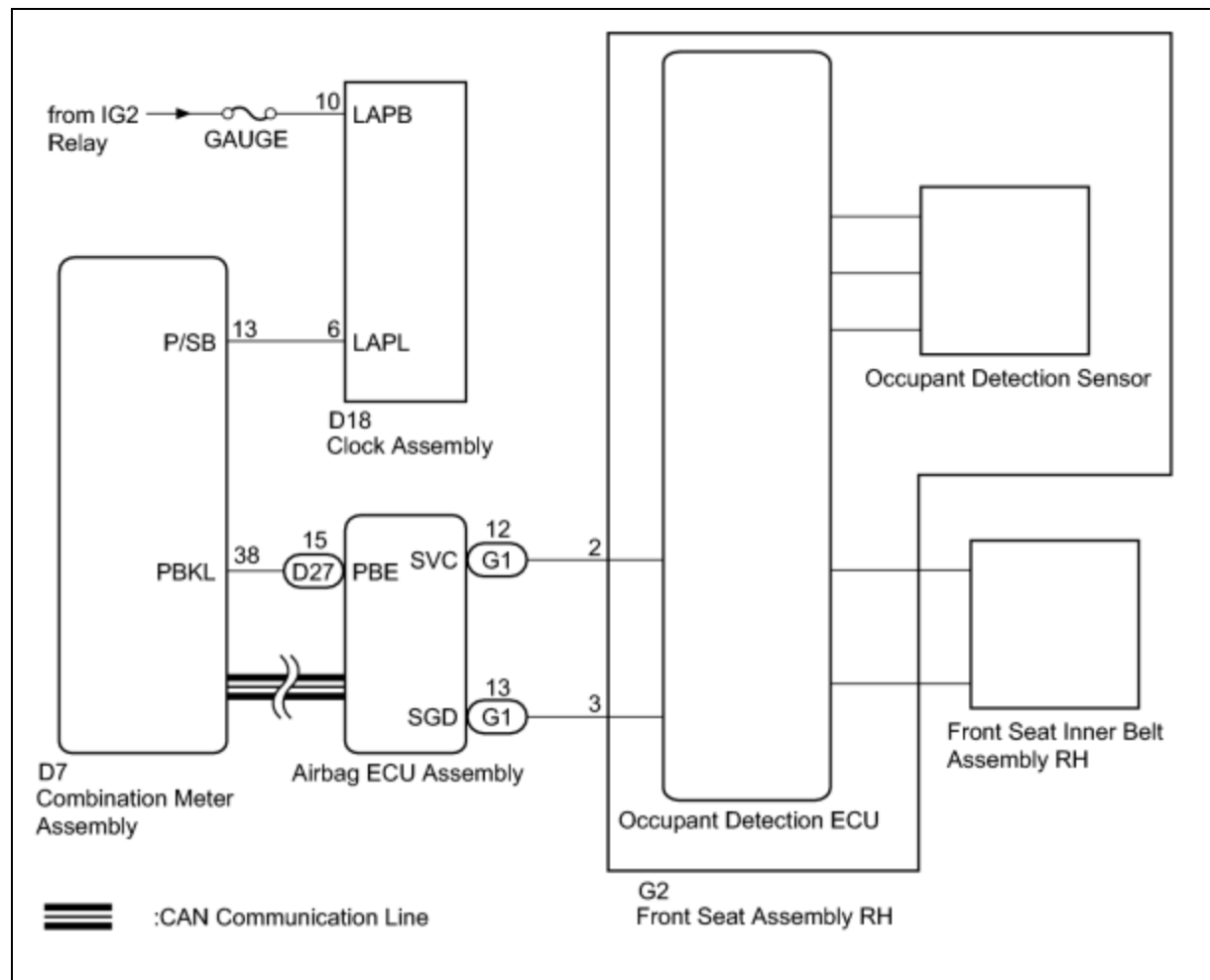
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000014DL09QX
Title: SEAT BELT: SEAT BELT WARNING SYSTEM: Front Passenger Side Seat Belt Warning Light Malfunction (2013 FR-S)		

Front Passenger Side Seat Belt Warning Light Malfunction

DESCRIPTION

When the ignition switch is ON, the occupant detection ECU sends a signal to the airbag sensor assembly to indicate the state of the front seat inner belt assembly RH and also whether the front passenger seat is occupied. The airbag sensor assembly sends those signals to the combination meter assembly. The telltale light assembly illuminates, blinks or turns off the seat belt warning light on the combination meter assembly in accordance with these signals.


WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Inspect the fuses for circuits related to this system before performing the following inspection

- procedure.
- The seat belt warning system uses the CAN communication system. First, confirm that there is no malfunction in the CAN communication system. Refer to the How to Proceed with Troubleshooting procedure  .

PROCEDURE

1.	CHECK DTC OUTPUT (OCCUPANT CLASSIFICATION SYSTEM)
-----------	--

(a) Clear DTCs  .

(b) Recheck for DTCs  .

Result:

RESULT	PROCEED TO
DTC is not output	A
DTC is output	B

B  **GO TO OCCUPANT CLASSIFICATION SYSTEM**

A



2.	CHECK DTC OUTPUT (AIRBAG SYSTEM)
-----------	---

(a) Clear DTCs  .

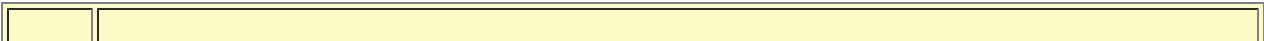
(b) Recheck for DTCs  .

Result:

RESULT	PROCEED TO
DTC is not output	A
DTC is output	B

B  **GO TO AIRBAG SYSTEM**

A



3. READ VALUE USING TECHSTREAM

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Occupant Detection / Data List.
- (e) Read the Data List according to the display on the Techstream.

Occupant Detection (Occupant Detection ECU)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Status of Passenger Side Buckle SW	Front passenger buckle switch/Set, Unset or NG	Set: Seat belt fastened Unset: Seat belt not fastened NG: Data is not determined	-

Result

RESULT	PROCEED TO
Unset or Set is displayed on the Techstream screen according to the front passenger seat belt condition	A
Unset or Set is not displayed normally on the Techstream screen according to the front passenger seat belt condition	B
NG is displayed on the Techstream screen	C

B ► REPLACE FRONT SEAT INNER BELT ASSEMBLY RH

C ► REPLACE FRONT SEAT ASSEMBLY RH

A



4. READ VALUE USING TECHSTREAM

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Body Electrical / Combination Meter / Data List.

(e) Read the Data List according to the display on the Techstream.

SRS Airbag (Airbag Sensor Assembly)

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
P-Seatbelt Buckle SW	Front passenger buckle switch/ON or OFF	ON: Seat belt is not fastened OFF: Seat belt is fastened	-

Result

RESULT	PROCEED TO
ON or OFF is displayed on the Techstream screen according to the front passenger seat belt condition	A
ON or OFF is not displayed normally on the Techstream screen according to the front passenger seat belt condition	B

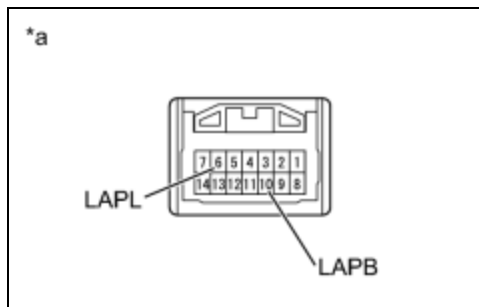
B ▶ REPLACE COMBINATION METER ASSEMBLY

A



5. INSPECT CLOCK ASSEMBLY

(a) Remove the clock assembly  .



(b) Apply battery voltage to the connector and check the illumination condition.

Result:

CONDITION	SPECIFIED CONDITION
Battery positive (+) → 10 (LAPB) Battery negative (-) → 6 (LAPL)	Front passenger side seat belt warning light comes on

Text in Illustration

*a	Component without harness connected
----	-------------------------------------

NG ▶ REPLACE CLOCK ASSEMBLY

OK



6.	CHECK HARNESS AND CONNECTOR (BATTERY - CLOCK ASSEMBLY - COMBINATION METER ASSEMBLY)
-----------	--

- (a) Disconnect the D18 clock assembly connector.
- (b) Disconnect the D7 combination meter assembly connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
D18-6 (LAPL) - D7-13 (P/SB)	Always	Below 1 Ω
D18-6 (LAPL) - Body ground	Always	10 k Ω or higher

- (d) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
D18-10 (LAPB) - Body ground	Ignition switch ON	11 to 14 V

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ USE SIMULATION METHOD TO CHECK

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000Y5I0BNX
Title: SEAT BELT: SEAT BELT WARNING SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use these procedures to troubleshoot the seat belt warning system.
- *: Use a Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	INSPECT BATTERY VOLTAGE
-----------	--------------------------------

Standard voltage:

11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding to the next step.

NEXT



3.	CHECK COMMUNICATION FUNCTION OF CAN COMMUNICATION SYSTEM*
-----------	--

(a) Use the Techstream to check if the CAN communication system is functioning normally.

Result:

RESULT	PROCEED TO
DTC is not output	A
DTC is output	B

B **GO TO CAN COMMUNICATION SYSTEM**

A



4.	PROBLEM SYMPTOMS TABLE
-----------	-------------------------------

Result:

RESULT	PROCEED TO
Fault is not listed in problem symptoms table	A
Fault is listed in problem symptoms table	B

B ▶ Go to step 6

A



5.	OVERALL ANALYSIS AND TROUBLESHOOTING*
-----------	--

(a) Operation Check INFO

(b) Data List/ Active Test INFO

(c) Terminals of ECU INFO

NEXT



6.	REPAIR OR REPLACE
-----------	--------------------------

NEXT



7.	CONFIRMATION TEST
-----------	--------------------------

NEXT ▶ **END**

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002N53029X
Title: SEAT BELT: SEAT BELT WARNING SYSTEM: OPERATION CHECK (2013 FR-S)		

OPERATION CHECK

1. INSPECT DRIVER SIDE SEAT BELT WARNING LIGHT

- (a) Turn the ignition switch to ON.
- (b) When the driver seat belt is not fastened, check that the front seat belt warning light in the combination meter assembly blinks.


2. INSPECT PASSENGER SIDE SEAT BELT WARNING LIGHT

- (a) Turn the ignition switch to ON.
- (b) When the front passenger side seat belt is not fastened with the front passenger seat occupied, check that the front passenger side seat belt warning light in the telltale light assembly blinks.
- (c) When the front passenger seat belt is fastened with the front passenger seat occupied, check that the front seat belt warning light in the telltale light assembly turns off.

3. INSPECT SEAT BELT WARNING BUZZER

HINT:

If the buzzer does not sound, the buzzer cancel setting may be set to on  .

- (a) Lift up the vehicle using a swing arm type lift  .
- (b) Turn the ignition switch to ON.
- (c) Place a weight of 20 kg (44.0 lb) on the front passenger seat.

NOTICE:

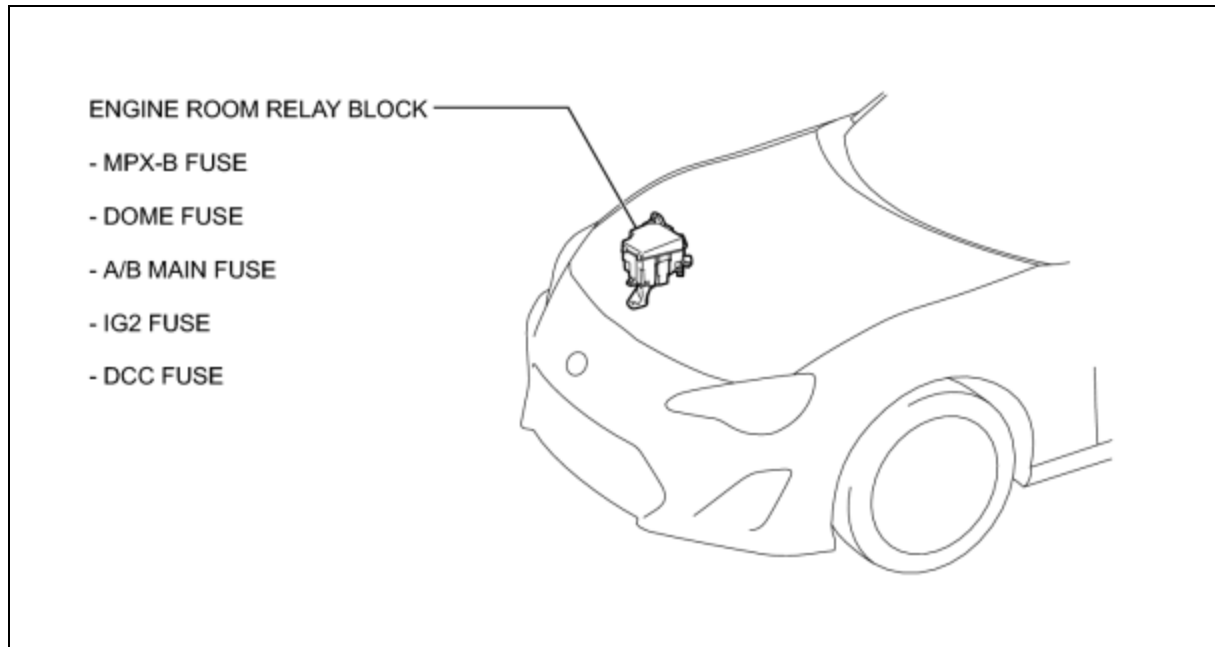
Place the weight on the seat cushion and do not allow it to come into contact with the seatback.

- (d) When the vehicle is driven at approximately 20 km/h (12.5 mph) or more while the driver or front passenger seat belt is not fastened, check that the buzzer in the combination meter assembly sounds at an interval of 1.2 seconds for 30 seconds, and then sounds at an interval of 0.4 seconds for 90 seconds.
- (e) Check that the buzzer stops 2 minutes after the buzzer starts sounding.
- (f) After the buzzer stops, turn the ignition switch off and then start the engine again. Then drive the vehicle at approximately 20 km/h (12.5 mph) or more while the driver or front passenger seat belt is not fastened, and check that the buzzer sounds again.
- (g) After the buzzer stops, fasten the driver and front passenger seat belts. Drive the vehicle at approximately 20 km/h (12.5 mph) or more and unfasten the driver or front passenger seat belt, and then check that the buzzer sounds again.
- (h) After the buzzer stops, move the shift lever to R, and then move it to D. Drive the vehicle at approximately 20 km/h (12.5 mph) or more, and then check that the buzzer sounds again.

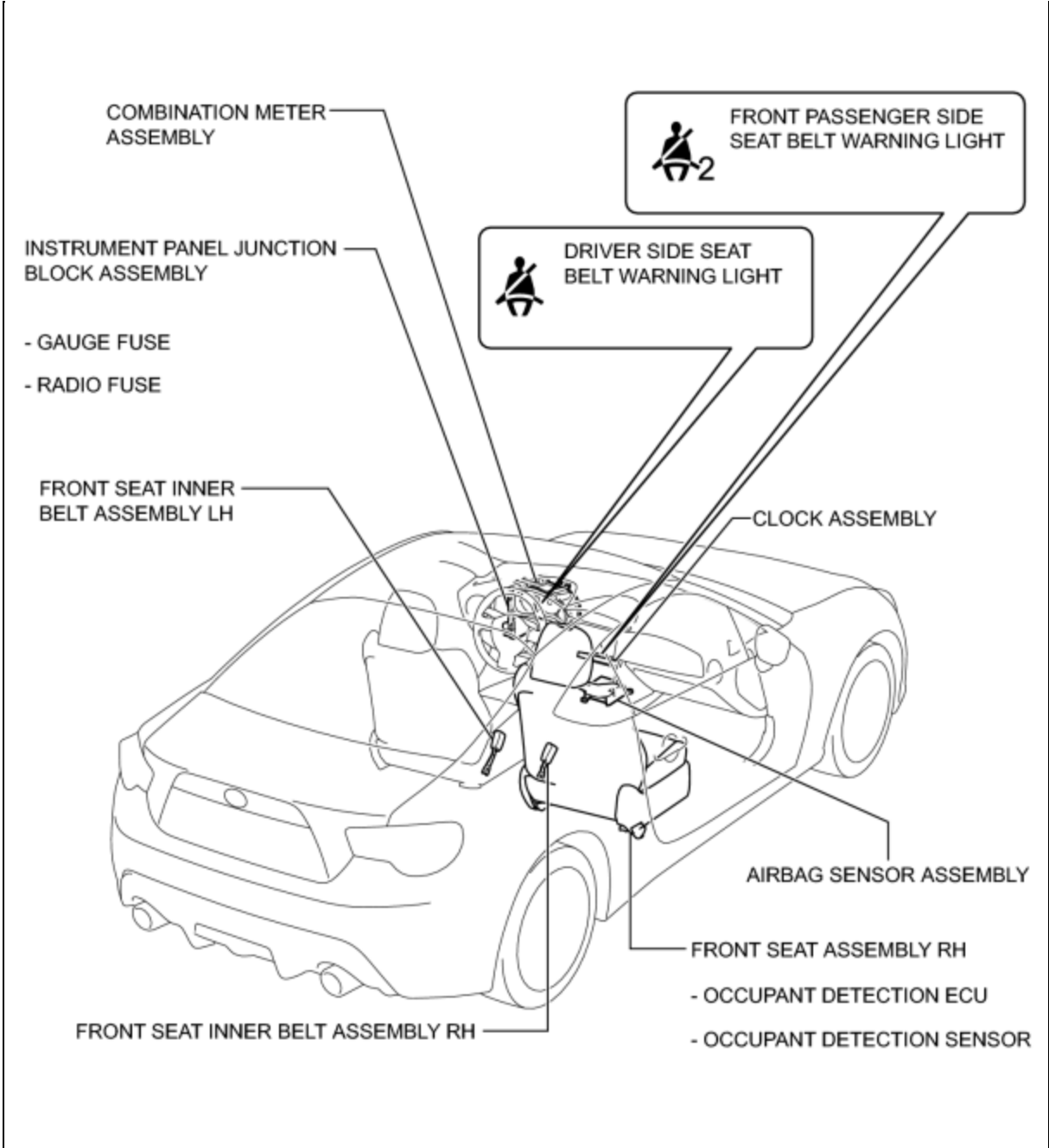
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003FD201PX
Title: SEAT BELT: SEAT BELT WARNING SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000148Y08DX
Title: SEAT BELT: SEAT BELT WARNING SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Seat Belt Warning System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Driver side seat belt warning light does not operate	Proceed to "Driver Side Seat Belt Warning Light does not Operate"	INFO
Front passenger side seat belt warning light malfunction	Airbag system	-
	Occupant classification system	-
	Proceed to "Front Passenger Side Seat Belt Warning Light Malfunction"	INFO
	Front seat inner belt assembly RH	-
	Combination meter assembly	-
Seat belt warning buzzer does not operate	Meter/Gauge system	-



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001OKO07NX
Title: SEAT BELT: SEAT BELT WARNING SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

SYSTEM DESCRIPTION

1. SEAT BELT WARNING SYSTEM DESCRIPTION

(a) Driver seat belt warning light:

When the driver seat belt is not fastened with the ignition switch ON, the front seat belt warning light in the combination meter assembly blinks to inform the driver. The combination meter assembly displays the driver seat belt status and vehicle speed.

(b) Front passenger seat belt warning light:

When the front passenger seat belt is not fastened with the ignition switch ON and the front passenger seat occupied, the front seat belt warning light in the telltale light assembly blinks. The combination meter assembly detects the front passenger seat belt status and whether the front passenger seat is occupied.

(c) Seat belt warning buzzer:

After turning the ignition switch to ON, if the driver seat belt is not fastened within 1.8 seconds, check that the seat belt warning buzzer in the combination meter assembly sounds at 1.2 second intervals for 6 seconds.

When the vehicle is driven at 20 km/h (12 mph) or more with the front passenger seat occupied and the driver or front passenger seat belt not fastened, the seat belt warning buzzer in the combination meter assembly sounds once.

When 30 seconds have passed after the buzzer sounded, the seat belt warning buzzer in the combination meter assembly sounds at an interval of 1.2 seconds for 30 seconds.

After that, the seat belt warning buzzer in the combination meter assembly sounds at an interval of 0.4 seconds for 90 seconds.

2. FUNCTION OF MAIN COMPONENTS

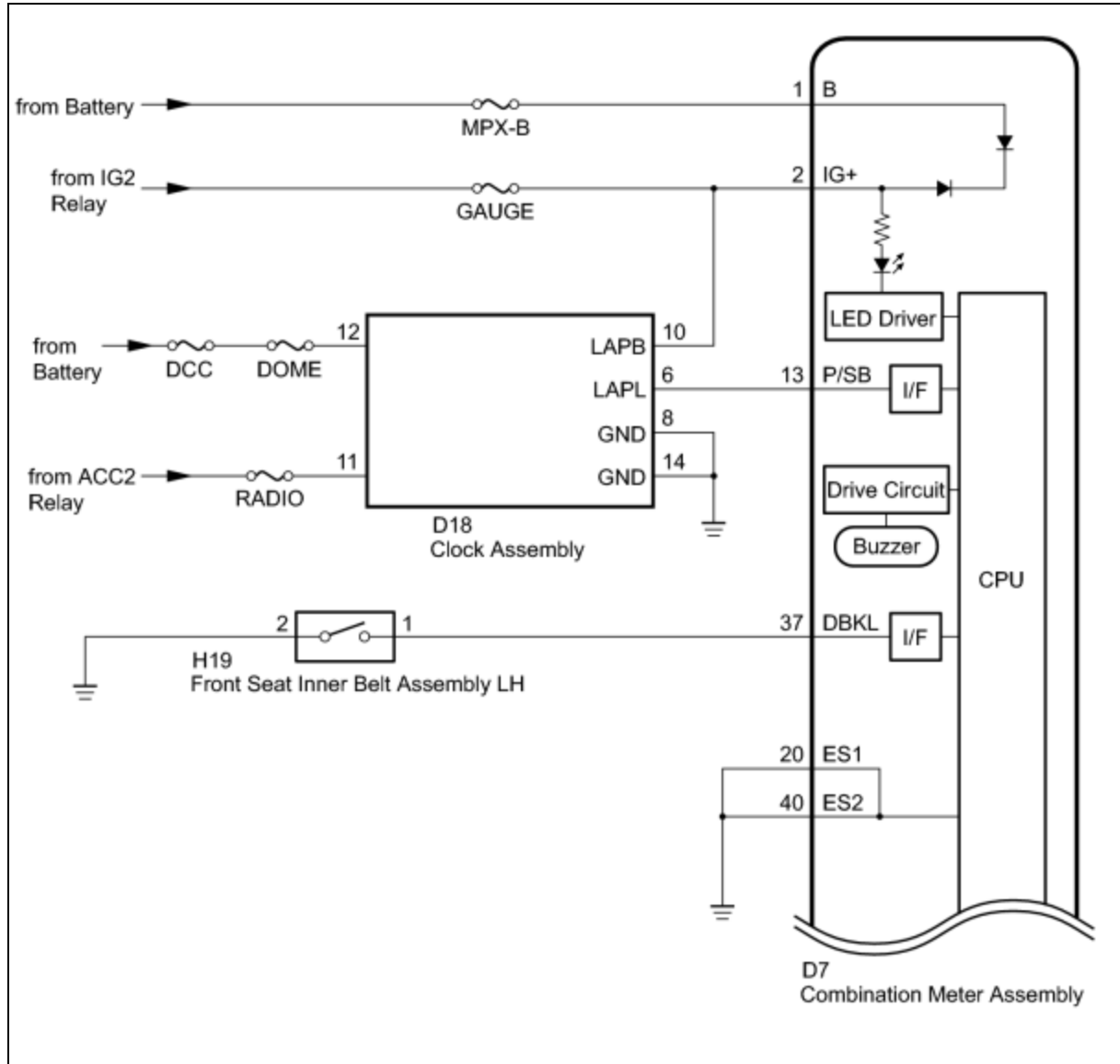
COMPONENT	FUNCTION
Front seat inner belt (driver side buckle switch)	Informs the combination meter assembly of the driver seat belt condition (fastened or unfastened).
Front seat inner belt (front passenger side buckle switch)	Informs the occupant detection ECU of the front passenger seat belt condition (fastened or unfastened).
Occupant detection sensor	Informs the occupant detection ECU of the front passenger seat condition (occupied or unoccupied).
Occupant detection ECU	Sends the front passenger seat belt buckle switch signal and occupant detection signal to the Airbag ECU assembly.
Airbag ECU assembly	Sends the front passenger seat belt buckle switch signal to the combination meter assembly.
Driver side seat belt warning light	If driver seat belt is unfastened and ignition switch is ON, combination meter flashes seat belt warning light in combination meter assembly as reminder.

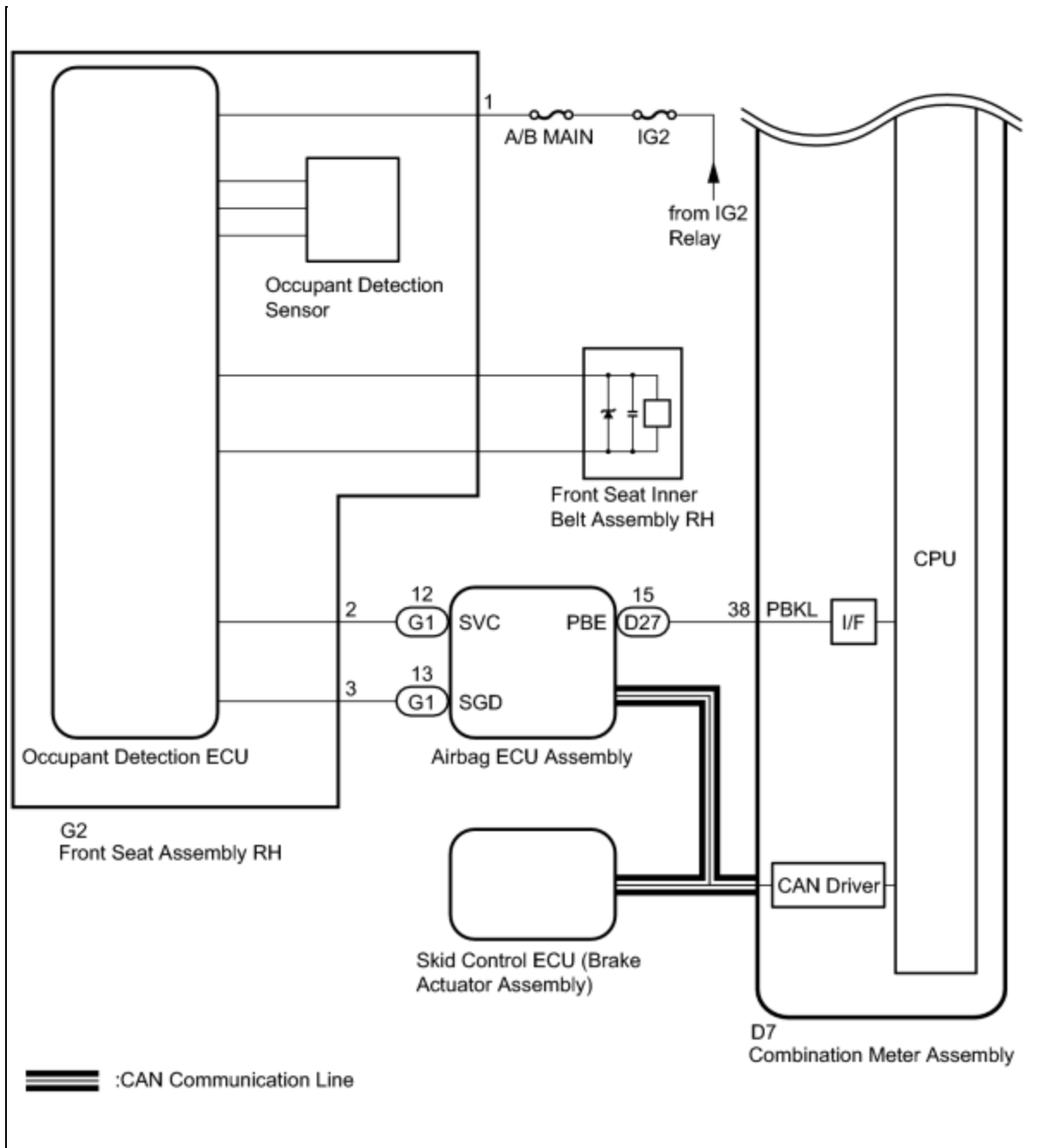
Front passenger side seat belt warning light	When front passenger seat is occupied and ignition switch is ON, if front passenger seat belt is unfastened, combination meter flashes seat belt warning light in the telltale light assembly as reminder.
Seat belt warning buzzer	If vehicle is driven at approximately 20 km/h (12.5 mph) or more with any of following conditions met, combination meter sounds buzzer as reminder: 1) driver seat belt is unfastened, 2) front passenger seat belt is unfastened with front passenger seat occupied.
Skid control ECU	Sends the vehicle speed signal to the combination meter assembly via CAN communication.



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001OC706MX
Title: SEAT BELT: SEAT BELT WARNING SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM





Communication Table

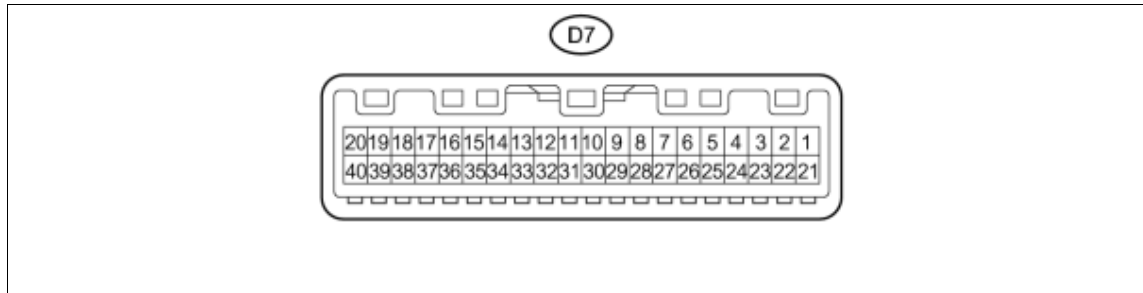
SENDER	RECEIVER	SIGNAL	COMMUNICATION METHOD
Airbag ECU assembly	Combination meter assembly	Occupant detection	CAN
Skid control ECU	Combination meter assembly	Vehicle speed	

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000014DJ07VX
Title: SEAT BELT: SEAT BELT WARNING SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. CHECK COMBINATION METER ASSEMBLY

(a) Disconnect the D7 combination meter assembly connector.



(b) Measure the resistance and voltage according to the value(s) in the table below.

HINT:

Measure the values on the wire harness side with the connector disconnected.

TESTER CONNECTION	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
D7-1 (+B)- Body ground	R-W - Body ground	Combination meter +B line	Always	11 to 14 V
D7-2 (IG+) - Body ground	W-G - Body ground	Combination meter IG line	Ignition switch ON	11 to 14 V
			Ignition switch off	Below 1 V
D7-20 (ES1) - Body ground	B-Y - Body ground	Ground	Always	Below 1 Ω
D7-37 (DBKL) - Body ground	R-B - Body ground	Driver seat belt signal	Driver seat belt fastened	10 k Ω or higher
			Driver seat belt unfastened	Below 1 Ω
D7-40 (ES2) - Body ground	B-Y - Body ground	Ground	Always	Below 1 Ω

If the result is not as specified, there may be a malfunction in the wire harness.

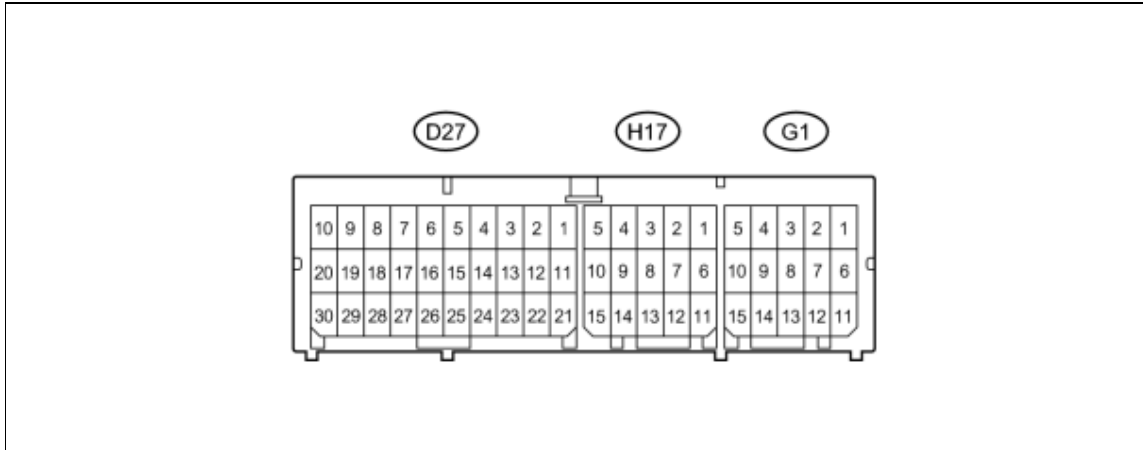
(c) Reconnect the D7 combination meter assembly connector.

(d) Measure the voltage according to the value(s) in the table below.

TESTER CONNECTION	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
D7-13 (P/SB) - Body ground	BR-R - Body ground	Front passenger seat belt warning signal	Front passenger seat occupied, seat belt fastened	Below 1 V
			Front passenger seat occupied, seat belt unfastened	11 to 14 V

If the result is not as specified, the combination meter assembly may have a malfunction.

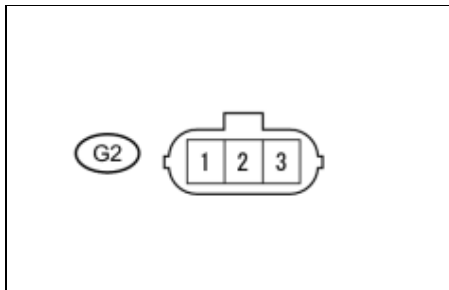
2. CHECK AIRBAG ECU ASSEMBLY



TERMINAL NO.	TERMINAL SYMBOL	DESTINATION
G1-12	SVC	Occupant detection ECU
G1-13	SGD	Occupant detection ECU

3. CHECK OCCUPANT DETECTION ECU

(a) Measure the voltage according to the value(s) in the table below.



TESTER CONNECTION	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFICATION
G2-1 - Body ground	G - Body ground	Occupant detection ECU IG line	Ignition switch ON	11 to 14 V
G2-2 - G2-3	Y-G - Y	Airbag ECU assembly communication line	Ignition switch ON	Pulse generation

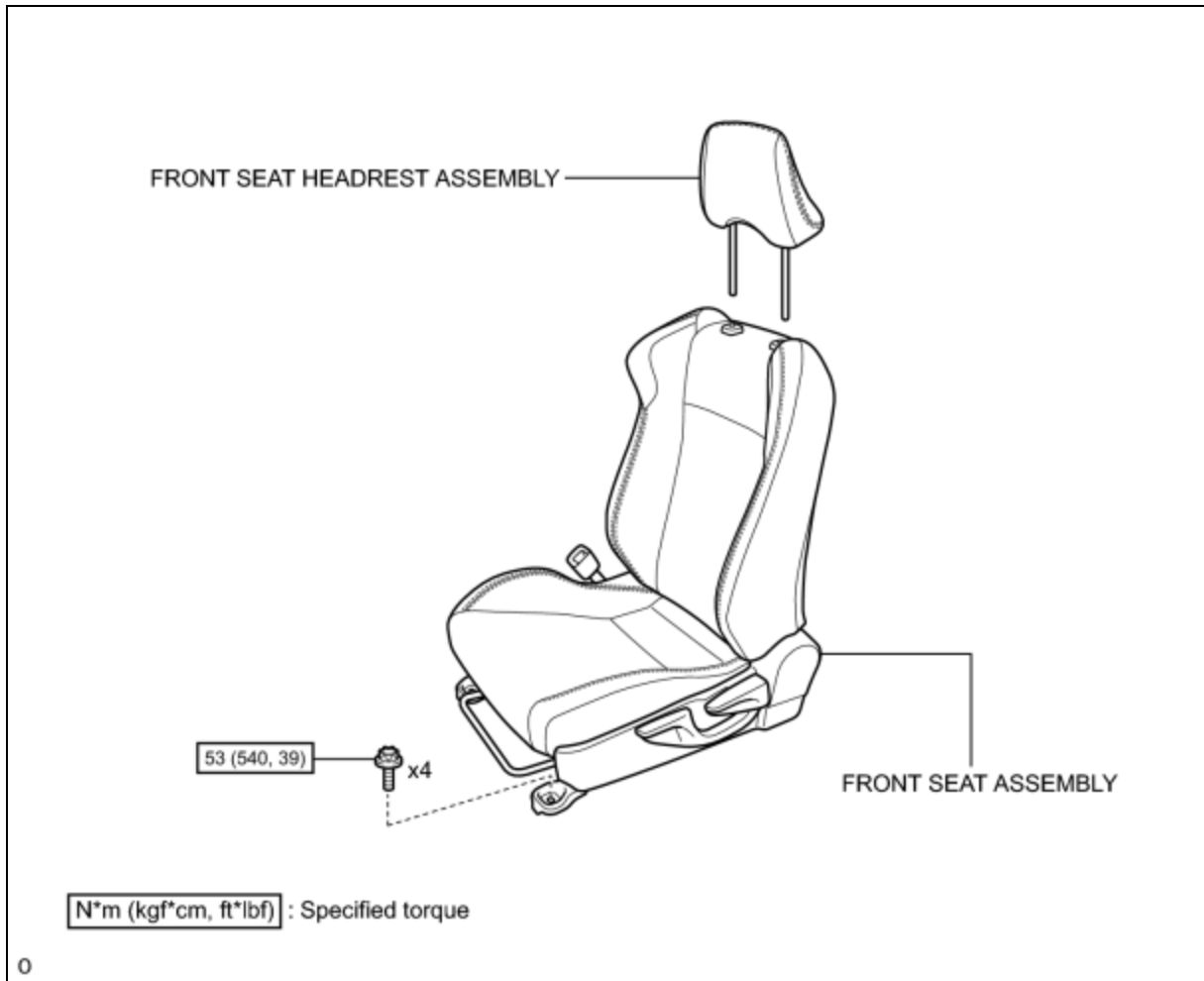
If the result is not as specified, the occupant detection ECU may have a malfunction.



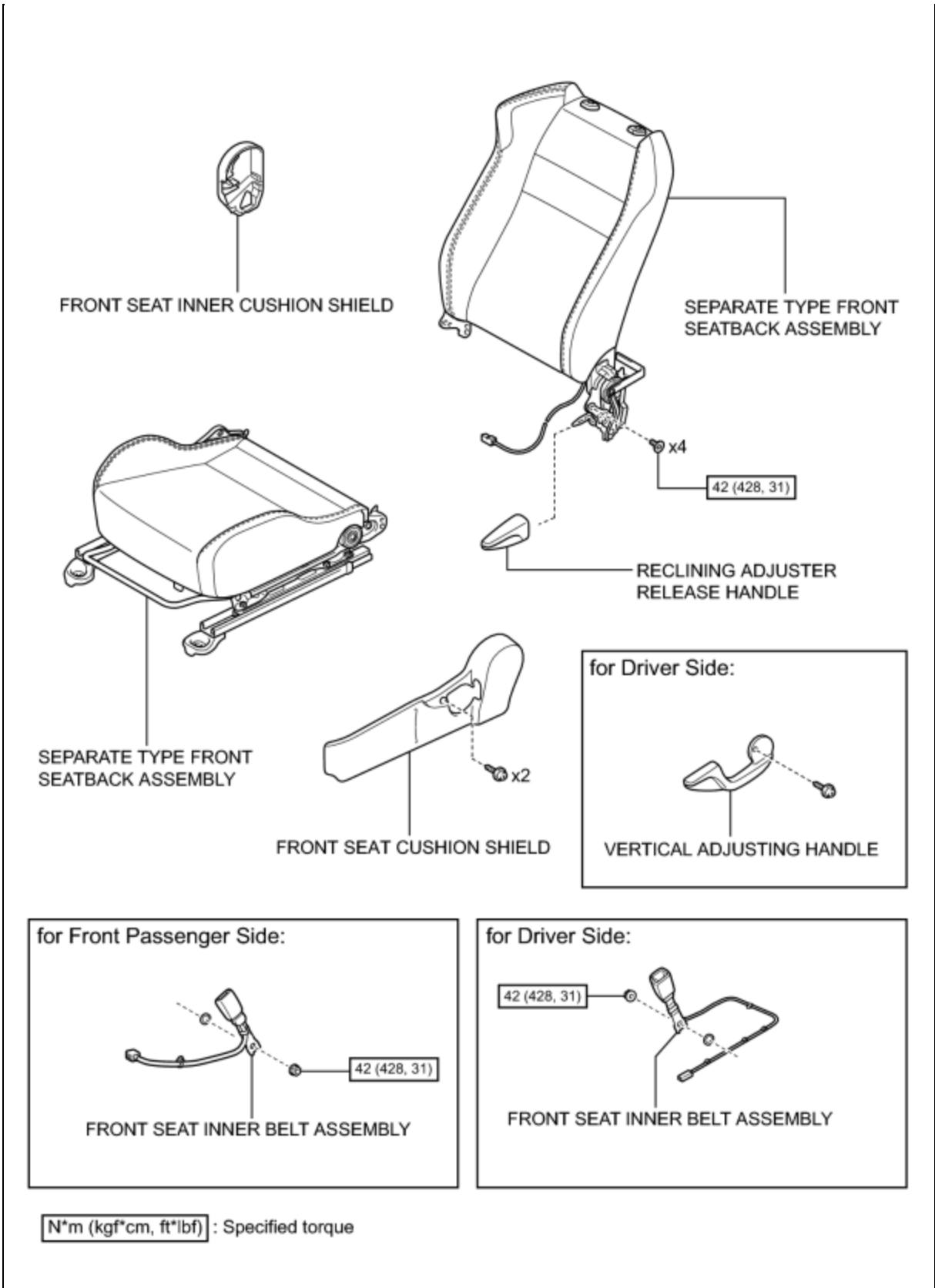
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001WAY01DX
Title: SEAT: FRONT SEAT ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

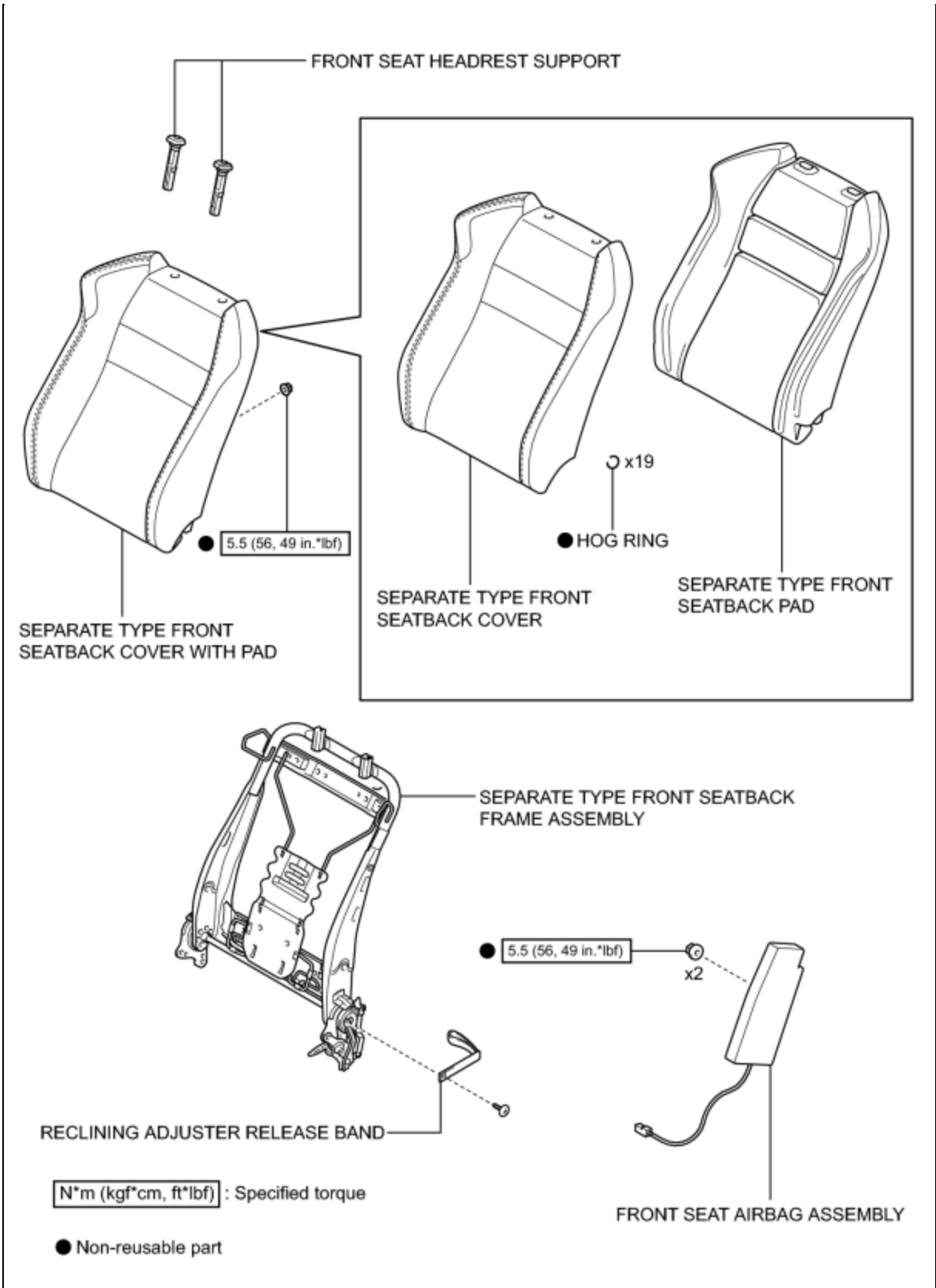
ILLUSTRATION



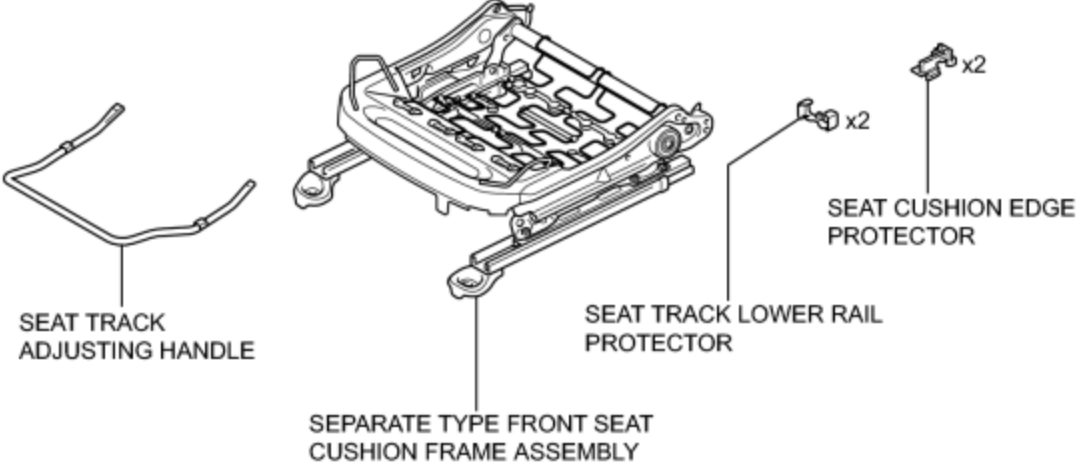
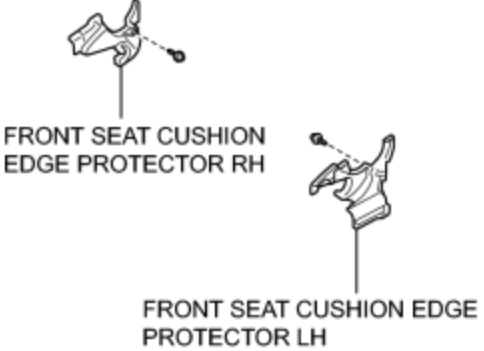
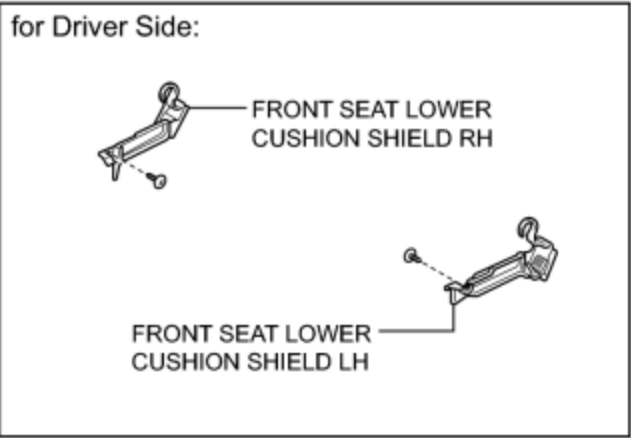
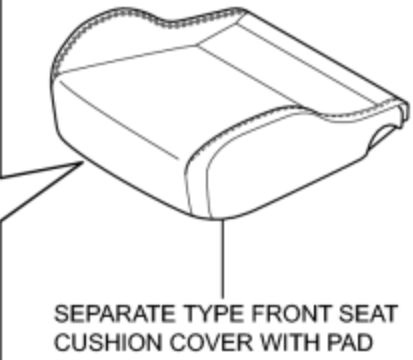
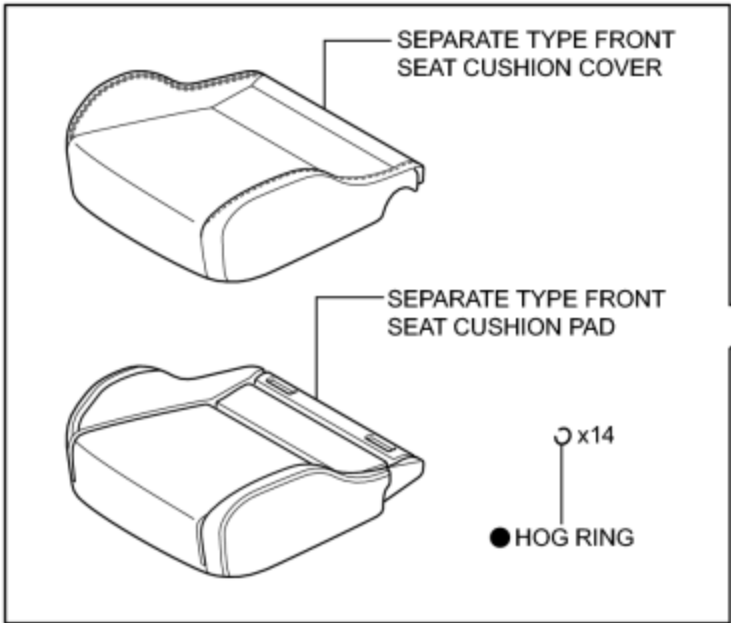
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION

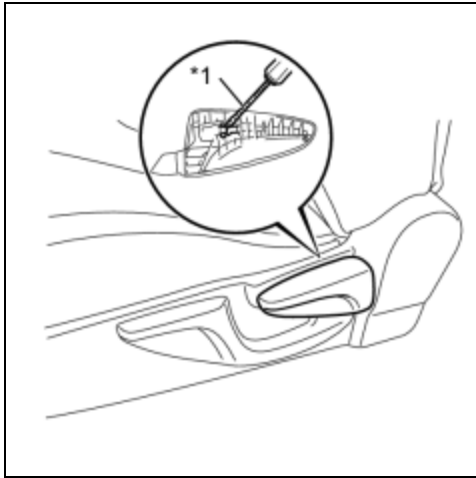


● Non-reusable part

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001WB0028X
Title: SEAT: FRONT SEAT ASSEMBLY: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. REMOVE RECLINING ADJUSTER RELEASE HANDLE

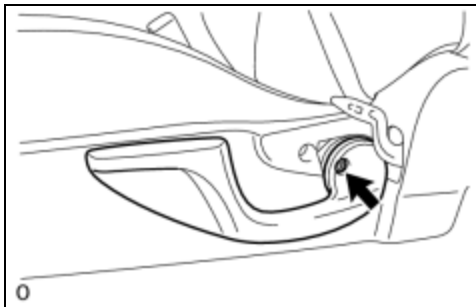


- (a) Using a screwdriver with its tip wrapped with protective tape, disengage the claw and remove the reclining adjuster release handle.

Text in Illustration

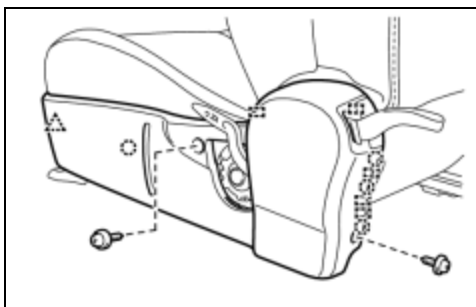
*1	Protective Tape
----	-----------------

2. REMOVE VERTICAL ADJUSTING HANDLE (for Driver Side)



- (a) Remove the screw and vertical adjusting handle.

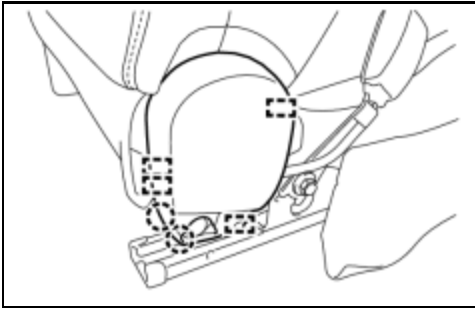
3. REMOVE FRONT SEAT CUSHION SHIELD



- (a) Remove the 2 screws.

(b) Disengage the 4 claws, 5 guides and clip to remove the front seat cushion shield.

4. REMOVE FRONT SEAT INNER CUSHION SHIELD

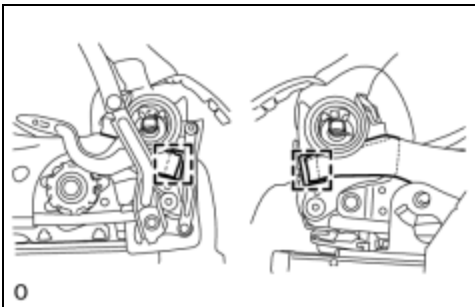


(a) Disengage the 2 claws and 4 guides to remove the front seat inner cushion shield.

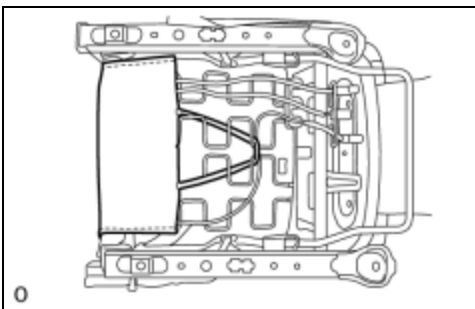
5. REMOVE FRONT SEAT INNER BELT ASSEMBLY (for Driver Side) INFO

6. REMOVE FRONT SEAT INNER BELT ASSEMBLY (for Front Passenger Side) INFO

7. REMOVE SEPARATE TYPE FRONT SEATBACK ASSEMBLY

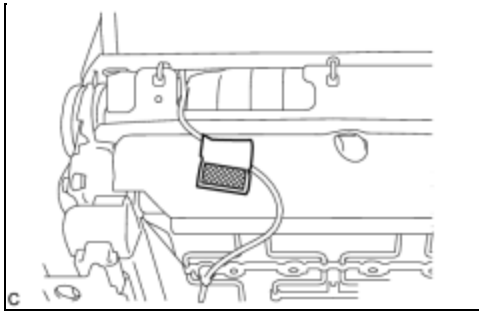


(a) Disengage the 2 hooks.

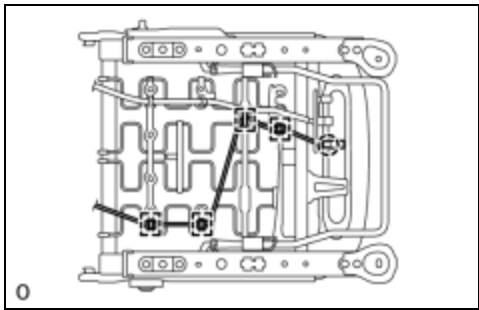
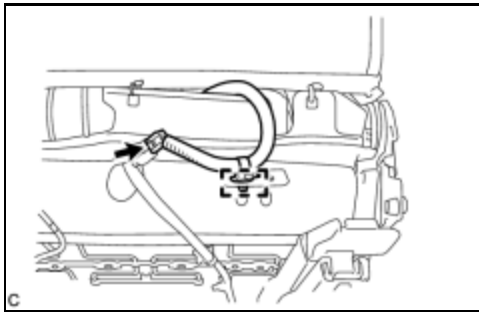


(b) Disconnect the rubber band of the separate type front seatback cover.

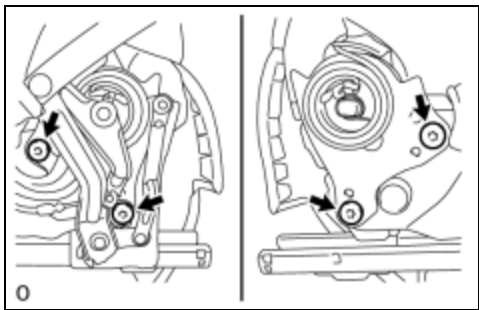
(c) Disengage the fastener and separate the front seat airbag assembly wire harness.



(d) Disconnect the front seat heater connector and disengage the clamp. (w/ Seat Heater System)

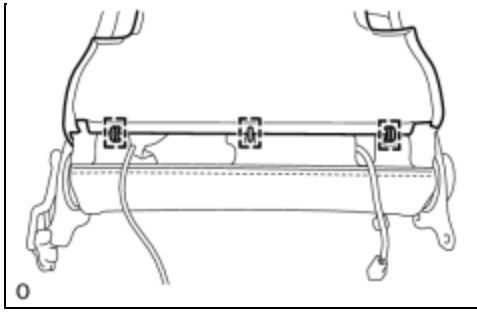


(e) Disengage the claw and 4 clamps to separate the front seat airbag assembly wire harness.

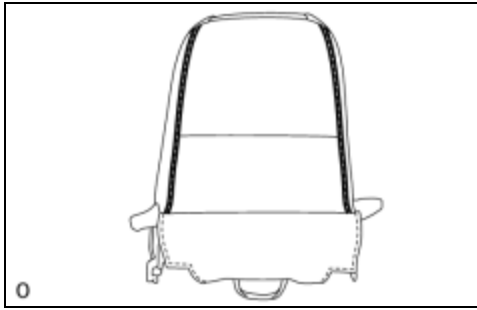


(f) Using a T40 "TORX" socket wrench, remove the 4 bolts and separate type front seatback assembly.

8. REMOVE SEPARATE TYPE FRONT SEATBACK COVER WITH PAD

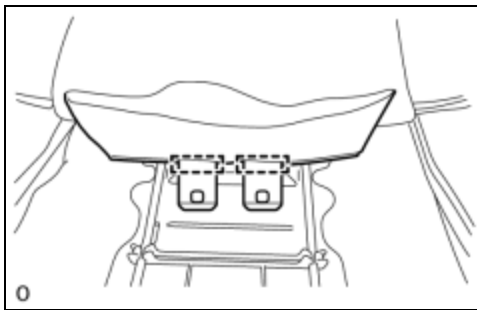


(a) Remove the 5 hog rings.

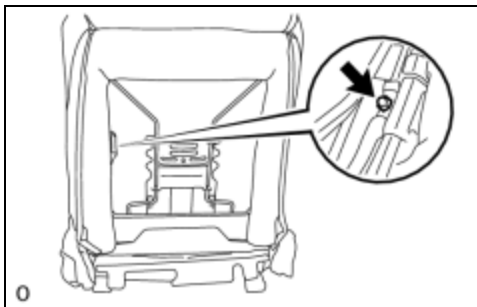


(b) Open the 2 fasteners.

(c) Turn back the separate type front seatback cover.

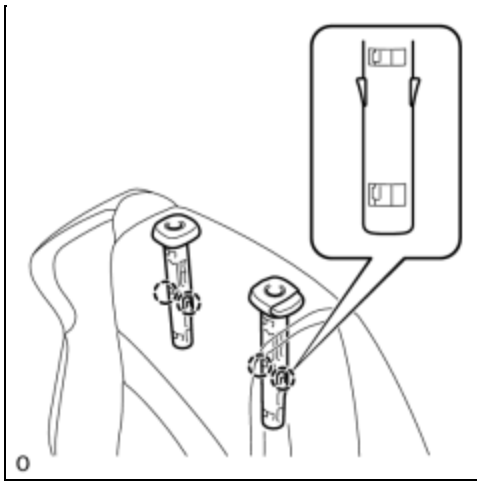


(d) Disengage the 2 hooks.



(e) Remove the nut and the 3 brackets.

(f) Disengage the 4 claws and remove the 2 front seat

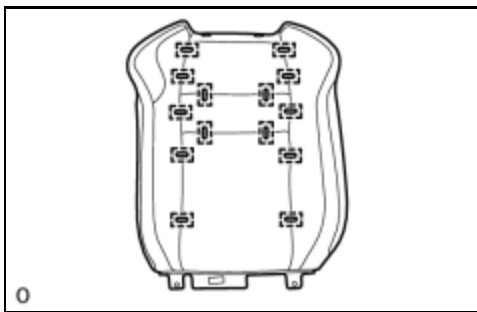


headrest supports.

(g) Remove the separate type front seatback cover with pad from front seatback frame assembly.

9. REMOVE FRONT SEAT AIRBAG ASSEMBLY INFO

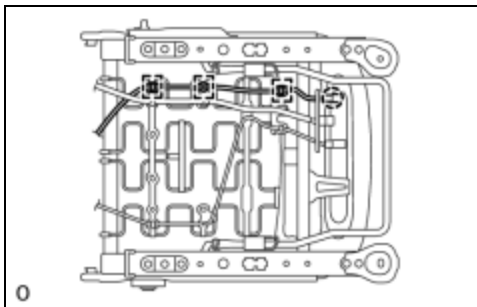
10. REMOVE SEPARATE TYPE FRONT SEATBACK COVER



(a) Remove the 14 hog rings and separate type front seatback cover from the separate type front seatback pad.

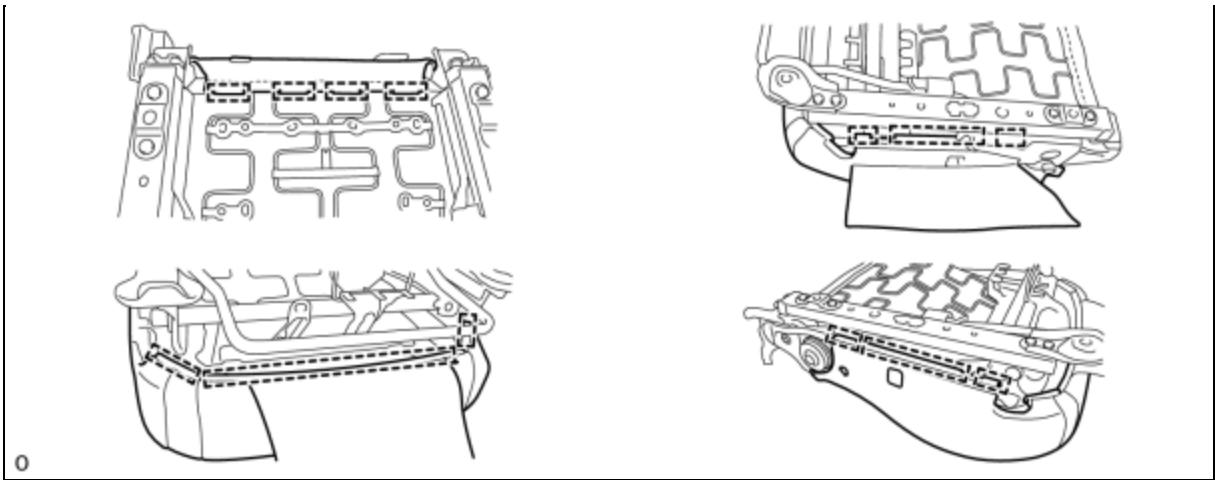
11. REMOVE SEPARATE TYPE FRONT SEAT CUSHION COVER WITH PAD

(a) Disconnect the occupant classification sensor connector. (for passenger side)

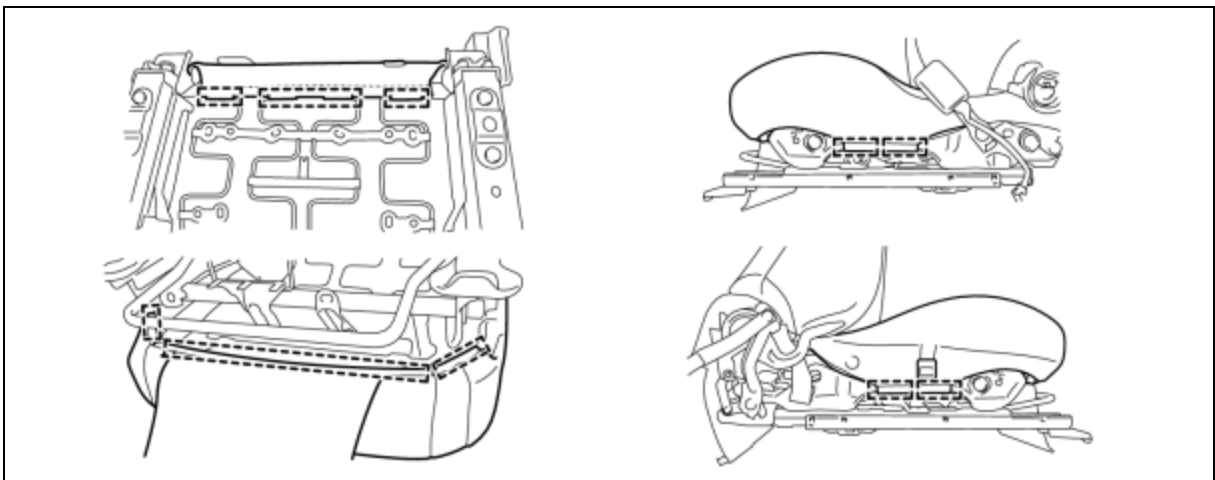


(b) Disengage the claw and 3 clamps to separate the front seat heater wire harness. (w/ Seat Heater System)

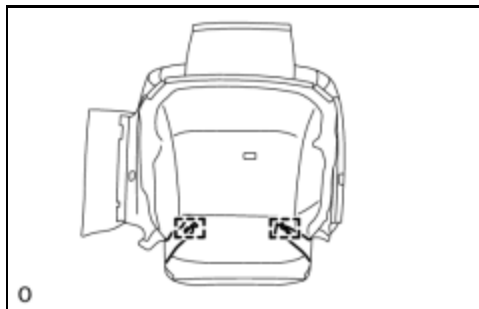
(c) Disengage each hook and remove the separate type front seat cushion cover with pad from separate type front seat cushion frame assembly. (for Driver Side)



(d) Disengage each hook and remove the separate type front seat cushion cover with pad from separate type front seat cushion frame assembly. (for Passenger Side)

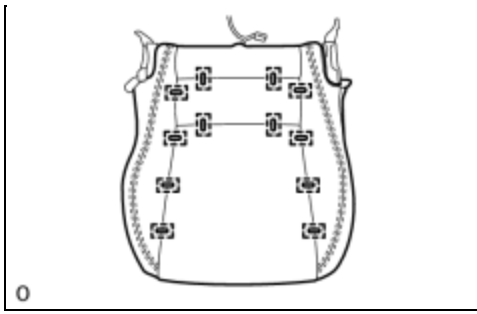


12. REMOVE SEPARATE TYPE FRONT SEAT CUSHION COVER

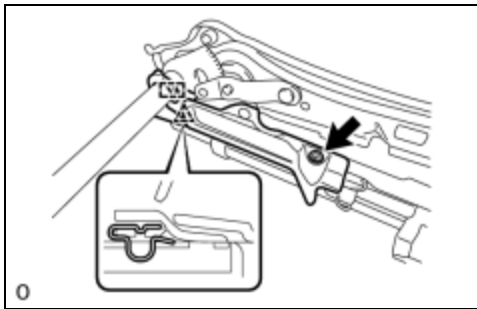


(a) Remove the 2 hog rings.

(b) Remove the 12 hog rings and the separate type front seat cushion cover from the separate type front seat cushion pad.



13. REMOVE FRONT SEAT LOWER CUSHION SHIELD LH (for Driver Side)



(a) Remove the screw.

(b) Disengage the hook.

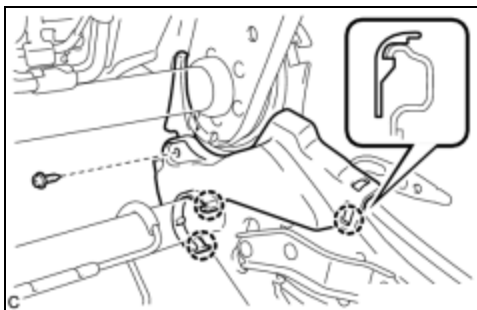
(c) Disengage the clip and remove the front seat lower cushion shield LH.

14. REMOVE FRONT SEAT LOWER CUSHION SHIELD RH (for Driver Side)

HINT:

Use the same procedure as for the LH side.

15. REMOVE FRONT SEAT CUSHION EDGE PROTECTOR LH



(a) Remove the screw.

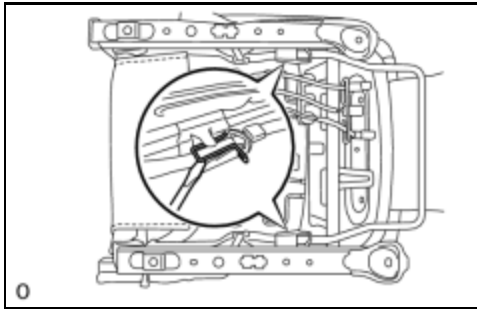
(b) Disengage the 3 claws to remove the front seat cushion edge protector LH.

16. REMOVE FRONT SEAT CUSHION EDGE PROTECTOR RH

HINT:

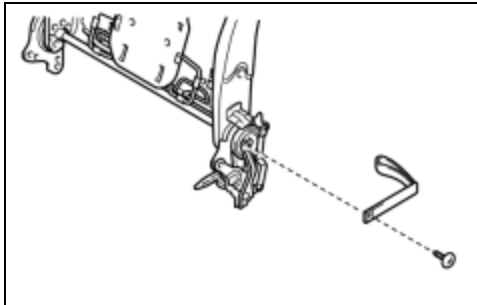
Use the same procedure as for the LH side.

17. REMOVE SEAT TRACK ADJUSTING HANDLE



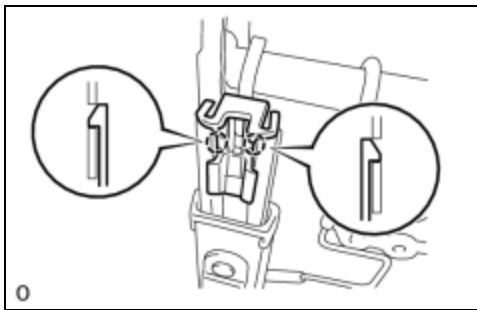
- (a) Using a screwdriver, disengage the 2 springs to remove the seat track adjusting handle from separate type front seat cushion frame assembly.

18. REMOVE RECLINING ADJUSTER RELEASE BAND



- (a) Remove the screw and reclining adjuster release band.

19. REMOVE SEAT CUSHION EDGE PROTECTOR

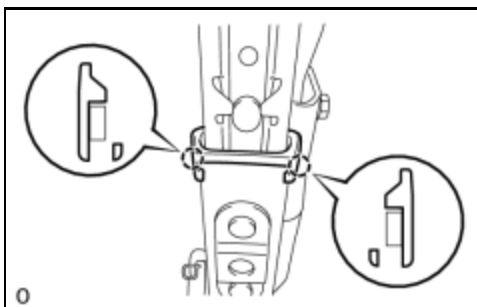


- (a) Disengage the 2 claws to remove the seat cushion edge protector.

HINT:

Use the same procedure for both the 2 seat cushion edge protectors.

20. REMOVE SEAT TRACK LOWER RAIL PROTECTOR



- (a) Disengage the 2 claws to remove the seat track lower rail protector.

HINT:

Use the same procedure for both the 2 seat track lower rail protectors.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001WAX01DX
Title: SEAT: FRONT SEAT ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

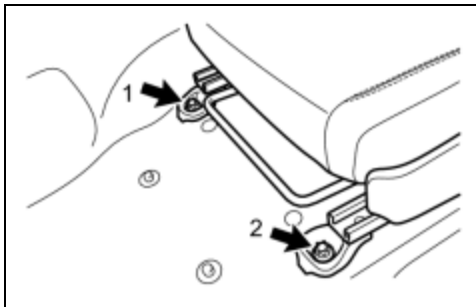
1. INSTALL FRONT SEAT ASSEMBLY

- (a) Place the front seat assembly in the cabin.

NOTICE:

Be careful not to damage the vehicle body.

- (b) Operate the reclining adjuster release handle and move the seatback to the upright position.
(c) Lift up the seat track adjusting handle and move the seat to the rearmost position.
(d) Temporarily install the 2 bolts on the front side of the front seat assembly.
(e) Connect each connector and clamp under the seat.
(f) Engage the hook of the separate type front seat cushion cover.
(g) Lift up the seat track adjusting handle and move the seat to the foremost position.
(h) Temporarily install the 2 bolts on the rear side of the front seat assembly.
(i) Lift up the seat track adjusting handle and move the seat to the rearmost position.



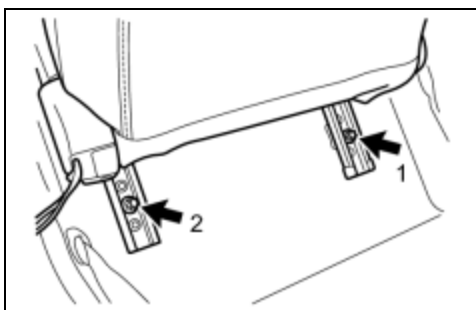
- (j) Using a E10 "TORX" socket wrench, tighten the 2 bolts on the front side of the seat.

Torque: 53 N·m (540 kgf·cm, 39ft·lbf)

NOTICE:

Tighten the bolts in the order indicated in the illustration.

- (k) Lift up the seat track adjusting handle and move the seat to the foremost position.



- (l) Using a E10 "TORX" socket wrench, tighten the 2 bolts on the rear side of the seat.

Torque: 53 N·m (540 kgf·cm, 39ft·lbf)

NOTICE:

Tighten the bolts in the order indicated in the illustration.

2. INSPECT SEAT SLIDE ADJUSTER LOCKS

- (a) During the sliding operation of the front seat, check that the left and right adjusters move together smoothly and lock simultaneously. If the seat adjusters do not lock simultaneously, loosen the seat installation bolts to adjust the adjuster position.

3. INSTALL FRONT SEAT HEADREST ASSEMBLY

4. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

5. INSPECT SRS WARNING LIGHT

INFO



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001WB1028X
Title: SEAT: FRONT SEAT ASSEMBLY: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL SEAT TRACK LOWER RAIL PROTECTOR

- (a) Engage the 2 claws to install the seat track lower rail protector.

HINT:

Use the same procedure for both the 2 seat track lower rail protectors.

2. INSTALL SEAT CUSHION EDGE PROTECTOR

- (a) Engage the 2 claws to install the seat cushion edge protector.

HINT:

Use the same procedure for both the 2 seat cushion edge protectors.

3. INSTALL RECLINING ADJUSTER RELEASE BAND

- (a) Install the reclining adjuster release band with the screw.

4. INSTALL SEAT TRACK ADJUSTING HANDLE

- (a) Engage the 2 springs to install the seat track adjusting handle to the separate type front seat cushion frame assembly.

NOTICE:

- Springs must be securely engaged.
- Install the rear end of seat track adjusting handle on the seat track lever.

5. INSTALL FRONT SEAT CUSHION EDGE PROTECTOR LH

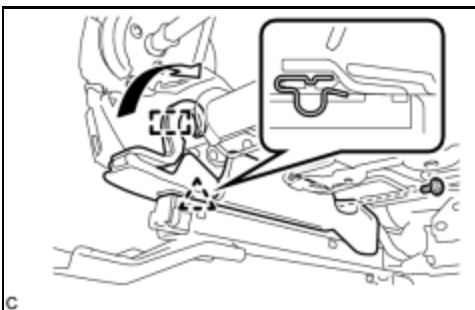
- (a) Engage the 3 claws to install the front seat cushion edge protector LH.
(b) Install the screw.

6. INSTALL FRONT SEAT CUSHION EDGE PROTECTOR RH

HINT:

Use the same procedure as for the LH side.

7. INSTALL FRONT SEAT LOWER CUSHION SHIELD LH (for Driver Side)



- (a) Engage the clip to install the front seat lower cushion shield LH.

(b) Engage the hook as shown in the illustration.

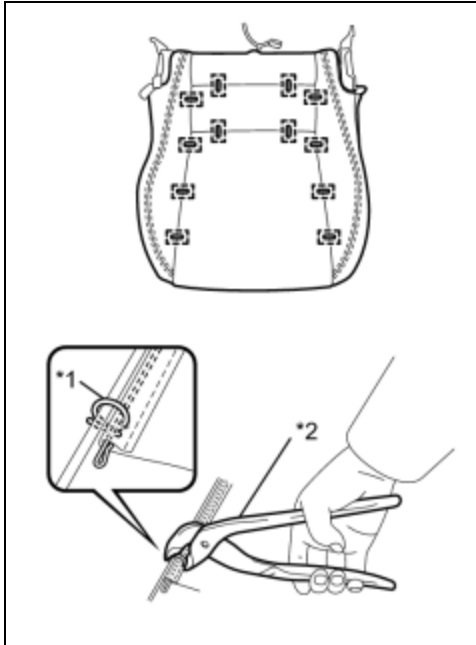
(c) Install the screw.

8. INSTALL FRONT SEAT LOWER CUSHION SHIELD RH (for Driver Side)

HINT:

Use the same procedure as for the LH side.

9. INSTALL SEPARATE TYPE FRONT SEAT CUSHION COVER



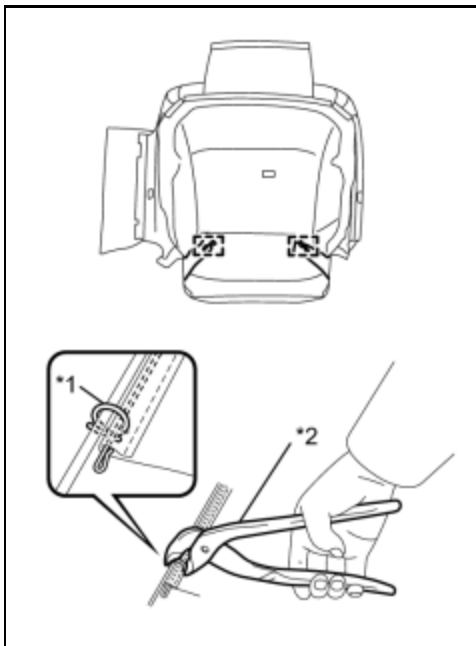
(a) Using hog ring pliers, install the separate type front seat cushion cover to the separate type front seat cushion pad with 12 new hog rings.

NOTICE:

- Be careful not to damage the separate type front seat cushion cover.
- When installing the hog rings, take care to minimize wrinkles as much as possible.

Text in Illustration

*1	Hog Ring
*2	Hog Ring Pliers



(b) Using hog ring pliers, install 2 new hog rings.

NOTICE:

- Be careful not to damage the separate type front seat cushion cover.
- When installing the hog rings, take care to minimize wrinkles as much as possible.

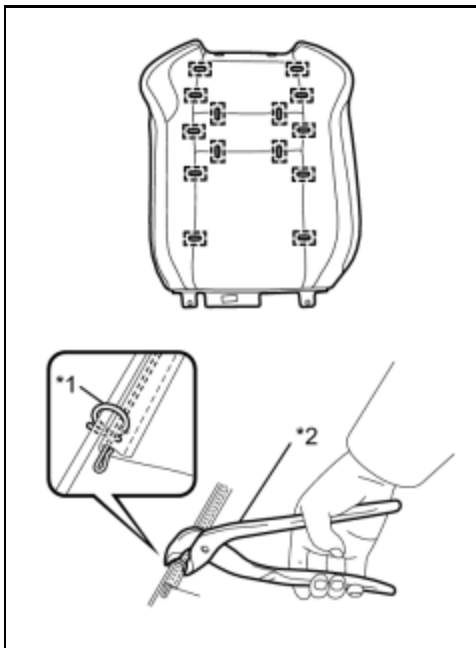
Text in Illustration

*1	Hog Ring
*2	Hog Ring Pliers

10. INSTALL SEPARATE TYPE FRONT SEAT CUSHION COVER WITH PAD

- (a) Temporarily install the separate type front seat cushion cover with pad to the separate type front seat cushion frame assembly
- (b) Engage each hook.
- (c) Engage the claw and 3 clamps to install the front seat cushion heater wire harness. (w/ Seat Heater System)
- (d) Connect the occupant classification sensor connector. (for Passenger Side)

11. INSTALL SEPARATE TYPE FRONT SEATBACK COVER



- (a) Using hog ring pliers, install the separate type front seatback cover to the separate type front seatback pad with 14 new hog rings.

NOTICE:

- Be careful not to damage the separate type front seatback cover.
- When installing the hog rings, take care to minimize wrinkles as much as possible.

Text in Illustration

*1	Hog Ring
*2	Hog Ring Pliers

12. INSTALL FRONT SEAT AIRBAG ASSEMBLY INFO

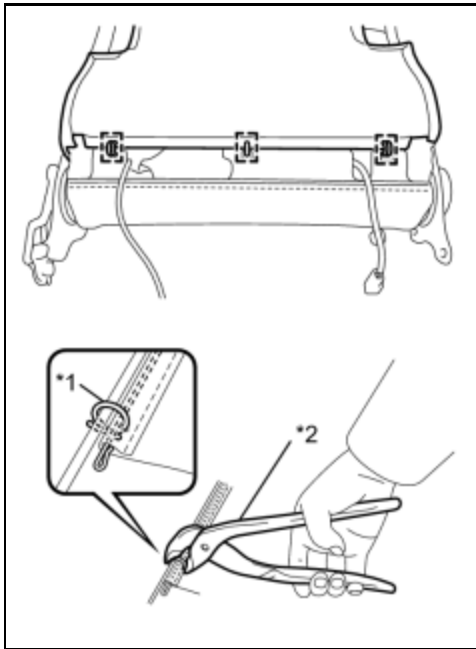
13. INSTALL SEPARATE TYPE FRONT SEATBACK COVER WITH PAD

- (a) Temporarily install the separate type front seatback cover with pad to the separate type front seatback frame assembly.
- (b) Install the 3 brackets with the nut.

Torque: 5.5 N·m (56 kgf·cm, 49in·lbf)

CAUTION:

- For vehicles with a front seat airbag assembly, the separate type front seatback cover must be securely installed. Otherwise, the front seat airbag assembly may not deploy properly.
 - Make sure that the strap is not twisted after installing the nut.
 - Install the bracket securely.
- (c) Engage the 4 claws to install the 2 front seat headrest supports.
 - (d) Engage the 2 hooks.
 - (e) Turn back the separate type front seatback cover.
 - (f) Close the 2 fasteners.



(g) Using hog ring pliers, install 5 new hog rings.

NOTICE:

- Be careful not to damage the separate type front seatback cover.
- When installing the hog rings, take care to minimize wrinkles as much as possible.

Text in Illustration

*1	Hog Ring
*2	Hog Ring Pliers

14. INSTALL SEPARATE TYPE FRONT SEATBACK ASSEMBLY

(a) Using a T40 "TORX" socket wrench, install the separate type front seatback assembly with the new 4 bolts.

Torque: 42 N·m (428 kgf·cm, 31ft·lbf)

- (b) Engage the claw and 4 clamps to install the front seat airbag assembly wire harness.
 (c) Engage the fastener to secure the front seat airbag assembly wire harness.
 (d) Engage the clamp and connect the front seat heater connector. (w/ Seat Heater System)
 (e) Connect the rubber band of the separate type front seatback cover.
 (f) Engage the 2 hooks.

15. INSTALL FRONT SEAT INNER BELT ASSEMBLY (for Driver Side) INFO

16. INSTALL FRONT SEAT INNER BELT ASSEMBLY (for Front Passenger Side) INFO

17. INSTALL FRONT SEAT INNER CUSHION SHIELD

(a) Engage the 2 claws and 4 guides to install the front seat inner cushion shield.

18. INSTALL FRONT SEAT CUSHION SHIELD

- (a) Engage the 4 claws, 5 guides and clip to install the front seat inner cushion shield.
 (b) Install the 2 screws.

19. INSTALL VERTICAL ADJUSTING HANDLE (for Driver Side)

(a) Install the vertical adjusting handle with the screw.

20. INSTALL RECLINING ADJUSTER RELEASE HANDLE

(a) Engage the claw to install the reclining adjuster release handle.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001WAZ01DX
Title: SEAT: FRONT SEAT ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

1. PRECAUTION

CAUTION:

- Be sure to read Precaution thoroughly before servicing. INFO
- If the side airbag was deployed, replace the front seat assembly,

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

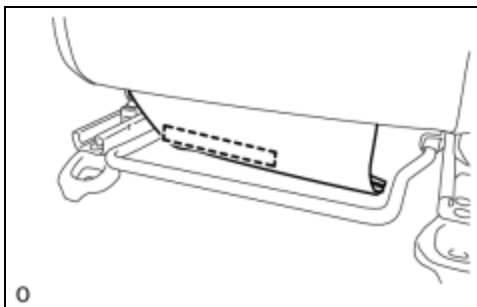
NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

3. REMOVE FRONT SEAT HEADREST ASSEMBLY

4. REMOVE FRONT SEAT ASSEMBLY

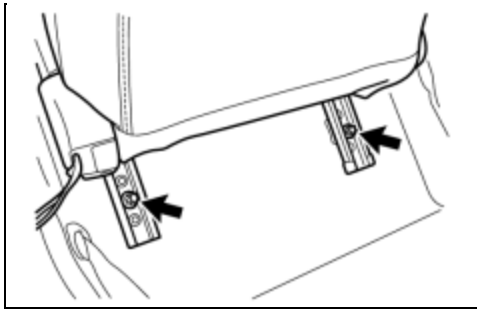
- (a) Operate the reclining adjuster release handle and move the seatback to the upright position.
- (b) Lift up the seat track adjusting handle and move the seat to the foremost position.



- (c) Disengage the hook of the separate type front seat cushion cover.

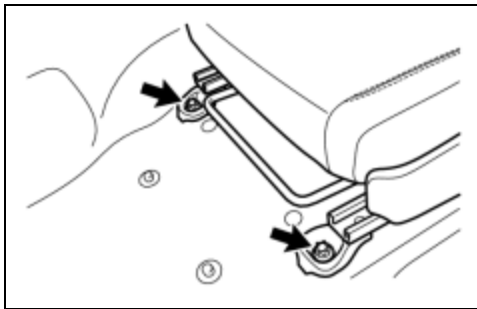
- (d) Disconnect each connector and clamp under the seat.

- (e) Using a E10 "TORX" socket wrench, remove the 2



bolts on the rear side of the seat.

(f) Lift up the seat track adjusting handle and move the seat to the rearmost position.



(g) Using a E10 "TORX" socket wrench, remove the 2 bolts on the front side of the seat.

(h) Remove the front seat assembly.

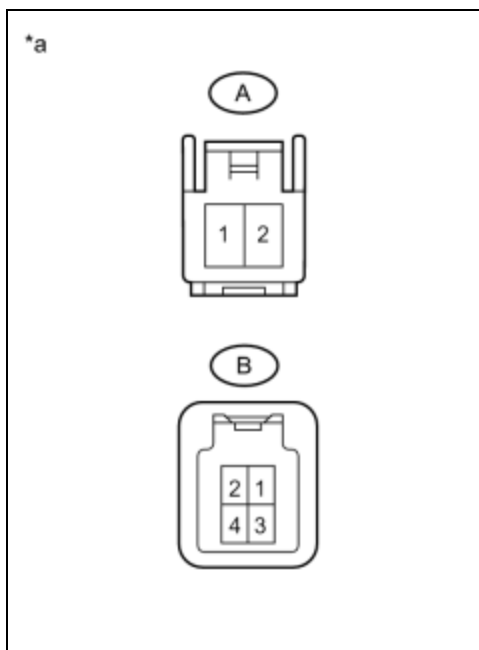
NOTICE:

- Be careful not to damage the vehicle body.
- Always work in teams of multiple people when removing seats from the vehicle.

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000012HG020X
Title: SEAT: FRONT SEAT CUSHION HEATER: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT FRONT SEAT CUSHION HEATER ASSEMBLY LH



(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

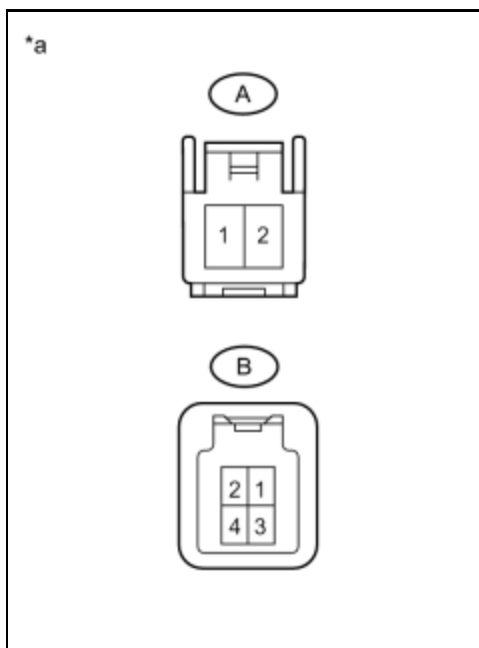
*a	Component without harness connected (Separate Type Front Seat Cushion Pad LH)
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Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A-1 - B-1	Always	Below 1 Ω
A-2 - A-3	Always	3.21 to 3.85 Ω
A-2 - B-2	Always	3.21 to 3.85 Ω
A-3 - B-2	Always	Below 1 Ω

If the result is not as specified, replace the separate type front seat cushion pad LH.

2. INSPECT FRONT SEAT CUSHION HEATER ASSEMBLY RH



(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Separate Type Front Seat Cushion Pad RH)
----	--

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A-1 - B-1	Always	Below 1 Ω
A-2 - A-3	Always	3.21 to 3.85 Ω
A-2 - B-2	Always	3.21 to 3.85 Ω
A-3 - B-2	Always	Below 1 Ω

If the result is not as specified, replace the separate

type front seat cushion pad RH.

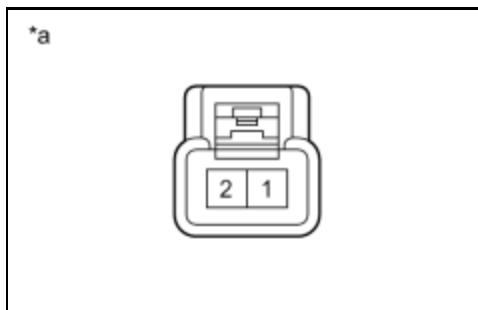


Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000012HF01ZX
Title: SEAT: FRONT SEATBACK HEATER: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT FRONT SEAT BACK HEATER ASSEMBLY LH

(a) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Separate Type Front Seatback Pad LH)
----	--

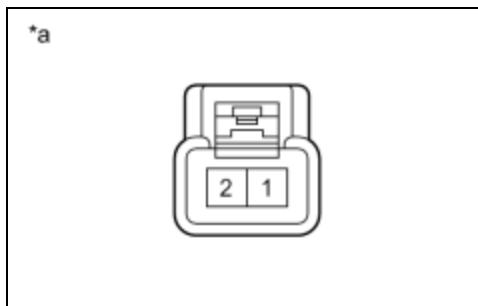
Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	Always	3.26 to 4 Ω

If the result is not as specified, replace the separate type front seatback pad LH.

2. INSPECT FRONT SEAT BACK HEATER ASSEMBLY RH

(a) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Separate Type Front Seatback Pad RH)
----	--

Standard Resistance:

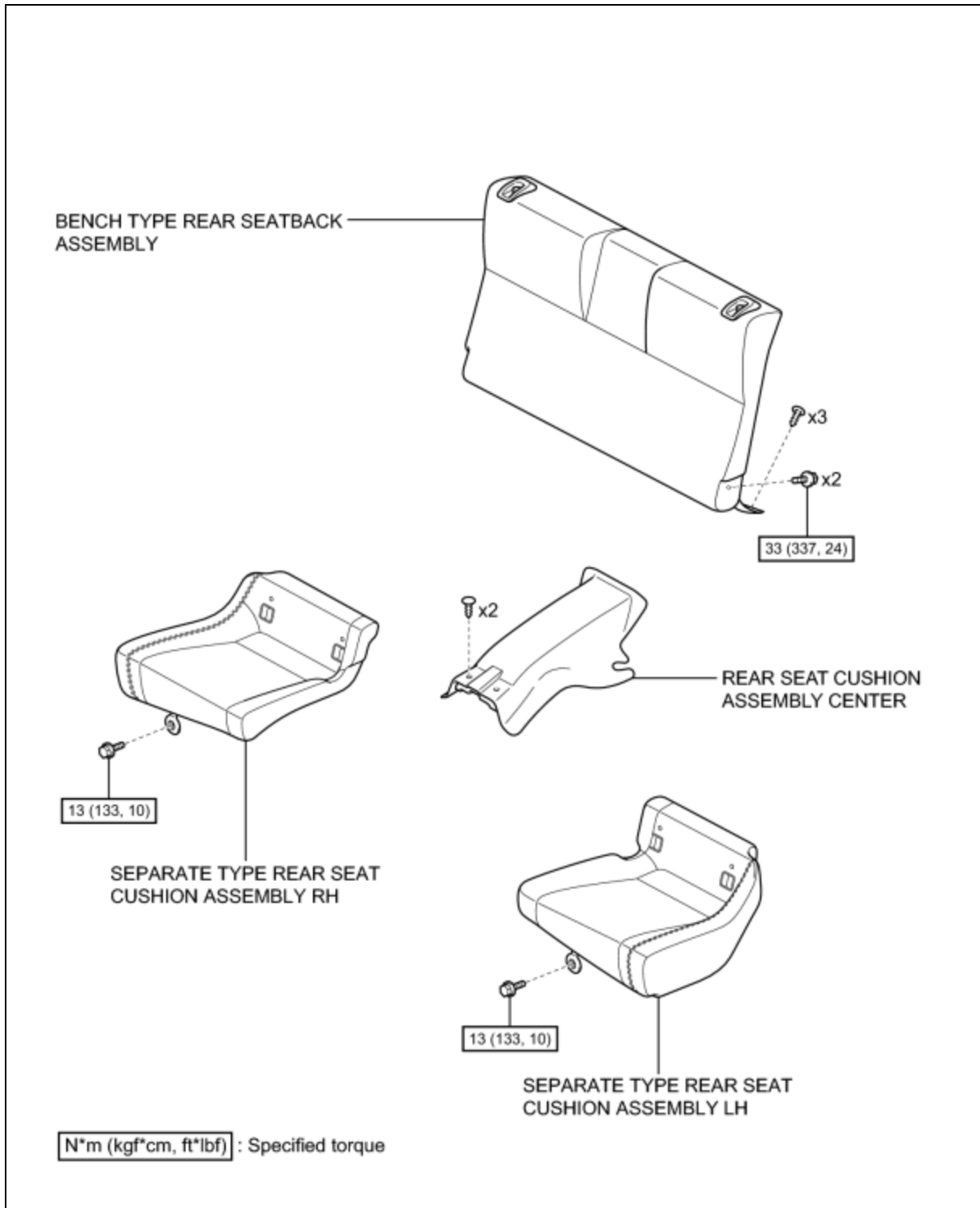
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	Always	3.26 to 4 Ω

If the result is not as specified, replace the separate type front seatback pad RH.

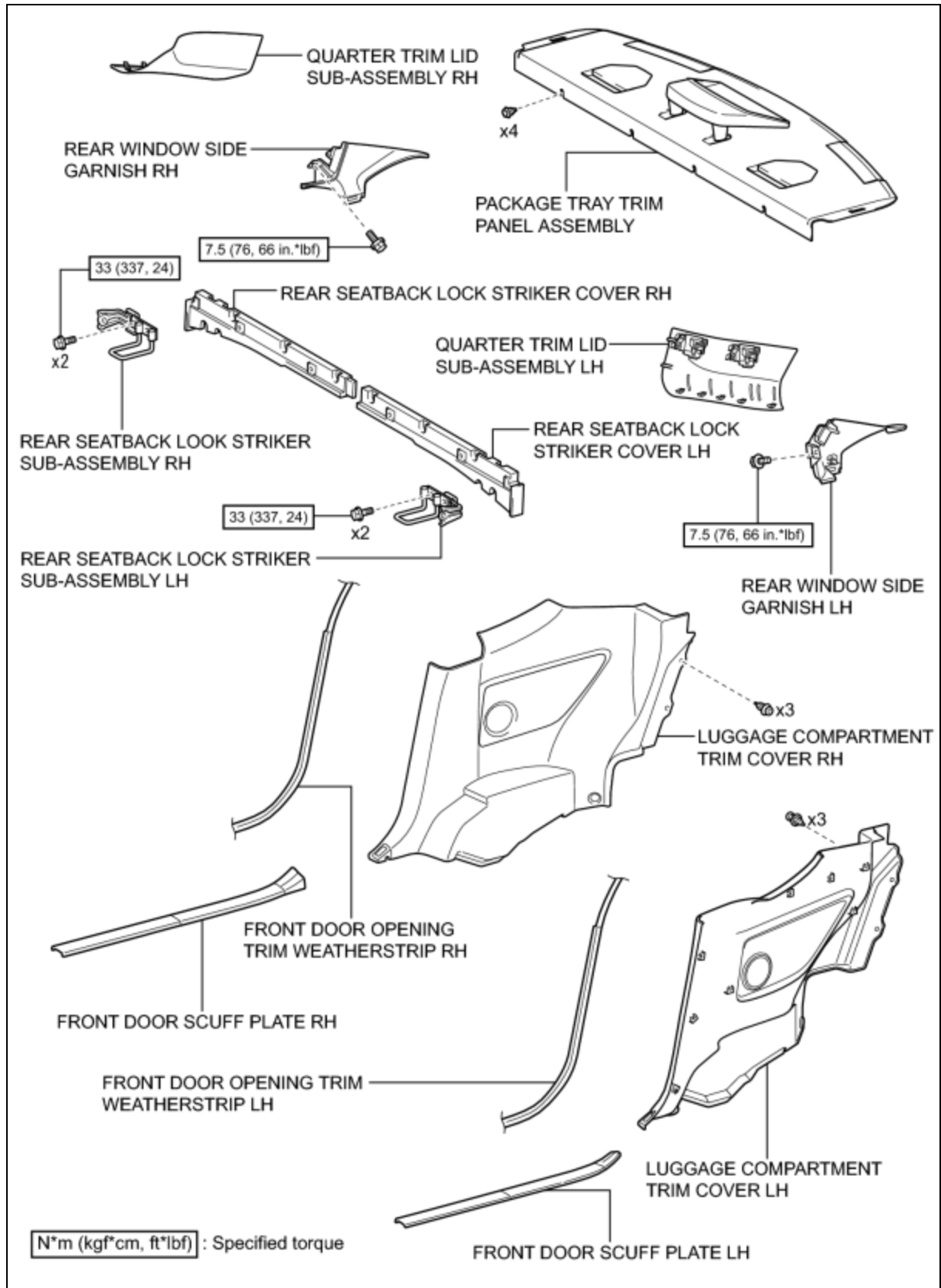
Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002SZW00SX
Title: SEAT: REAR SEAT ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

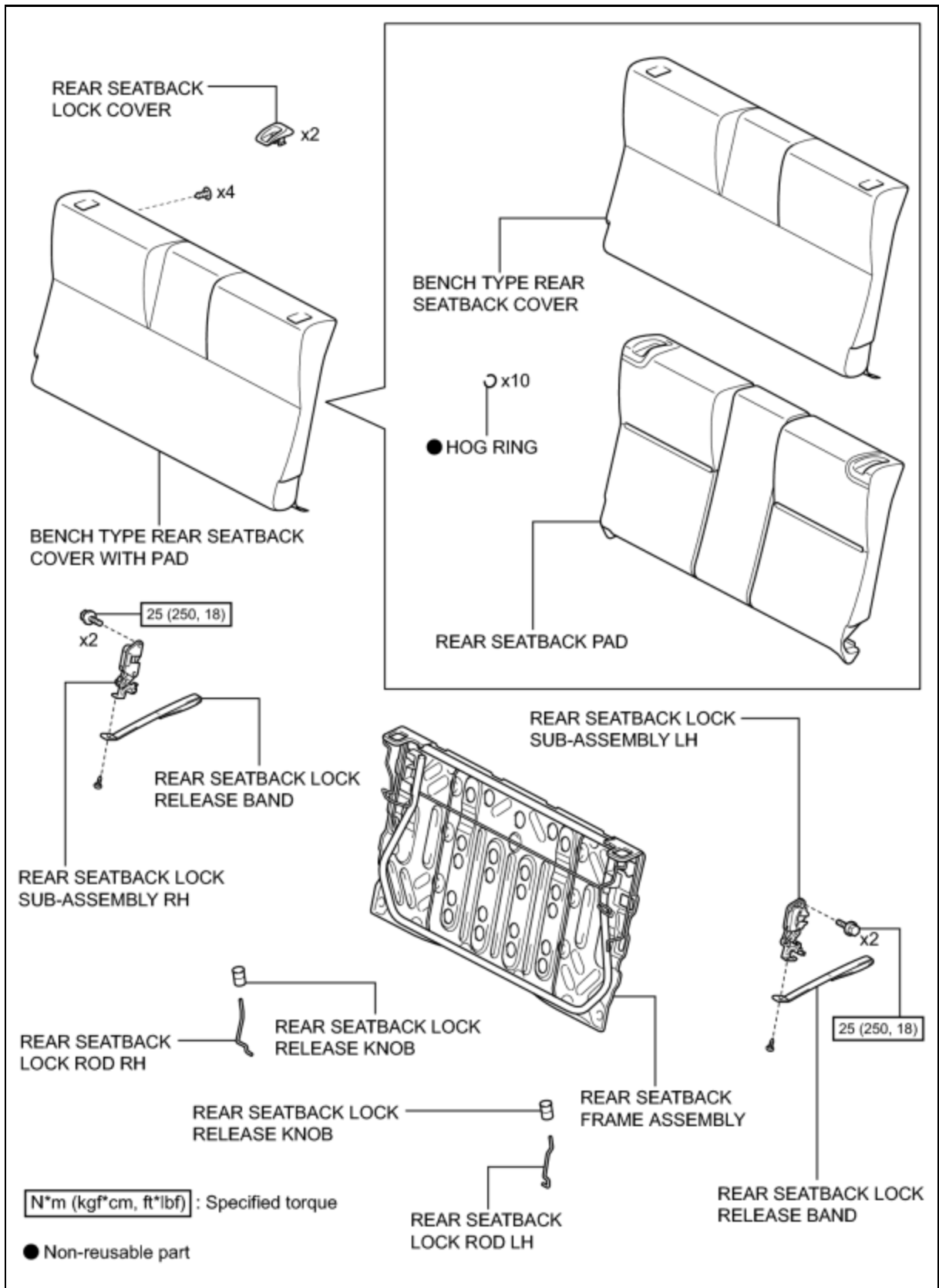
ILLUSTRATION



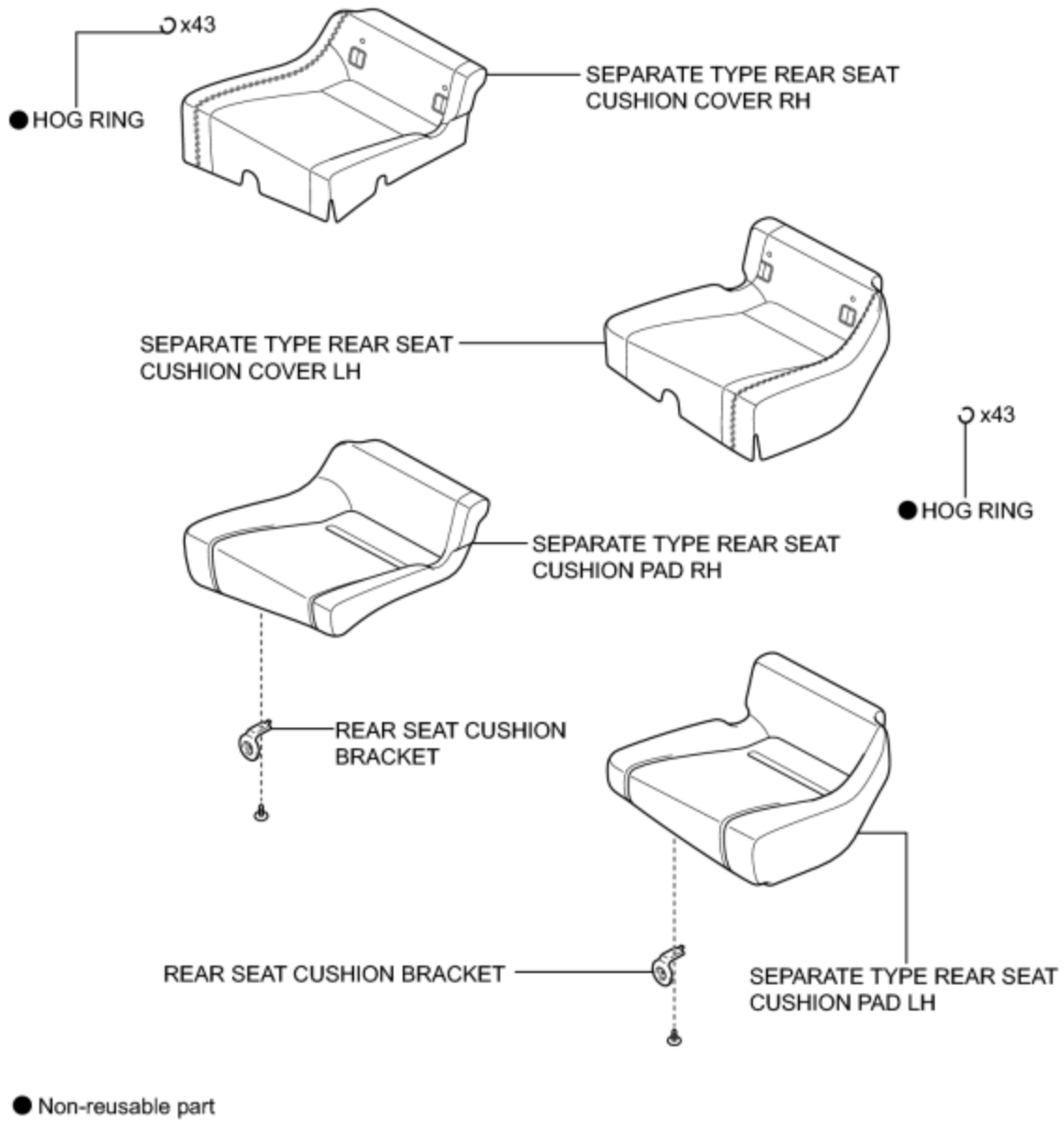
ILLUSTRATION



ILLUSTRATION



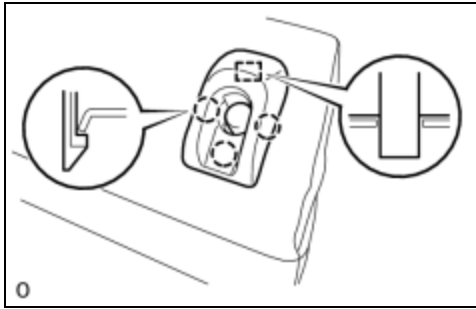
ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002SZY00SX
Title: SEAT: REAR SEAT ASSEMBLY: DISASSEMBLY (2013 FR-S)		

DISASSEMBLY

1. REMOVE REAR SEATBACK LOCK COVER

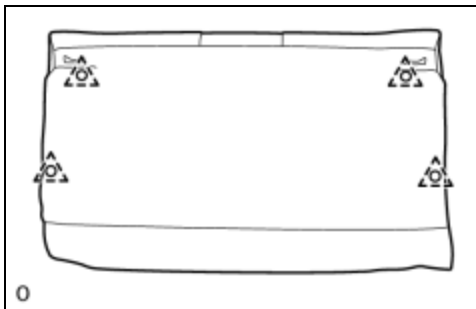


- (a) Disengage the 3 claws and guide to remove the rear seatback lock cover.

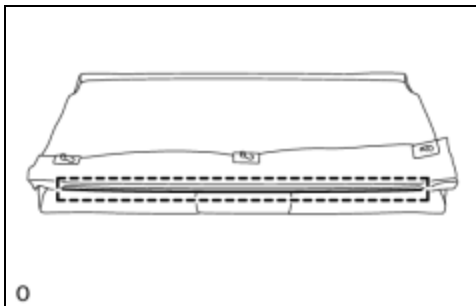
HINT:

Use the same procedure as for both the LH side and RH side.

2. REMOVE BENCH TYPE REAR SEATBACK COVER WITH PAD

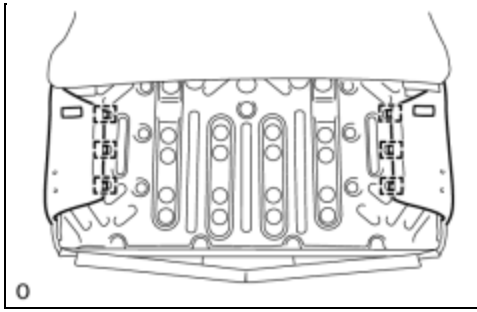


- (a) Remove the 4 clips.



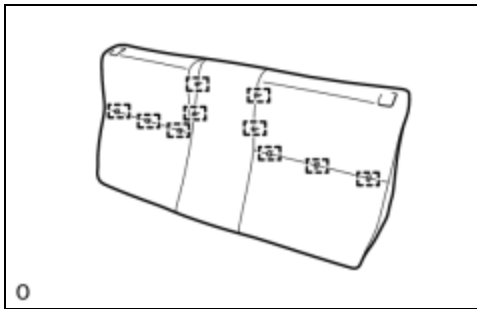
- (b) Disengage the hook and roll up the bench type rear seatback cover.

- (c) Disengage the 6 hooks and remove the bench type



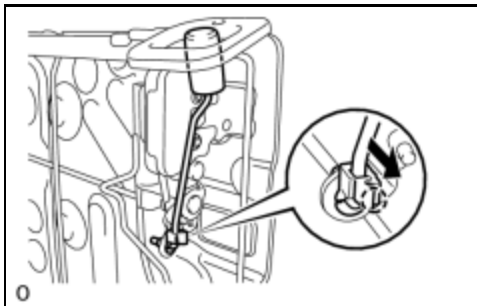
rear seatback cover with pad from rear seatback frame assembly.

3. REMOVE BENCH TYPE REAR SEATBACK COVER



(a) Remove the 10 hog rings and bench type rear seatback cover from the bench type rear seatback pad.

4. REMOVE REAR SEATBACK LOCK ROD LH



(a) Disengage the claw.

(b) Remove the rear seatback lock rod LH from rear seatback lock sub-assembly LH as shown in the illustration.

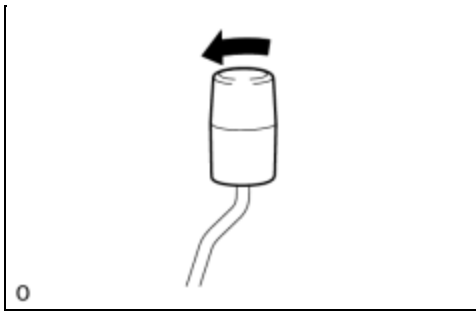
5. REMOVE REAR SEATBACK LOCK ROD RH

HINT:

Use the same procedure as for the LH side.

6. REMOVE REAR SEATBACK LOCK RELEASE KNOB

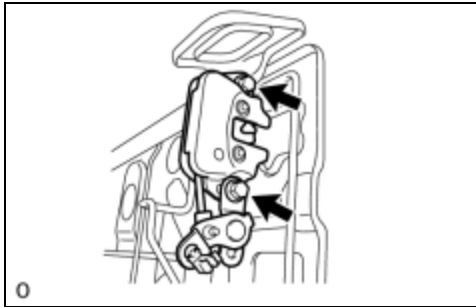
(a) Rotate the rear seatback lock release knob counterclockwise to remove them from the rear seatback lock rod LH.



HINT:

Use the same procedure as for both the LH side and RH side.

7. REMOVE REAR SEATBACK LOCK SUB-ASSEMBLY LH



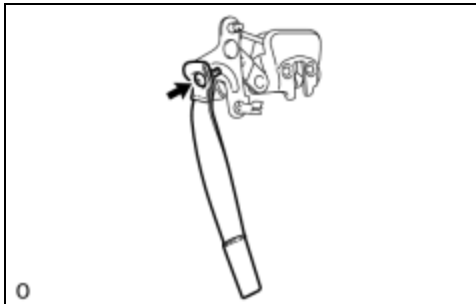
(a) Remove the 2 bolts and rear seatback lock sub-assembly LH.

8. REMOVE REAR SEATBACK LOCK SUB-ASSEMBLY RH

HINT:

Use the same procedure as for the LH side.

9. REMOVE REAR SEATBACK LOCK RELEASE BAND



(a) Remove the screw and rear seatback lock release band from rear seatback lock sub-assembly LH.

HINT:

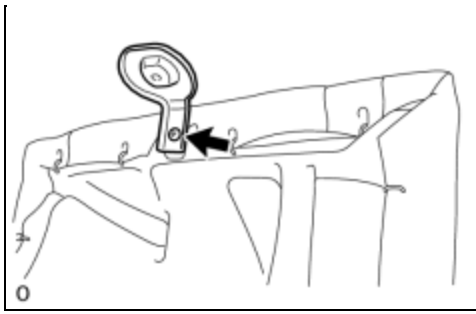
Use the same procedure as for both the LH side and RH side.

10. REMOVE REAR SEAT CUSHION BRACKET

(a) Remove the screw and rear seat cushion bracket from separate type rear seat cushion assembly LH.

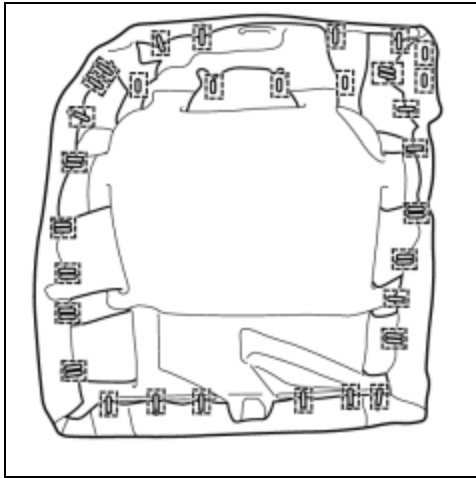
HINT:

Use the same procedure as for both the LH side and RH

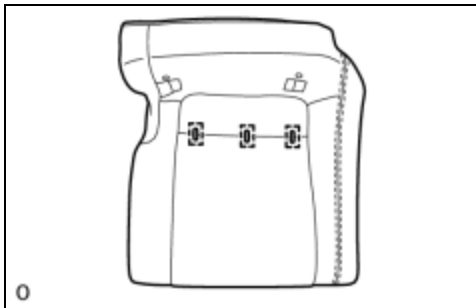


side.

11. REMOVE SEPARATE TYPE REAR SEAT CUSHION COVER LH



(a) Remove the 40 hog rings.



(b) Remove the 3 hog rings and separate type rear seat cushion cover LH from the separate type rear seat cushion pad LH.

12. REMOVE SEPARATE TYPE REAR SEAT CUSHION COVER RH

HINT:

Use the same procedure as for both the LH side.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002SZV00SX
Title: SEAT: REAR SEAT ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL REAR SEATBACK LOCK STRIKER SUB-ASSEMBLY LH

- (a) Install the rear seat back lock striker sub-assembly LH with the 2 bolts.

Torque: 33 N·m (337 kgf·cm, 24ft·lbf)

2. INSTALL REAR SEATBACK LOCK STRIKER SUB-ASSEMBLY RH

HINT:

Use the same procedure as for the LH side.

3. INSTALL REAR SEATBACK LOCK STRIKER COVER LH

- (a) Engage the 3 clips to install the rear seat back lock striker cover LH.

4. INSTALL REAR SEATBACK LOCK STRIKER COVER RH

HINT:

Use the same procedure as for the LH side.

5. INSTALL PACKAGE TRAY TRIM PANEL ASSEMBLY

6. INSTALL REAR WINDOW SIDE GARNISH LH INFO

7. INSTALL REAR WINDOW SIDE GARNISH RH

HINT:

Use the same procedure as for the LH side.

8. INSTALL QUARTER TRIM LID SUB-ASSEMBLY LH INFO

9. INSTALL QUARTER TRIM LID SUB-ASSEMBLY RH

HINT:

Use the same procedure as for the LH side.

10. INSTALL LUGGAGE COMPARTMENT TRIM COVER LH

- (a) Engage the 7 clips to install the quarter trim panel LH.
(b) Install the 3 clips.

11. INSTALL LUGGAGE COMPARTMENT TRIM COVER RH

HINT:

Use the same procedure as for the LH side.

12. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP LH INFO

13. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP RH

HINT:

Use the same procedure as for the LH side.

14. INSTALL FRONT DOOR SCUFF PLATE LH

INFO

15. INSTALL FRONT DOOR SCUFF PLATE RH

HINT:

Use the same procedure as for the LH side.

16. INSTALL BENCH TYPE REAR SEATBACK ASSEMBLY

(a) Install the bench type rear seatback assembly with the 2 bolts.

Torque: 33 N·m (337 kgf·cm, 24ft·lbf)

(b) Install the 3 clips and bench type rear seatback cover.

17. INSTALL REAR SEAT CUSHION ASSEMBLY CENTER

(a) Install the rear seat cushion assembly center with the 2 clips.

18. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY LH

(a) Engage the hook to install the separate type rear seat cushion assembly LH.

(b) Install the bolt.

Torque: 13 N·m (133 kgf·cm, 10ft·lbf)

19. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY RH

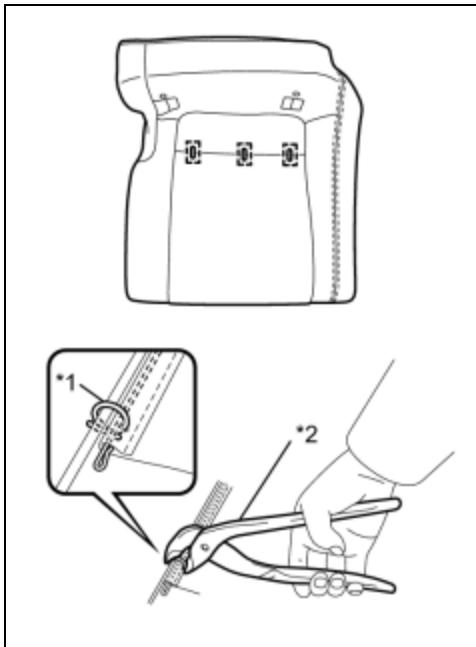
HINT:

Use the same procedure as for the LH side.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002SZZ00SX
Title: SEAT: REAR SEAT ASSEMBLY: REASSEMBLY (2013 FR-S)		

REASSEMBLY

1. INSTALL SEPARATE TYPE REAR SEAT CUSHION COVER LH



- (a) Using hog ring pliers, install the separate type rear seat cushion cover LH to the separate type rear seat cushion pad with 3 new hog rings.

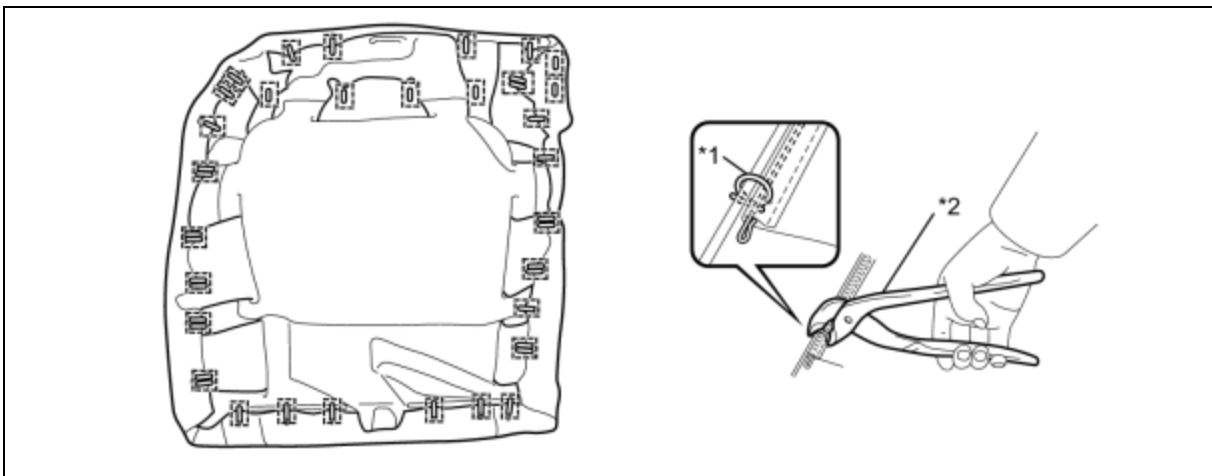
NOTICE:

- Be careful not to damage the cover.
- When installing the hog rings, take care to minimize wrinkles as much as possible.

Text in Illustration

*1	Hog Ring
*2	Hog Ring Pliers

- (b) Using hog ring pliers, install 40 new hog rings.



Text in Illustration

*1	Hog Ring	*2	Hog Ring Pliers
----	----------	----	-----------------

NOTICE:

- Be careful not to damage the cover.
- When installing the hog rings, take care to minimize wrinkles as much as possible.

2. INSTALL SEPARATE TYPE REAR SEAT CUSHION COVER RH

HINT:

Use the same procedure as for the LH side.

3. INSTALL REAR SEAT CUSHION BRACKET

- (a) Install the rear seat cushion bracket to the rear seat cushion assembly LH with the screw.

HINT:

Use the same procedure as for both the LH side and RH side.

4. INSTALL REAR SEATBACK LOCK RELEASE BAND

- (a) Install the rear seatback lock release band with the screw to rear seatback lock assembly LH.

HINT:

Use the same procedure as for both the LH side and RH side.

5. INSTALL REAR SEATBACK LOCK SUB-ASSEMBLY LH

- (a) Install the rear seatback lock sub-assembly LH with the 2 bolts.

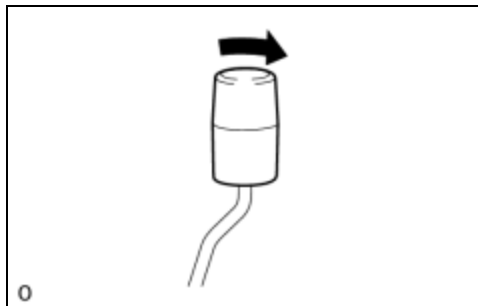
Torque: 25 N·m (250 kgf·cm, 18ft·lbf)

6. INSTALL REAR SEATBACK LOCK SUB-ASSEMBLY RH

HINT:

Use the same procedure as for the LH side.

7. INSTALL REAR SEATBACK LOCK RELEASE KNOB



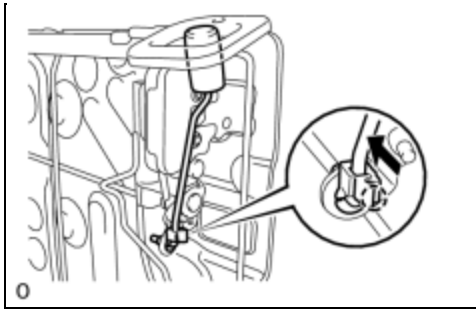
- (a) Rotate the rear seatback lock release knob clockwise to install it to the rear seatback lock rod LH.

HINT:

Use the same procedure as for both the LH side and RH side.

8. INSTALL REAR SEATBACK LOCK ROD LH

- (a) Connect the rear seatback lock rod LH to the rear seatback lock sub-assembly LH as shown in the illustration.



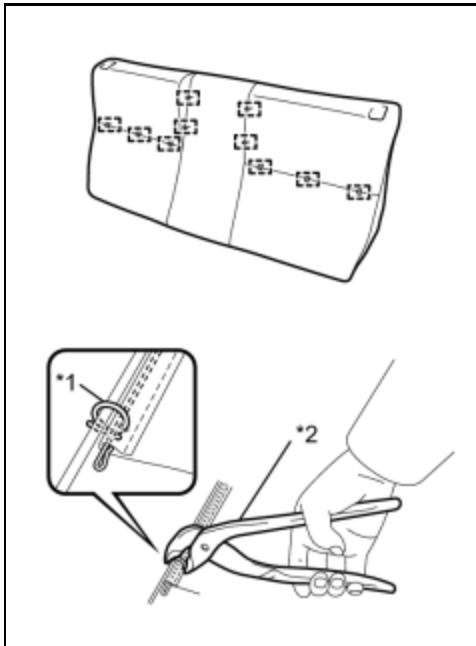
(b) Engage the claw to install the rear seatback lock rod LH.

9. INSTALL REAR SEATBACK LOCK ROD RH

HINT:

Use the same procedure as for the LH side.

10. INSTALL BENCH TYPE REAR SEATBACK COVER



(a) Using hog ring pliers, install the bench type rear seatback cover to the bench type rear seatback pad with 10 new hog rings.

NOTICE:

- Be careful not to damage the cover.
- When installing the hog rings, take care to minimize wrinkles as much as possible.

Text in Illustration

*1	Hog Ring
*2	Hog Ring Pliers

11. INSTALL BENCH TYPE REAR SEATBACK COVER WITH PAD

- Temporarily install the bench type rear seatback cover with pad to the rear seatback frame assembly.
- Engage the 6 hooks to the rear seatback frame assembly.
- Engage the hook.
- Install the bench type rear seatback cover with pad with the 4 clips.

12. INSTALL REAR SEATBACK LOCK COVER

- Engage the guide and 3 claws to install the rear seatback lock cover.

HINT:

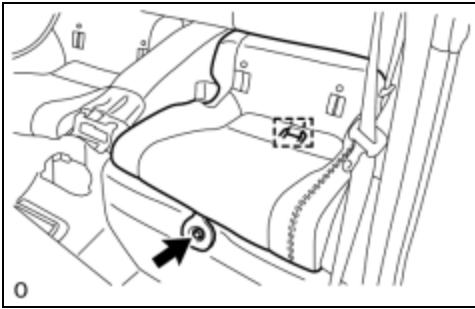
Use the same procedure as for both the LH side and RH side.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002SZX00SX
Title: SEAT: REAR SEAT ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY LH



(a) Remove the bolt.

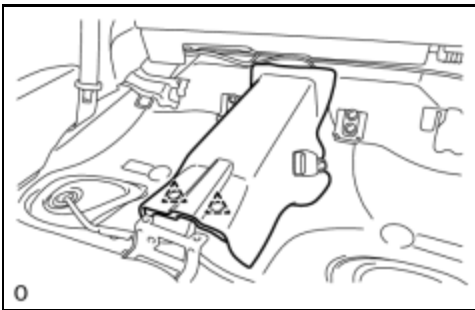
(b) Disengage the hook and remove the separate type rear seat cushion assembly LH.

2. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY RH

HINT:

Use the same procedure as for the LH side.

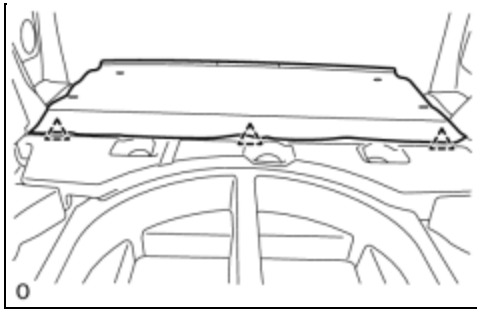
3. REMOVE REAR SEAT CUSHION ASSEMBLY CENTER



(a) Remove the 2 clips and rear seat cushion assembly center.

4. REMOVE BENCH TYPE REAR SEATBACK ASSEMBLY

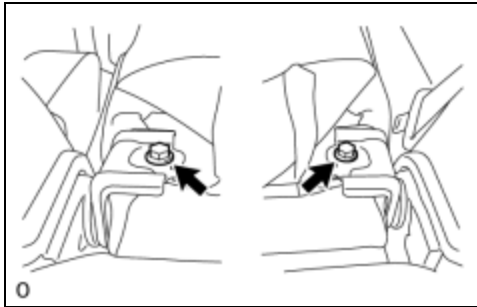
(a) Remove the 3 clips and turn back rear seatback cover.



(b) Remove the 2 bolts and bench type rear seatback assembly.

NOTICE:

Be careful not to damage the vehicle body.



5. REMOVE FRONT DOOR SCUFF PLATE LH INFO

6. REMOVE FRONT DOOR SCUFF PLATE RH

HINT:

Use the same procedure as for the LH side.

7. DISCONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP LH

HINT:

Disconnect the front door opening trim weatherstrip LH to the extent that allows the removal of the luggage compartment trim cover LH.

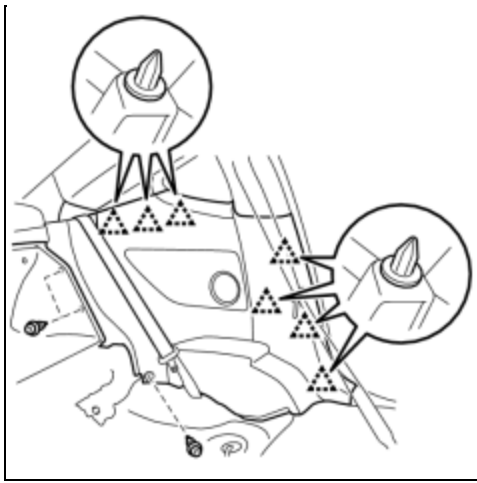
8. DISCONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP RH

HINT:

Use the same procedure as for the LH side.

9. REMOVE LUGGAGE COMPARTMENT TRIM COVER LH

(a) Remove the 3 clips.



(b) Disengage the 7 clips and remove the quarter trim panel LH.

10. REMOVE LUGGAGE COMPARTMENT TRIM COVER RH

HINT:

Use the same procedure as for the LH side.

11. REMOVE QUARTER TRIM LID SUB-ASSEMBLY LH

INFO

12. REMOVE QUARTER TRIM LID SUB-ASSEMBLY RH

HINT:

Use the same procedure as for the LH side.

13. REMOVE REAR WINDOW SIDE GARNISH LH

INFO

14. REMOVE REAR WINDOW SIDE GARNISH RH

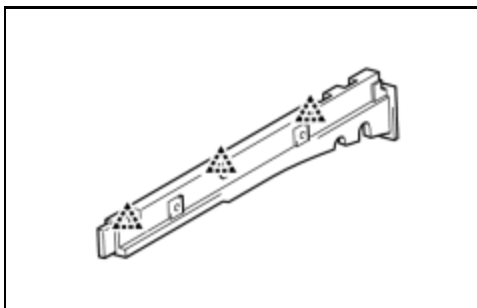
HINT:

Use the same procedure as for the LH side.

15. REMOVE PACKAGE TRAY TRIM PANEL ASSEMBLY

INFO

16. REMOVE REAR SEATBACK LOCK STRIKER COVER LH



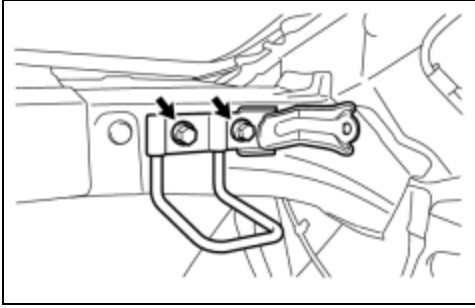
(a) Disengage the 3 clips to remove rear seatback lock striker cover LH.

17. REMOVE REAR SEATBACK LOCK STRIKER COVER RH

HINT:

Use the same procedure as for the LH side.

18. REMOVE REAR SEATBACK LOCK STRIKER SUB-ASSEMBLY LH



(a) Remove the 2 bolts and rear seatback lock striker sub-assembly LH.

19. REMOVE REAR SEATBACK LOCK STRIKER SUB-ASSEMBLY RH

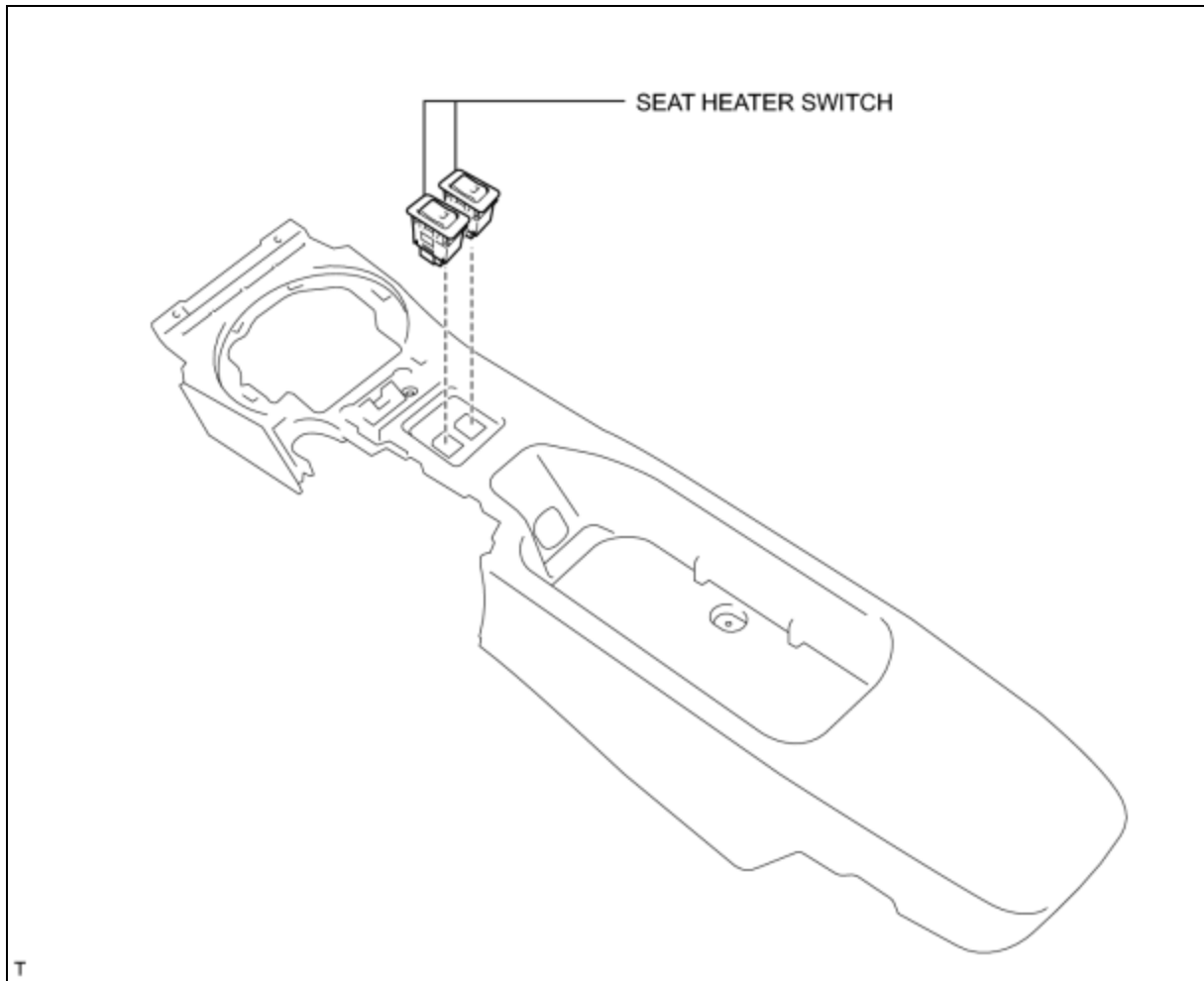
HINT:

Use the same procedure as for the LH side.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004E2100FX
Title: SEAT: SEAT HEATER SWITCH: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000012HE012X
Title: SEAT: SEAT HEATER SWITCH: INSPECTION (2013 FR-S)		

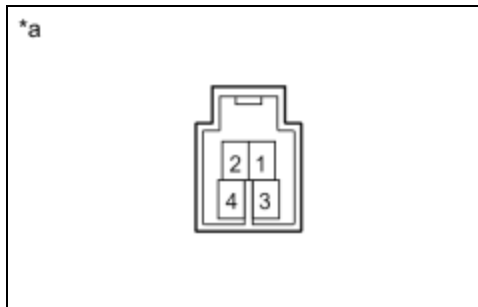
INSPECTION

1. INSPECT SEAT HEATER SWITCH (for LH)

(a) Check the seat heater switch.

(1) Measure the resistance according to the value(s) in the table below.

Text in Illustration



*a	Component without harness connected (Seat Heater Switch (for LH))
----	--

Standard Resistance:

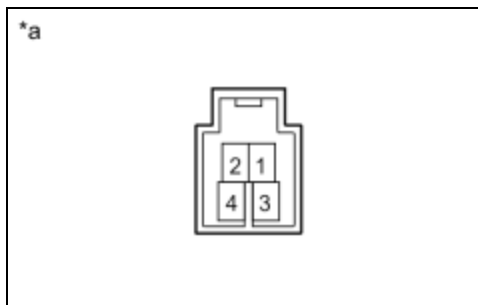
TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 - 2	ON (HI)	Below 1 Ω
3 - 4	ON (HI)	Below 1 Ω
2 - 4	ON (LO)	Below 1 Ω

If the result is not as specified, replace the seat heater switch (for LH).

(b) Check that the indicator illuminates.

(1) Apply battery voltage to the seat heater switch (for LH) and check that the indicator illuminates.

Text in Illustration



*a	Component without harness connected (Seat Heater Switch (for LH))
----	--

OK:

CONDITION	SWITCH CONDITION	SPECIFIED CONDITION
Battery positive (+) → Terminal 2 Battery negative (-) → Terminal 3	ON (HI)	Indicator illuminates
Battery positive (+) →		

Terminal 2 Battery negative (-) → Terminal 3	ON (LO)	
--	---------	--

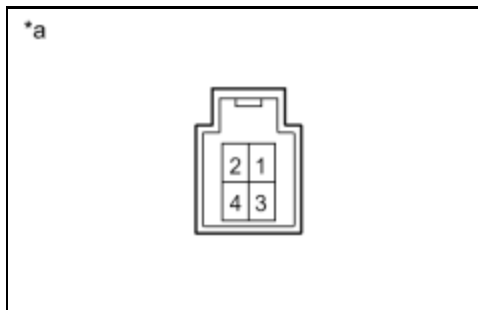
If the result is not as specified, replace the seat heater switch (for LH).

2. INSPECT SEAT HEATER SWITCH (for RH)

(a) Check the seat heater switch.

(1) Measure the resistance according to the value(s) in the table below.

Text in Illustration



*a	Component without harness connected (Seat Heater Switch (for RH))
----	--

Standard Resistance:

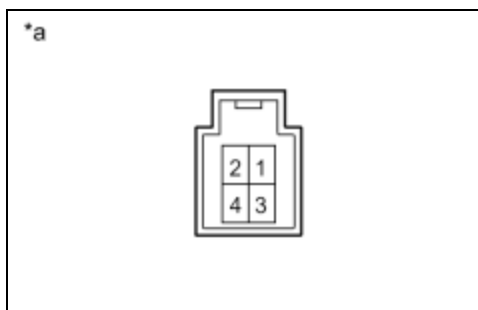
TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 - 2	ON (HI)	Below 1 Ω
3 - 4	ON (HI)	Below 1 Ω
2 - 4	ON (LO)	Below 1 Ω

If the result is not as specified, replace the seat heater switch (for RH).

(b) Check that the indicator illuminates.

(1) Apply battery voltage to the seat heater switch (for RH) and check that the indicator illuminates.

Text in Illustration



*a	Component without harness connected (Seat Heater Switch (for RH))
----	--

OK:

CONDITION	SWITCH CONDITION	SPECIFIED CONDITION
Battery positive (+) → Terminal 2 Battery negative (-) → Terminal 3	ON (HI)	Indicator illuminates
Battery positive (+) → Terminal 2 Battery negative (-) →	ON (LO)	

Terminal 3		
------------	--	--

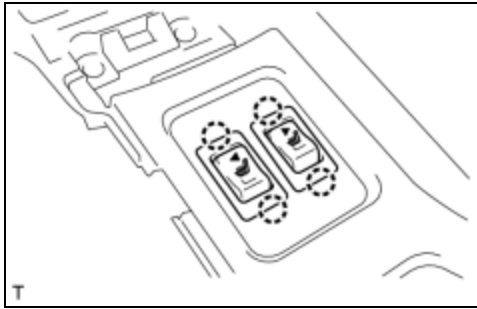
If the result is not as specified, replace the seat heater switch (for RH).



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002Y5G00LX
Title: SEAT: SEAT HEATER SWITCH: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL SEAT HEATER SWITCH



- (a) Engage the 4 claws to install the 2 seat heater switches to the console box assembly.

HINT:

Install the seat heater switch so that the pointed tip of the triangle mark is facing outside the vehicle.

2. INSTALL CONSOLE BOX ASSEMBLY

NFC

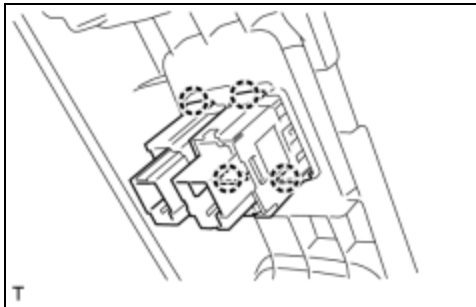
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002Y5100LX
Title: SEAT: SEAT HEATER SWITCH: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE CONSOLE BOX ASSEMBLY

INFO

2. REMOVE SEAT HEATER SWITCH



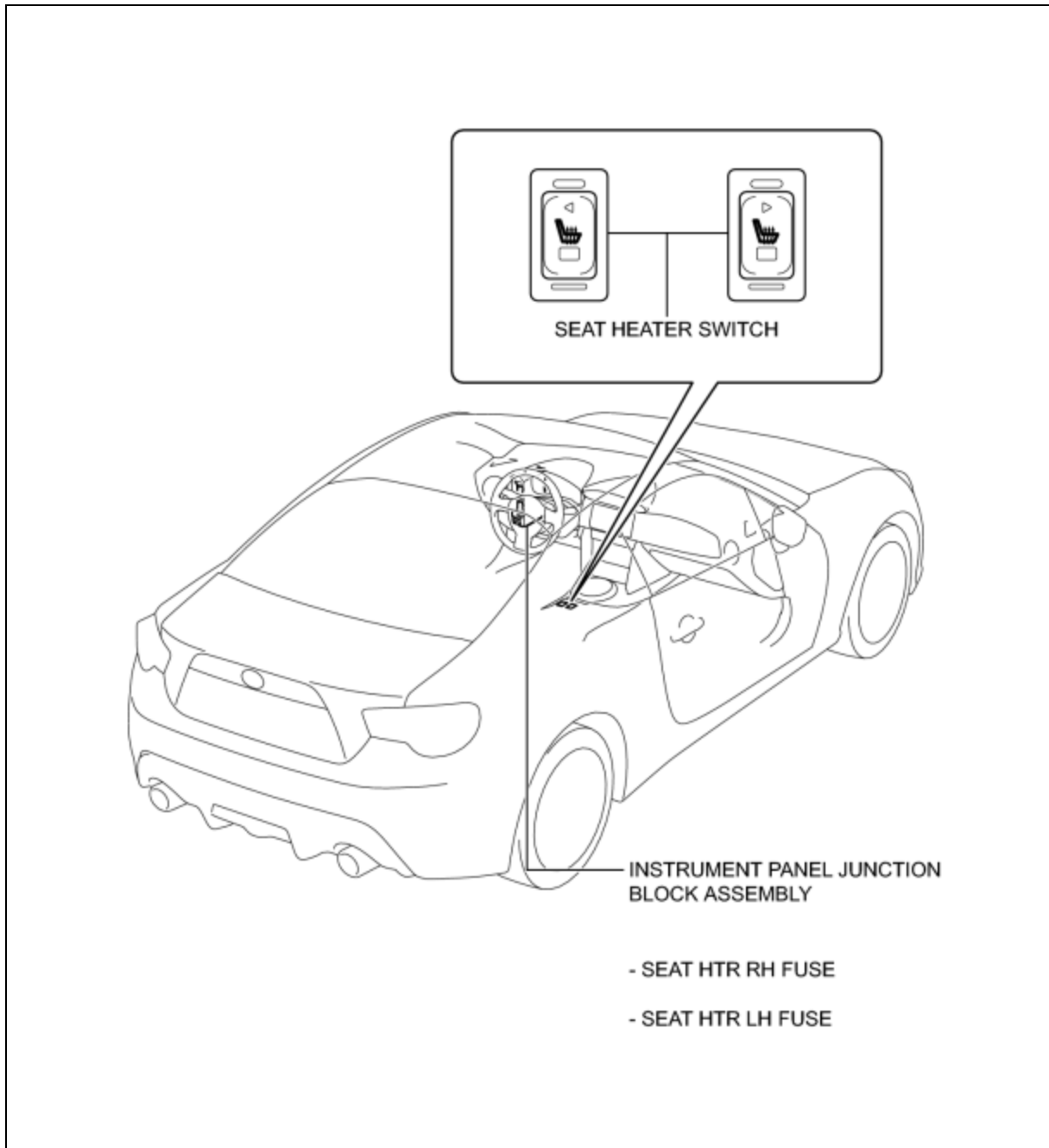
- (a) Disengage the 4 claws to remove the 2 seat heater switches from the console box assembly.



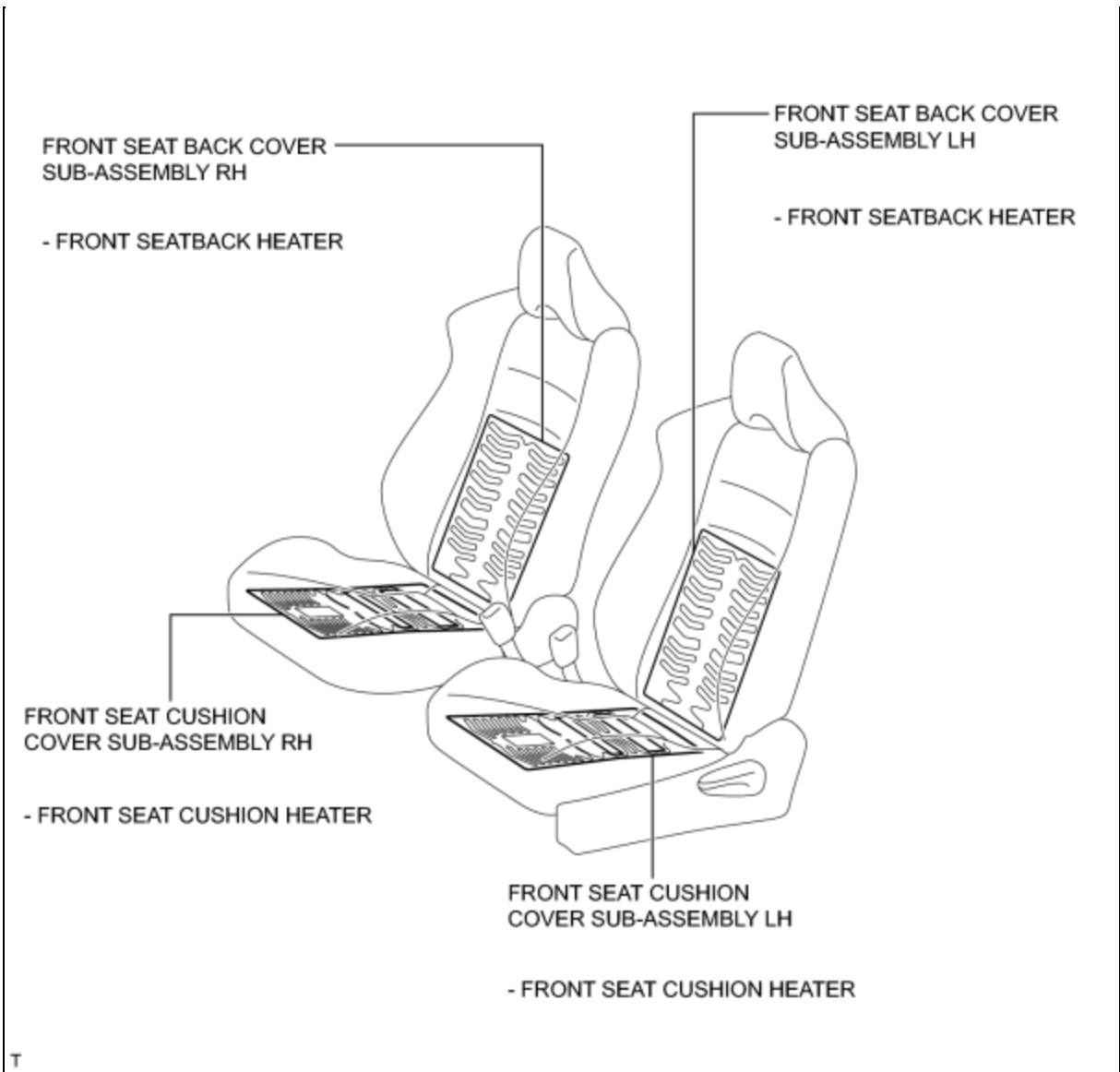
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011HP02TX
Title: SEAT: SEAT HEATER SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011HQ02ZX
Title: SEAT: SEAT HEATER SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

Seat Heater System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Seat heater does not operate (for Driver)	SEAT HTR LH fuse	-
	Seat heater switch LH	INFO
	Front seat assembly LH (Front seat cushion heater)	INFO
	Front seat assembly LH (Front seat back heater)	INFO
	Wire harness or connector	-
Seat heater does not operate (for Front Passenger)	SEAT HTR RH fuse	-
	Seat heater switch RH	INFO
	Front seat assembly RH (Front seat cushion heater)	INFO
	Front seat assembly RH (Front seat back heater)	INFO
	Wire harness or connector	-

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011HR02XX
Title: SEAT: SEAT HEATER SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

SYSTEM DESCRIPTION

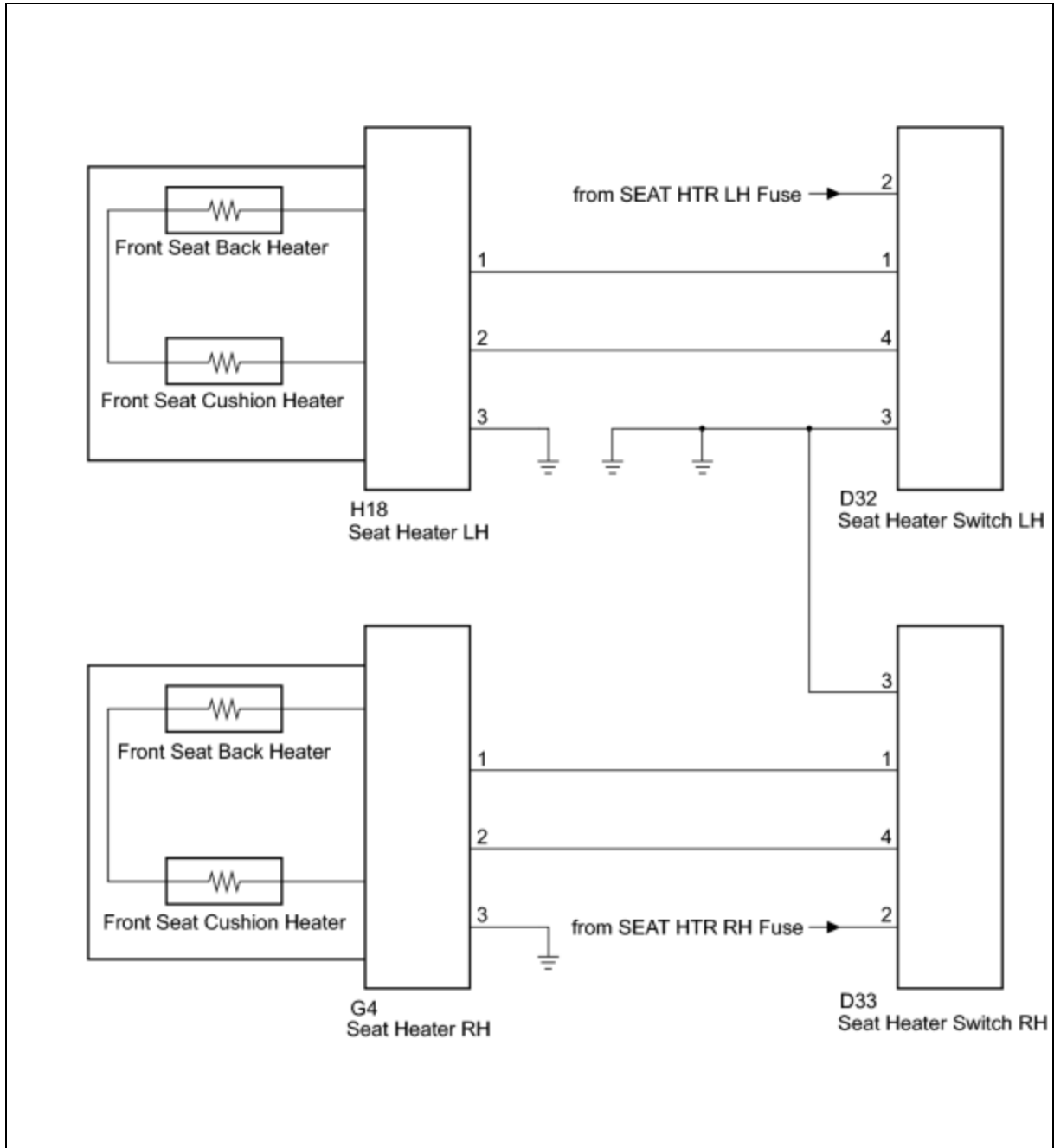
1. GENERAL DESCRIPTION

- (a) The seat heater system is controlled by operating the seat heater switch, which is located in the console box.
- (b) Whether the seat heater is on or off can be determined by checking if the seat heater switch indicator light is on or off.



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000011HS02UX
Title: SEAT: SEAT HEATER SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000589F000X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B16F1: Passenger Side Belt Warning Indicator Circuit (2013 FR-S)		

DTC	B16F1	Passenger Side Belt Warning Indicator Circuit
------------	--------------	--

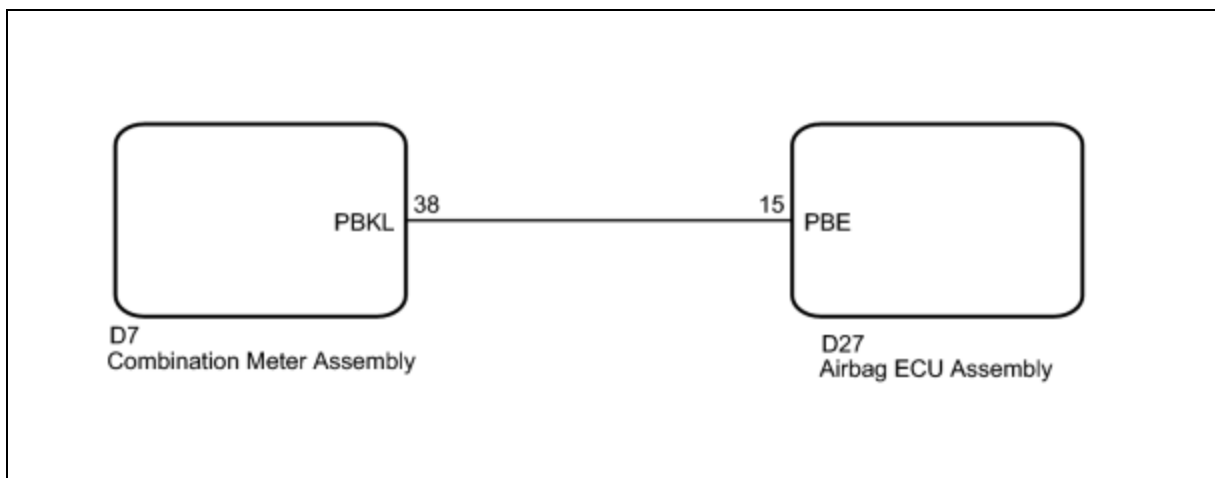
DESCRIPTION

The seat belt buckle switch RH signal circuit consists of the airbag ECU assembly and combination meter assembly.

DTC B16F1 is stored when a malfunction is detected for the seat belt buckle switch RH signal circuit.


DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B16F1	<ul style="list-style-type: none"> The airbag ECU assembly receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the seat belt buckle switch RH signal circuit. Combination meter assembly malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Instrument panel wire Combination meter assembly Airbag ECU assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work .

PROCEDURE

1.	CHECK CONNECTORS
-----------	-------------------------

- (a) Turn the ignition switch off.
- (b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Check that the connectors are properly connected to the airbag ECU assembly and combination meter assembly.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

- (d) Disconnect the connectors from the airbag ECU assembly and combination meter assembly.

- (e) Check that the terminals of connectors are not damaged.

OK:

The connectors are not deformed or damaged.

NG  **REPLACE INSTRUMENT PANEL WIRE**

OK

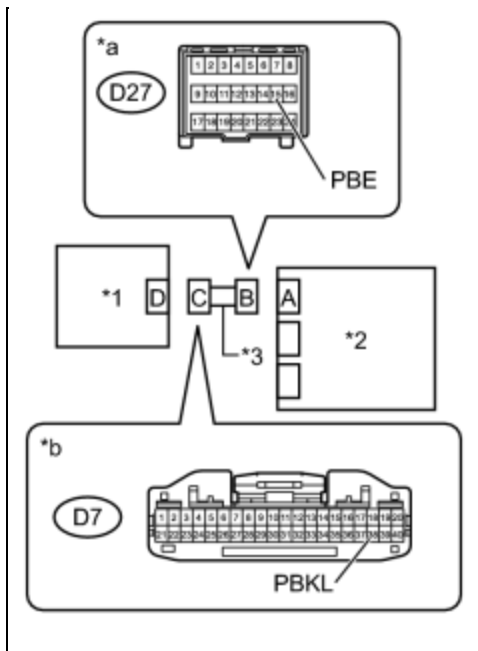


2.	CHECK INSTRUMENT PANEL WIRE (OPEN)
-----------	---

- (a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D27-15 (PBE) - D7-38 (PBKL)	Always	Below 1 Ω



Text in Illustration

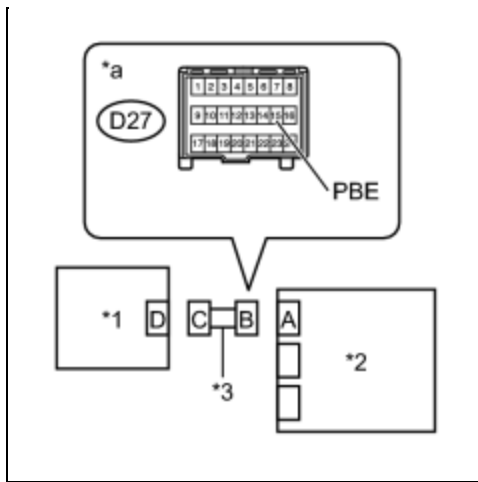
*1	Combination Meter Assembly
*2	Airbag ECU Assembly
*3	Instrument Panel Wire
*a	Front view of wire harness connector (to Airbag ECU Assembly)
*b	Front view of wire harness connector (to Combination Meter Assembly)

NG ▶ REPLACE INSTRUMENT PANEL WIRE

OK
▼

3.	CHECK INSTRUMENT PANEL WIRE (SHORT TO B+)
-----------	--

(a) Connect the cable to the negative (-) battery terminal.



(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D27-15 (PBE) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

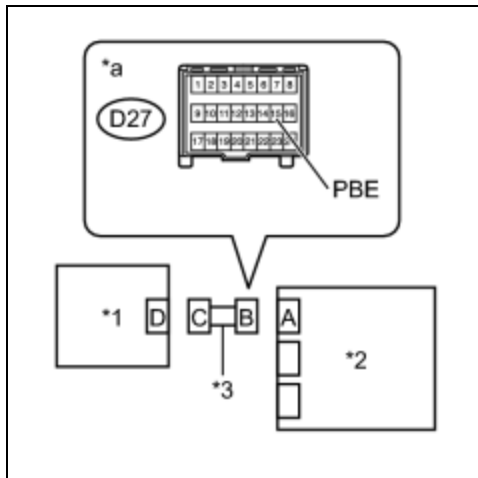
Text in Illustration

*1	Combination Meter Assembly
*2	Airbag ECU Assembly
*3	Instrument Panel Wire
*a	Front view of wire harness connector (to Airbag ECU Assembly)

NG ▶ REPLACE INSTRUMENT PANEL WIRE

OK
▼

4.	CHECK INSTRUMENT PANEL WIRE (SHORT TO GROUND)
-----------	--



(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D27-15 (PBE) - Body ground	Always	1 MΩ or higher

Text in Illustration

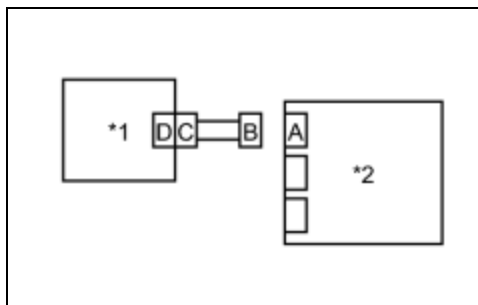
*1	Combination Meter Assembly
*2	Airbag ECU Assembly
*3	Instrument Panel Wire
*a	Front view of wire harness connector (to Airbag ECU Assembly)

NG ▶ REPLACE INSTRUMENT PANEL WIRE

OK



5. CHECK PASSENGER SEAT BELT WARNING LIGHT CONDITION



(a) Connect the connectors to the combination meter assembly.

(b) Connect the cable to the negative (-) battery terminal.

(c) Check the passenger seat belt warning light operation after the ignition switch is turned to

ON.

OK:

Blinks for 6 seconds and then goes off

Text in Illustration

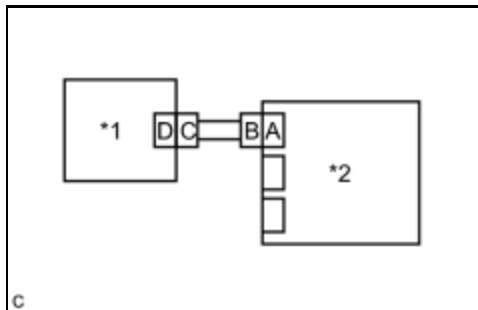
*1	Combination Meter Assembly
*2	Airbag ECU Assembly

NG ► **REPLACE COMBINATION METER ASSEMBLY**

OK



6. CHECK DTC



(a) Turn the ignition switch off.

(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Connect the connector to the airbag ECU assembly.

(d) Connect the cable to the negative (-) battery terminal.

(e) Clear the DTCs stored in memory **INFO** .

(f) Turn the ignition switch off.

(g) Turn the ignition switch to ON, and wait for at least 60 seconds.

(h) Check for DTCs **INFO** .

OK:

DTC B16F1 is not output.

HINT:

Codes other than DTC B16F1 may be output at this time, but they are not related to this check.

Text in Illustration

*1	Combination Meter Assembly
*2	Airbag ECU Assembly

NG ► REPLACE AIRBAG ECU ASSEMBLY

OK ► USE SIMULATION METHOD TO CHECK



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000432J031X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B161A: Lost Communication with Front Satellite Sensor Bus (2013 FR-S)		

DTC	B161A	Lost Communication with Front Satellite Sensor Bus
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DESCRIPTION

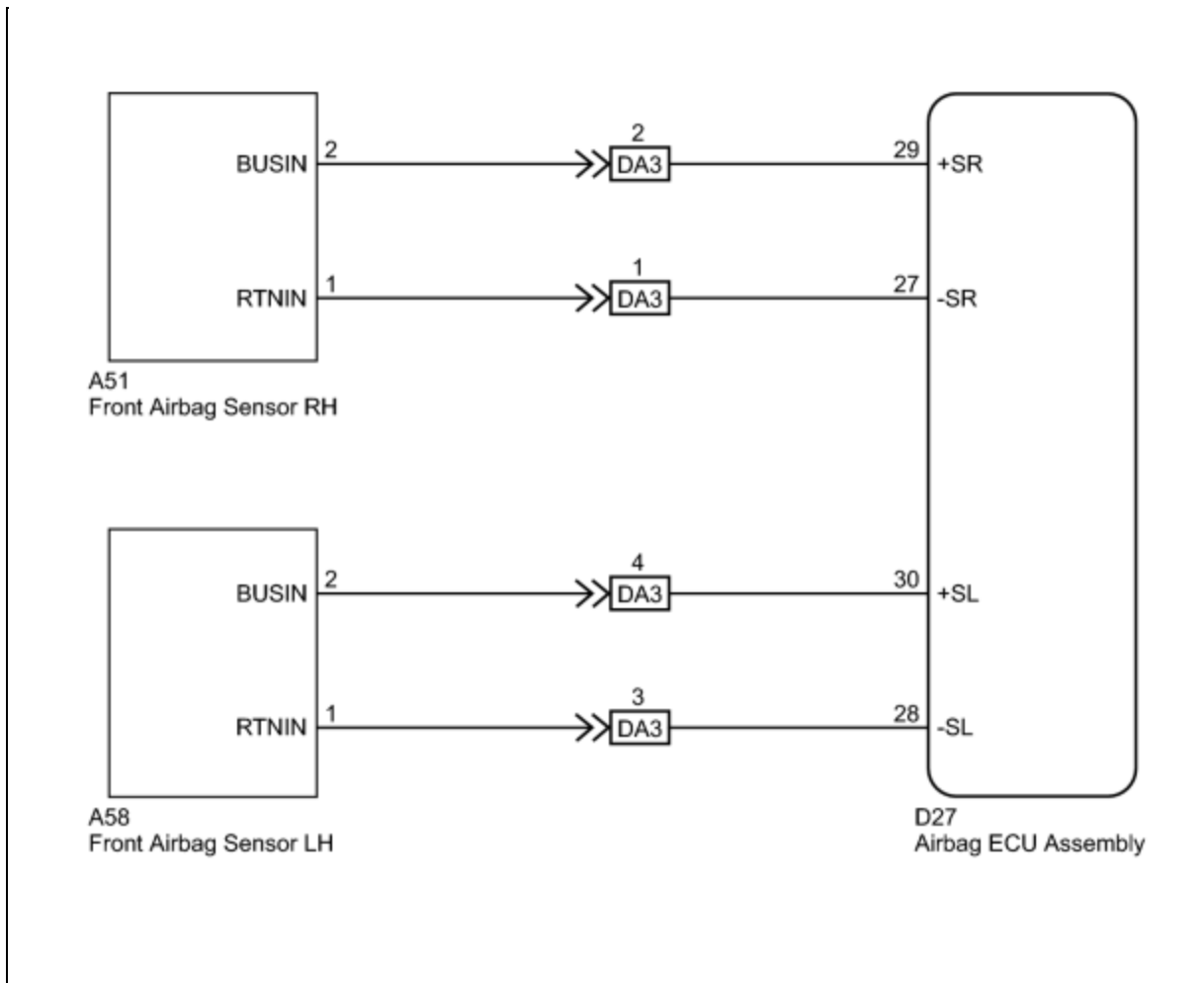
The front collision sensor circuit (front airbag sensor RH circuit and front airbag sensor LH circuit) is composed of the airbag ECU assembly, front airbag sensor RH and front airbag sensor LH.

The front airbag sensor RH and front airbag sensor LH detect impacts to the vehicle and send signals to the airbag ECU assembly to determine if the airbag should be deployed.

DTC B161A is stored when a malfunction is detected in the front collision sensor circuit (front airbag sensor RH circuit and front airbag sensor LH circuit).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B161A	<ul style="list-style-type: none"> The airbag ECU assembly receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the front collision sensor circuit (front airbag sensor RH circuit and front airbag sensor LH circuit). Front airbag sensor RH malfunction Front airbag sensor LH malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Instrument panel wire Engine room main wire Front airbag sensor RH Front airbag sensor LH Airbag ECU assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

PROCEDURE

1.	CHECK DTC
-----------	------------------

(a) Turn the ignition switch to ON, and wait for at least 60 seconds.

(b) Turn the ignition switch off.

HINT:

If a communication error occurs, DTCs for both the LH and RH sides will be stored simultaneously. To identify the malfunctioning area, turn the ignition switch off and then to ON again.

(c) Turn the ignition switch to ON, and wait for at least 60 seconds.

(d) Check for DTCs INFO.

Result:

RESULT	PROCEED TO
DTCs B1613 and B1618 are not output.	A
DTC B1613 is output.	B

DTC B1618 is output.

C

HINT:

- DTCs indicating communication errors will be changed to DTCs indicating errors in initialization by turning the ignition switch off and then to ON again.
- Codes other than DTCs B1613 and B1618 may be output at this time, but they are not related to this check.



B ► GO TO DTC B1613

C ► GO TO DTC B1618

A



2. CHECK DTC

- (a) Clear the DTCs stored in memory  .
- (b) Turn the ignition switch off.
- (c) Turn the ignition switch to ON, and wait for at least 60 seconds.
- (d) Check for DTCs  .
- OK:
DTC B161A is not output.

HINT:

Codes other than DTC B161A may be output at this time, but they are not related to this check.

NG ► REPLACE AIRBAG ECU ASSEMBLY

OK ► USE SIMULATION METHOD TO CHECK

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000YT10EJX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1000: Airbag ECU Assembly Malfunction (2013 FR-S)		

DTC	B1000	Airbag ECU Assembly Malfunction
------------	--------------	--

DESCRIPTION

The airbag ECU assembly consists of the deceleration sensor, drive circuit, diagnosis circuit, ignition control, etc.

If the airbag ECU assembly receives signals from the deceleration sensor, it determines whether the airbag squib and pretensioner squib should be activated.


DTC B1000 is stored when a malfunction is detected in the airbag ECU assembly.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1000	Airbag ECU assembly malfunction	Airbag ECU assembly

INSPECTION PROCEDURE

PROCEDURE

1.	CHECK DTC
-----------	------------------

(a) Check for DTCs  .

Result:

RESULT	PROCEED TO
DTC B1000 is output	A
DTC B1000 and other DTCs are output	B

NOTICE:

If only DTC B1000 is output, do not clear the DTCs, replace the airbag ECU assembly.

HINT:

If any DTCs other than DTC B1000 are also output, troubleshoot those DTCs first.

B ► GO TO DIAGNOSTIC TROUBLE CODE CHART

A ► REPLACE AIRBAG ECU ASSEMBLY



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000035ZW040X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1610,B16F2: Front Airbag Sensor RH Malfunction (2013 FR-S)		

DTC	B1610	Front Airbag Sensor RH Malfunction
------------	--------------	---

DTC	B16F2	Front Airbag Sensor RH Mismatch
------------	--------------	--

DESCRIPTION

The front airbag sensor RH circuit consists of the airbag ECU assembly and front airbag sensor RH.

The front airbag sensor RH detects impacts to the vehicle and sends signals to the airbag ECU assembly to determine if the airbag should be deployed.

These DTCs are stored when a malfunction is detected in the front airbag sensor RH.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1610	<ul style="list-style-type: none"> • Front airbag sensor RH malfunction • Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> • Front airbag sensor RH • Airbag ECU assembly
B16F2	<ul style="list-style-type: none"> • Improper installation of front airbag sensor RH • Airbag ECU assembly malfunction 	

WIRING DIAGRAM

Refer to DTCs B1612 and B1613 INFO .

INSPECTION PROCEDURE

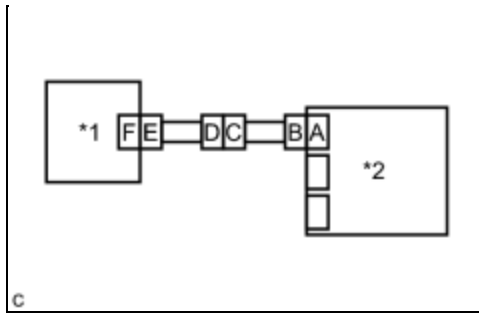
NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .

PROCEDURE

1.	CHECK FRONT AIRBAG SENSOR RH
-----------	-------------------------------------

(a) Turn the ignition switch off.



(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Interchange the front airbag sensor RH with LH and connect the connectors.

(d) Connect the cable to the negative (-) battery terminal.

(e) Clear the DTCs stored in memory **INFO**.

(f) Turn the ignition switch off.

(g) Turn the ignition switch to ON, and wait for at least 60 seconds.

(h) Check for DTCs **INFO**.

Result:

RESULT	PROCEED TO
DTCs B1610, B1615, B16F2 and B16F3 are not output.	A
DTC B1610, B16F2 are output.	B
DTC B1615, B16F3 are output.	C

HINT:

Codes other than DTCs B1610, B1615, B16F2 and B16F3 may be output at this time, but they are not related to this check.

(i) Turn the ignition switch off.

(j) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(k) Return the front airbag sensor RH and LH to their original positions and connect the connectors.

Text in Illustration

*1	Front Airbag Sensor LH
*2	Airbag ECU Assembly

C ▶ REPLACE FRONT AIRBAG SENSOR RH

A ▶ USE SIMULATION METHOD TO CHECK



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000YTM08HX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1612,B1613: Front Airbag Sensor RH Lost Communication (2013 FR-S)		

DTC	B1612	Front Airbag Sensor RH Lost Communication
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DTC	B1613	Front Airbag Sensor RH Initialization
------------	--------------	--

DESCRIPTION

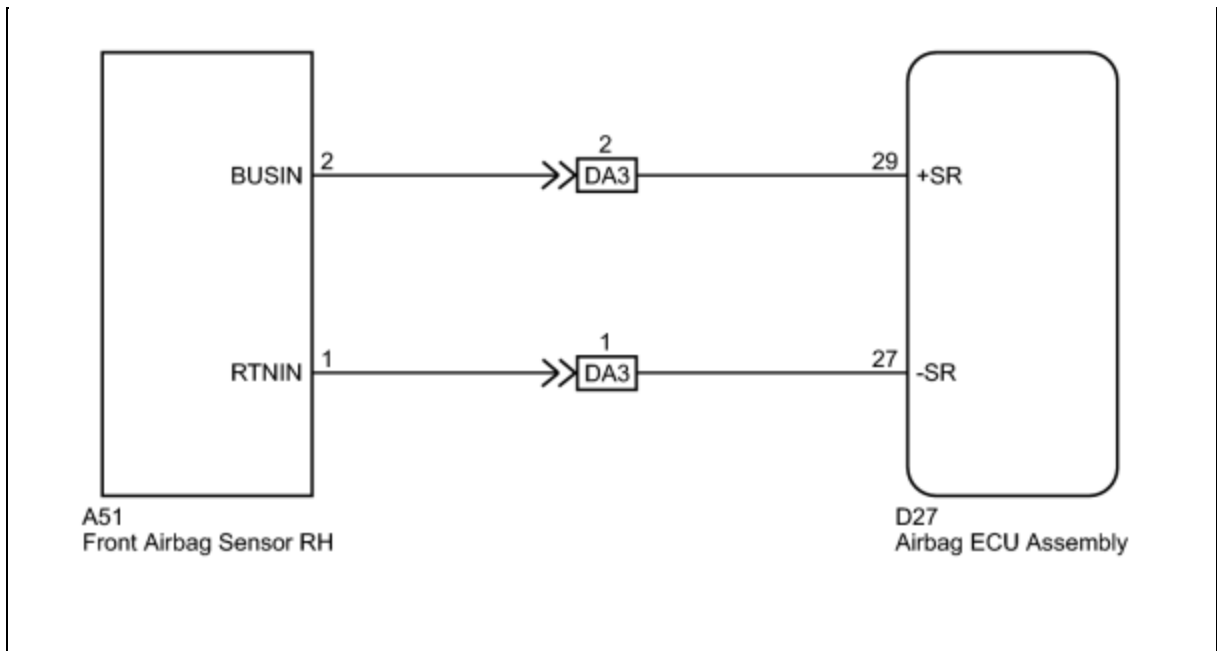
The front airbag sensor RH circuit consists of the airbag ECU assembly and front airbag sensor RH.

The front airbag sensor RH detects impacts to the vehicle and sends signals to the airbag ECU assembly to determine if the airbag should be deployed.

These DTCs are stored when a malfunction is detected in the front airbag sensor RH circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1612 B1613	<ul style="list-style-type: none"> The airbag ECU assembly receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the front airbag sensor RH circuit. Front airbag sensor RH malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Instrument panel wire Engine room main wire Front airbag sensor RH Airbag ECU assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

PROCEDURE

1.	CHECK CONNECTORS
-----------	-------------------------

- (a) Turn the ignition switch off.
- (b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Check that the connectors are properly connected to the airbag ECU assembly and front airbag sensor RH. Also check that the connectors that link the engine room main wire and instrument panel wire are properly connected.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

- (d) Disconnect the connectors from the airbag ECU assembly and front airbag sensor RH. Also disconnect the connectors that link the engine room main wire and instrument panel wire.
- (e) Check that the terminals of the connectors are not damaged.

OK:

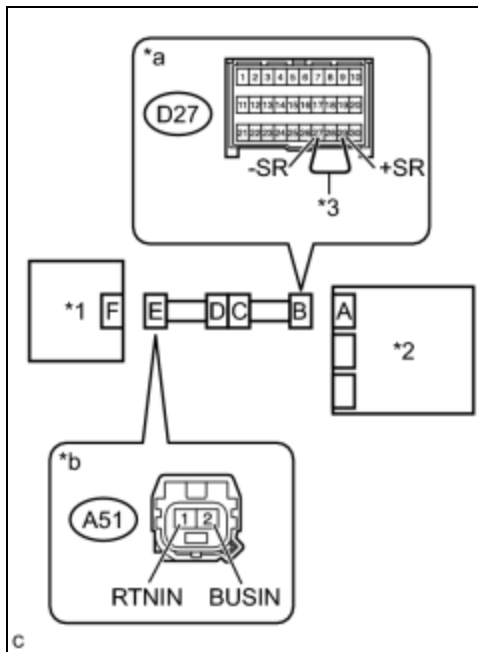
The terminals are not deformed or damaged.

NG ▶ REPLACE WIRE HARNESS

OK



2. CHECK FRONT AIRBAG SENSOR RH CIRCUIT (OPEN)



(a) Connect the connectors that link the engine room main wire and instrument panel wire.

(b) Using a service wire, connect terminals 29 (+SR) and 27 (-SR) of connector B.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A51-2 (BUSIN) - A51-1 (RTNIN)	Always	Below 1 Ω

Text in Illustration

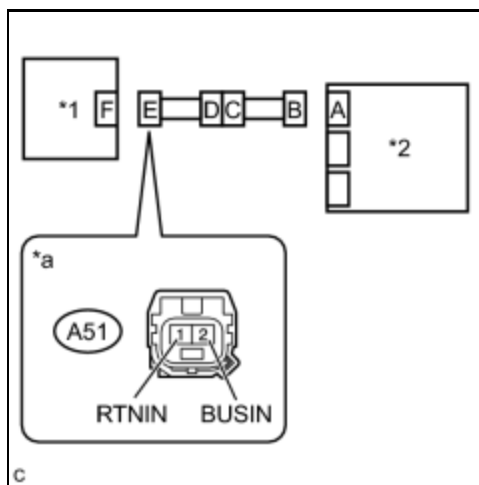
*1	Front Airbag Sensor RH
*2	Airbag ECU Assembly
*3	Service Wire

*a	Front view of wire harness connector (to Airbag ECU Assembly)
*b	Front view of wire harness connector (to Front Airbag Sensor RH)

NG ► CHECK INSTRUMENT PANEL WIRE
(OPEN)

OK
▼

3. CHECK FRONT AIRBAG SENSOR RH CIRCUIT (SHORT)



(a) Disconnect the service wire from connector B.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A51-2 (BUSIN) - A51-1 (RTNIN)	Always	1 MΩ or higher

Text in Illustration

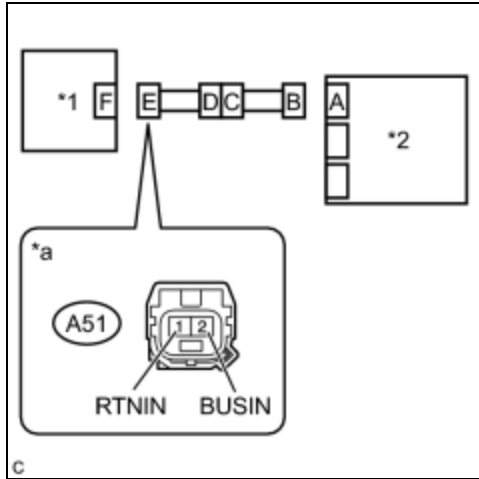
*1	Front Airbag Sensor RH
*2	Airbag ECU Assembly
*a	Front view of wire harness connector (to Front Airbag Sensor RH)

NG ► CHECK INSTRUMENT PANEL WIRE
(SHORT)

OK



4. CHECK FRONT AIRBAG SENSOR RH CIRCUIT (SHORT TO B+)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A51-2 (BUSIN) - Body ground	Ignition switch ON	Below 1 V
A51-1 (RTNIN) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Front Airbag Sensor RH
*2	Airbag ECU Assembly
*a	Front view of wire harness connector (to Front Airbag Sensor RH)

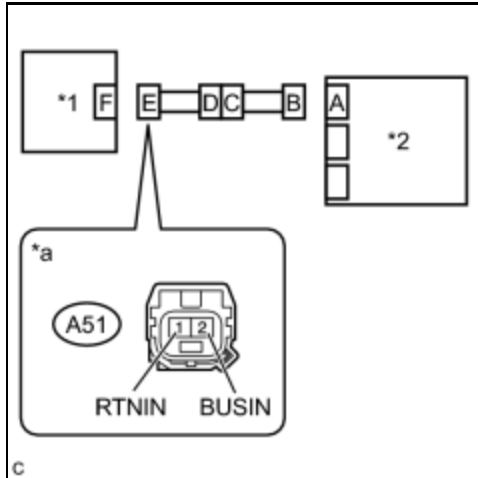
OK



5. CHECK FRONT AIRBAG SENSOR RH CIRCUIT (SHORT TO GROUND)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A51-2 (BUSIN) - Body ground	Always	1 MΩ or higher
A51-1 (RTNIN) - Body ground	Always	1 MΩ or higher

Text in Illustration

*1	Front Airbag Sensor RH
*2	Airbag ECU Assembly
*a	Front view of wire harness connector (to Front Airbag Sensor RH)

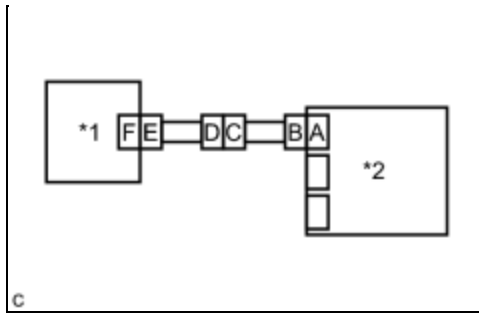
NG ► **CHECK INSTRUMENT PANEL WIRE (SHORT TO GROUND)**

OK



6. CHECK FRONT AIRBAG SENSOR RH

(a) Connect the connector to the airbag ECU assembly.



- (b) Interchange the front airbag sensor RH with LH and connect the connectors.
- (c) Connect the cable to the negative (-) battery terminal.
- (d) Clear the DTCs stored in memory **INFO** .
- (e) Turn the ignition switch off.
- (f) Turn the ignition switch to ON, and wait for at least 60 seconds.
- (g) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
DTCs B1612, B1613, B1617 and B1618 are not output.	A
DTC B1617 or B1618 is output.	B
DTC B1612 or B1613 is output.	C

HINT:

Codes other than DTCs B1612, B1613, B1617 and B1618 may be output at this time, but they are not related to this check.

- (h) Turn the ignition switch off.
- (i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (j) Return the front airbag sensor RH and LH to their original positions and connect the connectors.

Text in Illustration

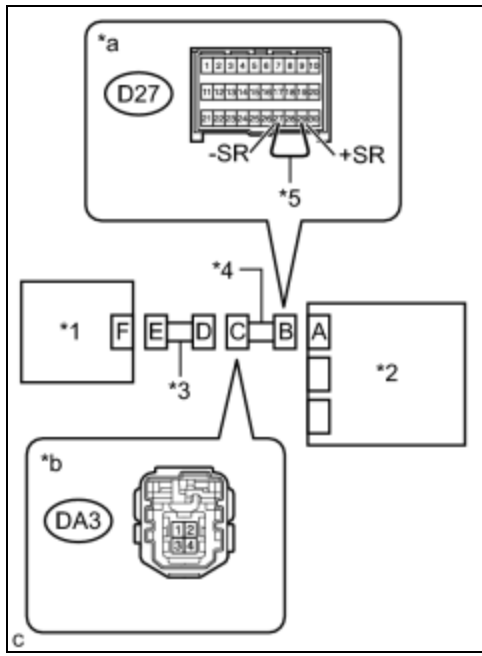
*1	Front Airbag Sensor LH
*2	Airbag ECU Assembly

B ► REPLACE FRONT AIRBAG SENSOR RH

C ► REPLACE AIRBAG ECU ASSEMBLY

A ► USE SIMULATION METHOD TO CHECK

7. CHECK INSTRUMENT PANEL WIRE (OPEN)



(a) Disconnect the instrument panel wire connector from the engine room main wire.

HINT:

The service wire has already been inserted into connector B.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
DA3-2 - DA3-1	Always	Below 1 Ω

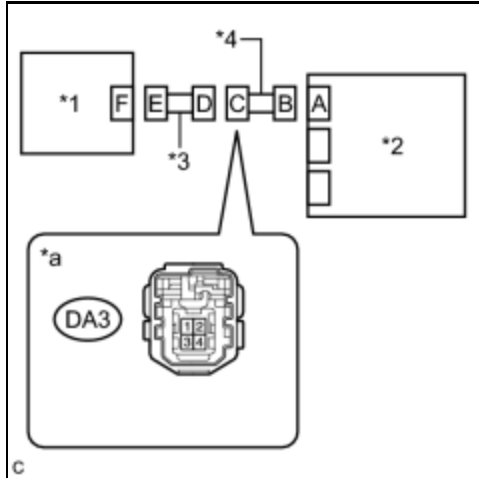
(c) Disconnect the service wire from connector B.

Text in Illustration

*1	Front Airbag Sensor RH
*2	Airbag ECU Assembly
*3	Engine Room Main Wire
*4	Instrument Panel Wire
*5	Service Wire
*a	Front view of wire harness connector (to Airbag ECU Assembly)
*b	Front view of wire harness connector (to Engine Room Main Wire)

OK ► REPLACE ENGINE ROOM MAIN WIRE

8. CHECK INSTRUMENT PANEL WIRE (SHORT)



(a) Disconnect the instrument panel wire connector from the engine room main wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
DA3-2 - DA3-1	Always	1 MΩ or higher

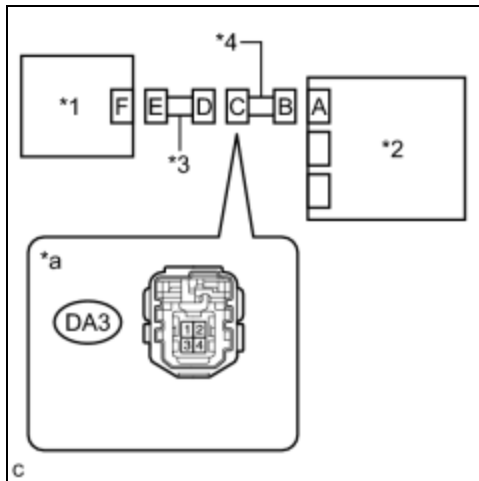
Text in Illustration

*1	Front Airbag Sensor RH
*2	Airbag ECU Assembly
*3	Engine Room Main Wire
*4	Instrument Panel Wire
*a	Front view of wire harness connector (to Engine Room Main Wire)

NG ► REPLACE INSTRUMENT PANEL WIRE

OK ► REPLACE ENGINE ROOM MAIN WIRE

9. CHECK INSTRUMENT PANEL WIRE (SHORT TO B+)



(a) Disconnect the instrument panel wire connector from the engine room main wire.

(b) Connect the cable to the negative (-) battery terminal.

(c) Turn the ignition switch to ON.

(d) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
DA3-2 - Body ground	Ignition switch ON	Below 1 V
DA3-1 - Body ground	Ignition switch ON	Below 1 V

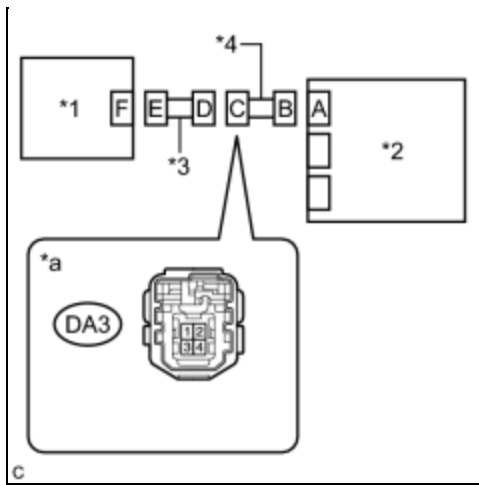
Text in Illustration

*1	Front Airbag Sensor RH
*2	Airbag ECU Assembly
*3	Engine Room Main Wire
*4	Instrument Panel Wire
*a	Front view of wire harness connector (to Engine Room Main Wire)

NG ► REPLACE INSTRUMENT PANEL WIRE

OK ► REPLACE ENGINE ROOM MAIN WIRE

10.	CHECK INSTRUMENT PANEL WIRE (SHORT TO GROUND)
------------	--



(a) Disconnect the instrument panel wire connector from the engine room main wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
DA3-2 - Body ground	Always	1 MΩ or higher
DA3-1 - Body ground	Always	1 MΩ or higher

Text in Illustration

*1	Front Airbag Sensor RH
*2	Airbag ECU Assembly
*3	Engine Room Main Wire
*4	Instrument Panel Wire
*a	Front view of wire harness connector (to Engine Room Main Wire)

NG ▶ REPLACE INSTRUMENT PANEL WIRE

OK ▶ REPLACE ENGINE ROOM MAIN WIRE

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003617040X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1615,B16F3: Front Airbag Sensor LH Malfunction (2013 FR-S)		

DTC	B1615	Front Airbag Sensor LH Malfunction
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DTC	B16F3	Front Airbag Sensor LH Mismatch
------------	--------------	--

DESCRIPTION

The front airbag sensor LH circuit consists of the airbag ECU assembly and front airbag sensor LH.

The front airbag sensor LH detects impacts to the vehicle and sends signals to the airbag ECU assembly to determine if the airbag should be deployed.

These DTCs are stored when a malfunction is detected in the front airbag sensor LH.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1615	<ul style="list-style-type: none"> • Front airbag sensor LH malfunction • Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> • Front airbag sensor LH • Airbag ECU assembly
B16F3	<ul style="list-style-type: none"> • Improper installation of front airbag sensor LH • Airbag ECU assembly malfunction 	

WIRING DIAGRAM

Refer to DTCs B1617 and B1618 INFO .

INSPECTION PROCEDURE

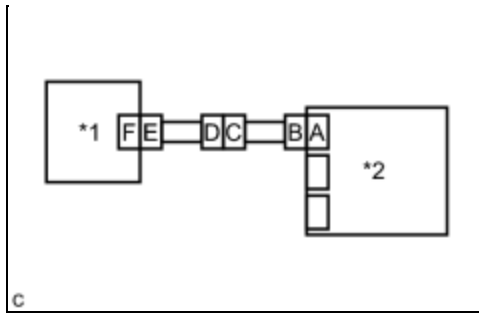
NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .

PROCEDURE

1.	CHECK FRONT AIRBAG SENSOR LH
-----------	-------------------------------------

(a) Turn the ignition switch off.



(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Interchange the front airbag sensor LH with RH and connect the connectors.

(d) Connect the cable to the negative (-) battery terminal.

(e) Clear the DTCs stored in memory **INFO** .

(f) Turn the ignition switch off.

(g) Turn the ignition switch to ON, and wait for at least 60 seconds.

(h) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
DTCs B1610, B1615, B16F2 and B16F3 are not output.	A
DTC B1615 and B16F3 are output.	B
DTC B1610 and B16F2 are output.	C

HINT:

Codes other than DTCs B1610, B1615, B16F2 and B16F3 may be output at this time, but they are not related to this check.

(i) Turn the ignition switch off.

(j) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(k) Return the front airbag sensor LH and RH to their original positions and connect the connectors.

Text in Illustration

*1	Front Airbag Sensor RH
*2	Airbag ECU Assembly

C ▶ REPLACE FRONT AIRBAG SENSOR LH

A ▶ USE SIMULATION METHOD TO CHECK



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000YTN08JX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1617,B1618: Front Airbag Sensor LH Lost Communication (2013 FR-S)		

DTC	B1617	Front Airbag Sensor LH Lost Communication
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DTC	B1618	Front Airbag Sensor LH Initialization
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DESCRIPTION

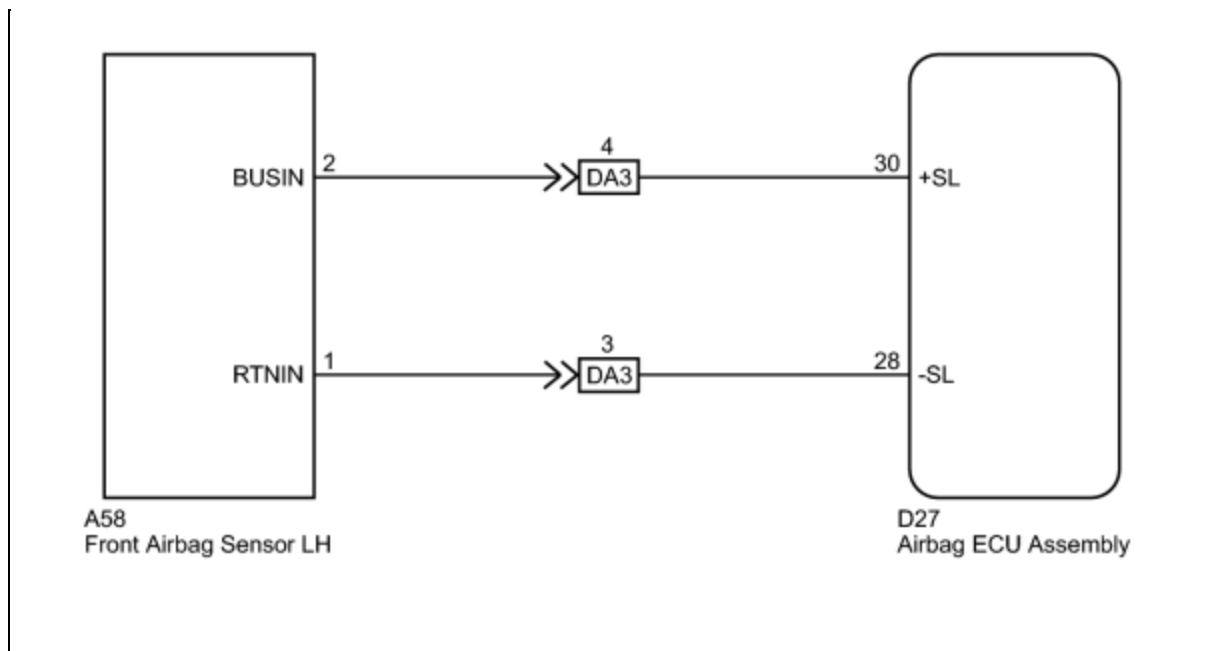
The front airbag sensor LH circuit consists of the airbag ECU assembly and front airbag sensor LH.

The front airbag sensor LH detects impacts to the vehicle and sends signals to the airbag ECU assembly to determine if the airbag should be deployed.

These DTCs are stored when a malfunction is detected in the front airbag sensor LH circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1617 B1618	<ul style="list-style-type: none"> The airbag ECU assembly receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the front airbag sensor LH circuit. Front airbag sensor LH malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Instrument panel wire Engine room main wire Front airbag sensor LH Airbag ECU assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

PROCEDURE

1.	CHECK CONNECTORS
-----------	-------------------------

- (a) Turn the ignition switch off.
- (b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Check that the connectors are properly connected to the airbag ECU assembly and front airbag sensor LH. Also check that the connectors that link the engine room main wire and instrument panel wire are properly connected.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

- (d) Disconnect the connectors from the airbag ECU assembly and front airbag sensor LH. Also disconnect the connectors that link the engine room main wire and instrument panel wire.
- (e) Check that the terminals of the connectors are not damaged.

OK:

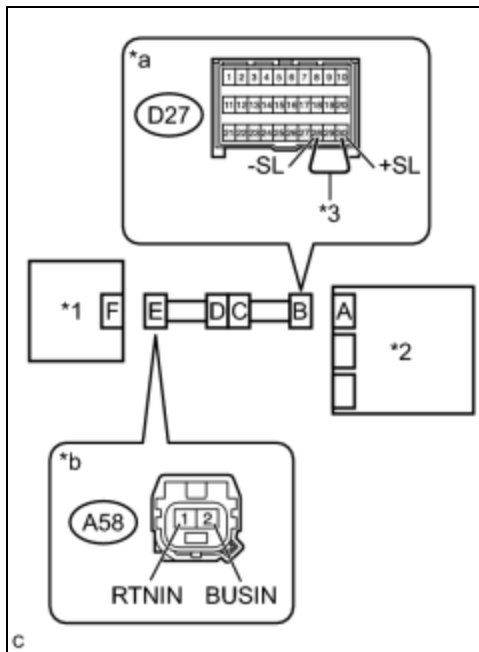
The terminals are not deformed or damaged.

NG  **REPLACE WIRE HARNESS**

OK



2. CHECK FRONT AIRBAG SENSOR LH CIRCUIT (OPEN)



(a) Connect the connectors that link the engine room main wire and instrument panel wire.

(b) Using a service wire, connect terminals 30 (+SL) and 28 (-SL) of connector B.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A58-2 (BUSIN) - A58-1 (RTNIN)	Always	Below 1 Ω

Text in Illustration

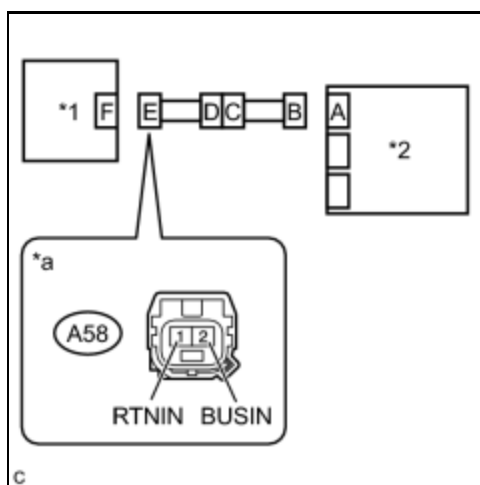
*1	Front Airbag Sensor LH
*2	Airbag ECU Assembly
*3	Service Wire

*a	Front view of wire harness connector (to Airbag ECU Assembly)
*b	Front view of wire harness connector (to Front Airbag Sensor LH)

NG ► CHECK INSTRUMENT PANEL WIRE
(OPEN)

OK
▼

3. CHECK FRONT AIRBAG SENSOR LH CIRCUIT (SHORT)



(a) Disconnect the service wire from connector B.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A58-2 (BUSIN) - A58-1 (RTNIN)	Always	1 MΩ or higher

Text in Illustration

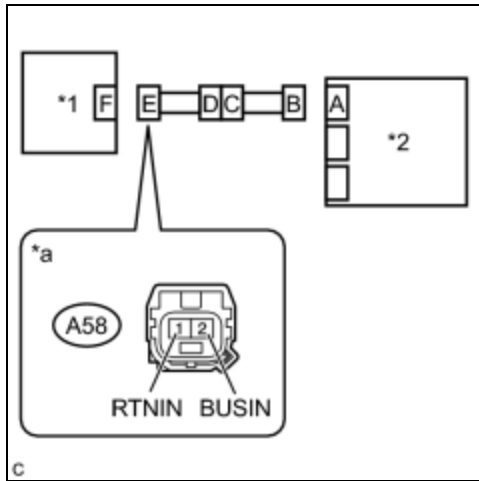
*1	Front Airbag Sensor LH
*2	Airbag ECU Assembly
*a	Front view of wire harness connector (to Front Airbag Sensor LH)

NG ► CHECK INSTRUMENT PANEL WIRE
(SHORT)

OK



4. CHECK FRONT AIRBAG SENSOR LH CIRCUIT (SHORT TO B+)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A58-2 (BUSIN) - Body ground	Ignition switch ON	Below 1 V
A58-1 (RTNIN) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Front Airbag Sensor LH
*2	Airbag ECU Assembly
*a	Front view of wire harness connector (to Front Airbag Sensor LH)

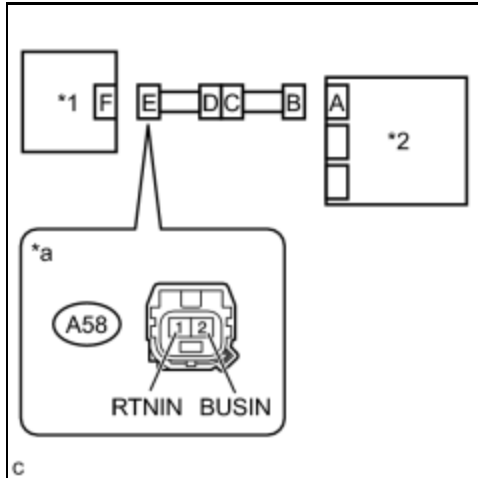
OK



5. CHECK FRONT AIRBAG SENSOR LH CIRCUIT (SHORT TO GROUND)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A58-2 (BUSIN) - Body ground	Always	1 MΩ or higher
A58-1 (RTNIN) - Body ground	Always	1 MΩ or higher

Text in Illustration

*1	Front Airbag Sensor LH
*2	Airbag ECU Assembly
*a	Front view of wire harness connector (to Front Airbag Sensor LH)

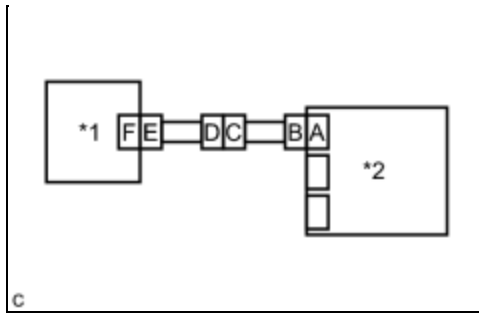
NG ► **CHECK INSTRUMENT PANEL WIRE (SHORT TO GROUND)**

OK



6. CHECK FRONT AIRBAG SENSOR LH

(a) Connect the connector to the airbag ECU assembly.



- (b) Interchange the front airbag sensor LH with RH and connect the connectors.
- (c) Connect the cable to the negative (-) battery terminal.
- (d) Clear the DTCs stored in memory **INFO** .
- (e) Turn the ignition switch off.
- (f) Turn the ignition switch to ON, and wait for at least 60 seconds.
- (g) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
DTCs B1612, B1613, B1617 and B1618 are not output.	A
DTC B1617 or B1618 is output.	B
DTC B1612 or B1613 is output.	C

HINT:

Codes other than DTCs B1612, B1613, B1617 and B1618 may be output at this time, but they are not related to this check.

- (h) Turn the ignition switch off.
- (i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (j) Return the front airbag sensor LH and RH to their original positions and connect the connectors.

Text in Illustration

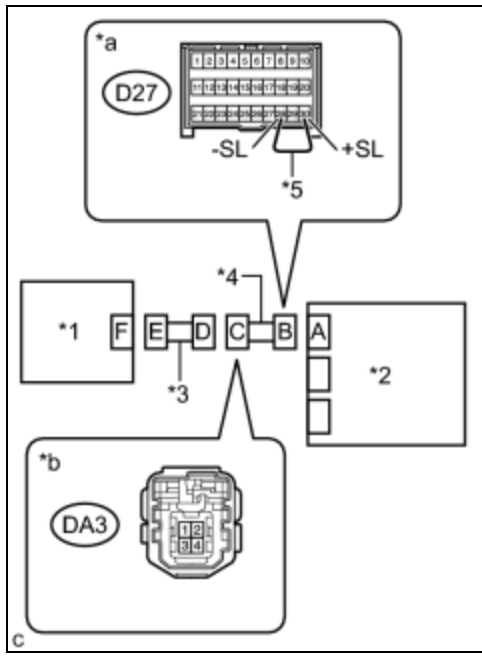
*1	Front Airbag Sensor RH
*2	Airbag ECU Assembly

B ► REPLACE AIRBAG ECU ASSEMBLY

C ► REPLACE FRONT AIRBAG SENSOR LH

A ► USE SIMULATION METHOD TO CHECK

7. CHECK INSTRUMENT PANEL WIRE (OPEN)



(a) Disconnect the instrument panel wire connector from the engine room main wire.

HINT:

The service wire has already been inserted into connector B.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
DA3-4 - DA3-3	Always	Below 1 Ω

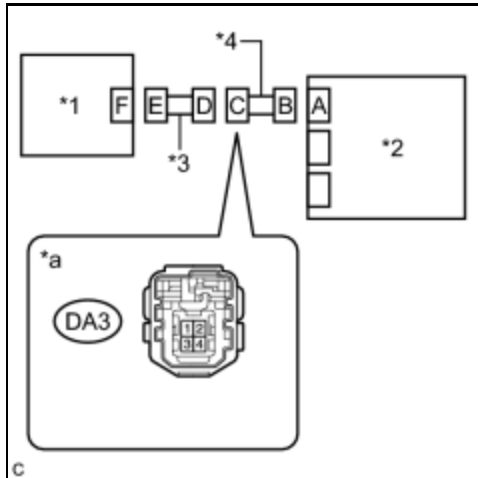
(c) Disconnect the service wire from connector B.

Text in Illustration

*1	Front Airbag Sensor LH
*2	Airbag ECU Assembly
*3	Engine Room Main Wire
*4	Instrument Panel Wire
*5	Service Wire
*a	Front view of wire harness connector (to Airbag ECU Assembly)
*b	Front view of wire harness connector (to Engine Room Main Wire)

OK ► REPLACE ENGINE ROOM MAIN WIRE

8. CHECK INSTRUMENT PANEL WIRE (SHORT)



(a) Disconnect the instrument panel wire connector from the engine room main wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
DA3-4 - DA3-3	Always	1 MΩ or higher

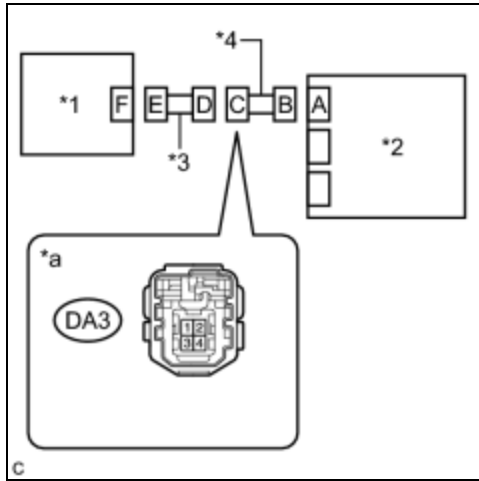
Text in Illustration

*1	Front Airbag Sensor LH
*2	Airbag ECU Assembly
*3	Engine Room Main Wire
*4	Instrument Panel Wire
*a	Front view of wire harness connector (to Engine Room Main Wire)

NG ► REPLACE INSTRUMENT PANEL WIRE

OK ► REPLACE ENGINE ROOM MAIN WIRE

9. CHECK INSTRUMENT PANEL WIRE (SHORT TO B+)



(a) Disconnect the instrument panel wire connector from the engine room main wire.

(b) Connect the cable to the negative (-) battery terminal.

(c) Turn the ignition switch to ON.

(d) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
DA3-4 - Body ground	Ignition switch ON	Below 1 V
DA3-3 - Body ground	Ignition switch ON	Below 1 V

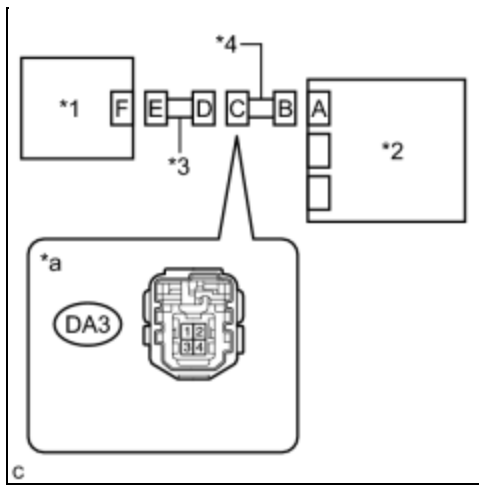
Text in Illustration

*1	Front Airbag Sensor LH
*2	Airbag ECU Assembly
*3	Engine Room Main Wire
*4	Instrument Panel Wire
*a	Front view of wire harness connector (to Engine Room Main Wire)

NG ► REPLACE INSTRUMENT PANEL WIRE

OK ► REPLACE ENGINE ROOM MAIN WIRE

10.	CHECK INSTRUMENT PANEL WIRE (SHORT TO GROUND)
------------	--



(a) Disconnect the instrument panel wire connector from the engine room main wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
DA3-4 - Body ground	Always	1 MΩ or higher
DA3-3 - Body ground	Always	1 MΩ or higher

Text in Illustration

*1	Front Airbag Sensor LH
*2	Airbag ECU Assembly
*3	Engine Room Main Wire
*4	Instrument Panel Wire
*a	Front view of wire harness connector (to Engine Room Main Wire)

NG ▶ REPLACE INSTRUMENT PANEL WIRE

OK ▶ REPLACE ENGINE ROOM MAIN WIRE

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001NZV05QX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1620,B16F4: Side Airbag Sensor RH Circuit Malfunction (2013 FR-S)		

DTC	B1620	Side Airbag Sensor RH Circuit Malfunction
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DTC	B16F4	Side Airbag Sensor RH Mismatch
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DESCRIPTION

The side collision sensor RH circuit (to determine deployment of the front seat airbag assembly RH, curtain shield airbag assembly RH and front seat outer belt assembly RH) is composed of the airbag ECU assembly, side airbag sensor assembly RH, side No. 2 airbag sensor assembly RH, rear airbag sensor RH and No. 2 airbag sensor assembly.

The side No. 2 airbag sensor assembly RH detects impacts to the vehicle and sends signals to the airbag ECU assembly to determine if the airbag should be deployed.

These DTCs are stored when a malfunction is detected in the side No. 2 airbag sensor assembly RH.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1620	<ul style="list-style-type: none"> Side No. 2 airbag sensor assembly RH malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Side No. 2 airbag sensor assembly RH Airbag ECU assembly
B16F4	<ul style="list-style-type: none"> Improper installation of side No. 2 airbag sensor assembly RH Airbag ECU assembly malfunction 	

WIRING DIAGRAM

Refer to DTCs B1622, B1623, B1632, B1633, B1642, B1692 and B1693 INFO .

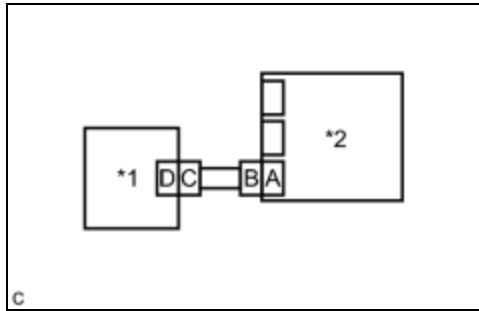
INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .

PROCEDURE

1.	CHECK SIDE NO. 2 AIRBAG SENSOR ASSEMBLY RH
-----------	---



(a) Turn the ignition switch off.

(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Interchange the side No. 2 airbag sensor assembly RH with LH and connect the connectors.

(d) Connect the cable to the negative (-) battery terminal.

(e) Clear the DTCs stored in memory **INFO**.

(f) Turn the ignition switch off.

(g) Turn the ignition switch to ON, and wait for at least 60 seconds.

(h) Check for DTCs **INFO**.

Result:

RESULT	PROCEED TO
DTC B1620 or B16F4 is output.	A
DTC B1625 or B16F5 is output.	B
DTCs B1620, B1625, B16F4 and B16F5 are not output.	C

HINT:

Codes other than DTCs B1620, B1625, B16F4 and B16F5 may be output at this time, but they are not related to this check.

(i) Turn the ignition switch off.

(j) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(k) Return the side No. 2 airbag sensor assembly RH and LH to their original positions and connect the connectors.

Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly LH
*2	Airbag ECU Assembly

B ▶ REPLACE SIDE NO. 2 AIRBAG SENSOR
ASSEMBLY RH

C ▶ USE SIMULATION METHOD TO CHECK

A ▶ REPLACE AIRBAG ECU ASSEMBLY



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000027E406VX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1622,B1623,B1632,B1633,B1642,B1692,B1693: Side Airbag Sensor RH Lost Communication (2013 FR-S)		

DTC	B1622	Side Airbag Sensor RH Lost Communication
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DTC	B1623	Side Airbag Sensor RH Initialization
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DTC	B1632	Side No. 2 Airbag Sensor RH Lost Communication
------------	--------------	---

DTC	B1633	Side No. 2 Airbag Sensor RH Initialization
------------	--------------	---

DTC	B1642	Side Satellite Sensor Bus Lost Communication (RH)
------------	--------------	--

DTC	B1692	Lost Communication with Side Airbag Sensor RH
------------	--------------	--

DTC	B1693	Side Airbag Sensor RH Initialization Incomplete
------------	--------------	--

DESCRIPTION

The side collision sensor RH circuit (to determine deployment of the front seat airbag assembly RH, curtain shield airbag assembly RH and front seat outer belt assembly RH) is composed of the airbag ECU assembly, side airbag sensor assembly RH, side No. 2 airbag sensor assembly RH, rear airbag sensor RH and No. 2 airbag sensor assembly.

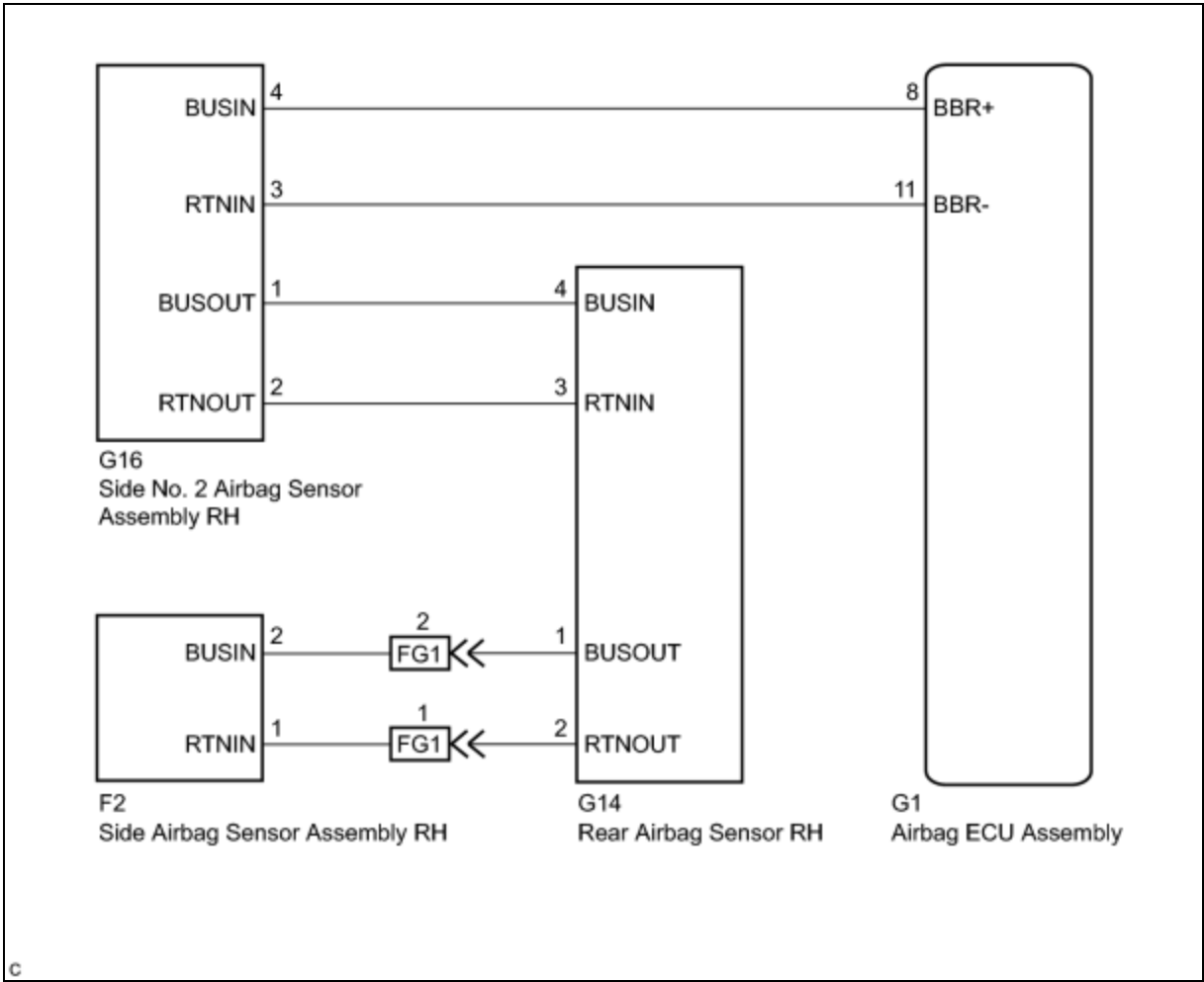
The side airbag sensor assembly RH, side No. 2 airbag sensor assembly RH and rear airbag sensor RH detect impacts to the vehicle and send signals to the airbag ECU assembly to determine if the airbag should be deployed.

These DTCs are stored when a malfunction is detected for the side collision sensor RH circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
		<ul style="list-style-type: none"> • No. 2 floor wire • Front door


<p>B1622 B1623 B1632 B1633 B1642 B1692 B1693</p>	<ul style="list-style-type: none"> • The airbag ECU assembly receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the side collision sensor RH circuit. • Side airbag sensor assembly RH malfunction • Side No. 2 airbag sensor assembly RH malfunction • Rear airbag sensor RH malfunction • Airbag ECU assembly malfunction 	<p>wire RH</p> <ul style="list-style-type: none"> • Side airbag sensor assembly RH • Side No. 2 airbag sensor assembly RH • Rear airbag sensor RH • Airbag ECU assembly
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WIRING DIAGRAM




INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work .

PROCEDURE

1.	CHECK CURRENT DTC
-----------	--------------------------

(a) Check for current DTCs .

Result:

RESULT	PROCEED TO
Current DTC B1642 is output.	A
Current DTC B1623 or B1633 is output.	B
Current DTC B1692 or B1693 is output.	C
Current DTC B1622 or B1632 is output.	D
Current DTCs B1622, B1623, B1632, B1633, B1642, B1692 and B1693 are not output.	E

HINT:

- DTCs indicating communication errors will be changed to DTCs indicating errors in initialization by turning the ignition switch off and then to ON again.
- Codes other than current DTCs B1622, B1623, B1632, B1633, B1642, B1692 and B1693 may be output at this time, but they are not related to this check.

B  **CHECK HISTORY DTC**

C  **CHECK CONNECTORS**

D  **CHECK CURRENT DTC**

E  **USE SIMULATION METHOD TO CHECK**

A



2.	CHECK CONNECTORS
-----------	-------------------------

(a) Turn the ignition switch off.

(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check that the connectors are properly connected to the airbag ECU assembly, side airbag sensor assembly RH, side No. 2 airbag sensor assembly RH and rear airbag sensor RH. Also check that the connectors that link the No. 2 floor wire and front door wire RH are properly connected.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

(d) Disconnect the connectors from the airbag ECU assembly, side airbag sensor assembly RH, side No. 2 airbag sensor assembly RH and rear airbag sensor RH. Also disconnect the connectors that link the No. 2 floor wire and front door wire RH.

(e) Check that the terminals of the connectors are not damaged.

OK:

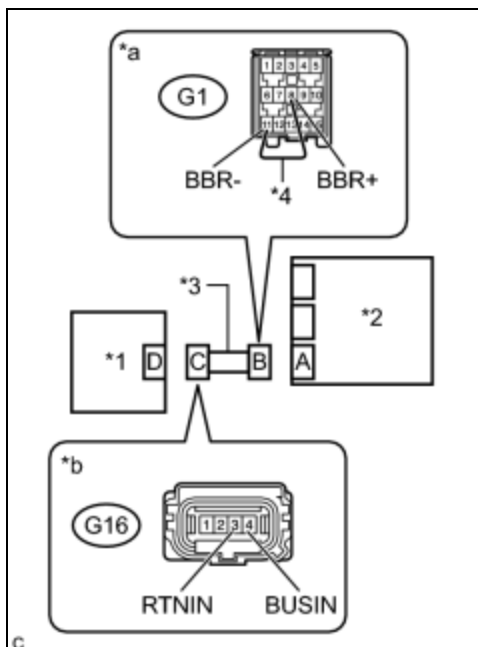
The terminals are not deformed or damaged.

NG ▶ REPLACE WIRE HARNESS

OK



3. CHECK NO. 2 FLOOR WIRE (OPEN)



(a) Using a service wire, connect terminals 8 (BBR+) and 11 (BBR-) of connector B.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G16-4 (BUSIN) - G16-3 (RTNIN)	Always	Below 1 Ω

(c) Disconnect the service wire from connector B.

Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly RH
*2	Airbag ECU Assembly
*3	No. 2 Floor Wire
*4	Service Wire
*a	Front view of wire harness connector (to Airbag ECU Assembly)
*b	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly RH)

NG ▶ REPLACE NO. 2 FLOOR WIRE

OK



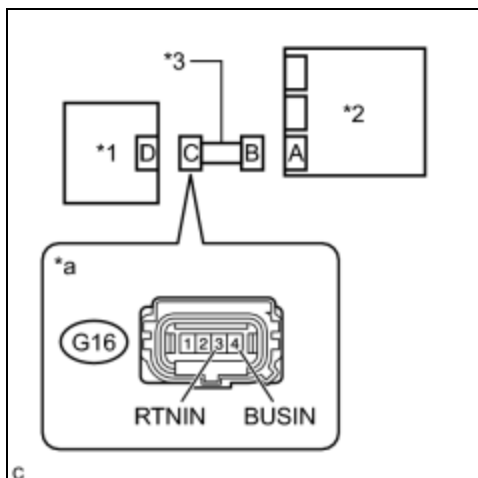
4. CHECK NO. 2 FLOOR WIRE (SHORT)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G16-4 (BUSIN) - G16-3 (RTNIN)	Always	1 M Ω or higher

Text in Illustration

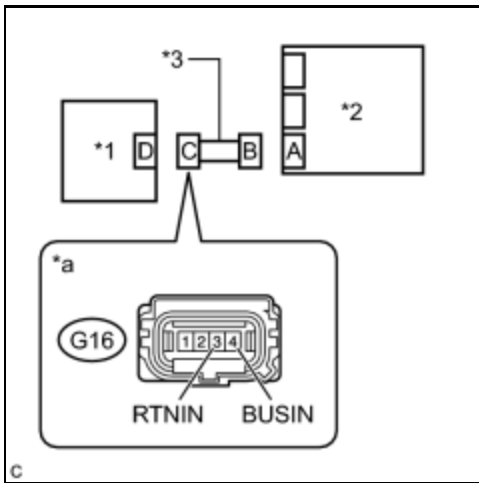


*1	Side No. 2 Airbag Sensor Assembly RH
*2	Airbag ECU Assembly
*3	No. 2 Floor Wire
*a	Front view of wire harness connector

NG ▶ **REPLACE NO. 2 FLOOR WIRE**

OK
▼

5. CHECK NO. 2 FLOOR WIRE (SHORT TO B+)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G16-4 (BUSIN) - Body ground	Ignition switch ON	Below 1 V
G16-3 (RTNIN) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly RH
*2	Airbag ECU Assembly

*3	No. 2 Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly RH)

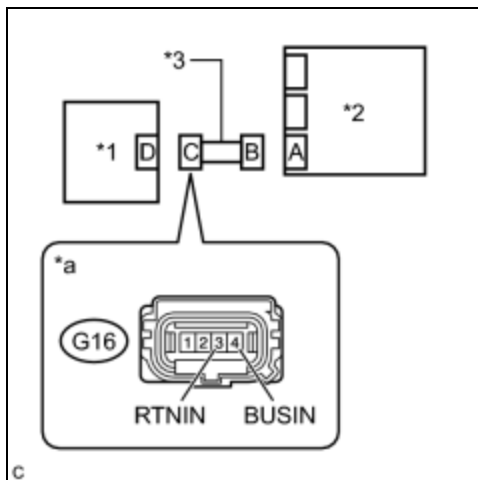
NG ▶ REPLACE NO. 2 FLOOR WIRE

OK
▼

6. CHECK NO. 2 FLOOR WIRE (SHORT TO GROUND)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G16-4 (BUSIN) - Body ground	Always	1 MΩ or higher
G16-3 (RTNIN) - Body ground	Always	1 MΩ or higher

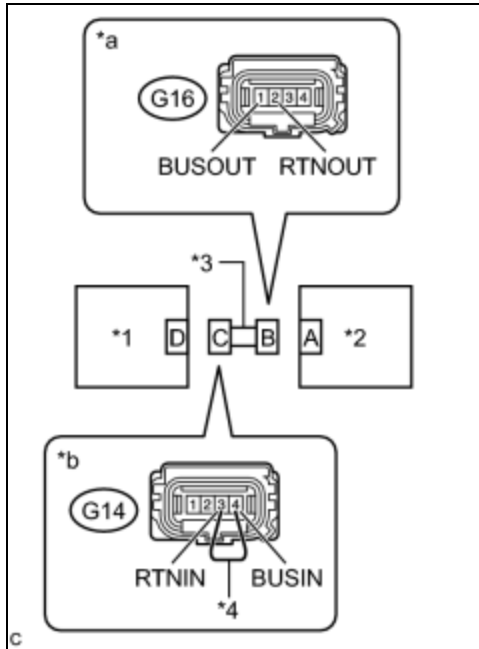
Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly RH
*2	Airbag ECU Assembly
*3	No. 2 Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly RH)

NG ▶ REPLACE NO. 2 FLOOR WIRE

OK
▼

7. CHECK NO. 2 FLOOR WIRE (OPEN)



(a) Using a service wire, connect terminals 3 (RTNIN) and 4 (BUSIN) of connector C.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G16-1 (BUSOUT) - G16-2 (RTNOUT)	Always	Below 1 Ω

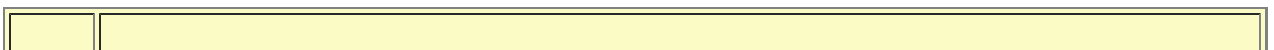
(c) Disconnect the service wire from connector C.

Text in Illustration

*1	Rear Airbag Sensor RH
*2	Side No. 2 Airbag Sensor Assembly RH
*3	No. 2 Floor Wire
*4	Service Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly RH)
*b	Front view of wire harness connector (to Rear Airbag Sensor RH)

NG ▶ REPLACE NO. 2 FLOOR WIRE

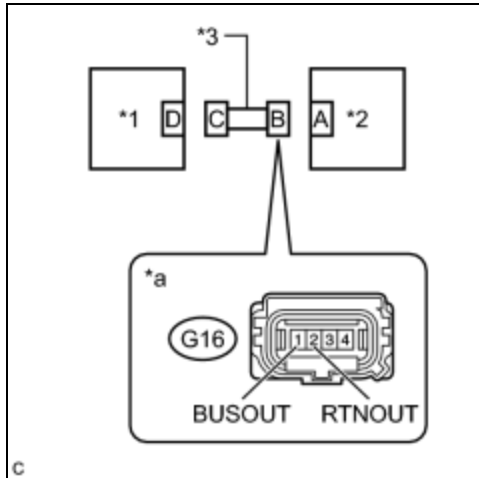
OK
▼



8. CHECK NO. 2 FLOOR WIRE (SHORT)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G16-1 (BUSOUT) - G16-2 (RTNOUT)	Always	1 MΩ or higher

Text in Illustration

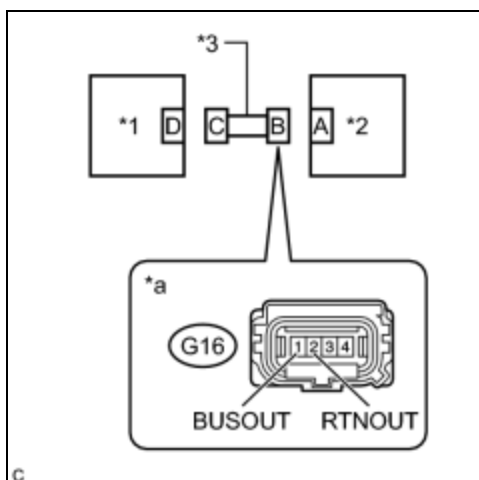
*1	Rear Airbag Sensor RH
*2	Side No. 2 Airbag Sensor Assembly RH
*3	No. 2 Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly RH)

NG ▶ REPLACE NO. 2 FLOOR WIRE

OK



9. CHECK NO. 2 FLOOR WIRE (SHORT TO B+)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G16-1 (BUSOUT) - Body ground	Ignition switch ON	Below 1 V
G16-2 (RTNOUT) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Rear Airbag Sensor RH
*2	Side No. 2 Airbag Sensor Assembly RH
*3	No. 2 Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly RH)

NG  **REPLACE NO. 2 FLOOR WIRE**

OK



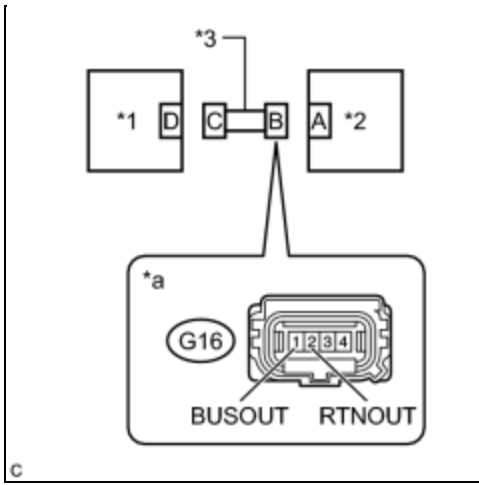
10.	CHECK NO. 2 FLOOR WIRE (SHORT TO GROUND)
------------	---

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G16-1 (BUSOUT) - Body ground	Always	1 M Ω or higher
G16-2 (RTNOUT) - Body ground	Always	1 M Ω or higher

Text in Illustration

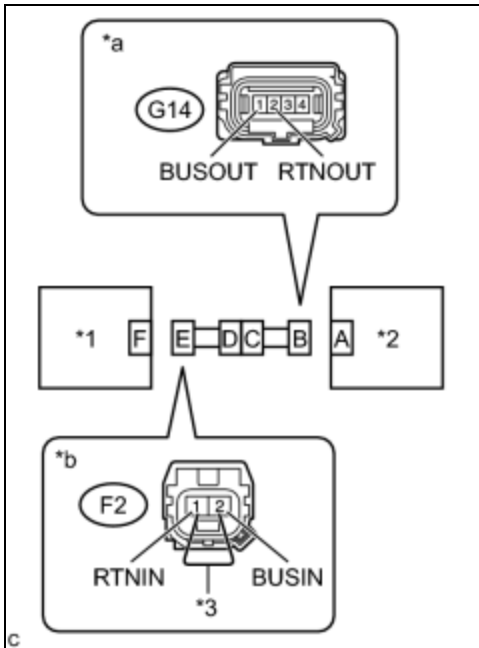


*1	Rear Airbag Sensor RH
*2	Side No. 2 Airbag Sensor Assembly RH
*3	No. 2 Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly RH)

NG ▶ REPLACE NO. 2 FLOOR WIRE

OK
▼

11. CHECK SIDE AIRBAG SENSOR RH CIRCUIT (OPEN)



(a) Connect the connectors that link the No. 2 floor wire and front door wire RH.

(b) Using a service wire, connect terminals 2 (BUSIN) and 1 (RTNIN) of connector E.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G14-1 (BUSOUT) - G14-2 (RTNOUT)	Always	Below 1 Ω

Text in Illustration

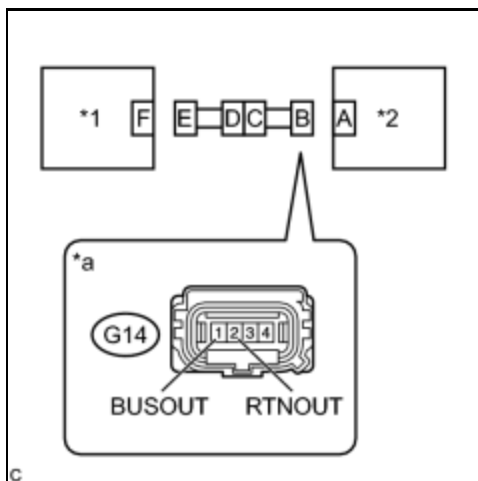
*1	Side Airbag Sensor Assembly RH
*2	Rear Airbag Sensor RH
*3	Service Wire
*a	Front view of wire harness connector (to Rear Airbag Sensor RH)
*b	Front view of wire harness connector (to Side Airbag Sensor Assembly RH)

NG ► CHECK FRONT DOOR WIRE RH (OPEN)

OK



12. CHECK SIDE AIRBAG SENSOR RH CIRCUIT (SHORT)



(a) Disconnect the service wire from connector E.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G14-1 (BUSOUT) - G14-2 (RTNOUT)	Always	1 MΩ or higher

Text in Illustration

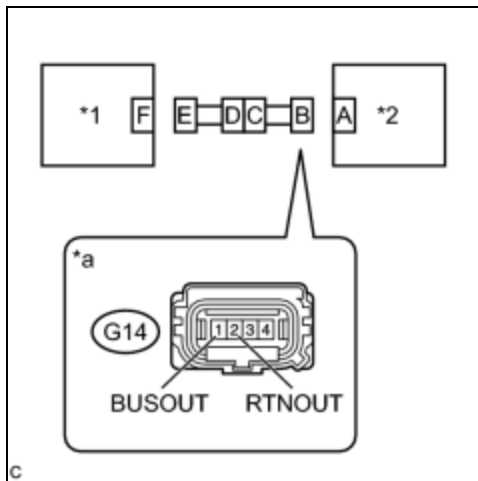
*1	Side Airbag Sensor Assembly RH
*2	Rear Airbag Sensor RH
*a	Front view of wire harness connector (to Rear Airbag Sensor RH)

NG ► CHECK FRONT DOOR WIRE RH (SHORT)

OK



13. CHECK SIDE AIRBAG SENSOR RH CIRCUIT (SHORT TO B+)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G14-1 (BUSOUT) - Body ground	Ignition switch ON	Below 1 V
G14-2 (RTNOUT) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Side Airbag Sensor Assembly RH
*2	Rear Airbag Sensor RH
*a	Front view of wire harness connector (to Rear Airbag Sensor RH)

NG ► CHECK FRONT DOOR WIRE RH (SHORT TO B+)

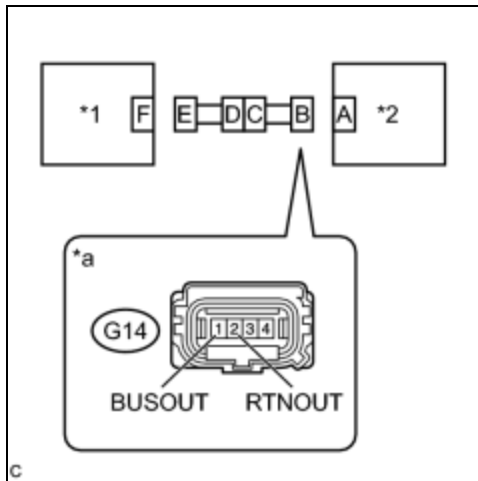
OK



14. CHECK SIDE AIRBAG SENSOR RH CIRCUIT (SHORT TO GROUND)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G14-1 (BUSOUT) - Body ground	Always	1 MΩ or higher
G14-2 (RTNOUT) - Body ground	Always	1 MΩ or higher

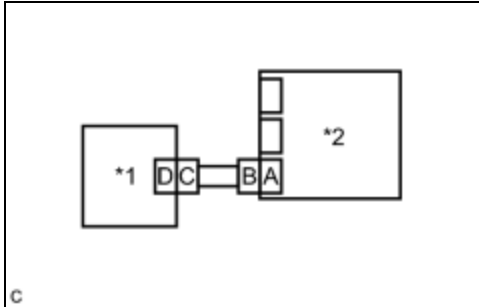
Text in Illustration

*1	Side Airbag Sensor Assembly RH
*2	Rear Airbag Sensor RH
*a	Front view of wire harness connector (to Rear Airbag Sensor RH)

NG ► CHECK FRONT DOOR WIRE RH (SHORT TO GROUND)

OK
▼

15. CHECK SIDE NO. 2 AIRBAG SENSOR ASSEMBLY RH



(a) Connect the connectors to the rear airbag sensor RH, side airbag sensor assembly RH and airbag ECU assembly.

(b) Interchange the side No. 2 airbag sensor assembly RH with LH and connect the connectors.

(c) Connect the cable to the negative (-) battery terminal.

(d) Clear the DTCs stored in memory **INFO** .

(e) Turn the ignition switch off.

(f) Turn the ignition switch to ON, and wait for at least 60 seconds.

(g) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
DTC B1642 is output.	A
DTC B1647 is output.	B
DTCs B1642 and B1647 are not output.	C

HINT:

Codes other than DTCs B1642 and B1647 may be output at this time, but they are not related to this check.

(h) Turn the ignition switch off.

(i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(j) Return the side No. 2 airbag sensor assembly RH and LH to their original positions and connect the connectors.

Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly LH
*2	Airbag ECU Assembly

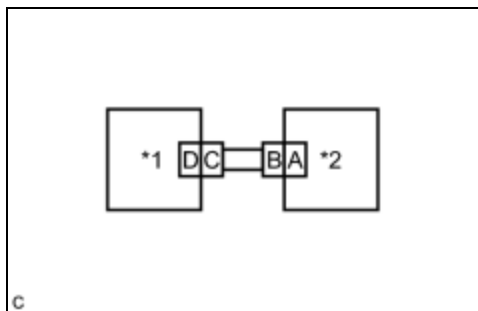
B ▶ REPLACE SIDE NO. 2 AIRBAG SENSOR ASSEMBLY RH

C ▶ USE SIMULATION METHOD TO CHECK

A



16.	CHECK REAR AIRBAG SENSOR RH
------------	------------------------------------



(a) Interchange the rear airbag sensor RH with LH and connect the connectors to them.

(b) Connect the cable to the negative (-) battery terminal.

(c) Clear the DTCs stored in memory INFO .

(d) Turn the ignition switch off.

(e) Turn the ignition switch to ON, and wait for at least 60 seconds.

(f) Check for DTCs INFO .

Result:

RESULT	PROCEED TO
DTC B1642 is output.	A
DTC B1647 is output.	B
DTCs B1642 and B1647 are not output.	C

HINT:

Codes other than DTCs B1642 and B1647 may be output at this time, but they are not related to this check.

- (g) Turn the ignition switch off.
- (h) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (i) Return the rear airbag sensor RH and LH to their original positions and connect the connectors.

Text in Illustration

*1	Rear Airbag Sensor LH
*2	Side No. 2 Airbag Sensor Assembly RH

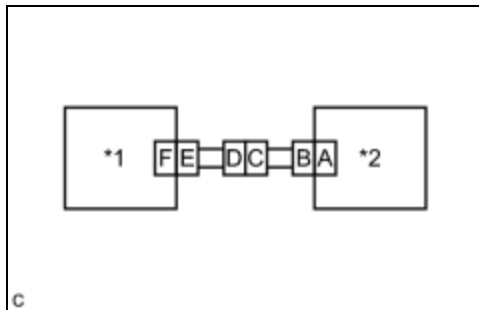
B ▶ REPLACE REAR AIRBAG SENSOR RH

C ▶ USE SIMULATION METHOD TO CHECK

A



17. CHECK SIDE AIRBAG SENSOR ASSEMBLY RH



- (a) Interchange the side airbag sensor assembly RH with LH and connect the connectors.

- (b) Connect the cable to the negative (-) battery terminal.
- (c) Clear the DTCs stored in memory **INFO** .
- (d) Turn the ignition switch off.
- (e) Turn the ignition switch to ON, and wait for at least 60 seconds.
- (f) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
--------	------------

DTC B1642 is output.	A
DTC B1647 is output.	B
DTCs B1642 and B1647 are not output.	C

HINT:

Codes other than DTCs B1642 and B1647 may be output at this time, but they are not related to this check.

- (g) Turn the ignition switch off.
- (h) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (i) Return the side airbag sensor assembly RH and LH to their original positions and connect the connectors.

Text in Illustration

*1	Side Airbag Sensor Assembly LH
*2	Rear Airbag Sensor RH

B ▶ REPLACE SIDE AIRBAG SENSOR ASSEMBLY RH

C ▶ USE SIMULATION METHOD TO CHECK

A ▶ REPLACE AIRBAG ECU ASSEMBLY

18. CHECK HISTORY DTC

- (a) Check for history DTCs  .

Result:

RESULT	PROCEED TO
History DTCs B1622 and B1632 are not output.	A
History DTC B1622 is output.	B
History DTC B1632 is output.	C

HINT:

Codes other than history DTCs B1622 and B1632 may be output at this time, but they are not related to this check.

B ▶ CHECK SIDE NO. 2 AIRBAG SENSOR ASSEMBLY RH

A



19.	CHECK CURRENT DTC
------------	--------------------------

(a) Check for current DTCs INFO.

Result:

RESULT	PROCEED TO
Current DTC B1623 is output.	A
Current DTC B1633 is output.	B

HINT:

Codes other than current DTCs B1623 and B1633 may be output at this time, but they are not related to this check.

A



20.	CHECK CONNECTORS
------------	-------------------------

- (a) Turn the ignition switch off.
- (b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Check that the connectors are properly connected to the airbag ECU assembly and side No. 2 airbag sensor assembly RH.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

- (d) Disconnect the connectors from the airbag ECU assembly and side No. 2 airbag sensor

assembly RH.

(e) Check that the terminals of the connectors are not damaged.

OK:

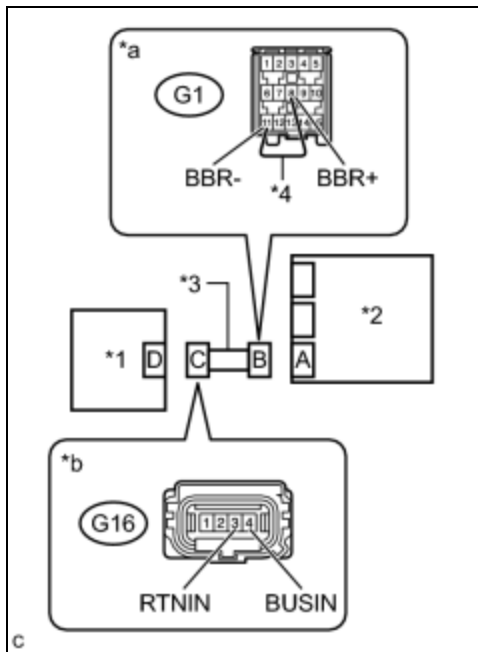
The terminals are not deformed or damaged.

NG ▶ REPLACE NO. 2 FLOOR WIRE

OK



21. CHECK NO. 2 FLOOR WIRE (OPEN)



(a) Using a service wire, connect terminals 8 (BBR+) and 11 (BBR-) of connector B.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G16-4 (BUSIN) - G16-3 (RTNIN)	Always	Below 1 Ω

(c) Disconnect the service wire from connector B.

Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly RH
*2	Airbag ECU Assembly

*3	No. 2 Floor Wire
*4	Service Wire
*a	Front view of wire harness connector (to Airbag ECU Assembly)
*b	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly RH)

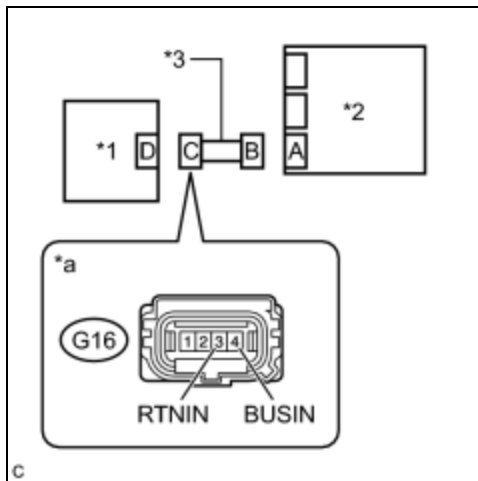
NG ▶ REPLACE NO. 2 FLOOR WIRE

OK
▼

22. CHECK NO. 2 FLOOR WIRE (SHORT)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G16-4 (BUSIN) - G16-3 (RTNIN)	Always	1 MΩ or higher

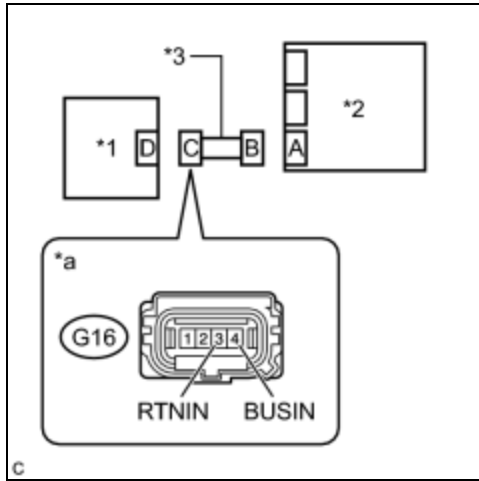
Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly RH
*2	Airbag ECU Assembly
*3	No. 2 Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly RH)

NG ▶ REPLACE NO. 2 FLOOR WIRE

OK
▼

23. CHECK NO. 2 FLOOR WIRE (SHORT TO B+)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G16-4 (BUSIN) - Body ground	Ignition switch ON	Below 1 V
G16-3 (RTNIN) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly RH
*2	Airbag ECU Assembly
*3	No. 2 Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly RH)

NG **REPLACE NO. 2 FLOOR WIRE**

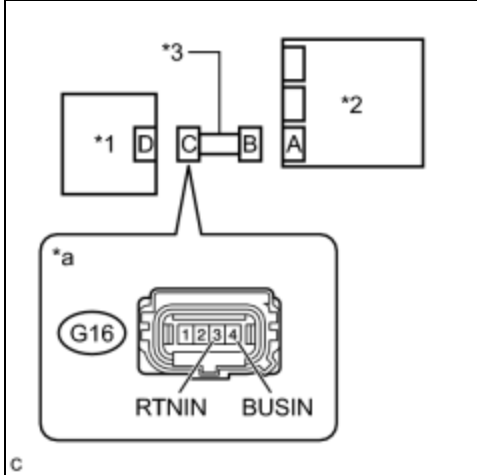
OK



24. CHECK NO. 2 FLOOR WIRE (SHORT TO GROUND)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G16-4 (BUSIN) - Body ground	Always	1 MΩ or higher
G16-3 (RTNIN) - Body ground	Always	1 MΩ or higher

Text in Illustration

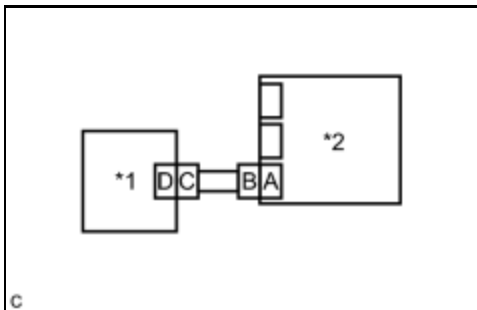
*1	Side No. 2 Airbag Sensor Assembly RH
*2	Airbag ECU Assembly
*3	No. 2 Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly RH)

NG ▶ REPLACE NO. 2 FLOOR WIRE

OK



25. CHECK SIDE NO. 2 AIRBAG SENSOR ASSEMBLY RH



(a) Connect the connector to the airbag ECU assembly.

(b) Interchange the side No. 2 airbag sensor assembly RH with LH and connect the connectors.

- (c) Connect the cable to the negative (-) battery terminal.
- (d) Clear the DTCs stored in memory **INFO** .
- (e) Turn the ignition switch off.
- (f) Turn the ignition switch to ON, and wait for at least 60 seconds.
- (g) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
DTC B1623 is output.	A
DTC B1628 is output.	B
DTCs B1623 and B1628 are not output.	C

HINT:

Codes other than DTCs B1623 and B1628 may be output at this time, but they are not related to this check.

- (h) Turn the ignition switch off.
- (i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (j) Return the side No. 2 airbag sensor assembly RH and LH to their original positions and connect the connectors.

Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly LH
*2	Airbag ECU Assembly

B ▶ REPLACE SIDE NO. 2 AIRBAG SENSOR ASSEMBLY RH

C ▶ USE SIMULATION METHOD TO CHECK

A ▶ REPLACE AIRBAG ECU ASSEMBLY

26.	CHECK CONNECTORS
------------	-------------------------

- (a) Turn the ignition switch off.
- (b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal

to disable the SRS system.

- (c) Check that the connectors are properly connected to the side No. 2 airbag sensor assembly RH and rear airbag sensor RH.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

- (d) Disconnect the connectors from the side No. 2 airbag sensor assembly RH and rear airbag sensor RH.

- (e) Check that the terminals of the connectors are not damaged.

OK:

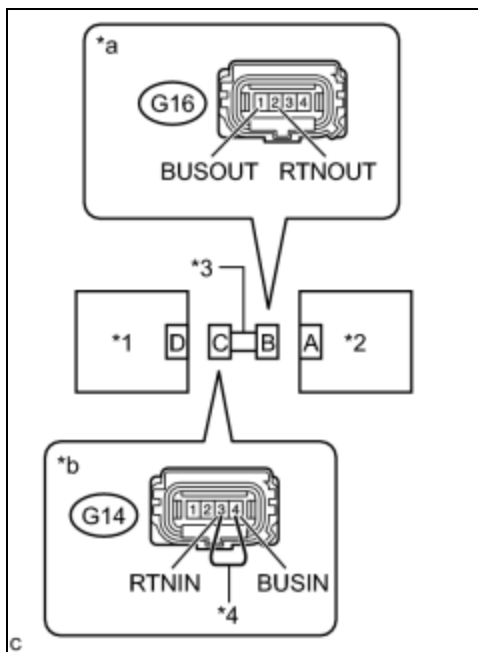
The terminals are not deformed or damaged.

NG ▶ REPLACE WIRE HARNESS

OK



27.	CHECK NO. 2 FLOOR WIRE (OPEN)
------------	--------------------------------------



- (a) Using a service wire, connect terminals 4 (BUSIN) and 3 (RTNIN) of connector C.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G16-1 (BUSOUT) - G16-2 (RTNOUT)	Always	Below 1 Ω

(c) Disconnect the service wire from connector C.

Text in Illustration

*1	Rear Airbag Sensor RH
*2	Side No. 2 Airbag Sensor Assembly RH
*3	No. 2 Floor Wire
*4	Service Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly RH)
*b	Front view of wire harness connector (to Rear Airbag Sensor RH)

NG  **REPLACE NO. 2 FLOOR WIRE**

OK

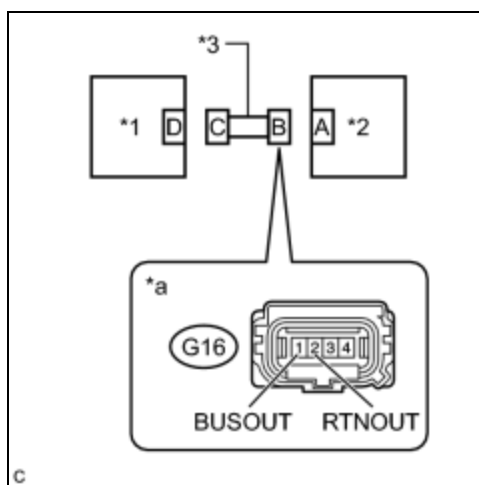

28. CHECK NO. 2 FLOOR WIRE (SHORT)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G16-1 (BUSOUT) - G16-2 (RTNOUT)	Always	1 M Ω or higher

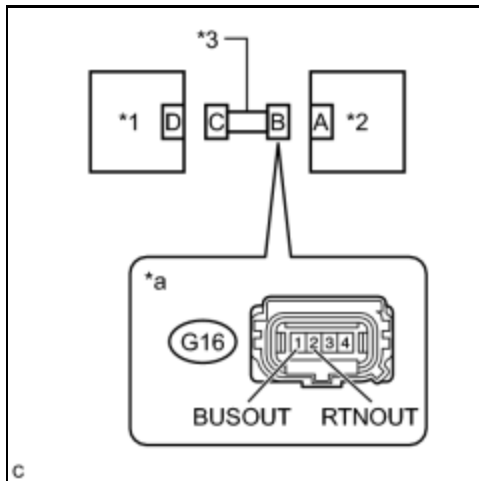
Text in Illustration



*1	Rear Airbag Sensor RH
*2	Side No. 2 Airbag Sensor Assembly RH
*3	No. 2 Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly RH)

OK


29. CHECK NO. 2 FLOOR WIRE (SHORT TO B+)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G16-1 (BUSOUT) - Body ground	Ignition switch ON	Below 1 V
G16-2 (RTNOUT) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Rear Airbag Sensor RH
*2	Side No. 2 Airbag Sensor Assembly RH
*3	No. 2 Floor Wire
	Front view of wire harness connector

*a

(to Side No. 2 Airbag Sensor Assembly RH)

NG ▶ REPLACE NO. 2 FLOOR WIRE

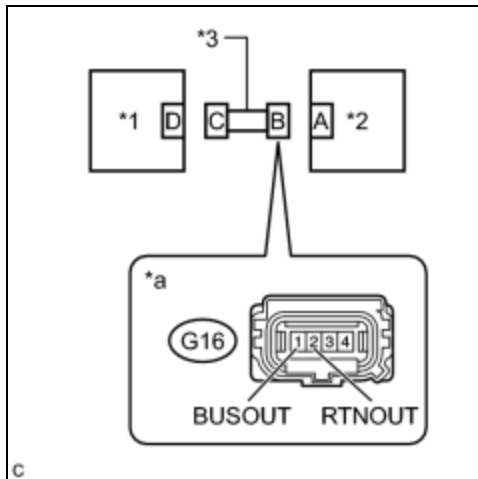
OK



30. CHECK NO. 2 FLOOR WIRE (SHORT TO GROUND)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G16-1 (BUSOUT) - Body ground	Always	1 MΩ or higher
G16-2 (RTNOUT) - Body ground	Always	1 MΩ or higher

Text in Illustration

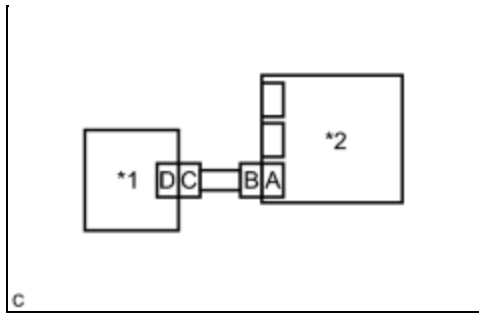
*1	Rear Airbag Sensor RH
*2	Side No. 2 Airbag Sensor Assembly RH
*3	No. 2 Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly RH)

NG ▶ REPLACE NO. 2 FLOOR WIRE

OK



31. CHECK SIDE NO. 2 AIRBAG SENSOR ASSEMBLY RH



(a) Connect the connector to the rear airbag sensor RH.

(b) Interchange the side No. 2 airbag sensor assembly RH with LH and connect the connectors.

(c) Connect the cable to the negative (-) battery terminal.

(d) Clear the DTCs stored in memory **INFO** .

(e) Turn the ignition switch off.

(f) Turn the ignition switch to ON, and wait for at least 60 seconds.

(g) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
DTC B1633 is output.	A
DTC B1638 is output.	B
DTCs B1633 and B1638 are not output.	C

HINT:

Codes other than DTCs B1633 and B1638 may be output at this time, but they are not related to this check.

(h) Turn the ignition switch off.

(i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

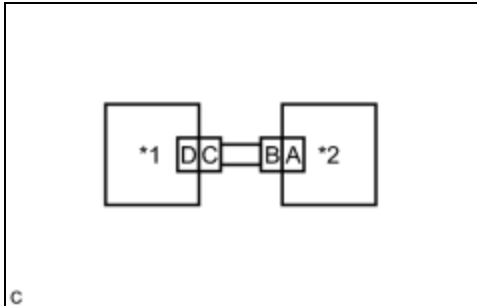
(j) Return the side No. 2 airbag sensor assembly RH and LH to their original positions and connect the connectors.

Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly LH
*2	Airbag ECU Assembly

A
▼

32.	CHECK REAR AIRBAG SENSOR RH
------------	------------------------------------



(a) Interchange the rear airbag sensor RH with LH and connect the connectors.

- (b) Connect the cable to the negative (-) battery terminal.
- (c) Clear the DTCs stored in memory INFO.
- (d) Turn the ignition switch off.
- (e) Turn the ignition switch to ON, and wait for at least 60 seconds.
- (f) Check for DTCs INFO.

Result:

RESULT	PROCEED TO
DTC B1633 is output.	A
DTC B1638 is output.	B
DTCs B1633 and B1638 are not output.	C

HINT:

Codes other than DTCs B1633 and B1638 may be output at this time, but they are not related to this check.

- (g) Turn the ignition switch off.
- (h) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (i) Return the rear airbag sensor RH and LH to their original positions and connect the connectors.

Text in Illustration

*1	Rear Airbag Sensor LH
*2	Side No. 2 Airbag Sensor Assembly RH

B ▶ REPLACE REAR AIRBAG SENSOR RH

C ▶ USE SIMULATION METHOD TO CHECK

A ▶ REPLACE AIRBAG ECU ASSEMBLY

33.	CHECK CONNECTORS
------------	-------------------------

- (a) Turn the ignition switch off.
- (b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Check that the connectors are properly connected to the rear airbag sensor RH and side airbag sensor assembly RH. Also check that the connectors that link the No. 2 floor wire and front door wire RH are properly connected.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

- (d) Disconnect the connectors from the rear airbag sensor RH and side airbag sensor assembly RH. Also disconnect the connectors that link the No. 2 floor wire and front door wire RH.

- (e) Check that the terminals of the connectors are not damaged.

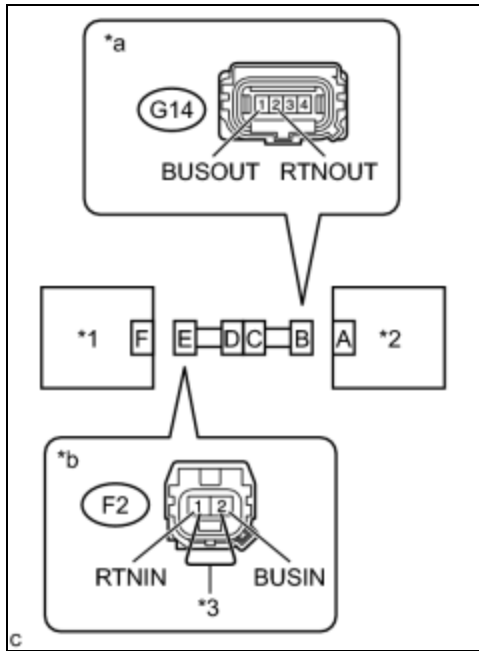
OK:

The terminals are not deformed or damaged.

NG ▶ REPLACE WIRE HARNESS

OK
▼

34.	CHECK SIDE AIRBAG SENSOR ASSEMBLY RH CIRCUIT (OPEN)
------------	--



(a) Connect the connectors that link the No. 2 floor wire and front door wire RH.

(b) Using a service wire, connect terminals 2 (BUSIN) and 1 (RTNIN) of connector E.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G14-1 (BUSOUT) - G14-2 (RTNOUT)	Always	Below 1 Ω

Text in Illustration

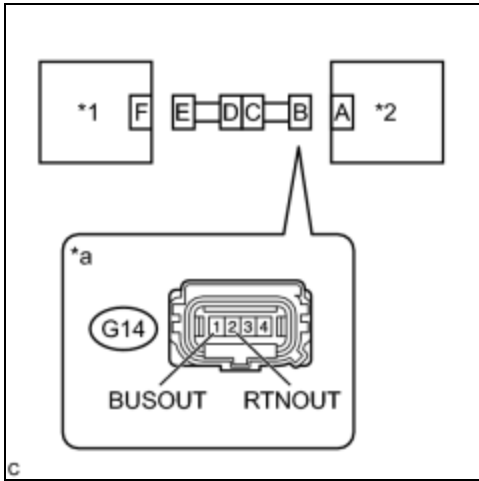
*1	Side Airbag Sensor Assembly RH
*2	Rear Airbag Sensor RH
*3	Service Wire
*a	Front view of wire harness connector (to Rear Airbag Sensor RH)
*b	Front view of wire harness connector (to Side Airbag Sensor Assembly RH)

NG CHECK FRONT DOOR WIRE RH (OPEN)

OK



35. CHECK SIDE AIRBAG SENSOR ASSEMBLY RH CIRCUIT (SHORT)



(a) Disconnect the service wire from connector E.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G14-1 (BUSOUT) - G14-2 (RTNOUT)	Always	1 MΩ or higher

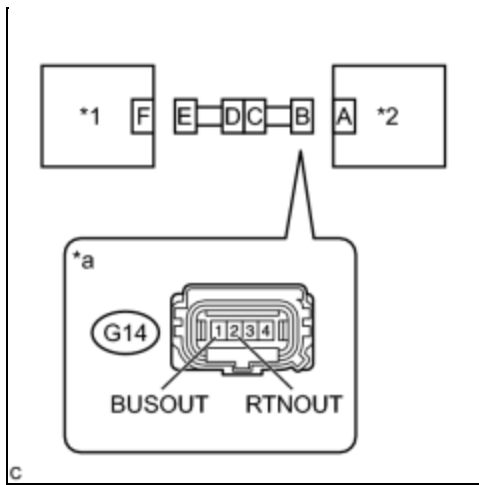
Text in Illustration

*1	Side Airbag Sensor Assembly RH
*2	Rear Airbag Sensor RH
*a	Front view of wire harness connector (to Rear Airbag Sensor RH)

NG ► CHECK FRONT DOOR WIRE RH (SHORT)

OK
▼

36. CHECK SIDE AIRBAG SENSOR ASSEMBLY RH CIRCUIT (SHORT TO B+)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G14-1 (BUSOUT) - Body ground	Ignition switch ON	Below 1 V
G14-2 (RTNOUT) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Side Airbag Sensor Assembly RH
*2	Rear Airbag Sensor RH
*a	Front view of wire harness connector (to Rear Airbag Sensor RH)

NG ► CHECK FRONT DOOR WIRE RH (SHORT TO B+)

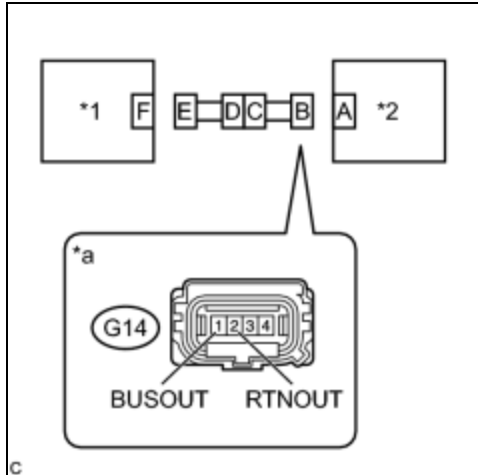
OK



37.	CHECK SIDE AIRBAG SENSOR ASSEMBLY RH CIRCUIT (SHORT TO GROUND)
------------	---

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G14-1 (BUSOUT) - Body ground	Always	1 MΩ or higher
G14-2 (RTNOUT) - Body ground	Always	1 MΩ or higher

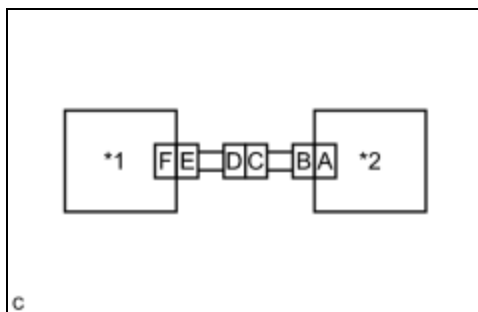
Text in Illustration

*1	Side Airbag Sensor Assembly RH
*2	Rear Airbag Sensor RH
*a	Front view of wire harness connector (to Rear Airbag Sensor RH)

NG ► CHECK FRONT DOOR WIRE RH (SHORT TO GROUND)

OK
▼

38. CHECK SIDE AIRBAG SENSOR ASSEMBLY RH



(a) Connect the connectors to the rear airbag sensor RH.

- (b) Interchange the side airbag sensor assembly RH with LH and connect the connectors.
- (c) Connect the cable to the negative (-) battery terminal.
- (d) Clear the DTCs stored in memory **INFO**.
- (e) Turn the ignition switch off.

(f) Turn the ignition switch to ON, and wait for at least 60 seconds.

(g) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
DTC B1692 or B1693 is output.	A
DTC B1697 or B1698 is output.	B
DTCs B1692, B1693, B1697 and B1698 are not output.	C

HINT:

Codes other than DTCs B1692, B1693, B1697 and B1698 may be output at this time, but they are not related to this check.

(h) Turn the ignition switch off.

(i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(j) Return the side airbag sensor assembly RH and LH to their original positions and connect the connectors.

Text in Illustration

*1	Side Airbag Sensor Assembly LH
*2	Rear Airbag Sensor RH

B ▶ REPLACE SIDE AIRBAG SENSOR ASSEMBLY RH

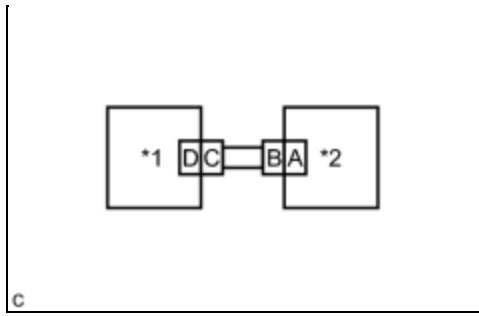
C ▶ USE SIMULATION METHOD TO CHECK

A



39.	CHECK REAR AIRBAG SENSOR RH
------------	------------------------------------

(a) Interchange the rear airbag sensor RH with LH and connect the connectors.



- (b) Connect the cable to the negative (-) battery terminal.
- (c) Clear the DTCs stored in memory **INFO** .
- (d) Turn the ignition switch off.
- (e) Turn the ignition switch to ON, and wait for at least 60 seconds.
- (f) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
DTC B1692 or B1693 is output.	A
DTC B1697 or B1698 is output.	B
DTCs B1692, B1693, B1697 and B1698 are not output.	C

HINT:

Codes other than DTCs B1692, B1693, B1697 and B1698 may be output at this time, but they are not related to this check.

- (g) Turn the ignition switch off.
- (h) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (i) Return the rear airbag sensor RH and LH to their original positions and connect the connectors.

Text in Illustration

*1	Rear Airbag Sensor LH
*2	Side No. 2 Airbag Sensor Assembly RH

B ► REPLACE REAR AIRBAG SENSOR RH

C ► USE SIMULATION METHOD TO CHECK

A ► REPLACE AIRBAG ECU ASSEMBLY

40.	CHECK CURRENT DTC
------------	--------------------------

(a) Check for current DTCs INFO.

Result:

RESULT	PROCEED TO
Current DTC B1622 is output.	A
Current DTC B1632 is output.	B

HINT:

Codes other than current DTCs B1622 and B1632 may be output at this time, but they are not related to this check.

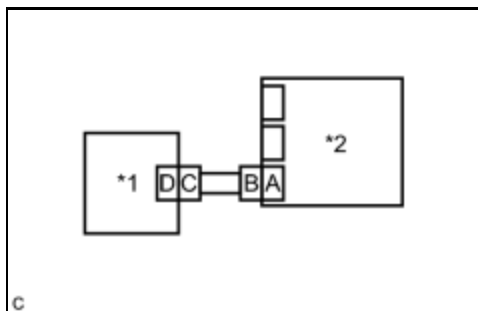
(b) Turn the ignition switch off.

B ▶ **CHECK REAR AIRBAG SENSOR RH**

A



41.	CHECK SIDE NO. 2 AIRBAG SENSOR ASSEMBLY RH
------------	---



(a) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(b) Interchange the side No. 2 airbag sensor assembly RH with LH and connect the connectors.

(c) Connect the cable to the negative (-) battery terminal.

(d) Clear the DTCs stored in memory INFO.

(e) Turn the ignition switch off.

(f) Turn the ignition switch to ON, and wait for at least 60 seconds.

(g) Check for DTCs INFO.

Result:

RESULT	PROCEED TO
DTC B1622 is output.	A
DTC B1627 is output.	B
DTCs B1622 and B1627 are not output.	C

HINT:

Codes other than DTCs B1622 and B1627 may be output at this time, but they are not related to this check.

- (h) Turn the ignition switch off.
- (i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (j) Return the side No. 2 airbag sensor assembly RH and LH to their original positions and connect the connectors.

Text in Illustration

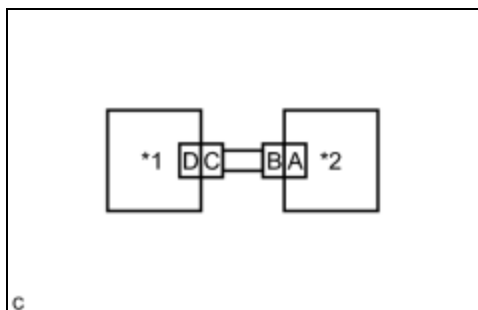
*1	Side No. 2 Airbag Sensor Assembly LH
*2	Airbag ECU Assembly

B ► REPLACE SIDE NO. 2 AIRBAG SENSOR ASSEMBLY RH

C ► USE SIMULATION METHOD TO CHECK

A ► REPLACE AIRBAG ECU ASSEMBLY

42.	CHECK REAR AIRBAG SENSOR RH
------------	------------------------------------



- (a) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (b) Interchange the rear airbag sensor RH with LH and connect the connectors to them.

- (c) Connect the cable to the negative (-) battery terminal.
- (d) Clear the DTCs stored in memory **INFO** .
- (e) Turn the ignition switch off.
- (f) Turn the ignition switch to ON, and wait for at least 60 seconds.
- (g) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
DTC B1632 is output.	A
DTC B1637 is output.	B
DTCs B1632 and B1637 are not output.	C

HINT:

Codes other than DTCs B1632 and B1637 may be output at this time, but they are not related to this check.

- (h) Turn the ignition switch off.
- (i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (j) Return the rear airbag sensor RH and LH to their original positions and connect the connectors.

Text in Illustration

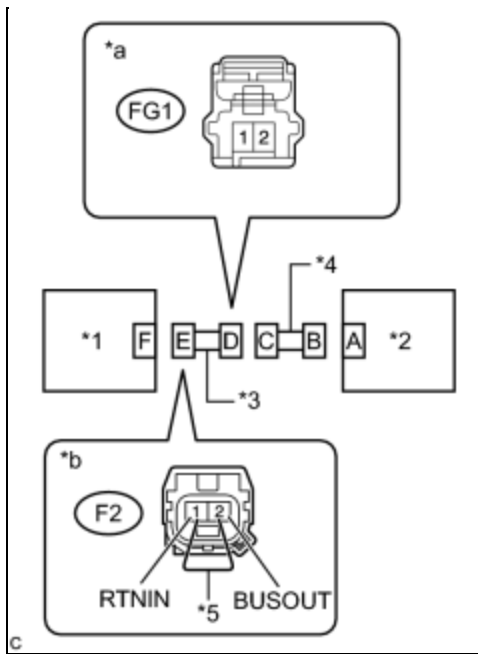
*1	Rear Airbag Sensor LH
*2	Side No. 2 Airbag Sensor Assembly RH

B ► REPLACE REAR AIRBAG SENSOR RH

C ► USE SIMULATION METHOD TO CHECK

A ► REPLACE AIRBAG ECU ASSEMBLY

43.	CHECK FRONT DOOR WIRE RH (OPEN)
-----	---------------------------------



(a) Disconnect the front door wire RH connector from the No. 2 floor wire.

HINT:

The service wire has already been inserted into connector E.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
FG1-1 - FG1-2	Always	Below 1 Ω

(c) Disconnect the service wire from connector E.

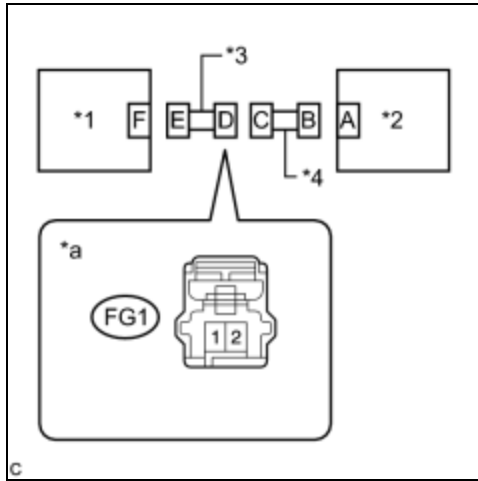
Text in Illustration

*1	Side Airbag Sensor Assembly RH
*2	Rear Airbag Sensor RH
*3	Front Door Wire RH
*4	No. 2 Floor Wire
*5	Service Wire
*a	Front view of wire harness connector (to No. 2 Floor Wire)
*b	Front view of wire harness connector (to Side Airbag Sensor Assembly RH)

NG ► REPLACE FRONT DOOR WIRE RH

OK ► REPLACE NO. 2 FLOOR WIRE

44.	CHECK FRONT DOOR WIRE RH (SHORT)
-----	----------------------------------



(a) Disconnect the front door wire RH connector from the No. 2 floor wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
FG1-1 - FG1-2	Always	1 MΩ or higher

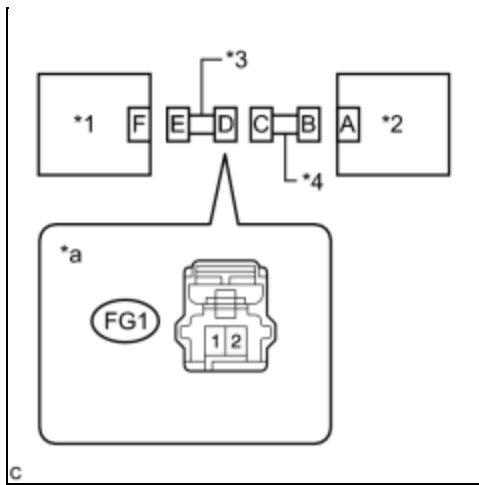
Text in Illustration

*1	Side Airbag Sensor Assembly RH
*2	Rear Airbag Sensor RH
*3	Front Door Wire RH
*4	No. 2 Floor Wire
*a	Front view of wire harness connector (to No. 2 Floor Wire)

NG ► REPLACE FRONT DOOR WIRE RH

OK ► REPLACE NO. 2 FLOOR WIRE

45.	CHECK FRONT DOOR WIRE RH (SHORT TO B+)
------------	---



(a) Disconnect the front door wire RH connector from the No. 2 floor wire.

(b) Connect the cable to the negative (-) battery terminal.

(c) Turn the ignition switch to ON.

(d) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
FG1-1 - Body ground	Ignition switch ON	Below 1 V
FG1-2 - Body ground	Ignition switch ON	Below 1 V

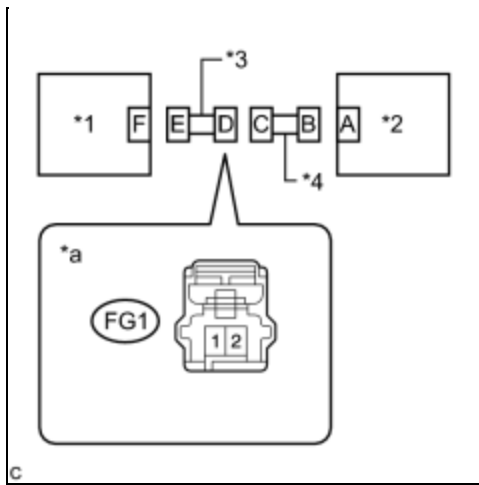
Text in Illustration

*1	Side Airbag Sensor Assembly RH
*2	Rear Airbag Sensor RH
*3	Front Door Wire RH
*4	No. 2 Floor Wire
*a	Front view of wire harness connector (to No. 2 Floor Wire)

NG ▶ REPLACE FRONT DOOR WIRE RH

OK ▶ REPLACE NO. 2 FLOOR WIRE

46.	CHECK FRONT DOOR WIRE RH (SHORT TO GROUND)
------------	---



(a) Disconnect the front door wire RH connector from the No. 2 floor wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
FG1-1 - Body ground	Always	1 MΩ or higher
FG1-2 - Body ground	Always	1 MΩ or higher

Text in Illustration

*1	Side Airbag Sensor Assembly RH
*2	Rear Airbag Sensor RH
*3	Front Door Wire RH
*4	No. 2 Floor Wire
*a	Front view of wire harness connector (to No. 2 Floor Wire)

NG ► REPLACE FRONT DOOR WIRE RH

OK ► REPLACE NO. 2 FLOOR WIRE

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001NZU05QX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1625,B16F5: Side Airbag Sensor LH Circuit Malfunction (2013 FR-S)		

DTC	B1625	Side Airbag Sensor LH Circuit Malfunction
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DTC	B16F5	Side Airbag Sensor LH Mismatch
------------	--------------	---------------------------------------

DESCRIPTION

The side collision sensor LH circuit (to determine deployment of the front seat airbag assembly LH, curtain shield airbag assembly LH and front seat outer belt assembly LH) is composed of the airbag ECU assembly, side airbag sensor assembly LH, side No. 2 airbag sensor assembly LH and rear airbag sensor LH and No. 2 airbag sensor assembly.

The side No. 2 airbag sensor assembly LH detects impacts to the vehicle and sends signals to the airbag ECU assembly to determine if the airbag should be deployed.

These DTCs are stored when a malfunction is detected in the side No. 2 airbag sensor assembly LH.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1625	<ul style="list-style-type: none"> Side No. 2 airbag sensor assembly LH malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Side No. 2 airbag sensor assembly LH Airbag ECU assembly
B16F5	<ul style="list-style-type: none"> Improper installation of side No. 2 airbag sensor assembly LH Airbag ECU assembly malfunction 	

WIRING DIAGRAM

Refer to DTCs B1627, B1628, B1637, B1638, B1647, B1697 and B1698 INFO .

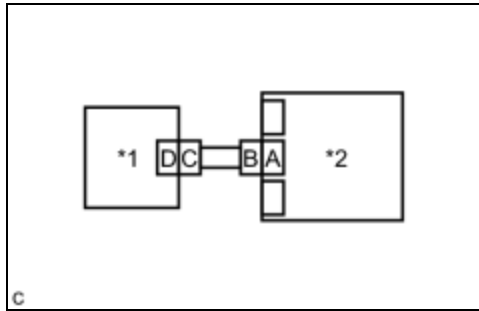
INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .

PROCEDURE

1.	CHECK SIDE NO. 2 AIRBAG SENSOR ASSEMBLY LH
-----------	---



(a) Turn the ignition switch off.

(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Interchange the side No. 2 airbag sensor assembly LH with RH and connect the connectors.

(d) Connect the cable to the negative (-) battery terminal.

(e) Clear the DTCs stored in memory INFO.

(f) Turn the ignition switch off.

(g) Turn the ignition switch to ON, and wait for at least 60 seconds.

(h) Check for DTCs INFO.

Result:

RESULT	PROCEED TO
DTC B1625 is output.	A
DTC B1620 is output.	B
DTCs B1620 and B1625 are not output.	C

HINT:

Codes other than DTCs B1620 and B1625 may be output at this time, but they are not related to this check.

(i) Turn the ignition switch off.

(j) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(k) Return the side No. 2 airbag sensor assembly LH and RH to their original positions and connect the connectors.

Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly RH
*2	Airbag ECU Assembly

B ▶ REPLACE SIDE NO. 2 AIRBAG SENSOR ASSEMBLY LH

C ▶ USE SIMULATION METHOD TO CHECK

A ▶ REPLACE AIRBAG ECU ASSEMBLY



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000027E205HX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1627,B1628,B1637,B1638,B1647,B1697,B1698: Side Airbag Sensor LH Lost Communication (2013 FR-S)		

DTC	B1627	Side Airbag Sensor LH Lost Communication
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DTC	B1628	Side Airbag Sensor LH Initialization
------------	--------------	---

DTC	B1637	Side No. 2 Airbag Sensor LH Lost Communication
------------	--------------	---

DTC	B1638	Side No. 2 Airbag Sensor LH Initialization
------------	--------------	---

DTC	B1647	Side Satellite Sensor Bus Lost Communication (LH)
------------	--------------	--

DTC	B1697	Lost Communication with Side Airbag Sensor LH
------------	--------------	--

DTC	B1698	Side Airbag Sensor LH Initialization Incomplete
------------	--------------	--

DESCRIPTION

The side collision sensor LH circuit (to determine deployment of the front seat airbag assembly LH, curtain shield airbag assembly LH and front seat outer belt assembly LH) is composed of the airbag ECU assembly, side airbag sensor assembly LH, side No. 2 airbag sensor assembly LH and rear airbag sensor LH and No. 2 airbag sensor assembly.

The side airbag sensor assembly LH, side No. 2 airbag sensor assembly LH and rear airbag sensor LH detect impacts to the vehicle and send signals to the airbag ECU assembly to determine if the airbag should be deployed.

These DTCs are stored when a malfunction is detected for the side collision sensor LH circuit.

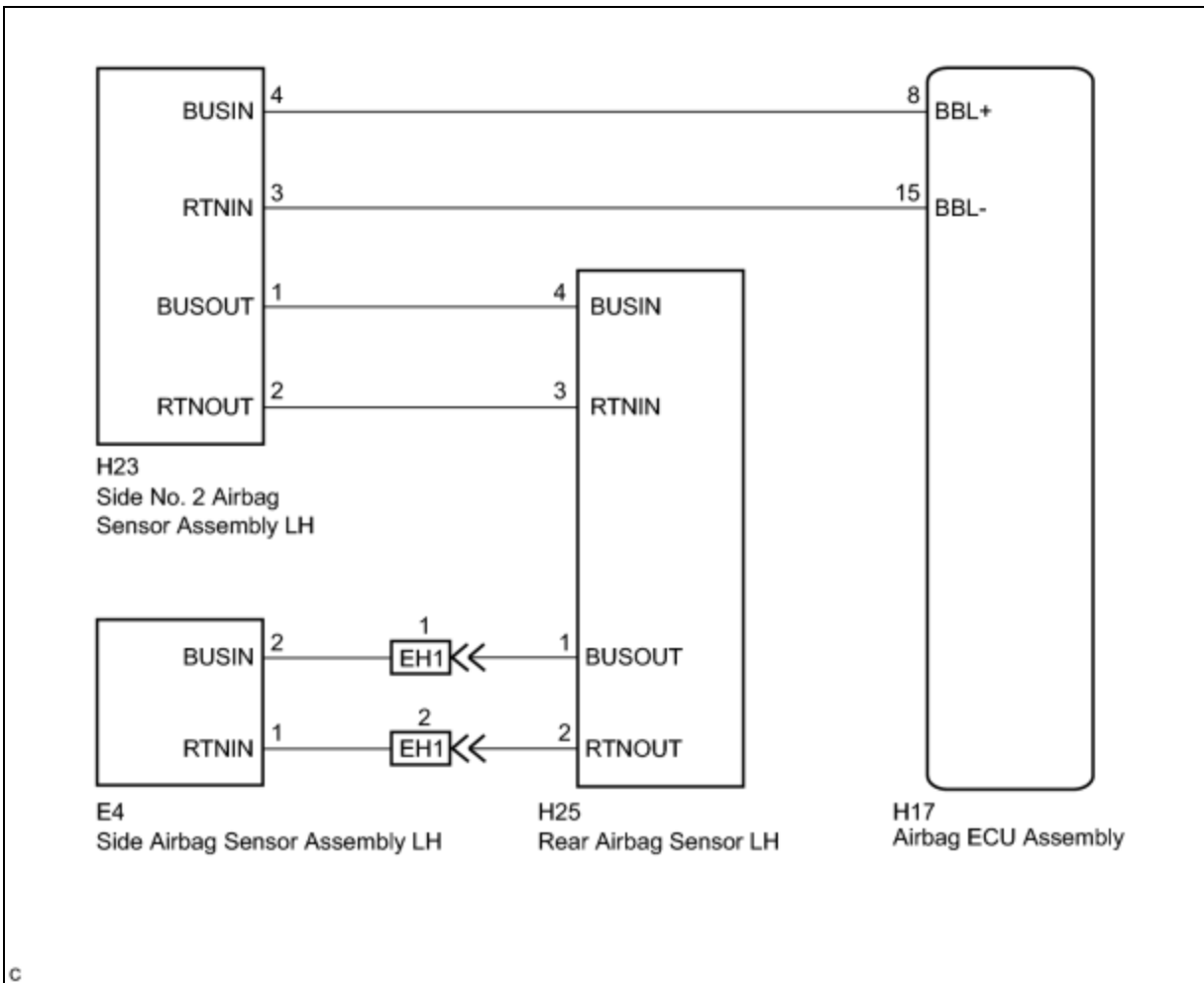
DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
		<ul style="list-style-type: none"> • Floor wire • Front door wire LH

B1627
 B1628
 B1637
 B1638
 B1647
 B1697
 B1698

- The airbag ECU assembly receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the side collision sensor LH circuit.
- Side airbag sensor assembly LH malfunction
- Side No. 2 airbag sensor assembly LH malfunction
- Rear airbag sensor LH malfunction
- Airbag ECU assembly malfunction


- Side airbag sensor assembly LH
- Side No. 2 airbag sensor assembly LH
- Rear airbag sensor LH
- Airbag ECU assembly

WIRING DIAGRAM




INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work .

PROCEDURE

1.	CHECK CURRENT DTC
-----------	--------------------------

(a) Check for current DTCs .

Result:

RESULT	PROCEED TO
Current DTC B1647 is output.	A
Current DTC B1628 or B1638 is output.	B
Current DTC B1697 or B1698 is output.	C
Current DTC B1627 or B1637 is output.	D
Current DTCs B1627, B1628, B1637, B1638, B1647, B1697 and B1698 are not output.	E

HINT:

- DTCs indicating communication errors will be changed to DTCs indicating errors in initialization by turning the ignition switch off and then to ON again.
- Codes other than current DTCs B1627, B1628, B1637, B1638, B1647, B1697 and B1698 may be output at this time, but they are not related to this check.

B ► CHECK HISTORY DTC

C ► CHECK CONNECTORS

D ► CHECK CURRENT DTC

E ► USE SIMULATION METHOD TO CHECK

A



2.	CHECK CONNECTORS
-----------	-------------------------

(a) Turn the ignition switch off.

(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Check that the connectors are properly connected to the airbag ECU assembly, side airbag sensor assembly LH, side No. 2 airbag sensor assembly LH and rear airbag sensor LH. Also check that the connectors that link the floor wire and front door wire LH are properly connected.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

- (d) Disconnect the connectors from the airbag ECU assembly, side airbag sensor assembly LH, side No. 2 airbag sensor assembly LH and rear airbag sensor LH. Also disconnect the connectors that link the floor wire and front door wire LH.

- (e) Check that the terminals of the connectors are not damaged.

OK:

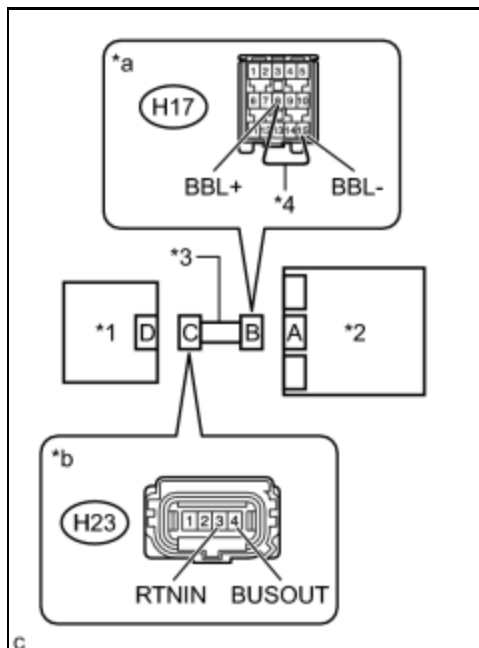
The terminals are not deformed or damaged.

NG ► **REPLACE WIRE HARNESS**

OK



3. CHECK FLOOR WIRE (OPEN)



- (a) Using a service wire, connect terminals 8 (BBL+) and 15 (BBL-) of connector B.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H23-4 (BUSIN) -H23-3 (RTNIN)	Always	Below 1 Ω

(c) Disconnect the service wire from connector B.

Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly LH
*2	Airbag ECU Assembly
*3	Floor Wire
*4	Service Wire
*a	Front view of wire harness connector (to Airbag ECU Assembly)
*b	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly LH)

NG ▶ REPLACE FLOOR WIRE

OK
▼

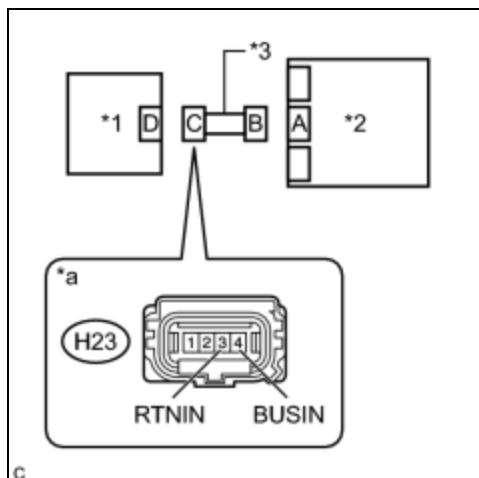
4. CHECK FLOOR WIRE (SHORT)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H23-4 (BUSIN) - H23-3 (RTNIN)	Always	1 MΩ or higher

Text in Illustration

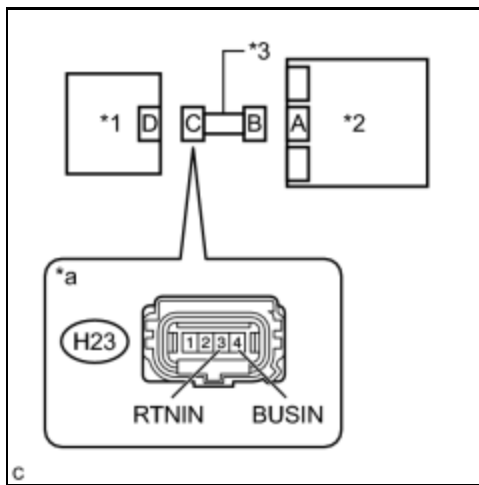


*1	Side No. 2 Airbag Sensor Assembly LH
*2	Airbag ECU Assembly
*3	Floor Wire
*a	Front view of wire harness connector

NG ▶ **REPLACE FLOOR WIRE**

OK
▼

5. CHECK FLOOR WIRE (SHORT TO B+)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H23-4 (BUSIN) - Body ground	Ignition switch ON	Below 1 V
H23-3 (RTNIN) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly LH
*2	Airbag ECU Assembly

*3	Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly LH)

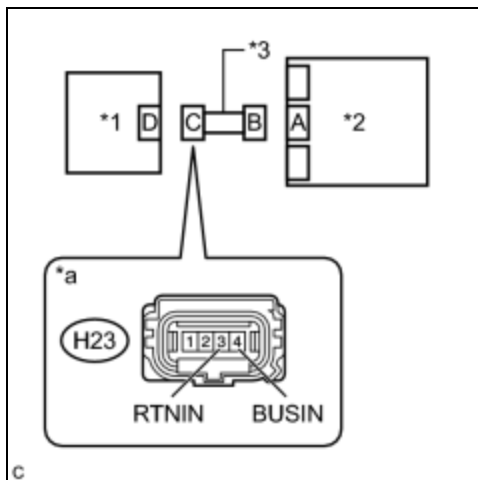
NG ▶ REPLACE FLOOR WIRE

OK
▼

6. CHECK FLOOR WIRE (SHORT TO GROUND)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H23-4 (BUSIN) - Body ground	Always	1 MΩ or higher
H23-3 (RTNIN) - Body ground	Always	1 MΩ or higher

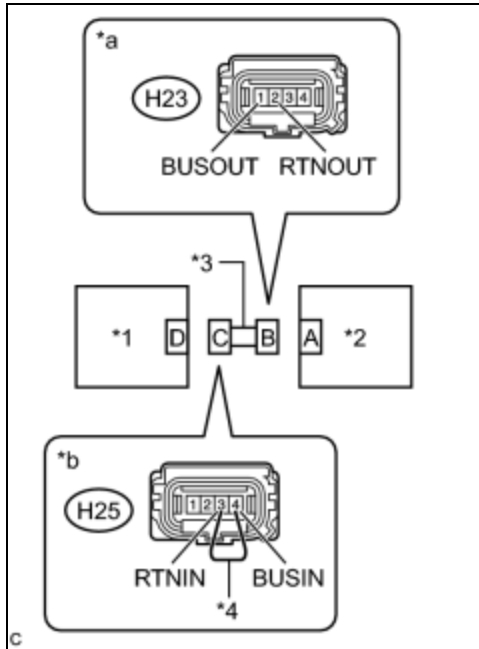
Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly LH
*2	Airbag ECU Assembly
*3	Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly LH)

NG ▶ REPLACE FLOOR WIRE

OK
▼

7. CHECK FLOOR WIRE (OPEN)



(a) Using a service wire, connect terminals 4 (BUSIN) and 3 (RTNIN) of connector C.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H23-1 (BUSOUT) - H23-2 (RTNOUT)	Always	Below 1 Ω

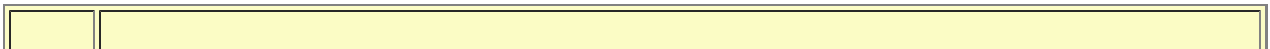
(c) Disconnect the service wire from connector C.

Text in Illustration

*1	Rear Airbag Sensor LH
*2	Side No. 2 Airbag Sensor Assembly LH
*3	Floor Wire
*4	Service Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly LH)
*b	Front view of wire harness connector (to Rear Airbag Sensor LH)

NG **REPLACE FLOOR WIRE**

OK



8. CHECK FLOOR WIRE (SHORT)

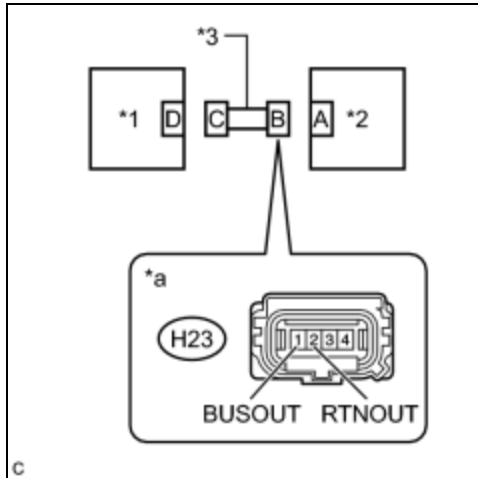
(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H23-1 (BUSOUT) - H23-2 (RTNOUT)	Always	1 M Ω or higher

Text in Illustration

*1	Rear Airbag Sensor LH
*2	Side No. 2 Airbag Sensor Assembly LH
*3	Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly LH)

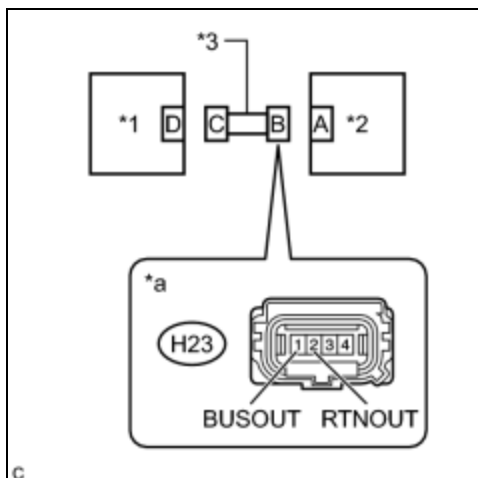


NG ▶ REPLACE FLOOR WIRE

OK



9. CHECK FLOOR WIRE (SHORT TO B+)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H23-1 (BUSOUT) - Body ground	Ignition switch ON	Below 1 V
H23-2 (RTNOUT) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Rear Airbag Sensor LH
*2	Side No. 2 Airbag Sensor Assembly LH
*3	Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly LH)

NG  **REPLACE FLOOR WIRE**

OK



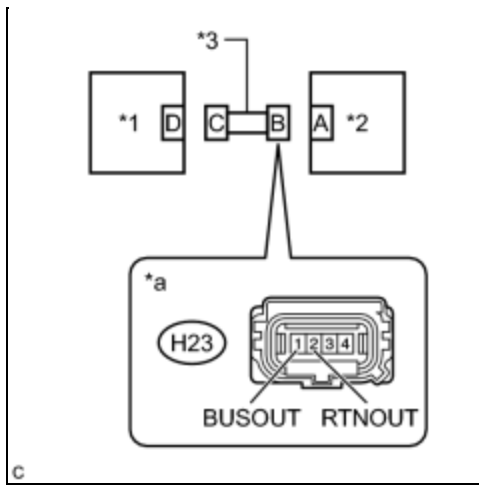
10.	CHECK FLOOR WIRE (SHORT TO GROUND)
------------	---

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H23-1 (BUSOUT) - Body ground	Always	1 M Ω or higher
H23-2 (RTNOUT) - Body ground	Always	1 M Ω or higher

Text in Illustration

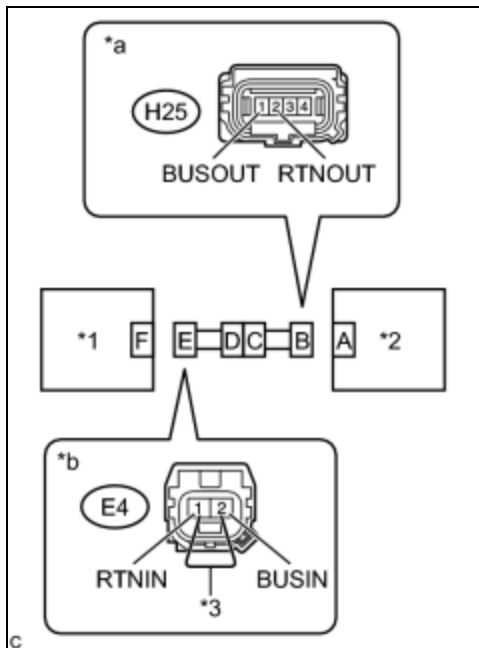


*1	Rear Airbag Sensor LH
*2	Side No. 2 Airbag Sensor Assembly LH
*3	Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly LH)

NG ▶ REPLACE FLOOR WIRE

OK
▼

11. CHECK SIDE AIRBAG SENSOR ASSEMBLY LH CIRCUIT (OPEN)



(a) Connect the connectors that link the floor wire and front door wire LH.

(b) Using a service wire, connect terminals 2 (BUSIN) and 1 (RTNIN) of connector E.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H25-1 (BUSOUT) - H25-2 (RTNOUT)	Always	Below 1 Ω

Text in Illustration

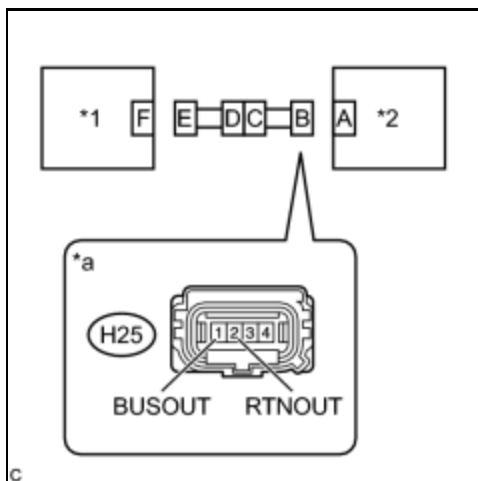
*1	Side Airbag Sensor Assembly LH
*2	Rear Airbag Sensor LH
*3	Service Wire
*a	Front view of wire harness connector (to Rear Airbag Sensor LH)
*b	Front view of wire harness connector (to Side Airbag Sensor Assembly LH)

NG ► CHECK FRONT DOOR WIRE LH (OPEN)

OK



12. CHECK SIDE AIRBAG SENSOR ASSEMBLY LH CIRCUIT (SHORT)



(a) Disconnect the service wire from connector E.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H25-1 (BUSOUT) - H25-2 (RTNOUT)	Always	1 MΩ or higher

Text in Illustration

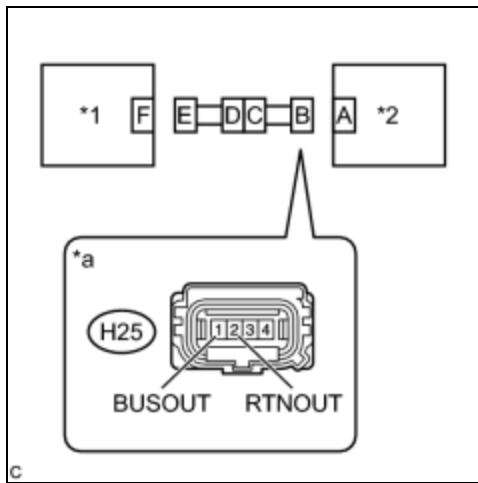
*1	Side Airbag Sensor Assembly LH
*2	Rear Airbag Sensor LH
*a	Front view of wire harness connector (to Rear Airbag Sensor LH)

NG ► CHECK FRONT DOOR WIRE LH (SHORT)

OK



13. CHECK SIDE AIRBAG SENSOR ASSEMBLY LH CIRCUIT (SHORT TO B+)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H25-1 (BUSOUT) - Body ground	Ignition switch ON	Below 1 V
H25-2 (RTNOUT) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Side Airbag Sensor Assembly LH
*2	Rear Airbag Sensor LH
*a	Front view of wire harness connector (to Rear Airbag Sensor LH)

NG ► CHECK FRONT DOOR WIRE LH (SHORT TO B+)

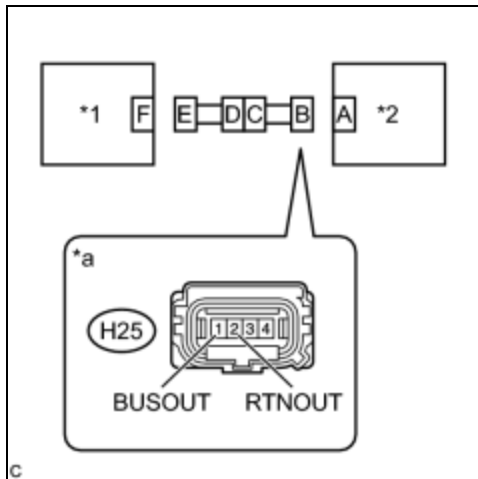
OK



14. CHECK SIDE AIRBAG SENSOR ASSEMBLY LH CIRCUIT (SHORT TO GROUND)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H25-1 (BUSOUT) - Body ground	Always	1 MΩ or higher
H25-2 (RTNOUT) - Body ground	Always	1 MΩ or higher

Text in Illustration

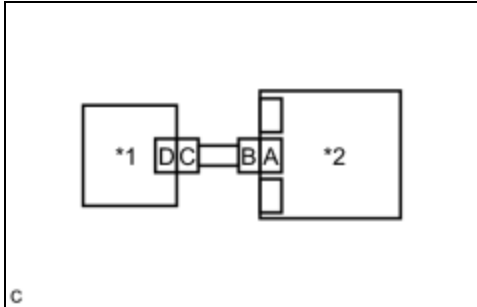
*1	Side Airbag Sensor Assembly LH
*2	Rear Airbag Sensor LH
*a	Front view of wire harness connector (to Rear Airbag Sensor LH)

NG ► CHECK FRONT DOOR WIRE LH (SHORT TO GROUND)

OK



15. CHECK SIDE NO. 2 AIRBAG SENSOR ASSEMBLY LH



(a) Connect the connectors to the rear airbag sensor LH, side airbag sensor assembly LH and airbag ECU assembly.

(b) Interchange the side No. 2 airbag sensor assembly LH with RH and connect the connectors.

(c) Connect the cable to the negative (-) battery terminal.

(d) Clear the DTCs stored in memory **INFO** .

(e) Turn the ignition switch off.

(f) Turn the ignition switch to ON, and wait for at least 60 seconds.

(g) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
DTC B1647 is output.	A
DTC B1642 is output.	B
DTCs B1642 and B1647 are not output.	C

HINT:

Codes other than DTCs B1642 and B1647 may be output at this time, but they are not related to this check.

(h) Turn the ignition switch off.

(i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(j) Return the side No. 2 airbag sensor assembly LH and RH to their original positions and connect the connectors.

Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly RH
*2	Airbag ECU Assembly

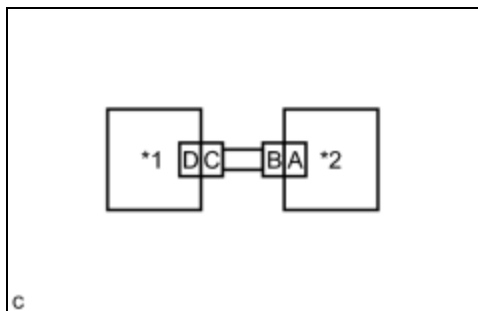
B ▶ REPLACE SIDE NO. 2 AIRBAG SENSOR ASSEMBLY LH

C ▶ USE SIMULATION METHOD TO CHECK

A



16.	CHECK REAR AIRBAG SENSOR LH
------------	------------------------------------



(a) Interchange the rear airbag sensor LH with RH and connect the connectors to them.

(b) Connect the cable to the negative (-) battery terminal.

(c) Clear the DTCs stored in memory **INFO** .

(d) Turn the ignition switch off.

(e) Turn the ignition switch to ON, and wait for at least 60 seconds.

(f) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
DTC B1647 is output.	A
DTC B1642 is output.	B
DTCs B1642 and B1647 are not output.	C

HINT:

Codes other than DTCs B1642 and B1647 may be output at this time, but they are not related to this check.

- (g) Turn the ignition switch off.
- (h) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (i) Return the rear airbag sensor LH and RH to their original positions and connect the connectors.

Text in Illustration

*1	Rear Airbag Sensor RH
*2	Side No. 2 Airbag Sensor Assembly LH

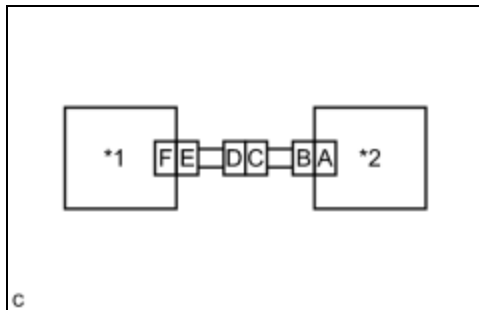
B ▶ REPLACE REAR AIRBAG SENSOR LH

C ▶ USE SIMULATION METHOD TO CHECK

A



17. CHECK SIDE AIRBAG SENSOR ASSEMBLY LH



(a) Interchange the side airbag sensor assembly LH with RH and connect the connectors.

- (b) Connect the cable to the negative (-) battery terminal.
- (c) Clear the DTCs stored in memory **INFO** .
- (d) Turn the ignition switch off.
- (e) Turn the ignition switch to ON, and wait for at least 60 seconds.
- (f) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
--------	------------

DTC B1647 is output.	A
DTC B1642 is output.	B
DTCs B1642 and B1647 are not output.	C

HINT:

Codes other than DTCs B1642 and B1647 may be output at this time, but they are not related to this check.

(g) Turn the ignition switch off.

(h) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(i) Return the side airbag sensor assembly LH and RH to their original positions and connect the connectors.

Text in Illustration

*1	Side Airbag Sensor Assembly RH
*2	Rear Airbag Sensor LH

B ▶ REPLACE SIDE AIRBAG SENSOR ASSEMBLY LH

C ▶ USE SIMULATION METHOD TO CHECK

A ▶ REPLACE AIRBAG ECU ASSEMBLY

18.	CHECK HISTORY DTC
------------	--------------------------

(a) Check for history DTCs  .

Result:

RESULT	PROCEED TO
History DTCs B1627 and B1637 are not output.	A
History DTC B1627 is output.	B
History DTC B1637 is output.	C

HINT:

Codes other than history DTCs B1627 and B1637 may be output at this time, but they are not related to this check.


B ▶ CHECK SIDE NO. 2 AIRBAG SENSOR ASSEMBLY LH

C ► CHECK REAR AIRBAG SENSOR LH

A



19.	CHECK CURRENT DTC
-----	-------------------

(a) Check for current DTCs  .

Result:

RESULT	PROCEED TO
Current DTC B1628 is output.	A
Current DTC B1638 is output.	B

HINT:

Codes other than current DTCs B1628 and B1638 may be output at this time, but they are not related to this check.

B ► CHECK CONNECTORS

A



20.	CHECK CONNECTORS
-----	------------------

- (a) Turn the ignition switch off.
- (b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Check that the connectors are properly connected to the airbag ECU assembly and side No. 2 airbag sensor assembly LH.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

- (d) Disconnect the connectors from the airbag ECU assembly and side No. 2 airbag sensor

assembly LH.

(e) Check that the terminals of the connectors are not damaged.

OK:

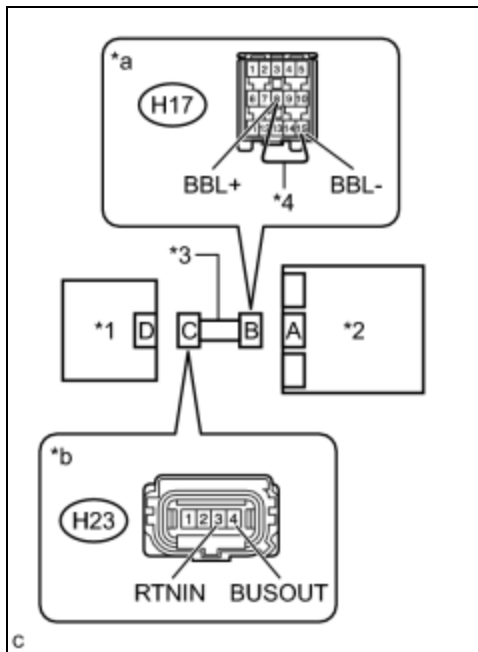
The terminals are not deformed or damaged.

NG ▶ REPLACE FLOOR WIRE

OK



21. CHECK FLOOR WIRE (OPEN)



(a) Using a service wire, connect terminals 8 (BBL+) and 15 (BBL-) of connector B.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H23-4 (BUSIN) - H23-3 (RTNIN)	Always	Below 1 Ω

(c) Disconnect the service wire from connector B.

Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly LH
*2	Airbag ECU Assembly

*3	Floor Wire
*4	Service Wire
*a	Front view of wire harness connector (to Airbag ECU Assembly)
*b	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly LH)

NG ▶ REPLACE FLOOR WIRE

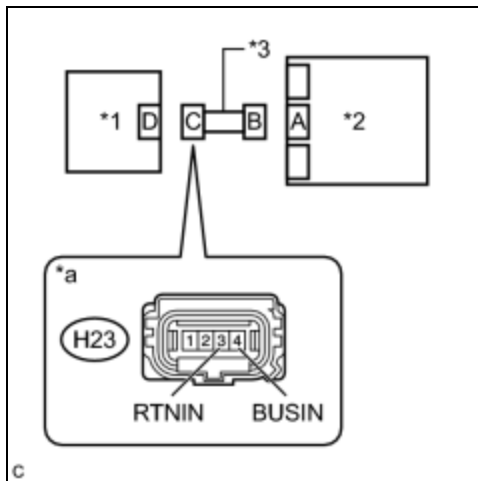
OK



22. CHECK FLOOR WIRE (SHORT)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H23-4 (BUSIN) - H23-3 (RTNIN)	Always	1 MΩ or higher

Text in Illustration

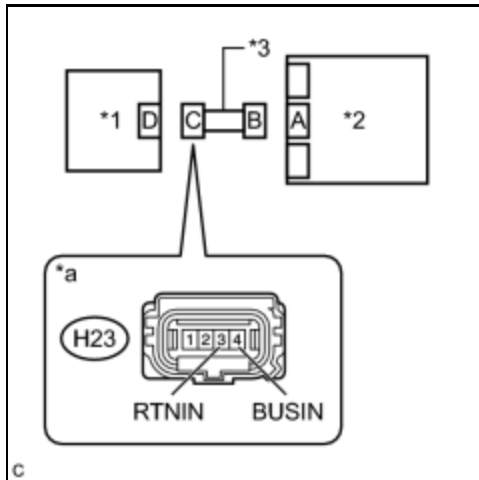
*1	Side No. 2 Airbag Sensor Assembly LH
*2	Airbag ECU Assembly
*3	Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly LH)

NG ▶ REPLACE FLOOR WIRE

OK



23. CHECK FLOOR WIRE (SHORT TO B+)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H23-4 (BUSIN) - Body ground	Ignition switch ON	Below 1 V
H23-3 (RTNIN) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly LH
*2	Airbag ECU Assembly
*3	Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly LH)

NG  **REPLACE FLOOR WIRE**

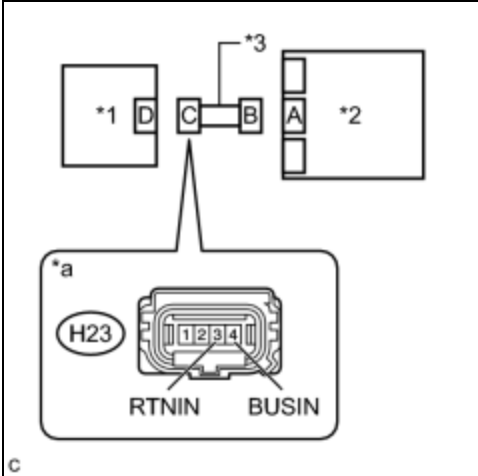
OK



24. CHECK FLOOR WIRE (SHORT TO GROUND)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H23-4 (BUSIN) - Body ground	Always	1 MΩ or higher
H23-3 (RTNIN) - Body ground	Always	1 MΩ or higher

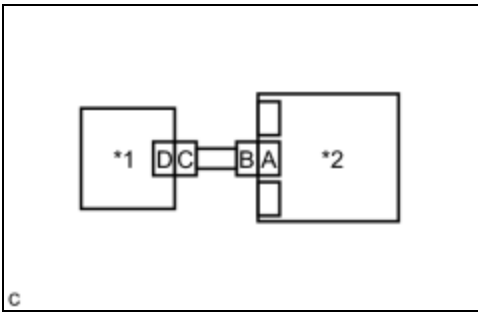
Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly LH
*2	Airbag ECU Assembly
*3	Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly LH)

NG ▶ REPLACE FLOOR WIRE

OK
▼

25. CHECK SIDE NO. 2 AIRBAG SENSOR ASSEMBLY LH



(a) Connect the connector to the airbag ECU assembly.

(b) Interchange the side No. 2 airbag sensor assembly LH with RH and connect the connectors.

- (c) Connect the cable to the negative (-) battery terminal.
- (d) Clear the DTCs stored in memory **INFO** .
- (e) Turn the ignition switch off.
- (f) Turn the ignition switch to ON, and wait for at least 60 seconds.
- (g) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
DTC B1628 is output.	A
DTC B1623 is output.	B
DTCs B1623 and B1628 are not output.	C

HINT:

Codes other than DTCs B1623 and B1628 may be output at this time, but they are not related to this check.

- (h) Turn the ignition switch off.
- (i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (j) Return the side No. 2 airbag sensor assembly LH and RH to their original positions and connect the connectors.

Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly RH
*2	Airbag ECU Assembly

B ▶ REPLACE SIDE NO. 2 AIRBAG SENSOR ASSEMBLY LH

C ▶ USE SIMULATION METHOD TO CHECK

A ▶ REPLACE AIRBAG ECU ASSEMBLY

26.	CHECK CONNECTORS
------------	-------------------------

- (a) Turn the ignition switch off.
- (b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal

to disable the SRS system.

- (c) Check that the connectors are properly connected to the side No. 2 airbag sensor assembly LH and rear airbag sensor LH.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

- (d) Disconnect the connectors from the side No. 2 airbag sensor assembly LH and rear airbag sensor LH.

- (e) Check that the terminals of the connectors are not damaged.

OK:

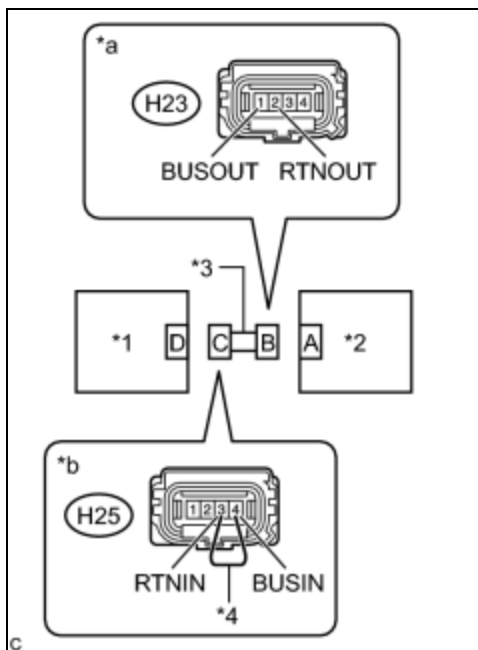
The terminals are not deformed or damaged.

NG ► REPLACE WIRE HARNESS

OK



27.	CHECK FLOOR WIRE (OPEN)
-----	-------------------------



- (a) Using a service wire, connect terminals 4 (BUSIN) and 3 (RTNIN) of connector C.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H23-1 (BUSOUT) - H23-2 (RTNOUT)	Always	Below 1 Ω

(c) Disconnect the service wire from connector C.

Text in Illustration

*1	Rear Airbag Sensor LH
*2	Side No. 2 Airbag Sensor Assembly LH
*3	Floor Wire
*4	Service Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly LH)
*b	Front view of wire harness connector (to Rear Airbag Sensor LH)

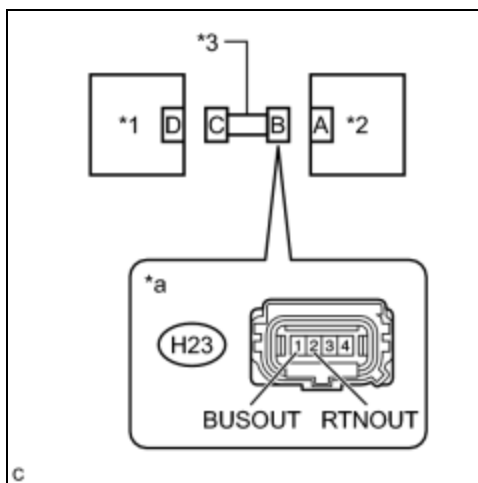
NG  **REPLACE FLOOR WIRE**

OK


28.	CHECK FLOOR WIRE (SHORT)
------------	---------------------------------

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



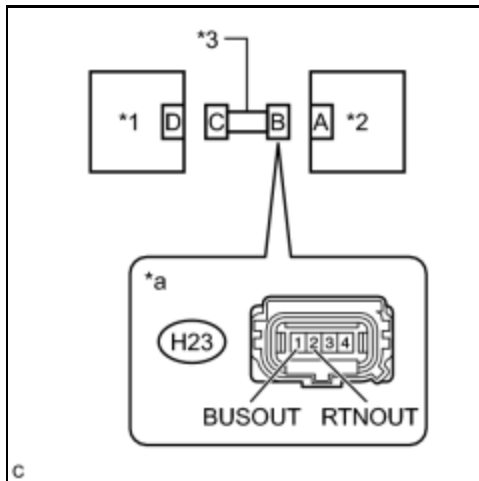
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H23-1 (BUSOUT) - H23-2 (RTNOUT)	Always	1 M Ω or higher

Text in Illustration

*1	Rear Airbag Sensor LH
*2	Side No. 2 Airbag Sensor Assembly LH
*3	Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly LH)

OK


29. CHECK FLOOR WIRE (SHORT TO B+)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H23-1 (BUSOUT) - Body ground	Ignition switch ON	Below 1 V
H23-2 (RTNOUT) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Rear Airbag Sensor LH
*2	Side No. 2 Airbag Sensor Assembly LH
*3	Floor Wire
	Front view of wire harness connector

*a

(to Side No. 2 Airbag Sensor Assembly LH)

NG ▶ REPLACE FLOOR WIRE

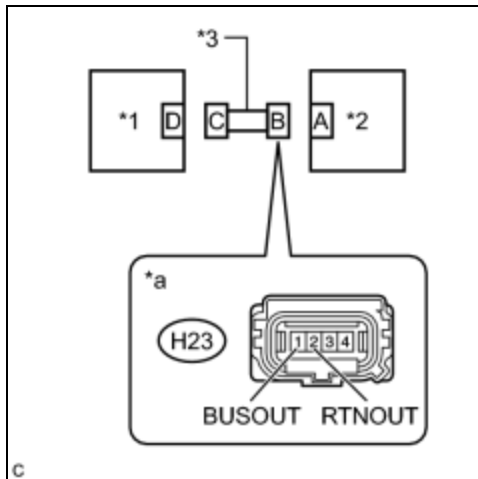
OK



30. CHECK FLOOR WIRE (SHORT TO GROUND)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H23-1 (BUSOUT) - Body ground	Always	1 MΩ or higher
H23-2 (RTNOUT) - Body ground	Always	1 MΩ or higher

Text in Illustration

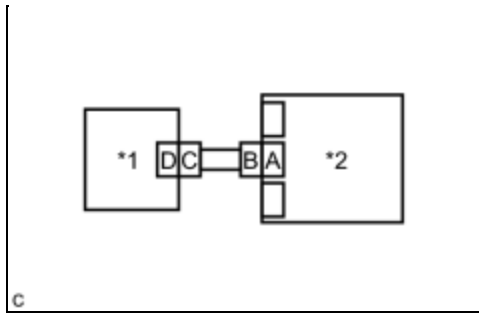
*1	Rear Airbag Sensor LH
*2	Side No. 2 Airbag Sensor Assembly LH
*3	Floor Wire
*a	Front view of wire harness connector (to Side No. 2 Airbag Sensor Assembly LH)

NG ▶ REPLACE FLOOR WIRE

OK



31. CHECK SIDE NO. 2 AIRBAG SENSOR ASSEMBLY LH



(a) Connect the connector to the rear airbag sensor LH.

(b) Interchange the side No. 2 airbag sensor assembly LH with RH and connect the connectors.

(c) Connect the cable to the negative (-) battery terminal.

(d) Clear the DTCs stored in memory **INFO**.

(e) Turn the ignition switch off.

(f) Turn the ignition switch to ON, and wait for at least 60 seconds.

(g) Check for DTCs **INFO**.

Result:

RESULT	PROCEED TO
DTC B1638 is output.	A
DTC B1633 is output.	B
DTCs B1633 and B1638 are not output.	C

HINT:

Codes other than DTCs B1633 and B1638 may be output at this time, but they are not related to this check.

(h) Turn the ignition switch off.

(i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(j) Return the side No. 2 airbag sensor assembly LH and RH to their original positions and connect the connectors.

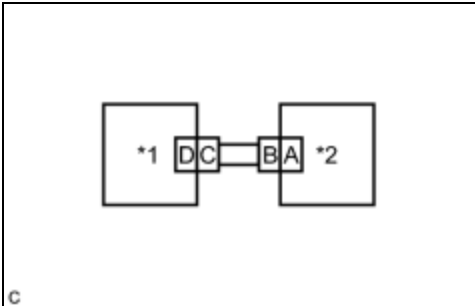
Text in Illustration

*1	Side No. 2 Airbag Sensor Assembly RH
*2	Airbag ECU Assembly

A



32.	CHECK REAR AIRBAG SENSOR LH
------------	------------------------------------



(a) Interchange the rear airbag sensor LH with RH and connect the connectors to them.

- (b) Connect the cable to the negative (-) battery terminal.
- (c) Clear the DTCs stored in memory INFO.
- (d) Turn the ignition switch off.
- (e) Turn the ignition switch to ON, and wait for at least 60 seconds.
- (f) Check for DTCs INFO.

Result:

RESULT	PROCEED TO
DTC B1638 is output.	A
DTC B1633 is output.	B
DTCs B1633 and B1638 are not output.	C

HINT:

Codes other than DTCs B1633 and B1638 may be output at this time, but they are not related to this check.

- (g) Turn the ignition switch off.
- (h) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (i) Return the rear airbag sensor LH and RH to their original positions and connect the connectors.

Text in Illustration

*1	Rear Airbag Sensor RH
*2	Side No. 2 Airbag Sensor Assembly LH

B ► REPLACE REAR AIRBAG SENSOR LH

C ► USE SIMULATION METHOD TO CHECK

A ► REPLACE AIRBAG ECU ASSEMBLY

33.	CHECK CONNECTORS
------------	-------------------------

- (a) Turn the ignition switch off.
- (b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Check that the connectors are properly connected to the rear airbag sensor LH and side airbag sensor assembly LH. Also check that the connectors that link the floor wire and front door wire LH are properly connected.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

- (d) Disconnect the connectors from the rear airbag sensor LH and side airbag sensor assembly LH. Also disconnect the connectors that link the floor wire and front door wire LH.

- (e) Check that the terminals of the connectors are not damaged.

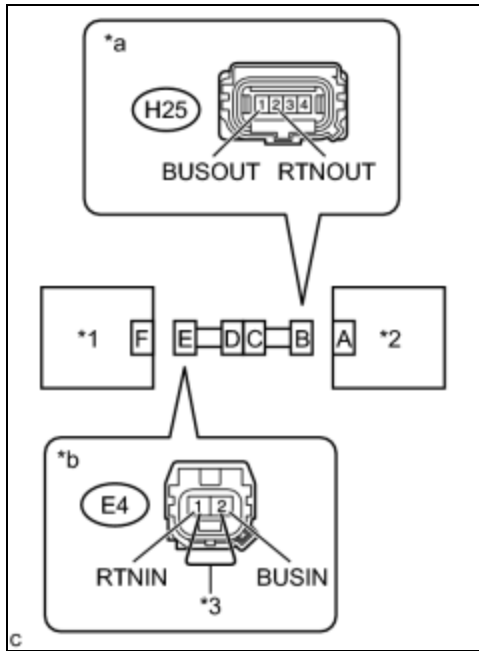
OK:

The terminals are not deformed or damaged.

NG ► REPLACE WIRE HARNESS

OK
▼

34.	CHECK SIDE AIRBAG SENSOR ASSEMBLY LH CIRCUIT (OPEN)
------------	--



(a) Connect the connectors that link the floor wire and front door wire LH.

(b) Using a service wire, connect terminals 2 (BUSIN) and 1 (RTNIN) of connector E.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H25-1 (BUSOUT) - H25-2 (RTNOUT)	Always	Below 1 Ω

Text in Illustration

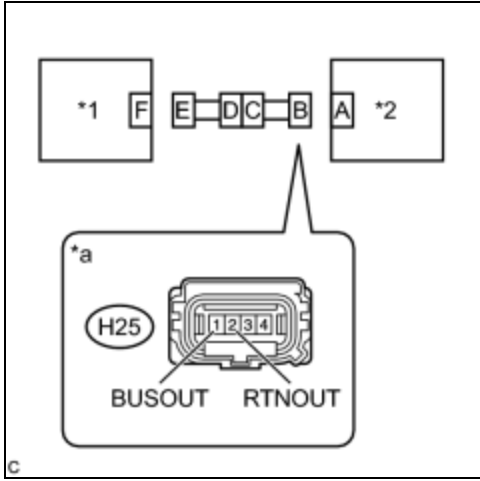
*1	Side Airbag Sensor Assembly LH
*2	Rear Airbag Sensor LH
*3	Service Wire
*a	Front view of wire harness connector (to Rear Airbag Sensor LH)
*b	Front view of wire harness connector (to Side Airbag Sensor Assembly LH)

NG ► CHECK FRONT DOOR WIRE LH (OPEN)

OK



35. CHECK SIDE AIRBAG SENSOR ASSEMBLY LH CIRCUIT (SHORT)



(a) Disconnect the service wire from connector E.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H25-1 (BUSOUT) - H25-2 (RTNOUT)	Always	1 MΩ or higher

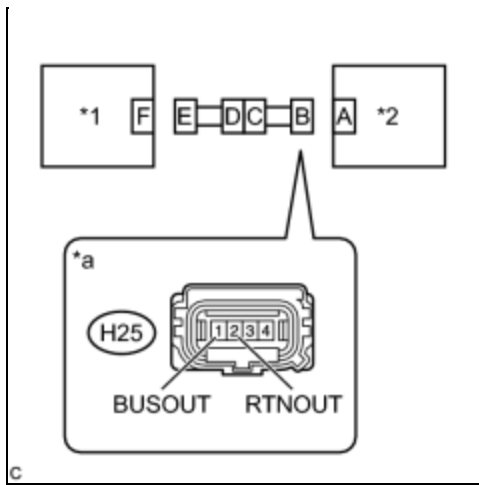
Text in Illustration

*1	Side Airbag Sensor Assembly LH
*2	Rear Airbag Sensor LH
*a	Front view of wire harness connector (to Rear Airbag Sensor LH)

NG ▶ CHECK FRONT DOOR WIRE LH (SHORT)

OK
▼

36. CHECK SIDE AIRBAG SENSOR ASSEMBLY LH CIRCUIT (SHORT TO B+)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H25-1 (BUSOUT) - Body ground	Ignition switch ON	Below 1 V
H25-2 (RTNOUT) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Side Airbag Sensor Assembly LH
*2	Rear Airbag Sensor LH
*a	Front view of wire harness connector (to Rear Airbag Sensor LH)

NG ► CHECK FRONT DOOR WIRE LH (SHORT TO B+)

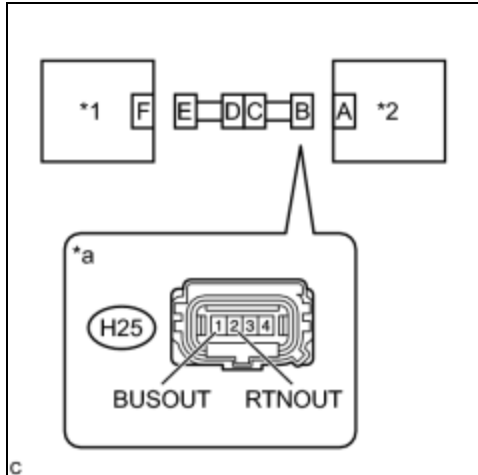
OK



37.	CHECK SIDE AIRBAG SENSOR ASSEMBLY LH CIRCUIT (SHORT TO GROUND)
------------	---

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H25-1 (BUSOUT) - Body ground	Always	1 MΩ or higher
H25-2 (RTNOUT) - Body ground	Always	1 MΩ or higher

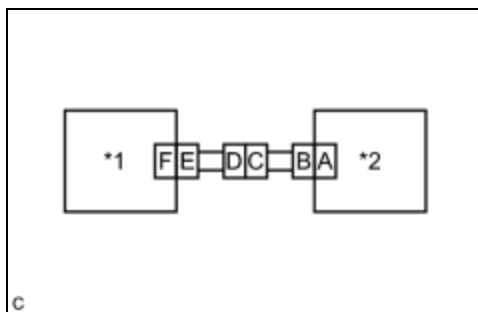
Text in Illustration

*1	Side Airbag Sensor Assembly LH
*2	Rear Airbag Sensor LH
*a	Front view of wire harness connector (to Rear Airbag Sensor LH)

NG ► CHECK FRONT DOOR WIRE LH (SHORT TO GROUND)

OK
▼

38. CHECK SIDE AIRBAG SENSOR ASSEMBLY LH



(a) Connect the connectors to the rear airbag sensor LH.


(b) Interchange the side airbag sensor assembly LH with RH and connect the connectors.

(c) Connect the cable to the negative (-) battery terminal.

(d) Clear the DTCs stored in memory **INFO**.

(e) Turn the ignition switch off.

(f) Turn the ignition switch to ON, and wait for at least 60 seconds.

(g) Check for DTCs  .

Result:

RESULT	PROCEED TO
DTC B1697 or B1698 is output.	A
DTC B1692 or B1693 is output.	B
DTCs B1692, B1693, B1697 and B1698 are not output.	C

HINT:

Codes other than DTCs B1692, B1693, B1697 and B1698 may be output at this time, but they are not related to this check.

(h) Turn the ignition switch off.

(i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(j) Return the side airbag sensor assembly LH and RH to their original positions and connect the connectors.

Text in Illustration

*1	Side Airbag Sensor Assembly RH
*2	Rear Airbag Sensor LH

B ▶ REPLACE SIDE AIRBAG SENSOR ASSEMBLY LH

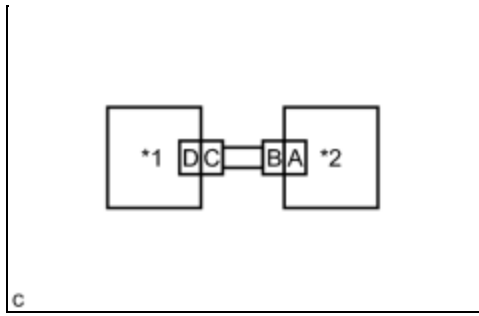
C ▶ USE SIMULATION METHOD TO CHECK

A



39.	CHECK REAR AIRBAG SENSOR LH
------------	------------------------------------

(a) Interchange the rear airbag sensor LH with RH and connect the connectors to them.



- (b) Connect the cable to the negative (-) battery terminal.
- (c) Clear the DTCs stored in memory **INFO** .
- (d) Turn the ignition switch off.
- (e) Turn the ignition switch to ON, and wait for at least 60 seconds.
- (f) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
DTC B1697 or B1698 is output.	A
DTC B1692 or B1693 is output.	B
DTCs B1692, B1693, B1697 and B1698 are not output.	C

HINT:

Codes other than DTCs B1692, B1693, B1697 and B1698 may be output at this time, but they are not related to this check.

- (g) Turn the ignition switch off.
- (h) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (i) Return the rear airbag sensor LH and RH to their original positions and connect the connectors.

Text in Illustration

*1	Rear Airbag Sensor RH
*2	Side No. 2 Airbag Sensor Assembly LH

B ► REPLACE REAR AIRBAG SENSOR LH

C ► USE SIMULATION METHOD TO CHECK

A ► REPLACE AIRBAG ECU ASSEMBLY

40.	CHECK CURRENT DTC
------------	--------------------------

(a) Check for current DTCs INFO .

Result:

RESULT	PROCEED TO
Current DTC B1627 is output.	A
Current DTC B1637 is output.	B

HINT:

Codes other than current DTCs B1627 and B1637 may be output at this time, but they are not related to this check.

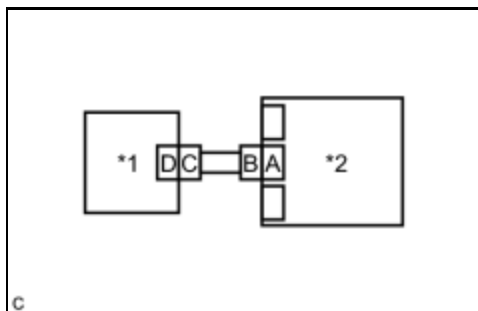
(b) Turn the ignition switch off.

B ▶ **CHECK REAR AIRBAG SENSOR LH**

A



41.	CHECK SIDE NO. 2 AIRBAG SENSOR ASSEMBLY LH
------------	---



(a) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(b) Interchange the side No. 2 airbag sensor assembly LH with RH and connect the connectors.

(c) Connect the cable to the negative (-) battery terminal.

(d) Clear the DTCs stored in memory INFO .

(e) Turn the ignition switch off.

(f) Turn the ignition switch to ON, and wait for at least 60 seconds.

(g) Check for DTCs INFO .

Result:

RESULT	PROCEED TO
DTC B1627 is output.	A
DTC B1622 is output.	B
DTCs B1622 and B1627 are not output.	C

HINT:

Codes other than DTCs B1622 and B1627 may be output at this time, but they are not related to this check.

- (h) Turn the ignition switch off.
- (i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (j) Return the side No. 2 airbag sensor assembly LH and RH to their original positions and connect the connectors.

Text in Illustration

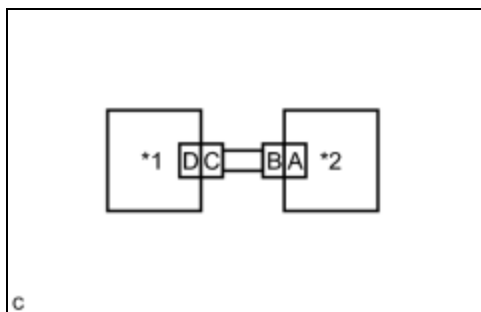
*1	Side No. 2 Airbag Sensor Assembly RH
*2	Airbag ECU Assembly

B ▶ REPLACE SIDE NO. 2 AIRBAG SENSOR ASSEMBLY LH

C ▶ USE SIMULATION METHOD TO CHECK

A ▶ REPLACE AIRBAG ECU ASSEMBLY

42. CHECK REAR AIRBAG SENSOR LH



- (a) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (b) Interchange the rear airbag sensor LH with RH and connect the connectors to them.

- (c) Connect the cable to the negative (-) battery terminal.
- (d) Clear the DTCs stored in memory **INFO** .
- (e) Turn the ignition switch off.
- (f) Turn the ignition switch to ON, and wait for at least 60 seconds.
- (g) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
DTC B1637 is output.	A
DTC B1632 is output.	B
DTCs B1632 and B1637 are not output.	C

HINT:

Codes other than DTCs B1632 and B1637 may be output at this time, but they are not related to this check.

- (h) Turn the ignition switch off.
- (i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (j) Return the rear airbag sensor LH and RH to their original positions and connect the connectors.

Text in Illustration

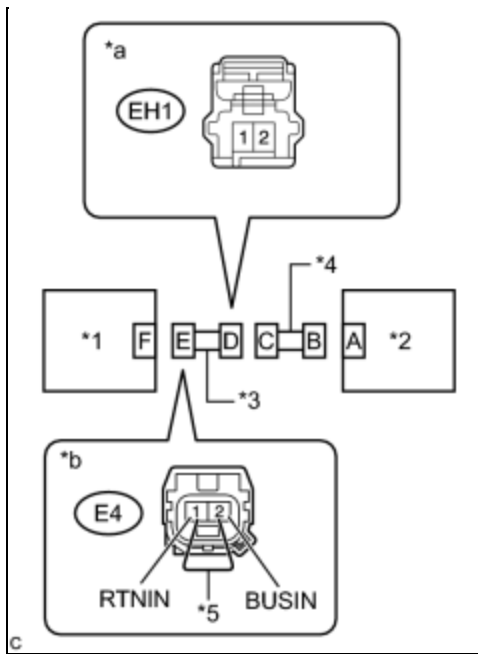
*1	Rear Airbag Sensor RH
*2	Side No. 2 Airbag Sensor Assembly LH

B ► REPLACE REAR AIRBAG SENSOR LH

C ► USE SIMULATION METHOD TO CHECK

A ► REPLACE AIRBAG ECU ASSEMBLY

43.	CHECK FRONT DOOR WIRE LH (OPEN)
-----	---------------------------------



(a) Disconnect the front door wire LH connector from the floor wire.

HINT:

The service wire has already been inserted into connector E.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EH1-1 - EH1-2	Always	Below 1 Ω

(c) Disconnect the service wire from connector E.

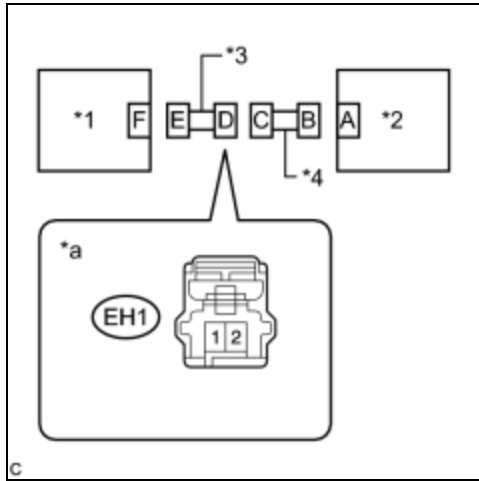
Text in Illustration

*1	Side Airbag Sensor Assembly LH
*2	Rear Airbag Sensor LH
*3	Front Door Wire LH
*4	Floor Wire
*5	Service Wire
*a	Front view of wire harness connector (to Floor Wire)
*b	Front view of wire harness connector (to Side Airbag Sensor Assembly LH)

NG ► REPLACE FRONT DOOR WIRE LH

OK ► REPLACE FLOOR WIRE

44.	CHECK FRONT DOOR WIRE LH (SHORT)
-----	----------------------------------



(a) Disconnect the front door wire LH connector from the floor wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EH1 - 1 - EH1 - 2	Always	1 MΩ or higher

Text in Illustration

*1	Side Airbag Sensor Assembly LH
*2	Rear Airbag Sensor LH
*3	Front Door Wire LH
*4	Floor Wire
*a	Front view of wire harness connector (to Floor Wire)

NG ► REPLACE FRONT DOOR WIRE LH

OK ► REPLACE FLOOR WIRE

45.	CHECK FRONT DOOR WIRE LH (SHORT TO B+)
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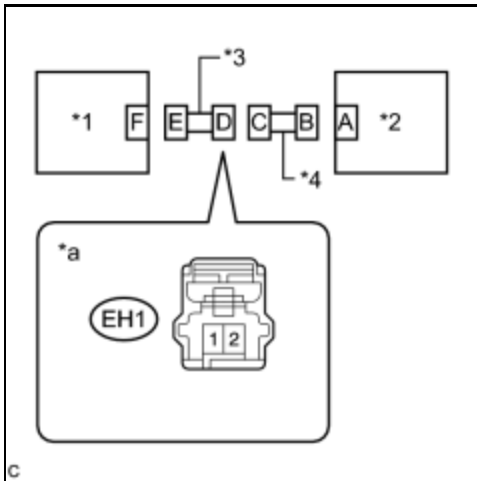
(a) Disconnect the front door wire LH connector from the floor wire.

(b) Connect the cable to the negative (-) battery terminal.

(c) Turn the ignition switch to ON.

(d) Measure the voltage according to the value(s) in the table below.

Standard Voltage:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EH1-1 - Body ground	Ignition switch ON	Below 1 V
EH1-2 - Body ground	Ignition switch ON	Below 1 V

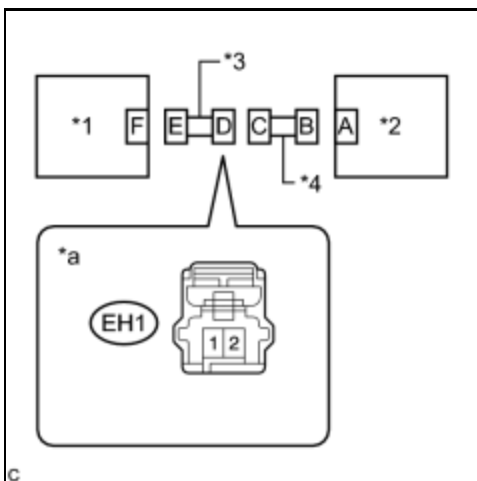
Text in Illustration

*1	Side Airbag Sensor Assembly LH
*2	Rear Airbag Sensor LH
*3	Front Door Wire LH
*4	Floor Wire
*a	Front view of wire harness connector (to Floor Wire)

NG ► REPLACE FRONT DOOR WIRE LH

OK ► REPLACE FLOOR WIRE

46. CHECK FRONT DOOR WIRE LH (SHORT TO GROUND)



(a) Disconnect the front door wire LH connector from the floor wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
EH1 - 1 - Body ground	Always	1 MΩ or higher
EH1 - 2 - Body ground	Always	1 MΩ or higher

Text in Illustration

*1	Side Airbag Sensor Assembly LH
*2	Rear Airbag Sensor LH
*3	Front Door Wire LH
*4	Floor Wire
*a	Front view of wire harness connector (to Floor Wire)

NG ► REPLACE FRONT DOOR WIRE LH

OK ► REPLACE FLOOR WIRE

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001NZX05CX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1630,B16F6: Side No. 2 Airbag Sensor RH Malfunction (2013 FR-S)		

DTC	B1630	Side No. 2 Airbag Sensor RH Malfunction
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DTC	B16F6	Side No. 2 Airbag Sensor RH Mismatch
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DESCRIPTION

The side collision sensor RH circuit (to determine deployment of the front seat airbag assembly RH, curtain shield airbag assembly RH and front seat outer belt assembly RH) is composed of the airbag ECU assembly, side airbag sensor assembly RH, side No. 2 airbag sensor assembly RH and rear airbag sensor RH and No. 2 airbag sensor assembly.

The rear airbag sensor RH detects impacts to the vehicle and sends signals to the airbag ECU assembly to determine if the airbag should be deployed.

These DTCs are stored when a malfunction is detected in the rear airbag sensor RH.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1630	<ul style="list-style-type: none"> Rear airbag sensor RH malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Rear airbag sensor RH Airbag ECU assembly
B16F6	<ul style="list-style-type: none"> Improper installation of rear airbag sensor RH Airbag ECU assembly malfunction 	

WIRING DIAGRAM

Refer to DTCs B1622, B1623, B1632, B1633, B1642, B1692 and B1693 INFO .

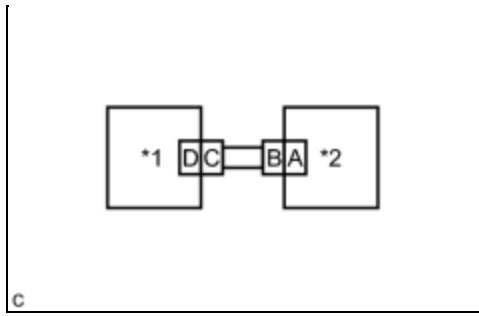
INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .

PROCEDURE

1.	CHECK REAR AIRBAG SENSOR RH
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(a) Turn the ignition switch off.

(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Interchange the rear airbag sensor RH with LH and connect the connectors to them.

(d) Connect the cable to the negative (-) battery terminal.

(e) Clear the DTCs stored in memory **INFO** .

(f) Turn the ignition switch off.

(g) Turn the ignition switch to ON, and wait for at least 60 seconds.

(h) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
DTC B1630 or B16F6 is output.	A
DTC B1635 or B16F7 is output.	B
DTCs B1630, B1635, B16F6 and B16F7 are not output.	C

HINT:

Codes other than DTCs B1630, B1635, B16F6 and B16F7 may be output at this time, but they are not related to this check.

(i) Turn the ignition switch off.

(j) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(k) Return the rear airbag sensor RH and LH to their original positions and connect the connectors.

Text in Illustration

*1	Rear Airbag Sensor LH
*2	Side No. 2 Airbag Sensor Assembly RH

C ▶ USE SIMULATION METHOD TO CHECK

A ▶ REPLACE AIRBAG ECU ASSEMBLY



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001NZW05CX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1635,B16F7: Side No. 2 Airbag Sensor LH Malfunction (2013 FR-S)		

DTC	B1635	Side No. 2 Airbag Sensor LH Malfunction
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DTC	B16F7	Side No. 2 Airbag Sensor LH Mismatch
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DESCRIPTION

The side collision sensor LH circuit (to determine deployment of the front seat airbag assembly LH, curtain shield airbag assembly LH and front seat outer belt assembly LH) is composed of the airbag ECU assembly, side airbag sensor assembly LH, side No. 2 airbag sensor assembly LH and rear airbag sensor LH and No. 2 airbag sensor assembly.

The rear airbag sensor LH detects impacts to the vehicle and sends signals to the airbag ECU assembly to determine if the airbag should be deployed.

These DTCs are stored when a malfunction is detected in the rear airbag sensor LH.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1635	<ul style="list-style-type: none"> Rear airbag sensor LH malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Rear airbag sensor LH Airbag ECU assembly
B16F7	<ul style="list-style-type: none"> Improper installation of rear airbag sensor LH Airbag ECU assembly malfunction 	

WIRING DIAGRAM

Refer to DTCs B1627, B1628, B1637, B1638, B1647, B1697 and B1698 [INFO](#) .

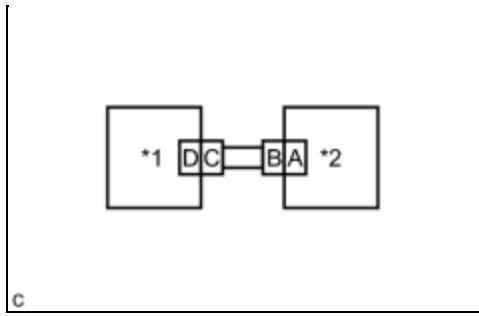
INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work [INFO](#) .

PROCEDURE

1.	CHECK REAR AIRBAG SENSOR LH
-----------	------------------------------------



(a) Turn the ignition switch off.

(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Interchange the rear airbag sensor LH with RH and connect the connectors to them.

(d) Connect the cable to the negative (-) battery terminal.

(e) Clear the DTCs stored in memory **INFO** .

(f) Turn the ignition switch off.

(g) Turn the ignition switch to ON, and wait for at least 60 seconds.

(h) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
DTC B1635 or B16F7 is output.	A
DTC B1630 or B16F6 is output.	B
DTCs B1630, B1635, B16F6 and B16F7 are not output.	C

HINT:

Codes other than DTCs B1630, B1635, B16F6 and B16F7 may be output at this time, but they are not related to this check.

(i) Turn the ignition switch off.

(j) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(k) Return the rear airbag sensor LH and RH to their original positions and connect the connectors.

Text in Illustration

*1	Rear Airbag Sensor RH
*2	Side No. 2 Airbag Sensor Assembly LH

C ▶ USE SIMULATION METHOD TO CHECK

A ▶ REPLACE AIRBAG ECU ASSEMBLY



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000016WN05TX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1650: Occupant Classification System Malfunction (2013 FR-S)		

DTC	B1650	Occupant Classification System Malfunction
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DESCRIPTION

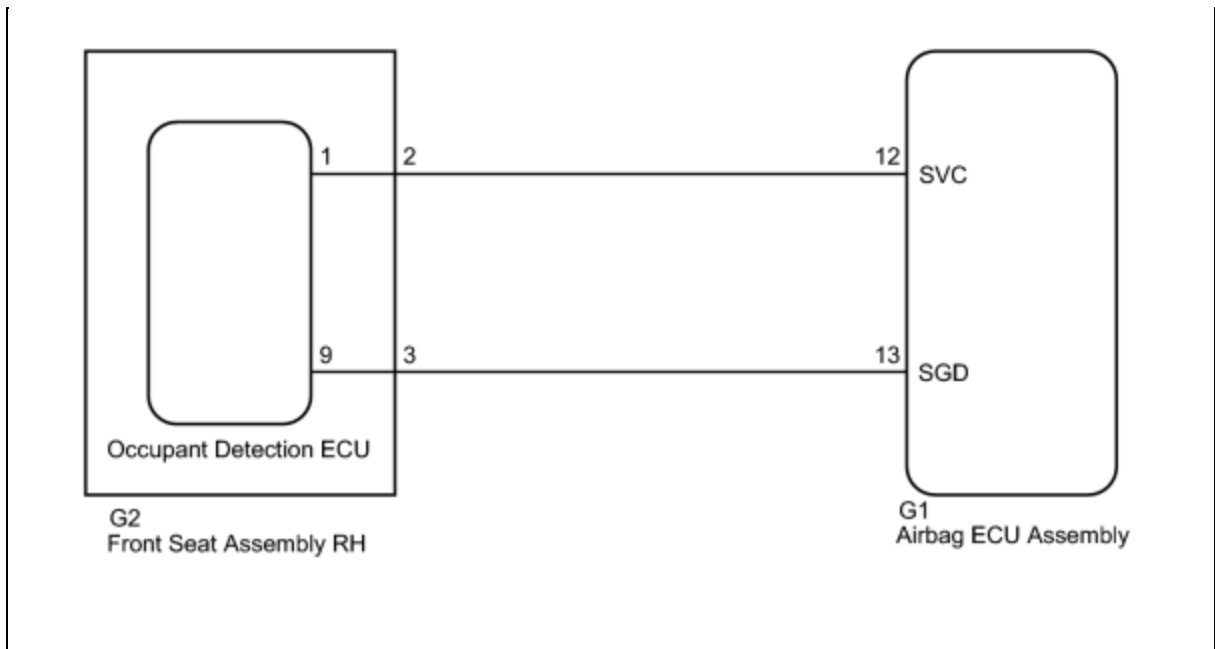
The occupant classification system circuit consists of the airbag ECU assembly and occupant classification system.

If the airbag ECU assembly receives signals from the occupant detection ECU, it determines whether the front passenger airbag and front seat belt pretensioner RH should be operated.

DTC B1650 is stored when a malfunction is detected in the occupant classification system circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1650	<ul style="list-style-type: none"> The airbag ECU assembly receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the occupant classification system circuit. Occupant classification system malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> No. 2 floor wire Front seat assembly RH Airbag ECU assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.

PROCEDURE

1.	CHECK DTC (OCCUPANT DETECTION ECU)
-----------	---

(a) Check for DTCs of the occupant detection ECU **INFO**.

OK:

DTC is not output.

NG **▶ GO TO OCCUPANT CLASSIFICATION SYSTEM**

OK



2.	CHECK CONNECTORS
-----------	-------------------------

(a) Turn the ignition switch off.

(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check that the connectors are properly connected to the airbag ECU assembly and front seat wire RH.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

(d) Disconnect the connectors from the airbag ECU assembly and front seat wire RH.

(e) Check that the terminals of the connectors are not damaged.

OK:

The terminals are not deformed or damaged.

NG ► **REPLACE NO. 2 FLOOR WIRE**

OK



3.	CHECK CONNECTORS
-----------	-------------------------

(a) Check that the connectors are properly connected to the occupant detection ECU.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

(b) Disconnect the connectors from the occupant detection ECU.

(c) Check that the terminals of the connectors are not damaged.

OK:

The terminals are not deformed or damaged.

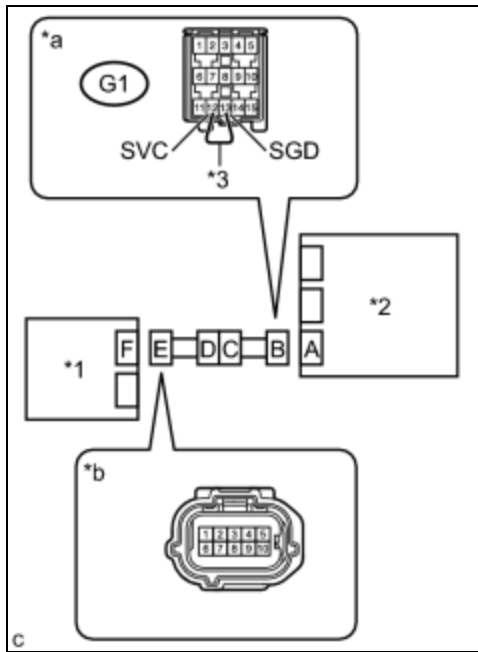
NG ► **REPLACE FRONT SEAT ASSEMBLY RH**

OK



4.	CHECK OCCUPANT CLASSIFICATION SYSTEM CIRCUIT (OPEN)
-----------	--

(a) Connect the connectors to the front seat wire RH.



(b) Using a service wire, connect terminals 12 (SVC) and 13 (SGD) of connector B.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 9	Always	Below 1 Ω

Text in Illustration

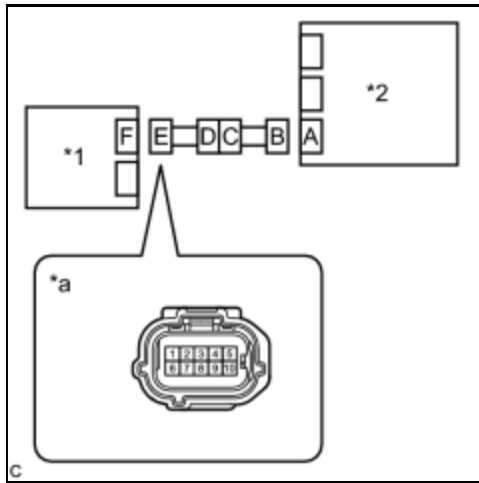
*1	Occupant Detection ECU
*2	Airbag ECU Assembly
*3	Service Wire
*a	Front view of wire harness connector (to Airbag ECU Assembly)
*b	Front view of wire harness connector (to Occupant Detection ECU)

NG ► CHECK NO. 2 FLOOR WIRE (OPEN)

OK



5.	CHECK OCCUPANT CLASSIFICATION SYSTEM CIRCUIT (SHORT)
----	--



(a) Disconnect the service wire from connector B.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 9	Always	1 MΩ or higher

Text in Illustration

*1	Occupant Detection ECU
*2	Airbag ECU Assembly
*a	Front view of wire harness connector (to Occupant Detection ECU)

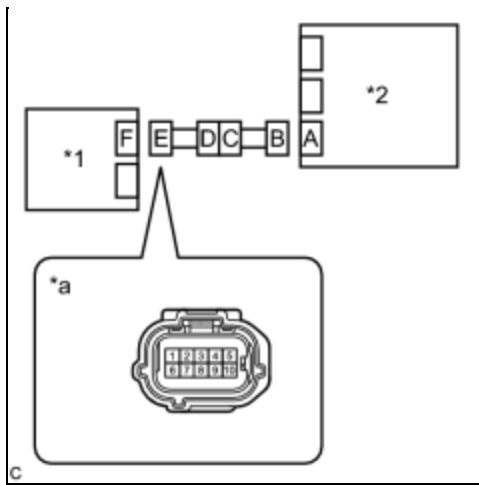
NG ► CHECK NO. 2 FLOOR WIRE (SHORT)

OK



6.	CHECK OCCUPANT CLASSIFICATION SYSTEM CIRCUIT (SHORT TO B+)
-----------	---

(a) Connect the cable to the negative (-) battery terminal.



(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - Body ground	Ignition switch ON	Below 1 V
9 - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Occupant Detection ECU
*2	Airbag ECU Assembly
*a	Front view of wire harness connector (to Occupant Detection ECU)

NG ► CHECK NO. 2 FLOOR WIRE (SHORT TO B+)

OK
▼

7.	CHECK OCCUPANT CLASSIFICATION SYSTEM CIRCUIT (SHORT TO GROUND)
-----------	---

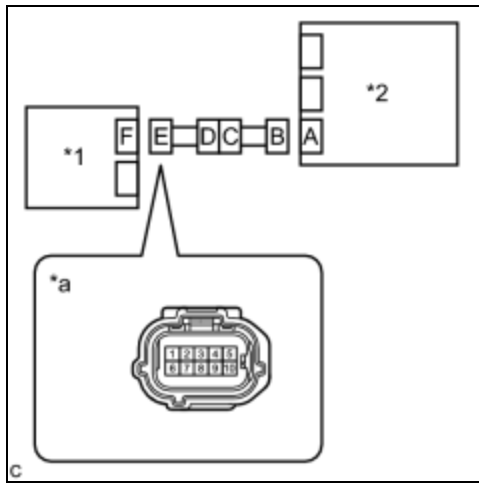
(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - Body ground	Always	1 MΩ or higher
9 - Body ground	Always	1 MΩ or higher

Text in Illustration

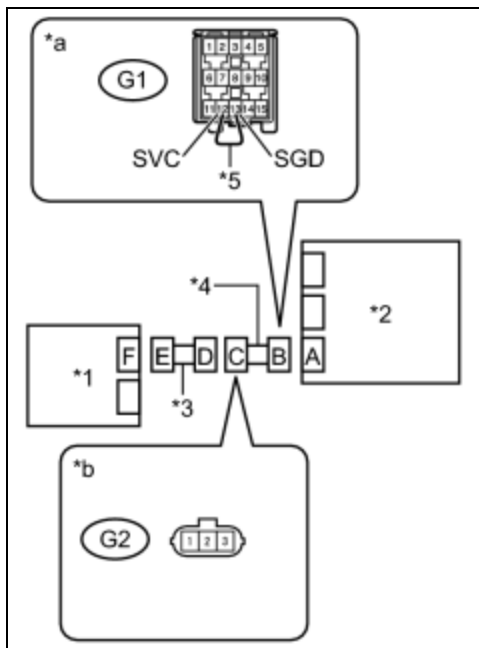
*1	Occupant Detection ECU
*2	Airbag ECU Assembly
*a	Front view of wire harness connector (to Occupant Detection ECU)



NG ► CHECK NO. 2 FLOOR WIRE (SHORT TO GROUND)

OK ► REPLACE AIRBAG ECU ASSEMBLY

8. CHECK NO. 2 FLOOR WIRE (OPEN)



(a) Disconnect the front seat wire RH from the No. 2 floor wire.

HINT:

The service wire has already been inserted into connector B.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G2-2 - G2-3	Always	Below 1 Ω

(c) Disconnect the service wire from connector B.

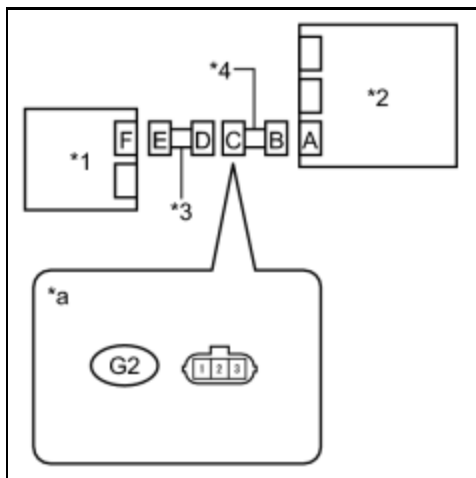
Text in Illustration

*1	Occupant Detection ECU
*2	Airbag ECU Assembly
*3	Front Seat Wire RH
*4	No. 2 Floor Wire
*5	Service Wire
*a	Front view of wire harness connector (to Airbag ECU Assembly)
*b	Front view of wire harness connector (to Front Seat Wire RH)

NG ► REPLACE NO. 2 FLOOR WIRE

OK ► REPLACE FRONT SEAT ASSEMBLY RH

9. CHECK NO. 2 FLOOR WIRE (SHORT)
--



(a) Disconnect the front seat wire RH from the No. 2 floor wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G2-2 - G2-3	Always	1 M Ω or higher

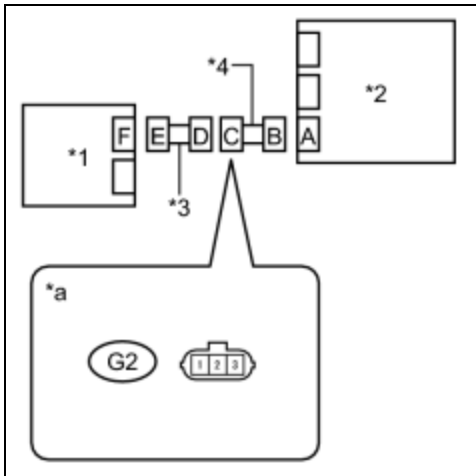
Text in Illustration

*1	Occupant Detection ECU
*2	Airbag ECU Assembly
*3	Front Seat Wire RH
*4	No. 2 Floor Wire
*a	Front view of wire harness connector (to Front Seat Wire RH)

NG ► REPLACE NO. 2 FLOOR WIRE

OK ► REPLACE FRONT SEAT ASSEMBLY RH

10. CHECK NO. 2 FLOOR WIRE (SHORT TO B+)



(a) Disconnect the front seat wire RH from the No. 2 floor wire.

(b) Connect the cable to the negative (-) battery terminal.

(c) Turn the ignition switch to ON.

(d) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G2-2 - Body ground	Ignition switch ON	Below 1 V
G2-3 - Body ground	Ignition switch ON	Below 1 V

Text in Illustration

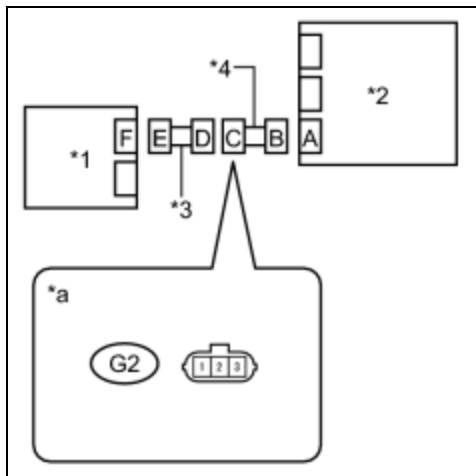
--	--

*1	Occupant Detection ECU
*2	Airbag ECU Assembly
*3	Front Seat Wire RH
*4	No. 2 Floor Wire
*a	Front view of wire harness connector (to Front Seat Wire RH)

NG ► REPLACE NO. 2 FLOOR WIRE

OK ► REPLACE FRONT SEAT ASSEMBLY RH

11. CHECK NO. 2 FLOOR WIRE (SHORT TO GROUND)



(a) Disconnect the front seat wire RH from the No. 2 floor wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G2-2 - Body ground	Always	1 MΩ or higher
G2-3 - Body ground	Always	1 MΩ or higher

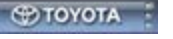
Text in Illustration

*1	Occupant Detection ECU
*2	Airbag ECU Assembly
*3	Front Seat Wire RH
*4	No. 2 Floor Wire
*a	Front view of wire harness connector

(to Front Seat Wire RH)

NG ► REPLACE NO. 2 FLOOR WIRE

OK ► REPLACE FRONT SEAT ASSEMBLY RH



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001NZY05LX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1655: Seat Belt Buckle Switch (RH) (2013 FR-S)		

DTC	B1655	Seat Belt Buckle Switch (RH)
------------	--------------	-------------------------------------

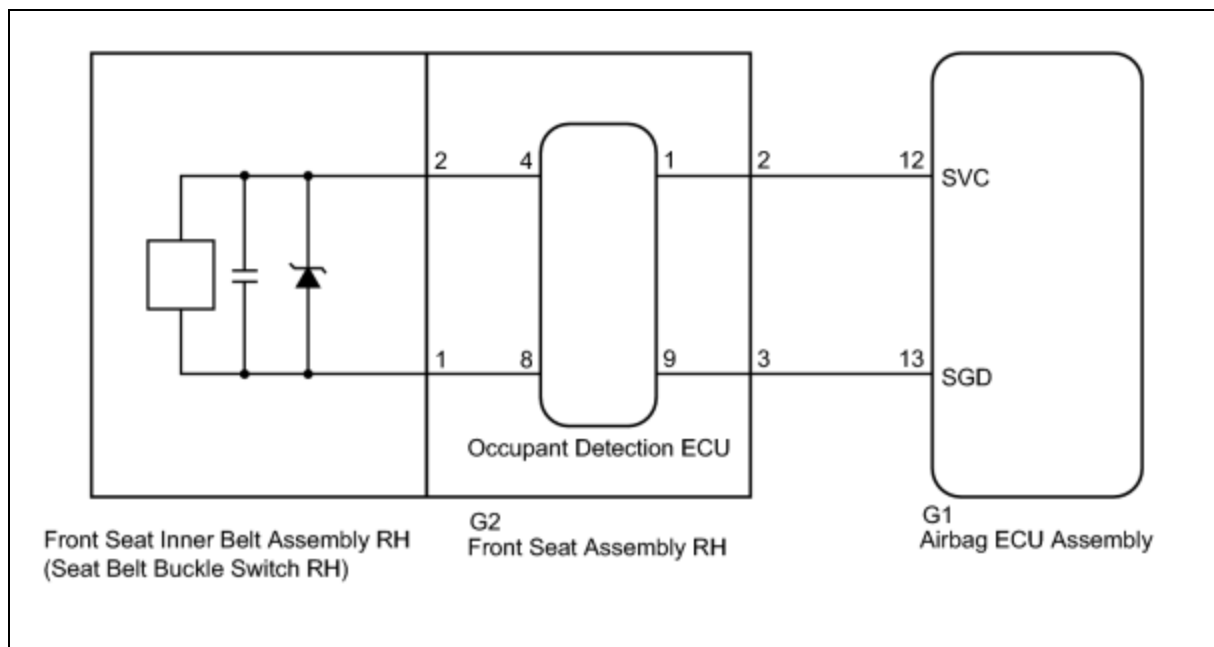
DESCRIPTION

The seat belt buckle switch RH circuit consists of the occupant detection ECU, airbag ECU assembly and front seat inner belt assembly RH.

DTC B1655 is stored when a malfunction is detected in the seat belt buckle switch RH circuit.


DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1655	<ul style="list-style-type: none"> The airbag ECU assembly receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the seat belt buckle switch RH circuit. Front seat inner belt assembly RH malfunction Occupant detection ECU malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Front seat assembly RH Front seat inner belt assembly RH (Seat belt buckle switch RH) Airbag ECU assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work .

HINT:

If DTC B1650 has been stored, check the errors with respect to that DTC first.


PROCEDURE

1.	CHECK DTC (OCCUPANT CLASSIFICATION SYSTEM)
-----------	---

(a) Check for DTCs of the occupant classification system .

Result :

RESULT	PROCEED TO
DTCs are not output	A
DTC B1760, B1761,B1771 or B1795 is output.	B

B  **GO TO OCCUPANT CLASSIFICATION SYSTEM (DIAGNOSTIC TROUBLE CODE CHART)**

A



2.	CHECK CONNECTORS
-----------	-------------------------

(a) Turn the ignition switch off.

(b) Disconnect the cable from the negative (-) battery terminal.

(c) Check that the connectors are properly connected to the occupant detection ECU and front seat inner belt assembly RH.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

(d) Disconnect the connectors from the occupant detection ECU and front seat inner belt assembly RH.

(e) Check that the terminals of the connectors are not damaged.

OK:

The terminals are not deformed or damaged.

NG  **REPLACE FRONT SEAT ASSEMBLY RH**

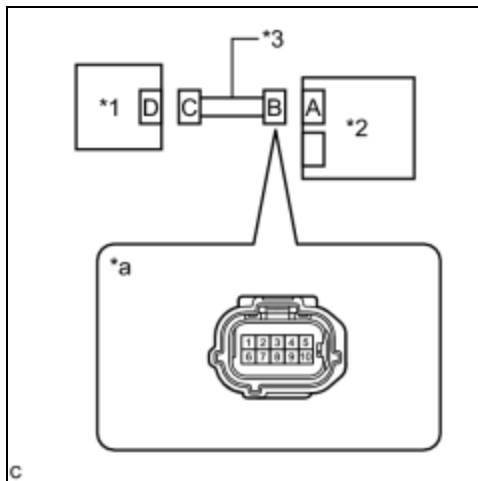
OK



3.	CHECK FRONT SEAT WIRE RH (SHORT TO B+)
-----------	---

(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.



(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 - Body ground	Ignition switch ON	Below 1 V
8 - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Front Seat Inner Belt Assembly RH
*2	Occupant Detection ECU
*3	Front Seat Wire RH
*a	Front view of wire harness connector (to Occupant Detection ECU)

NG  **REPLACE FRONT SEAT ASSEMBLY RH**

OK

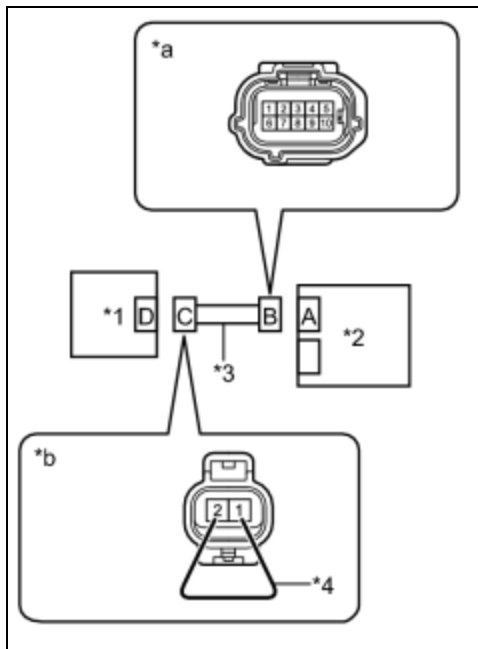


4. CHECK FRONT SEAT WIRE RH (OPEN)

(a) Using a service wire, connect terminals 1 and 2 of connector C.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 - 8	Always	Below 1 Ω

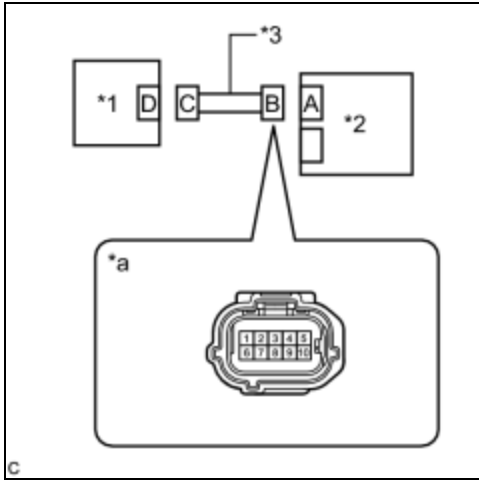
(c) Disconnect the service wire from connector C.

Text in Illustration

*1	Front Seat Inner Belt Assembly RH
*2	Occupant Detection ECU
*3	Front Seat Wire RH
*4	Service Wire
*a	Front view of wire harness connector (to Occupant Detection ECU)
*b	Front view of wire harness connector (to Front Seat Inner Belt Assembly RH)

OK
▼

5. CHECK FRONT SEAT WIRE RH (SHORT)



(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 - 8	Always	1 MΩ or higher

Text in Illustration

*1	Front Seat Inner Belt Assembly RH
*2	Occupant Detection ECU
*3	Front Seat Wire RH
*a	Front view of wire harness connector (to Occupant Detection ECU)

NG ► REPLACE FRONT SEAT ASSEMBLY RH

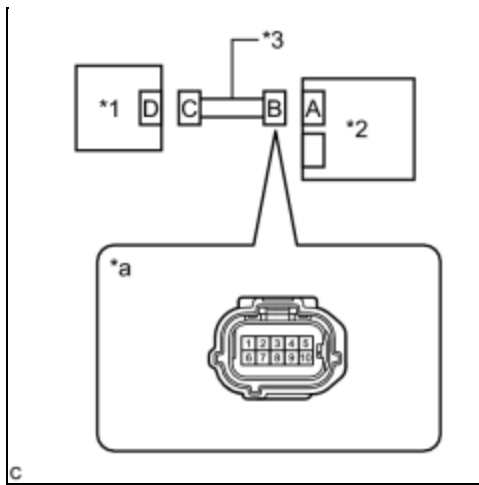
OK
▼

6. CHECK FRONT SEAT WIRE RH (SHORT TO GROUND)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
-------------------	-----------	---------------------



4 - Body ground	Always	1 MΩ or higher
8 - Body ground	Always	1 MΩ or higher

Text in Illustration

*1	Front Seat Inner Belt Assembly RH
*2	Occupant Detection ECU
*3	Front Seat Wire RH
*a	Front view of wire harness connector (to Occupant Detection ECU)

NG ► REPLACE FRONT SEAT ASSEMBLY RH

OK
▼

7. CHECK DTC

- (a) Connect the connectors to the occupant detection ECU and front seat inner belt assembly RH.
- (b) Connect the cable to the negative (-) battery terminal.
- (c) Clear the DTCs stored in the occupant detection ECU **INFO**.
- (d) Clear the DTCs stored in the airbag ECU assembly **INFO**.
- (e) Turn the ignition switch off.
- (f) Turn the ignition switch to ON, and wait for at least 60 seconds.
- (g) Check for DTCs **INFO**.
 OK:
 DTC B1655 is not output.

HINT:

Codes other than DTC B1655 may be output at this time, but they are not related to this check.

- (h) Turn the ignition switch off.

NG ► CHECK FRONT SEAT INNER BELT ASSEMBLY LH

8.	CHECK FRONT SEAT INNER BELT ASSEMBLY LH
-----------	--

(a) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(b) Replace the front seat inner belt assembly RH with a known good one INFO.

HINT:

Perform the following inspection using known good parts from another vehicle if possible.

(c) Connect the cable to the negative (-) battery terminal.

(d) Clear the DTCs stored in the occupant detection ECU INFO.

(e) Clear the DTCs stored in the airbag ECU assembly INFO.

(f) Turn the ignition switch off.

(g) Turn the ignition switch to ON, and wait for at least 60 seconds.

(h) Check for DTCs INFO.

OK:

DTC B1655 is not output.

HINT:

Codes other than DTC B1655 may be output at this time, but they are not related to this check.

(i) Turn the ignition switch off.

(j) Disconnect the cable from the negative (-) battery terminal.

(k) Restore the front seat inner belt assembly RH that was installed for testing to its original location INFO.

NG ► CHECK FRONT SEAT ASSEMBLY RH

OK ► REPLACE FRONT SEAT INNER BELT ASSEMBLY LH

9.	CHECK FRONT SEAT ASSEMBLY RH
-----------	-------------------------------------

(a) Disconnect the cable from the negative (-) battery terminal.

(b) Replace the front seat assembly RH with a new one INFO.

(c) Connect the cable to the negative (-) battery terminal.

- (d) Connect the connectors to the occupant detection ECU and front seat inner belt assembly RH.
- (e) Connect the cable to the negative (-) battery terminal.
- (f) Clear the DTCs stored in the occupant detection ECU INFO .
- (g) Clear the DTCs stored in the airbag ECU assembly INFO .
- (h) Turn the ignition switch off.
- (i) Turn the ignition switch to ON, and wait for at least 60 seconds.
- (j) Check for DTCs INFO .
 - OK:
DTC B1655 is not output.

HINT:

Codes other than DTC B1655 may be output at this time, but they are not related to this check.

NG ▶ REPLACE AIRBAG ECU ASSEMBLY

OK ▶ END (FRONT SEAT ASSEMBLY RH WAS DEFECTIVE)



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001W2808SX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1660: P Seat Airbag Active Mode Indicator (2013 FR-S)		

DTC	B1660	P Seat Airbag Active Mode Indicator
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DESCRIPTION

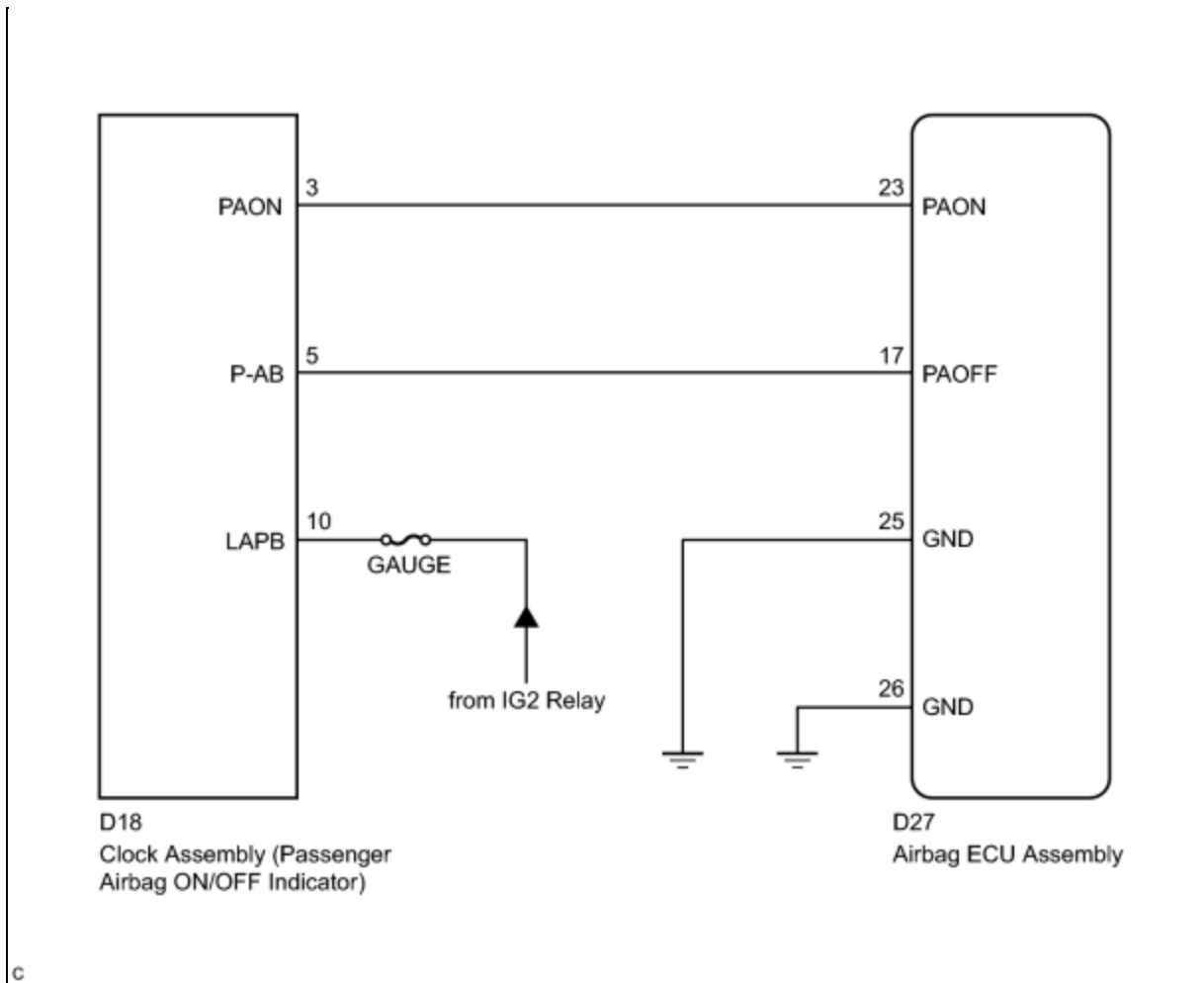
The passenger airbag ON/OFF indicator circuit consists of the airbag ECU assembly and clock assembly (passenger airbag ON/OFF indicator).

The passenger airbag ON/OFF indicator indicates the operation condition of the front passenger airbag and front seat belt pretensioner RH.

DTC B1660 is stored when a malfunction is detected in the passenger airbag ON/OFF indicator circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1660	<ul style="list-style-type: none"> The airbag ECU assembly receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the passenger airbag ON/OFF indicator circuit. Clock assembly malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Instrument panel wire Clock assembly (Passenger airbag ON/OFF indicator) Airbag ECU assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO** .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

- Perform the simulation method by selecting check mode (Signal Check) using the Techstream **INFO** .
- After selecting check mode (Signal Check), perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city road or rough road **INFO** .

PROCEDURE

1.	CHECK PASSENGER AIRBAG ON/OFF INDICATOR CONDITION
-----------	--

- (a) Turn the ignition switch to ON.
- (b) Check the passenger airbag ON/OFF indicator operation.

Result:

ON/OFF INDICATOR ILLUMINATION	PROCEED TO
Always ON	A
OFF	B

HINT:

Refer to the normal condition of the passenger airbag ON/OFF indicator  .

B  **CHECK CONNECTORS**

A



2.	CHECK CONNECTORS
-----------	-------------------------

- (a) Turn the ignition switch off.
- (b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Check that the connectors are properly connected to the airbag ECU assembly and clock assembly.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

- (d) Disconnect the connectors from the airbag ECU assembly and clock assembly.
- (e) Check that the terminals of the connectors are not damaged.

OK:

The terminals are not deformed or damaged.

NG  **REPLACE INSTRUMENT PANEL WIRE**

OK



--	--

3. CHECK PASSENGER AIRBAG ON/OFF INDICATOR

- (a) Connect the connector to the clock assembly.
- (b) Connect the cable to the negative (-) battery terminal.
- (c) Turn the ignition switch to ON.
- (d) Check the passenger airbag ON/OFF indicator operation.

OK:

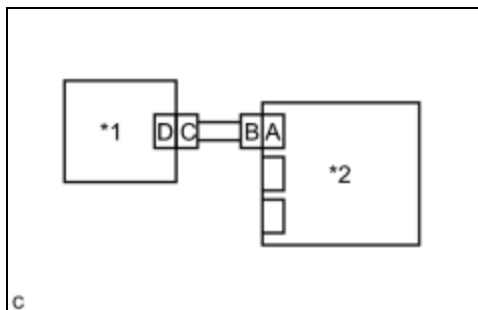
The passenger airbag ON/OFF indicator does not come on.

NG ► **CHECK INSTRUMENT PANEL WIRE (OPEN)**

OK



4. CHECK DTC



- (a) Turn the ignition switch off.

- (b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Connect the connector to the airbag ECU assembly.
- (d) Connect the cable to the negative (-) battery terminal.
- (e) Clear the DTCs stored in memory **INFO**.
- (f) Turn the ignition switch off.
- (g) Turn the ignition switch to ON, and wait for at least 60 seconds.
- (h) Check for DTCs **INFO**.

OK:

DTC B1660 is not output.

HINT:

Codes other than DTC B1660 may be output at this time, but they are not related to this check.

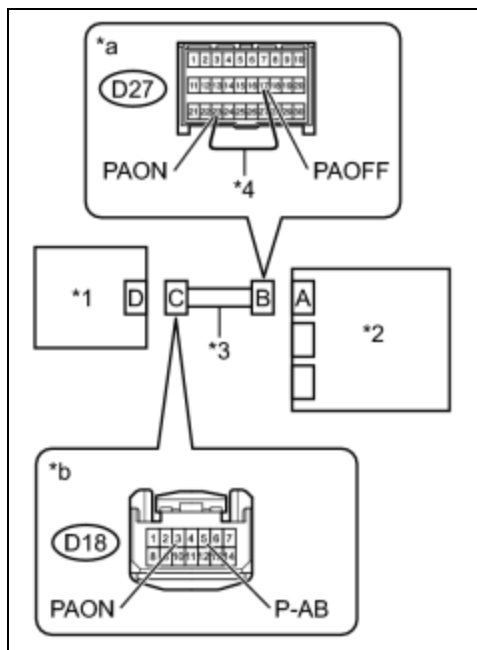
Text in Illustration

*1	Clock Assembly
*2	Airbag ECU Assembly

NG ► REPLACE AIRBAG ECU ASSEMBLY

OK ► USE SIMULATION METHOD TO CHECK

5. CHECK INSTRUMENT PANEL WIRE (OPEN)



(a) Turn the ignition switch off.

(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Disconnect the connector from the clock assembly.

(d) Using a service wire, connect terminals 23 (PAON) and 17 (PAOFF) of connector B.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

(e) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

--	--	--

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D18-3 (PAON) - D18-5 (P-AB)	Always	Below 1 Ω

(f) Disconnect the service wire from connector B.

Text in Illustration

*1	Clock Assembly
*2	Airbag ECU Assembly
*3	Instrument Panel Wire
*4	Service Wire
*a	Front view of wire harness connector (to Airbag ECU Assembly)
*b	Front view of wire harness connector (to Clock Assembly)

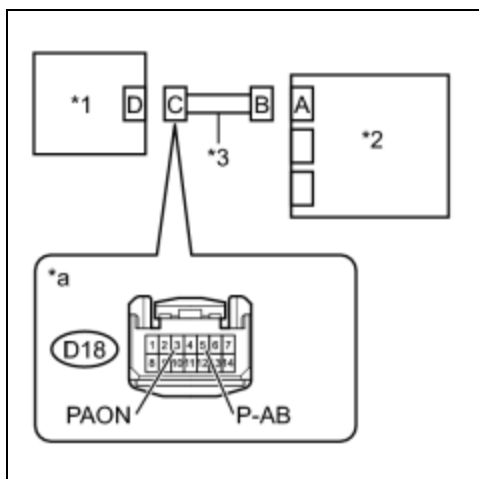
NG ▶ REPLACE INSTRUMENT PANEL WIRE

OK
▼

6. CHECK INSTRUMENT PANEL WIRE (SHORT)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



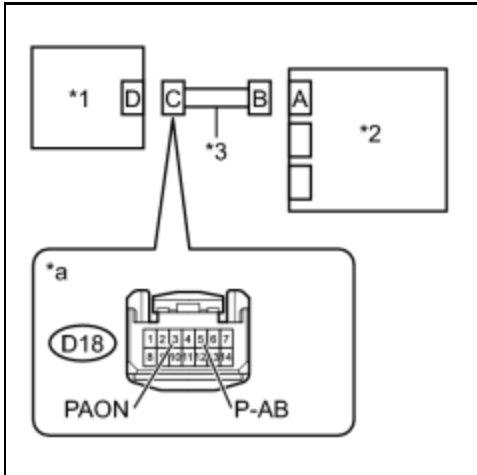
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D18-3 (PAON) - D18-5 (P-AB)	Always	1 MΩ or higher

Text in Illustration

*1	Clock Assembly
*2	Airbag ECU Assembly
*3	Instrument Panel Wire
*a	Front view of wire harness connector (to Clock Assembly)

OK


7. CHECK INSTRUMENT PANEL WIRE (SHORT TO B+)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D18-3 (PAON) - Body ground	Ignition switch ON	Below 1 V
D18-5 (P-AB) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Clock Assembly
*2	Airbag ECU Assembly
*3	Instrument Panel Wire
*a	Front view of wire harness connector

(to Clock Assembly)

NG ▶ REPLACE INSTRUMENT PANEL WIRE

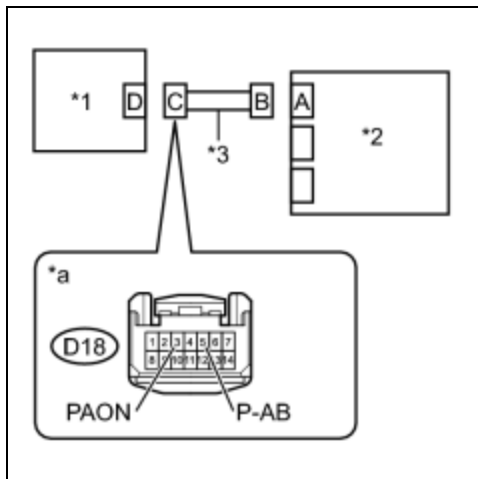
OK



8. CHECK INSTRUMENT PANEL WIRE (SHORT TO GROUND)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D18-3 (PAON) - Body ground	Always	1 MΩ or higher
D18-5 (P-AB) - Body ground	Always	1 MΩ or higher

Text in Illustration

*1	Clock Assembly
*2	Airbag ECU Assembly
*3	Instrument Panel Wire
*a	Front view of wire harness connector (to Clock Assembly)

NG ▶ REPLACE INSTRUMENT PANEL WIRE

OK ▶ REPLACE CLOCK ASSEMBLY

9. CHECK CONNECTORS

- (a) Turn the ignition switch off.
- (b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check that the connectors are properly connected to the airbag ECU assembly and clock assembly.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

(d) Disconnect the connectors from the airbag ECU assembly and clock assembly.

(e) Check that the terminals of the connectors are not damaged.

OK:

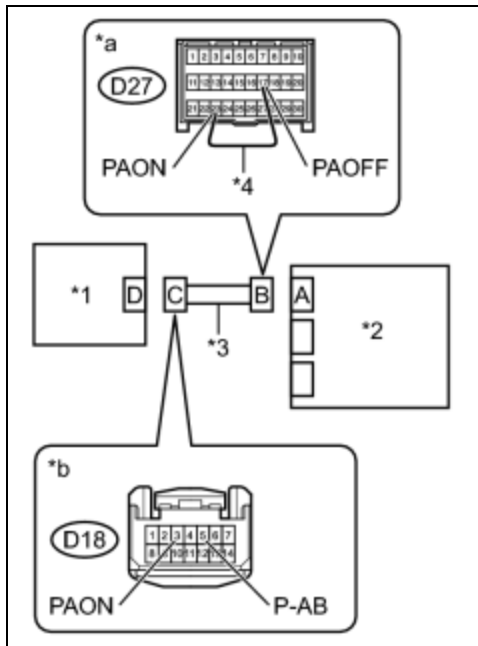
The terminals are not deformed or damaged.

NG ▶ REPLACE INSTRUMENT PANEL WIRE

OK



10. CHECK INSTRUMENT PANEL WIRE (OPEN)



(a) Using a service wire, connect terminals 23 (PAON) and 17 (PAOFF) of connector B.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D18-3 (PAON) - D18-5 (P-AB)	Always	Below 1 Ω

(c) Disconnect the service wire from connector B.

Text in Illustration

*1	Clock Assembly
*2	Airbag ECU Assembly
*3	Instrument Panel Wire
*4	Service Wire
*a	Front view of wire harness connector (to Airbag ECU Assembly)
*b	Front view of wire harness connector (to Clock Assembly)

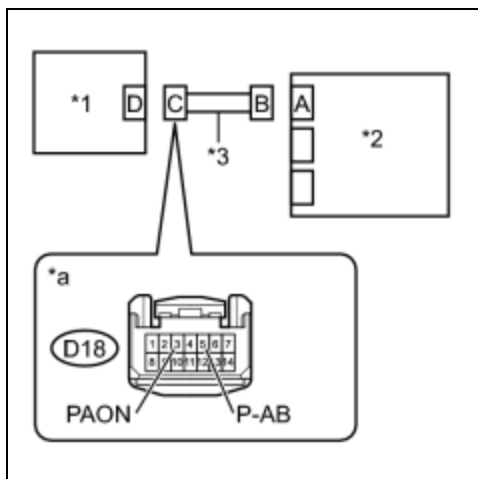
NG ▶ REPLACE INSTRUMENT PANEL WIRE

OK
▼

11. CHECK INSTRUMENT PANEL WIRE (SHORT)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



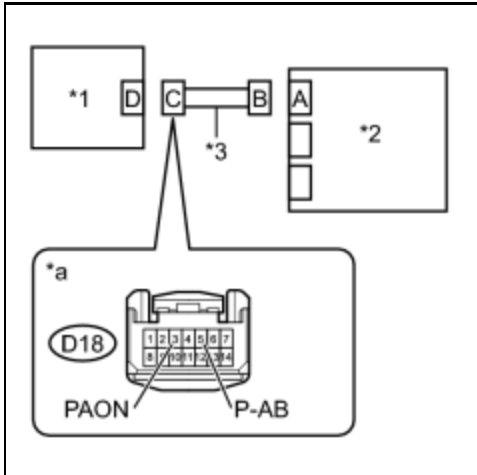
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D18-3 (PAON) - D18-5 (P-AB)	Always	1 MΩ or higher

Text in Illustration

*1	Clock Assembly
*2	Airbag ECU Assembly
*3	Instrument Panel Wire
*a	Front view of wire harness connector (to Clock Assembly)

OK


12. CHECK INSTRUMENT PANEL WIRE (SHORT TO B+)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D18-3 (PAON) - Body ground	Ignition switch ON	Below 1 V
D18-5 (P-AB) - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Clock Assembly
*2	Airbag ECU Assembly
*3	Instrument Panel Wire
*a	Front view of wire harness connector

(to Clock Assembly)

NG ▶ REPLACE INSTRUMENT PANEL WIRE

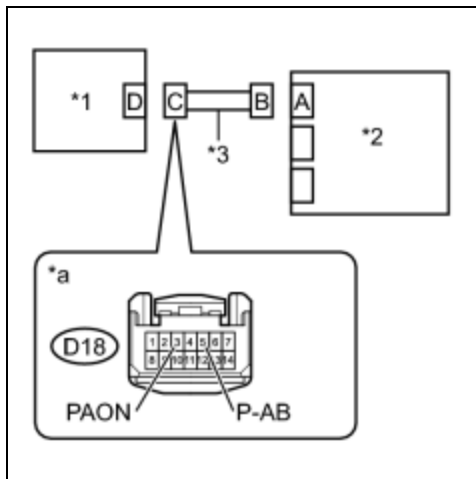
OK



13. CHECK INSTRUMENT PANEL WIRE (SHORT TO GROUND)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D18-3 (PAON) - Body ground	Always	1 MΩ or higher
D18-5 (P-AB) - Body ground	Always	1 MΩ or higher

Text in Illustration

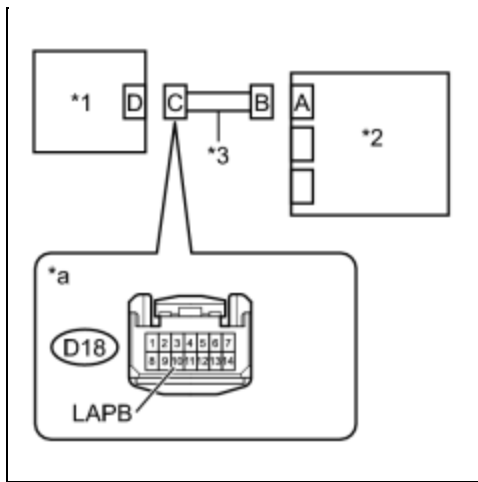
*1	Clock Assembly
*2	Airbag ECU Assembly
*3	Instrument Panel Wire
*a	Front view of wire harness connector (to Clock Assembly)

NG ▶ REPLACE INSTRUMENT PANEL WIRE

OK



14. CHECK CLOCK ASSEMBLY (SOURCE VOLTAGE)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D18-10 (LAPB) - Body ground	Ignition switch ON	11 to 14 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	Clock Assembly
*2	Airbag ECU Assembly
*3	Instrument Panel Wire
*a	Front view of wire harness connector (to Clock Assembly)

NG ▶ REPLACE WIRE HARNESS OR BATTERY

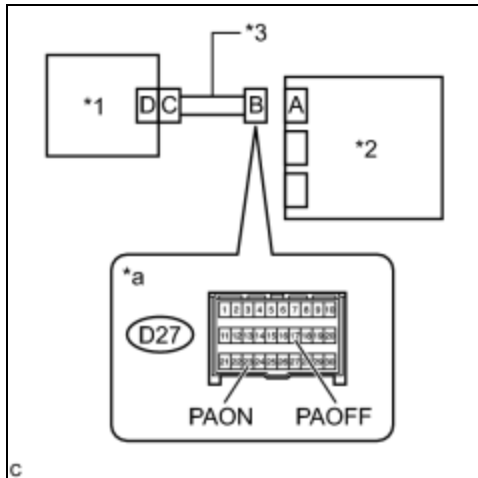
OK
▼

15.	CHECK PASSENGER AIRBAG ON/OFF INDICATOR
-----	--

- (a) Connect the connector to the clock assembly.
- (b) Connect the cable to the negative (-) battery terminal.
- (c) Turn the ignition switch to ON.
- (d) Check the indicator according to the conditions in the table below.

OK:

TERMINAL CONNECTION	CONDITION	SPECIFIED CONDITION
D27-23 (PAON) - Body ground	Ignition switch ON	"ON" comes on
D27-17 (PAOFF) - Body ground	Ignition switch ON	"OFF" comes on



- (e) Turn the ignition switch off.
- (f) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

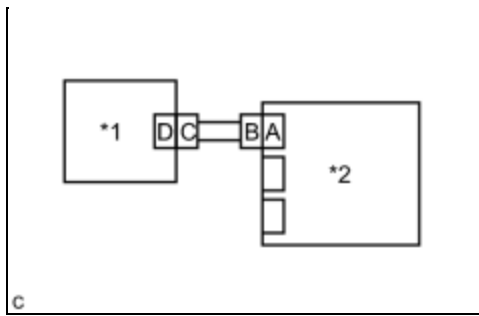
*1	Clock Assembly
*2	Airbag ECU Assembly
*3	Instrument Panel Wire
*a	Front view of wire harness connector (to Airbag ECU Assembly)

NG **REPLACE CLOCK ASSEMBLY**

OK



16.	CHECK DTC
------------	------------------



(a) Connect the connector to the airbag ECU assembly.

(b) Connect the cable to the negative (-) battery terminal.

(c) Clear the DTCs stored in memory **INFO** .

(d) Turn the ignition switch off.

(e) Turn the ignition switch to ON, and wait for at least 60 seconds.

(f) Check for DTCs **INFO** .

OK:

DTC B1660 is not output.

HINT:

Codes other than DTC B1660 may be output at this time, but they are not related to this check.

Text in Illustration

*1	Clock Assembly
*2	Airbag ECU Assembly

NG ► REPLACE AIRBAG ECU ASSEMBLY

OK ► USE SIMULATION METHOD TO CHECK

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000038D4014X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1675,B16F8: Rear Floor Airbag Sensor (2013 FR-S)		

DTC	B1675	Rear Floor Airbag Sensor
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DTC	B16F8	Rear Floor Airbag Sensor RH Mismatch
------------	--------------	---

DESCRIPTION

The No. 2 airbag sensor assembly circuit is composed of the airbag ECU assembly and No. 2 airbag sensor assembly.

The No. 2 airbag sensor assembly detects impacts to the vehicle and sends signals to the airbag ECU assembly to determine if the airbag should be deployed.

These DTCs are stored when a malfunction is detected in the No. 2 airbag sensor assembly circuit.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B1675	<ul style="list-style-type: none"> No. 2 airbag sensor assembly malfunction. Airbag ECU assembly malfunction. 	<ul style="list-style-type: none"> No. 2 airbag sensor assembly Airbag ECU assembly
B16F8	<ul style="list-style-type: none"> Improper installation of No. 2 airbag sensor assembly. Airbag ECU assembly malfunction. 	

WIRING DIAGRAM

Refer to DTCs B1678 and B1679 INFO.

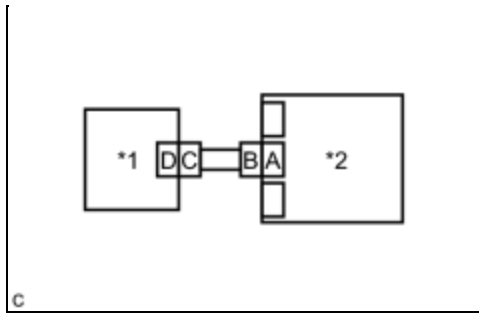
INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

PROCEDURE

1.	CHECK NO. 2 AIRBAG SENSOR ASSEMBLY
-----------	---



(a) Turn the ignition switch off.

(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Replace the No. 2 airbag sensor assembly with a new one.

(d) Connect the cable to the negative (-) battery terminal.

(e) Clear the DTCs stored in memory **INFO** .

(f) Turn the ignition switch off.

(g) Turn the ignition switch to ON, and wait for at least 60 seconds.

(h) Check for DTCs **INFO** .

Result:

RESULT	PROCEED TO
DTCs B1675 and B16F8 are not output.	A
DTC B1675 or B16F8 is output.	B

HINT:

Codes other than DTC B1675, B16F8 may be output at this time, but they are not related to this check.

Text in Illustration

*1	No. 2 Airbag Sensor Assembly
*2	Airbag ECU Assembly

B ▶ REPLACE AIRBAG ECU ASSEMBLY

A ▶ END (NO. 2 AIRBAG SENSOR ASSEMBLY WAS DEFECTIVE)

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000038BD014X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1678,B1679: Lost Communication with Rear Floor Airbag Sensor LH (2013 FR-S)		

DTC	B1678	Lost Communication with Rear Floor Airbag Sensor LH
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DTC	B1679	Rear Floor Airbag Sensor LH Initialization Incomplete
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DESCRIPTION

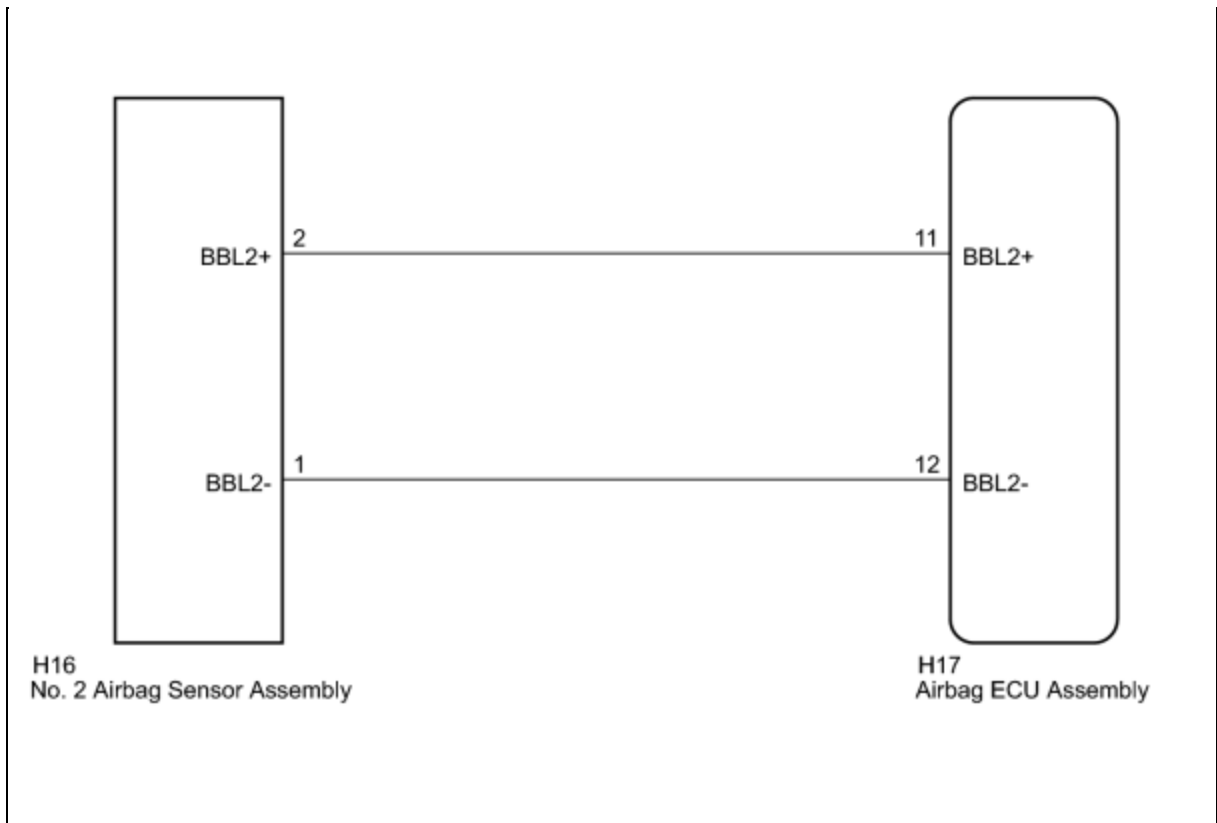
The No. 2 airbag sensor assembly circuit consists of the airbag ECU assembly and No. 2 airbag sensor assembly.

The No. 2 airbag sensor assembly detects impacts to the vehicle and sends signals to the airbag ECU assembly to determine if the airbag should be deployed.

These DTCs are stored when a malfunction is detected in the No. 2 airbag sensor assembly circuit.


DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B1678 B1679	<ul style="list-style-type: none"> The airbag ECU assembly receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the No. 2 airbag sensor assembly circuit. No. 2 airbag sensor assembly malfunction. Airbag ECU assembly malfunction. 	<ul style="list-style-type: none"> Floor wire No. 2 airbag sensor assembly Airbag ECU assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work .

PROCEDURE

1.	CHECK CONNECTORS
-----------	-------------------------

- (a) Turn the ignition switch off.
- (b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Check that the connectors are properly connected to the airbag ECU assembly and No. 2 airbag sensor assembly.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

- (d) Disconnect the connectors from the airbag ECU assembly and No. 2 airbag sensor assembly.

(e) Check that the terminals of connectors are not damaged.

OK:

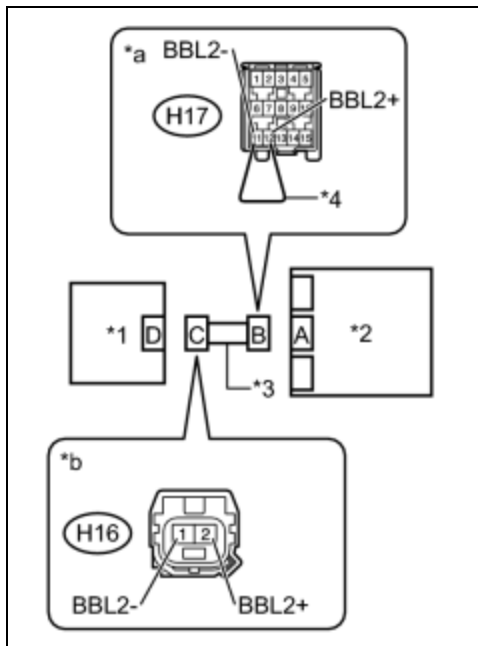
The connectors are not deformed or damaged.

NG  **REPLACE FLOOR WIRE**

OK



2.	CHECK FLOOR WIRE (OPEN)
-----------	--------------------------------



(a) Using a service wire, connect terminals 11 (BBL2+) and 12 (BBL2-) of connector B.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H16-1 (BBL2-) - H16-2 (BBL2+)	Always	Below 1 Ω

(c) Disconnect the service wire from connector B.

Text in Illustration

*1	No. 2 Airbag Sensor Assembly
*2	Airbag ECU Assembly
*3	Floor Wire

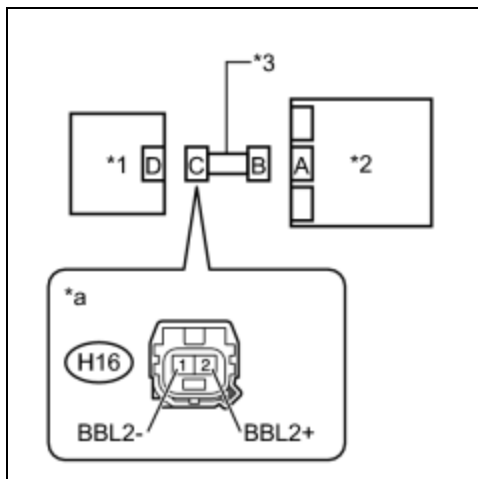
*4	Service Wire
*a	Front view of wire harness connector (to Airbag ECU Assembly)
*b	Front view of wire harness connector (to No. 2 Airbag Sensor Assembly)

NG ▶ REPLACE FLOOR WIRE

OK



3. CHECK FLOOR WIRE (SHORT)



(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H16-1 (BBL2-) - H16-2 (BBL2+)	Always	1 MΩ or higher

Text in Illustration

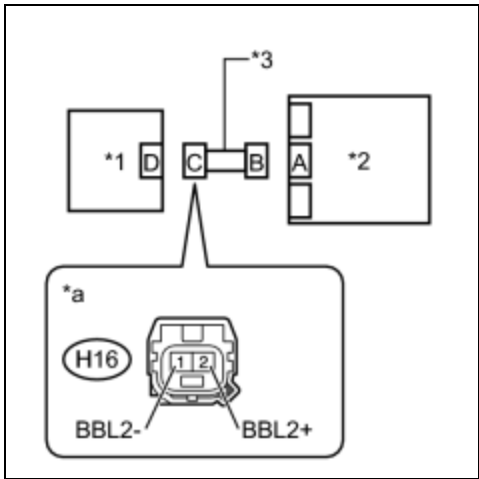
*1	No. 2 Airbag Sensor Assembly
*2	Airbag ECU Assembly
*3	Floor Wire
*a	Front view of wire harness connector (to No. 2 Airbag Sensor Assembly)

NG ▶ REPLACE FLOOR WIRE

OK



4. CHECK FLOOR WIRE (SHORT TO B+)



(a) Connect the cable to the negative (-) battery terminal.

- (b) Turn the ignition switch to ON.
- (c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H16-1 (BBL2-) - Body ground	Ignition switch ON	Below 1 V
H16-2 (BBL2+) - Body ground	Ignition switch ON	Below 1 V

- (d) Turn the ignition switch off.
- (e) Disconnect the cable from the negative (-) battery terminal.

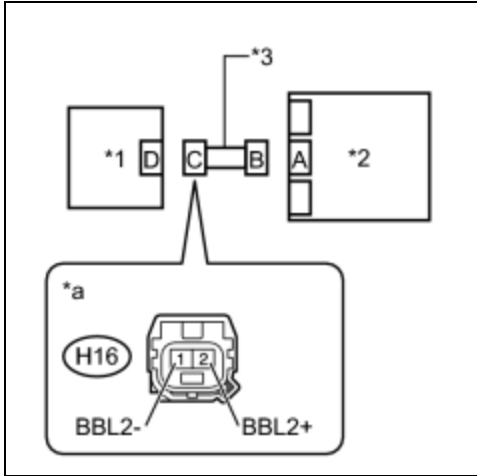
CAUTION:
 Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

Text in Illustration

*1	No. 2 Airbag Sensor Assembly
*2	Airbag ECU Assembly
*3	Floor Wire
*a	Front view of wire harness connector (to No. 2 Airbag Sensor Assembly)



5. CHECK FLOOR WIRE (SHORT TO GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H16-1 (BBL2-) - Body ground	Always	1 MΩ or higher
H16-2 (BBL2+) - Body ground	Always	1 MΩ or higher

Text in Illustration

*1	No. 2 Airbag Sensor Assembly
*2	Airbag ECU Assembly
*3	Floor Wire
*a	Front view of wire harness connector (to No. 2 Airbag Sensor Assembly)

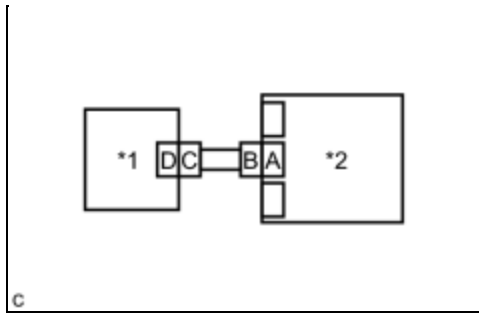
NG **REPLACE FLOOR WIRE**

OK



6. CHECK NO. 2 AIRBAG SENSOR ASSEMBLY

(a) Connect the connectors to the No. 2 airbag sensor assembly and airbag ECU assembly.



- (b) Replace the No. 2 airbag sensor assembly with a new one.
- (c) Connect the cable to the negative (-) battery terminal.
- (d) Clear the DTCs stored in memory **INFO** .
- (e) Turn the ignition switch off.
- (f) Turn the ignition switch to ON, and wait for at least 60 seconds.
- (g) Check for DTCs **INFO** .

:

RESULT	PROCEED TO
DTCs B1678 and B1679 are not output.	A
DTC B1678 or B1679 is output.	B

HINT:

Codes other than DTCs B1678 and B1679 may be output at this time, but they are not related to this check.

Text in Illustration

*1	No. 2 Airbag Sensor Assembly
*2	Airbag ECU Assembly

B ▶ REPLACE AIRBAG ECU ASSEMBLY

A ▶ END (NO. 2 AIRBAG SENSOR ASSEMBLY WAS DEFECTIVE)

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003NXE012X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1690,B16F9: Side Airbag Sensor RH (2013 FR-S)		

DTC	B1690	Side Airbag Sensor RH
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DTC	B16F9	Door Side Airbag Sensor RH Mismatch
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DESCRIPTION

The side collision sensor RH circuit (to determine deployment of the front seat airbag assembly RH, curtain shield airbag assembly RH and front seat outer belt assembly RH) is composed of the airbag ECU assembly, side airbag sensor assembly RH, side No. 2 airbag sensor assembly RH and rear airbag sensor RH and No. 2 airbag sensor assembly.

The side airbag sensor assembly RH detects impacts to the vehicle and sends signals to the airbag ECU assembly to determine if the airbag should be deployed.

These DTCs are stored when a malfunction is detected in the side airbag sensor assembly RH.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1690	<ul style="list-style-type: none"> Side airbag sensor assembly RH malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Side airbag sensor assembly RH Airbag ECU assembly
B16F9	<ul style="list-style-type: none"> Improper installation of side airbag sensor assembly RH Airbag ECU assembly malfunction 	

WIRING DIAGRAM

Refer to DTCs B1622, B1623, B1632, B1633, B1642, B1692 and B1693 INFO.

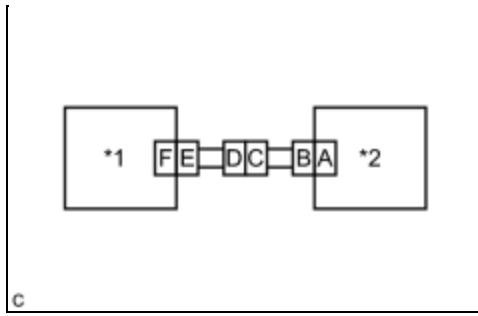
INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

PROCEDURE

1.	CHECK SIDE AIRBAG SENSOR ASSEMBLY RH
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(a) Turn the ignition switch off.

(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Interchange the side airbag sensor assembly RH with LH and connect the connectors.

(d) Connect the cable to the negative (-) battery terminal.

(e) Clear the DTCs stored in memory **INFO**.

(f) Turn the ignition switch off.

(g) Turn the ignition switch to ON, and wait for at least 60 seconds.

(h) Check for DTCs **INFO**.

Result:

RESULT	PROCEED TO
DTC B1690 or B16F9 is output.	A
DTC B1695 or B16FA is output.	B
DTCs B1690, B1695, B16F9 and B16FA are not output.	C

HINT:

Codes other than DTCs B1690, B1695, B16F9 and B16FA may be output at this time, but they are not related to this check.

(i) Turn the ignition switch off.

(j) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(k) Return the side airbag sensor assembly RH and LH to their original positions and connect the connectors.

Text in Illustration

*1	Side Airbag Sensor Assembly LH
*2	Rear Airbag Sensor RH

B ▶ RH

C ▶ USE SIMULATION METHOD TO CHECK

A ▶ REPLACE AIRBAG ECU ASSEMBLY



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003NXD012X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1695,B16FA: Side Airbag Sensor LH (2013 FR-S)		

DTC	B1695	Side Airbag Sensor LH
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DTC	B16FA	Door Side Airbag Sensor LH Mismatch
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DESCRIPTION

The side collision sensor LH circuit (to determine deployment of the front seat airbag assembly LH, curtain shield airbag assembly LH and front seat outer belt assembly LH) is composed of the airbag ECU assembly, side airbag sensor assembly LH, side No. 2 airbag sensor assembly LH and rear airbag sensor LH and No. 2 airbag sensor assembly.

The side airbag sensor assembly LH detects impacts to the vehicle and sends signals to the airbag ECU assembly to determine if the airbag should be deployed.

These DTCs are stored when a malfunction is detected in the side airbag sensor assembly LH.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1695	<ul style="list-style-type: none"> Side airbag sensor assembly LH malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Side airbag sensor assembly LH Airbag ECU assembly
B16FA	<ul style="list-style-type: none"> Improper installation of side airbag sensor assembly LH Airbag ECU assembly malfunction 	

WIRING DIAGRAM

Refer to DTCs B1627, B1628, B1637, B1638, B1647, B1697 and B1698 INFO .

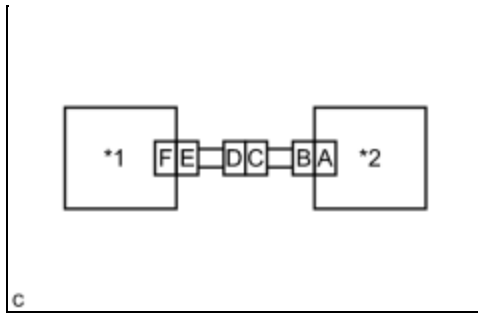
INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .

PROCEDURE

1.	CHECK SIDE AIRBAG SENSOR ASSEMBLY LH
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(a) Turn the ignition switch off.

(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Interchange the side airbag sensor assembly LH with RH and connect the connectors.

(d) Connect the cable to the negative (-) battery terminal.

(e) Clear the DTCs stored in memory **INFO**.

(f) Turn the ignition switch off.

(g) Turn the ignition switch to ON, and wait for at least 60 seconds.

(h) Check for DTCs **INFO**.

Result:

RESULT	PROCEED TO
DTC B1695 or B16FA is output.	A
DTC B1690 or B16F9 is output.	B
DTCs B1690, B1695, B16F9 and B16FA are not output.	C

HINT:

Codes other than DTCs B1690, B1695, B16F9 and B16FA may be output at this time, but they are not related to this check.

(i) Turn the ignition switch off.

(j) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(k) Return the side airbag sensor assembly LH and RH to their original positions and connect the connectors.

Text in Illustration

*1	Side Airbag Sensor Assembly RH
*2	Rear Airbag Sensor LH

B ▶ LH

C ▶ USE SIMULATION METHOD TO CHECK

A ▶ REPLACE AIRBAG ECU ASSEMBLY



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XFIOHWX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1800-B1803: Short in D Squib Circuit (2013 FR-S)		

DTC	B1800	Short in D Squib Circuit
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DTC	B1801	Open in D Squib Circuit
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DTC	B1802	Short in D Squib Circuit (to Ground)
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DTC	B1803	Short in D Squib Circuit (to +B)
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DESCRIPTION

The driver side squib circuit consists of the airbag ECU assembly, spiral cable sub-assembly and horn button assembly.

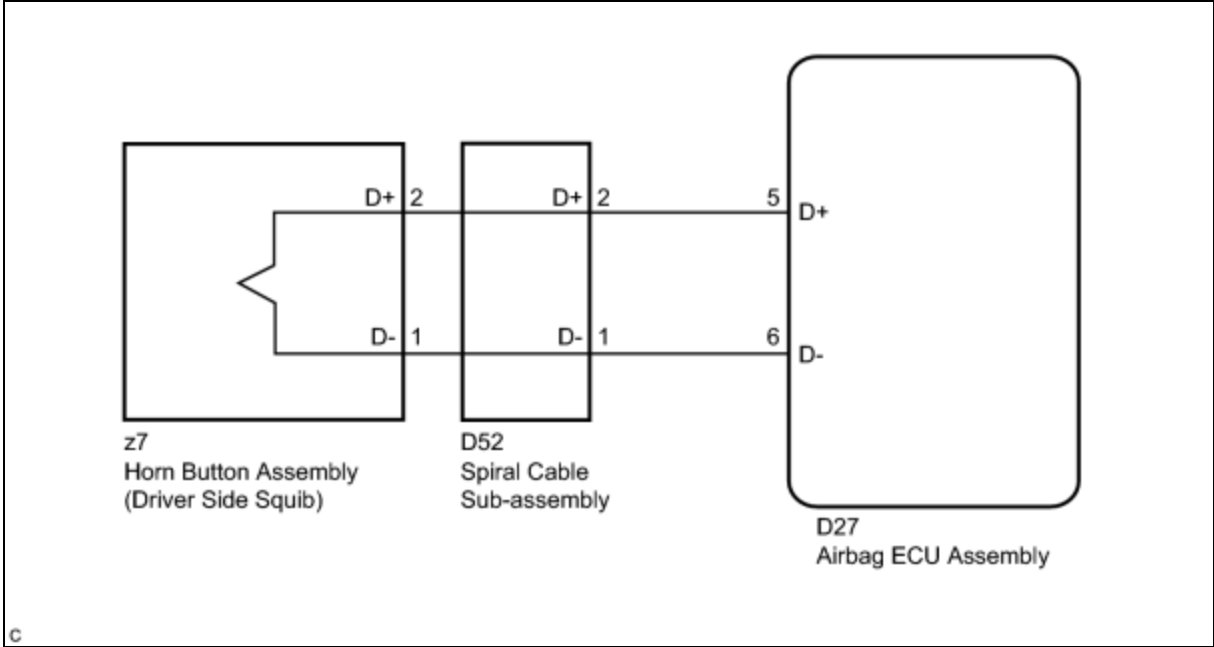
The airbag ECU assembly uses this circuit to deploy the airbag when deployment conditions are met.

These DTCs are stored when a malfunction is detected in the driver side squib circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1800	<ul style="list-style-type: none"> The airbag ECU assembly receives a line short circuit signal in the driver side squib circuit during primary check. Spiral cable sub-assembly malfunction Driver side squib malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Instrument panel wire Spiral cable sub-assembly Horn button assembly (Driver side squib) Airbag ECU assembly
B1801	<ul style="list-style-type: none"> The airbag ECU assembly receives an open circuit signal in the driver side squib circuit. Spiral cable sub-assembly malfunction Driver side squib malfunction Airbag ECU assembly malfunction 	
B1802	<ul style="list-style-type: none"> The airbag ECU assembly receives a short circuit to ground signal in the driver side squib circuit. Spiral cable sub-assembly malfunction Driver side squib malfunction Airbag ECU assembly malfunction 	
	<ul style="list-style-type: none"> The airbag ECU assembly receives a short circuit to 	

B1803	<p>B+ signal in the driver side squib circuit.</p> <ul style="list-style-type: none"> • Spiral cable sub-assembly malfunction • Driver side squib malfunction • Airbag ECU assembly malfunction
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WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

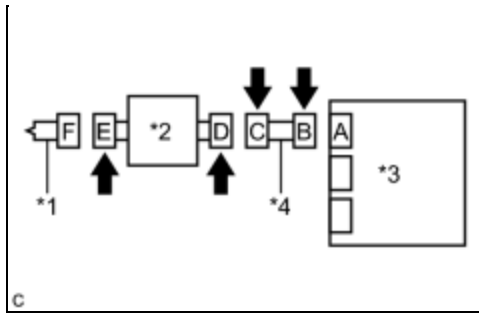
HINT:

- Perform the simulation method by selecting check mode (Signal Check) using the Techstream INFO.
- After selecting check mode (Signal Check), perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city road or rough road INFO.

PROCEDURE

1.	CHECK CONNECTORS
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(a) Turn the ignition switch off.



(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check that the connectors are properly connected to the horn button assembly, spiral cable sub-assembly and airbag ECU assembly.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

(d) Disconnect the connectors from the horn button assembly, spiral cable sub-assembly and airbag ECU assembly.

(e) Check that the terminals of the connectors are not damaged.

OK:

The terminals are not deformed or damaged.

(f) Check that the spiral cable sub-assembly connector (on the horn button assembly side) is not damaged.

OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

(g) Check that the short springs for the instrument panel wire and spiral cable sub-assembly with the activation prevention mechanism are not deformed or damaged.

OK:

The short springs are not deformed or damaged.

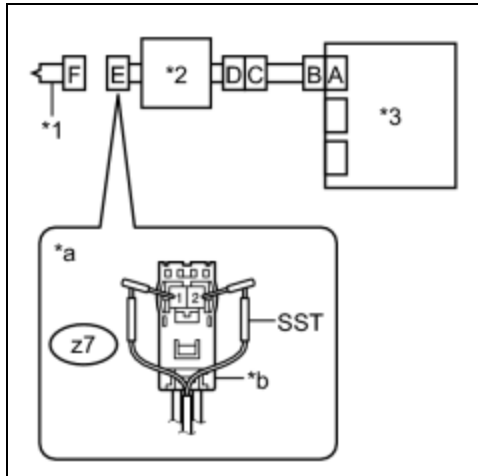
Text in Illustration

*1	Horn Button Assembly
*2	Spiral Cable Sub-assembly
*3	Airbag ECU Assembly
*4	Instrument Panel Wire

OK



2. CHECK HORN BUTTON ASSEMBLY (DRIVER SIDE SQUIB)



(a) Connect the instrument panel wire to the airbag ECU assembly and spiral cable sub-assembly.

(b) Connect SST (resistance 2.1 Ω) to connector E (orange connector).

CAUTION:

Never connect the tester to the horn button assembly (driver side squib) for measurement, as this may lead to a serious injury due to airbag deployment.

NOTICE:

- Do not forcibly insert SST into the terminals of the connector when connecting it.
- Insert SST straight into the terminals of the connector.

SST: 09843-18061

(c) Connect the cable to the negative (-) battery terminal.

(d) Clear the DTCs stored in memory  .

(e) Turn the ignition switch off.

(f) Turn the ignition switch to ON, and wait for at least 60 seconds.

(g) Check for DTCs  .

OK:

DTC B1800, B1801, B1802 or B1803 is not output.

HINT:

Codes other than DTCs B1800, B1801, B1802 and B1803 may be output at this time, but they are not related to this check.

(h) Turn the ignition switch off.

(i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(j) Disconnect SST from connector E.

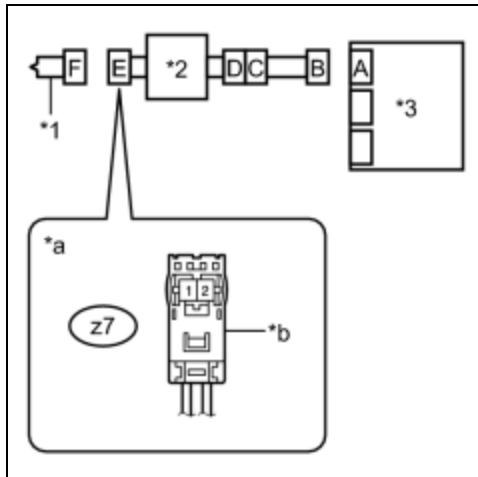
Text in Illustration

*1	Horn Button Assembly
*2	Spiral Cable Sub-assembly
*3	Airbag ECU Assembly
*a	Front view of wire harness connector (to Horn Button Assembly)
*b	Color: Orange

NG ► CHECK DRIVER SIDE SQUIB CIRCUIT

OK ► REPLACE HORN BUTTON ASSEMBLY

3. CHECK DRIVER SIDE SQUIB CIRCUIT



(a) Disconnect the instrument panel wire from the airbag ECU assembly.

(b) Check for a short to B+ in the circuit.

(1) Connect the cable to the negative (-) battery terminal.

(2) Turn the ignition switch to ON.

(3) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
z7-2 (D+) - Body ground	Ignition switch ON	Below 1 V

z7-1 (D-) - Body ground	Ignition switch ON	Below 1 V
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(4) Turn the ignition switch off.

(5) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check for an open in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
z7-2 (D+) - z7-1 (D-)	Always	Below 1 Ω

(d) Check for a short to ground in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
z7-2 (D+) - Body ground	Always	1 MΩ or higher
z7-1 (D-) - Body ground	Always	1 MΩ or higher

(e) Check for a short in the circuit.

(1) Release the activation prevention mechanism built into connector B  .

(2) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
z7-2 (D+) - z7-1 (D-)	Always	1 MΩ or higher

(3) Restore the released activation prevention mechanism of connector B to the original condition.

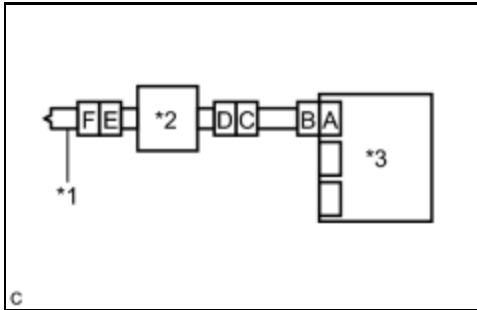
Text in Illustration

*1	Horn Button Assembly
*2	Spiral Cable Sub-assembly
*3	Airbag ECU Assembly
*a	Front view of wire harness connector (to Horn Button Assembly)
*b	Color: Orange

OK



4. CHECK DTC



(a) Connect the connectors to the horn button assembly and airbag ECU assembly.

(b) Connect the cable to the negative (-) battery terminal.

(c) Clear the DTCs stored in memory **INFO** .

(d) Turn the ignition switch off.

(e) Turn the ignition switch to ON, and wait for at least 60 seconds.

(f) Check for DTCs **INFO** .

OK:

DTC B1800, B1801, B1802 or B1803 is not output.

HINT:

Codes other than DTCs B1800, B1801, B1802 and B1803 may be output at this time, but they are not related to this check.

Text in Illustration

*1	Horn Button Assembly
*2	Spiral Cable Sub-assembly
*3	Airbag ECU Assembly

NG ► REPLACE AIRBAG ECU ASSEMBLY

OK ► USE SIMULATION METHOD TO CHECK

5. CHECK INSTRUMENT PANEL WIRE

- (a) Disconnect the instrument panel wire from the spiral cable sub-assembly.
- (b) Check for a short to B+ in the circuit.
 - (1) Connect the cable to the negative (-) battery terminal.
 - (2) Turn the ignition switch to ON.
 - (3) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D52-1 (D-) - Body ground	Ignition switch ON	Below 1 V
D52-2 (D+) - Body ground	Ignition switch ON	Below 1 V

- (4) Turn the ignition switch off.
- (5) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Check for an open in the circuit.
 - (1) Measure the resistance according to the value(s) in the table below.

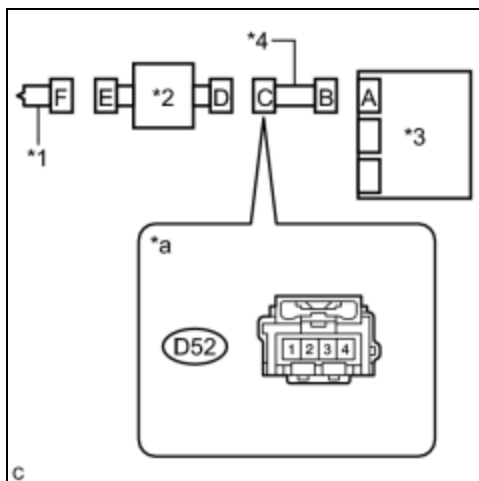
Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D52-1 (D-) - D52-2 (D+)	Always	Below 1 Ω

- (d) Check for a short to ground in the circuit.
 - (1) Measure the resistance according to the value(s) in the table below.


Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D52-1 (D-) - Body ground	Always	1 MΩ or higher
D52-2 (D+) - Body		



ground	Always	1 MΩ or higher
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(e) Check for a short in the circuit.

(1) Release the activation prevention mechanism built into connector B  .

(2) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D52-1 (D-) - D52-2 (D+)	Always	1 MΩ or higher

(3) Restore the released activation prevention mechanism of connector B to the original condition.

Text in Illustration

*1	Horn Button Assembly
*2	Spiral Cable Sub-assembly
*3	Airbag ECU Assembly
*4	Instrument Panel Wire
*a	Front view of wire harness connector (to Spiral Cable Sub-assembly)

NG  **REPLACE INSTRUMENT PANEL WIRE**

OK



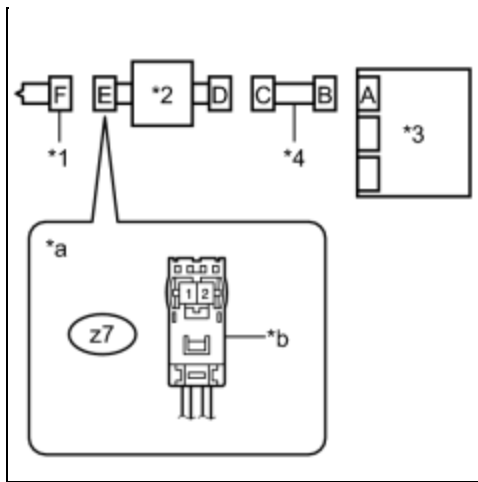
6.	CHECK SPIRAL CABLE SUB-ASSEMBLY
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(a) Check for a short to B+ in the circuit.

(1) Connect the cable to the negative (-) battery terminal.

(2) Turn the ignition switch to ON.

(3) Measure the voltage according to the value(s) in



the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
z7-2 (D+) - Body ground	Ignition switch ON	Below 1 V
z7-1 (D-) - Body ground	Ignition switch ON	Below 1 V

(4) Turn the ignition switch off.

(5) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(b) Check for an open in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
z7-2 (D+) - z7-1 (D-)	Always	Below 1 Ω

(c) Check for a short to ground in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
z7-2 (D+) - Body ground	Always	1 MΩ or higher
z7-1 (D-) - Body ground	Always	1 MΩ or higher

(d) Check for a short in the circuit.

(1) Release the activation prevention mechanism built into connector D INFO.

(2) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
z7-2 (D+) - z7-1 (D-)	Always	1 MΩ or higher

(3) Restore the released activation prevention mechanism of connector D to the original condition.

Text in Illustration

*1	Horn Button Assembly
*2	Spiral Cable Sub-assembly
*3	Airbag ECU Assembly
*4	Instrument Panel Wire
*a	Front view of wire harness connector (to Horn Button Assembly)
*b	Color: Orange

NG ► REPLACE SPIRAL CABLE SUB-ASSEMBLY

OK ► USE SIMULATION METHOD TO CHECK



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XFJOINX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1805-B1808: Short in P Squib Circuit (2013 FR-S)		

DTC	B1805	Short in P Squib Circuit
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DTC	B1806	Open in P Squib Circuit
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DTC	B1807	Short in P Squib Circuit (to Ground)
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DTC	B1808	Short in P Squib Circuit (to +B)
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DESCRIPTION

The front passenger side squib circuit consists of the airbag ECU assembly and instrument panel passenger airbag assembly.

The airbag ECU assembly uses this circuit to deploy the airbag when deployment conditions are met.

These DTCs are stored when a malfunction is detected in the front passenger side squib circuit.

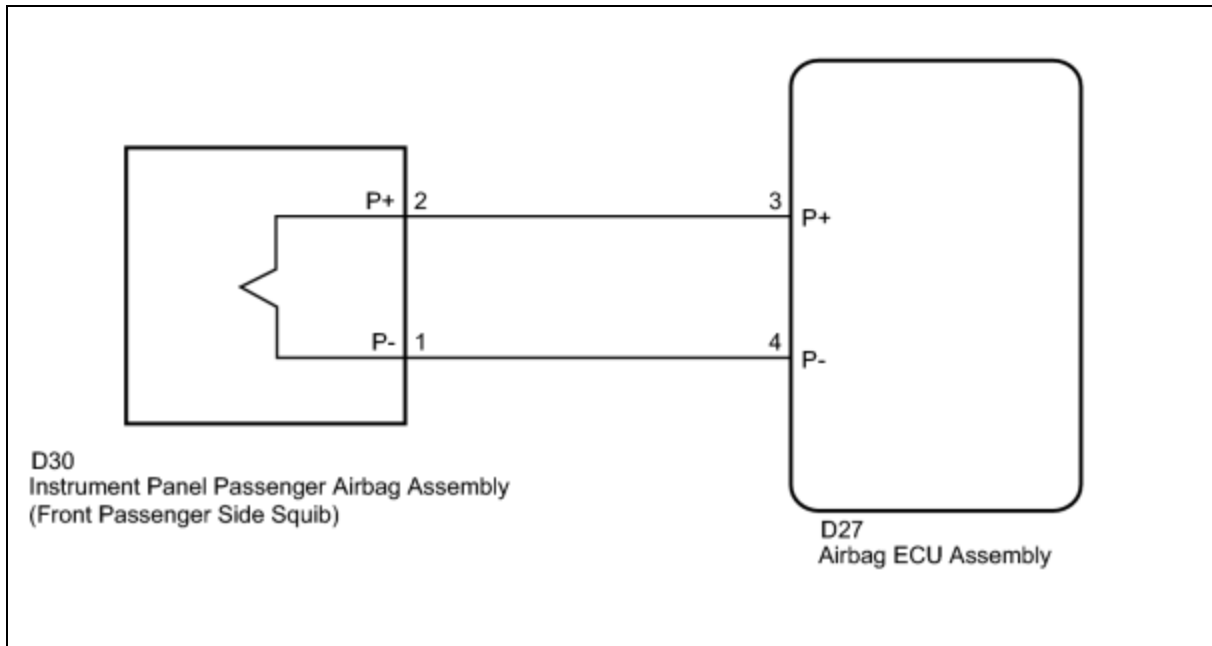
DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1805	<ul style="list-style-type: none"> The airbag ECU assembly receives a line short circuit signal in the front passenger side squib circuit during primary check. Front passenger side squib malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Instrument panel wire Instrument panel passenger airbag assembly (Front passenger side squib) Airbag ECU assembly
B1806	<ul style="list-style-type: none"> The airbag ECU assembly receives an open circuit signal in the front passenger side squib circuit. Front passenger side squib malfunction Airbag ECU assembly malfunction 	
B1807	<ul style="list-style-type: none"> The airbag ECU assembly receives a short circuit to ground signal in the front passenger side squib circuit. Front passenger side squib malfunction Airbag ECU assembly malfunction 	
	<ul style="list-style-type: none"> The airbag ECU assembly receives a short circuit to B+ signal in the front passenger 	

B1808

side squib circuit.

- Front passenger side squib malfunction
- Airbag ECU assembly malfunction

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.

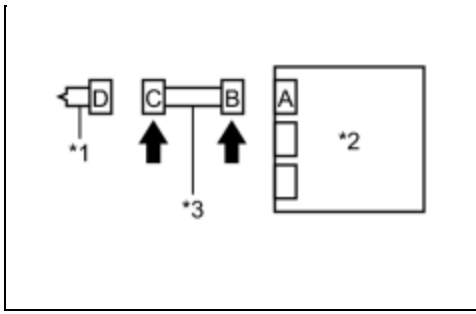
HINT:

- Perform the simulation method by selecting check mode (Signal Check) using the Techstream **INFO**.
- After selecting check mode (Signal Check), perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city road or rough road **INFO**.

PROCEDURE

1. CHECK CONNECTORS

(a) Turn the ignition switch off.



(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check that the connectors are properly connected to the instrument panel passenger airbag assembly and airbag ECU assembly.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

(d) Disconnect the connectors from the instrument panel passenger airbag assembly and airbag ECU assembly.

(e) Check that the terminals of the connectors are not damaged.

OK:

The terminals are not deformed or damaged.

(f) Check that the short spring for the instrument panel wire with the activation prevention mechanism is not deformed or damaged.

OK:

The short spring is not deformed or damaged.

Text in Illustration

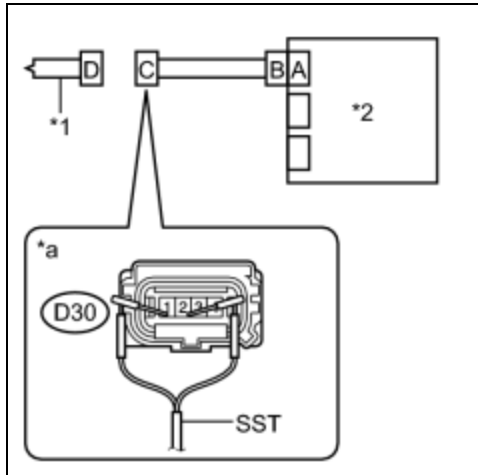
*1	Instrument Panel Passenger Airbag Assembly
*2	Airbag ECU Assembly
*3	Instrument Panel Wire

NG  **REPLACE INSTRUMENT PANEL WIRE**

OK



2.	CHECK INSTRUMENT PANEL PASSENGER AIRBAG ASSEMBLY (FRONT
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(a) Connect the connector to the airbag ECU assembly.

(b) Connect SST (resistance 2.1 Ω) to connector C.

CAUTION:

Never connect the tester to the instrument panel passenger airbag assembly (front passenger side squib) for measurement, as this may lead to a serious injury due to airbag deployment.

NOTICE:

- Do not forcibly insert SST into the terminals of the connector when connecting it.
- Insert SST straight into the terminals of the connector.

SST: 09843-18061

(c) Connect the cable to the negative (-) battery terminal.

(d) Clear the DTCs stored in memory **INFO** .

(e) Turn the ignition switch off.

(f) Turn the ignition switch to ON, and wait for at least 60 seconds.

(g) Check for DTCs **INFO** .

OK:

DTC B1805, B1806, B1807 or B1808 is not output.

HINT:

Codes other than DTCs B1805, B1806, B1807 and B1808 may be output at this time, but they are not related to this check.

(h) Turn the ignition switch off.

(i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(j) Disconnect SST from connector C.

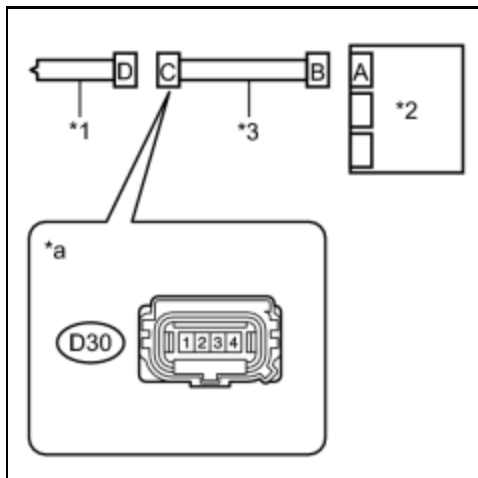
Text in Illustration

*1	Instrument Panel Passenger Airbag Assembly
*2	Airbag ECU Assembly
*a	Front view of wire harness connector (to Instrument Panel Passenger Airbag Assembly)

NG ► CHECK INSTRUMENT PANEL WIRE

OK ► REPLACE INSTRUMENT PANEL PASSENGER AIRBAG ASSEMBLY

3.	CHECK INSTRUMENT PANEL WIRE
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(a) Disconnect the instrument panel wire from the airbag ECU assembly.

(b) Check for a short to B+ in the circuit.

(1) Connect the cable to the negative (-) battery terminal.

(2) Turn the ignition switch to ON.

(3) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D30-2 (P+) - Body ground	Ignition switch ON	Below 1 V
D30-1 (P-) - Body ground	Ignition switch ON	Below 1 V

(4) Turn the ignition switch off.

(5) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check for an open in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D30-2 (P+) - D30-1 (P-)	Always	Below 1 Ω

(d) Check for a short to ground in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D30-2 (P+) - Body ground	Always	1 M Ω or higher
D30-1 (P-) - Body ground	Always	1 M Ω or higher

(e) Check for a short in the circuit.

(1) Release the activation prevention mechanism built into connector B  .

(2) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D30-2 (P+) - D30-1 (P-)	Always	1 M Ω or higher

(3) Restore the released activation prevention mechanism of connector B to the original condition.

Text in Illustration

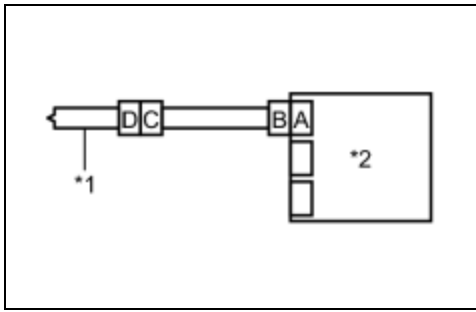
*1	Instrument Panel Passenger Airbag Assembly
*2	Airbag ECU Assembly
*3	Instrument Panel Wire
*a	Front view of wire harness connector (to Instrument Panel Passenger Airbag Assembly)

NG  **REPLACE INSTRUMENT PANEL WIRE**

OK



4.	CHECK DTC
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(a) Connect the connectors to the instrument panel passenger airbag assembly and airbag ECU assembly.

(b) Connect the cable to the negative (-) battery terminal.

(c) Clear the DTCs stored in memory **INFO** .

(d) Turn the ignition switch off.

(e) Turn the ignition switch to ON, and wait for at least 60 seconds.

(f) Check for DTCs **INFO** .

OK:

DTC B1805, B1806, B1807 or B1808 is not output.

HINT:

Codes other than DTCs B1805, B1806, B1807 and B1808 may be output at this time, but they are not related to this check.

Text in Illustration

*1	Instrument Panel Passenger Airbag Assembly
*2	Airbag ECU Assembly

NG ► REPLACE AIRBAG ECU ASSEMBLY

OK ► USE SIMULATION METHOD TO CHECK

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XF10HXX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1810-B1813: Short in D Squib (Dual Stage - 2nd Step) Circuit (2013 FR-S)		

DTC	B1810	Short in D Squib (Dual Stage - 2nd Step) Circuit
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DTC	B1811	Open in D Squib (Dual Stage - 2nd Step) Circuit
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DTC	B1812	Short in D Squib (Dual Stage - 2nd Step) Circuit (to Ground)
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DTC	B1813	Short in D Squib (Dual Stage - 2nd Step) Circuit (to +B)
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DESCRIPTION

The driver side squib 2nd step circuit consists of the airbag ECU assembly, spiral cable sub-assembly and horn button assembly.

The airbag ECU assembly uses this circuit to deploy the airbag when deployment conditions are met.

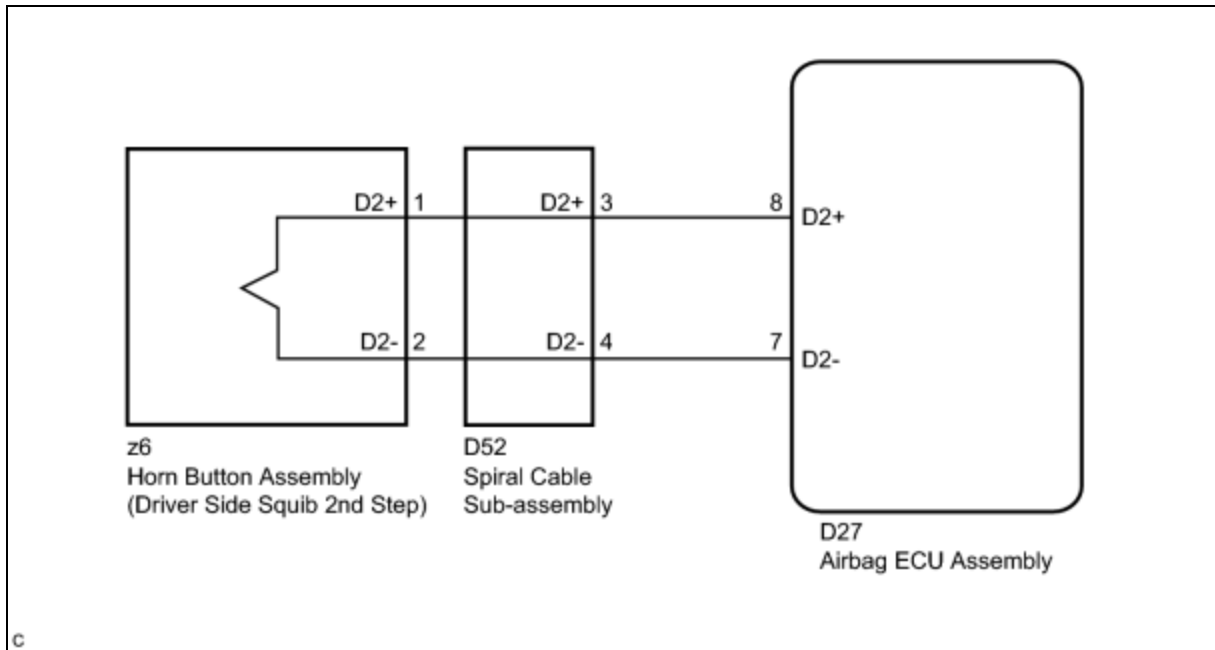
These DTCs are stored when a malfunction is detected in the driver side squib 2nd step circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1810	<ul style="list-style-type: none"> The airbag ECU assembly receives a line short circuit signal in the driver side squib 2nd step circuit during primary check. Spiral cable sub-assembly malfunction Driver side squib 2nd step malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Instrument panel wire Spiral cable sub-assembly Horn button assembly (Driver side squib 2nd step) Airbag ECU assembly
B1811	<ul style="list-style-type: none"> The airbag ECU assembly receives an open circuit signal in the driver side squib 2nd step circuit. Spiral cable sub-assembly malfunction Driver side squib 2nd step malfunction Airbag ECU assembly malfunction 	
B1812	<ul style="list-style-type: none"> The airbag ECU assembly receives a short circuit to ground signal in the driver side squib 2nd step circuit. Spiral cable sub-assembly malfunction Driver side squib 2nd step malfunction Airbag ECU assembly malfunction 	

B1813

- The airbag ECU assembly receives a short circuit to B+ signal in the driver side squib 2nd step circuit.
- Spiral cable sub-assembly malfunction
- Driver side squib 2nd step malfunction
- Airbag ECU assembly malfunction

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.

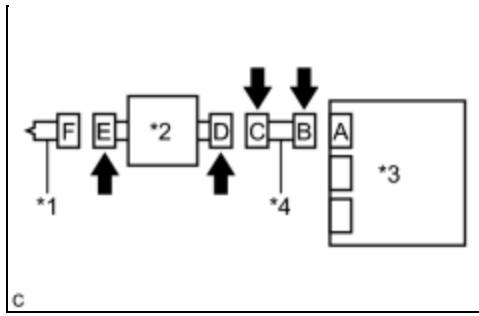
HINT:

- Perform the simulation method by selecting check mode (Signal Check) using the Techstream **INFO**.
- After selecting check mode (Signal Check), perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city road or rough road **INFO**.

PROCEDURE

1. CHECK CONNECTORS

(a) Turn the ignition switch off.



(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check that the connectors are properly connected to the horn button assembly, spiral cable sub-assembly and airbag ECU assembly.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

(d) Disconnect the connectors from the horn button assembly, spiral cable sub-assembly and airbag ECU assembly.

(e) Check that the terminals of the connectors are not damaged.

OK:

The terminals are not deformed or damaged.

(f) Check that the spiral cable sub-assembly connector (on the horn button assembly side) is not damaged.

OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

(g) Check that the short springs for the instrument panel wire and spiral cable sub-assembly with the activation prevention mechanism are not deformed or damaged.

OK:

The short springs are not deformed or damaged.

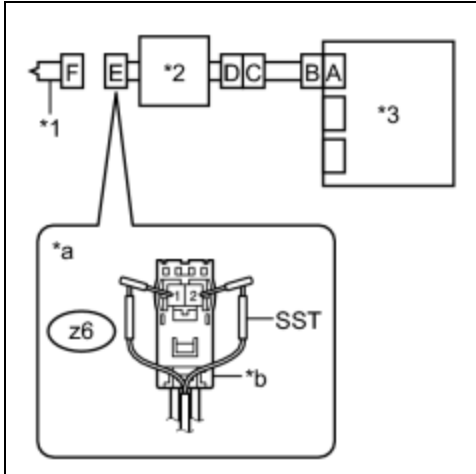
Text in Illustration

*1	Horn Button Assembly
*2	Spiral Cable Sub-assembly
*3	Airbag ECU Assembly
*4	Instrument Panel Wire

OK



2. CHECK HORN BUTTON ASSEMBLY (DRIVER SIDE SQUIB 2ND STEP)



(a) Connect the instrument panel wire to the airbag ECU assembly and spiral cable sub-assembly.

(b) Connect SST (resistance 2.1 Ω) to connector E (black connector).

CAUTION:

Never connect the tester to the horn button assembly (driver side squib 2nd step) for measurement, as this may lead to a serious injury due to airbag deployment.

NOTICE:

- Do not forcibly insert SST into the terminals of the connector when connecting it.
- Insert SST straight into the terminals of the connector.

SST: 09843-18061

(c) Connect the cable to the negative (-) battery terminal.

(d) Clear the DTCs stored in memory  .

(e) Turn the ignition switch off.

(f) Turn the ignition switch to ON, and wait for at least 60 seconds.

(g) Check for DTCs  .

OK:

DTC B1810, B1811, B1812 or B1813 is not output.

HINT:

Codes other than DTCs B1810, B1811, B1812 and B1813 may be output at this time, but they are not related to this check.

(h) Turn the ignition switch off.

(i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(j) Disconnect SST from connector E.

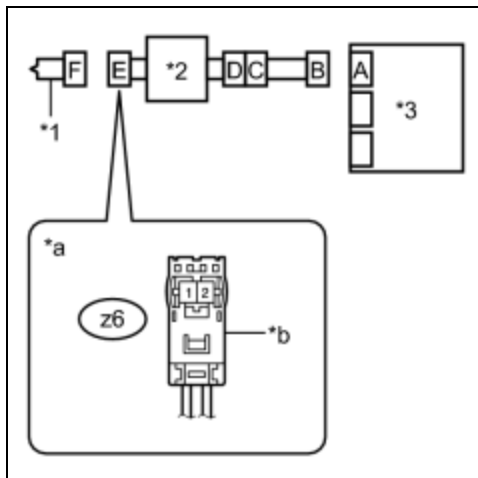
Text in Illustration

*1	Horn Button Assembly
*2	Spiral Cable Sub-assembly
*3	Airbag ECU Assembly
*a	Front view of wire harness connector (to Horn Button Assembly)
*b	Color: Black

NG ► CHECK DRIVER SIDE SQUIB 2ND STEP CIRCUIT

OK ► REPLACE HORN BUTTON ASSEMBLY

3. CHECK DRIVER SIDE SQUIB 2ND STEP CIRCUIT



(a) Disconnect the instrument panel wire from the airbag ECU assembly.

(b) Check for a short to B+ in the circuit.

(1) Connect the cable to the negative (-) battery terminal.

(2) Turn the ignition switch to ON.

(3) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
z6-1 (D2+) - Body ground	Ignition switch ON	Below 1 V

z6-2 (D2-) - Body ground	Ignition switch ON	Below 1 V
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(4) Turn the ignition switch off.

(5) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check for an open in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
z6-1 (D2+) - z6-2 (D2-)	Always	Below 1 Ω

(d) Check for a short to ground in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
z6-1 (D2+) - Body ground	Always	1 M Ω or higher
z6-2 (D2-) - Body ground	Always	1 M Ω or higher

(e) Check for a short in the circuit.

(1) Release the activation prevention mechanism built into connector B  .

(2) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
z6-1 (D2+) - z6-2 (D2-)	Always	1 M Ω or higher

(3) Restore the released activation prevention mechanism of connector B to the original condition.

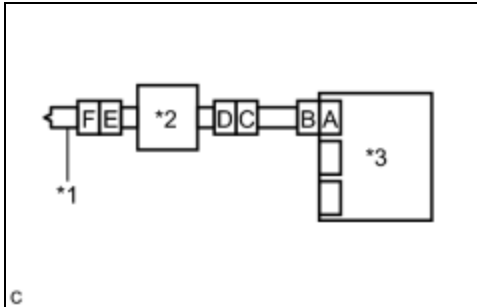
Text in Illustration

*1	Horn Button Assembly
*2	Spiral Cable Sub-assembly
*3	Airbag ECU Assembly
*a	Front view of wire harness connector (to Horn Button Assembly)
*b	Color: Black

OK



4. CHECK DTC



(a) Connect the connectors to the horn button assembly and airbag ECU assembly.

(b) Connect the cable to the negative (-) battery terminal.

(c) Clear the DTCs stored in memory **INFO** .

(d) Turn the ignition switch off.

(e) Turn the ignition switch to ON, and wait for at least 60 seconds.

(f) Check for DTCs **INFO** .

OK:

DTC B1810, B1811, B1812 or B1813 is not output.

HINT:

Codes other than DTCs B1810, B1811, B1812 and B1813 may be output at this time, but they are not related to this check.

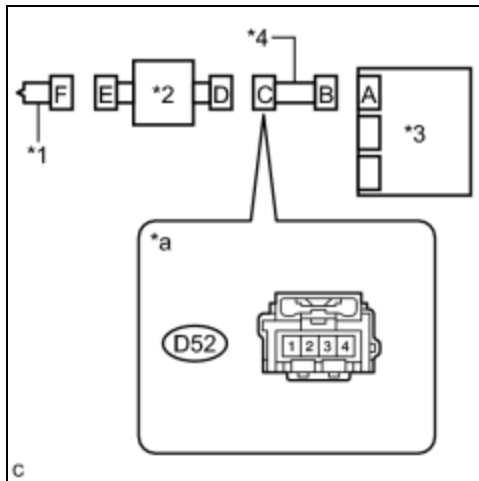
Text in Illustration

*1	Horn Button Assembly
*2	Spiral Cable Sub-assembly
*3	Airbag ECU Assembly

NG ► REPLACE AIRBAG ECU ASSEMBLY

OK ► USE SIMULATION METHOD TO CHECK

5. CHECK INSTRUMENT PANEL WIRE



(a) Disconnect the instrument panel wire from spiral cable sub-assembly.

(b) Check for a short to B+ in the circuit.

(1) Connect the cable to the negative (-) battery terminal.

(2) Turn the ignition switch to ON.

(3) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D52-3 (D2+) - Body ground	Ignition switch ON	Below 1 V
D52-4 (D2-) - Body ground	Ignition switch ON	Below 1 V

(4) Turn the ignition switch off.

(5) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check for an open in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D52-3 (D2+) - D52-4 (D2-)	Always	Below 1 Ω

(d) Check for a short to ground in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D52-3 (D2+) - Body ground	Always	1 M Ω or higher

D52-4 (D2-) - Body ground	Always	1 MΩ or higher
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(e) Check for a short in the circuit.

(1) Release the activation prevention mechanism built into connector B  .

(2) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D52-3 (D2+) - D52-4 (D2-)	Always	1 MΩ or higher

(3) Restore the released activation prevention mechanism of connector B to the original condition.

Text in Illustration

*1	Horn Button Assembly
*2	Spiral Cable Sub-assembly
*3	Airbag ECU Assembly
*4	Instrument Panel Wire
*a	Front view of wire harness connector (to Spiral Cable Sub-assembly)

NG  **REPLACE INSTRUMENT PANEL WIRE**

OK



6.	CHECK SPIRAL CABLE SUB-ASSEMBLY
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(a) Check for a short to B+ in the circuit.

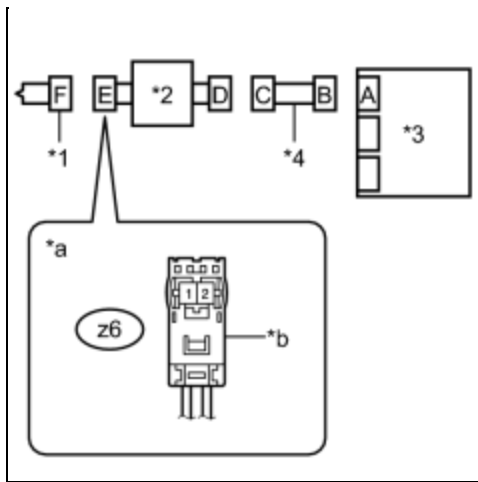
(1) Connect the cable to the negative (-) battery terminal.

(2) Turn the ignition switch to ON.

(3) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION



z6-1 (D2+) - Body ground	Ignition switch ON	Below 1 V
z6-2 (D2-) - Body ground	Ignition switch ON	Below 1 V

(4) Turn the ignition switch off.

(5) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(b) Check for an open in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
z6-1 (D2+) - z6-2 (D2-)	Always	Below 1 Ω

(c) Check for a short to ground in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
z6-1 (D2+) - Body ground	Always	1 MΩ or higher
z6-2 (D2-) - Body ground	Always	1 MΩ or higher

(d) Check for a short in the circuit.

(1) Release the activation prevention mechanism built into connector D INFO.

(2) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
z6-1 (D2+) - z6-2 (D2-)	Always	1 MΩ or higher

(3) Restore the released activation prevention mechanism of connector D to the original condition.

Text in Illustration

*1	Horn Button Assembly
*2	Spiral Cable Sub-assembly
*3	Airbag ECU Assembly
*4	Instrument Panel Wire
*a	Front view of wire harness connector (to Horn Button Assembly)
*b	Color: Black

NG ► REPLACE SPIRAL CABLE SUB-ASSEMBLY

OK ► USE SIMULATION METHOD TO CHECK



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XFJ0IOX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1815-B1818: Short in P Squib (Dual Stage - 2nd Step) Circuit (2013 FR-S)		

DTC	B1815	Short in P Squib (Dual Stage - 2nd Step) Circuit
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DTC	B1816	Open in P Squib (Dual Stage - 2nd Step) Circuit
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DTC	B1817	Short in P Squib (Dual Stage - 2nd Step) Circuit (to Ground)
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DTC	B1818	Short in P Squib (Dual Stage - 2nd Step) Circuit (to +B)
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DESCRIPTION

The front passenger side squib 2nd step circuit consists of the airbag ECU assembly and instrument panel passenger airbag assembly.

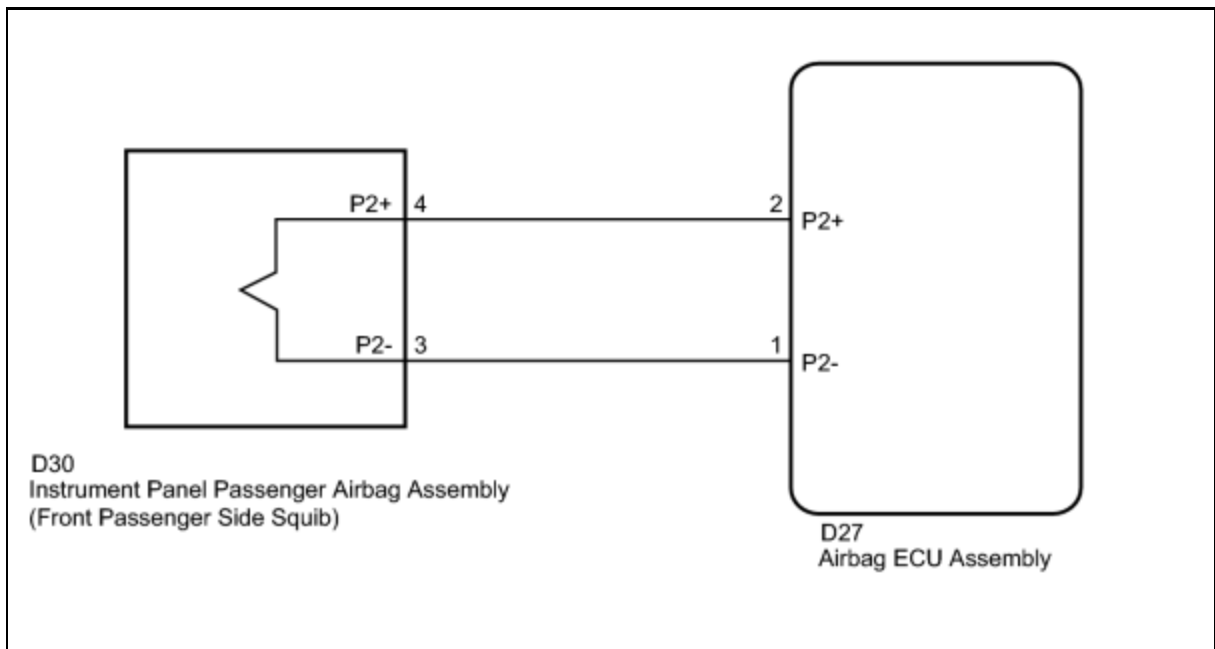
The airbag ECU assembly uses this circuit to deploy the airbag when deployment conditions are met.

These DTCs are stored when a malfunction is detected in the front passenger side squib 2nd step circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1815	<ul style="list-style-type: none"> The airbag ECU assembly receives a line short circuit signal in the front passenger side squib 2nd step circuit during primary check. Front passenger side squib 2nd step malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Instrument panel wire Instrument panel passenger airbag assembly (Front passenger side squib 2nd step) Airbag ECU assembly
B1816	<ul style="list-style-type: none"> The airbag ECU assembly receives an open circuit signal in the front passenger side squib 2nd step circuit. Front passenger side squib 2nd step malfunction Airbag ECU assembly malfunction 	
B1817	<ul style="list-style-type: none"> The airbag ECU assembly receives a short circuit to ground signal in the front passenger side squib 2nd step circuit. Front passenger side squib 2nd step 	

	malfunction <ul style="list-style-type: none"> • Airbag ECU assembly malfunction 	
B1818	<ul style="list-style-type: none"> • The airbag ECU assembly receives a short circuit to B+ signal in the front passenger side squib 2nd step circuit. • Front passenger side squib 2nd step malfunction • Airbag ECU assembly malfunction 	

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.

HINT:

- Perform the simulation method by selecting check mode (Signal Check) using the Techstream **INFO**.
- After selecting check mode (Signal Check), perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city road or rough road **INFO**.

PROCEDURE

1.	CHECK CONNECTORS
-----------	-------------------------

(a) Turn the ignition switch off.

- (b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

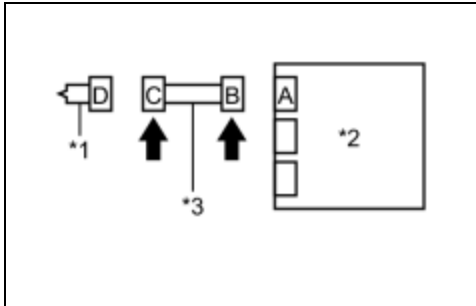
- (c) Check that the connectors are properly connected to the instrument panel passenger airbag assembly and airbag ECU assembly.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.



- (d) Disconnect the connectors from the instrument panel passenger airbag assembly and airbag ECU assembly.

- (e) Check that the terminals of the connectors are not damaged.

OK:

The terminals are not deformed or damaged.

- (f) Check that the short spring for the instrument panel wire with the activation prevention mechanism is not deformed or damaged.

OK:

The short spring is not deformed or damaged.

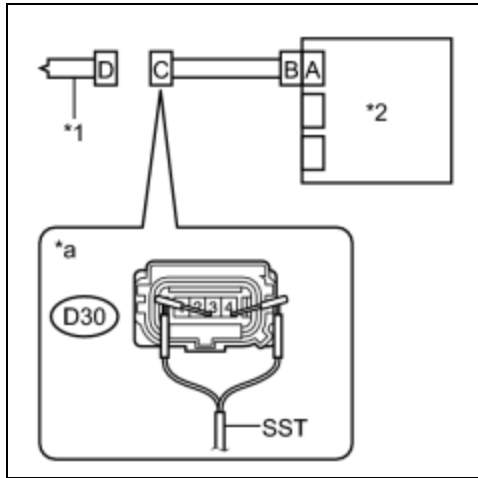
Text in Illustration

*1	Instrument Panel Passenger Airbag Assembly
*2	Airbag ECU Assembly
*3	Instrument Panel Wire

NG ▶ REPLACE INSTRUMENT PANEL WIRE

OK
▼

2.	CHECK INSTRUMENT PANEL PASSENGER AIRBAG ASSEMBLY (FRONT PASSENGER SIDE SQUIB 2ND STEP)
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(a) Connect the connector to the airbag ECU assembly.

(b) Connect SST (resistance 2.1 Ω) to connector C.

CAUTION:

Never connect the tester to the instrument panel passenger airbag assembly (front passenger side squib 2nd step) for measurement, as this may lead to a serious injury due to airbag deployment.

NOTICE:

- Do not forcibly insert SST into the terminals of the connector when connecting it.
- Insert SST straight into the terminals of the connector.

SST: 09843-18061

(c) Connect the cable to the negative (-) battery terminal.

(d) Clear the DTCs stored in memory **INFO** .

(e) Turn the ignition switch off.

(f) Turn the ignition switch to ON, and wait for at least 60 seconds.

(g) Check for DTCs **INFO** .

OK:

DTC B1815, B1816, B1817 or B1818 is not output.

HINT:

Codes other than DTCs B1815, B1816, B1817 and B1818 may be output at this time, but they are not related to this check.

(h) Turn the ignition switch off.

(i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(j) Disconnect SST from connector C.

Text in Illustration

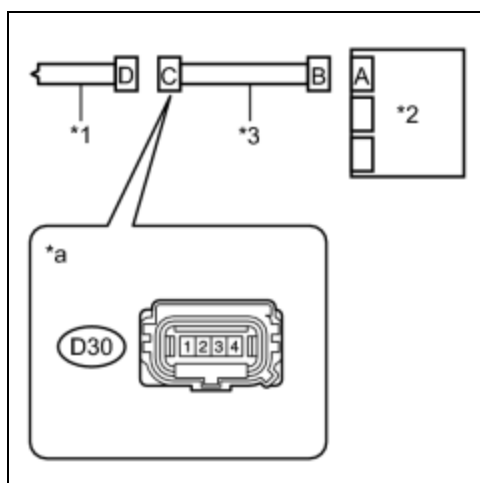
*1	Instrument Panel Passenger Airbag Assembly
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*2	Airbag ECU Assembly
*a	Front view of wire harness connector (to Instrument Panel Passenger Airbag Assembly)

NG ► CHECK FRONT PASSENGER SIDE SQUIB 2ND STEP CIRCUIT

OK ► REPLACE INSTRUMENT PANEL PASSENGER AIRBAG ASSEMBLY

3. CHECK FRONT PASSENGER SIDE SQUIB 2ND STEP CIRCUIT



(a) Disconnect the instrument panel wire from the airbag ECU assembly.

(b) Check for a short to B+ in the circuit.

(1) Connect the cable to the negative (-) battery terminal.

(2) Turn the ignition switch to ON.

(3) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D30-4 (P2+) - Body ground	Ignition switch ON	Below 1 V
D30-3 (P2-) - Body ground	Ignition switch ON	Below 1 V

(4) Turn the ignition switch off.

(5) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check for an open in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D30-4 (P2+) - D30-3 (P2-)	Always	Below 1 Ω

(d) Check for a short to ground in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D30-4 (P2+) - Body ground	Always	1 MΩ or higher
D30-3 (P2-) - Body ground	Always	1 MΩ or higher

(e) Check for a short in the circuit.

(1) Release the activation prevention mechanism built into connector B  .

(2) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D30-4 (P2+) - D30-3 (P2-)	Always	1 MΩ or higher

(3) Restore the released activation prevention mechanism of connector B to the original condition.

Text in Illustration

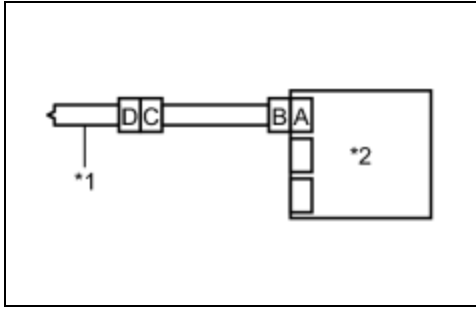
*1	Instrument Panel Passenger Airbag Assembly
*2	Airbag ECU Assembly
*3	Instrument Panel Wire
*a	Front view of wire harness connector (to Instrument Panel Passenger Airbag Assembly)

NG  **REPLACE INSTRUMENT PANEL WIRE**

OK



4.	CHECK DTC
-----------	------------------



(a) Connect the connectors to the instrument panel passenger airbag assembly and airbag ECU assembly.

(b) Connect the cable to the negative (-) battery terminal.

(c) Clear the DTCs stored in memory **INFO** .

(d) Turn the ignition switch off.

(e) Turn the ignition switch to ON, and wait for at least 60 seconds.

(f) Check for DTCs **INFO** .

OK:

DTC B1815, B1816, B1817 or B1818 is not output.

HINT:

Codes other than DTCs B1815, B1816, B1817 and B1818 may be output at this time, but they are not related to this check.

Text in Illustration

*1	Instrument Panel Passenger Airbag Assembly
*2	Airbag ECU Assembly

NG ► REPLACE AIRBAG ECU ASSEMBLY

OK ► USE SIMULATION METHOD TO CHECK

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001NZQ081X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1820-B1823: Short in Side Squib (RH) Circuit (2013 FR-S)		

DTC	B1820	Short in Side Squib (RH) Circuit
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DTC	B1821	Open in Side Squib (RH) Circuit
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DTC	B1822	Short in Side Squib (RH) Circuit (to Ground)
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DTC	B1823	Short in Side Squib (RH) Circuit (to +B)
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DESCRIPTION

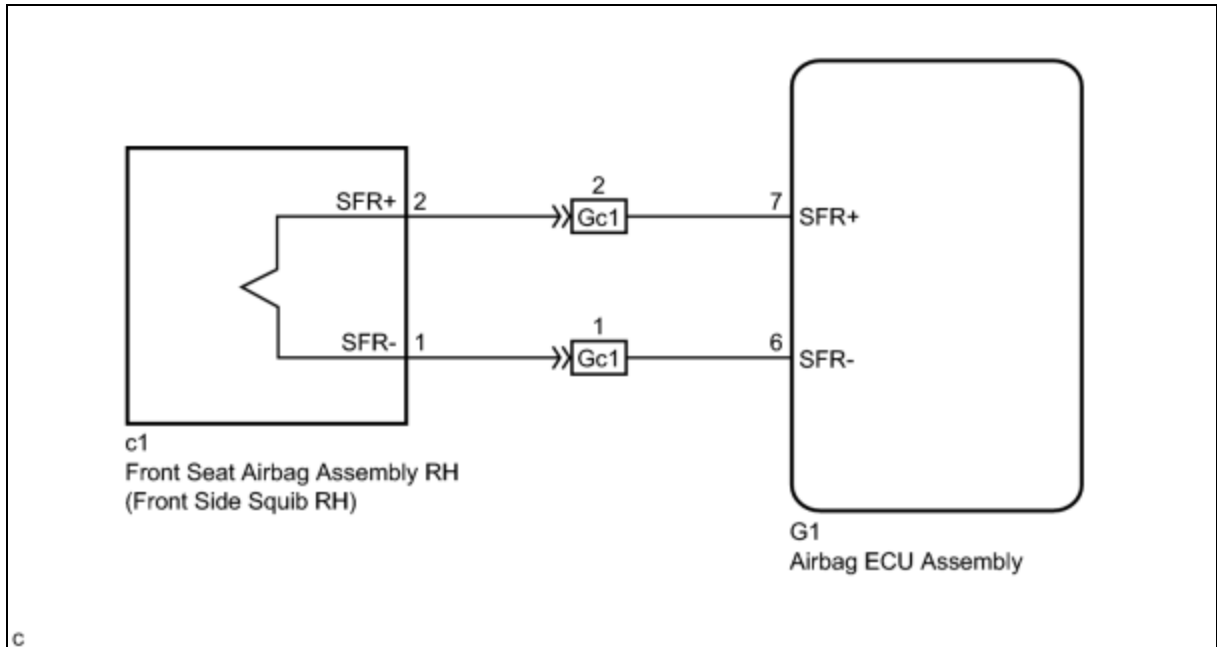
The front side squib RH circuit consists of the airbag ECU assembly and front seat airbag assembly RH.

The airbag ECU assembly uses this circuit to deploy the airbag when deployment conditions are met.

These DTCs are stored when a malfunction is detected in the front side squib RH circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1820	<ul style="list-style-type: none"> The airbag ECU assembly receives a line short circuit signal in the front side squib RH circuit during primary check. Front side squib RH malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> No. 2 floor wire Front seat assembly RH (Front seat wire RH) Front seat airbag assembly RH (Front side squib RH) Airbag ECU assembly
B1821	<ul style="list-style-type: none"> The airbag ECU assembly receives an open circuit signal in the front side squib RH circuit. Front side squib RH malfunction Airbag ECU assembly malfunction 	
B1822	<ul style="list-style-type: none"> The airbag ECU assembly receives a short circuit to ground signal in the front side squib RH circuit. Front side squib RH malfunction Airbag ECU assembly malfunction 	
B1823	<ul style="list-style-type: none"> The airbag ECU assembly receives a short circuit to B+ signal in the front side squib RH circuit. Front side squib RH malfunction Airbag ECU assembly malfunction 	

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

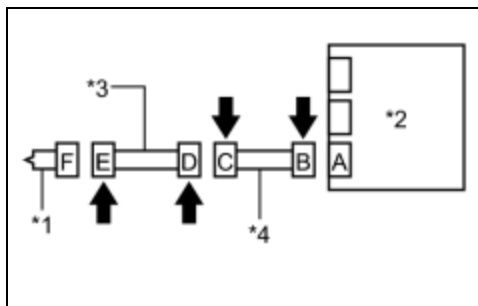
After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.

HINT:

- Perform the simulation method by selecting check mode (Signal Check) using the Techstream **INFO**.
- After selecting check mode (Signal Check), perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city road or rough road **INFO**.

PROCEDURE

1.	CHECK CONNECTORS
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(a) Turn the ignition switch off.

(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Check that the connectors are properly connected to the front seat airbag assembly RH and airbag ECU assembly. Also check that the connectors that link the No. 2 floor wire and front seat wire RH are properly connected.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

- (d) Disconnect the connectors from the front seat airbag assembly RH and airbag ECU assembly. Also disconnect the No. 2 floor wire from the front seat wire RH.

- (e) Check that the terminals of the connectors are not damaged.

OK:

The terminals are not deformed or damaged.

- (f) Check that the front seat wire RH connector (on the front seat airbag assembly RH side) is not damaged.

OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

- (g) Check that the short springs for the No. 2 floor wire and the front seat wire RH with the activation prevention mechanism are not deformed or damaged.

OK:

The short springs are not deformed or damaged.

Text in Illustration

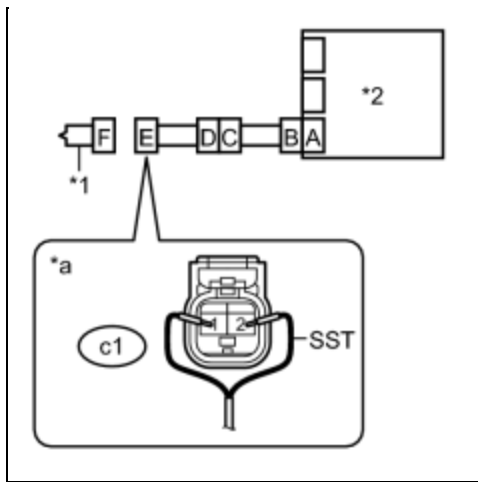
*1	Front Seat Airbag Assembly RH
*2	Airbag ECU Assembly
*3	Front Seat Wire RH
*4	No. 2 Floor Wire

NG  **REPLACE WIRE HARNESS**

OK



2.	CHECK FRONT SEAT AIRBAG ASSEMBLY RH (FRONT SIDE SQUIB RH)
-----------	--



(a) Connect the No. 2 floor wire to the front seat wire RH and airbag ECU assembly.

(b) Connect SST (resistance 2.1 Ω) to connector E.

CAUTION:

Never connect the tester to the front seat airbag assembly RH (front side squib RH) for measurement, as this may lead to a serious injury due to airbag deployment.

NOTICE:

- Do not forcibly insert SST into the terminals of the connector when connecting it.
- Insert SST straight into the terminals of the connector.

SST: 09843-18061

(c) Connect the cable to the negative (-) battery terminal.

(d) Clear the DTCs stored in memory **INFO** .

(e) Turn the ignition switch off.

(f) Turn the ignition switch to ON, and wait for at least 60 seconds.

(g) Check for DTCs **INFO** .

OK:

DTC B1820, B1821, B1822 or B1823 is not output.

HINT:

Codes other than DTCs B1820, B1821, B1822 and B1823 may be output at this time, but they are not related to this check.

(h) Turn the ignition switch off.

(i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(j) Disconnect SST from connector E.

Text in Illustration

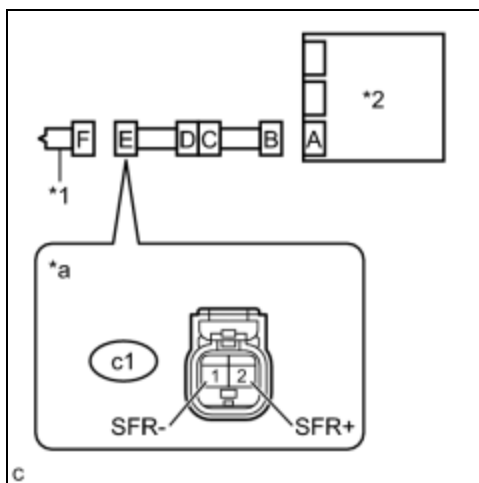
*1	Front Seat Airbag Assembly RH
*2	Airbag ECU Assembly

*a	Front view of wire harness connector (to Front Seat Airbag Assembly RH)
----	--

NG ► CHECK FRONT SIDE SQUIB RH CIRCUIT

OK ► REPLACE FRONT SEAT AIRBAG ASSEMBLY
RH

3. CHECK FRONT SIDE SQUIB RH CIRCUIT



(a) Disconnect the No. 2 floor wire from the airbag ECU assembly.

(b) Check for a short to B+ in the circuit.

(1) Connect the cable to the negative (-) battery terminal.

(2) Turn the ignition switch to ON.

(3) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
c1-1 (SFR-) - Body ground	Ignition switch ON	Below 1 V
c1-2 (SFR+) - Body ground	Ignition switch ON	Below 1 V

(4) Turn the ignition switch off.

(5) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check for an open in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
c1-1 (SFR-) - c1-2 (SFR+)	Always	Below 1 Ω

(d) Check for a short to ground in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
c1-1 (SFR-) - Body ground	Always	1 M Ω or higher
c1-2 (SFR+) - Body ground	Always	1 M Ω or higher

(e) Check for a short in the circuit.

(1) Release the activation prevention mechanism built into connector B  .

(2) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
c1-1 (SFR-) - c1-2 (SFR+)	Always	1 M Ω or higher

(3) Restore the released activation prevention mechanism of connector B to the original condition.

Text in Illustration

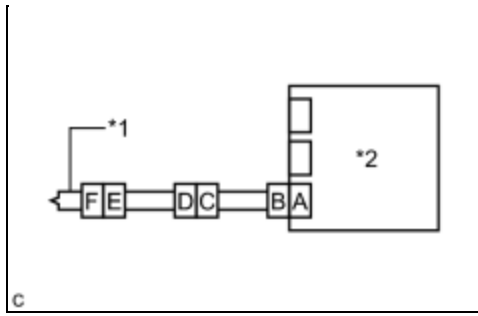
*1	Front Seat Airbag Assembly RH
*2	Airbag ECU Assembly
*a	Front view of wire harness connector (to Front Seat Airbag Assembly RH)

NG  **CHECK NO. 2 FLOOR WIRE**

OK



4.	CHECK DTC
-----------	------------------



(a) Connect the connectors to the front seat airbag assembly RH and airbag ECU assembly.

(b) Connect the cable to the negative (-) battery terminal.

(c) Clear the DTCs stored in memory **INFO** .

(d) Turn the ignition switch off.

(e) Turn the ignition switch to ON, and wait for at least 60 seconds.

(f) Check for DTCs **INFO** .

OK:

DTC B1820, B1821, B1822 or B1823 is not output.

HINT:

Codes other than DTCs B1820, B1821, B1822 and B1823 may be output at this time, but they are not related to this check.

Text in Illustration

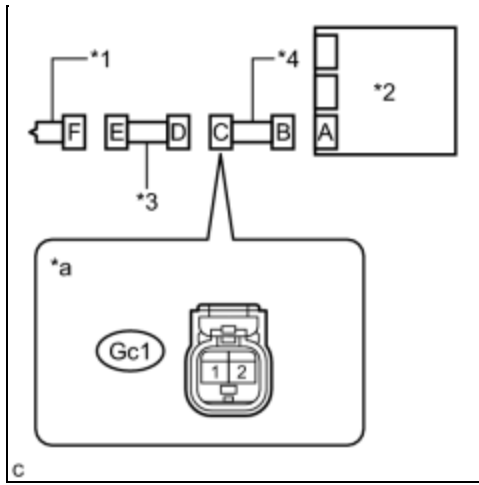
*1	Front Seat Airbag Assembly RH
*2	Airbag ECU Assembly

NG ► REPLACE AIRBAG ECU ASSEMBLY

OK ► USE SIMULATION METHOD TO CHECK

5.	CHECK NO. 2 FLOOR WIRE
-----------	-------------------------------

(a) Disconnect the front seat wire RH from the No. 2 floor wire.



(b) Check for a short to B+ in the circuit.

- (1) Connect the cable to the negative (-) battery terminal.
- (2) Turn the ignition switch to ON.
- (3) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Gc1-1 - Body ground	Ignition switch ON	Below 1 V
Gc1-2 - Body ground	Ignition switch ON	Below 1 V

- (4) Turn the ignition switch off.
- (5) Disconnect the cable from the negative (-) battery terminal.

NOTICE:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check for an open in the circuit.

- (1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Gc1-1 - Gc1-2	Always	Below 1 Ω

(d) Check for a short to ground in the circuit.

- (1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Gc1-1 - Body ground	Always	1 M Ω or higher
Gc1-2 - Body ground	Always	1 M Ω or higher

(e) Check for a short in the circuit.

(1) Release the activation prevention mechanism built into connector B INFO.

(2) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Gc1-1 - Gc1-2	Always	1 MΩ or higher

(3) Restore the released activation prevention mechanism of connector B to the original condition.

Text in Illustration

*1	Front Seat Airbag Assembly RH
*2	Airbag ECU Assembly
*3	Front Seat Wire RH
*4	No. 2 Floor Wire
*a	Front view of wire harness connector (to Front Seat Wire RH)

NG  **REPLACE NO. 2 FLOOR WIRE**

OK



6.	CHECK FRONT SEAT WIRE RH
-----------	---------------------------------

(a) Check for a short to B+ in the circuit.

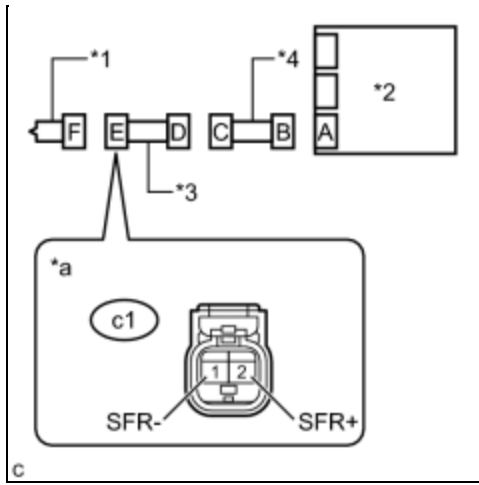
(1) Connect the cable to the negative (-) battery terminal.

(2) Turn the ignition switch to ON.

(3) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
c1-1 (SFR-) - Body ground	Ignition switch ON	Below 1 V



c1-2 (SFR+) - Body ground	Ignition switch ON	Below 1 V

(4) Turn the ignition switch off.

(5) Disconnect the cable from the negative (-) battery terminal.

NOTICE:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(b) Check for an open in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
c1-1 (SFR-) - c1-2 (SFR+)	Always	Below 1 Ω

(c) Check for a short to ground in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
c1-1 (SFR-) - Body ground	Always	1 MΩ or higher
c1-2 (SFR+) - Body ground	Always	1 MΩ or higher

(d) Check for a short in the circuit.

(1) Release the activation prevention mechanism built into connector D INFO.

(2) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
c1-1 (SFR-) - c1-2 (SFR+)	Always	1 MΩ or higher

(3) Restore the released activation prevention mechanism of connector D to the original condition.

Text in Illustration

*1	Front Seat Airbag Assembly RH
*2	Airbag ECU Assembly
*3	Front Seat Wire RH
*4	No. 2 Floor Wire
*a	Front view of wire harness connector (to Front Seat Airbag Assembly RH)

NG ► REPLACE FRONT SEAT ASSEMBLY RH

OK ► USE SIMULATION METHOD TO CHECK



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001O0208HX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1825-B1828: Short in Side Squib (LH) Circuit (2013 FR-S)		

DTC	B1825	Short in Side Squib (LH) Circuit
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DTC	B1826	Open in Side Squib (LH) Circuit
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DTC	B1827	Short in Side Squib (LH) Circuit (to Ground)
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DTC	B1828	Short in Side Squib (LH) Circuit (to +B)
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DESCRIPTION

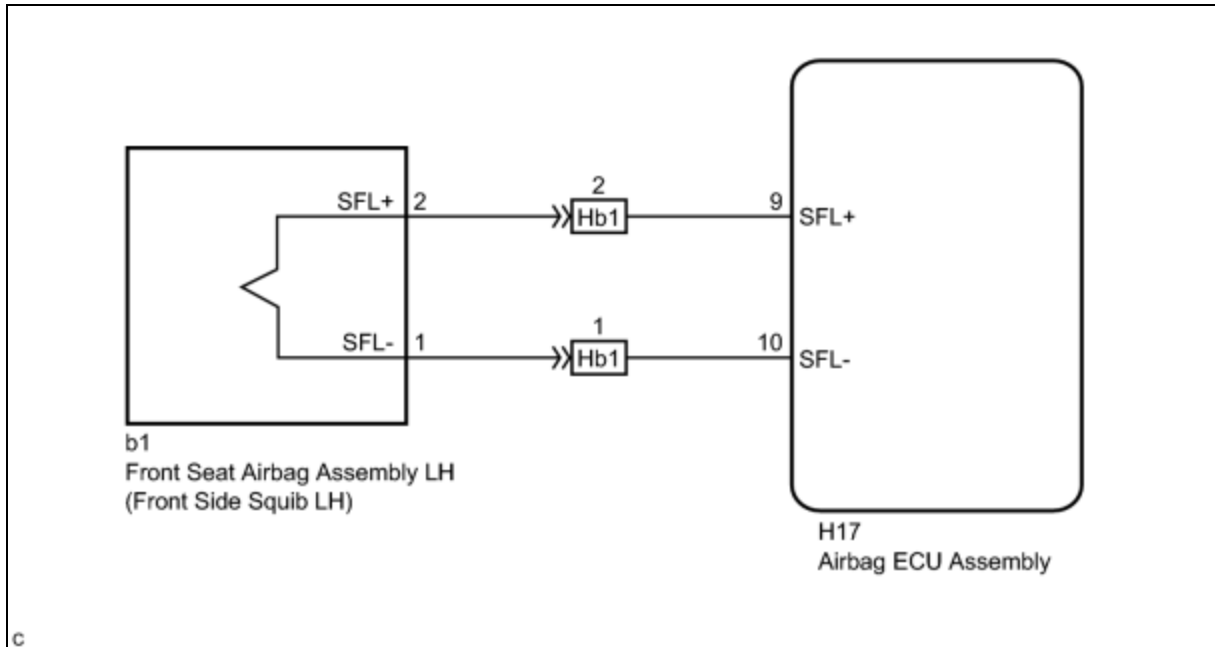
The front side squib LH circuit consists of the airbag ECU assembly and front seat airbag assembly LH.

The airbag ECU assembly uses this circuit to deploy the airbag when deployment conditions are met.

These DTCs are stored when a malfunction is detected in the front side squib LH circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1825	<ul style="list-style-type: none"> The airbag ECU assembly receives a line short circuit signal in the front side squib LH circuit during primary check. Front side squib LH malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Floor wire Front seat assembly LH (Front seat wire LH) Front seat airbag assembly LH (Front side squib LH) Airbag ECU assembly
B1826	<ul style="list-style-type: none"> The airbag ECU assembly receives an open circuit signal in the front side squib LH circuit. Front side squib LH malfunction Airbag ECU assembly malfunction 	
B1827	<ul style="list-style-type: none"> The airbag ECU assembly receives a short circuit to ground signal in the front side squib LH circuit. Front side squib LH malfunction Airbag ECU assembly malfunction 	
B1828	<ul style="list-style-type: none"> The airbag ECU assembly receives a short circuit to B+ signal in the front side squib LH circuit. Front side squib LH malfunction Airbag ECU assembly malfunction 	

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

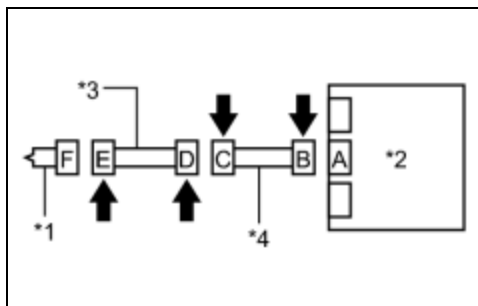
After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.

HINT:

- Perform the simulation method by selecting check mode (Signal Check) using the Techstream **INFO**.
- After selecting check mode (Signal Check), perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city road or rough road **INFO**.

PROCEDURE

1.	CHECK CONNECTORS
----	------------------



(a) Turn the ignition switch off.

(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Check that the connectors are properly connected to the front seat airbag assembly LH and airbag ECU assembly. Also check that the connectors that link the floor wire and front seat wire LH are properly connected.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

- (d) Disconnect the connectors from the front seat airbag assembly LH and airbag ECU assembly. Also disconnect the floor wire from the front seat wire LH.

- (e) Check that the terminals of the connectors are not damaged.

OK:

The terminals are not deformed or damaged.

- (f) Check that the front seat wire LH connector (on the front seat airbag assembly LH side) is not damaged.

OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

- (g) Check that the short springs for the floor wire and the front seat wire LH with the activation prevention mechanism are not deformed or damaged.

OK:

The short springs are not deformed or damaged.

Text in Illustration

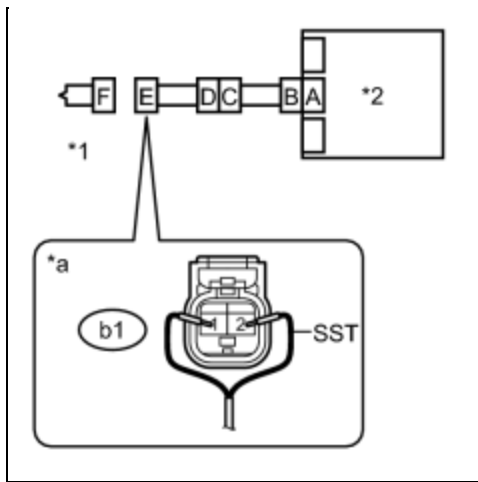
*1	Front Seat Airbag Assembly LH
*2	Airbag ECU Assembly
*3	Front Seat Wire LH
*4	Floor Wire

NG  **REPLACE WIRE HARNESS**

OK



2.	CHECK FRONT SEAT AIRBAG ASSEMBLY LH (FRONT SIDE SQUIB LH)
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(a) Connect the floor wire to the front seat wire LH and airbag ECU assembly.

(b) Connect SST (resistance 2.1 Ω) to connector E.

CAUTION:

Never connect the tester to the front seat airbag assembly LH (front side squib LH) for measurement, as this may lead to a serious injury due to airbag deployment.

NOTICE:

- Do not forcibly insert SST into the terminals of the connector when connecting it.
- Insert SST straight into the terminals of the connector.

SST: 09843-18061

(c) Connect the cable to the negative (-) battery terminal.

(d) Clear the DTCs stored in memory **INFO** .

(e) Turn the ignition switch off.

(f) Turn the ignition switch to ON, and wait for at least 60 seconds.

(g) Check for DTCs **INFO** .

OK:

DTC B1825, B1826, B1827 or B1828 is not output.

HINT:

Codes other than DTCs B1825, B1826, B1827 and B1828 may be output at this time, but they are not related to this check.

(h) Turn the ignition switch off.

(i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(j) Disconnect SST from connector E.

Text in Illustration

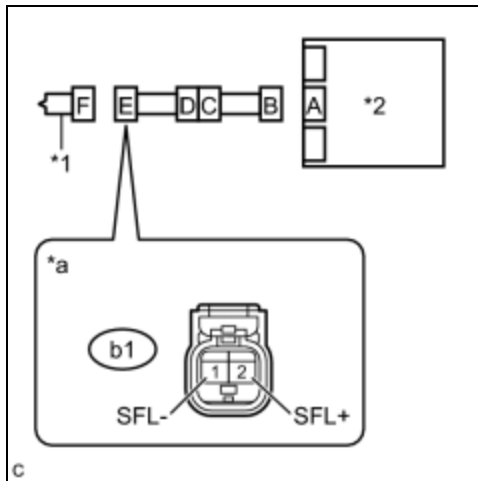
*1	Front Seat Airbag Assembly LH
*2	Airbag ECU Assembly

*a	Front view of wire harness connector (to Front Seat Airbag Assembly LH)
----	--

NG ► CHECK FLOOR WIRE

OK ► REPLACE FRONT SEAT AIRBAG ASSEMBLY LH

3. CHECK FLOOR WIRE



(a) Disconnect the floor wire from the airbag ECU assembly.

(b) Check for a short to B+ in the circuit.

- (1) Connect the cable to the negative (-) battery terminal.
- (2) Turn the ignition switch to ON.
- (3) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
b1-1 (SFL-) - Body ground	Ignition switch ON	Below 1 V
b1-2 (SFL+) - Body ground	Ignition switch ON	Below 1 V

- (4) Turn the ignition switch off.
- (5) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check for an open in the circuit.

- (1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
b1-1 (SFL-) - b1-2 (SFL+)	Always	Below 1 Ω

(d) Check for a short to ground in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
b1-1 (SFL-) - Body ground	Always	1 M Ω or higher
b1-2 (SFL+) - Body ground	Always	1 M Ω or higher

(e) Check for a short in the circuit.

(1) Release the activation prevention mechanism built into connector B  .

(2) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
b1-1 (SFL-) - b1-2 (SFL+)	Always	1 M Ω or higher

(3) Restore the released activation prevention mechanism of connector B to the original condition.

Text in Illustration

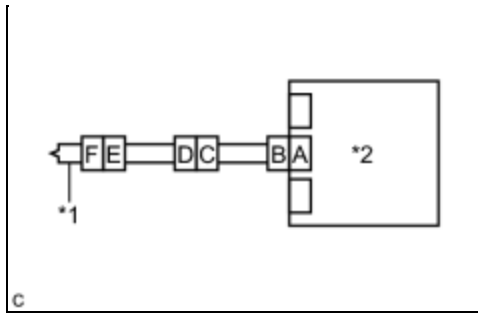
*1	Front Seat Airbag Assembly LH
*2	Airbag ECU Assembly
*a	Front view of wire harness connector (to Front Seat Airbag Assembly LH)

NG  **CHECK FLOOR WIRE**

OK



4.	CHECK DTC
-----------	------------------



(a) Connect the connectors to the front seat airbag assembly LH and airbag ECU assembly.

(b) Connect the cable to the negative (-) battery terminal.

(c) Clear the DTCs stored in memory **INFO** .

(d) Turn the ignition switch off.

(e) Turn the ignition switch to ON, and wait for at least 60 seconds.

(f) Check for DTCs **INFO** .

OK:

DTC B1825, B1826, B1827 or B1828 is not output.

HINT:

Codes other than DTCs B1825, B1826, B1827 and B1828 may be output at this time, but they are not related to this check.

Text in Illustration

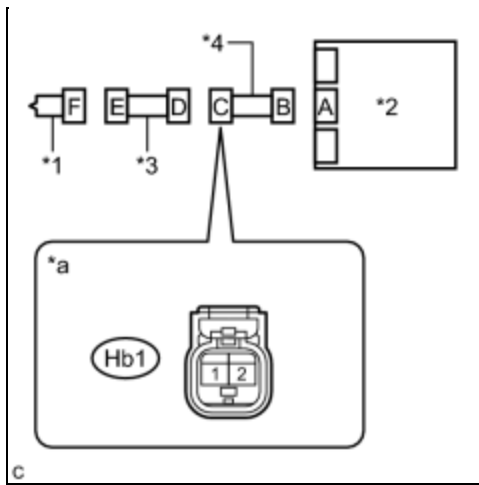
*1	Front Seat Airbag Assembly LH
*2	Airbag ECU Assembly

NG ► REPLACE AIRBAG ECU ASSEMBLY

OK ► USE SIMULATION METHOD TO CHECK

5.	CHECK FLOOR WIRE
-----------	-------------------------

(a) Disconnect the front seat wire LH from the floor wire.



(b) Check for a short to B+ in the circuit.

- (1) Connect the cable to the negative (-) battery terminal.
- (2) Turn the ignition switch to ON.
- (3) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Hb1-1 - Body ground	Ignition switch ON	Below 1 V
Hb1-2 - Body ground	Ignition switch ON	Below 1 V

- (4) Turn the ignition switch off.
- (5) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check for an open in the circuit.

- (1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Hb1-1 - Hb1-2	Always	Below 1 Ω

(d) Check for a short to ground in the circuit.

- (1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Hb1-1 - Body ground	Always	1 M Ω or higher
Hb1-2 - Body ground	Always	1 M Ω or higher

(e) Check for a short in the circuit.

(1) Release the activation prevention mechanism built into connector B INFO.

(2) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Hb1-1 - Hb1-2	Always	1 MΩ or higher

(3) Restore the released activation prevention mechanism of connector B to the original condition.

Text in Illustration

*1	Front Seat Airbag Assembly LH
*2	Airbag ECU Assembly
*3	Front Seat Wire LH
*4	Floor Wire
*a	Front view of wire harness connector (to Front Seat Wire LH)

NG  **REPLACE FLOOR WIRE**

OK



6.	CHECK FRONT SEAT WIRE LH
-----------	---------------------------------

(a) Check for a short to B+ in the circuit.

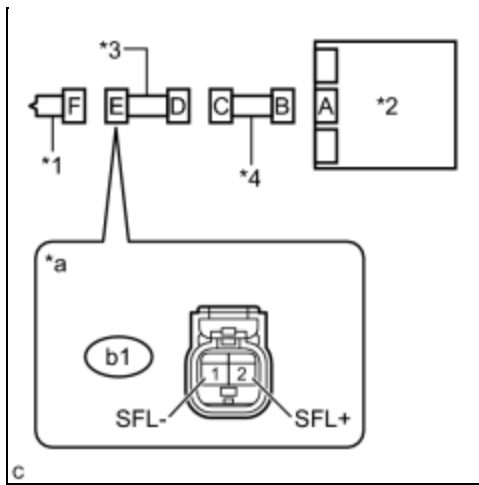
(1) Connect the cable to the negative (-) battery terminal.

(2) Turn the ignition switch to ON.

(3) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
b1-1 (SFL-) - Body ground	Ignition switch ON	Below 1 V



b1-2 (SFL+) - Body ground	Ignition switch ON	Below 1 V

(4) Turn the ignition switch off.

(5) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(b) Check for an open in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
b1-1 (SFL-) - b1-2 (SFL+)	Always	Below 1 Ω

(c) Check for a short to ground in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
b1-1 (SFL-) - Body ground	Always	1 MΩ or higher
b1-2 (SFL+) - Body ground	Always	1 MΩ or higher

(d) Check for a short in the circuit.

(1) Release the activation prevention mechanism built into connector D INFO.

(2) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
b1-1 (SFL-) - b1-2 (SFL+)	Always	1 MΩ or higher

(3) Restore the released activation prevention mechanism of connector D to the original condition.

Text in Illustration

*1	Front Seat Airbag Assembly LH
*2	Airbag ECU Assembly
*3	Front Seat Wire LH
*4	Floor Wire
*a	Front view of wire harness connector (to Front Seat Airbag Assembly LH)

NG ► REPLACE FRONT SEAT ASSEMBLY LH

OK ► USE SIMULATION METHOD TO CHECK



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000100307EX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1830-B1833: Short in Curtain Shield Airbag (RH) Squib Circuit (2013 FR-S)		

DTC	B1830	Short in Curtain Shield Airbag (RH) Squib Circuit
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DTC	B1831	Open in Curtain Shield Airbag (RH) Squib Circuit
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DTC	B1832	Short in Curtain Shield Airbag (RH) Squib Circuit (to Ground)
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DTC	B1833	Short in Curtain Shield Airbag (RH) Squib Circuit (to +B)
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DESCRIPTION

The curtain shield squib RH circuit consists of the airbag ECU assembly and curtain shield airbag assembly RH.

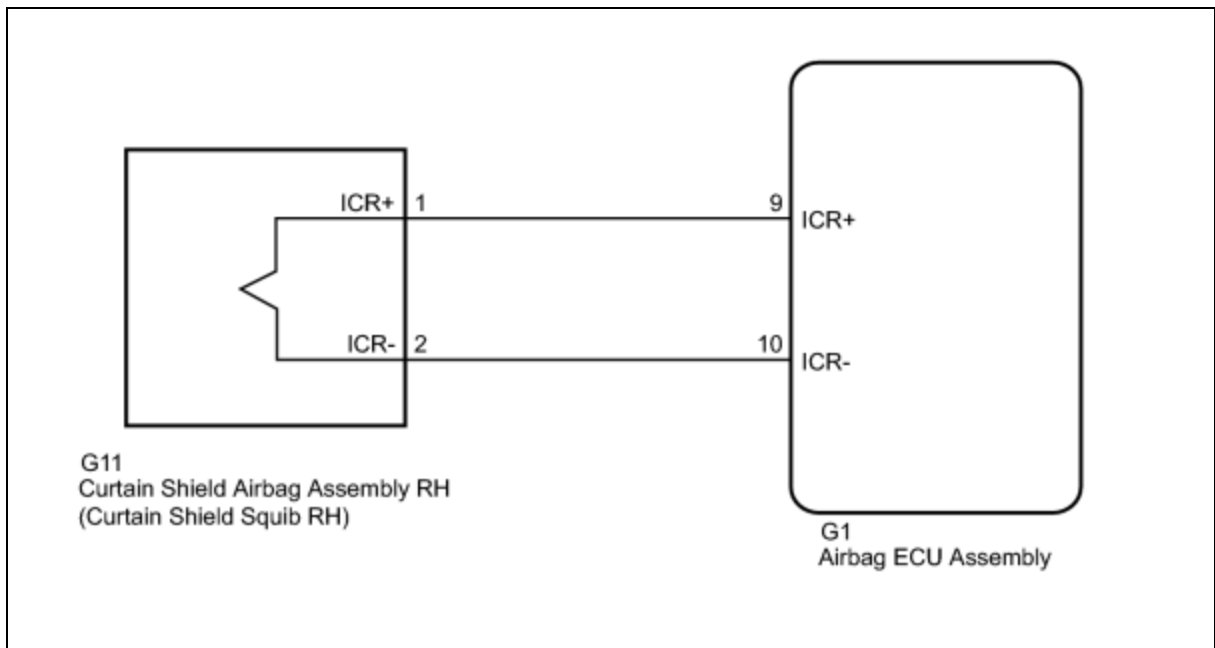
The airbag ECU assembly uses this circuit to deploy the airbag when deployment conditions are met.

These DTCs are stored when a malfunction is detected in the curtain shield squib RH circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1830	<ul style="list-style-type: none"> The airbag ECU assembly receives a line short circuit signal in the curtain shield squib RH circuit during primary check. Curtain shield squib RH malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> No. 2 floor wire Curtain shield airbag assembly RH (Curtain shield squib RH) Airbag ECU assembly
B1831	<ul style="list-style-type: none"> The airbag ECU assembly receives an open circuit signal in the curtain shield squib RH circuit. Curtain shield squib RH malfunction Airbag ECU assembly malfunction 	
B1832	<ul style="list-style-type: none"> The airbag ECU assembly receives a short circuit to ground signal in the curtain shield squib RH circuit. Curtain shield squib RH malfunction Airbag ECU assembly malfunction 	
B1833	<ul style="list-style-type: none"> The airbag ECU assembly receives a short circuit to B+ signal in the curtain shield squib RH circuit. 	

- Curtain shield squib RH malfunction
- Airbag ECU assembly malfunction

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

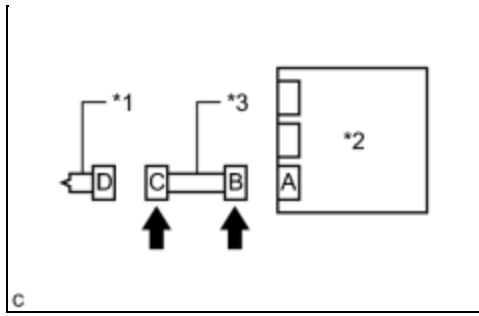
HINT:

- Perform the simulation method by selecting check mode (Signal Check) using the Techstream INFO.
- After selecting check mode (Signal Check), perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city road or rough road INFO.

PROCEDURE

1.	CHECK CONNECTORS
-----------	-------------------------

(a) Turn the ignition switch off.



(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check that the connectors are properly connected to the curtain shield airbag assembly RH and airbag ECU assembly.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

(d) Disconnect the connectors from the curtain shield airbag assembly RH and airbag ECU assembly.

(e) Check that the terminals of the connectors are not damaged.

OK:

The terminals are not deformed or damaged.

(f) Check that the No. 2 floor wire connector (on the curtain shield airbag assembly RH side) is not damaged.

OK:

The lock button is not disengaged, and the claw of the lock is not deformed or damaged.

(g) Check that the short spring for the No. 2 floor wire with the activation prevention mechanism is not deformed or damaged.

OK:

The short spring is not deformed or damaged.

Text in Illustration

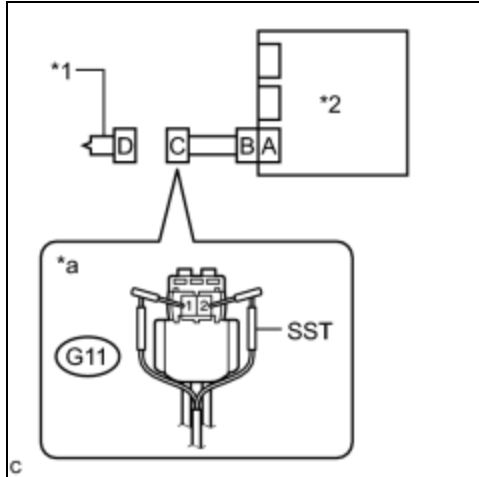
*1	Curtain Shield Airbag Assembly RH
*2	Airbag ECU Assembly
*3	No. 2 Floor Wire

NG  **REPLACE NO. 2 FLOOR WIRE**

OK



2.	CHECK CURTAIN SHIELD AIRBAG ASSEMBLY RH (CURTAIN SHIELD SQUIB RH)
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(a) Connect the connector to the airbag ECU assembly.

(b) Connect SST (resistance 2.1 Ω) to connector C.

CAUTION:

Never connect the tester to the curtain shield airbag assembly RH (curtain shield squib RH) for measurement, as this may lead to a serious injury due to airbag deployment.

NOTICE:

- Do not forcibly insert SST into the terminals of the connector when connecting it.
- Insert SST straight into the terminals of the connector.

SST: 09843-18061

(c) Connect the cable to the negative (-) battery terminal.

(d) Clear the DTCs stored in memory **INFO** .

(e) Turn the ignition switch off.

(f) Turn the ignition switch to ON, and wait for at least 60 seconds.

(g) Check for DTCs **INFO** .

OK:

DTC B1830, B1831, B1832 or B1833 is not output.

HINT:

Codes other than DTCs B1830, B1831, B1832 and B1833 may be output at this time, but they are not related to this check.

(h) Turn the ignition switch off.

(i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal

to disable the SRS system.

(j) Disconnect SST from connector C.

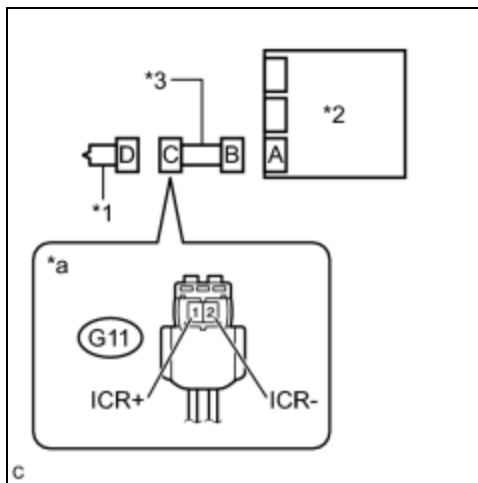
Text in Illustration

*1	Curtain Shield Airbag Assembly RH
*2	Airbag ECU Assembly
*a	Front view of wire harness connector (to Curtain Shield Airbag Assembly RH)

NG ► CHECK NO. 2 FLOOR WIRE

OK ► REPLACE CURTAIN SHIELD AIRBAG ASSEMBLY RH

3. CHECK NO. 2 FLOOR WIRE



(a) Disconnect the No. 2 floor wire from the airbag ECU assembly.

(b) Check for a short to B+ in the circuit.

- (1) Connect the cable to the negative (-) battery terminal.
- (2) Turn the ignition switch to ON.
- (3) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G11-1 (ICR+) - Body ground	Ignition switch ON	Below 1 V
G11-2 (ICR-) - Body ground	Ignition switch ON	Below 1 V

(4) Turn the ignition switch off.

(5) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check for an open in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G11-1 (ICR+) - G11-2 (ICR-)	Always	Below 1 Ω

(d) Check for a short to ground in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G11-1 (ICR+) - Body ground	Always	1 M Ω or higher
G11-2 (ICR-) - Body ground	Always	1 M Ω or higher

(e) Check for a short in the circuit.

(1) Release the activation prevention mechanism built into connector B  .

(2) Measure the resistance according to the value(s) in the table below.


Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G11-1 (ICR+) - G11-2 (ICR-)	Always	1 M Ω or higher

(3) Restore the released activation prevention mechanism of connector B to the original condition.

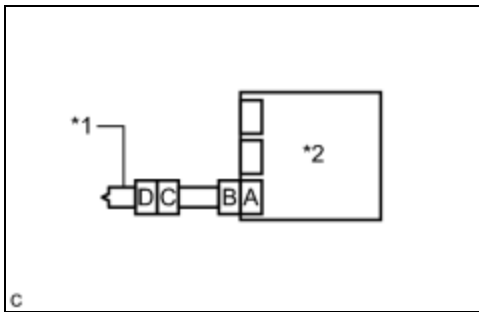
Text in Illustration

*1	Curtain Shield Airbag Assembly RH
*2	Airbag ECU Assembly
*3	No. 2 Floor Wire
*a	Front view of wire harness connector (to Curtain Shield Airbag Assembly RH)

NG  **REPLACE NO. 2 FLOOR WIRE**

OK


4.	CHECK DTC
-----------	------------------



(a) Connect the connectors to the curtain shield airbag assembly RH and airbag ECU assembly.

- (b) Connect the cable to the negative (-) battery terminal.
- (c) Clear the DTCs stored in memory INFO.
- (d) Turn the ignition switch off.
- (e) Turn the ignition switch to ON, and wait for at least 60 seconds.
- (f) Check for DTCs INFO.

OK:
DTC B1830, B1831, B1832 or B1833 is not output.

HINT:

Codes other than DTCs B1830, B1831, B1832 and B1833 may be output at this time, but they are not related to this check.

Text in Illustration

*1	Curtain Shield Airbag Assembly RH
*2	Airbag ECU Assembly

NG ▶ REPLACE AIRBAG ECU ASSEMBLY

OK ▶ USE SIMULATION METHOD TO CHECK

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000100407EX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1835-B1838: Short in Curtain Shield Airbag (LH) Squib Circuit (2013 FR-S)		

DTC	B1835	Short in Curtain Shield Airbag (LH) Squib Circuit
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DTC	B1836	Open in Curtain Shield Airbag (LH) Squib Circuit
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DTC	B1837	Short in Curtain Shield Airbag (LH) Squib Circuit (to Ground)
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DTC	B1838	Short in Curtain Shield Airbag (LH) Squib Circuit (to +B)
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DESCRIPTION

The curtain shield squib LH circuit consists of the airbag ECU assembly and curtain shield airbag assembly LH.

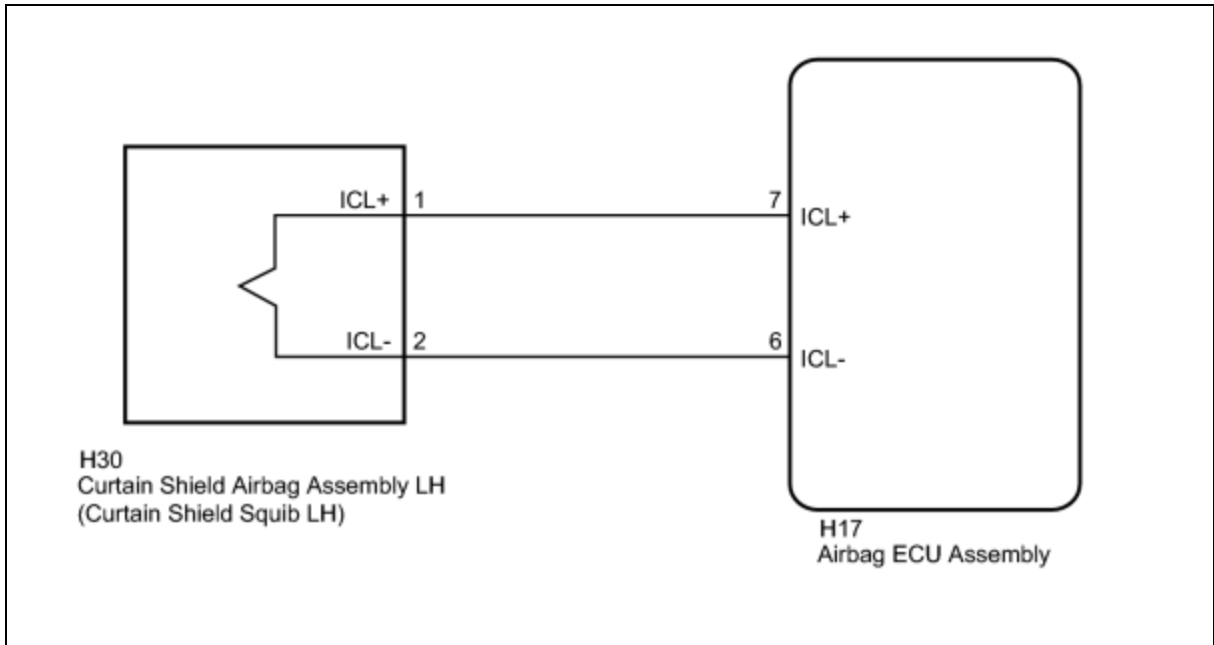
The airbag ECU assembly uses this circuit to deploy the airbag when deployment conditions are met.

These DTCs are stored when a malfunction is detected in the curtain shield squib LH circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1835	<ul style="list-style-type: none"> The airbag ECU assembly receives a line short circuit signal in the curtain shield squib LH circuit during primary check. Curtain shield squib LH malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Floor wire Curtain shield airbag assembly LH (Curtain shield squib LH) Airbag ECU assembly
B1836	<ul style="list-style-type: none"> The airbag ECU assembly receives an open circuit signal in the curtain shield squib LH circuit. Curtain shield squib LH malfunction Airbag ECU assembly malfunction 	
B1837	<ul style="list-style-type: none"> The airbag ECU assembly receives a short circuit to ground signal in the curtain shield squib LH circuit. Curtain shield squib LH malfunction Airbag ECU assembly malfunction 	
B1838	<ul style="list-style-type: none"> The airbag ECU assembly receives a short circuit to B+ signal in the curtain shield squib LH circuit. Curtain shield squib LH malfunction 	

- Airbag ECU assembly malfunction

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

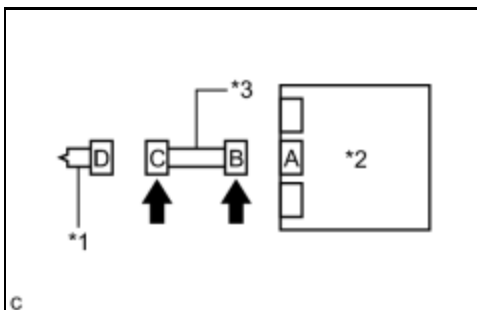
After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

HINT:

- Perform the simulation method by selecting check mode (Signal Check) using the Techstream INFO.
- After selecting check mode (Signal Check), perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city road or rough road INFO.

PROCEDURE

1. CHECK CONNECTORS



(a) Turn the ignition switch off.

(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check that the connectors are properly connected to the curtain shield airbag assembly LH and airbag ECU assembly.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

(d) Disconnect the connectors from the curtain shield airbag assembly LH and airbag ECU assembly.

(e) Check that the terminals of the connectors are not damaged.

OK:

The terminals are not deformed or damaged.

(f) Check that the floor wire connector (on the curtain shield airbag assembly LH side) is not damaged.

OK:

The lock button is not disengaged, and the claw of the lock is not deformed or damaged.

(g) Check that the short spring for the floor wire with the activation prevention mechanism is not deformed or damaged.

OK:

The short spring is not deformed or damaged.

Text in Illustration

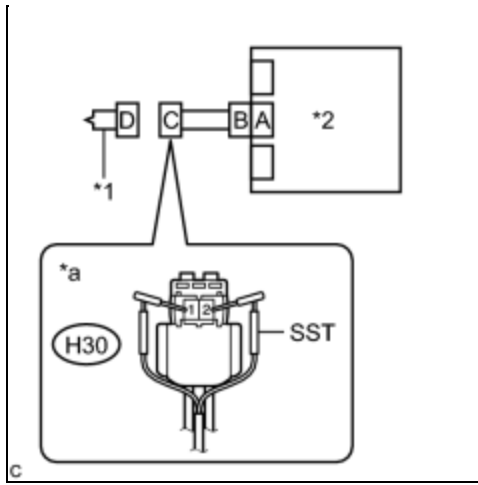
*1	Curtain Shield Airbag Assembly LH
*2	Airbag ECU Assembly
*3	Floor Wire

NG  **REPLACE FLOOR WIRE**

OK



2.	CHECK CURTAIN SHIELD AIRBAG ASSEMBLY LH (CURTAIN SHIELD SQUIB LH)
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(a) Connect the connector to the airbag ECU assembly.

(b) Connect SST (resistance 2.1 Ω) to connector C.

CAUTION:

Never connect the tester to the curtain shield airbag assembly LH (curtain shield squib LH) for measurement, as this may lead to a serious injury due to airbag deployment.

NOTICE:

- Do not forcibly insert SST into the terminals of the connector when connecting it.
- Insert SST straight into the terminals of the connector.

SST: 09843-18061

(c) Connect the cable to the negative (-) battery terminal.

(d) Clear the DTCs stored in memory **INFO** .

(e) Turn the ignition switch off.

(f) Turn the ignition switch to ON, and wait for at least 60 seconds.

(g) Check for DTCs **INFO** .

OK:

DTC B1835, B1836, B1837 or B1838 is not output.

HINT:

Codes other than DTCs B1835, B1836, B1837 and B1838 may be output at this time, but they are not related to this check.

(h) Turn the ignition switch off.

(i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(j) Disconnect SST from connector C.

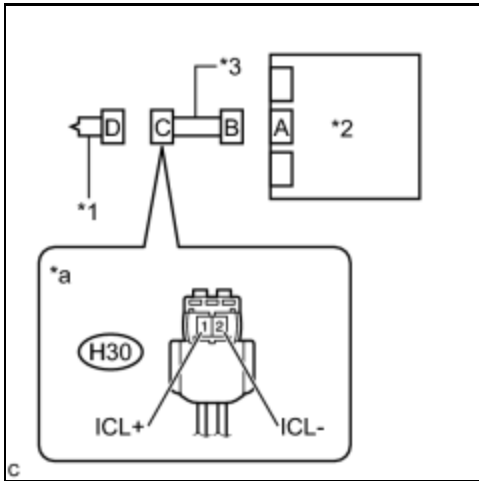
Text in Illustration

*1	Curtain Shield Airbag Assembly LH
*2	Airbag ECU Assembly
	Front view of wire harness connector

NG ► CHECK FLOOR WIRE

OK ► REPLACE CURTAIN SHIELD AIRBAG ASSEMBLY LH

3. CHECK FLOOR WIRE



(a) Disconnect the floor wire from the airbag ECU assembly.

(b) Check for a short to B+ in the circuit.

(1) Connect the cable to the negative (-) battery terminal.

(2) Turn the ignition switch to ON.

(3) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H30-1 (ICL+) - Body ground	Ignition switch ON	Below 1 V
H30-2 (ICL-) - Body ground	Ignition switch ON	Below 1 V

(4) Turn the ignition switch off.

(5) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check for an open in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H30-1 (ICL+) - H30-2 (ICL-)	Always	Below 1 Ω

(d) Check for a short to ground in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H30-1 (ICL+) - Body ground	Always	1 MΩ or higher
H30-2 (ICL-) - Body ground	Always	1 MΩ or higher

(e) Check for a short in the circuit.

(1) Release the activation prevention mechanism built into connector B  .

(2) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H30-1 (ICL+) - H30-2 (ICL-)	Always	1 MΩ or higher

(3) Restore the released activation prevention mechanism of connector B to the original condition.

Text in Illustration

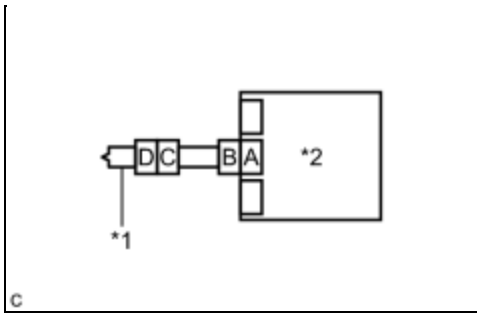
*1	Curtain Shield Airbag Assembly LH
*2	Airbag ECU Assembly
*3	Floor Wire
*a	Front view of wire harness connector (to Curtain Shield Airbag Assembly LH)

NG  **REPLACE FLOOR WIRE**

OK



4.	CHECK DTC
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(a) Connect the connectors to the curtain shield airbag assembly LH and airbag ECU assembly.

(b) Connect the cable to the negative (-) battery terminal.

(c) Clear the DTCs stored in memory **INFO** .

(d) Turn the ignition switch off.

(e) Turn the ignition switch to ON, and wait for at least 60 seconds.

(f) Check for DTCs **INFO** .

OK:

DTC B1835, B1836, B1837 or B1838 is not output.

HINT:

Codes other than DTCs B1835, B1836, B1837 and B1838 may be output at this time, but they are not related to this check.

Text in Illustration

*1	Curtain Shield Airbag Assembly LH
*2	Airbag ECU Assembly

NG ► REPLACE AIRBAG ECU ASSEMBLY

OK ► USE SIMULATION METHOD TO CHECK

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000100509EX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1900-B1903: Short in P/T Squib (RH) Circuit (2013 FR-S)		

DTC	B1900	Short in P/T Squib (RH) Circuit
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DTC	B1901	Open in P/T Squib (RH) Circuit
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DTC	B1902	Short in P/T Squib (RH) Circuit (to Ground)
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DTC	B1903	Short in P/T Squib (RH) Circuit (to +B)
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DESCRIPTION

The front pretensioner squib RH circuit consists of the airbag ECU assembly and front seat outer belt assembly RH.

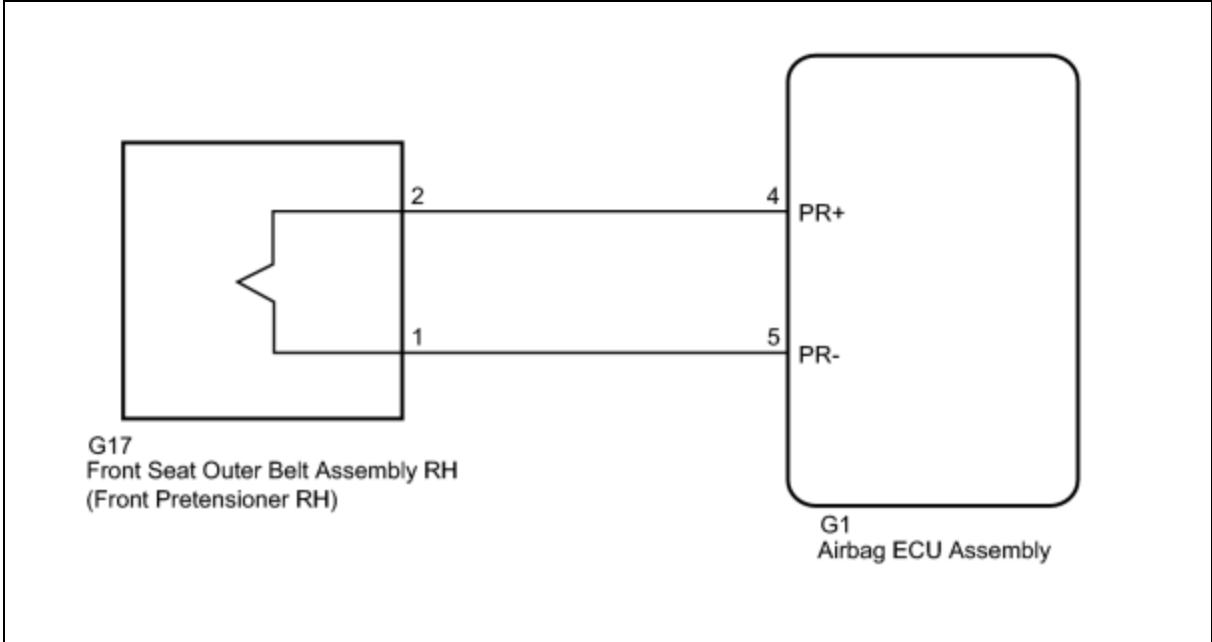
The airbag ECU assembly uses this circuit to deploy the seat belt pretensioner when deployment conditions are met.

These DTCs are stored when a malfunction is detected in the front pretensioner squib RH circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1900	<ul style="list-style-type: none"> The airbag ECU assembly receives a line short circuit signal in the front pretensioner squib RH circuit during primary check. Front pretensioner squib RH malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> No. 2 floor wire Front seat outer belt assembly RH (Front pretensioner squib RH) Airbag ECU assembly
B1901	<ul style="list-style-type: none"> The airbag ECU assembly receives an open circuit signal in the front pretensioner squib RH circuit. Front pretensioner squib RH malfunction Airbag ECU assembly malfunction 	
B1902	<ul style="list-style-type: none"> The airbag ECU assembly receives a short circuit to ground signal in the front pretensioner squib RH circuit. Front pretensioner squib RH malfunction Airbag ECU assembly malfunction 	
	<ul style="list-style-type: none"> The airbag ECU assembly receives a short circuit 	

B1903	<p>to B+ signal in the front pretensioner squib RH circuit.</p> <ul style="list-style-type: none"> • Front pretensioner squib RH malfunction • Airbag ECU assembly malfunction
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WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

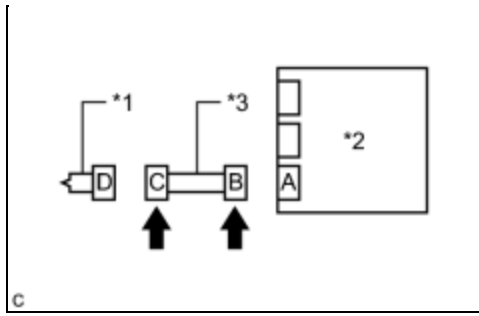
HINT:

- Perform the simulation method by selecting check mode (Signal Check) using the Techstream INFO.
- After selecting check mode (Signal Check), perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city road or rough road INFO.

PROCEDURE

1.	CHECK CONNECTORS
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(a) Turn the ignition switch off.



(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check that the connectors are properly connected to the front seat outer belt assembly RH and airbag ECU assembly.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

(d) Disconnect the connectors from the front seat outer belt assembly RH and airbag ECU assembly.

(e) Check that the terminals of the connectors are not damaged.

OK:

The terminals are not deformed or damaged.

(f) Check that the No. 2 floor wire connector (on the front seat outer belt assembly RH side) is not damaged.

OK:

The lock button is not disengaged, and the claw of the lock is not deformed or damaged.

(g) Check that the short spring for the No. 2 floor wire with the activation prevention mechanism is not deformed or damaged.

OK:

The short spring is not deformed or damaged.

Text in Illustration

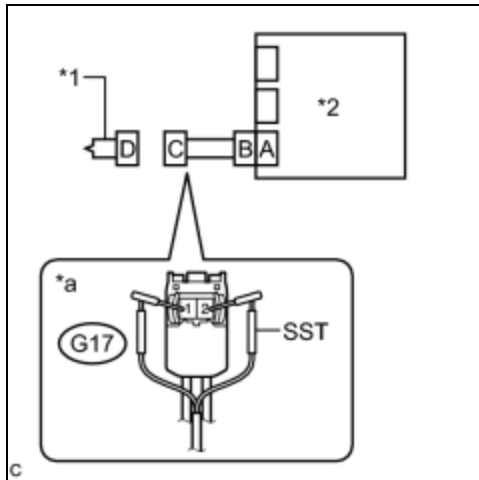
*1	Front Seat Outer Belt Assembly RH
*2	Airbag ECU Assembly
*3	No. 2 Floor Wire

NG  **REPLACE NO. 2 FLOOR WIRE**

OK



2.	CHECK FRONT SEAT OUTER BELT ASSEMBLY RH (FRONT PRETENSIONER SQUIB RH)
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(a) Connect the connector to the airbag ECU assembly.

(b) Connect SST (resistance 2.1 Ω) to connector C.

CAUTION:

Never connect the tester to the front seat outer belt assembly RH (front pretensioner squib RH) for measurement, as this may lead to a serious injury due to pretensioner deployment.

NOTICE:

- Do not forcibly insert SST into the terminals of the connector when connecting it.
- Insert SST straight into the terminals of the connector.

SST: 09843-18061

(c) Connect the cable to the negative (-) battery terminal.

(d) Clear the DTCs stored in memory **INFO** .

(e) Turn the ignition switch off.

(f) Turn the ignition switch to ON, and wait for at least 60 seconds.

(g) Check for DTCs **INFO** .

OK:

DTC B1900, B1901, B1902 or B1903 is not output.

HINT:

Codes other than DTCs B1900, B1901, B1902 and B1903 may be output at this time, but they are not related to this check.

(h) Turn the ignition switch off.

(i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(j) Disconnect SST from connector C.

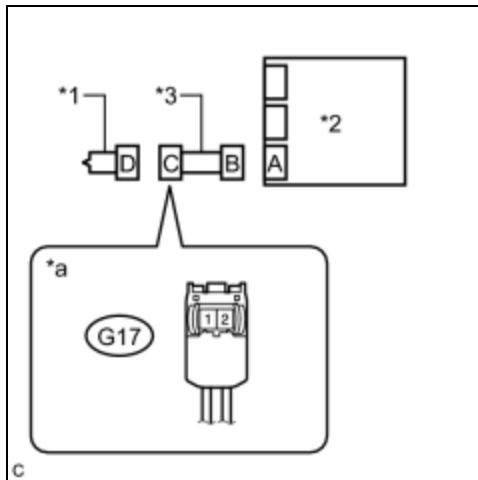
Text in Illustration

*1	Front Seat Outer Belt Assembly RH
*2	Airbag ECU Assembly
*a	Front view of wire harness connector (to Front Seat Outer Belt Assembly RH)

NG ► CHECK NO. 2 FLOOR WIRE

OK ► REPLACE FRONT SEAT OUTER BELT ASSEMBLY RH

3.	CHECK NO. 2 FLOOR WIRE
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(a) Disconnect the No. 2 floor wire from the airbag ECU assembly.

(b) Check for a short to B+ in the circuit.

- (1) Connect the cable to the negative (-) battery terminal.
- (2) Turn the ignition switch to ON.
- (3) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G17-1 - Body ground	Ignition switch ON	Below 1 V
G17-2 - Body ground	Ignition switch ON	Below 1 V

(4) Turn the ignition switch off.

(5) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check for an open in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G17-1 - G17-2	Always	Below 1 Ω

(d) Check for a short to ground in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G17-1 - Body ground	Always	1 MΩ or higher
G17-2 - Body ground	Always	1 MΩ or higher

(e) Check for a short in the circuit.

(1) Release the activation prevention mechanism built into connector B  .

(2) Measure the resistance according to the value(s) in the table below.


Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
G17-1 - G17-2	Always	1 MΩ or higher

(3) Restore the released activation prevention mechanism of connector B to the original condition.

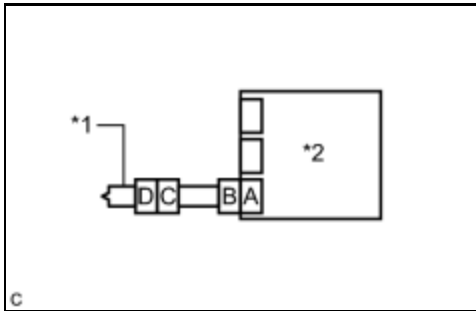
Text in Illustration

*1	Front Seat Outer Belt Assembly RH
*2	Airbag ECU Assembly
*3	No. 2 Floor Wire
*a	Front view of wire harness connector (to Front Seat Outer Belt Assembly RH)

NG  **REPLACE NO. 2 FLOOR WIRE**

OK


4. CHECK DTC



(a) Connect the connectors to the front seat outer belt assembly RH and airbag ECU assembly.

(b) Connect the cable to the negative (-) battery terminal.

(c) Clear the DTCs stored in memory **INFO** .

(d) Turn the ignition switch off.

(e) Turn the ignition switch to ON, and wait for at least 60 seconds.

(f) Check for DTCs **INFO** .

OK:

DTC B1900, B1901, B1902 or B1903 is not output.

HINT:

Codes other than DTCs B1900, B1901, B1902 and B1903 may be output at this time, but they are not related to this check.

Text in Illustration

*1	Front Seat Outer Belt Assembly RH
*2	Airbag ECU Assembly

NG ► **REPLACE AIRBAG ECU ASSEMBLY**

OK ► **USE SIMULATION METHOD TO CHECK**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000100609CX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: B1905-B1908: Short in P/T Squib (LH) Circuit (2013 FR-S)		

DTC	B1905	Short in P/T Squib (LH) Circuit
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DTC	B1906	Open in P/T Squib (LH) Circuit
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DTC	B1907	Short in P/T Squib (LH) Circuit (to Ground)
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DTC	B1908	Short in P/T Squib (LH) Circuit (to +B)
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DESCRIPTION

The front pretensioner squib LH circuit consists of the airbag ECU assembly and front seat outer belt assembly LH.

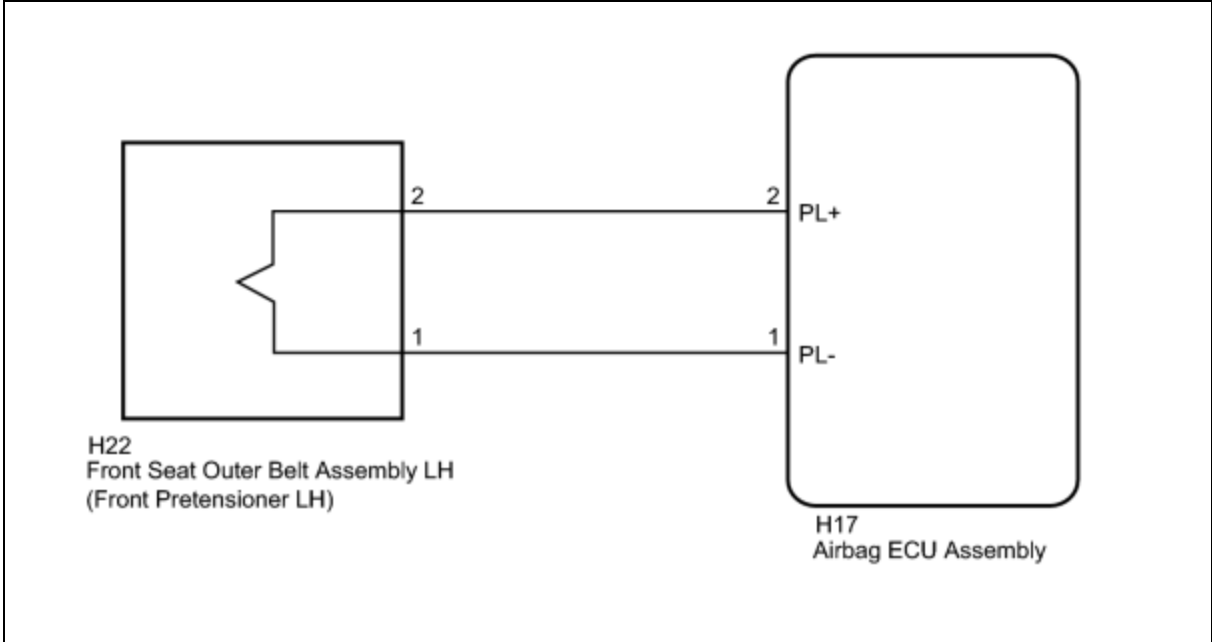
The airbag ECU assembly uses this circuit to deploy the seat belt pretensioner when deployment conditions are met.

These DTCs are stored when a malfunction is detected in the front pretensioner squib LH circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1905	<ul style="list-style-type: none"> The airbag ECU assembly receives a line short circuit signal in the front pretensioner squib LH circuit during primary check. Front pretensioner squib LH malfunction Airbag ECU assembly malfunction 	<ul style="list-style-type: none"> Floor wire Front seat outer belt assembly LH (Front pretensioner squib LH) Airbag ECU assembly
B1906	<ul style="list-style-type: none"> The airbag ECU assembly receives an open circuit signal in the front pretensioner squib LH circuit. Front pretensioner squib LH malfunction Airbag ECU assembly malfunction 	
B1907	<ul style="list-style-type: none"> The airbag ECU assembly receives a short circuit to ground signal in the front pretensioner squib LH circuit. Front pretensioner squib LH malfunction Airbag ECU assembly malfunction 	
	<ul style="list-style-type: none"> The airbag ECU assembly receives a short circuit 	

B1908	<p>to B+ signal in the front pretensioner squib LH circuit.</p> <ul style="list-style-type: none"> • Front pretensioner squib LH malfunction • Airbag ECU assembly malfunction
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WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

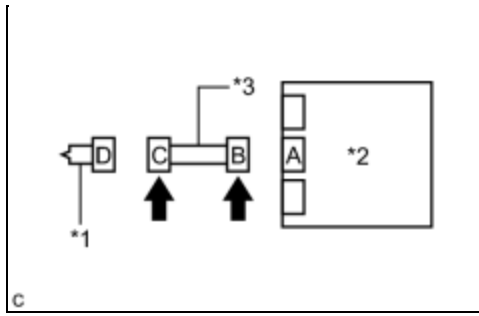
HINT:

- Perform the simulation method by selecting check mode (Signal Check) using the Techstream INFO.
- After selecting check mode (Signal Check), perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city road or rough road INFO.

PROCEDURE

1.	CHECK CONNECTORS
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(a) Turn the ignition switch off.



(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check that the connectors are properly connected to the front seat outer belt assembly LH and airbag ECU assembly.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

(d) Disconnect the connectors from the front seat outer belt assembly LH and airbag ECU assembly.

(e) Check that the terminals of the connectors are not damaged.

OK:

The terminals are not deformed or damaged.

(f) Check that the floor wire connector (on the front seat outer belt assembly LH side) is not damaged.

OK:

The lock button is not disengaged, and the claw of the lock is not deformed or damaged.

(g) Check that the short spring for the floor wire with the activation prevention mechanism is not deformed or damaged.

OK:

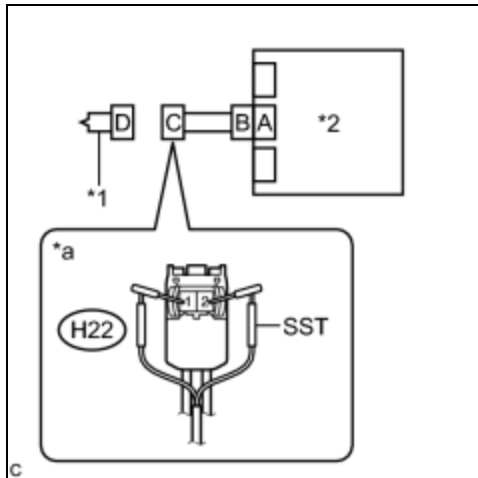
The short spring is not deformed or damaged.

Text in Illustration

*1	Front Seat Outer Belt Assembly LH
*2	Airbag ECU Assembly
*3	Floor Wire



2.	CHECK FRONT SEAT OUTER BELT ASSEMBLY LH (FRONT PRETENSIONER SQUIB LH)
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(a) Connect the connector to the airbag ECU assembly.

(b) Connect SST (resistance 2.1 Ω) to connector C.

CAUTION:

Never connect the tester to the front seat outer belt assembly LH (front pretensioner squib LH) for measurement, as this may lead to a serious injury due to pretensioner deployment.

NOTICE:

- Do not forcibly insert SST into the terminals of the connector when connecting it.
- Insert SST straight into the terminals of the connector.

SST: 09843-18061

(c) Connect the cable to the negative (-) battery terminal.

(d) Clear the DTCs stored in memory **INFO** .

(e) Turn the ignition switch off.

(f) Turn the ignition switch to ON, and wait for at least 60 seconds.

(g) Check for DTCs **INFO** .

OK:

DTC B1905, B1906, B1907 or B1908 is not output.

HINT:

Codes other than DTCs B1905, B1906, B1907 and B1908 may be output at this time, but they are not related to this check.

(h) Turn the ignition switch off.

(i) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(j) Disconnect SST from connector C.

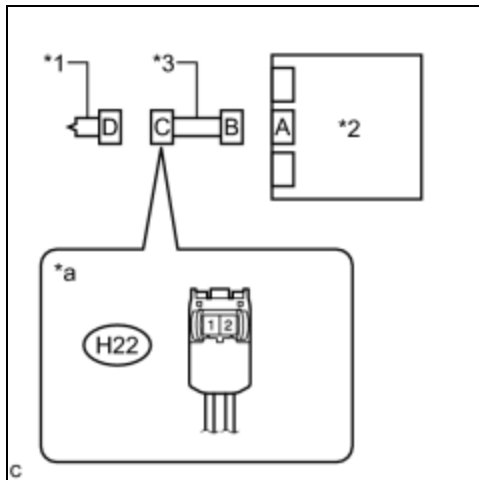
Text in Illustration

*1	Front Seat Outer Belt Assembly LH
*2	Airbag ECU Assembly
*a	Front view of wire harness connector (to Front Seat Outer Belt Assembly LH)

NG ► CHECK FLOOR WIRE

OK ► REPLACE FRONT SEAT OUTER BELT ASSEMBLY LH

3. CHECK FLOOR WIRE



(a) Disconnect the floor wire from the airbag ECU assembly.

(b) Check for a short to B+ in the circuit.

(1) Connect the cable to the negative (-) battery terminal.

(2) Turn the ignition switch to ON.

(3) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H22-1 - Body ground	Ignition switch ON	Below 1 V
H22-2 - Body ground	Ignition switch ON	Below 1 V

(4) Turn the ignition switch off.

(5) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check for an open in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H22-1 - H22-2	Always	Below 1 Ω

(d) Check for a short to ground in the circuit.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H22-1 - Body ground	Always	1 M Ω or higher
H22-2 - Body ground	Always	1 M Ω or higher

(e) Check for a short in the circuit.

(1) Release the activation prevention mechanism built into connector B  .

(2) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
H22-1 - H22-2	Always	1 M Ω or higher

(3) Restore the released activation prevention mechanism of connector B to the original condition.

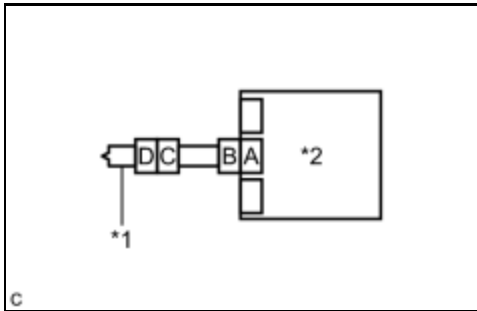
Text in Illustration

*1	Front Seat Outer Belt Assembly LH
*2	Airbag ECU Assembly
*3	Floor Wire
*a	Front view of wire harness connector (to Front Seat Outer Belt Assembly LH)

NG  **REPLACE FLOOR WIRE**

OK


4. CHECK DTC



(a) Connect the connectors to the front seat outer belt assembly LH and airbag ECU assembly.

(b) Connect the cable to the negative (-) battery terminal.

(c) Clear the DTCs stored in memory **INFO** .

(d) Turn the ignition switch off.

(e) Turn the ignition switch to ON, and wait for at least 60 seconds.

(f) Check for DTCs **INFO** .

OK:

DTC B1905, B1906, B1907 or B1908 is not output.

HINT:

Codes other than DTCs B1905, B1906, B1907 and B1908 may be output at this time, but they are not related to this check.

Text in Illustration

*1	Front Seat Outer Belt Assembly LH
*2	Airbag ECU Assembly

NG ► **REPLACE AIRBAG ECU ASSEMBLY**

OK ► **USE SIMULATION METHOD TO CHECK**

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XFF0BYX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: CHECK MODE PROCEDURE (2013 FR-S)		

CHECK MODE PROCEDURE

1. CHECK MODE (SIGNAL CHECK): DTC CHECK

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Body Electrical / SRS Airbag / Utility / Signal Check, and proceed with checking using the Techstream.

NOTICE:

Select Signal Check screen on the Techstream to clear the output DTCs (both current and history).

HINT:

- DTCs can be detected more sensitively in check mode than in normal diagnosis mode.
- Perform check mode inspection when a malfunction in a squib circuit is suspected even after the normal system code is output through normal diagnosis mode inspection.



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XFH0BDX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

DATA LIST / ACTIVE TEST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

1. DATA LIST FOR AIRBAG ECU ASSEMBLY

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Body Electrical / SRS Airbag / Data List.
- (f) Check the values by referring to the table below.

SRS Airbag

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Passenger Classification	Passenger Classification/ NG: Data is not determined OFF: Vacant Child: Child (less than 32 kg (70.6 lb)) is seated AF05: Adult (36 to 54 kg (79.4 to 119.1 lb)) is seated AM50: Adult (more than 54 kg (119.1 lb)) is seated Fail: A failure is detected	OFF/Child/AF05/AM50	-
Driver Buckle SW	Driver Buckle SW/ Unset: The seat belt is not fastened Set: The seat belt is fastened NG: Data is not determined	Unset/Set	-
Number of DTC	Number of DTC/ Min.: 0, Max.: 255	0	-



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XFD0FVX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: DIAGNOSIS SYSTEM (2013 FR-S)		

DIAGNOSIS SYSTEM

1. FUNCTION OF SRS WARNING LIGHT

(a) Primary check

- (1) Turn the ignition switch off. Wait for at least 2 seconds, then turn the ignition switch to ON. The SRS warning light comes on for approximately 6 seconds and the diagnosis of the airbag system (including the seat belt pretensioners) is performed.

HINT:

If malfunctions are detected during the primary check, the SRS warning light remains on even after the primary check period of approximately 6 seconds.

(b) Constant check

- (1) After the primary check, the airbag ECU assembly constantly monitors the airbag system for malfunctions.

HINT:

If malfunctions are detected during the constant check, the airbag ECU assembly functions as follows:

- The SRS warning light comes on.
- The SRS warning light goes off, and then comes on. This indicates a source voltage drop. The SRS warning light goes off 10 seconds after the source voltage returns to normal.

(c) Review

- (1) When the airbag system is normal:

The SRS warning light comes on only during the primary check period of approximately 6 seconds after the ignition switch is turned to ON.

- (2) When the airbag system is malfunctioning:

- The SRS warning light remains on even after the primary check period.
- The SRS warning light goes off after the primary check, but comes on again during the constant check.
- The SRS warning light does not come on when turning the ignition switch from off to ON.

HINT:

The airbag ECU assembly keeps the SRS warning light on if airbags have been deployed.

2. SRS WARNING LIGHT CHECK

- (a) Turn the ignition switch to ON, and check that the SRS warning light comes on for approximately 6 seconds (primary check).



(b) Check that the SRS warning light goes off approximately 6 seconds after the ignition switch is turned to ON (constant check).

HINT:

When any of the following symptoms occur, refer to Problem Symptoms Table INFO.

- The SRS warning light comes on occasionally after the primary check period.
- The SRS warning light comes on, but a DTC is not output.
- The ignition switch is turned from off to ON, but the SRS warning light does not come on.

3. FUNCTION OF PASSENGER AIRBAG ON/OFF INDICATOR

(a) Initial check

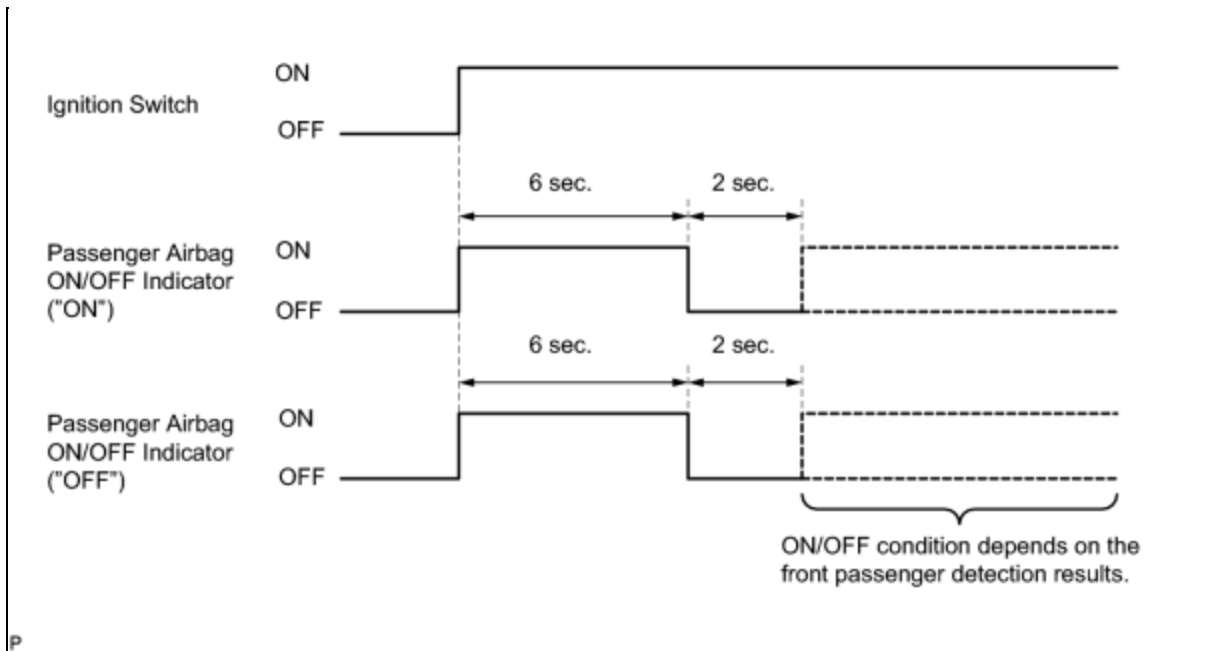
- (1) Turn the ignition switch to ON.
- (2) The passenger airbag ON/OFF indicator comes on for approximately 6 seconds, then goes off for approximately 2 seconds.
- (3) Approximately 6 seconds after the ignition switch is turned to ON, the passenger airbag ON/OFF indicator will indicate ON/OFF depending on the conditions listed below.

Indicator Operation

FRONT PASSENGER SEAT CONDITION	PASSENGER AIRBAG ON/OFF INDICATOR		SRS WARNING LIGHT
	ON INDICATOR	OFF INDICATOR	
Vacant	OFF	OFF	OFF
Adult is seated.	ON	OFF	OFF
Child is seated.	OFF	ON	OFF
Child restraint system is installed.			
Front passenger occupant classification failure	OFF	ON	ON

HINT:

- The passenger airbag ON/OFF indicator illuminates based on the timing chart below in order to check the indicator light circuit.
- When the occupant classification system has trouble, both the SRS warning light and passenger airbag ON/OFF indicator ("OFF") come on. In this case, check the DTCs in the airbag system first.



4. PASSENGER AIRBAG ON/OFF INDICATOR CHECK



(a) Turn the ignition switch to ON.

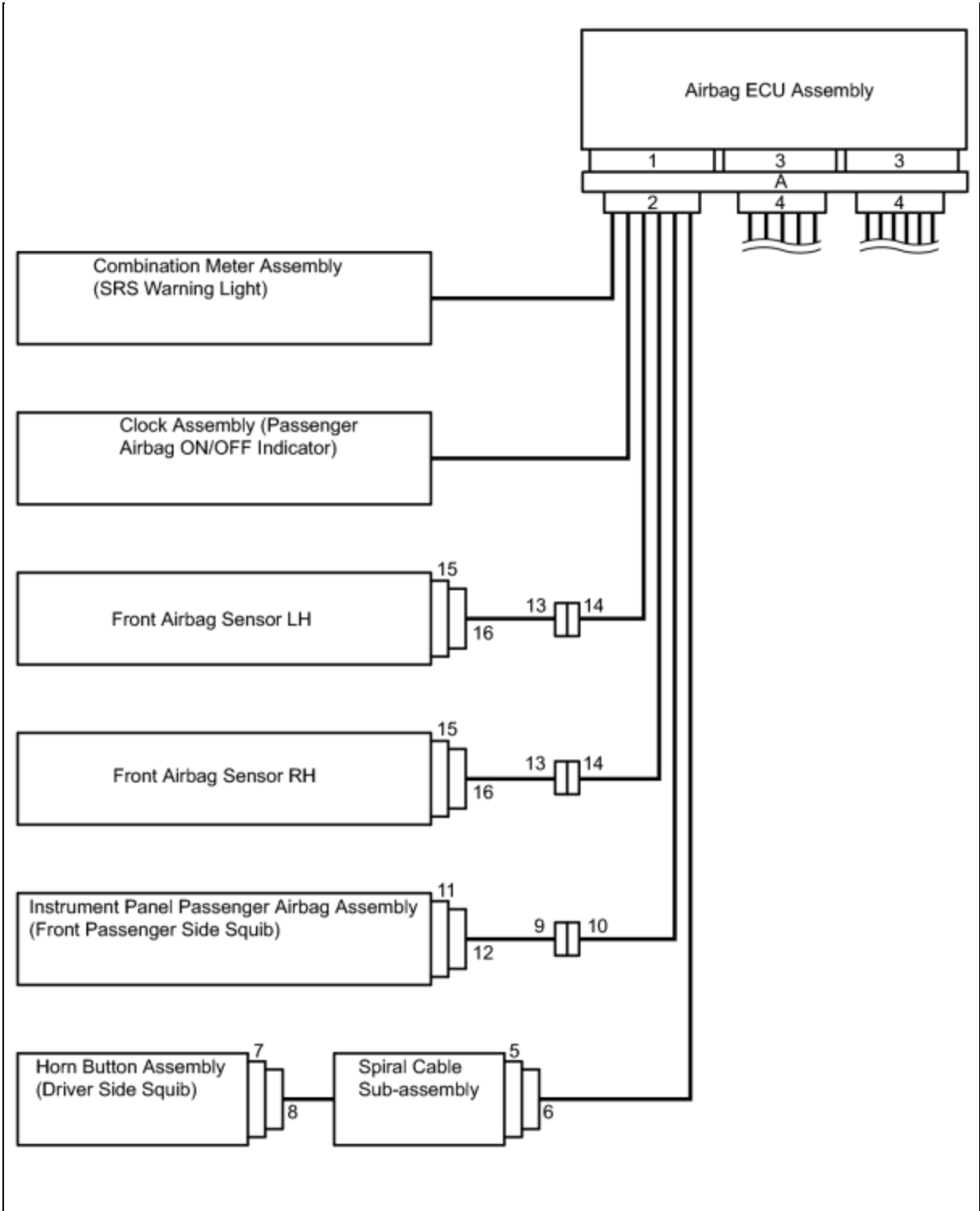
(b) Check that the passenger airbag ON/OFF indicator ("ON" and "OFF") comes on for approximately 6 seconds, then goes off for approximately 2 seconds.

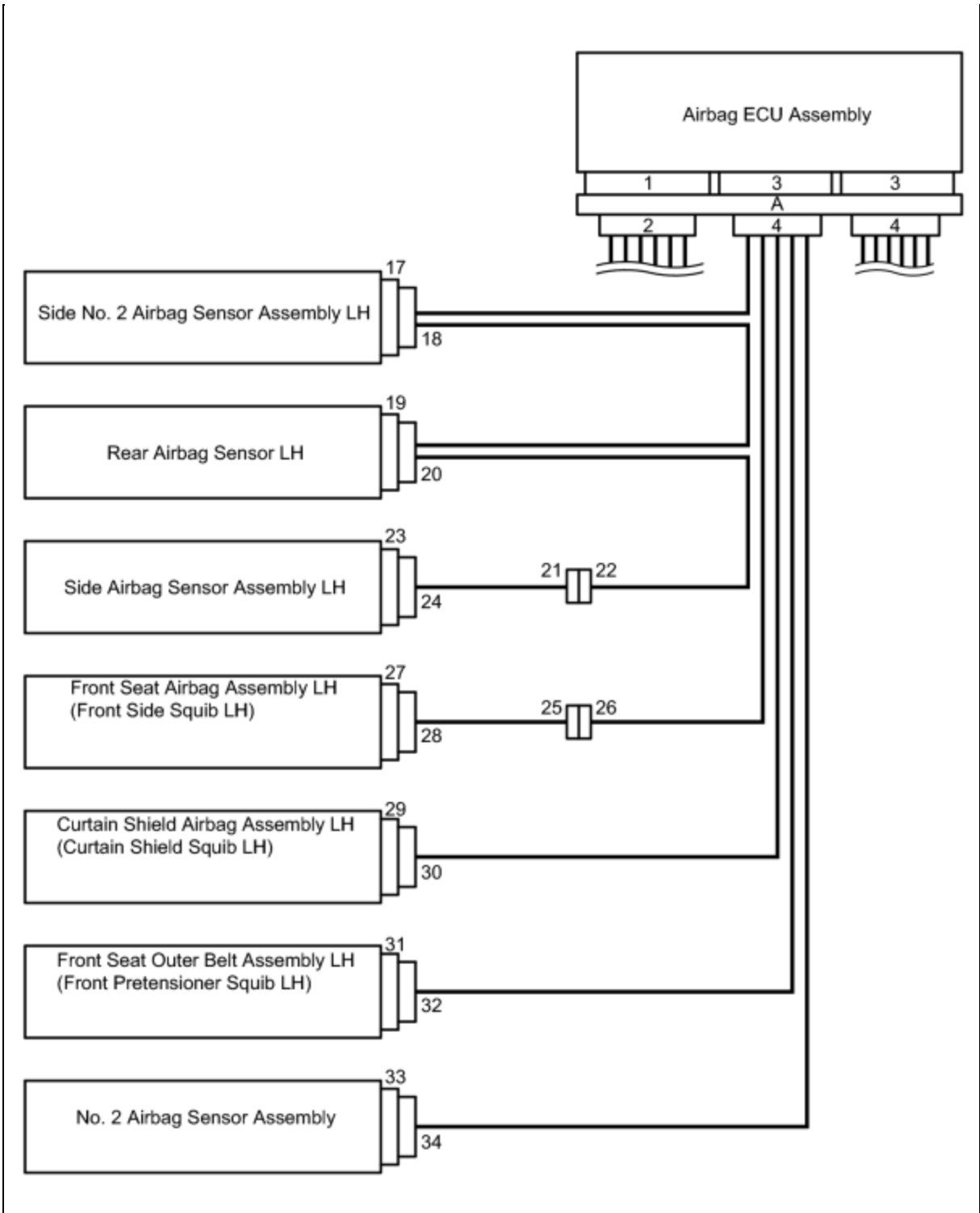
HINT:

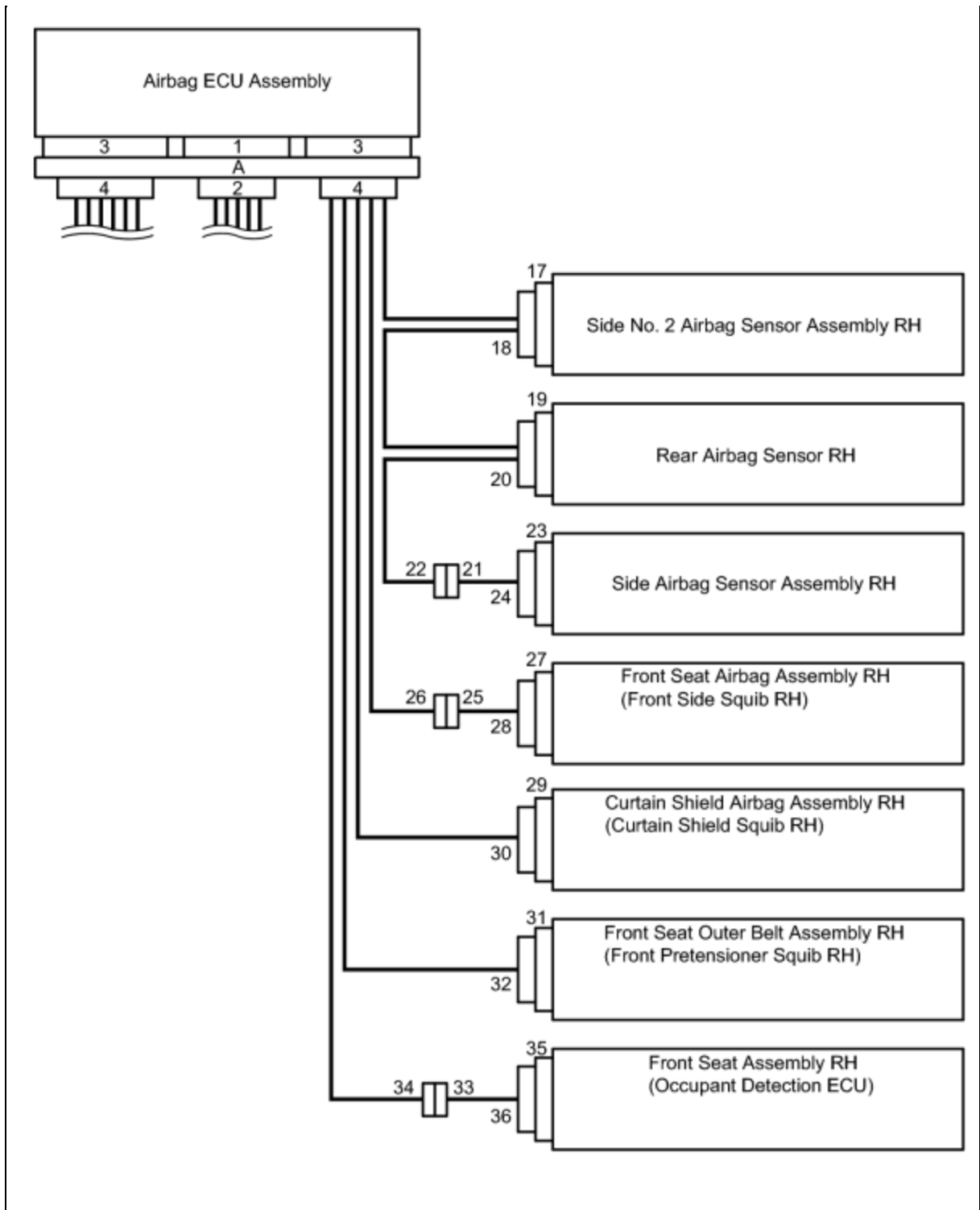
Refer to the indicator operation table in the preceding step regarding the passenger airbag ON/OFF indicator when the ignition switch is turned to ON and approximately 6 seconds elapse.

5. FUNCTION OF SRS CONNECTORS

(a) The SRS connectors are located as shown in the illustration.

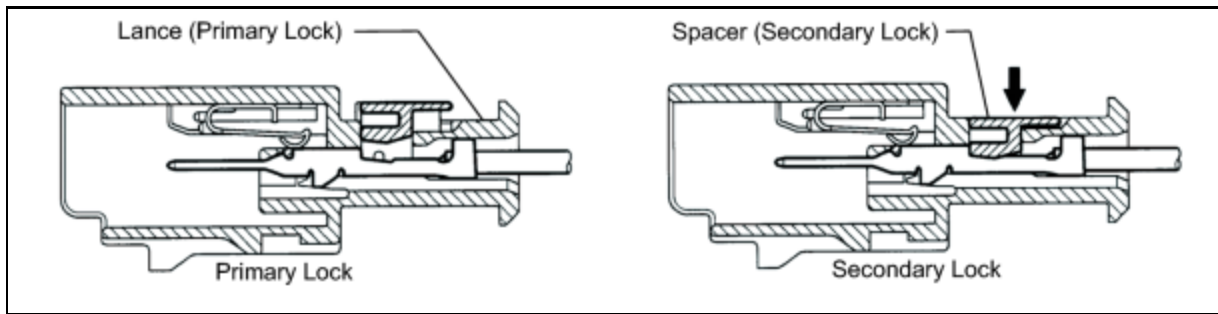






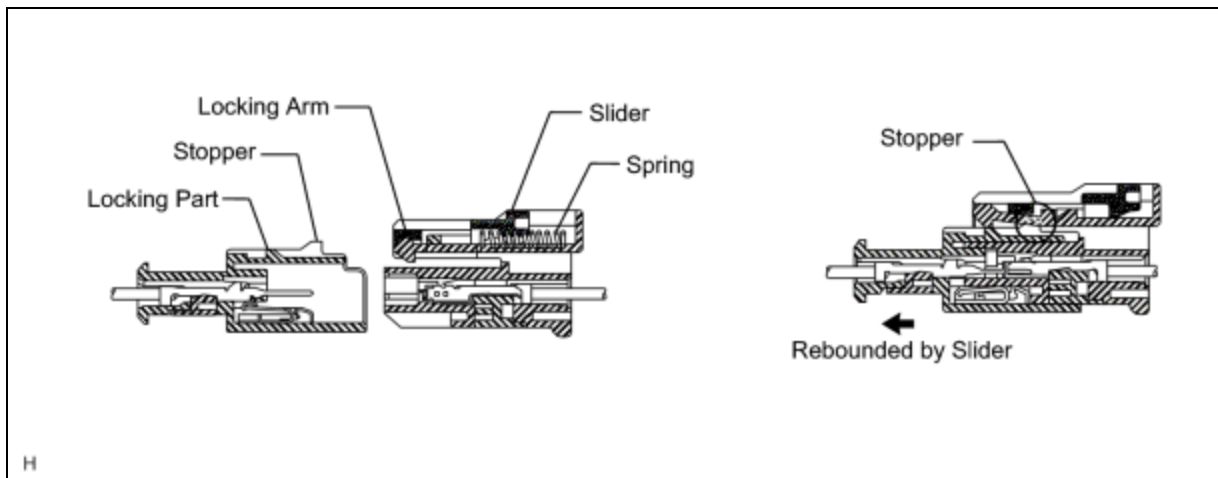
CONNECTOR TYPE	APPLICATION
Terminal Twin-lock Mechanism	Connectors 2, 4, 6, 9, 13, 21
Half Connection Prevention Mechanism	Connectors 6, 10
Activation Prevention Mechanism	Connectors 2, 4, 5, 7, 9, 11, 25, 27, 29, 31
Connector Lock Mechanism (1)	Connectors 8, 12, 30, 32
Connector Position Assurance Mechanism	Connectors 14, 16, 18, 20, 21, 24
Connector Lock Mechanism (2)	Connector A

(b) Terminal twin-lock mechanism



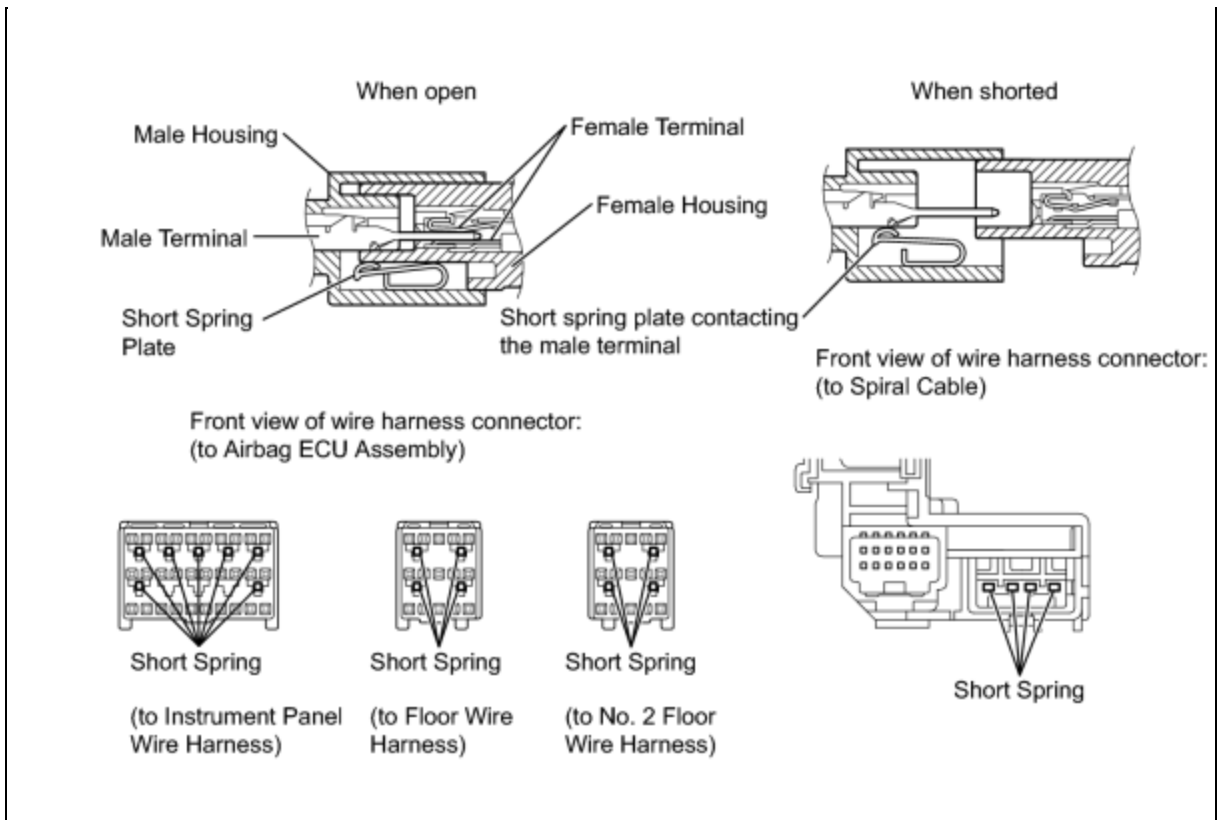
- (1) This mechanism is designed to increase the ability of the terminal to remain connected and prevent it from accidentally being disconnected.
- (2) The connector has a two-piece construction consisting of the housing and spacer to securely lock the terminal using both the lance (primary lock) and spacer (secondary lock).

(c) Half connection prevention mechanism

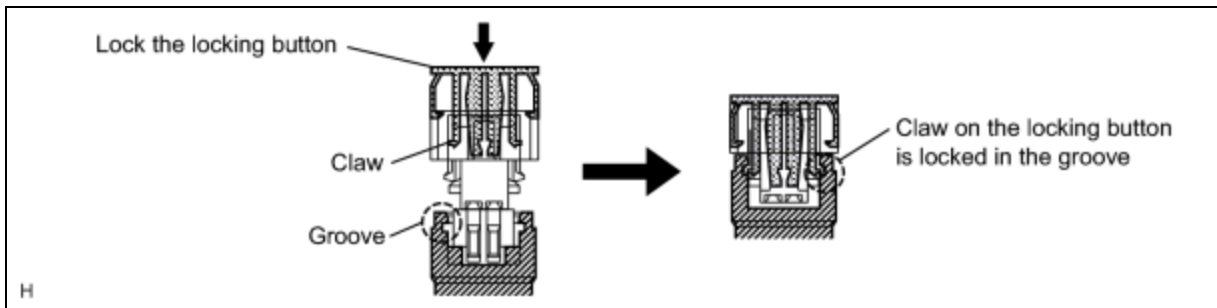


- (1) This mechanism is designed to prevent the connector from being connected only halfway.
- (2) If the connector is not completely connected, the connector is disconnected due to the spring force so that no continuity exists.

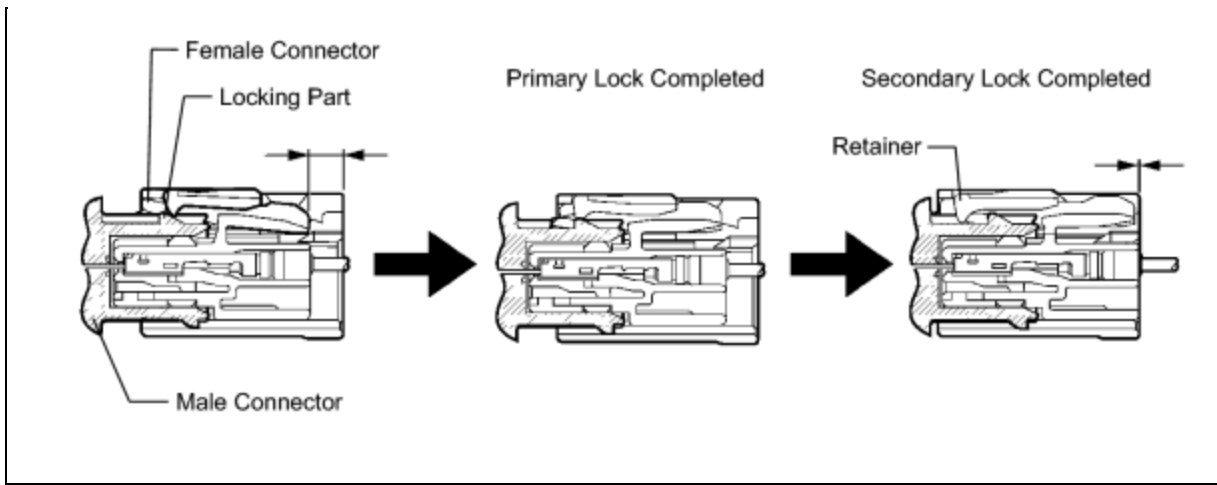
(d) Activation prevention mechanism



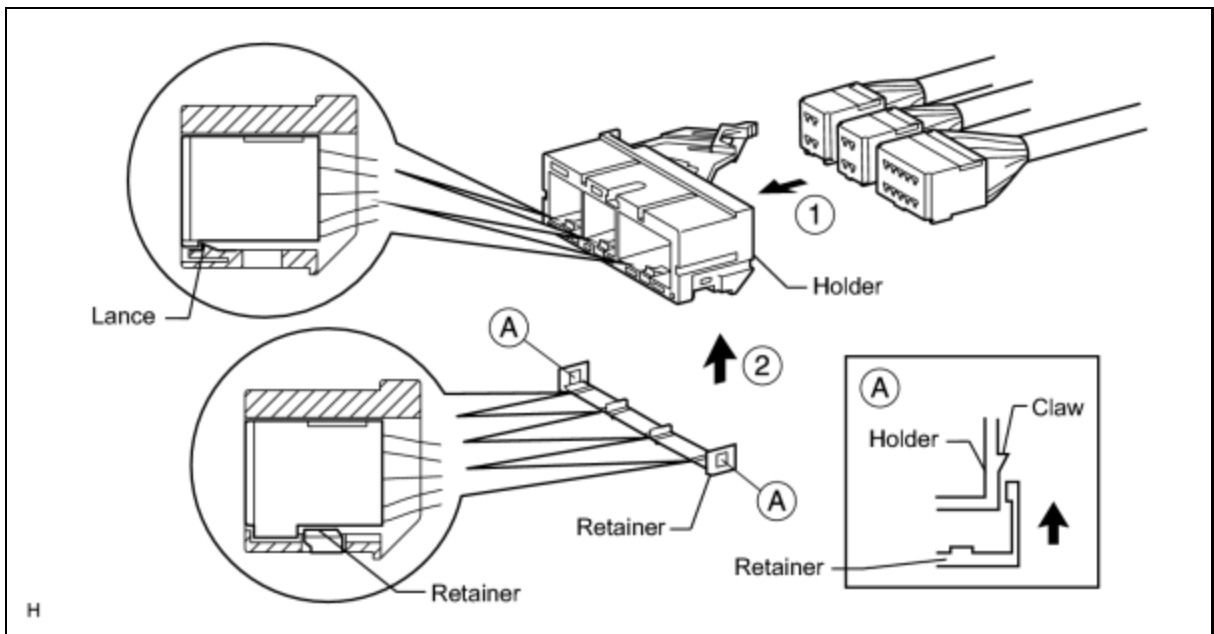
- (1) The activation prevention mechanism is designed to create a short circuit automatically between the positive and negative terminals of an airbag power source connector when disconnected.
 - (2) The short spring plate contained in the connector creates a closed circuit on the airbag side (no potential difference can occur between both terminals), preventing accidental airbag deployment when servicing.
- (e) Connector lock mechanism (1)



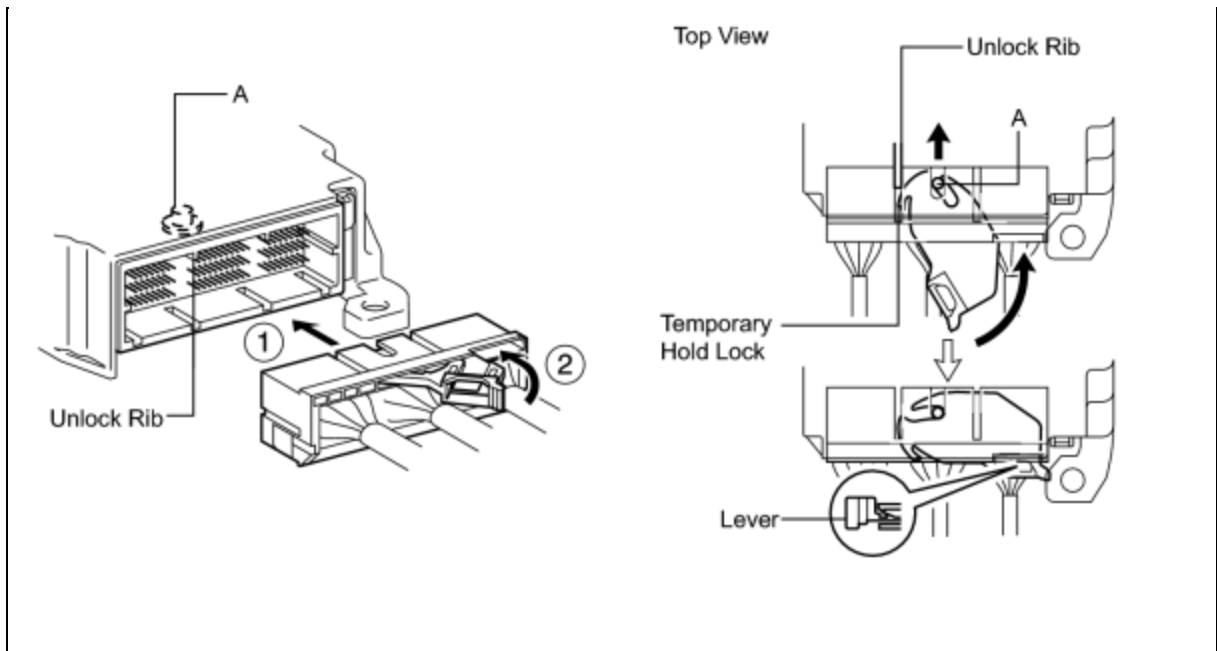
- (1) This mechanism is designed to prevent the connector from accidentally being disconnected.
 - (2) Locking the connector lock button engages the locking button claw to the groove on the other side connector to connect the connector securely.
- (f) Connector Position Assurance (CPA) mechanism



- (1) This mechanism is designed to detect when the connector is connected only halfway.
 - (2) The CPA and female connector slide to the male connector side at the same time and the primary lock is completed when the female connector is engaged with the male connector. From this point, only the CPA slides to the male connector side and secondary lock is completed when the CPA retainer is engaged with the female connector. When the CPA and female connector ends are aligned, they are completely engaged.
- (g) Connector lock mechanism (2)



- (1) This mechanism is designed to prevent the connector from accidentally being disconnected.
 - (2) Sliding the connector all the way into the holder and locking the lance completes the primary lock.
 - (3) Engaging the retainer to the holder as shown in the illustration completes the secondary lock, preventing the connector from accidentally being disconnected.
- (h) Improper connection prevention lock mechanism



- (1) This mechanism is designed to prevent the connector from being connected only halfway.
- (2) When the holder is connected to the airbag ECU assembly, the unlock rib unlocks the temporary hold lock, allowing the lever to be pushed in by rotating around the axis A.
- (3) Locking the lever to the holder locks the holder securely.

6. ACTIVATION PREVENTION MECHANISM

(a) Function of activation prevention mechanism

- (1) An activation prevention mechanism is built into the connector (on the airbag ECU assembly side) of the airbag system squib circuit to prevent accidental airbag activation.
- (2) This mechanism closes the circuit when the connector is disconnected by bringing the short spring into contact with the terminals and insulating the circuit from external power sources to prevent accidental airbag activation.

(b) Releasing of activation prevention mechanism

- (1) To release the activation prevention mechanism, insert a piece of paper with the same thickness as the male terminal (approximately 0.5 mm (0.0197 in.)) between the terminals and short spring to break the connection.
- (2) Refer to the following illustrations concerning connectors utilizing the activation prevention mechanism and its release method.

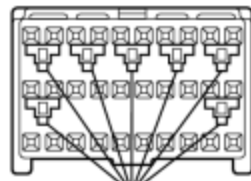
CAUTION:

Never release the activation prevention mechanism on the squib connector even when inspecting with the squib disconnected.

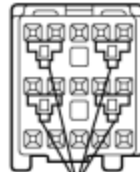
NOTICE:

- Do not release the activation prevention mechanism unless specially directed by the troubleshooting procedure.
- To prevent the terminal and short spring from being damaged, always use a piece of paper with the same thickness as the male terminal.

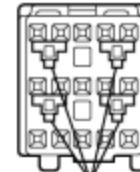
Airbag ECU Assembly Connector:



Short Spring

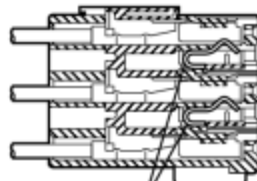


Short Spring

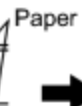


Short Spring

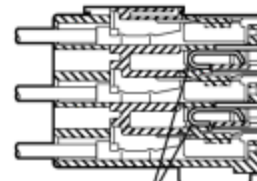
Before Release



Short Spring

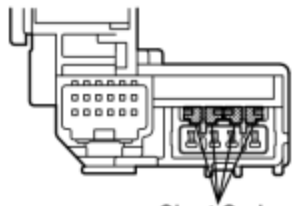


After Release



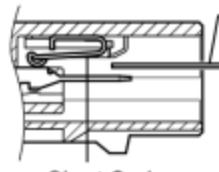
Short Spring

Spiral Cable Connector:



Short Spring

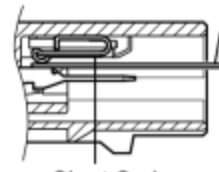
Before Release



Short Spring



After Release



Short Spring

Last Modified: 3-27-2012	6.4 S	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XF70C2X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: DIAGNOSTIC TROUBLE CODE CHART (2013 FR-S)		

DIAGNOSTIC TROUBLE CODE CHART

If a trouble code is displayed during the DTC check, check the trouble areas listed for the code in the table below (refer to the appropriate page).

HINT:

- When the SRS warning light remains on and the DTC is output (or the normal system code is output), this may be due to a source voltage drop. This malfunction is not stored in memory by the airbag ECU assembly. If the power source voltage returns to normal, the SRS warning light will automatically go off.
- When 2 or more codes are indicated, the code with the lower number appears first.
- If a code is not listed on the display chart, the airbag ECU assembly may have failed.
- In the case of any malfunction concerning an open circuit, short to ground, or short to B+ due to a squib, other trouble codes may not be detected. In this case, repair the malfunction currently indicated and then perform malfunction diagnosis again.
- Mark in the check mode column:

*1: DTC does not apply to check mode.

*2: DTC applies to check mode.

Airbag System

DTC CODE	DETECTION ITEM	CHECK MODE	SEE PAGE
B1000	Airbag ECU Assembly Malfunction	*1	INFO
B1610	Front Airbag Sensor RH Malfunction	*1	INFO
B1612	Front Airbag Sensor RH Lost Communication	*1	INFO
B1613	Front Airbag Sensor RH Initialization	*1	INFO
B1615	Front Airbag Sensor LH Malfunction	*1	INFO
B1617	Front Airbag Sensor LH Lost Communication	*1	INFO
B1618	Front Airbag Sensor LH Initialization	*1	INFO
B161A	Lost Communication with Front Satellite Sensor Bus	*1	INFO
B1620	Side Airbag Sensor RH Circuit Malfunction	*1	INFO
B1622	Side Airbag Sensor RH Lost Communication	*1	INFO
B1623	Side Airbag Sensor RH Initialization	*1	INFO
B1625	Side Airbag Sensor LH Circuit Malfunction	*1	INFO
B1627	Side Airbag Sensor LH Lost Communication	*1	INFO
B1628	Side Airbag Sensor LH Initialization	*1	INFO
B1630	Side No. 2 Airbag Sensor RH Malfunction	*1	INFO

B1632	Side No. 2 Airbag Sensor RH Lost Communication	*1	INFO
B1633	Side No. 2 Airbag Sensor RH Initialization	*1	INFO
B1635	Side No. 2 Airbag Sensor LH Malfunction	*1	INFO
B1637	Side No. 2 Airbag Sensor LH Lost Communication	*1	INFO
B1638	Side No. 2 Airbag Sensor LH Initialization	*1	INFO
B1642	Side Satellite Sensor Bus Lost Communication (RH)	*1	INFO
B1647	Side Satellite Sensor Bus Lost Communication (LH)	*1	INFO
B1650	Occupant Classification System Malfunction	*1	INFO
B1655	Seat Belt Buckle Switch (RH)	*1	INFO
B1660	P Seat Airbag Active Mode Indicator	*1	INFO
B1675	Rear Floor Airbag Sensor	*1	INFO
B1678	Lost Communication with Rear Floor Airbag Sensor LH	*1	INFO
B1679	Rear Floor Airbag Sensor LH Initialization Incomplete	*1	INFO
B1690	Side Airbag Sensor RH	*1	INFO
B1692	Lost Communication with Side Airbag Sensor RH	*1	INFO
B1693	Side Airbag Sensor RH Initialization Incomplete	*1	INFO
B1695	Side Airbag Sensor LH	*1	INFO
B1697	Lost Communication with Side Airbag Sensor LH	*1	INFO
B1698	Side Airbag Sensor LH Initialization Incomplete	*1	INFO
B16F1	Passenger Side Belt Warning Indicator Circuit	*1	INFO
B16F2	Front Airbag Sensor RH Mismatch	*1	INFO
B16F3	Front Airbag Sensor LH Mismatch	*1	INFO
B16F4	Side Airbag Sensor RH Mismatch	*1	INFO
B16F5	Side Airbag Sensor LH Mismatch	*1	INFO
B16F6	Side No. 2 Airbag Sensor RH Mismatch	*1	INFO
B16F7	Side No. 2 Airbag Sensor LH Mismatch	*1	INFO
B16F8	Rear Floor Airbag Sensor RH Mismatch	*1	INFO
B16F9	Door Side Airbag Sensor RH Mismatch	*1	INFO
B16FA	Door Side Airbag Sensor LH Mismatch	*1	INFO
B1800	Short in D Squib Circuit	*2	INFO
B1801	Open in D Squib Circuit	*2	INFO
B1802	Short in D Squib Circuit (to Ground)	*2	INFO
B1803	Short in D Squib Circuit (to +B)	*2	INFO
B1805	Short in P Squib Circuit	*2	INFO
B1806	Open in P Squib Circuit	*2	INFO

B1807	Short in P Squib Circuit (to Ground)	*2	INFO
B1808	Short in P Squib Circuit (to +B)	*2	INFO
B1810	Short in D Squib (Dual Stage - 2nd Step) Circuit	*2	INFO
B1811	Open in D Squib (Dual Stage - 2nd Step) Circuit	*2	INFO
B1812	Short in D Squib (Dual Stage - 2nd Step) Circuit (to Ground)	*2	INFO
B1813	Short in D Squib (Dual Stage - 2nd Step) Circuit (to +B)	*2	INFO
B1815	Short in P Squib (Dual Stage - 2nd Step) Circuit	*2	INFO
B1816	Open in P Squib (Dual Stage - 2nd Step) Circuit	*2	INFO
B1817	Short in P Squib (Dual Stage - 2nd Step) Circuit (to Ground)	*2	INFO
B1818	Short in P Squib (Dual Stage - 2nd Step) Circuit (to +B)	*2	INFO
B1820	Short in Side Squib (RH) Circuit	*2	INFO
B1821	Open in Side Squib (RH) Circuit	*2	INFO
B1822	Short in Side Squib (RH) Circuit (to Ground)	*2	INFO
B1823	Short in Side Squib (RH) Circuit (to +B)	*2	INFO
B1825	Short in Side Squib (LH) Circuit	*2	INFO
B1826	Open in Side Squib (LH) Circuit	*2	INFO
B1827	Short in Side Squib (LH) Circuit (to Ground)	*2	INFO
B1828	Short in Side Squib (LH) Circuit (to +B)	*2	INFO
B1830	Short in Curtain Shield Airbag (RH) Squib Circuit	*2	INFO
B1831	Open in Curtain Shield Airbag (RH) Squib Circuit	*2	INFO
B1832	Short in Curtain Shield Airbag (RH) Squib Circuit (to Ground)	*2	INFO
B1833	Short in Curtain Shield Airbag (RH) Squib Circuit (to +B)	*2	INFO
B1835	Short in Curtain Shield Airbag (LH) Squib Circuit	*2	INFO
B1836	Open in Curtain Shield Airbag (LH) Squib Circuit	*2	INFO
B1837	Short in Curtain Shield Airbag (LH) Squib Circuit (to Ground)	*2	INFO
B1838	Short in Curtain Shield Airbag (LH) Squib Circuit (to +B)	*2	INFO
B1900	Short in P/T Squib (RH) Circuit	*2	INFO
B1901	Open in P/T Squib (RH) Circuit	*2	INFO
B1902	Short in P/T Squib (RH) Circuit (to Ground)	*2	INFO
B1903	Short in P/T Squib (RH) Circuit (to +B)	*2	INFO
B1905	Short in P/T Squib (LH) Circuit	*2	INFO
B1906	Open in P/T Squib (LH) Circuit	*2	INFO
B1907	Short in P/T Squib (LH) Circuit (to Ground)	*2	INFO
B1908	Short in P/T Squib (LH) Circuit (to +B)	*2	INFO

U0073

Control Module Communication Bus OFF

*1

INFO



TOYOTA

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XFE0G0X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: DTC CHECK / CLEAR (2013 FR-S)		

DTC CHECK / CLEAR

1. DTC CHECK (USING TECHSTREAM)

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON, and wait for approximately 60 seconds.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Body Electrical / SRS Airbag / Trouble Codes.
- (f) Check for DTCs by following the prompts on the Techstream screen.

HINT:

Refer to the Techstream operator's manual for further details.

2. DTC CLEAR (USING TECHSTREAM)

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON, and wait for approximately 60 seconds.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Body Electrical / SRS Airbag / Trouble Codes.
- (f) Clear the DTCs by following the prompts on the Techstream screen.

HINT:

Refer to the Techstream operator's manual for further details.



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XF60F7X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedure to troubleshoot the airbag system.
- *: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	CUSTOMER PROBLEM ANALYSIS
-----------	----------------------------------

(a) Confirm problem symptoms INFO.

NEXT



3.	CHECK CAN COMMUNICATION SYSTEM*
-----------	--

(a) Use the Techstream to check if the CAN communication system is functioning normally.

HINT:

- Refer to Bus Check for the CAN communication system INFO.
- The airbag ECU assembly is connected to the CAN communication system. Therefore, before starting troubleshooting, make sure to check that there is no trouble in the CAN communication system.

Result:


RESULT	PROCEED TO
CAN communication DTC is not output.	A
CAN communication DTC is output.	B

B **GO TO CAN COMMUNICATION SYSTEM**

A



4.	SRS WARNING LIGHT CHECK
-----------	--------------------------------

(a) Proceed to Diagnosis System  .

NEXT




5.	CHECK FOR DTC*
-----------	-----------------------

(a) Proceed to DTC Check / Clear  .

Result:

RESULT	PROCEED TO
DTC is output.	A
DTC is not output.	B

B  Go to step 7

A




6.	DIAGNOSTIC TROUBLE CODE CHART
-----------	--------------------------------------

(a) Proceed to Diagnostic Trouble Code Chart  .

NEXT  Go to step 9

7.	SYMPTOM SIMULATION
-----------	---------------------------

(a) Proceed to How to Proceed with Troubleshooting  .

NEXT



8.	PROBLEM SYMPTOMS TABLE
----	------------------------

(a) Proceed to Problem Symptoms Table [INFO](#) .

NEXT



9.	CIRCUIT INSPECTION*
----	---------------------

NEXT



10.	IDENTIFICATION OF PROBLEM
-----	---------------------------

NEXT



11.	REPAIR OR REPLACEMENT
-----	-----------------------

NEXT



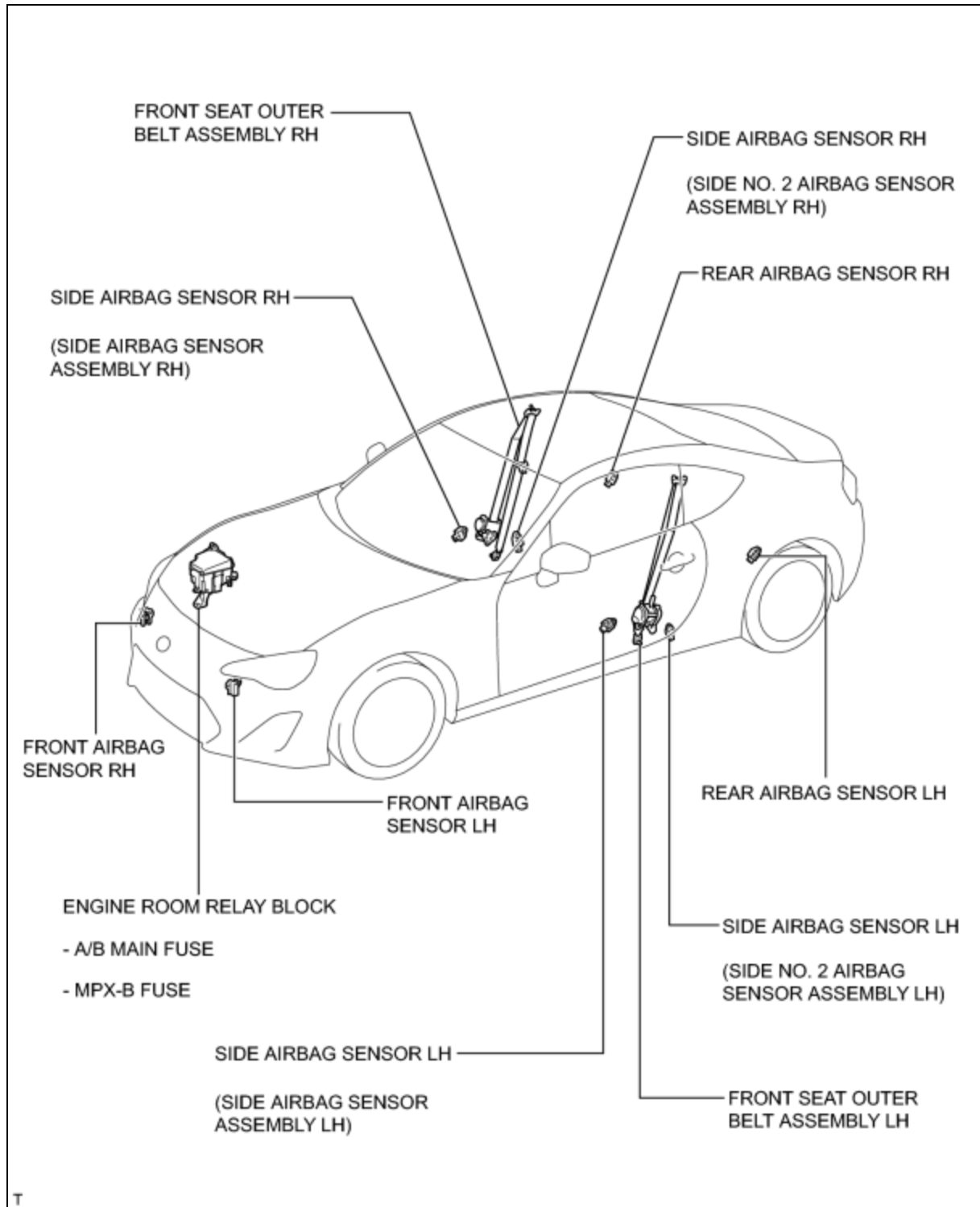
12.	CONFIRMATION TEST
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NEXT **END**

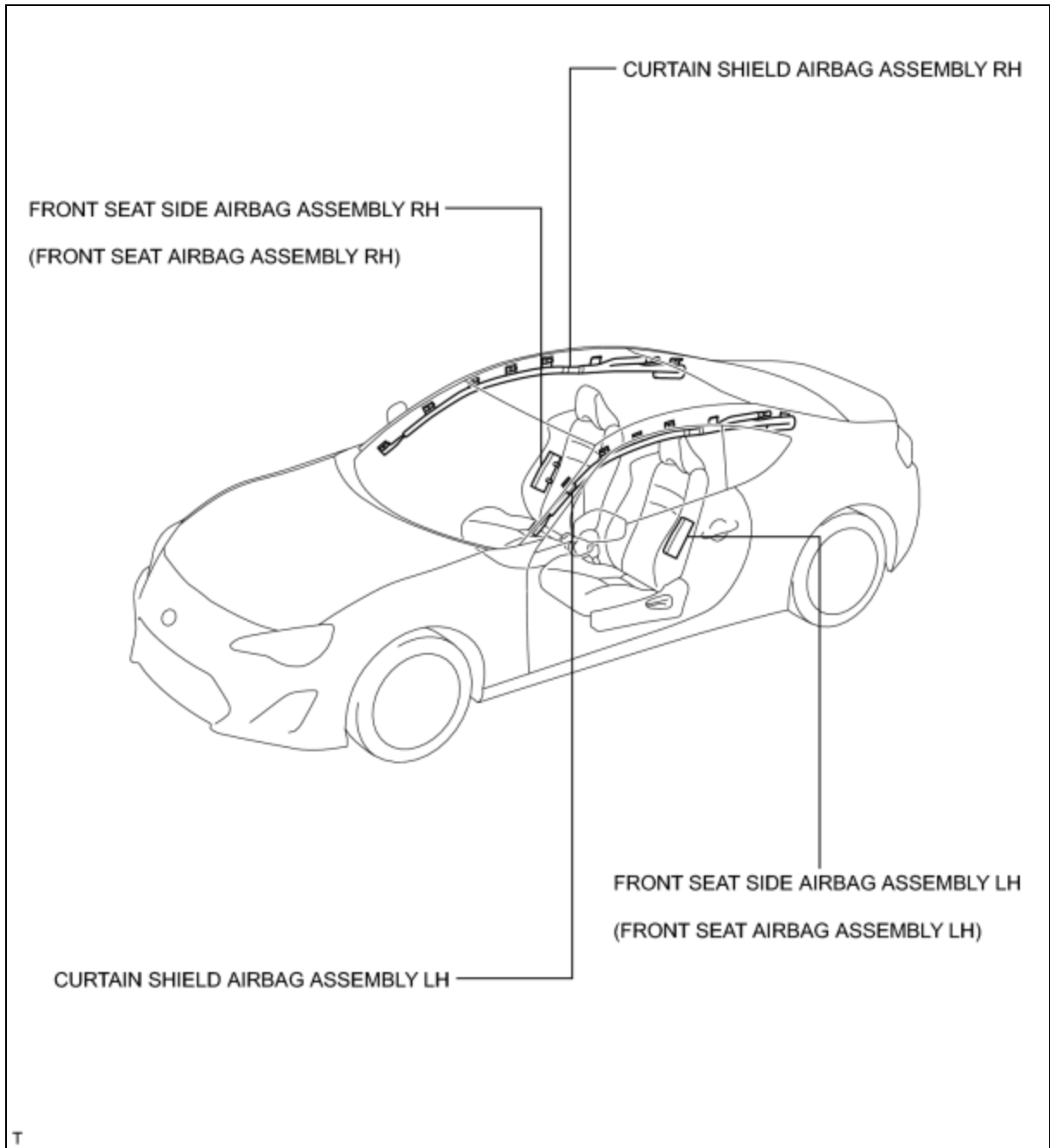
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003XTA014X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

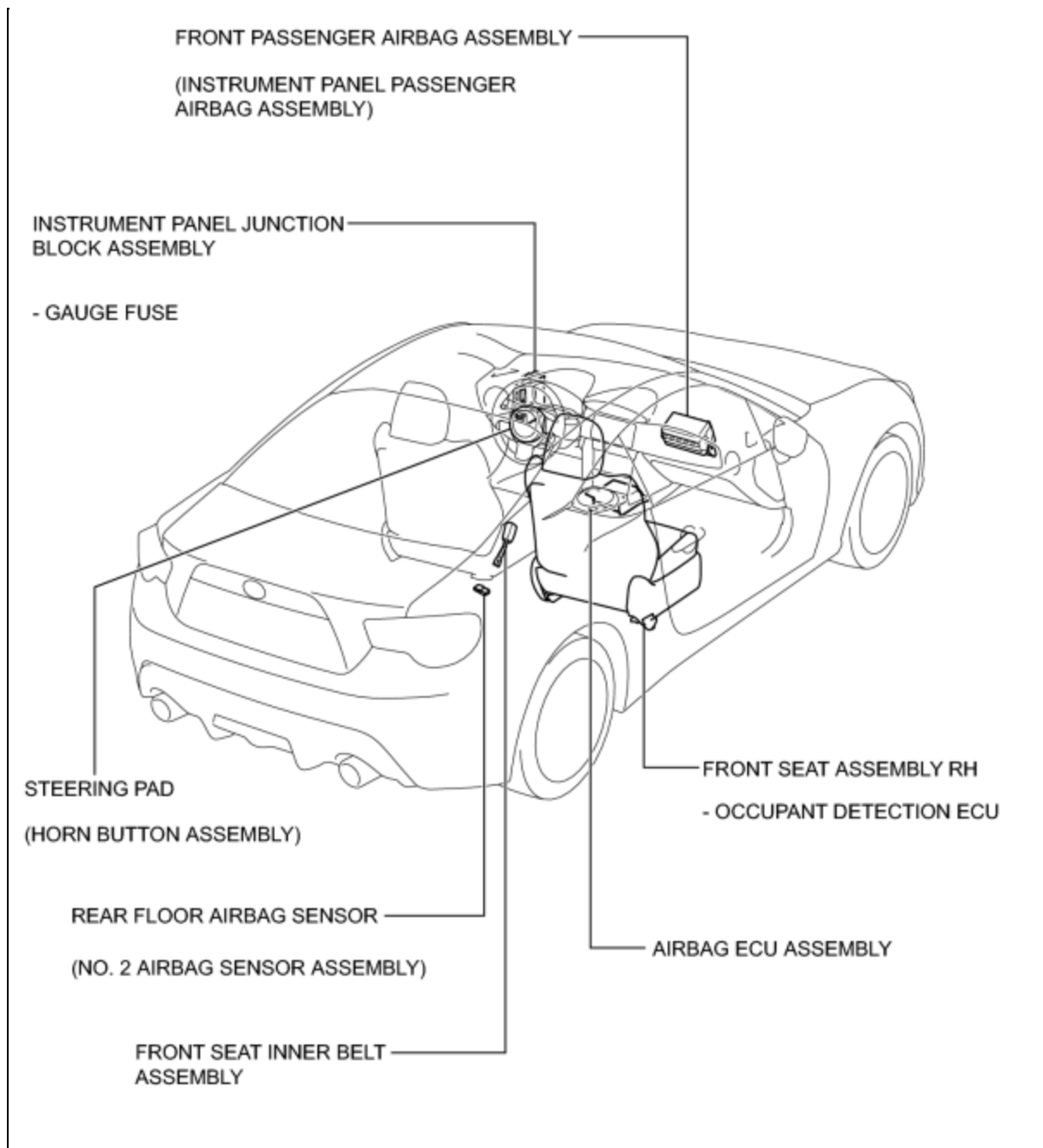
ILLUSTRATION



ILLUSTRATION



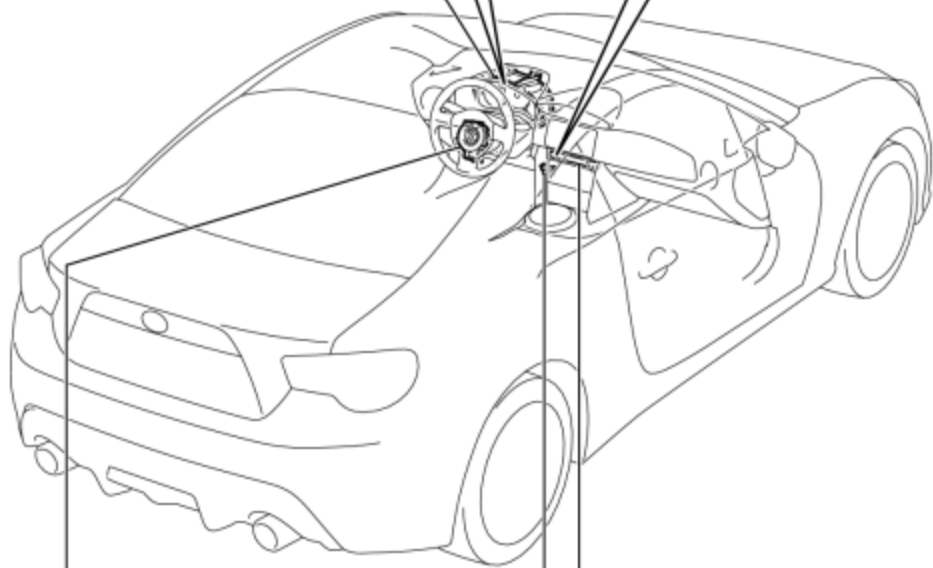
ILLUSTRATION



ILLUSTRATION



COMBINATION METER ASSEMBLY



SPIRAL CABLE
(SPIRAL CABLE SUB-ASSEMBLY)

CLOCK ASSEMBLY

DLC3

Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000KT10FZX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

HINT:

In the airbag system, the following parts listed below are collectively referred to as the airbag sensors.

- Airbag ECU assembly
- Front airbag sensors
- Side airbag sensor assemblies
- Side No. 2 airbag sensor assemblies
- Rear airbag sensors
- No. 2 airbag sensor assembly

HINT:

The following parts listed below are collectively referred to as the SRS parts.

- Horn button assembly
- Instrument panel passenger airbag assembly
- Curtain shield airbag assemblies
- Front seat airbag assemblies
- Front seat outer belt assemblies


1. PRECAUTION FOR HANDLING SRS SYSTEM

- (a) Failure to carry out service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Furthermore, if a mistake is made when servicing the SRS, it is possible that the SRS may fail to operate when required. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully, then follow the procedures exactly as indicated in the repair manual.

2. PRECAUTION FOR DISCONNECTING CABLE FROM NEGATIVE BATTERY TERMINAL

- (a) As SRS malfunctions are difficult to confirm, the Diagnostic Trouble Codes (DTCs) become the most important source of information when troubleshooting. When troubleshooting the SRS, always check for DTCs before disconnecting the cable from the negative (-) battery terminal.

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work  .

- (b) When the cable is disconnected from the negative (-) battery terminal, the memory of various systems will be cleared. Because of this, be sure to make a record of the contents memorized in each system before starting work. When work is finished, adjust each system to its previous state.

3. GENERAL PRECAUTION

- (a) Use a voltmeter/ohmmeter with high impedance (minimum = 10 kΩ) for troubleshooting electrical circuits.
- (b) Information labels are attached to the SRS parts. Follow the instructions on the labels.

- (c) Never disassemble or attempt to repair any of the SRS parts.
- (d) If any of the SRS parts are dropped, or if any cracks, dents or other defects are found, replace them with new parts.
- (e) Never use SRS parts from another vehicle. When replacing parts, use new parts.
- (f) Do not expose any of the SRS parts directly to high temperatures or flames.
- (g) If the vehicle has been involved in a minor collision where the SRS does not deploy, the SRS parts should be inspected before further use of the vehicle.
- (h) Do not apply grease, detergent, oil or water to the SRS parts. If applied, immediately wipe it off with a dry cloth.
- (i) When deploying or storing the SRS parts, avoid places with a high temperature (ambient temperature of 93°C (199°F) or higher for an airbag and 80°C (176°F) or higher for a pretensioner) and high humidity, and keep them away from electrical noise.
- (j) Do not stack or place anything on top of the SRS parts.
- (k) When disposing of the vehicle or an SRS part by itself, deploy it using SST before disposal. Deploy the SRS parts in a safe place away from electrical noise.

HINT:

- Horn button assembly INFO
- Instrument panel passenger airbag assembly INFO
- Curtain shield airbag assemblies INFO
- Front seat airbag assemblies INFO
- Front seat outer belt assemblies INFO

- (l) Never inspect the resistance of the SRS parts.

CAUTION:

Never measure the resistance of the SRS parts because current from the tester may cause the SRS parts to deploy.

4. PRECAUTION FOR DISPOSAL OF SRS PARTS (NOT DEPLOYED)

- (a) Before performing pre-disposal deployment of any SRS parts, review and closely follow all applicable environmental and hazardous material regulations. Pre-disposal deployment may be considered hazardous material treatment.
- (b) Never dispose of any SRS parts that are not deployed.
- (c) Deploy the SRS parts outdoors in a safe and level place where it will not disturb nearby residents.
- (d) As the SRS parts produce a loud sound when deployed, be sure to inform nearby residents before deployment.
- (e) When deploying the SRS parts, always use SST and keep people at least 10 m (32.8 ft.) away.
- (f) The SRS parts may be accidentally deployed by static electricity. To prevent this, be sure to touch a grounded metal surface with your bare hands to discharge any static electricity before handling the SRS parts.
- (g) Do not face the airbag deployment side down when deploying an airbag.

5. PRECAUTION FOR DISPOSAL OF SRS PARTS (DEPLOYED)

- (a) As the SRS parts are very hot after being deployed, allow at least 30 minutes for them to cool down sufficiently before disposal.
- (b) Do not apply water etc. to any deployed SRS parts.
- (c) Use gloves and safety glasses when handling any deployed SRS parts.

- (d) Seal the deployed SRS parts in a thick clear plastic bag when disposing them.
- (e) Always wash your hands with water after disposing of deployed SRS parts.

6. PRECAUTION FOR HORN BUTTON ASSEMBLY, INSTRUMENT PANEL PASSENGER AIRBAG ASSEMBLY, CURTAIN SHIELD AIRBAG ASSEMBLY AND FRONT SEAT AIRBAG ASSEMBLY

- (a) Keep the airbag deployment side facing upward even when the airbag is temporarily removed during an operation.

CAUTION:

Always place a removed or new airbag with the deployment surface facing upward. Placing the airbag with the deployment surface facing downward could cause a serious accident if the airbag deploys.


7. PRECAUTION FOR FRONT SEAT OUTER BELT ASSEMBLY (PRETENSIONER)

- (a) Do not touch the area around the retractor even when the pretensioner is temporarily removed during an operation.

CAUTION:

If the retractor unexpectedly operates and the belt is retracted during an operation, it could cause a serious accident.

8. PRECAUTION FOR SPIRAL CABLE SUB-ASSEMBLY

- (a) Do not replace the spiral cable sub-assembly with the battery connected and the ignition switch ON.
- (b) Do not rotate the spiral cable sub-assembly without the steering wheel with the battery connected and the ignition switch ON.
- (c) Ensure that the steering wheel is installed and aligned straight when inspecting the steering sensor.
- (d) When rotating the spiral cable sub-assembly, make sure to push on the interlock to release the interlock mechanism.
- (e) Removing the steering sensor from the spiral cable sub-assembly without using a lock pin may result in a misaligned center position of the steering sensor. Therefore, make sure to use the lock pin provided with a new spiral cable sub-assembly or steering sensor when removing the steering sensor from the spiral cable sub-assembly.
- (f) Be sure that the spiral cable is in the neutral position during installation and when removing and installing the steering wheel .

CAUTION:

If the steering wheel is turned without the spiral cable installed in the neutral position, the cable may break.

9. PRECAUTION FOR AIRBAG SENSORS

- (a) Perform a diagnostic system check.
- (b) When the SRS parts are deployed (including when only an airbag or pretensioner is deployed) due to a collision, be sure to replace all sensors in the damaged areas (anywhere in need of repair) and Airbag ECU assembly.
- (c) Visually check the airbag sensors in undamaged areas for defects.
 - (1) The defects are as follows:
 - Cracks on the sensor housing
 - Dents on the sensor housing
 - Chips on the sensor housing
 - Cracks or other damage to the connector

- Damage to the serial number

OK:

No defects are found.

If any of the defects is found or an airbag sensor has detected a major collision, replace the airbag sensor with a new one.

10. PRECAUTION FOR WIRE HARNESS AND CONNECTOR

- (a) All wire harnesses except unexposed harnesses in the engine room are colored yellow.
- (b) As special connectors are used, be careful when handling them.

11. WHEN SERVICING DAMAGED VEHICLE

- (a) Before using an electric welder on the vehicle, remove any SRS parts around the area being repaired.

CAUTION:

Make sure to remove any SRS parts as necessary to prevent them from accidentally deploying.

- (b) Before repairs, remove the airbag sensor assemblies if impacts are likely to be applied to the sensor during repairs.
- (c) Never expose an airbag sensor directly to high temperatures.
- (d) As the SRS parts are very hot after being deployed, ensure that all wire harnesses and connectors around deployed SRS parts are not damaged.

12. CONDITIONS WHEN INSPECTION OF SRS PARTS IS NECESSARY

- (a) When the vehicle is damaged in a collision even when the SRS parts are not deployed.
- (b) When an SRS system DTC is output.



Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XFA09MX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Airbag System

SYMPTOM	SUSPECTED AREA	SEE PAGE
The SRS warning light goes off after the primary check, but then comes on.	SRS Warning Light Remains ON	INFO
When the ignition switch is turned to ON, the SRS warning light sometimes comes on after approximately 6 seconds.	SRS Warning Light Remains ON	INFO
The SRS warning light always comes on even when a DTC is not output.	SRS Warning Light Remains ON	INFO
When the ignition switch is turned to ON, the SRS warning light does not come on.	SRS Warning Light does not Come ON	INFO

Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000YE30EQX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: SRS Warning Light does not Come ON (2013 FR-S)		

[SRS Warning Light does not Come ON](#)

DESCRIPTION

The SRS warning light is located on the combination meter assembly.

When the SRS is normal, the SRS warning light comes on for approximately 6 seconds after the ignition switch is turned from off to ON, and then goes off automatically.

If there is a malfunction in the SRS, the SRS warning light comes on to inform the driver of a problem.

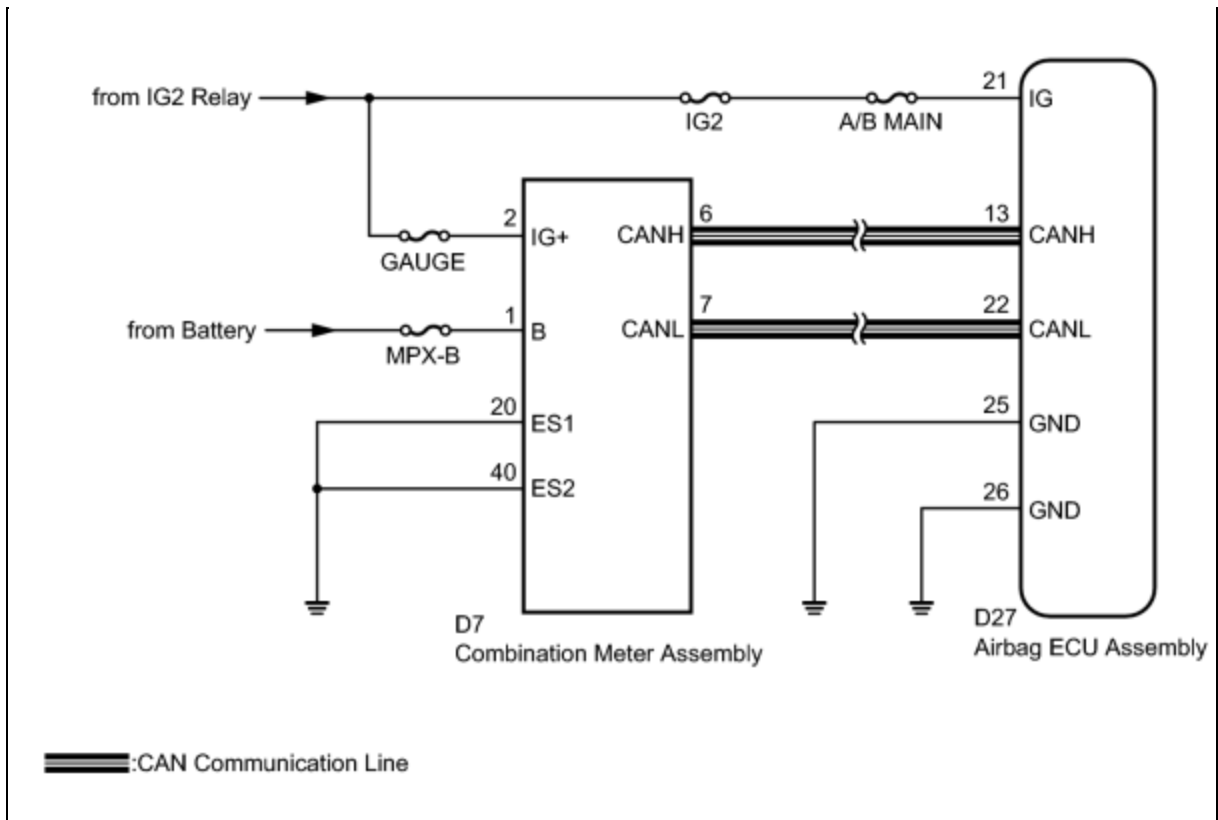
The SRS is equipped with a voltage-increase circuit (DC-DC converter) in the airbag ECU assembly in case the source voltage drops.

When the battery voltage drops, the voltage-increase circuit (DC-DC converter) functions to increase the voltage of the SRS to normal voltage.

A malfunction in this circuit is not stored in the airbag ECU assembly. The SRS warning light automatically goes off when the source voltage returns to normal.

The signal to illuminate the SRS warning light is transmitted from the airbag ECU assembly to the combination meter assembly through the CAN communication system.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work [INFO](#) .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CHECK BATTERY VOLTAGE
-----------	------------------------------

(a) Measure the voltage of the battery.

Standard Voltage:

11 to 14 V

NG ▶ **INSPECT CHARGING SYSTEM AND BATTERY**

OK



2.	CHECK CONNECTOR
-----------	------------------------

- (a) Turn the ignition switch off.
- (b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Check that the connector is properly connected to the combination meter assembly.

OK:

The connector is properly connected.

HINT:

If the connector is not connected securely, reconnect the connector and proceed to the next inspection.

- (d) Disconnect the connector from the combination meter assembly.

- (e) Check that the terminal of the connector is not damaged.

OK:

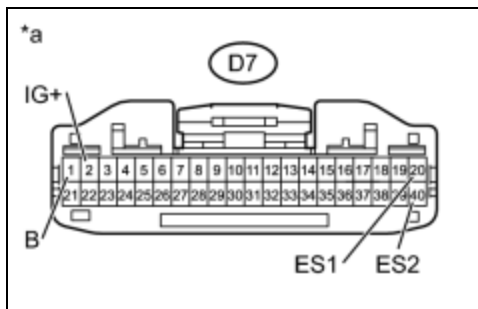
The terminal is not deformed or damaged.

NG ► REPAIR OR REPLACE CONNECTOR

OK



3. CHECK WIRE HARNESS (COMBINATION METER ASSEMBLY - BODY GROUND)



- (a) Connect the cable to the negative (-) battery terminal.

- (b) Turn the ignition switch to ON.
- (c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION

D7-1 (B) - Body ground	Always	11 to 14 V
D7-2 (IG+) - Body ground	Ignition switch ON	11 to 14 V

(d) Turn the ignition switch off.

(e) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D7-20 (ES1) - Body ground	Always	Below 1 Ω
D7-40 (ES2) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Combination Meter Assembly)
----	---

NG  **REPAIR OR REPLACE WIRE HARNESS**

OK


4. CHECK SRS WARNING LIGHT

(a) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(b) Connect the connector to the combination meter assembly.

(c) Disconnect the connector from the airbag ECU assembly.

(d) Connect the cable to the negative (-) battery terminal.

(e) Turn the ignition switch to ON.

(f) Check the SRS warning light condition.

OK:

After the primary check period, the SRS warning light goes off for approximately 10 seconds and turns back on.

HINT:

The primary check period is approximately 6 seconds after the ignition switch is turned to ON.

NG  **REPLACE COMBINATION METER**

ASSEMBLY

OK ► REPLACE AIRBAG ECU ASSEMBLY



Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000YE20F6X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: SRS Warning Light Remains ON (2013 FR-S)		

[SRS Warning Light Remains ON](#)

DESCRIPTION

The SRS warning light is located on the combination meter assembly.

When the SRS is normal, the SRS warning light comes on for approximately 6 seconds after the ignition switch is turned from off to ON, and then goes off automatically.

If there is a malfunction in the SRS, the SRS warning light comes on to inform the driver of a problem.

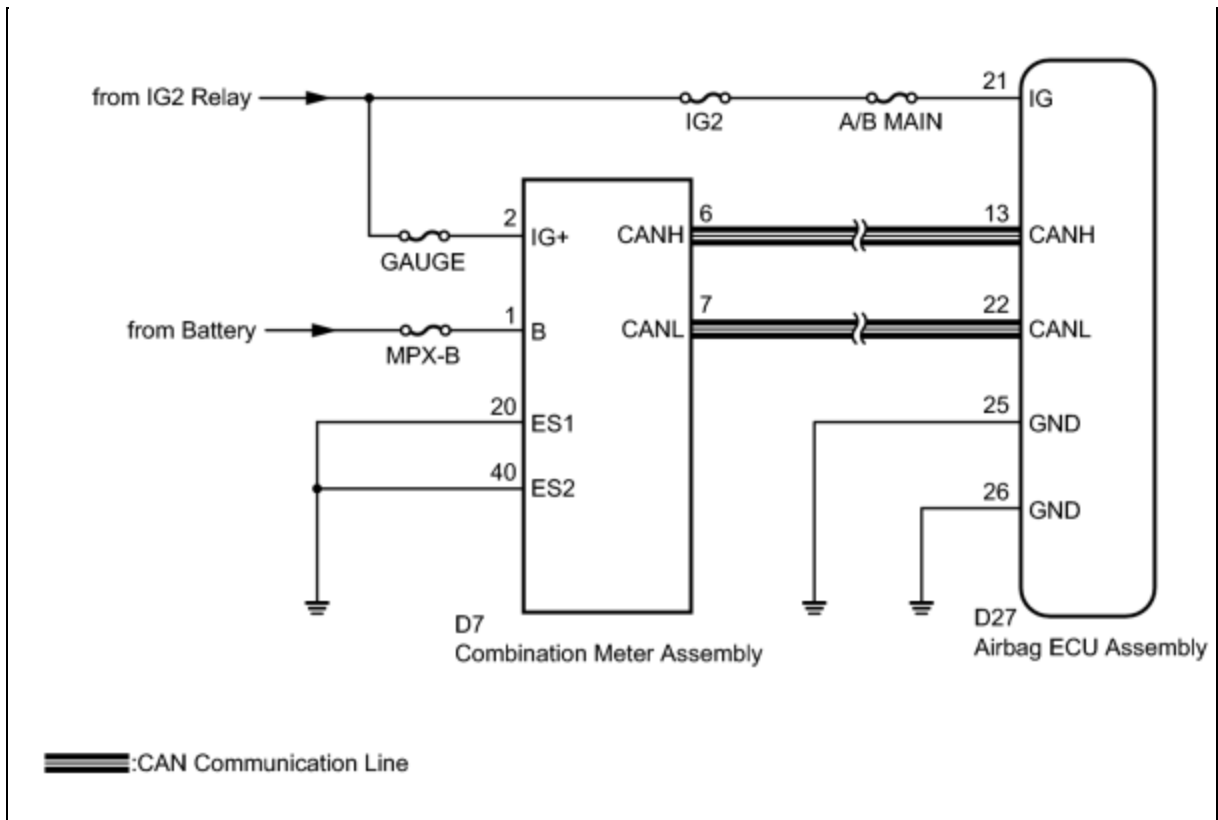
The SRS is equipped with a voltage-increase circuit (DC-DC converter) in the airbag ECU assembly in case the source voltage drops.

When the battery voltage drops, the voltage-increase circuit (DC-DC converter) functions to increase the voltage of the SRS to normal voltage. In addition, when the voltage drops, the SRS warning light will illuminate.

A malfunction in this circuit is not stored in the airbag ECU assembly. The SRS warning light automatically goes off when the source voltage returns to normal.

The signal to illuminate the SRS warning light is transmitted from the airbag ECU assembly to the combination meter assembly through the CAN communication system.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CHECK SRS WARNING LIGHT OPERATION
-----------	--

(a) Check the SRS warning light operation approximately 6 seconds after the ignition switch is turned to ON.

Result:

SRS WARNING LIGHT ILLUMINATION	PROCEED TO
Remains on	A
Goes off and then comes on again	B

B CHECK CAN COMMUNICATION SYSTEM

A



2.	CHECK BATTERY VOLTAGE
-----------	------------------------------

(a) Measure the voltage of the battery.

Standard Voltage:

11 to 14 V

NG ▶ **INSPECT CHARGING SYSTEM AND BATTERY**

OK



3.	CHECK CONNECTOR
-----------	------------------------

(a) Turn the ignition switch off.

(b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check that the connector is properly connected to the airbag ECU assembly.

OK:

The connector is properly connected.

HINT:

If the connector is not connected securely, reconnect the connector and proceed to the next inspection.

(d) Disconnect the connector from the airbag ECU assembly.

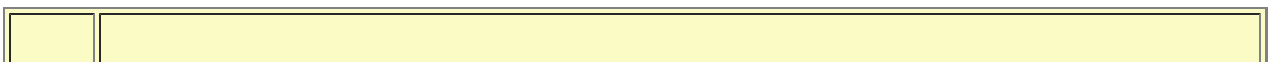
(e) Check that the terminal of the connector is not damaged.

OK:

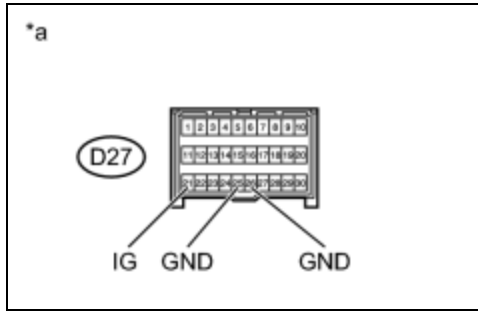
The terminal is not deformed or damaged.

NG ▶ **REPLACE WIRE HARNESS**

OK



4. CHECK WIRE HARNESS (AIRBAG ECU ASSEMBLY - BODY GROUND)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Operate all components of the electrical system (defogger, wipers, headlights, heater blower, etc.).

(d) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D27-21 (IG) - Body ground	Ignition switch ON	8 to 16 V

(e) Turn the ignition switch off.

(f) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D27-25 (GND) - Body ground	Always	Below 1 Ω
D27-26 (GND) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Airbag ECU Assembly)
----	--

NG  REPLACE WIRE HARNESS

OK



5. CHECK SRS WARNING LIGHT

- (a) Turn the ignition switch to ON.
- (b) Check the SRS warning light condition.

OK:

After the primary check period, the SRS warning light goes off for approximately 10 seconds and turns back on.

HINT:

The primary check period is approximately 6 seconds after the ignition switch is turned to ON.

NG ► REPLACE COMBINATION METER ASSEMBLY

OK ► REPLACE AIRBAG ECU ASSEMBLY

6.	CHECK CAN COMMUNICATION SYSTEM
-----------	---------------------------------------

- (a) Use the Techstream to check if the CAN communication system is functioning normally.

HINT:

- Refer to Bus Check for the CAN communication system INFO.
- The airbag ECU assembly is connected to the CAN communication system. Therefore, before starting troubleshooting, make sure to check that there is no trouble in the CAN communication system.

Result:

RESULT	PROCEED TO
DTC is not output	A
DTC is output	B

B ► GO TO CAN COMMUNICATION SYSTEM

A



7.	CHECK BATTERY VOLTAGE
-----------	------------------------------

- (a) Measure the voltage of the battery.

Standard Voltage:

11 to 14 V

NG ► INSPECT CHARGING SYSTEM AND

OK



8.	CHECK CONNECTOR
-----------	------------------------

- (a) Turn the ignition switch off.
- (b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Check that the connector is properly connected to the airbag ECU assembly.

OK:

The connector is properly connected.

HINT:

If the connector is not connected securely, reconnect the connector and proceed to the next inspection.

- (d) Disconnect the connector from the airbag ECU assembly.
- (e) Check that the terminal of the connector is not damaged.

OK:

The terminal is not deformed or damaged.

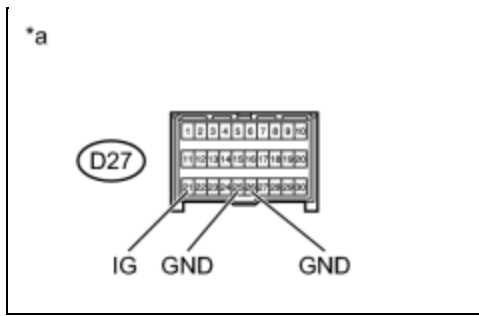
NG  **REPLACE WIRE HARNESS**

OK



9.	CHECK WIRE HARNESS (AIRBAG ECU ASSEMBLY - BODY GROUND)
-----------	---

- (a) Connect the cable to the negative (-) battery terminal.



(b) Turn the ignition switch to ON.

(c) Operate all components of the electrical system (defogger, wipers, headlights, heater blower, etc.).

(d) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D27-21 (IG) - Body ground	Ignition switch ON	8 to 16 V

(e) Turn the ignition switch off.

(f) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D27-25 (GND) - Body ground	Always	Below 1 Ω
D27-26 (GND) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Airbag ECU Assembly)
----	--

NG  **REPLACE WIRE HARNESS**

OK



10.	CHECK CONNECTOR
------------	------------------------

(a) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(b) Check that the connector is properly connected to the combination meter assembly.

OK:

The connector is properly connected.

HINT:

If the connector is not connected securely, reconnect the connector and proceed to the next inspection.

(c) Disconnect the connector from the combination meter assembly.

(d) Check that the terminal of the connector is not damaged.

OK:

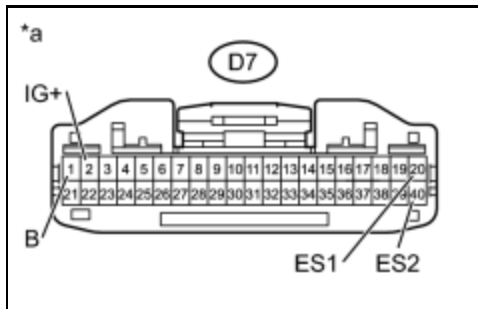
The terminal is not deformed or damaged.

NG ▶ REPAIR OR REPLACE CONNECTOR

OK



11. CHECK WIRE HARNESS (COMBINATION METER ASSEMBLY - BODY GROUND)



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D7-1 (B) - Body ground	Always	11 to 14 V
D7-2 (IG+) - Body ground	Ignition switch ON	11 to 14 V

(d) Turn the ignition switch off.

(e) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D7-20 (ES1) - Body ground	Always	Below 1 Ω
D7-40 (ES2) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Combination Meter Assembly)
----	---

NG ► REPAIR OR REPLACE WIRE HARNESS

OK
▼

12. CHECK SRS WARNING LIGHT

(a) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(b) Connect the connector to the combination meter assembly.

(c) Connect the cable to the negative (-) battery terminal.

(d) Turn the ignition switch to ON.

(e) Check the SRS warning light condition.

OK:

After the primary check period, the SRS warning light goes off for approximately 10 seconds and turns back on.

HINT:

The primary check period is approximately 6 seconds after the ignition switch is turned to ON.

NG ► REPLACE COMBINATION METER ASSEMBLY

OK ► REPLACE AIRBAG ECU ASSEMBLY

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XFC0BZX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

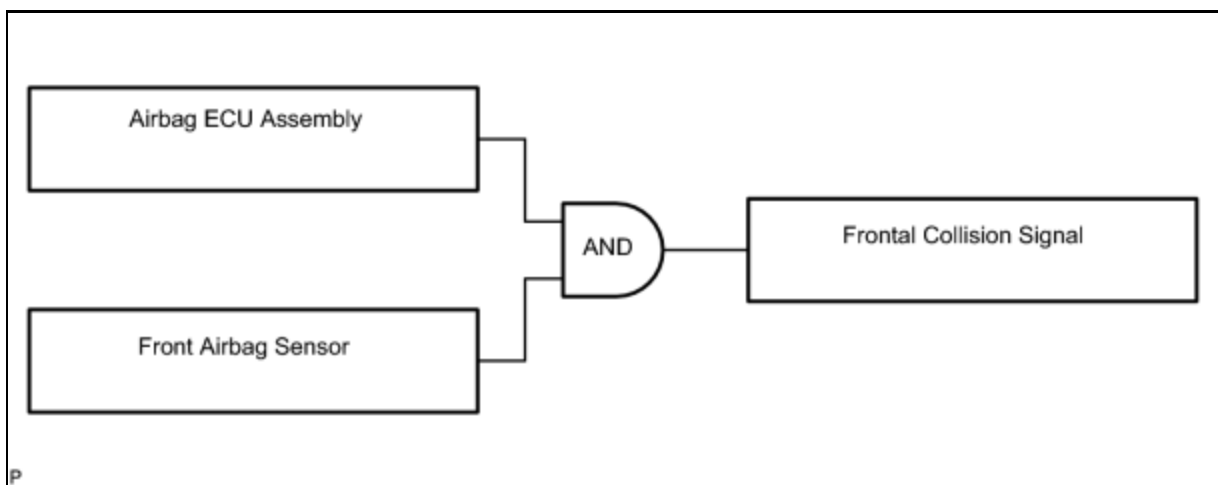
SYSTEM DESCRIPTION

1. GENERAL

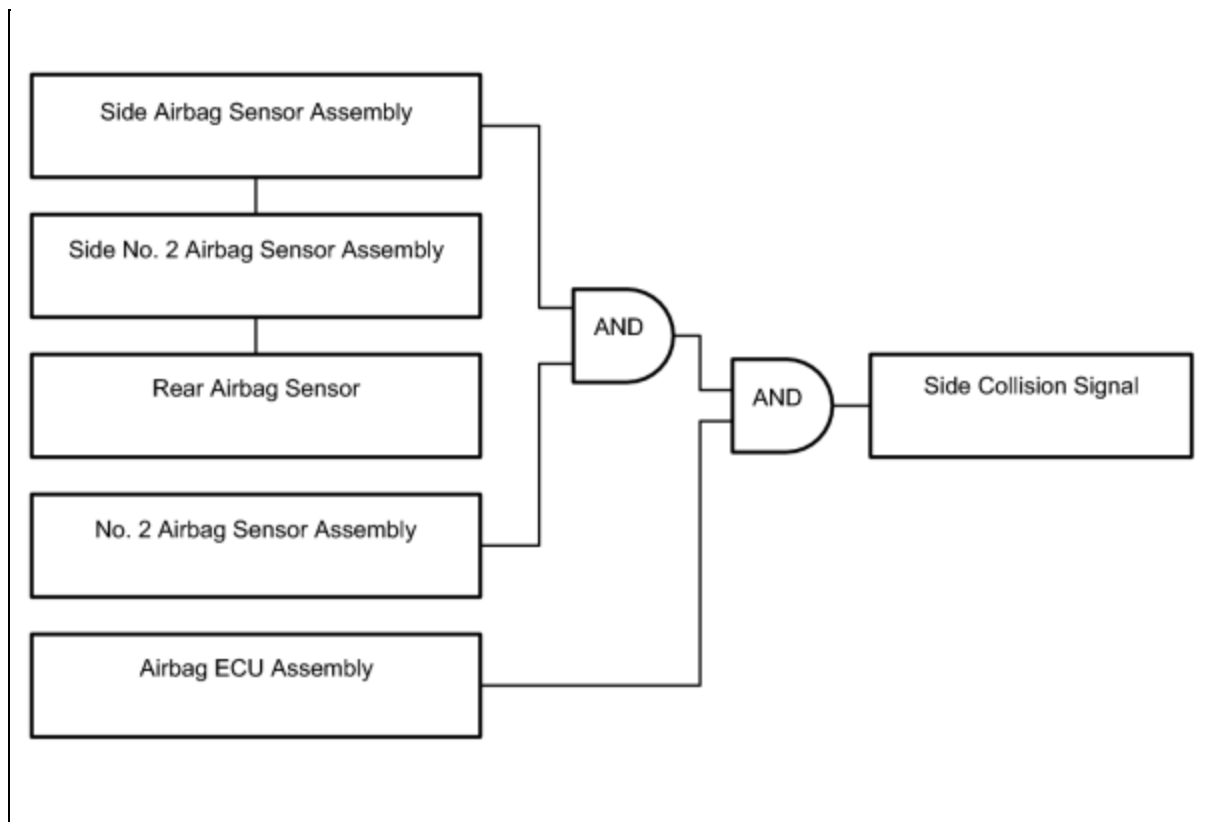
- (a) Deceleration sensors used for the airbag system are installed on various parts on the vehicle and calculate the deceleration rate of each part during a collision.
- (b) Depending on the situation, the airbag ECU assembly sends a deployment signal to each airbag based on the information from each sensor.

2. DEPLOYMENT CONDITION

- (a) FRONTAL COLLISION



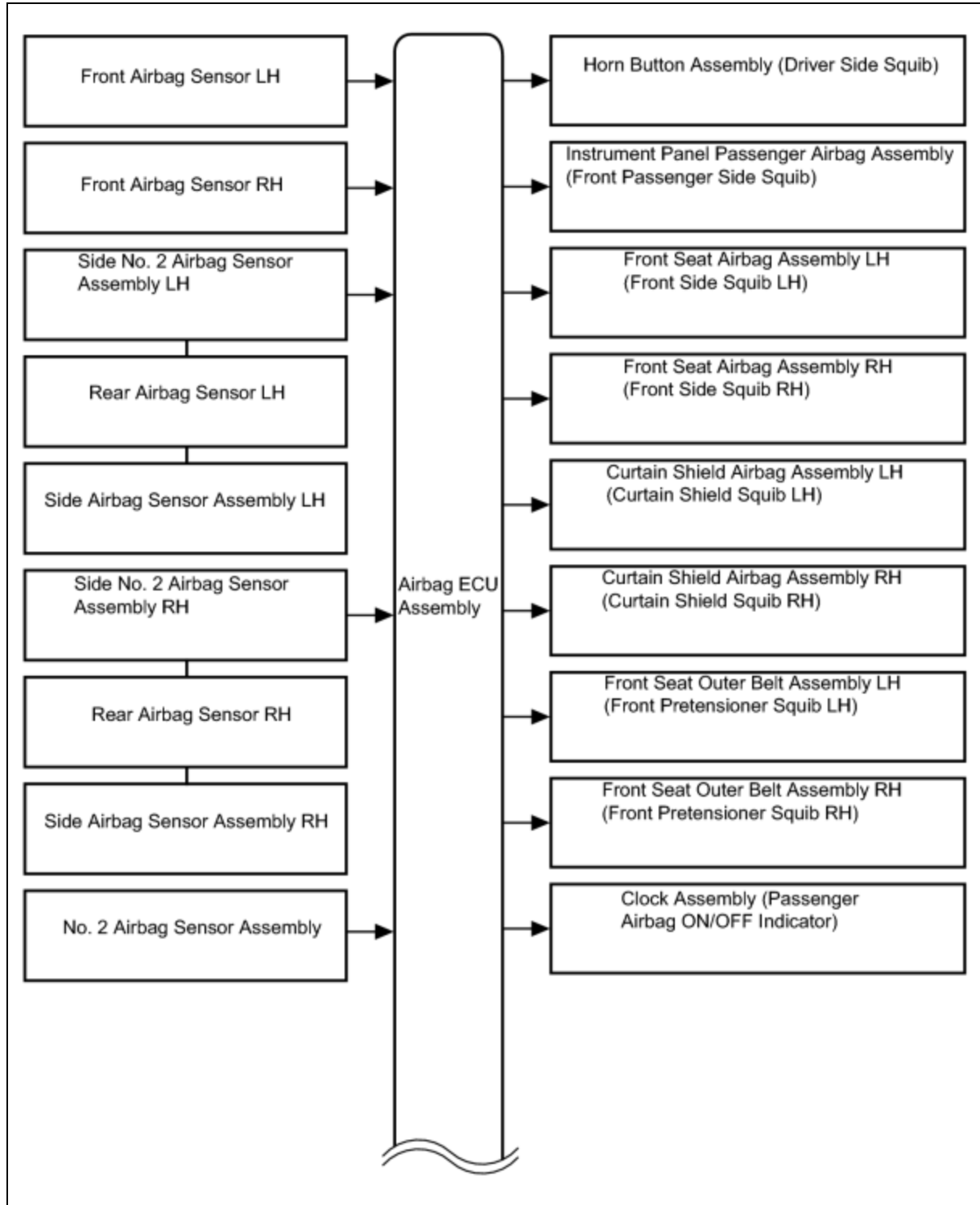
- (1) Frontal collision signals are produced based on the information from the airbag ECU assembly and front airbag sensors.
- (b) SIDE COLLISION

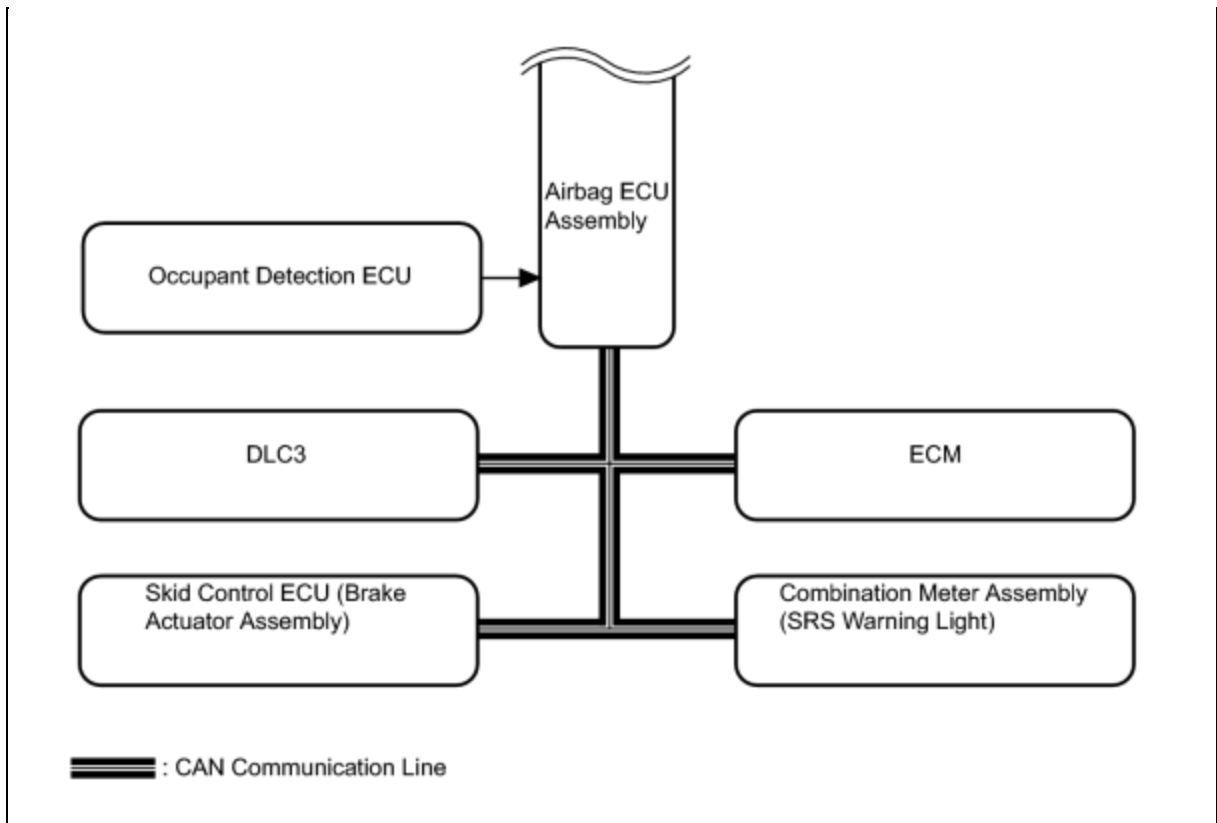


- (1) Side collision signals are produced based on the information from the airbag ECU assembly, side airbag sensor assembly, side No. 2 airbag sensor assembly, rear airbag sensor and No. 2 airbag sensor assembly.

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XFG0BTX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM





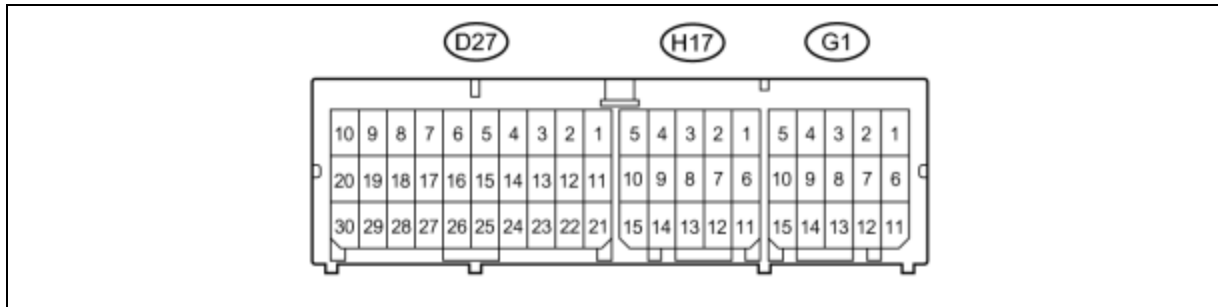
Communication Table

TRANSMITTING ECU (TRANSMITTER)	RECEIVING ECU	SIGNAL	COMMUNICATION METHOD
Airbag ECU Assembly	ECM	Crash detection signal	CAN
	Combination Meter Assembly	<ul style="list-style-type: none"> SRS warning light ON demand signal Passenger seat occupant detection signal Diagnosis signal (DTC) 	
ECM	Airbag ECU Assembly	<ul style="list-style-type: none"> Engine speed signal Accelerator opening angle signal Shift position signal Test mode signal 	
Skid Control ECU (Brake Actuator Assembly)		<ul style="list-style-type: none"> Vehicle speed signal Stop signal 	
Combination Meter Assembly		Driver seat buckle switch signal	

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000XF90AYX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. AIRBAG ECU ASSEMBLY



TERMINAL NO.	TERMINAL SYMBOL	DESTINATION
D27-1	P2-	Instrument panel passenger airbag assembly (Front passenger side squib 2nd step)
D27-2	P2+	Instrument panel passenger airbag assembly (Front passenger side squib 2nd step)
D27-3	P+	Instrument panel passenger airbag assembly (Front passenger side squib)
D27-4	P-	Instrument panel passenger airbag assembly (Front passenger side squib)
D27-5	D+	Horn button assembly (Driver side squib)
D27-6	D-	Horn button assembly (Driver side squib)
D27-7	D2-	Horn button assembly (Driver side squib 2nd step)
D27-8	D2+	Horn button assembly (Driver side squib 2nd step)
D27-13	CANH	CAN communication line
D27-15	PBE	Combination meter assembly
D27-17	PAOFF	Clock assembly (Passenger airbag ON/OFF indicator)
D27-21	IG	A/B MAIN fuse
D27-22	CANL	CAN communication line
D27-23	PAON	Clock assembly (Passenger airbag ON/OFF indicator)
D27-25	GND	Ground
D27-26	GND	Ground
D27-27	-SR	Front airbag sensor RH
D27-28	-SL	Front airbag sensor LH
D27-29	+SR	Front airbag sensor RH

D27-30	+SL	Front airbag sensor LH
H17-1	PL-	Front seat outer belt assembly LH (Front pretensioner squib LH)
H17-2	PL+	Front seat outer belt assembly LH (Front pretensioner squib LH)
H17-6	ICL-	Curtain shield airbag assembly LH (Curtain shield squib LH)
H17-7	ICL+	Curtain shield airbag assembly LH (Curtain shield squib LH)
H17-8	BBL+	Side No. 2 airbag sensor assembly LH
H17-9	SFL+	Front seat airbag assembly LH (Front side squib LH)
H17-10	SFL-	Front seat airbag assembly LH (Front side squib LH)
H17-11	BBL2+	No. 2 airbag sensor assembly
H17-12	BBL2-	No. 2 airbag sensor assembly
H17-15	BBL-	Side No. 2 airbag sensor assembly LH
G1-4	PR+	Front seat outer belt assembly RH (Front pretensioner squib RH)
G1-5	PR-	Front seat outer belt assembly RH (Front pretensioner squib RH)
G1-6	SFR-	Front seat airbag assembly RH (Front side squib RH)
G1-7	SFR+	Front seat airbag assembly RH (Front side squib RH)
G1-8	BBR+	Side No. 2 airbag sensor assembly RH
G1-9	ICR+	Curtain shield airbag assembly RH (Curtain shield squib RH)
G1-10	ICR-	Curtain shield airbag assembly RH (Curtain shield squib RH)
G1-11	BBR-	Side No. 2 airbag sensor assembly RH
G1-12	SVC	Front seat assembly RH (Occupant detection ECU)
G1-13	SGD	Front seat assembly RH (Occupant detection ECU)



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003VCK008X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: AIRBAG SYSTEM: U0073: Control Module Communication Bus OFF (2013 FR-S)		

DTC	U0073	Control Module Communication Bus OFF
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DESCRIPTION

These DTCs are stored when the self-diagnosis of the airbag ECU assembly determines that the CAN communication system is malfunctioning.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
U0073	Control Module Communication Bus OFF	CAN communication System

INSPECTION PROCEDURE

PROCEDURE

1.	CHECK FOR DTC (CAN COMMUNICATION SYSTEM)
-----------	---

(a) Use the Techstream to check if the CAN communication system is functioning normally.

Result

RESULT	PROCEED TO
DTC U0073 is not output	A
DTC U0073 is output	B

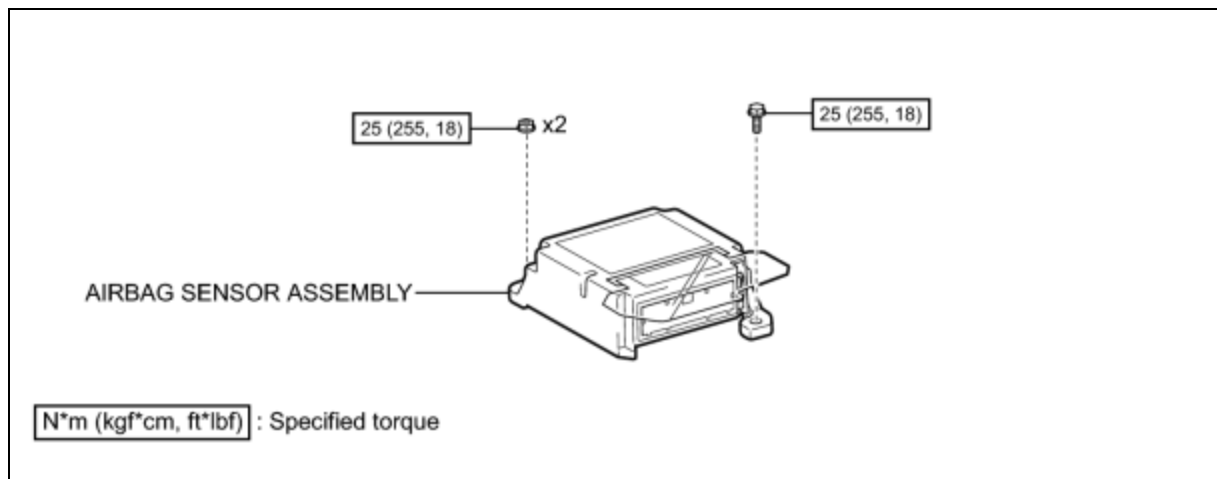
B ► **GO TO CAN COMMUNICATION SYSTEM**

A ► **USE SIMULATION METHOD TO CHECK**

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWU063X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: CENTER AIRBAG SENSOR ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003VV1025X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: CENTER AIRBAG SENSOR ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL AIRBAG SENSOR ASSEMBLY

- (a) Check that the ignition switch is off.
- (b) Check that the cable is disconnected from the negative (-) battery terminal.

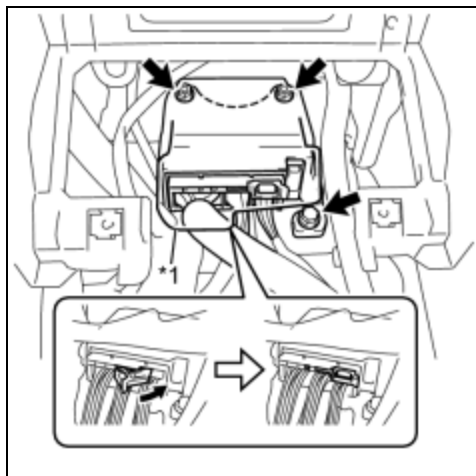
CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

- (c) Install the airbag sensor assembly with the bolt and 2 nuts.



Text in Illustration

*1	Waterproof Sheet
----	------------------

Torque: 25 N·m (255 kgf·cm, 18ft·lbf)

NOTICE:

- If the airbag sensor assembly has been dropped, or there are any cracks, dents or other defects in the case or connector, replace it with a new one.
- When installing the airbag sensor assembly, be careful that the SRS wiring does not interfere with or is not pinched between other parts.
- When the ignition switch is first turned on (IG) after the airbag sensor assembly has been replaced, make sure that no one is in the vehicle.

- (d) Connect the connectors to the airbag sensor assembly as shown in the illustration.

NOTICE:

When connecting any airbag connector, take care not to damage the airbag wire harness.

- (e) Check that the waterproof sheet is properly set.
- (f) Check that there is no looseness in the installation parts of the airbag sensor assembly.

2. INSTALL AIR CONDITIONING CONTROL ASSEMBLY

INFO

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

4. PERFORM DIAGNOSTIC SYSTEM CHECK

INFO

5. INSPECT SRS WARNING LIGHT

INFO



Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VPT091X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: CENTER AIRBAG SENSOR ASSEMBLY: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

CAUTION:

Be sure to correctly follow the removal and installation procedures for the airbag sensor assembly.

1. INSPECT AIRBAG SENSOR ASSEMBLY (for Vehicle not Involved in Collision)

- (a) Perform a diagnostic system check. 

2. INSPECT AIRBAG SENSOR ASSEMBLY (for Vehicle Involved in Collision and Airbag not Deployed)

- (a) Perform a diagnostic system check. 
- (b) Visually check for defects with the airbag sensor assembly installed on the vehicle.

(1) The defects are as follows:

- Cracks on the sensor housing
- Dents on the sensor housing
- Chips on the sensor housing
- Cracks or other damage to the connector
- Peeling of the label

OK:

No defects are found.

If any of the defects is found, replace the airbag sensor assembly with a new one.

3. INSPECT AIRBAG SENSOR ASSEMBLY (for Vehicle Involved in Collision and Airbag is Deployed)

- (a) Replace the airbag sensor assembly.

HINT:

The airbag sensor assembly should be replaced after any of the airbags has deployed, as it has been subjected to an impact.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003VVJ025X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: CENTER AIRBAG SENSOR ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

1. PRECAUTION

CAUTION:

Be sure to read Precaution thoroughly before servicing. INFO

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

3. REMOVE AIR CONDITIONING CONTROL ASSEMBLY

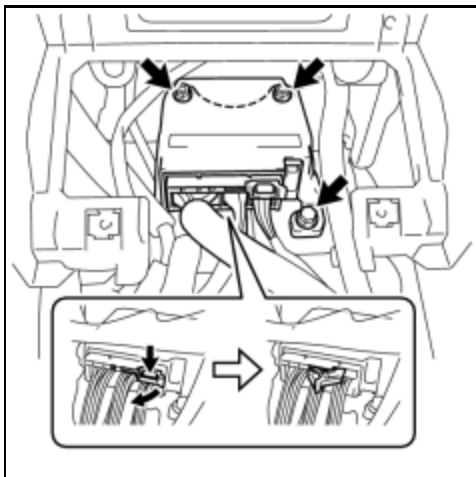
INFO

4. REMOVE AIRBAG SENSOR ASSEMBLY

- (a) Check that the ignition switch is off.
- (b) Check that the cable is disconnected from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.



- (c) Disconnect the connectors from the airbag sensor assembly as shown in the illustration.

NOTICE:

When disconnecting any airbag connector, take care not to damage the airbag wire harness.

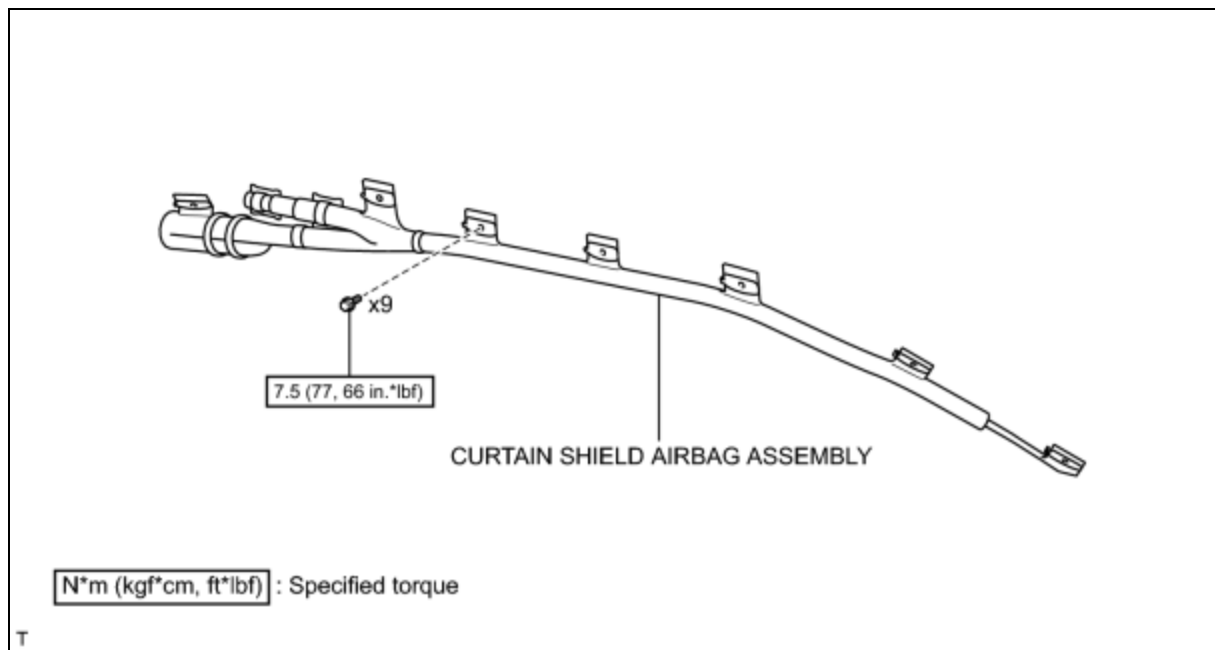
(d) Remove the bolt, 2 nuts and airbag sensor assembly.



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UXF06DX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: CURTAIN SHIELD AIRBAG ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UXC09ZX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: CURTAIN SHIELD AIRBAG ASSEMBLY: DISPOSAL (2013 FR-S)		

DISPOSAL

CAUTION:

Before performing pre-disposal deployment of any SRS part, review and closely follow all applicable environmental and hazardous material regulations. Pre-disposal deployment may be considered hazardous material treatment.

1. PRECAUTION

CAUTION:

- An airbag or pretensioner may be activated by static electricity. To prevent this, be sure to touch a metal surface with your bare hands to discharge static electricity before performing this procedure.
- Never dispose of a curtain shield airbag assembly with an undeployed airbag.
- The airbag produces an exploding sound when it is deployed, so perform the operation outdoors and where it will not create a nuisance to nearby residents.
- When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.
- When deploying the airbag, perform the operation at least 10 m (32.8 ft.) away from the curtain shield airbag assembly.
- The curtain shield airbag assembly becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling a curtain shield airbag assembly with a deployed airbag.
- Do not apply water etc. to a curtain shield airbag assembly with a deployed airbag.
- Always wash your hands with water after completing the operation.

HINT:

When scrapping a vehicle equipped with an SRS or disposing of the curtain shield airbag assembly, be sure to deploy the airbag first in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the Service Dept. of TOYOTA MOTOR SALES, U.S.A., INC.


2. DISPOSE OF CURTAIN SHIELD AIRBAG ASSEMBLY (When Installed in Vehicle)

NOTICE:

- When disposing of the curtain shield airbag assembly, never use the customer's vehicle to deploy the airbag.
- Be sure to observe the following procedure when deploying the airbag.

HINT:

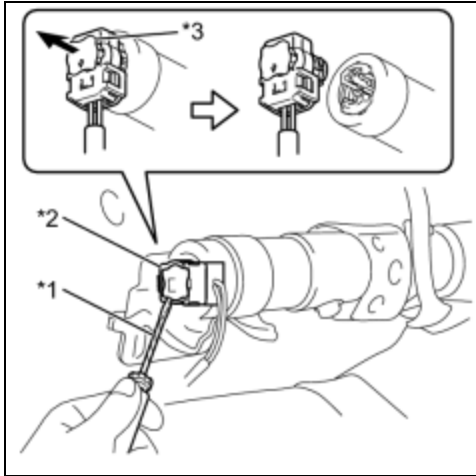
Prepare a battery as the power source to deploy the airbag.

- (a) Refer to Precaution .
- (b) Disconnect the cable from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Remove the rid cover **INFO**.
- (d) Disconnect the curtain shield airbag assembly connector.



- (1) Using a screwdriver with the tip wrapped with protective tape, release the airbag connector lock and disconnect the curtain shield airbag connector.

Text in Illustration

*1	Protective Tape
*2	Airbag Connector
*3	Airbag Connector Lock

NOTICE:

When disconnecting the airbag connector, take care not to damage the airbag wire harness.

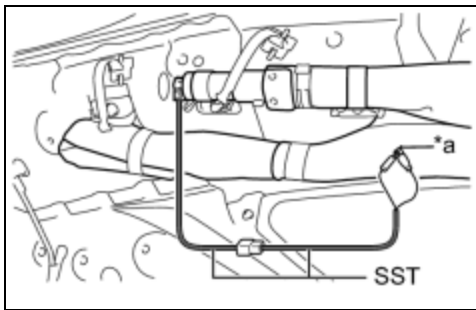
- (e) Install SST.

SST: 09082-18010
SST: 09082-18020

CAUTION:

Check that there is no looseness in the curtain shield airbag assembly.

- (1) Connect the clip and terminal of SST.



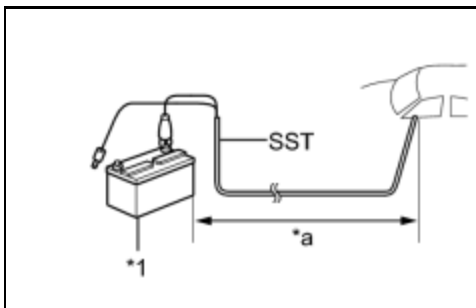
- (2) After connecting the following SST to each other, connect them to the curtain shield airbag assembly.

Text in Illustration

*a	Connect the clip and terminal
----	-------------------------------

NOTICE:

To avoid damaging the SST connector or wire harness, do not lock the secondary lock of the twin lock.



- (3) Move SST at least 10 m (32.8 ft.) away from the rear side window.

Text in Illustration

*1	Battery
*a	10 m (32.8 ft.) or more

- (4) Maintaining sufficient clearance for the SST wire harness in the rear side window, close all doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

- (5) Connect the clip of SST to the positive (+) battery terminal.
- (6) Connect the terminal of SST to the negative (-) battery terminal to deploy the curtain shield airbag assembly.
- (f) Deploy the airbag.
- (1) Check that no one is inside the vehicle or within a 10 m (32.8 ft.) radius of the vehicle.
- (2) Connect the clip of SST to the positive (+) battery terminal.
- (3) Connect the terminal of SST to the negative (-) battery terminal to deploy the curtain shield airbag assembly.

CAUTION:

- Before deployment, make sure that no one is near the vehicle.
- The curtain shield airbag assembly becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling a curtain shield airbag assembly with a deployed airbag.
- Do not apply water etc. to a curtain shield airbag assembly with a deployed airbag.
- Always wash your hands with water after completing the operation.

3. DISPOSE OF CURTAIN SHIELD AIRBAG ASSEMBLY (When not Installed in Vehicle)

NOTICE:

Be sure to observe the following procedure when deploying the airbag.

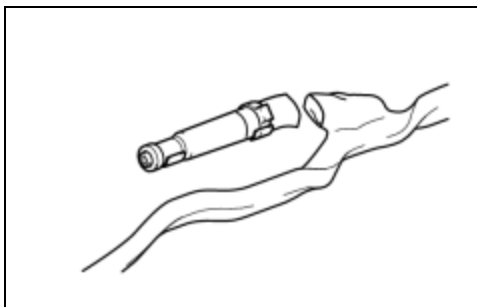
HINT:

Prepare a battery as the power source to deploy the airbag.

- (a) Remove the curtain shield airbag assembly  .

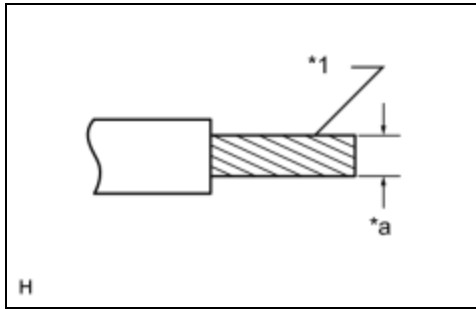
CAUTION:

- Before removing the curtain shield airbag assembly, wait at least 90 seconds after turning the ignition switch off and disconnecting the cable from the negative (-) battery terminal.
- When storing the curtain shield airbag assembly, keep the airbag deployment side facing upward.



- (b) Cut off the deployment section of the curtain shield airbag assembly.

(c) Using braided wire, tie down the curtain shield airbag assembly to an unneeded tire.



Text in Illustration

*1	Stripped Wire Section
*a	Wire Diameter

Wire:

Stripped wire section

1.25 mm² (0.0019 in.²) or more

CAUTION:

If the wire is too thin or an alternative object is used to tie down the curtain shield airbag assembly, it may snap when the airbag is deployed. Always use a wire for vehicle use with an area of at least 1.25 mm² (0.0019 in.²).

HINT:

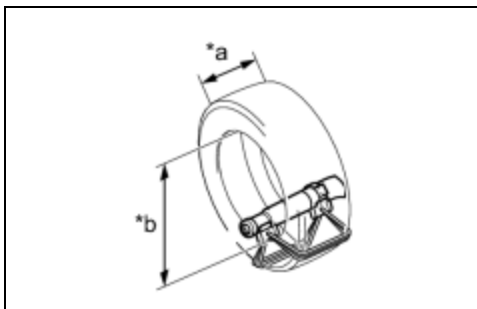
To calculate the area of the stripped wire section:

$$\text{Area} = 3.14 \times (\text{Diameter})^2 / 4$$

(1) Position the curtain shield airbag assembly inside the tire as shown in the illustration.

Text in Illustration

*a	Width
*b	Inner Diameter



Minimum tire size:

Width

185 mm (7.28 in.)

Inner diameter

360 mm (1.18 ft.)

CAUTION:

Make sure that the wires are tight. If there is slack in the wires, the curtain shield airbag assembly may break loose when the airbag is deployed.

NOTICE:

The tire may be damaged by the airbag deployment, so use an unneeded tire.

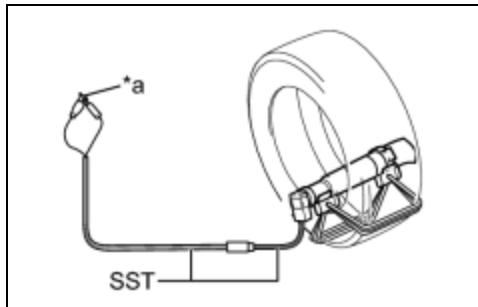
(d) Install SST.

SST: 09082-18010

SST: 09082-18020

NOTICE:

To avoid damaging the SST connector or wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the tire.



(1) Connect the clip and terminal of SST.

Text in Illustration

*a	Connect the clip and terminal
----	-------------------------------

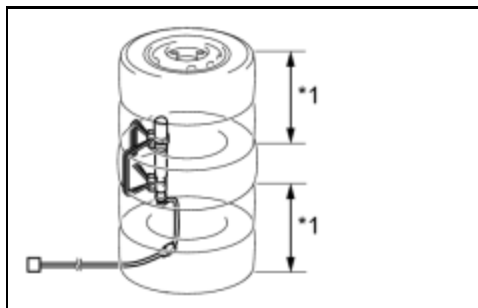
(2) After connecting the following SST to each other, connect them to the curtain shield airbag assembly.

(e) Place the tires.

CAUTION:

Do not face the deployment side of the curtain shield airbag assembly toward the ground.

(1) Place at least 2 tires under the tire to which the curtain shield airbag assembly is tied.



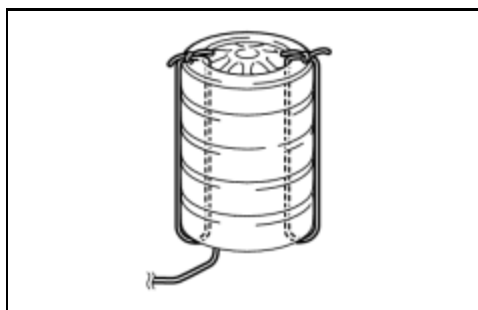
Text in Illustration

*1	Tires (2 or more)
----	-------------------

NOTICE:

- Do not place the SST connector under the tire because it could be damaged.
- The tires and wheel may be damaged by the airbag deployment, so use unneeded tires and wheel.

(2) Place at least 2 tires onto the tire to which the curtain shield airbag assembly is tied. The top tire should have a wheel installed.



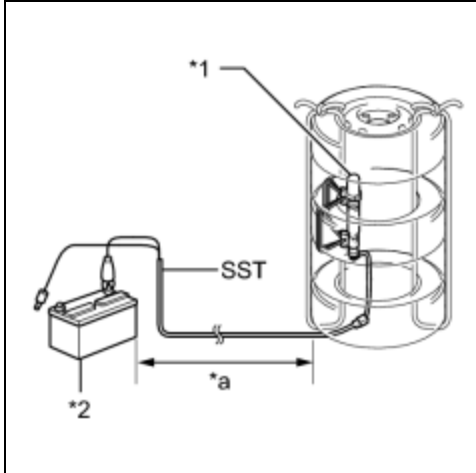
(3) Tie the tires together with the 2 wires.

CAUTION:

Make sure that the wires are tight. Looseness in the wires results in the tires breaking loose when the airbag is deployed.

(f) Deploy the airbag.

Text in Illustration



*1	Curtain Shield Airbag Assembly
*2	Battery
*a	10 m (32.8 ft.) or more

- (1) Move SST at least 10 m (32.8 ft.) away from the airbag tied down to the tire.
- (2) Check that no one is within a 10 m (32.8 ft.) radius of the tire to which the curtain shield airbag assembly is tied.
- (3) Connect the clip of SST to the positive (+) battery terminal.
- (4) Connect the terminal of SST to the negative (-) battery terminal to deploy the curtain shield airbag assembly.

CAUTION:

Before deployment, make sure that no one is near the airbag.

(g) Dispose of the curtain shield airbag assembly.

CAUTION:

- The curtain shield airbag assembly becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling a curtain shield airbag assembly with a deployed airbag.
- Do not apply water etc. to a curtain shield airbag assembly with a deployed airbag.
- Always wash your hands with water after completing the operation.

- (1) Remove the curtain shield airbag assembly from the tire.
- (2) Place the curtain shield airbag assembly in a plastic bag, tie it tightly, and dispose of it according to local regulations.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UXD08UX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: CURTAIN SHIELD AIRBAG ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for the RH side and LH side.
- The procedure listed below is for the LH side.

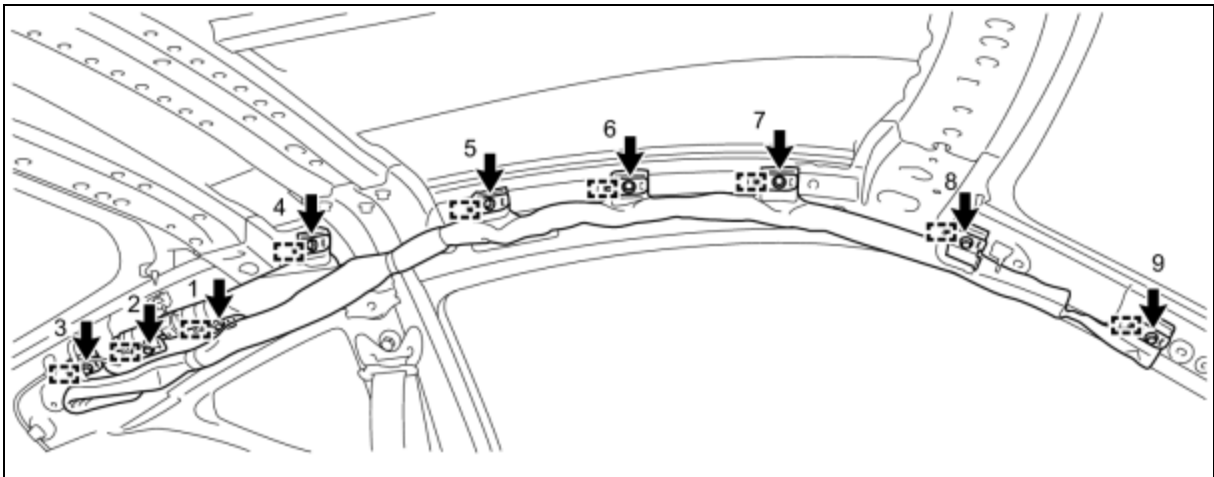
1. INSTALL CURTAIN SHIELD AIRBAG ASSEMBLY

- Check that the ignition switch is off.
- Check that the cable is disconnected from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- Engage the 9 guides and install the curtain shield airbag assembly with the 9 bolts in the sequence shown in the illustration.



NOTICE:

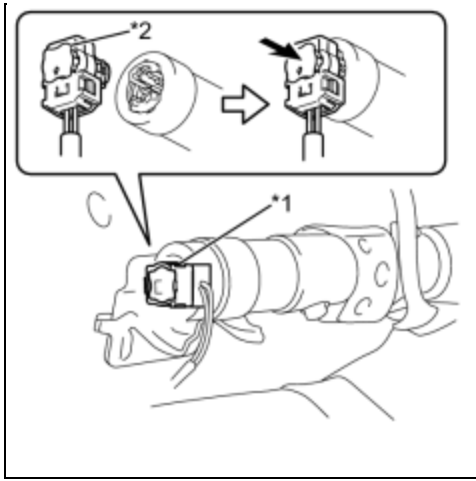
- When installing the curtain shield airbag assembly, have assistants hold it to prevent it from bending.
- Do not twist the curtain shield airbag assembly when installing it.

HINT:

Install the bolts and guides in order, from the rear.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

- Connect the curtain shield airbag connector.



Text in Illustration

*1	Airbag Connector
*2	Airbag Connector Lock

NOTICE:

When connecting any airbag connector, take care not to damage the airbag wire harness.

(e) Push in the lock to install the curtain shield airbag connector.

2. INSTALL ROOF HEADLINING ASSEMBLY

INFO

3. PERFORM DIAGNOSTIC SYSTEM CHECK

INFO

4. INSPECT SRS WARNING LIGHT

INFO


Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UXH09EX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: CURTAIN SHIELD AIRBAG ASSEMBLY: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

CAUTION:

Be sure to correctly follow the removal and installation procedures for the curtain shield airbag assemblies.

1. INSPECT CURTAIN SHIELD AIRBAG ASSEMBLY (for Vehicle not Involved in Collision)

- (a) Perform a diagnostic system check  .
- (b) Visually check for defects with the curtain shield airbag assemblies installed on the vehicle.

HINT:

The defects are as follows:


- Cuts on each pillar garnish or the roof headlining assembly around the curtain shield airbag assemblies
- Small cracks on each pillar garnish or the roof headlining assembly around the curtain shield airbag assemblies
- Significant discoloration on each pillar garnish or the roof headlining assembly around the curtain shield airbag assemblies

OK:

No defects are found.

If any of the defects is found, replace each pillar garnish or the roof headlining assembly with a new one.

2. INSPECT CURTAIN SHIELD AIRBAG ASSEMBLY (for Vehicle Involved in Collision and Airbag not Deployed)

- (a) Perform a diagnostic system check  .
- (b) Visually check for defects with the curtain shield airbag assemblies removed from the vehicle.

HINT:

The defects are as follows:

- Cuts
- Small cracks
- Significant discoloration
- Cracks or other damage to the connector

OK:

No defects are found.

If any of the defects is found, replace the curtain shield airbag assembly with a new one.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UXG08MX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: CURTAIN SHIELD AIRBAG ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. PRECAUTION

CAUTION:

Be sure to read Precaution thoroughly before servicing. INFO

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

2. REMOVE ROOF HEADLINING ASSEMBLY

INFO

3. REMOVE CURTAIN SHIELD AIRBAG ASSEMBLY

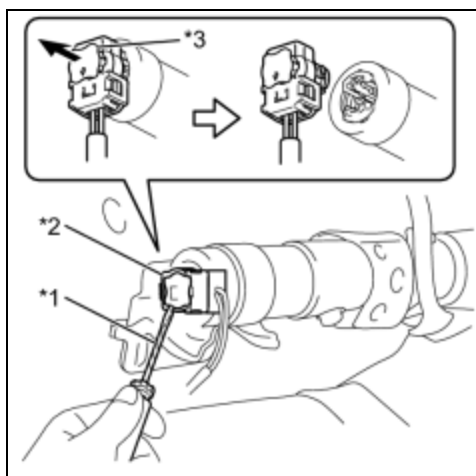
CAUTION:

When storing the curtain shield airbag assembly, keep the airbag deployment side facing upward.

- Check that the ignition switch is off.
- Check that the cable is disconnected from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.



- Using a screwdriver with the tip wrapped with protective tape, release the airbag connector lock and disconnect the curtain shield airbag connector.

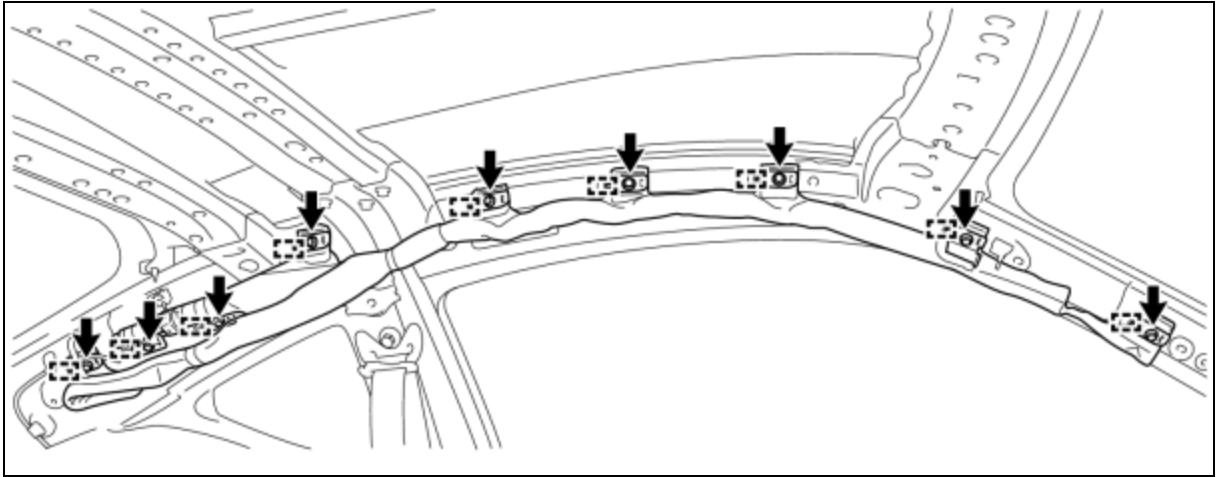
Text in Illustration

*1	Protective Tape
*2	Airbag Connector
*3	Airbag Connector Lock

NOTICE:

When disconnecting any airbag connector, take care not to damage the airbag wire harness.

(d) Remove the 9 bolts and engage the 9 guides to remove the curtain shield airbag assembly.



NOTICE:

When removing the curtain shield airbag assembly, have assistants hold it to prevent it from bending.

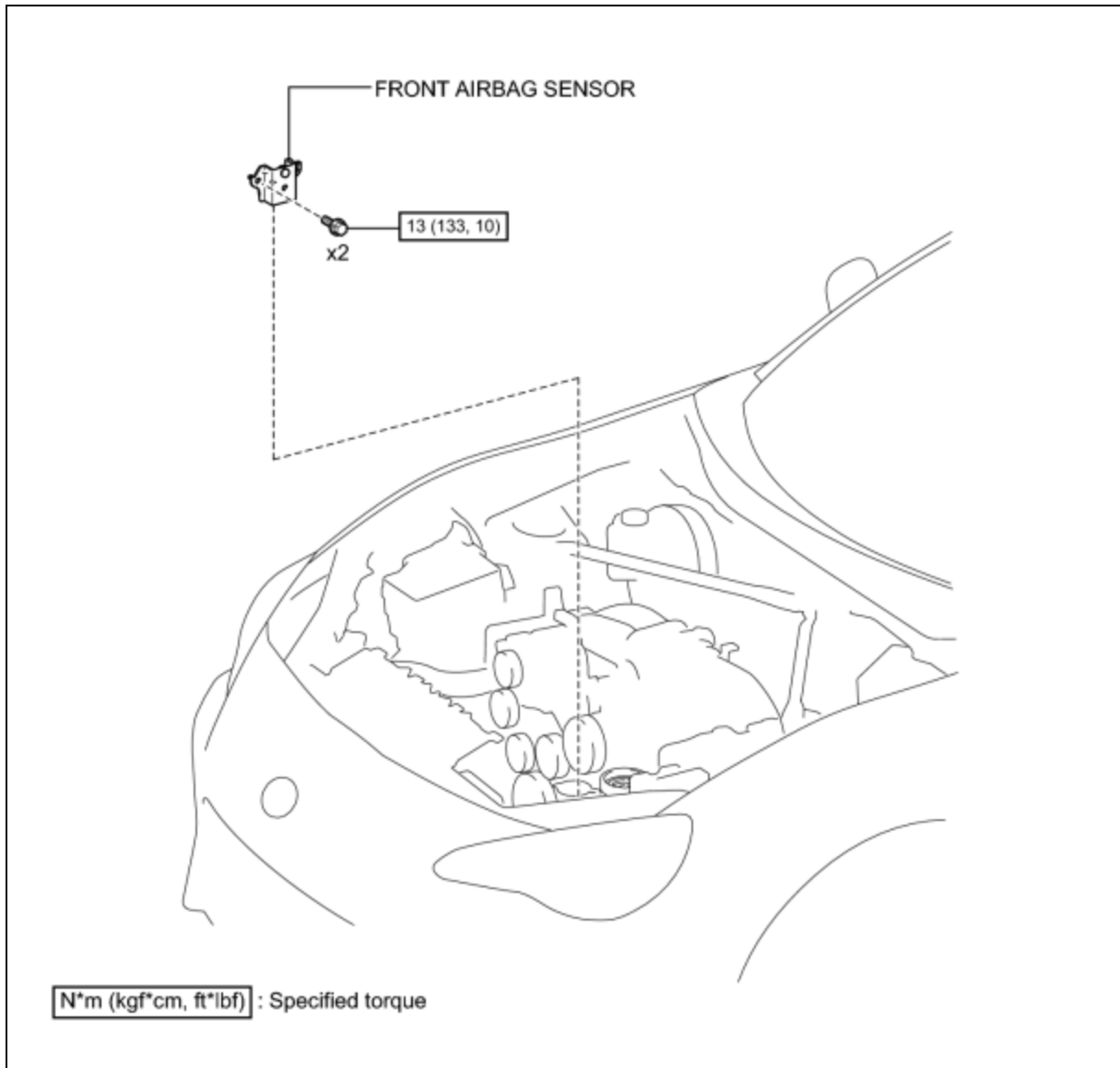
HINT:

Remove the bolts and guides in order, from the front.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWY05ZX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: FRONT AIRBAG SENSOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWW08RX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: FRONT AIRBAG SENSOR: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. INSTALL FRONT AIRBAG SENSOR

- Check that the ignition switch is off.
- Check that the cable is disconnected from the negative (-) battery terminal.

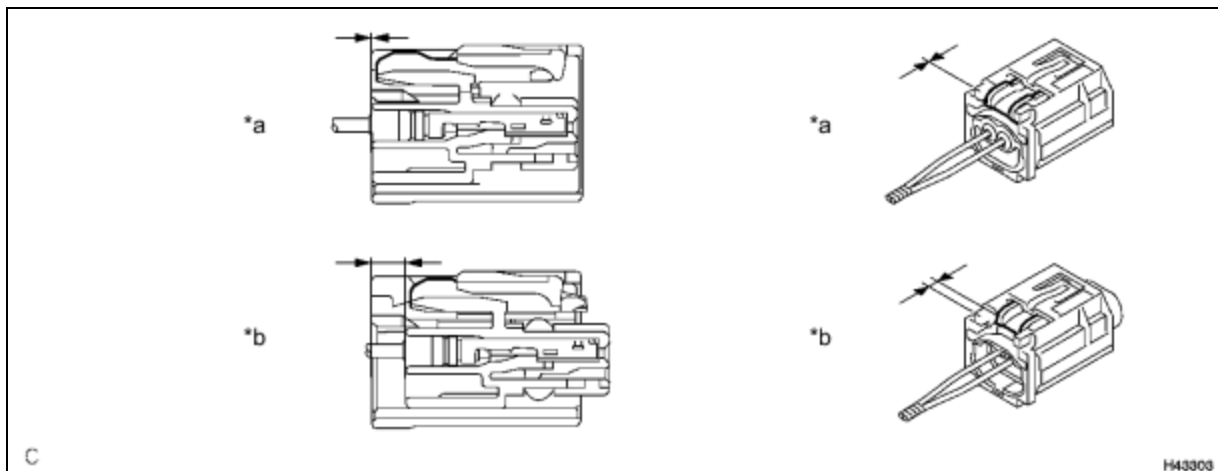
CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

- Before connecting the connector, check that the position of the white housing lock is correct as shown in the illustration.



Text in Illustration

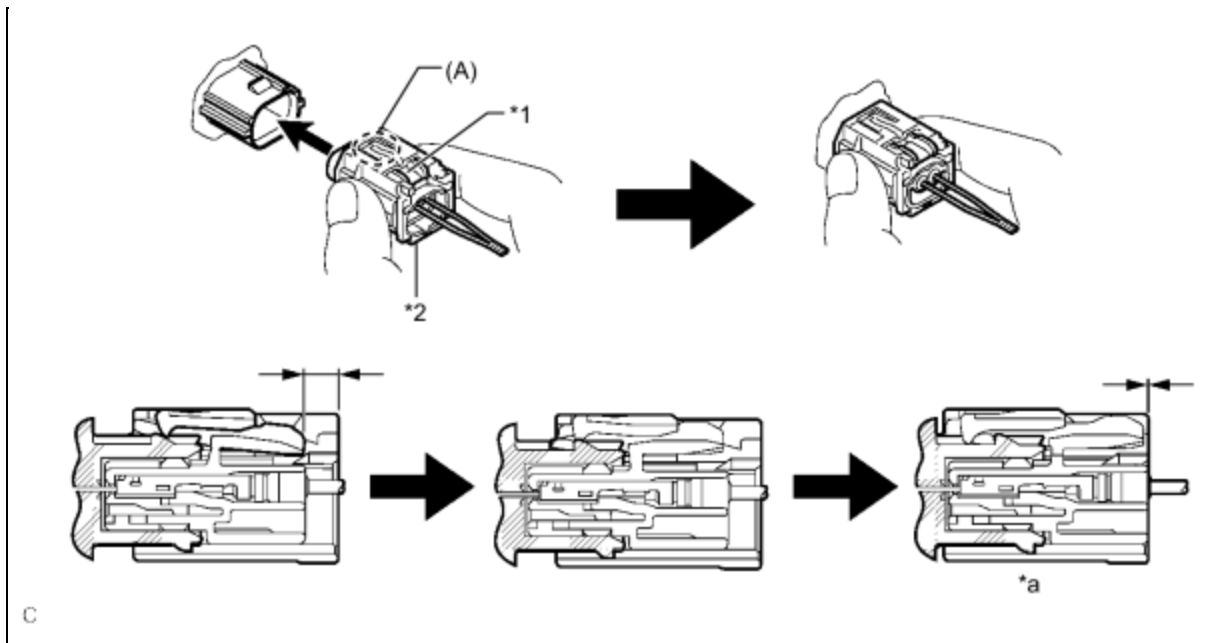
*a	Incorrect	*b	Correct
----	-----------	----	---------

- Connect the connector to the front airbag sensor.

NOTICE:

When connecting any airbag connector, take care not to damage the airbag wire harness.

- Be sure to engage the connectors until they are locked (when locking, make sure that a click sound can be heard).



Text in Illustration

*1	White Housing Lock	*2	Yellow CPA
*a	Connection is Completed	-	-

HINT:

When engaged, the white housing lock will slide. Be sure not to hold the white housing lock and part (A), as it may result in an insecure fit.

(e) Engage the 2 hooks and install the front airbag sensor with the 2 bolts.

Torque: 13 N·m (133 kgf·cm, 10ft·lbf)

NOTICE:

- If the front airbag sensor has been dropped, or there are any cracks, dents or other defects in the case or connector, replace it with a new one.
- When installing the front airbag sensor, be careful that the SRS wiring does not interfere with or is not pinched between other parts.

(f) Check that there is no looseness in the installation parts of the front airbag sensor.

2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

3. PERFORM DIAGNOSTIC SYSTEM CHECK

INFO

4. INSPECT SRS WARNING LIGHT

INFO


Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VPU08KX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: FRONT AIRBAG SENSOR: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION


CAUTION:

Be sure to correctly follow the removal and installation procedures for the front airbag sensors.

1. INSPECT FRONT AIRBAG SENSOR (for Vehicle not Involved in Collision)

(a) Perform a diagnostic system check  .

2. INSPECT FRONT AIRBAG SENSOR (for Vehicle Involved in Collision and Airbag not Deployed)

(a) Perform a diagnostic system check  .

(b) Visually check the front airbag sensors for defects if the front bumper of the vehicle or the area around the bumper is damaged.

HINT:

The defects are as follows:

- Cracks on the sensor housing
- Dents on the sensor housing
- Chips on the sensor housing
- Cracks or other damage to the connector
- Damage to the serial number

OK:

No defects are found.

If any of the defects is found, replace the front airbag sensor with a new one.

3. INSPECT FRONT AIRBAG SENSOR (for Vehicle Involved in Collision and Airbag is Deployed)

(a) When airbags have deployed as the result of a collision, be sure to replace all front airbag sensors in the damaged areas (anywhere in need of repair).

(b) Visually check the front airbag sensors in undamaged areas for defects.

HINT:

The defects are as follows:

- Cracks on the sensor housing
- Dents on the sensor housing
- Chips on the sensor housing
- Cracks or other damage to the connector
- Damage to the serial number

OK:

No defects are found.

If any of the defects is found or a front airbag sensor has detected a major collision, replace the

front airbag sensor with a new one.



TOYOTA

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWZ08RX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: FRONT AIRBAG SENSOR: REMOVAL (2013 FR-S)		

REMOVAL

HINT:

- Use the same procedure for the RH side and LH side.
- The procedure listed below is for the LH side.

1. PRECAUTION

CAUTION:

Be sure to read Precaution thoroughly before servicing. INFO

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

3. REMOVE FRONT AIRBAG SENSOR

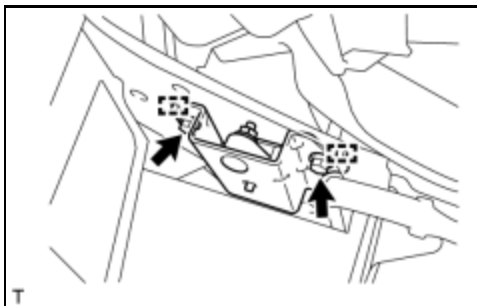
- Check that the ignition switch is off.
- Check that the cable is disconnected from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.



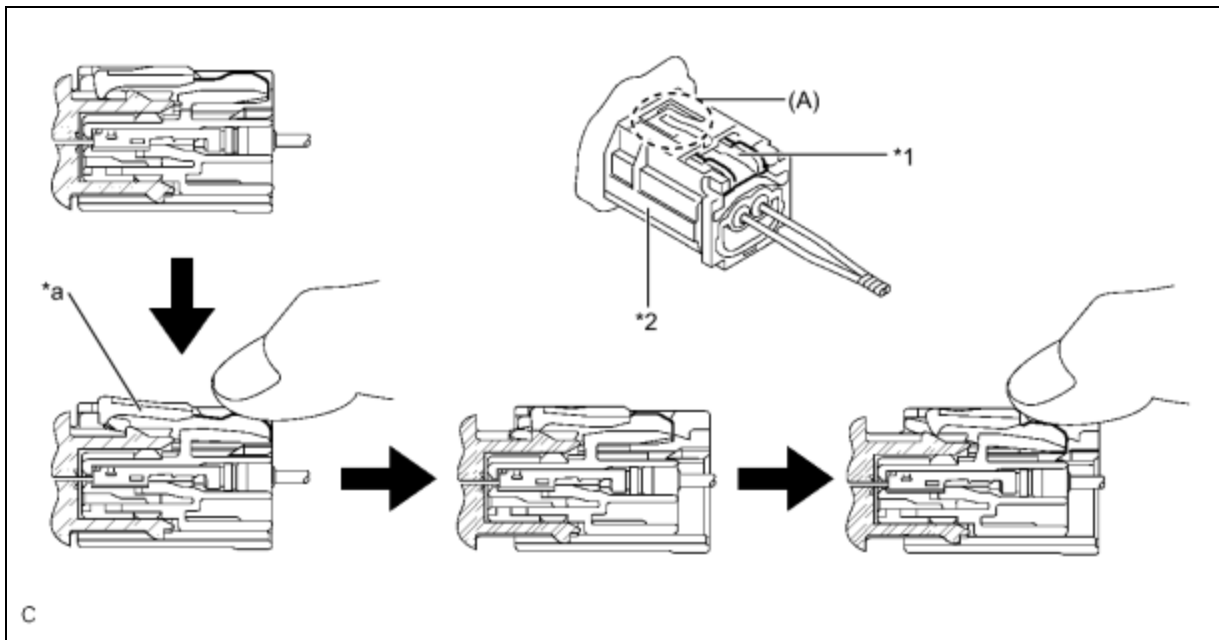
- Remove the 2 bolts and disengage the 2 hooks.

(d) Disconnect the connector to remove the front airbag sensor.

NOTICE:

When disconnecting any airbag connector, take care not to damage the airbag wire harness.

(1) Push down the white housing lock and slide the yellow CPA. (At this time, the connector cannot be disconnected yet.)



Text in Illustration

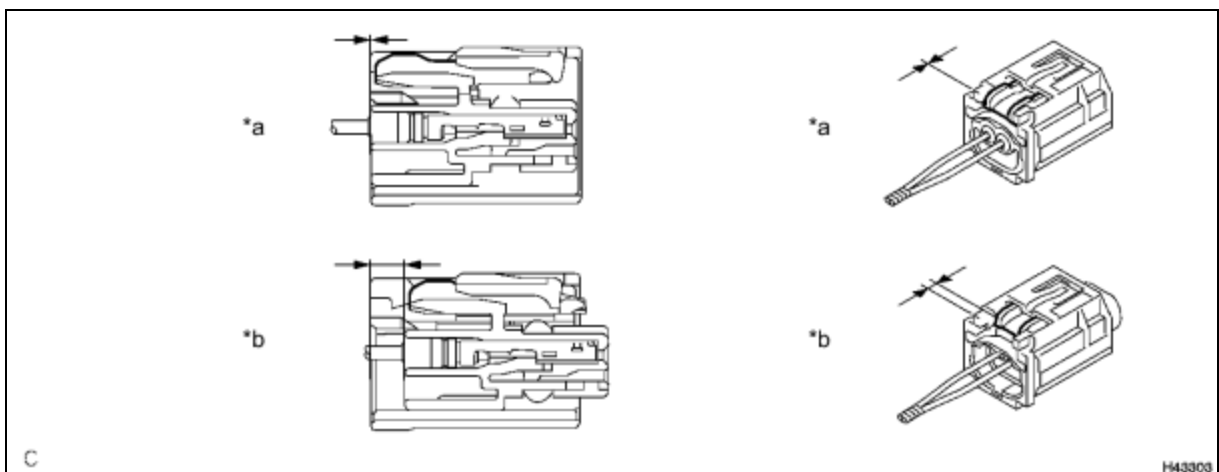
*1	White Housing Lock	*2	Yellow CPA
*a	Connector Lock is Released	-	-

(2) Push down the white housing lock again and disconnect the connector.

NOTICE:

Do not push down the part (A) shown in the illustration when disconnecting.

(e) After disconnecting the connector, check that the position of the white housing lock is correct as shown in the illustration.



Text in Illustration

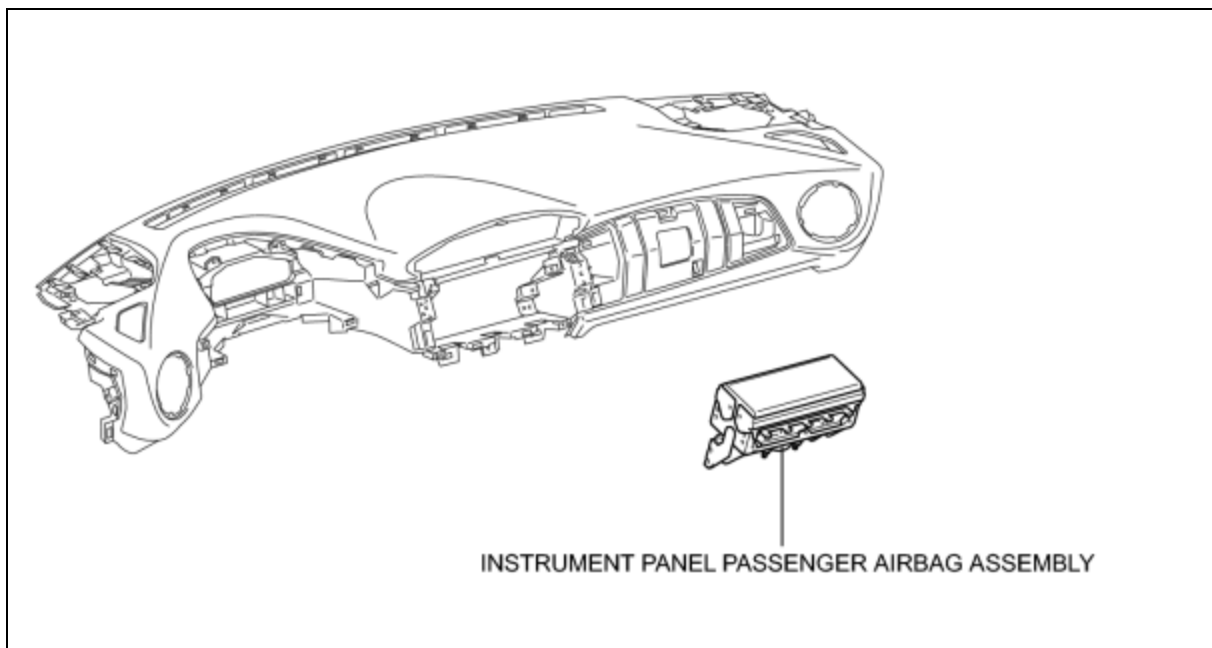
*a	Incorrect	*b	Correct
----	-----------	----	---------



Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UX906GX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: FRONT PASSENGER AIRBAG ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UX60A3X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: FRONT PASSENGER AIRBAG ASSEMBLY: DISPOSAL (2013 FR-S)		

DISPOSAL

CAUTION:

Before performing pre-disposal deployment of any SRS part, review and closely follow all applicable environmental and hazardous material regulations. Pre-disposal deployment may be considered hazardous material treatment.

1. PRECAUTION

CAUTION:

- An airbag or pretensioner may be activated by static electricity. To prevent this, be sure to touch a metal surface with bare hands to discharge static electricity before performing this procedure.
- Never dispose of an instrument panel passenger airbag assembly with an undeployed airbag.
- The airbag produces an exploding sound when it is deployed, so perform the operation outdoors and where it will not create a nuisance to nearby residents.
- When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.
- When deploying the airbag, perform the operation at least 10 m (32.8 ft.) away from the instrument panel passenger airbag assembly.
- The instrument panel passenger airbag assembly becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling an instrument panel passenger airbag assembly with a deployed airbag.
- Do not apply water etc. to an instrument panel passenger airbag assembly with a deployed airbag.
- Always wash your hands with water after completing the operation.

HINT:

When scrapping a vehicle equipped with an SRS or disposing of the instrument panel passenger airbag assembly, be sure to deploy the airbag first in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the Service Dept. of TOYOTA MOTOR SALES, U.S.A., INC.


2. DISPOSE OF INSTRUMENT PANEL PASSENGER AIRBAG ASSEMBLY (When Installed in Vehicle)

NOTICE:

- When disposing of the instrument panel passenger airbag assembly, never use the customer's vehicle to deploy the airbag.
- Be sure to observe the following procedure when deploying the airbag.

HINT:

Prepare a battery as the power source to deploy the airbag.

- Refer to Precaution  .
- Disconnect the cable from the negative (-) battery terminal.

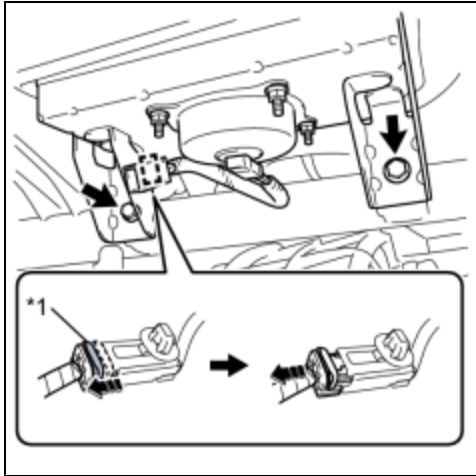
CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Remove the lower instrument panel sub-assembly INFO.
- (d) Disconnect the No. 2 instrument panel wire.

NOTICE:

When disconnecting any airbag connector, take care not to damage the airbag wire harness.



- (1) Slide the slider to release the lock, and then disconnect the connector.

Text in Illustration

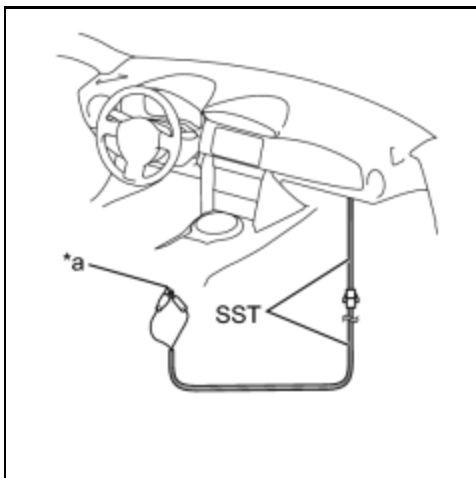
*1	Slider
----	--------

- (e) Install SST.

SST: 09082-18010
SST: 09082-18030

CAUTION:

Check that there is no looseness in the instrument panel passenger airbag assembly and instrument panel safety pad.



- (1) Connect the clip and terminal of SST.

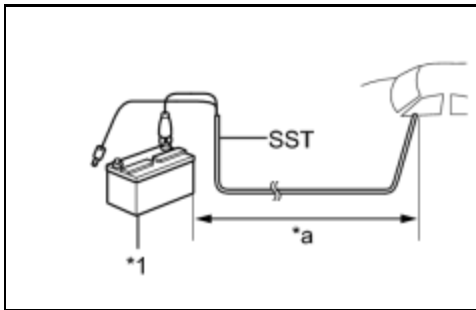
Text in Illustration

*a	Connect the clip and terminal
----	-------------------------------

- (2) After connecting the following SST to each other, connect them to the instrument panel passenger airbag assembly.
- (3) Connect the SST connector to the No. 2 instrument panel wire.

NOTICE:

To avoid damaging the SST connector or wire harness, do not lock the secondary lock of the twin lock.



(4) Move SST at least 10 m (32.8 ft.) away from the front side window of the vehicle.

Text in Illustration

*1	Battery
*a	10 m (32.8 ft.) or more

(5) Maintaining sufficient clearance for the SST wire harness in the front side window, close all doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

(f) Deploy the airbag.

(1) Check that no one is inside the vehicle or within a 10 m (32.8 ft.) radius of the vehicle.

(2) Connect the clip of SST to the positive (+) battery terminal.

(3) Connect the terminal of SST to the negative (-) battery terminal to deploy the instrument panel passenger airbag assembly.

CAUTION:

- Before deployment, make sure that no one is near the vehicle.
- The instrument panel passenger airbag assembly becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling an instrument panel passenger airbag assembly with a deployed airbag.
- Do not apply water etc. to an instrument panel passenger airbag assembly with a deployed airbag.
- Always wash your hands with water after completing the operation.


3. DISPOSE OF INSTRUMENT PANEL PASSENGER AIRBAG ASSEMBLY (When not Installed in Vehicle)

NOTICE:

Be sure to observe the following procedure when deploying the airbag.

HINT:

Prepare a battery as the power source to deploy the airbag.

(a) Remove the instrument panel passenger airbag assembly  .

CAUTION:

- Before removing the instrument panel passenger airbag assembly, wait at least 90 seconds after turning the ignition switch off and disconnecting the cable from the negative (-) battery terminal.
- When storing the instrument panel passenger airbag assembly, keep the airbag deployment side facing upward.

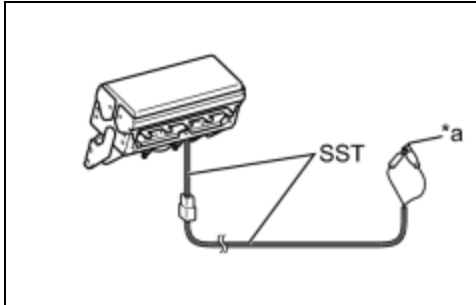
(b) Install SST.

SST: 09082-18010

SST: 09082-18030

NOTICE:

To avoid damaging the SST connector or wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the tire.



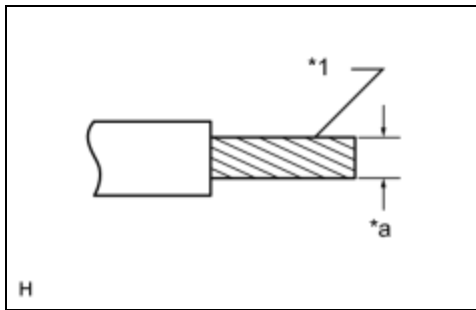
(1) Connect the clip and terminal of SST.

Text in Illustration

*a	Connect the clip and terminal
----	-------------------------------

(2) After connecting the following SST to each other, connect them to the instrument panel passenger airbag assembly.

(c) Using braided wire, tie down the instrument panel passenger airbag assembly to an unneeded tire.



Text in Illustration

*1	Stripped Wire Section
*a	Wire Diameter

Wire:

Stripped wire section

1.25 mm² (0.0019 in.²) or more

CAUTION:

If the wire is too thin or an alternative object is used to tie down the instrument panel passenger airbag assembly, it may snap when the airbag is deployed. Always use a wire for vehicle use with an area of at least 1.25 mm² (0.0019 in.²).

HINT:

To calculate the area of the stripped wire section:

$$\text{Area} = 3.14 \times (\text{Diameter})^2 / 4$$

(1) Position the instrument panel passenger airbag assembly inside the tire with the airbag deployment side facing inside.

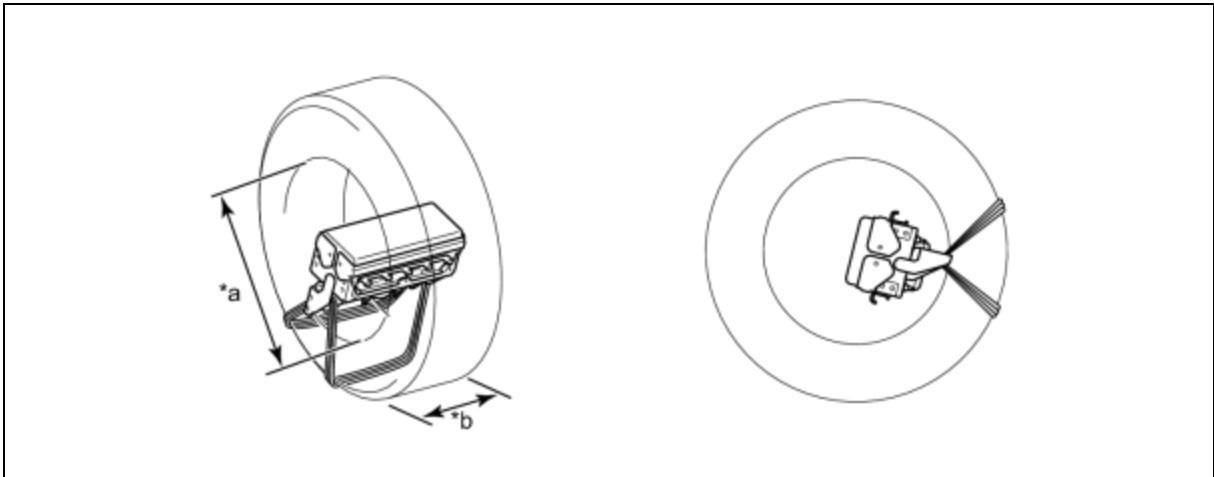
Minimum tire size:

Width

185 mm (7.28 in.)

Inner diameter

360 mm (1.18 ft.)



Text in Illustration

*a	Inner Diameter	*b	Width
----	----------------	----	-------

CAUTION:

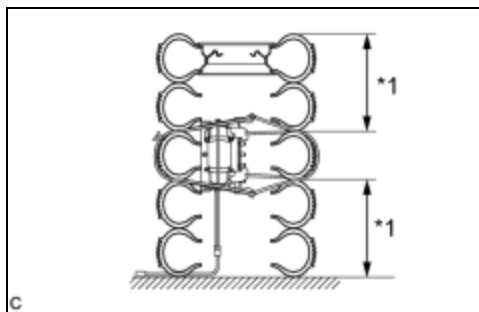
- Make sure that the wires are tight. If there is slack in the wires, the instrument panel passenger airbag assembly may break loose when the airbag is deployed.
- Always tie down the instrument panel passenger airbag assembly with the airbag deployment side facing inside the tire as shown in the illustration.

NOTICE:

The tire may be damaged by the airbag deployment, so use an unneeded tire.

(d) Place the tires.

(1) Place at least 2 tires under the tire to which the instrument panel passenger airbag assembly is tied.



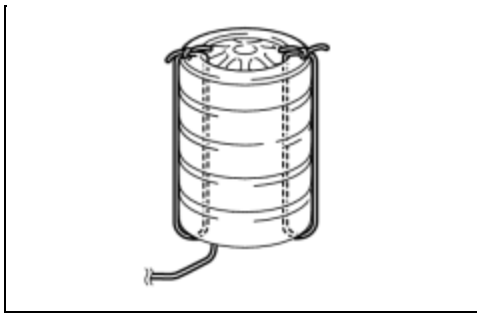
Text in Illustration

*1	Tires (2 or more)
----	-------------------

NOTICE:

- Do not place the SST connector under the tire because it could be damaged.
- The tires and wheel may be damaged by the airbag deployment, so use unneeded tires and wheel.

(2) Place at least 2 tires onto the tire to which the instrument panel passenger airbag assembly is tied. The top tire should have a wheel installed.



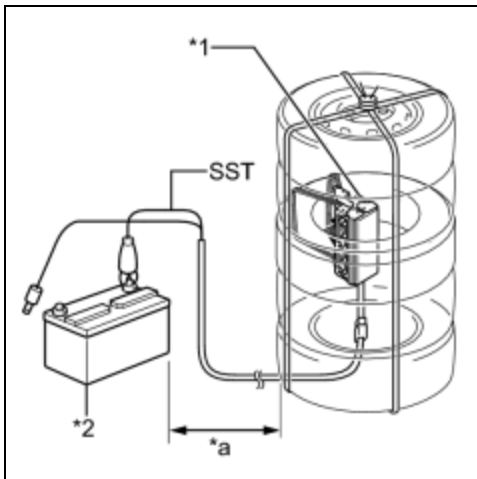
(3) Tie the tires together with the 2 wires.

CAUTION:

Make sure that the wires are tight. Looseness in the wires results in the tires breaking loose when the airbag is deployed.

(e) Deploy the airbag.

Text in Illustration



*1	Instrument Panel Passenger Airbag Assembly
*2	Battery
*a	10 m (32.8 ft.) or more

- (1) Move SST at least 10 m (32.8 ft.) away from the airbag tied down to the tire.
- (2) Check that no one is within a 10 m (32.8 ft.) radius of the tire to which the instrument panel passenger airbag assembly is tied.
- (3) Connect the clip of SST to the positive (+) battery terminal.
- (4) Connect the terminal of SST to the negative (-) battery terminal to deploy the instrument panel passenger airbag assembly.

CAUTION:

Before deployment, make sure that no one is near the airbag.

(f) Dispose of the instrument panel passenger airbag assembly.

CAUTION:

- The instrument panel passenger airbag assembly becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling an instrument panel passenger airbag assembly with a deployed airbag.
- Do not apply water etc. to an instrument panel passenger airbag assembly with a deployed airbag.
- Always wash your hands with water after completing the operation.

- (1) Remove the instrument panel passenger airbag assembly from the tire.
- (2) Place the instrument panel passenger airbag assembly in a plastic bag, tie it tightly, and dispose of it according to local regulations.

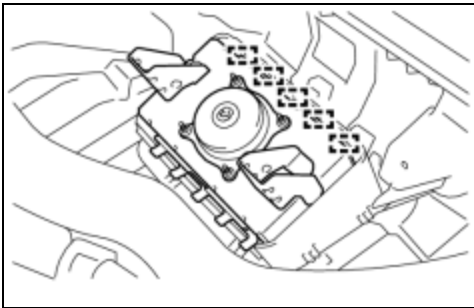
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UX709MX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: FRONT PASSENGER AIRBAG ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL INSTRUMENT PANEL PASSENGER AIRBAG ASSEMBLY

NOTICE:

If the hooks are not engaged in the correct order, the deployment part of the instrument panel passenger airbag assembly may be damaged.



(a) Engage the 5 hooks as shown in the illustration to temporarily install the instrument panel passenger airbag assembly.

(b) Push the instrument panel passenger airbag assembly to engage the 5 hooks.

2. INSTALL INSTRUMENT PANEL SUB-ASSEMBLY

INFO

3. PERFORM DIAGNOSTIC SYSTEM CHECK

INFO

4. INSPECT SRS WARNING LIGHT

INFO


Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UXB09DX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: FRONT PASSENGER AIRBAG ASSEMBLY: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

CAUTION:

Be sure to correctly follow the removal and installation procedures for the instrument panel passenger airbag assembly.

1. INSPECT INSTRUMENT PANEL PASSENGER AIRBAG ASSEMBLY (for Vehicle not Involved in Collision)

- (a) Perform a diagnostic system check  .
- (b) Visually check for defects with the instrument panel passenger airbag assembly installed on the vehicle.

HINT:

The defects are as follows:


- Cuts on the instrument panel sub-assembly around the instrument panel passenger airbag assembly
- Small cracks on the instrument panel sub-assembly around the instrument panel passenger airbag assembly
- Significant discoloration on the instrument panel sub-assembly around the instrument panel passenger airbag assembly

OK:

No defects are found.

If any of the defects is found, replace the instrument panel sub-assembly with a new one.

2. INSPECT INSTRUMENT PANEL PASSENGER AIRBAG ASSEMBLY (for Vehicle Involved in Collision and Airbag not Deployed)

- (a) Perform a diagnostic system check  .
- (b) Visually check for defects with the instrument panel passenger airbag assembly removed from the vehicle.

HINT:

- Cuts
- Small cracks
- Significant discoloration
- Cracks or other damage to the connector
- Deformation or cracks on the instrument panel sub-assembly or instrument panel reinforcement

OK:

No defects are found.

If any of the defects is found, replace the instrument panel passenger airbag assembly, instrument panel sub-assembly or instrument panel reinforcement with a new one.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UXA09JX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: FRONT PASSENGER AIRBAG ASSEMBLY: REMOVAL (2013 FR-S)		


REMOVAL

1. PRECAUTION

CAUTION:

Be sure to read Precaution thoroughly before servicing  .

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work  .

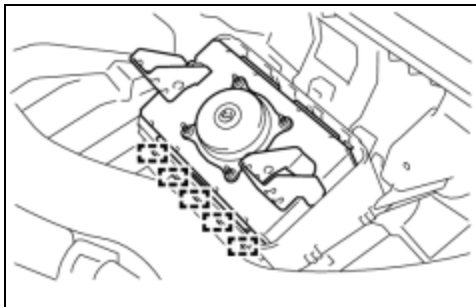
2. REMOVE INSTRUMENT PANEL SUB-ASSEMBLY



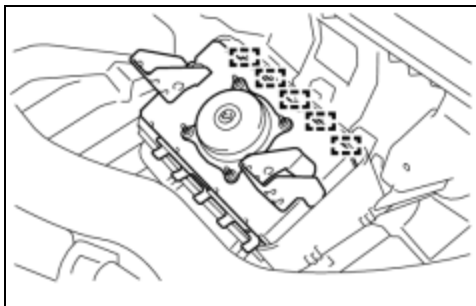
3. REMOVE INSTRUMENT PANEL PASSENGER AIRBAG ASSEMBLY

CAUTION:

When storing the instrument panel passenger airbag assembly, keep the airbag deployment side facing upward.



- (a) Lean the instrument panel safety pad assembly and disengage the 5 hooks.

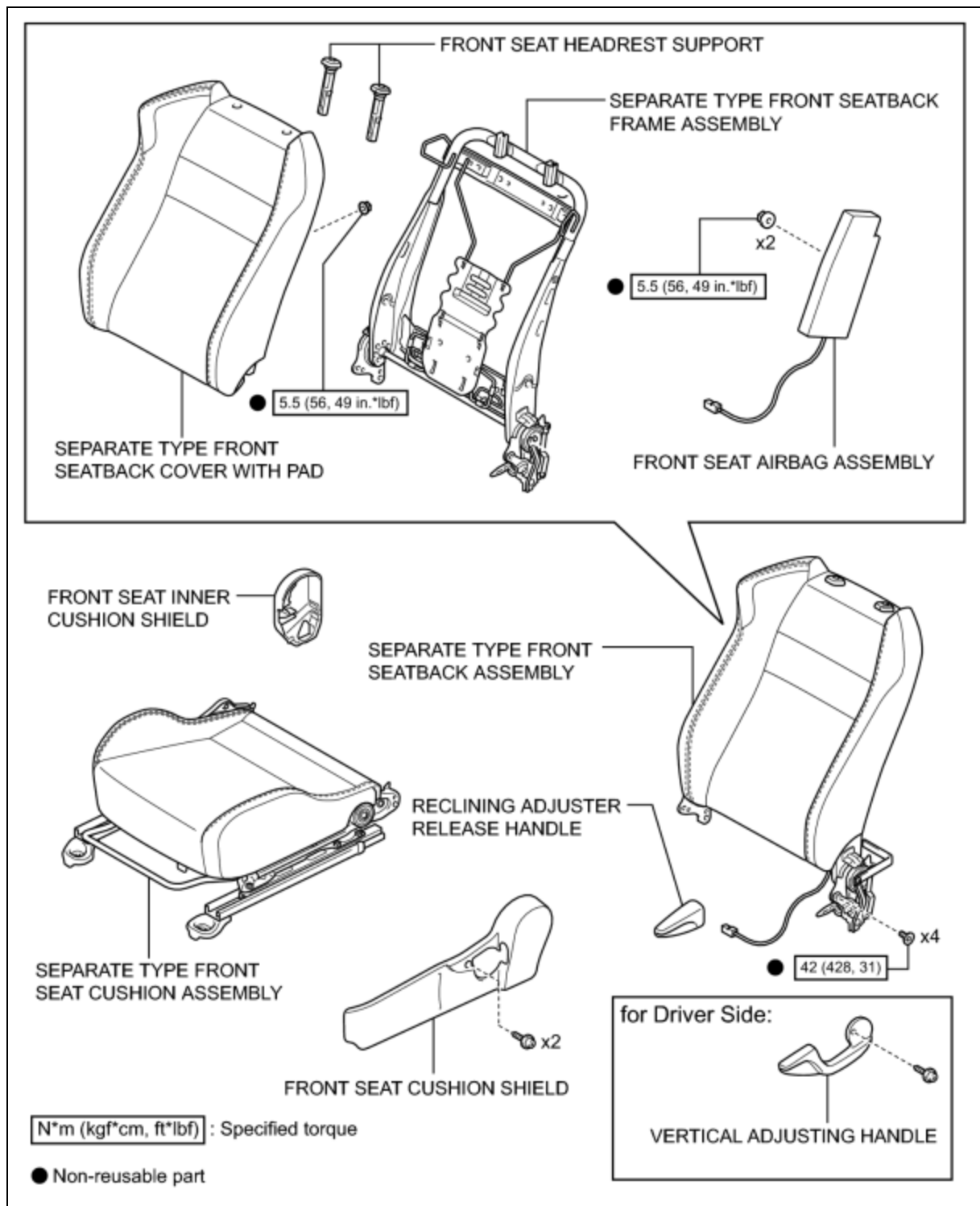


- (b) Disengage the 5 hooks to remove the instrument panel passenger airbag assembly from the upper instrument panel sub-assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004N2600QX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: FRONT SEAT SIDE AIRBAG ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION





Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UX00DAX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: FRONT SEAT SIDE AIRBAG ASSEMBLY: DISPOSAL (2013 FR-S)		

DISPOSAL

CAUTION:

Before performing pre-disposal deployment of any SRS part, review and closely follow all applicable environmental and hazardous material regulations. Pre-disposal deployment may be considered hazardous material treatment.

1. PRECAUTION

CAUTION:

- An airbag or pretensioner may be activated by static electricity. To prevent this, be sure to touch a metal surface with your bare hands to discharge static electricity before performing this procedure.
- Never dispose of a front seat airbag assembly with an undeployed airbag.
- The airbag produces an exploding sound when it is deployed, so perform the operation outdoors and where it will not create a nuisance to nearby residents.
- When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.
- When deploying the airbag, perform the operation at least 10 m (32.8 ft.) away from the front seat airbag assembly.
- The front seat airbag assembly becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling a front seat airbag assembly with a deployed airbag.
- Do not apply water etc. to a front seat airbag assembly with a deployed airbag.
- Always wash your hands with water after completing the operation.

HINT:

When scrapping a vehicle equipped with an SRS or disposing of the front seat airbag assembly, be sure to deploy the airbag first in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the Service Dept. of TOYOTA MOTOR SALES, U.S.A., INC.


2. DISPOSE OF FRONT SEAT AIRBAG ASSEMBLY (When Installed in Vehicle)

NOTICE:

- When disposing of the front seat airbag assembly, never use the customer's vehicle to deploy the airbag.
- Be sure to observe the following procedure when deploying the airbag.

HINT:

Prepare a battery as the power source to deploy the airbag.

- (a) Refer to Precaution .
- (b) Disconnect the cable from the negative (-) battery terminal.

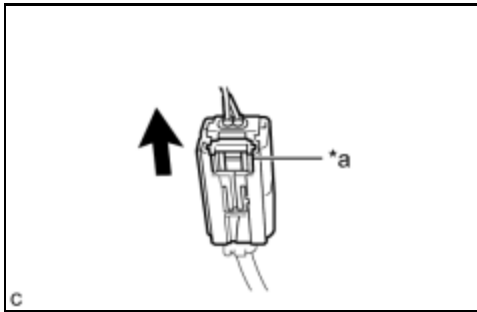
CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Disconnect the connector from the front seat airbag assembly under the front seat assembly.

NOTICE:

When disconnecting any airbag connector, take care not to damage the airbag wire harness.



(1) Slide the slider to release the lock, and then disconnect the yellow airbag connector as shown in the illustration.

Text in Illustration

*a	Slider
----	--------

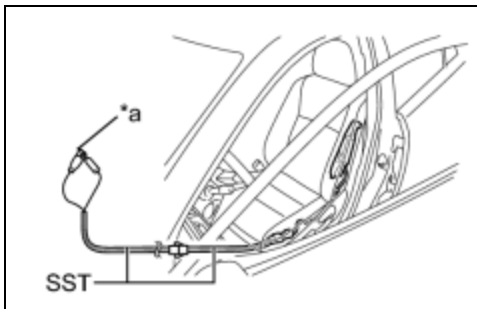
(d) Install SST.

SST: 09082-18010

SST: 09082-18040

CAUTION:

Check that there is no looseness in the front seat assembly.



(1) Connect the clip and terminal of SST.

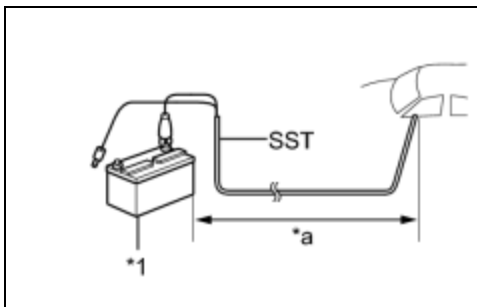
Text in Illustration

*a	Connect the clip and terminal
----	-------------------------------

(2) Connect the SST connector to the front seat airbag assembly connector.

NOTICE:

To avoid damaging the SST connector or wire harness, do not lock the secondary lock of the twin lock.



(3) Move SST at least 10 m (32.8 ft.) away from the front side window.

Text in Illustration

*1	Battery
*a	10 m (32.8 ft.) or more

- (4) Maintaining sufficient clearance for the SST wire harness in the front side window, close all doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

- (e) Deploy the airbag.
- (1) Check that no one is inside the vehicle or within a 10 m (32.8 ft.) radius of the vehicle.
 - (2) Connect the clip of SST to the positive (+) battery terminal.
 - (3) Connect the terminal of SST to the negative (-) battery terminal to deploy the front seat airbag assembly.

CAUTION:

- Before deployment, make sure that no one is near the vehicle.
- The front seat airbag assembly becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling a front seat airbag assembly with a deployed airbag.
- Do not apply water etc. to a front seat airbag assembly with a deployed airbag.
- Always wash your hands with water after completing the operation.

3. DISPOSE OF FRONT SEAT AIRBAG ASSEMBLY (When not Installed in Vehicle)

SST: 09082-18010


SST: 09082-18040

NOTICE:

Be sure to observe the following procedure when deploying the airbag.

HINT:

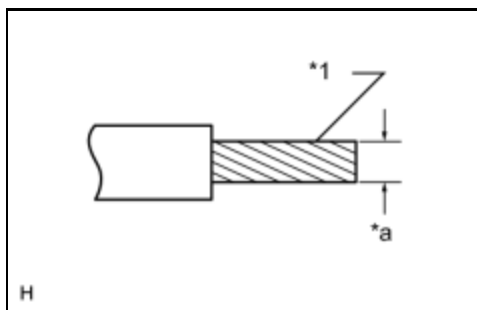
Prepare a battery as the power source to deploy the airbag.

- (a) Remove the front seat airbag assembly .

CAUTION:

- Before removing the front seat assembly, wait at least 90 seconds after turning the ignition switch off and disconnecting the cable from the negative (-) battery terminal.
- When storing the front seat airbag assembly, keep the airbag deployment side facing upward.

- (b) Using braided wire, tie down the front seat airbag assembly to an unneeded tire.



Text in Illustration

*1	Stripped Wire Section
*a	Wire Diameter

Wire:

Stripped wire section

1.25 mm² (0.0019 in.²) or more

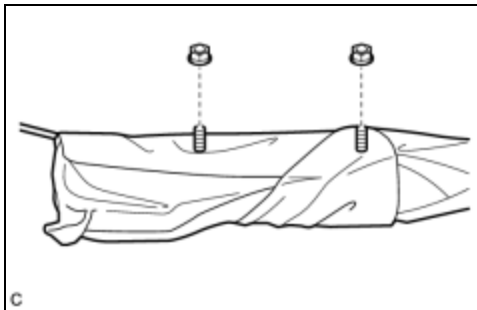
CAUTION:

If the wire is too thin or an alternative object is used to tie down the front seat airbag assembly, it may snap when the airbag is deployed. Always use a wire for vehicle use with an area of at least 1.25 mm² (0.0019 in.²).

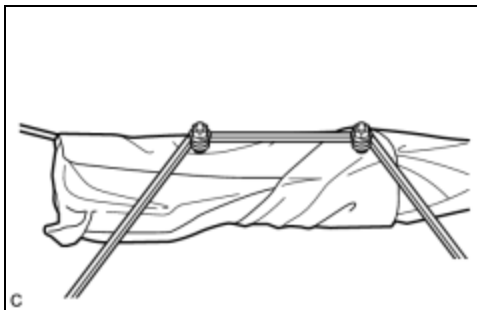
HINT:

To calculate the area of the stripped wire section:

$$\text{Area} = 3.14 \times (\text{Diameter})^2 / 4$$



(1) Install the 2 nuts to the front seat airbag assembly.



(2) Wind the wires around the stud bolts of the front seat airbag assembly as shown in the illustration.

(3) Position the front seat airbag assembly inside the tire.

Text in Illustration

*a	Width
*b	Inner Diameter

Minimum tire size:

Width

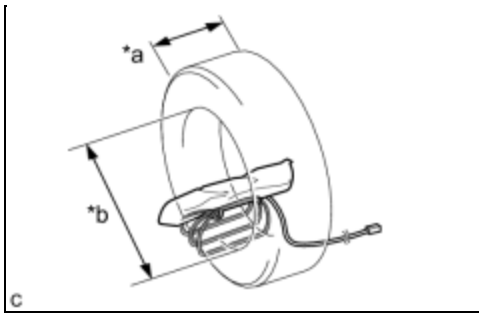
185 mm (7.28 in.)

Inner diameter

360 mm (1.18 ft.)

CAUTION:

- Make sure that the wires are tight. If there is slack in



the wires, the front seat airbag assembly may break loose when the airbag is deployed.

- Face the front seat airbag assembly deployment surface toward the inside the tire to evenly distribute the force of deployment.

NOTICE:

The tire may be damaged by the airbag deployment, so use an unneeded tire.

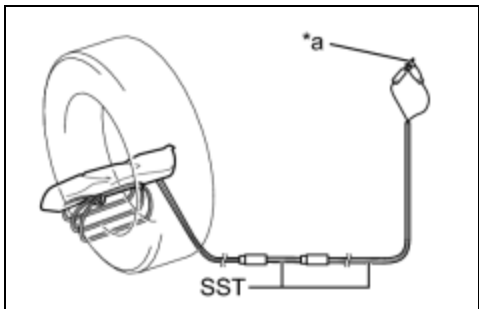
(c) Install SST.

SST: 09082-18010

SST: 09082-18040

NOTICE:

To avoid damaging the SST connector or wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the tire.



(1) Connect the clip and terminal of SST.

Text in Illustration

*a	Connect the clip and terminal
----	-------------------------------

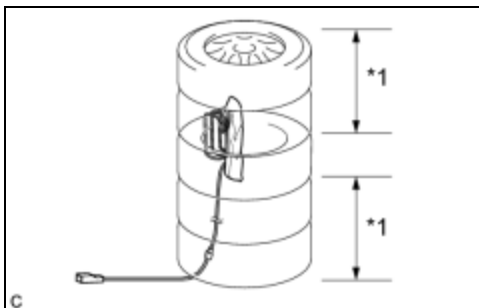
(2) After connecting the following SST to each other, connect them to the front seat airbag assembly.

(d) Place the tires.

(1) Place at least 2 tires under the tire to which the front seat airbag assembly is tied.

Text in Illustration

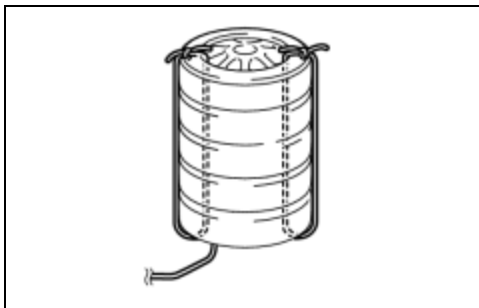
*1	Tires (2 or more)
----	-------------------



NOTICE:

- Do not place the SST connector under the tire because it could be damaged.
- The tires and wheel may be damaged by the airbag deployment, so use unneeded tires and wheel.

- (2) Place at least 2 tires onto the tire to which the front seat airbag assembly is tied. The top tire should have a wheel installed.



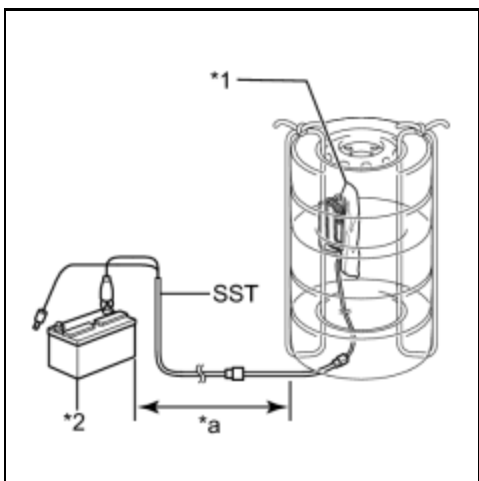
- (3) Tie the tires together with the 2 wires.

CAUTION:

Make sure that the wires are tight. Looseness in the wires results in the tires breaking loose when the airbag is deployed.

- (e) Deploy the airbag.

Text in Illustration



*1	Front Seat Airbag Assembly
*2	Battery
*a	10 m (32.8 ft.) or more

- (1) Move SST at least 10 m (32.8 ft.) away from the airbag tied down to the tire.
- (2) Check that no one is within a 10 m (32.8 ft.) radius of the tire to which the front seat airbag assembly is tied.
- (3) Connect the clip of SST to the positive (+) battery terminal.
- (4) Connect the terminal of SST to the negative (-) battery terminal to deploy the front seat airbag assembly.

CAUTION:

Before deployment, make sure that no one is near the airbag.

- (f) Dispose of the front seat airbag assembly.

CAUTION:

- The front seat airbag assembly becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling a front seat airbag assembly with a deployed airbag.
- Do not apply water etc. to a front seat airbag assembly with a deployed airbag.
- Always wash your hands with water after completing the operation.

- (1) Remove the front seat airbag assembly from the tire.
- (2) Place the front seat airbag assembly in a plastic bag, tie it tightly, and dispose of it according to local regulations.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004N2500QX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: FRONT SEAT SIDE AIRBAG ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL FRONT SEAT AIRBAG ASSEMBLY

CAUTION:

- The nuts must not be reused.
- Make sure that the separate type front seatback spring assembly is not deformed. If it is, replace it with a new one.

(a) Install the front seat airbag assembly with 2 new nuts.

Torque: 5.5 N·m (56 kgf·cm, 49in·lbf)

(b) Engage the 2 clamps.

2. INSTALL SEPARATE TYPE FRONT SEATBACK COVER WITH PAD INFO

3. INSTALL SEPARATE TYPE FRONT SEATBACK ASSEMBLY INFO

4. INSTALL FRONT SEAT INNER CUSHION SHIELD INFO

5. INSTALL FRONT SEAT CUSHION SHIELD INFO

6. INSTALL VERTICAL ADJUSTING HANDLE (for Driver Side) INFO

7. INSTALL RECLINING ADJUSTER RELEASE HANDLE INFO

8. INSTALL FRONT SEAT ASSEMBLY

INFO

9. PERFORM DIAGNOSTIC SYSTEM CHECK

INFO


Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VPSOCKX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: FRONT SEAT SIDE AIRBAG ASSEMBLY: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

CAUTION:

Be sure to correctly follow the removal and installation procedures for the front seat airbag assemblies.

1. INSPECT FRONT SEAT AIRBAG ASSEMBLY (for Vehicle not Involved in Collision)

- (a) Perform a diagnostic system check  .
- (b) Visually check for defects with the front seat airbag assemblies installed on the vehicle.

HINT:

The defects are as follows:


- Cuts on the front seatback assembly around the front seat airbag assemblies
- Small cracks on the front seatback assembly around the front seat airbag assemblies
- Significant discoloration on the front seatback assembly around the front seat airbag assemblies

OK:

No defects are found.

If any of the defects is found, replace the separate type front seatback pad or separate type front seatback cover with a new one.

2. INSPECT FRONT SEAT AIRBAG ASSEMBLY (for Vehicle Involved in Collision and Airbag not Deployed)

- (a) Perform a diagnostic system check  .
- (b) Visually check for defects with the front seat airbag assemblies removed from the vehicle.

HINT:

The defects are as follows:

- Make sure that there are no scratches, broken or frayed threads on the surface of the front seat airbag assemblies base fabric
- Marks from being dropped
- Deformation on the installation part of the front seat airbag assemblies
- Cracks or other damage to the wire harness or connector

OK:

No defects are found.

If any of the defects is found, replace the front seat airbag assembly with a new one.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004N2700RX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: FRONT SEAT SIDE AIRBAG ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

CAUTION:

- Be sure to read Precaution thoroughly before servicing. INFO
- Wear protective gloves. Sharp areas on the parts may may injure your hands.
- If the side airbag was deployed, replace the front seat airbag assembly, separate type front seatback spring assembly, separate type front seatback cover and separate type front seatback pad with the necessary parts in accordance with the extent of the collision damage. INFO

HINT:

Use the same procedure for the LH and RH sides.

1. REMOVE FRONT SEAT ASSEMBLY

INFO

2. REMOVE RECLINING ADJUSTER RELEASE HANDLE INFO

3. REMOVE VERTICAL ADJUSTING HANDLE (for Driver Side) INFO

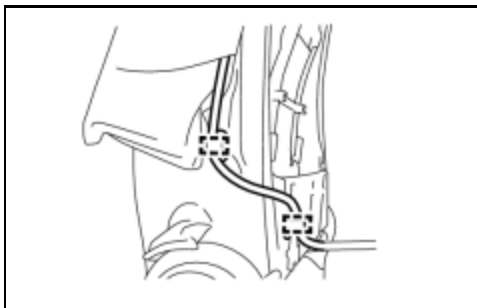
4. REMOVE FRONT SEAT CUSHION SHIELD INFO

5. REMOVE FRONT SEAT INNER CUSHION SHIELD INFO

6. REMOVE SEPARATE TYPE FRONT SEATBACK ASSEMBLY INFO

7. REMOVE SEPARATE TYPE FRONT SEATBACK COVER WITH PAD INFO

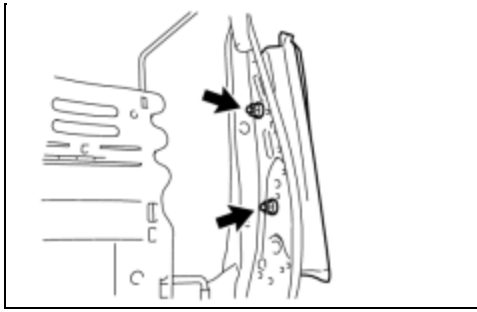
8. REMOVE FRONT SEAT AIRBAG ASSEMBLY



(a) Disengage the 2 clamps.

(b) Remove the 2 nuts and the front seat airbag assembly.

CAUTION:



- The nuts must not be reused.
- Make sure that the separate type front seatback spring assembly is not deformed. If it is, replace it with a new one.

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000057WN000X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: OCCUPANT CLASSIFICATION SYSTEM: B1760: Occupant Classification Sensor Circuit (2013 FR-S)		

DTC	B1760	Occupant Classification Sensor Circuit
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DESCRIPTION

The occupant detection sensor circuit consists of the occupant detection ECU and occupant detection sensor.

DTC B1760 is stored when a malfunction is detected in the occupant detection sensor circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1760	<ul style="list-style-type: none"> The occupant detection ECU receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the occupant detection sensor circuit. Occupant detection sensor malfunction Occupant detection ECU malfunction 	Front seat assembly RH

INSPECTION PROCEDURE

PROCEDURE

1.	CHECK CONNECTOR
-----------	------------------------

- Turn the ignition switch off.
- Disconnect the cable from the negative (-) battery terminal.
- Check that the connector is properly connected to the occupant detection ECU.

OK:

The connector is properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

- Disconnect the connector from the occupant detection ECU.
- Check that the terminal of the connector is not damaged.

OK:

The terminal is not deformed or damaged.

OK



2.	CHECK DTC
-----------	------------------

- (a) Connect the connector to the occupant detection ECU.
- (b) Connect the cable to the negative (-) battery terminal.
- (c) Clear the DTCs stored in the occupant detection ECU INFO.
- (d) Clear the DTCs stored in the airbag ECU assembly INFO.
- (e) Turn the ignition switch off.
- (f) Turn the ignition switch to ON.
- (g) Check for DTCs INFO.

OK:

DTC B1760 is not output.

HINT:

Codes other than DTC B1760 may be output at this time, but they are not related to this check.

NG **REPLACE FRONT SEAT ASSEMBLY RH**

OK **USE SIMULATION METHOD TO CHECK**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000057W0000X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: OCCUPANT CLASSIFICATION SYSTEM: B1761: Occupant Classification Sensor Soaked (2013 FR-S)		

DTC	B1761	Occupant Classification Sensor Soaked
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DESCRIPTION

DTC B1761 is stored when the occupant detection sensor is wet.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1761	<ul style="list-style-type: none"> The occupant detection sensor is wet. Occupant detection sensor malfunction Occupant detection ECU malfunction 	Front seat assembly RH

INSPECTION PROCEDURE

PROCEDURE

1.	DRYING FRONT SEAT ASSEMBLY RH
-----------	--------------------------------------

(a) Open the car windows inside a well-ventilated room and let the sheet dry for 24 hours.

NEXT



2.	CHECK DTC
-----------	------------------

(a) Clear the DTCs stored in the occupant detection ECU **INFO** .

(b) Clear the DTCs stored in the airbag ECU assembly **INFO** .

(c) Turn the ignition switch off.

(d) Turn the ignition switch to ON.

(e) Check for DTCs **INFO** .

OK:

DTC B1761 is not output.

HINT:

Codes other than DTC B1761 may be output at this time, but they are not related to this check.

NG ▶ REPLACE FRONT SEAT ASSEMBLY RH

OK ▶ END



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010V6088X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: OCCUPANT CLASSIFICATION SYSTEM: B1771: Seat Belt Buckle SW (2013 FR-S)		

DTC	B1771	Seat Belt Buckle SW
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DESCRIPTION

The passenger side buckle switch circuit consists of the occupant detection ECU and front seat inner belt assembly RH.

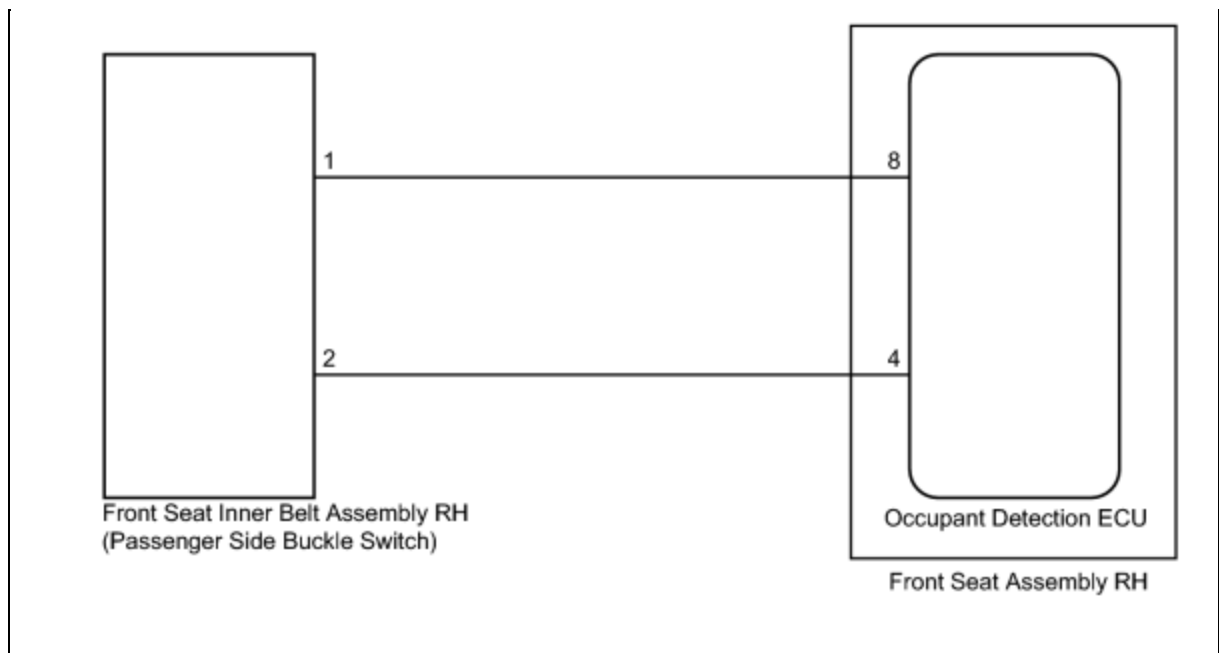
DTC B1771 is stored when a malfunction is detected in the passenger side buckle switch circuit.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1771	<ul style="list-style-type: none"> The occupant detection ECU receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the passenger side buckle switch circuit. Passenger side buckle switch malfunction Occupant detection ECU malfunction 	<ul style="list-style-type: none"> Front seat inner belt assembly RH (Passenger side buckle switch) Front seat assembly RH

HINT:

When DTC B1650 is detected as a result of troubleshooting for the airbag system, check the DTCs stored in the occupant detection ECU. When DTC B1771 is output, perform troubleshooting for the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work **INFO**.

HINT:

- If troubleshooting (wire harness inspection) is difficult to perform, remove the front passenger seat installation bolts to see under the seat cushion.
- In the above case, lift and hold the seat so that it does not fall down. Hold the seat only as necessary because holding the seat for a long period of time may cause seat rail deformation.

PROCEDURE

1.	CHECK CONNECTORS
-----------	-------------------------

- (a) Turn the ignition switch off.
- (b) Disconnect the cable from the negative (-) battery terminal.
- (c) Check that the connectors are properly connected to the occupant detection ECU and front seat inner belt assembly RH.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

- (d) Disconnect the connectors from the occupant detection ECU and front seat inner belt assembly RH.

(e) Check that the terminals of the connectors are not damaged.

OK:

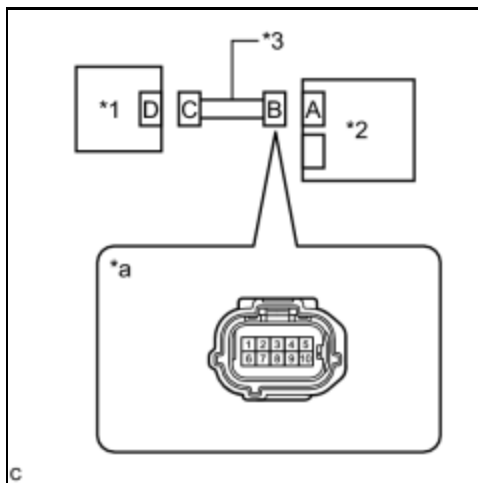
The terminals are not deformed or damaged.

NG  REPLACE FRONT SEAT ASSEMBLY RH

OK



2.	CHECK FRONT SEAT WIRE RH (SHORT TO B+)
-----------	---



(a) Connect the cable to the negative (-) battery terminal.

(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 - Body ground	Ignition switch ON	Below 1 V
8 - Body ground	Ignition switch ON	Below 1 V

(d) Turn the ignition switch off.

(e) Disconnect the cable from the negative (-) battery terminal.

Text in Illustration

*1	Front Seat Inner Belt Assembly RH
*2	Occupant Detection ECU
*3	Front Seat Wire RH
	Front view of wire harness connector

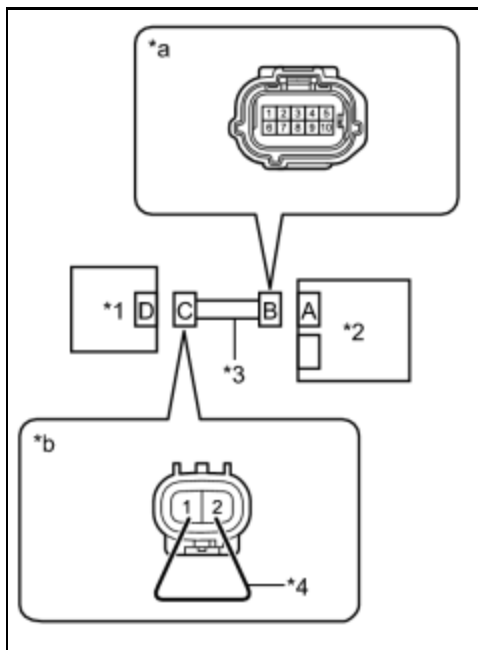
*a	(to Occupant Detection ECU)
----	-----------------------------

NG ▶ REPLACE FRONT SEAT ASSEMBLY RH

OK



3. CHECK FRONT SEAT WIRE RH (OPEN)



(a) Using a service wire, connect terminals 1 and 2 of connector C.

NOTICE:

Do not forcibly insert the service wire into the terminals of the connector when connecting the wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 - 8	Always	Below 1 Ω

(c) Disconnect the service wire from connector C.

Text in Illustration

*1	Front Seat Inner Belt Assembly RH
*2	Occupant Detection ECU
*3	Front Seat Wire RH
*4	Service Wire

*a	Front view of wire harness connector (to Occupant Detection ECU)
*b	Front view of wire harness connector (to Front Seat Inner Belt Assembly RH)

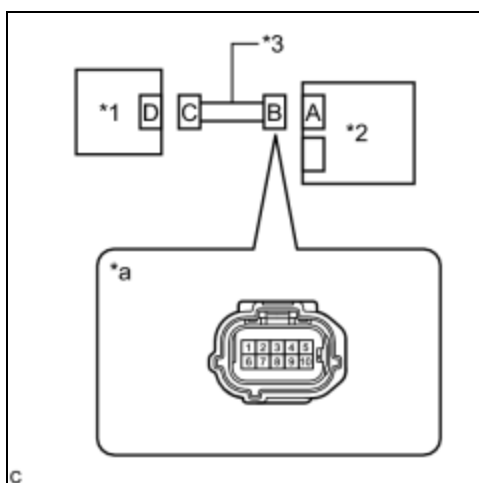
NG ► REPLACE FRONT SEAT ASSEMBLY RH

OK
▼

4. CHECK FRONT SEAT WIRE RH (SHORT)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 - 8	Always	1 MΩ or higher

Text in Illustration

*1	Front Seat Inner Belt Assembly RH
*2	Occupant Detection ECU
*3	Front Seat Wire RH
*a	Front view of wire harness connector (to Occupant Detection ECU)

NG ► REPLACE FRONT SEAT ASSEMBLY RH

OK
▼

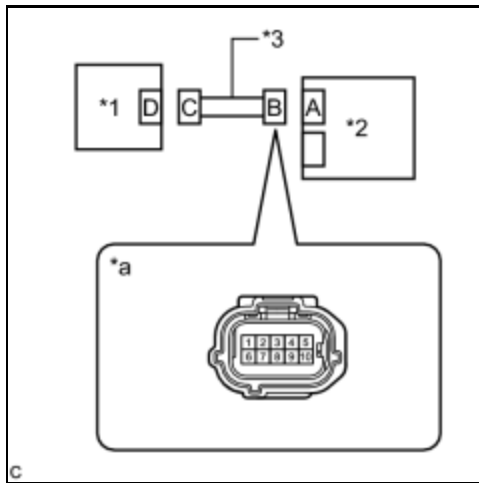
5. CHECK FRONT SEAT WIRE RH (SHORT TO GROUND)

(a) Measure the resistance according to the value(s) in

the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 - Body ground	Always	1 MΩ or higher
8 - Body ground	Always	1 MΩ or higher



Text in Illustration

*1	Front Seat Inner Belt Assembly RH
*2	Occupant Detection ECU
*3	Front Seat Wire RH
*a	Front view of wire harness connector (to Occupant Detection ECU)

NG ► REPLACE FRONT SEAT ASSEMBLY RH

OK



6. CHECK DTC

- Connect the connectors to the occupant detection ECU and front seat inner belt assembly RH.
- Connect the cable to the negative (-) battery terminal.
- Clear the DTCs stored in the occupant detection ECU **INFO**.
- Clear the DTCs stored in the airbag ECU assembly **INFO**.
- Turn the ignition switch off.
- Turn the ignition switch to ON.
- Check for DTCs **INFO**.
OK:
DTC B1771 is not output.

HINT:

Codes other than DTC B1771 may be output at this time, but they are not related to this check.

- Turn the ignition switch off.

NG ► CHECK FRONT SEAT INNER BELT ASSEMBLY RH

OK ► USE SIMULATION METHOD TO CHECK

7.	CHECK FRONT SEAT INNER BELT ASSEMBLY RH
-----------	--

- (a) Disconnect the cable from the negative (-) battery terminal.
- (b) Replace the front seat inner belt assembly RH INFO.

HINT:

Perform the inspection using parts from a normal vehicle if possible.

- (c) Connect the cable to the negative (-) battery terminal.
- (d) Clear the DTCs stored in the occupant detection ECU INFO.
- (e) Clear the DTCs stored in the airbag ECU assembly INFO.
- (f) Turn the ignition switch off.
- (g) Turn the ignition switch to ON.
- (h) Check for DTCs INFO.

OK:
DTC B1771 is not output.

HINT:

Codes other than DTC B1771 may be output at this time, but they are not related to this check.

NG ► REPLACE FRONT SEAT ASSEMBLY RH

OK ► END (FRONT SEAT INNER BELT ASSEMBLY RH WAS DEFECTIVE)

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010VH03WX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: OCCUPANT CLASSIFICATION SYSTEM: B1795: ECU Fault Status (2013 FR-S)		

DTC	B1795	ECU Fault Status
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DESCRIPTION

DTC B1795 is stored when a malfunction is detected in the occupant detection ECU.


DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
B1795	Occupant detection ECU malfunction	Front seat assembly RH

HINT:

When DTC B1650 is detected as a result of troubleshooting for the airbag system, check the DTCs stored in the occupant detection ECU. When DTC B1795 is output, perform troubleshooting for the DTC.


INSPECTION PROCEDURE

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work .

PROCEDURE

1.	REPLACE FRONT SEAT ASSEMBLY RH
-----------	---------------------------------------

- (a) Turn the ignition switch off.
- (b) Disconnect the cable from the negative (-) battery terminal.
- (c) Replace the front seat assembly RH .
- (d) Connect the cable to the negative (-) battery terminal.

NEXT  **END**

Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010VM07KX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: OCCUPANT CLASSIFICATION SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Body Electrical / Occupant Detection / Data List.
- (f) Check the values by referring to the table below.

Occupant Detection

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Passenger Detection	Passenger detection status/ ON / OFF	ON/OFF	-
Status of Passenger Side Buckle SW	Passenger side buckle switch/ Set / Unset / NG	Set/Unset	-
Number of Present DTC	Number of present DTC recorded/ Min.: 0, Max.: 255	0	-

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010VJ07PX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: OCCUPANT CLASSIFICATION SYSTEM: DIAGNOSIS SYSTEM (2013 FR-S)		

DIAGNOSIS SYSTEM

1. FUNCTION OF PASSENGER AIRBAG ON/OFF INDICATOR

(a) Initial check

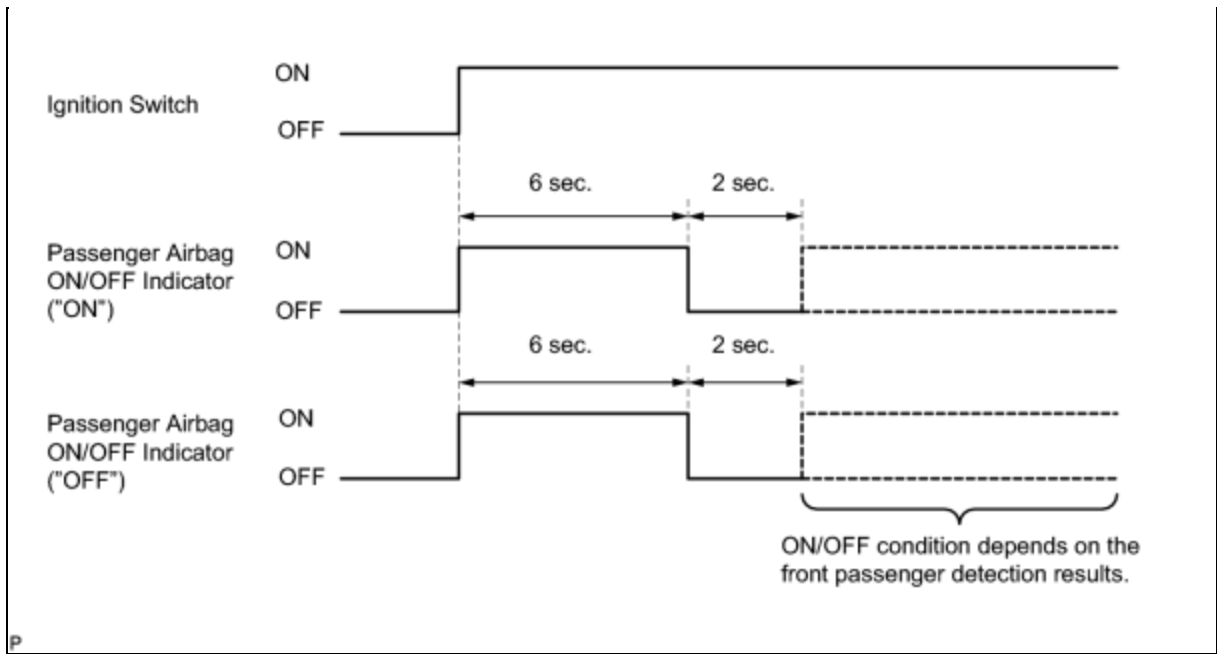
- (1) Turn the ignition switch to ON.
- (2) The passenger airbag ON/OFF indicator comes on for approximately 6 seconds, then goes off for approximately 2 seconds.
- (3) Approximately 6 seconds after the ignition switch is turned to ON, the passenger airbag ON/OFF indicator will indicate ON/OFF depending on the conditions listed below.

Indicator Operation

FRONT PASSENGER SEAT CONDITION	PASSENGER AIRBAG ON/OFF INDICATOR		SRS WARNING LIGHT
	ON INDICATOR	OFF INDICATOR	
Vacant	OFF	OFF	OFF
Adult is seated.	ON	OFF	OFF
Child is seated.	OFF	ON	OFF
Child restraint system is installed.			
Occupant classification system failure	OFF	ON	ON

HINT:

- The passenger airbag ON/OFF indicator illuminates based on the timing chart below in order to check the indicator light circuit.
- When the occupant classification system has trouble, both the SRS warning light and passenger airbag ON/OFF indicator ("OFF") come on. In this case, check the DTCs in the airbag system first.



2. CHECK PASSENGER AIRBAG ON/OFF INDICATOR



(a) Turn the ignition switch to ON.

(b) Check that the passenger airbag ON/OFF indicator ("ON" and "OFF") comes on for approximately 6 seconds, then goes off for approximately 2 seconds.

HINT:

Refer to the indicator operation table in the preceding step regarding the passenger airbag ON/OFF indicator when the ignition switch is turned to ON and approximately 6 seconds elapse.

Last Modified: 3-27-2012	6.4 S	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010V2031X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: OCCUPANT CLASSIFICATION SYSTEM: DIAGNOSTIC TROUBLE CODE CHART (2013 FR-S)		

DIAGNOSTIC TROUBLE CODE CHART

If a trouble code is displayed during the DTC check, check the circuit listed for the code in the table below (proceed to the page listed for that DTC).

HINT:

When DTC B1650 is detected as a result of troubleshooting for the airbag system, perform troubleshooting for the occupant classification system as shown in the chart below.

Occupant Classification System

DTC CODE	DETECTION ITEM	PASSENGER AIRBAG (OFF INDICATOR)	SEE PAGE
B1760	Occupant Classification Sensor Circuit	ON	INFO
B1761	Occupant Classification Sensor Soaked	ON	INFO
B1771	Seat Belt Buckle SW	ON	INFO
B1795	ECU Fault Status	ON	INFO

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010VK07LX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: OCCUPANT CLASSIFICATION SYSTEM: DTC CHECK / CLEAR (2013 FR-S)		

DTC CHECK / CLEAR

1. DTC CHECK

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Body Electrical / Occupant Detection / Trouble Codes.
- (f) Check for DTCs by following the prompts on the Techstream screen.

HINT:

Refer to the Techstream operator's manual for further details.

2. DTC CLEAR

- (a) Turn the ignition switch off.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Turn the Techstream on.
- (e) Enter the following menus: Body Electrical / Occupant Detection / Trouble Codes.
- (f) Clear the DTCs by following the prompts on the Techstream screen.

HINT:

Refer to the Techstream operator's manual for further details.



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000039SE01YX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: OCCUPANT CLASSIFICATION SYSTEM: FAIL-SAFE CHART (2013 FR-S)		

FAIL-SAFE CHART

1. FAIL SAFE FUNCTION

(a) The following chart shows the status of the controls when the system is normal and malfunctioning.

- The passenger airbag ON/OFF indicator ("ON" and "OFF") comes on for approximately 6 seconds, then goes off for approximately 2 seconds.
- Approximately 6 seconds after the ignition switch is turned to ON, the passenger airbag ON/OFF indicator will indicate ON or OFF depending on the conditions listed below.

CONDITION	ON INDICATOR	OFF INDICATOR	FRONT PASSENGER AIRBAG	FRONT SEAT SIDE AIRBAG RH	CURTAIN SHIELD AIRBAG RH	FRONT SEAT BELT PRETENSIONER RH
Adult is seated.	ON	OFF	○	○	○	○
Child is seated.	OFF	ON	X	○	○	○
Child restraint system is installed.	OFF	ON	X	○	○	○
Vacant	OFF	OFF	X	○	○	X
Failure	OFF	ON	X	○	○	○

- : Deployable
X: Not deployable

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010V107TX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: OCCUPANT CLASSIFICATION SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedure to troubleshoot the occupant classification system.
- *: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	CUSTOMER PROBLEM ANALYSIS
-----------	----------------------------------

(a) Confirm problem symptoms INFO .

NEXT



3.	PASSENGER AIRBAG ON/OFF INDICATOR CHECK
-----------	--

(a) Proceed to Diagnosis System INFO .

NEXT



4.	DTC CHECK (Present and History DTCs) *
-----------	---

(a) Proceed to DTC Check / Clear INFO .

Result:

RESULT	PROCEED TO
DTC is output.	A

DTC is not output.


B

B  **GO TO PROBLEM SYMPTOMS TABLE**

A



5.	DTC CHART
----	-----------

(a) Proceed to Diagnostic Trouble Code Chart  .

NEXT



6.	CIRCUIT INSPECTION*
----	---------------------

NEXT



7.	REPAIR
----	--------

NEXT



8.	CLEAR DTCS (Present and History DTCS)*
----	--

(a) Proceed to DTC Check / Clear  .

NEXT



9.	DTC CHECK*
----	------------

(a) Proceed to DTC Check / Clear .

Result:

RESULT	PROCEED TO
DTC is not output.	A
DTC is output.	B

B  [GO TO DIAGNOSTIC TROUBLE CODE CHART](#)

A



10.	SYMPTOM SIMULATION
------------	---------------------------

(a) Check the passenger airbag ON/OFF indicator condition.

Result:

RESULT	PROCEED TO
Passenger airbag ON/OFF indicator operates normally.	A
Passenger airbag ON/OFF indicator ("OFF") and SRS warning light come on.	B

B  [GO TO DIAGNOSTIC TROUBLE CODE CHART](#)

A



11.	CONFIRMATION TEST
------------	--------------------------

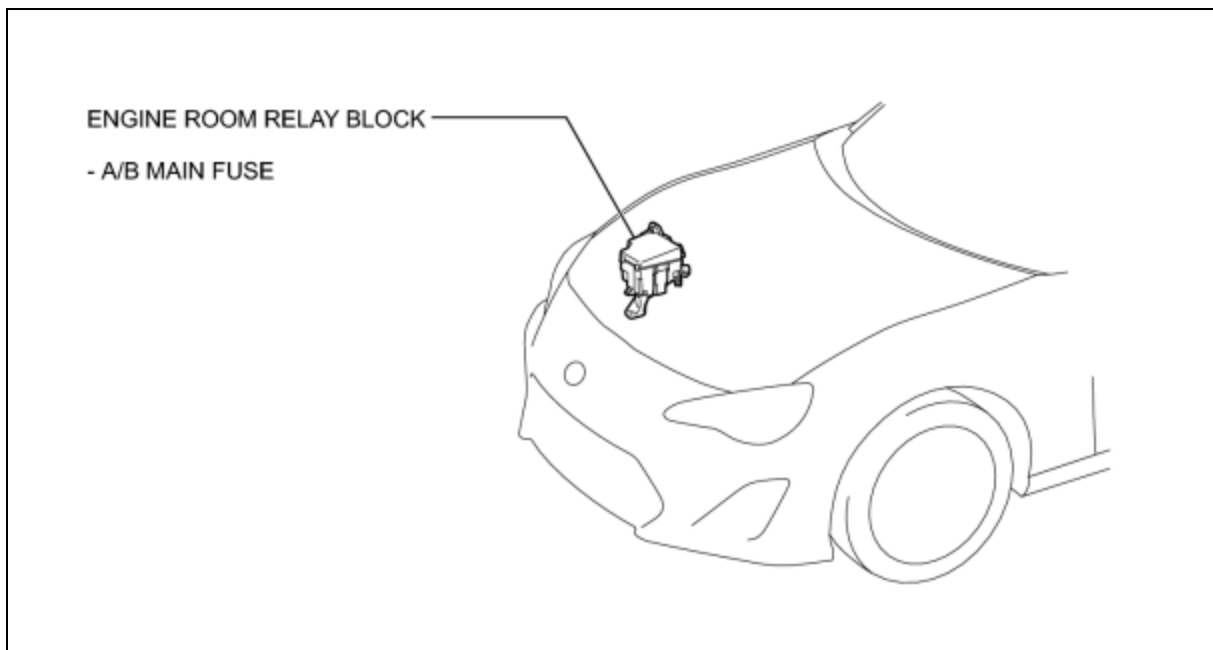
NEXT  **END**



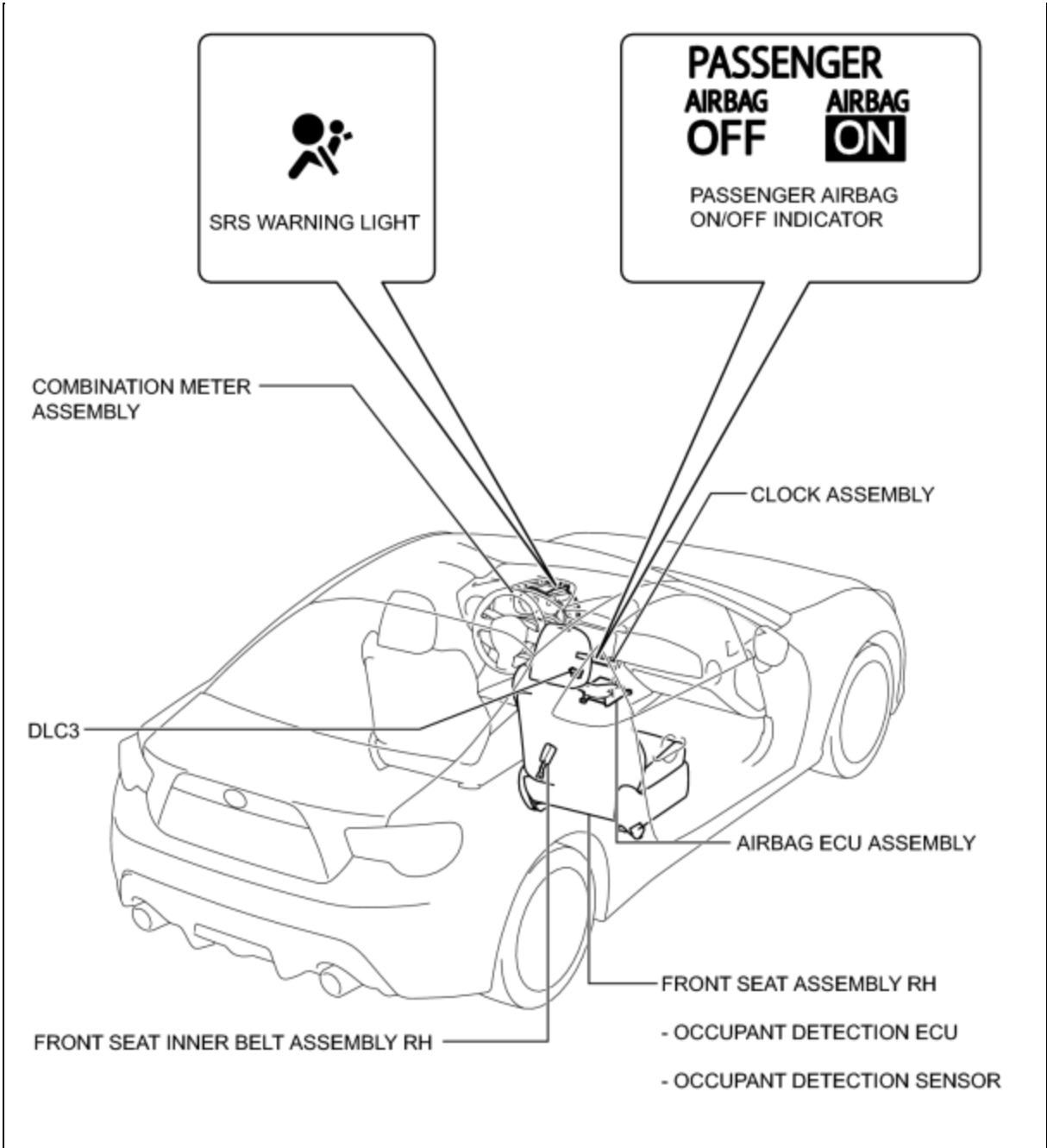
Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010V303KX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: OCCUPANT CLASSIFICATION SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION



ILLUSTRATION



Last Modified: 3-27-2012	6.4 L	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010V007MX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: OCCUPANT CLASSIFICATION SYSTEM: PRECAUTION (2013 FR-S)		

PRECAUTION

1. PRECAUTION FOR OCCUPANT CLASSIFICATION SYSTEM REPLACEMENT

- (a) The occupant sensing control unit of the occupant sensing system (passenger seat only) and the occupant sensor are secured to the seat cushion frame and therefore, never remove the occupant sensing control unit or occupant sensor from the seat cushion frame.
- (b) Do not replace the seat cushion pad by itself. Make sure to replace it in a unit of the seat cushion pad and frame assembly. In the production line, the seat cushion pad and cushion frame are adjusted as a set and therefore, the occupant sensing system may not work properly if these were paired with a cushion or frame from another vehicle or different set.
- (c) If the seat cushion cover is removed, make sure to replace the hang wire on the seat cushion side with a new wire.
- (d) Do not connect the battery to the opposite terminal. Ignoring this may damage the occupant sensing system instantaneously.
- (e) Do not disconnect the battery cable while the engine is running. Ignoring this may damage the electronic components such as in the occupant sensing control unit because of the large negative surge yielded in the alternator.
- (f) Before disconnecting the connector between each sensor and control unit, always turn off the ignition switch first and then wait at least 60 seconds. Ignoring this may damage the occupant sensing control unit.
- (g) All of the parts associated with the occupant sensing system are precision components. Do not drop them.

Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010V505QX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: OCCUPANT CLASSIFICATION SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Occupant Classification System

SYMPTOM	SUSPECTED AREA	SEE PAGE
The front passenger seat condition differs from the indication by the passenger airbag ON/OFF indicator (DTC is not output).	Front seat assembly RH	INFO
	Front seat inner belt assembly RH	INFO
	Harness or connector	-

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010VI03WX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: OCCUPANT CLASSIFICATION SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

SYSTEM DESCRIPTION

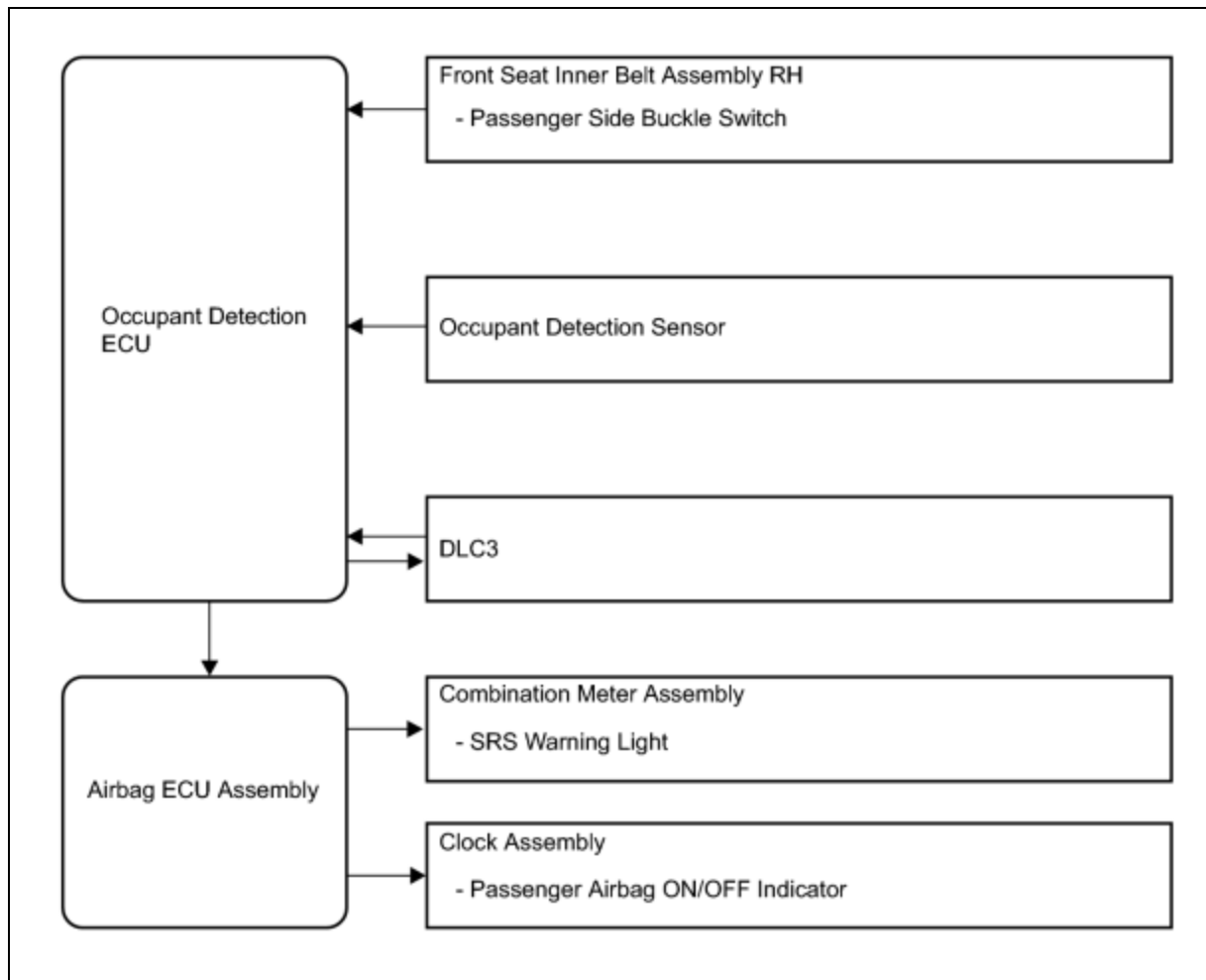
1. GENERAL

- (a) In the occupant classification system, the occupant detection ECU calculates the weight of the occupant based on signals from the occupant detection sensor. This system recognizes the occupant as a child if it detects a weight of less than 36 kg (79.4 lb) on the front passenger seat, and then disables the front passenger airbag and front seat belt pretensioner RH.
- (b) This system is mainly composed of the occupant detection sensor that detects the load on the front passenger seat. The occupant detection ECU controls the system, and the passenger airbag ON/OFF indicator indicates the ON/OFF condition of the front passenger airbag assembly and front seat belt pretensioner RH.



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010VL04XX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: OCCUPANT CLASSIFICATION SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

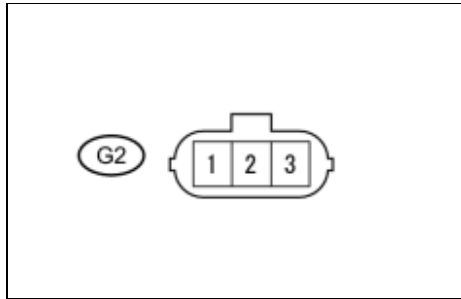
SYSTEM DIAGRAM



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000010V404WX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: OCCUPANT CLASSIFICATION SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. OCCUPANT DETECTION ECU

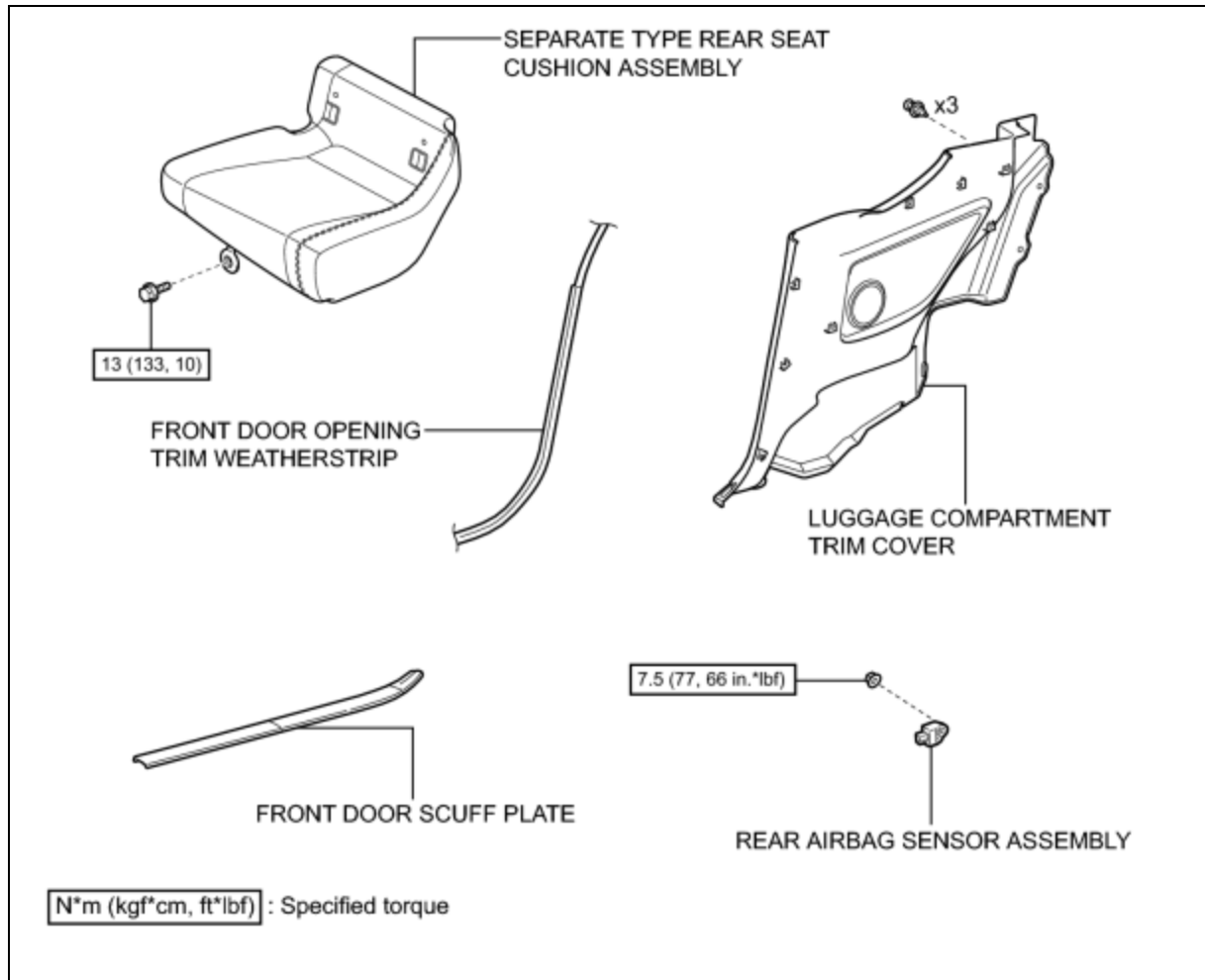


TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFICATION
G2-2 - G2-3	Y-G - Y	Airbag ECU assembly communication line	Ignition switch ON	Pulse generation
G2-1 - Body ground	G - Body ground	Power source	Ignition switch ON	11 to 14 V

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWQ05UX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: REAR AIRBAG SENSOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWO08DX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: REAR AIRBAG SENSOR: INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. INSTALL REAR AIRBAG SENSOR ASSEMBLY

- Check that the ignition switch is off.
- Check that the cable is disconnected from the negative (-) battery terminal.

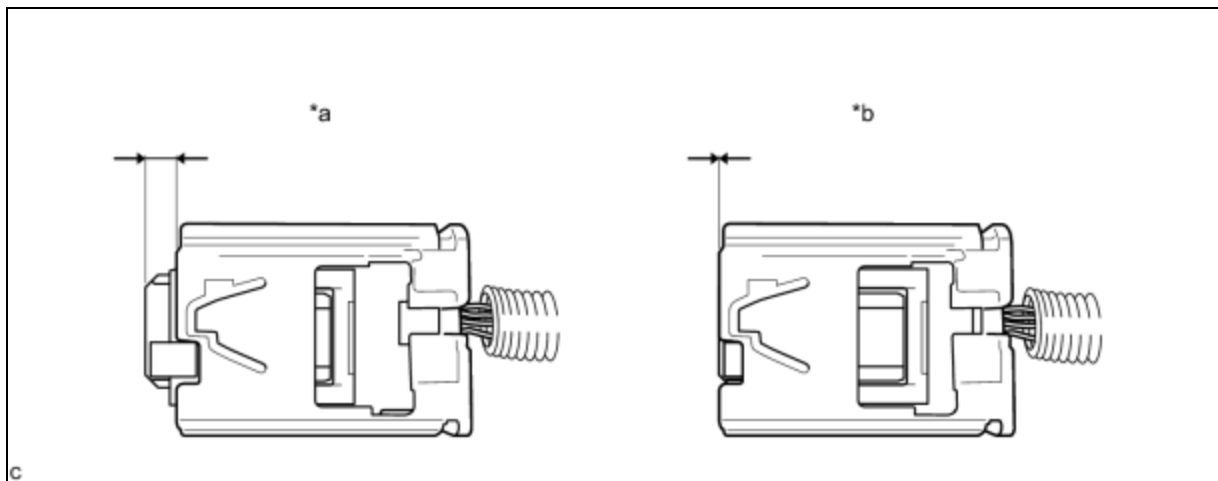
CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

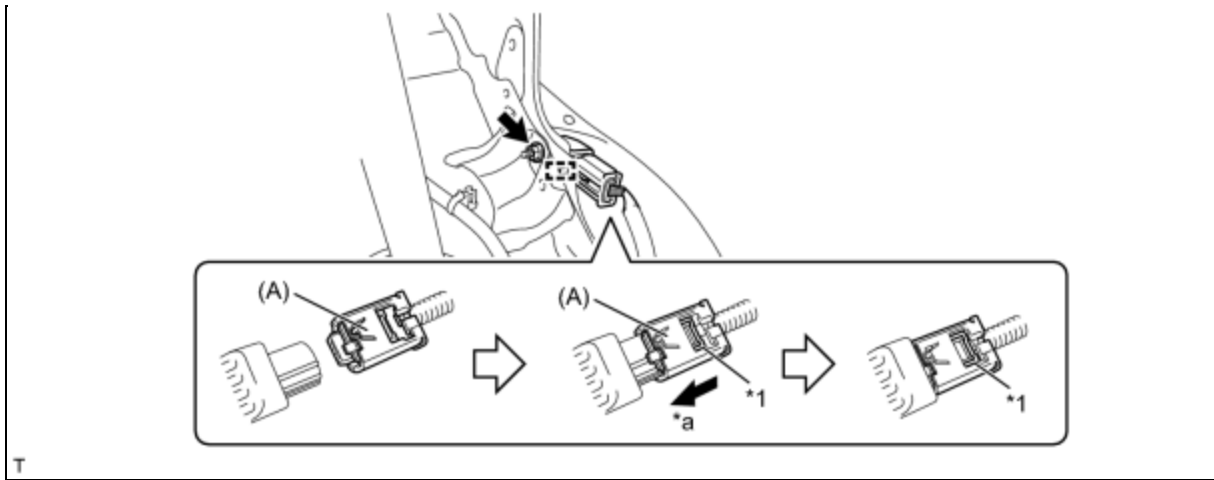
- Before connecting the connector, check that the position of the white housing lock is correct as shown in the illustration.



Text in Illustration

*a	Correct	*b	Incorrect
----	---------	----	-----------

- Connect the connector to the rear airbag sensor assembly.



Text in Illustration

*1	White housing lock	-	-
*a	Slide	-	-

NOTICE:

When connecting any airbag connector, take care not to damage the airbag wire harness.

- (1) Be sure to engage the connectors until they are locked (when locking, make sure that a click sound can be heard).

HINT:

When engaged, the white housing lock will slide. Be sure not to hold the white housing lock and part (A), as it may result in an insecure fit.

- (e) Insert the pin (stopper) into the body hole and install the rear airbag sensor assembly to the vehicle body with the nut.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

NOTICE:

- If the rear airbag sensor assembly has been dropped, or there are any cracks, dents or other defects in the case or connector, replace it with a new one.
- When installing the rear airbag sensor assembly, be careful that the SRS wiring does not interfere with or is not pinched between other parts.
- Make sure that the pin (stopper) is securely inserted into the body hole.
- Tighten the nut while holding the rear airbag sensor assembly because the rear airbag sensor assembly pin (stopper) is easily damaged.

- (f) Check that there is no looseness in the installation parts of the rear airbag sensor assembly.

2. INSTALL LUGGAGE COMPARTMENT TRIM COVER INFO

3. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP INFO

4. INSTALL FRONT DOOR SCUFF PLATE INFO

5. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY INFO

6. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

7. PERFORM DIAGNOSTIC SYSTEM CHECK

INFO

8. INSPECT SRS WARNING LIGHT

INFO




Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VPW08YX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: REAR AIRBAG SENSOR: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION


CAUTION:

Be sure to correctly follow the removal and installation procedures for the rear airbag sensor assemblies.

1. INSPECT REAR AIRBAG SENSOR ASSEMBLY (for Vehicle not Involved in Collision)

(a) Perform a diagnostic system check  .

2. INSPECT REAR AIRBAG SENSOR ASSEMBLY (for Vehicle Involved in Collision and Airbag not Deployed)

(a) Perform a diagnostic system check  .

(b) Visually check the rear airbag sensor assemblies for defects if a quarter panel of the vehicle or the area around a quarter panel is damaged.

HINT:

The defects are as follows:

- Cracks on the sensor housing
- Dents on the sensor housing
- Chips on the sensor housing
- Cracks or other damage to the connector
- Damage to the serial number

OK:

No defects are found.

If any of the defects is found, replace the rear airbag sensor assembly with a new one.

3. INSPECT REAR AIRBAG SENSOR ASSEMBLY (for Vehicle Involved in Collision and Airbag is Deployed)

(a) When airbags have deployed as the result of a collision, be sure to replace all rear airbag sensor assemblies in the damaged areas (anywhere in need of repair).

(b) Visually check the rear airbag sensor assemblies in undamaged areas for defects.

HINT:

The defects are as follows:

- Cracks on the sensor housing
- Dents on the sensor housing
- Chips on the sensor housing
- Cracks or other damage to the connector
- Damage to the serial number

OK:

No defects are found.

If any of the defects is found or a rear airbag sensor assembly has detected a major collision,

replace the rear airbag sensor assembly with a new one.



TOYOTA

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWR08CX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: REAR AIRBAG SENSOR: REMOVAL (2013 FR-S)		

REMOVAL

HINT:


- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. PRECAUTION

CAUTION:

Be sure to read Precaution thoroughly before servicing .

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work .

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

3. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY

4. REMOVE FRONT DOOR SCUFF PLATE

5. DISCONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP

HINT:

Disconnect the front door opening trim weatherstrip to the extent that allows the removal of the luggage compartment trim cover.

6. REMOVE LUGGAGE COMPARTMENT TRIM COVER

7. REMOVE REAR AIRBAG SENSOR ASSEMBLY

- (a) Check that the ignition switch is off.
- (b) Check that the cable is disconnected from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

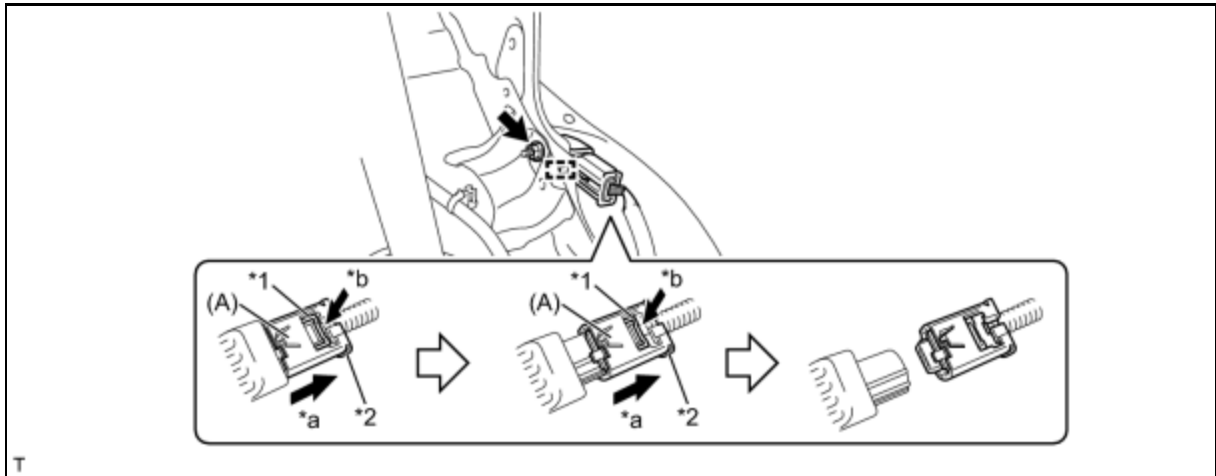
NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

(c) Remove the nut and separate the rear airbag sensor assembly from the vehicle body.

NOTICE:

Loosen the nut while holding the rear airbag sensor assembly because the rear airbag sensor assembly pin (stopper) is easily damaged.



Text in Illustration

*1	White Housing Lock	*2	Yellow CPA
*a	Slide	*b	Push

(d) Disconnect the connector to remove the rear airbag sensor assembly.

NOTICE:

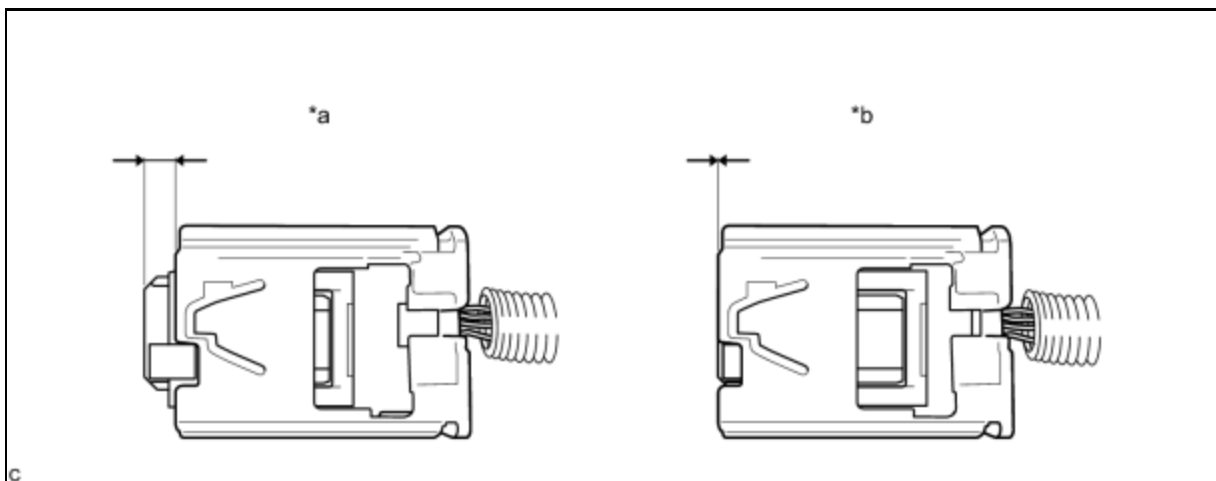
When disconnecting any airbag connector, take care not to damage the airbag wire harness.

- (1) Push down the white housing lock and slide the yellow CPA. (At this time, the connector cannot be disconnected yet.)
- (2) Push down the white housing lock again and disconnect the connector.

NOTICE:

Do not push down the part (A) shown in the illustration when disconnecting.

(e) After disconnecting the connector, check that the position of the white housing lock is correct as shown in the illustration.



Text in Illustration

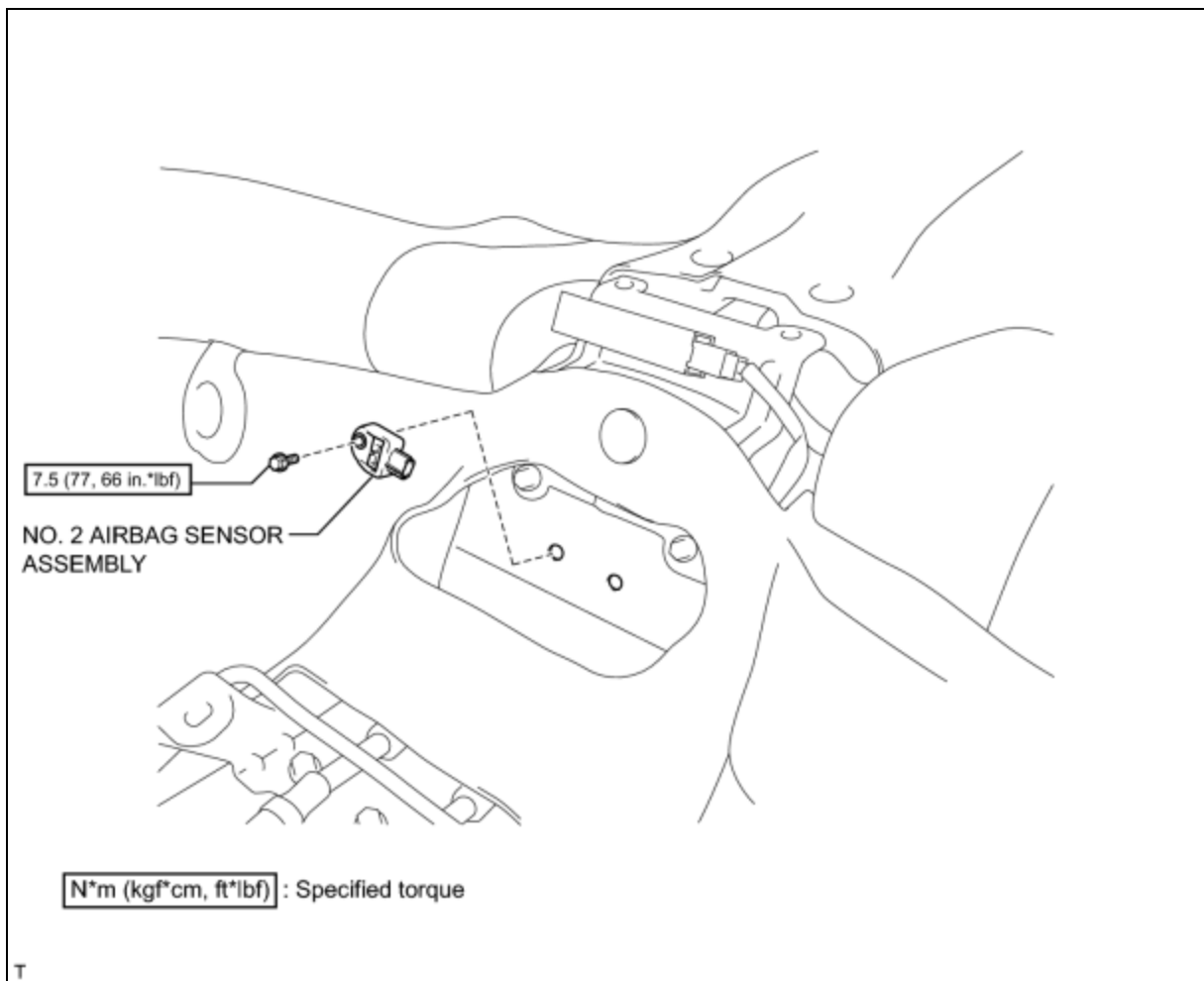
*a	Correct	*b	Incorrect
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Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000038MV00TX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: REAR FLOOR AIRBAG SENSOR: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000038MU00ZX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: REAR FLOOR AIRBAG SENSOR: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL NO. 2 AIRBAG SENSOR ASSEMBLY

- (a) Check that the ignition switch is off.
- (b) Check that the cable is disconnected from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

- (c) Connect the connector to the No. 2 airbag sensor assembly.

NOTICE:

When connecting airbag connector, take care not to damage the airbag wire harness.

- (1) Be sure to engage the connectors until they are locked (when locking, make sure that a click sound can be heard).
- (d) Insert the pin (stopper) into the rear floor hole and install the No. 2 airbag sensor assembly to the rear floor panel with the nut.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

NOTICE:

- If the No. 2 airbag sensor assembly has been dropped, or there are any cracks, dents or other defects in the case or connector, replace it with a new one.
 - When installing the No. 2 airbag sensor assembly, be careful that the SRS wiring does not interfere with or is not pinched between other parts.
 - Make sure that the pin (stopper) is securely inserted into the body hole.
 - Tighten the nut while holding the No. 2 airbag sensor assembly because the No. 2 airbag sensor assembly pin (stopper) is easily damaged.
- (e) Check that there is no looseness in the installation parts of the rear floor airbag sensor.

2. INSTALL CONSOLE BOX ASSEMBLY

INFO

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

4. PERFORM DIAGNOSTIC SYSTEM CHECK

INFO

5. CHECK SRS WARNING LIGHT




Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000038MX00XX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: REAR FLOOR AIRBAG SENSOR: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

CAUTION:

Be sure to correctly follow the removal and installation procedures for the rear floor side airbag sensor.

1. CHECK NO. 2 AIRBAG SENSOR ASSEMBLY (for Vehicle not Involved in Collision)

(a) Perform a diagnostic system check  .

2. CHECK NO. 2 AIRBAG SENSOR ASSEMBLY (for Vehicle Involved in Collision and Airbag not Deployed)

(a) Perform a diagnostic system check  .

(b) Visually check for defects with the No. 2 airbag sensor assembly installed on the vehicle.

HINT:

The defects are as follows:

- Cracks on the sensor housing
- Dents on the sensor housing
- Chips on the sensor housing
- Cracks or other damage to the connector
- Damage to the serial number

OK:

No defects are found.

If any of the defects is found, replace the No. 2 airbag sensor assembly with a new one.

3. CHECK NO. 2 AIRBAG SENSOR ASSEMBLY (for Vehicle Involved in Collision and Airbag is Deployed)

(a) When front seat airbags or curtain shield airbags have deployed as the result of a collision, be sure to replace No. 2 airbag sensor assembly.

(b) Visually check the No. 2 airbag sensor assembly in undamaged areas for defects.

HINT:

The defects are as follows:

- Cracks on the sensor housing
- Dents on the sensor housing
- Chips on the sensor housing
- Cracks or other damage to the connector
- Damage to the serial number

OK:

No defects are found.

If any of the defects is found, replace the No. 2 airbag sensor assembly with a new one.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM0000038MW00ZX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: REAR FLOOR AIRBAG SENSOR: REMOVAL (2013 FR-S)		

REMOVAL

1. PRECAUTION

CAUTION:

Be sure to read Precaution thoroughly before servicing. INFO

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

3. REMOVE CONSOLE BOX ASSEMBLY

INFO

4. REMOVE NO. 2 AIRBAG SENSOR ASSEMBLY

- (a) Check that the ignition switch is off.
- (b) Check that the cable is disconnected from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

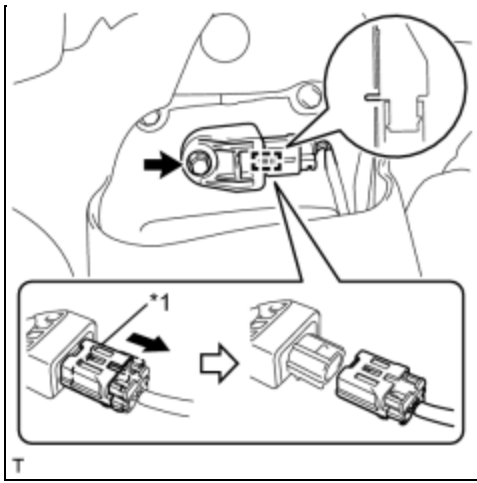
- (c) Remove the bolt.

NOTICE:

Loosen the bolt while holding the No. 2 airbag sensor assembly because the No. 2 airbag sensor assembly pin (stopper) is easily damaged.

Text in Illustration

*1	Outer Housing
----	---------------



(d) Slide the outer housing to release the lock, and then disconnect the connector to remove the No. 2 airbag sensor assembly.

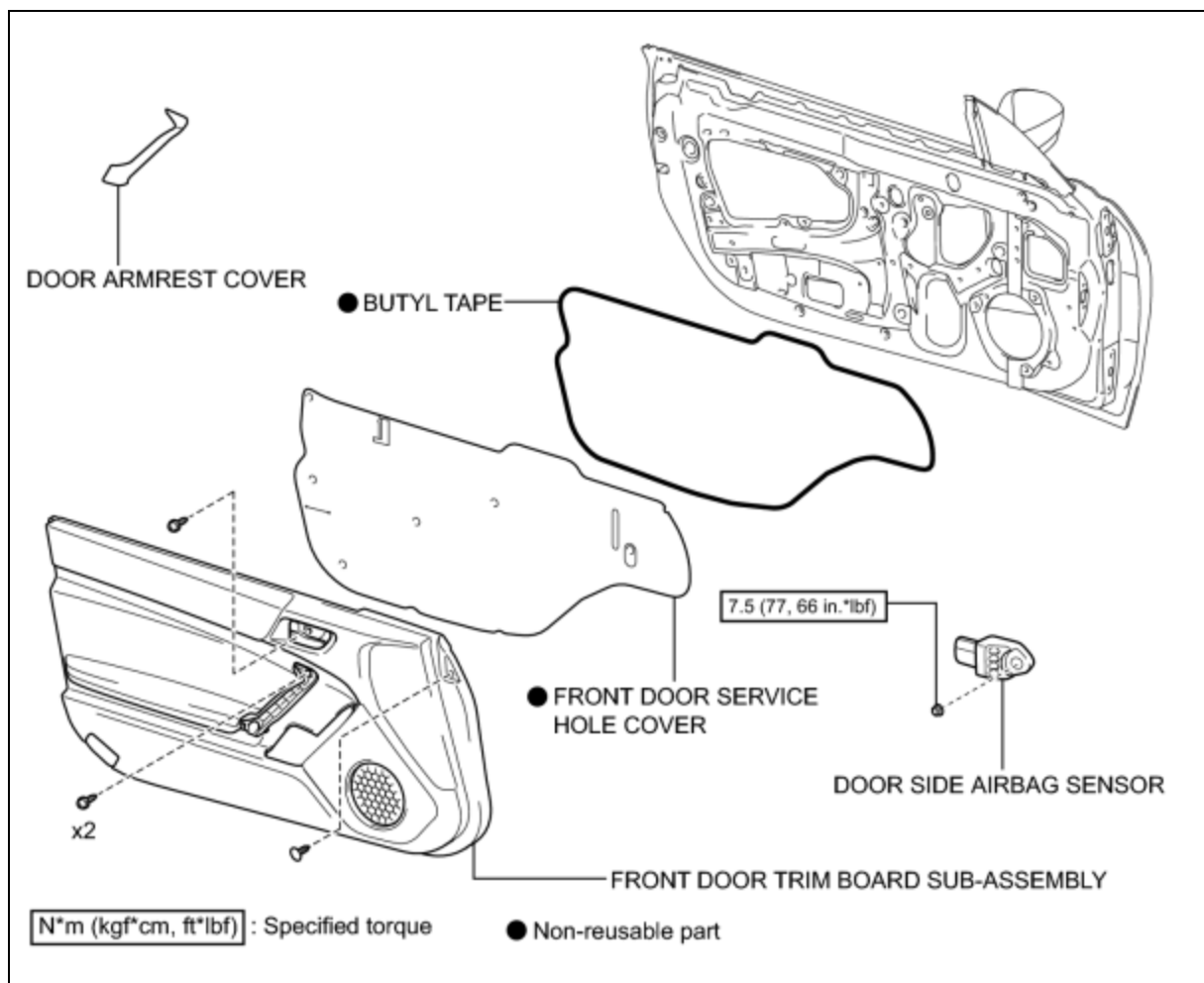
NOTICE:

When disconnecting airbag connector, take care not to damage the airbag wire harness.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWM06SX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: SIDE AIRBAG SENSOR (for Front Side): COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWK094X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: SIDE AIRBAG SENSOR (for Front Side): INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. INSTALL DOOR SIDE AIRBAG SENSOR

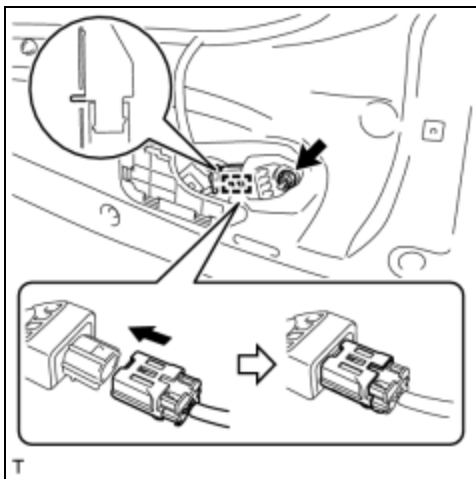
- Check that the ignition switch is off.
- Check that the cable is disconnected from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.



- Connect the connector to the door side airbag sensor.

NOTICE:

When connecting any airbag connector, take care not to damage the airbag wire harness.

- Be sure to engage the connectors until they are locked (when locking, make sure that a click sound can be heard).

- Insert the pin (stopper) into the door hole and install the door side airbag sensor to the front door panel with the nut.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

NOTICE:

- If the door side airbag sensor has been dropped, or there are any cracks, dents or other defects in the case or connector, replace it with a new one.
- When installing the door side airbag sensor, be careful that the SRS wiring does not interfere with or is not pinched between other parts.
- Make sure that the pin (stopper) is securely inserted into the body hole.
- Tighten the nut while holding the door side airbag sensor because the door side airbag sensor

pin (stopper) is easily damaged.

(e) Check that there is no looseness in the installation parts of the door side airbag sensor.

2. INSTALL FRONT DOOR SERVICE HOLE COVER INFO

3. INSTALL FRONT DOOR TRIM BOARD SUB-ASSEMBLY INFO

4. INSTALL DOOR ARMREST COVER INFO

5. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

6. PERFORM DIAGNOSTIC SYSTEM CHECK

INFO

7. INSPECT SRS WARNING LIGHT

INFO




Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VPVOACX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: SIDE AIRBAG SENSOR (for Front Side): ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION


CAUTION:

Be sure to correctly follow the removal and installation procedures for the door side airbag sensors.

1. INSPECT DOOR SIDE AIRBAG SENSOR (for Vehicle not Involved in Collision)

(a) Perform a diagnostic system check  .

2. INSPECT DOOR SIDE AIRBAG SENSOR (for Vehicle Involved in Collision and Airbag not Deployed)

(a) Perform a diagnostic system check  .

(b) Visually check the door side airbag sensors for defects if a front door of the vehicle or the area around a front door is damaged.

HINT:

The defects are as follows:

- Cracks on the sensor housing
- Dents on the sensor housing
- Chips on the sensor housing
- Cracks or other damage to the connector
- Damage to the serial number

OK:

No defects are found.

If any of the defects is found, replace the door side airbag sensor with a new one.

3. INSPECT DOOR SIDE AIRBAG SENSOR (for Vehicle Involved in Collision and Airbag is Deployed)

(a) When airbags have deployed as the result of a collision, be sure to replace all door side airbag sensors in the damaged areas (anywhere in need of repair).

(b) Visually check the door side airbag sensors in undamaged areas for defects.

HINT:

The defects are as follows:

- Cracks on the sensor housing
- Dents on the sensor housing
- Chips on the sensor housing
- Cracks or other damage to the connector
- Damage to the serial number

OK:

No defects are found.

If any of the defects is found or a door side airbag sensor has detected a major collision, replace

the door side airbag sensor with a new one.



TOYOTA

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWN092X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: SIDE AIRBAG SENSOR (for Front Side): REMOVAL (2013 FR-S)		

REMOVAL

HINT:


- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. PRECAUTION

CAUTION:

Be sure to read Precaution thoroughly before servicing .

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work .

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

3. REMOVE DOOR ARMREST COVER

4. REMOVE FRONT DOOR TRIM BOARD SUB-ASSEMBLY

5. REMOVE FRONT DOOR SERVICE HOLE COVER

6. REMOVE DOOR SIDE AIRBAG SENSOR

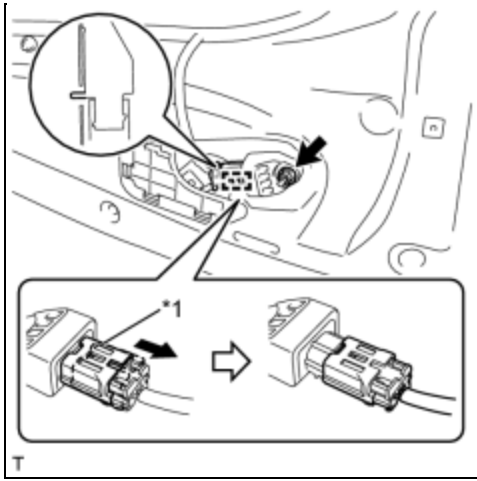
- (a) Check that the ignition switch is off.
- (b) Check that the cable is disconnected from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.



(c) Remove the nut and separate the door side airbag sensor from the front door panel.

NOTICE:

Loosen the bolt while holding the door side airbag sensor because the door side airbag sensor pin (stopper) is easily damaged.

(d) Slide the outer housing to release the lock, and then disconnect the connector to remove the door side airbag sensor.

NOTICE:

When disconnecting any airbag connector, take care not to damage the airbag wire harness.

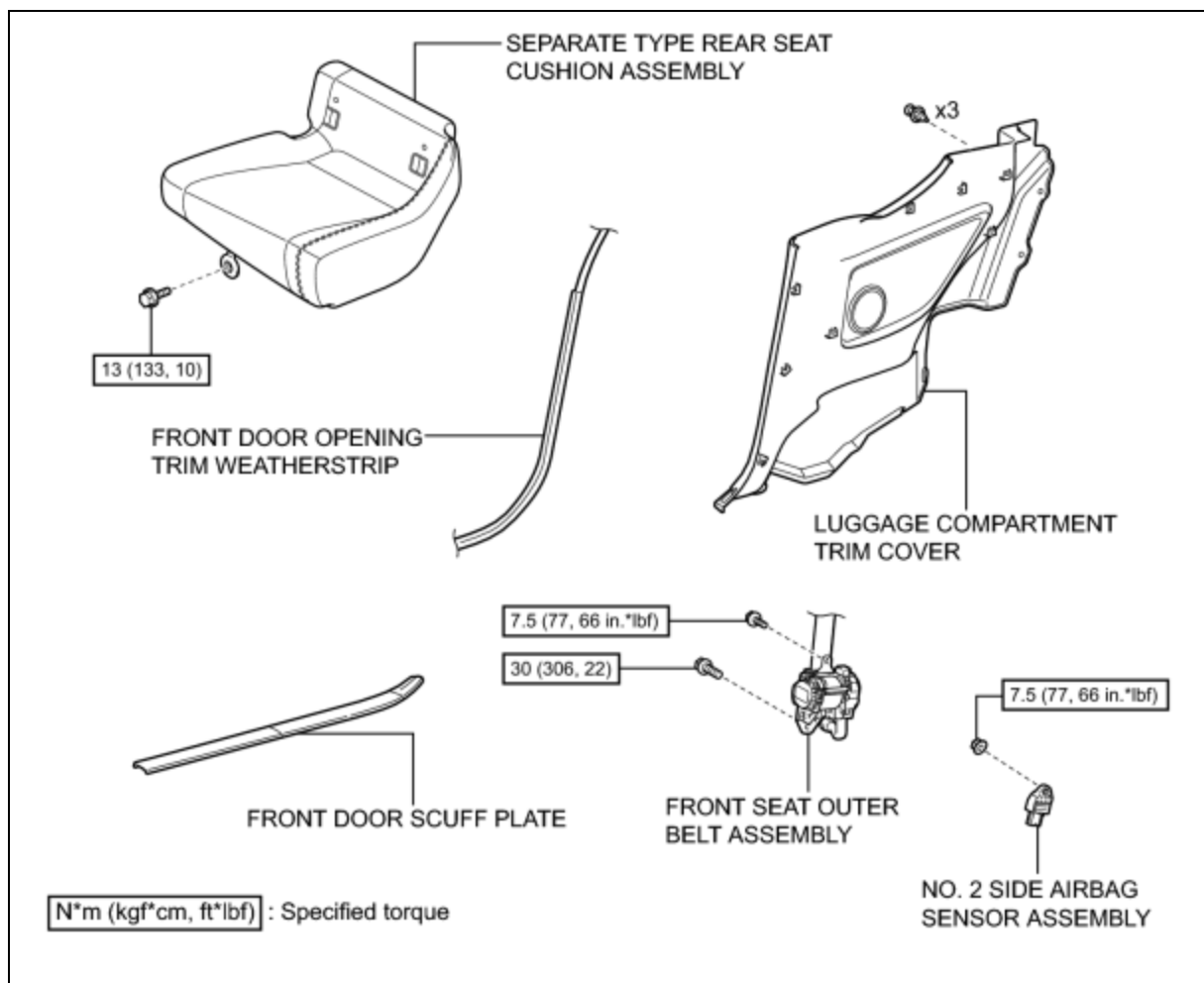
Text in Illustration

*1	Outer Housing
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Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWM06TX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: SIDE AIRBAG SENSOR (for Rear Side): COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWK095X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: SIDE AIRBAG SENSOR (for Rear Side): INSTALLATION (2013 FR-S)		

INSTALLATION

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. INSTALL NO. 2 SIDE AIRBAG SENSOR ASSEMBLY

- Check that the ignition switch is off.
- Check that the cable is disconnected from the negative (-) battery terminal.

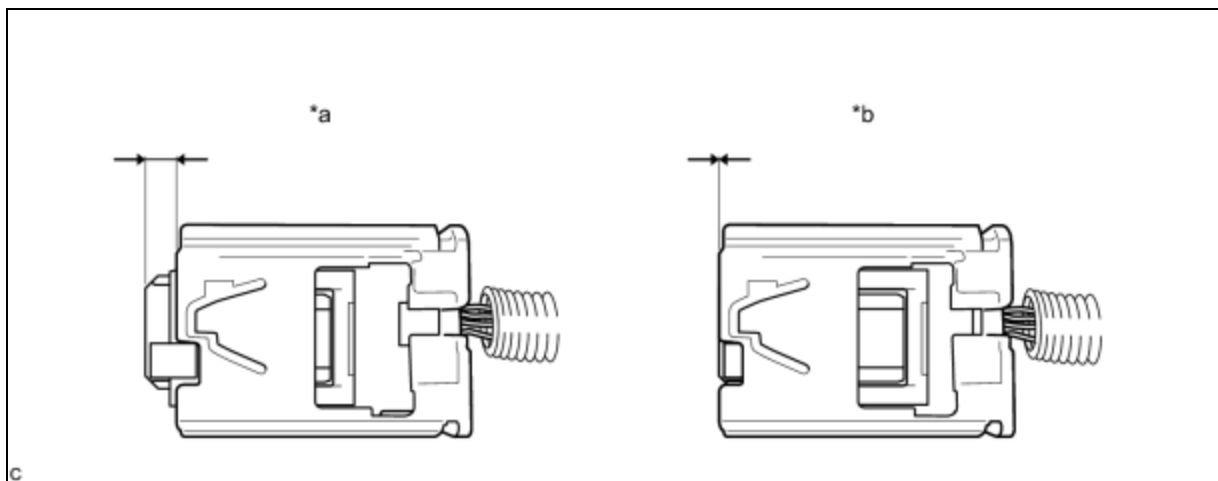
CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

- Before connecting the connector, check that the position of the white housing lock is correct as shown in the illustration.



Text in Illustration

*a	Correct	*b	Incorrect
----	---------	----	-----------

- Connect the connector to the No. 2 side airbag sensor assembly.

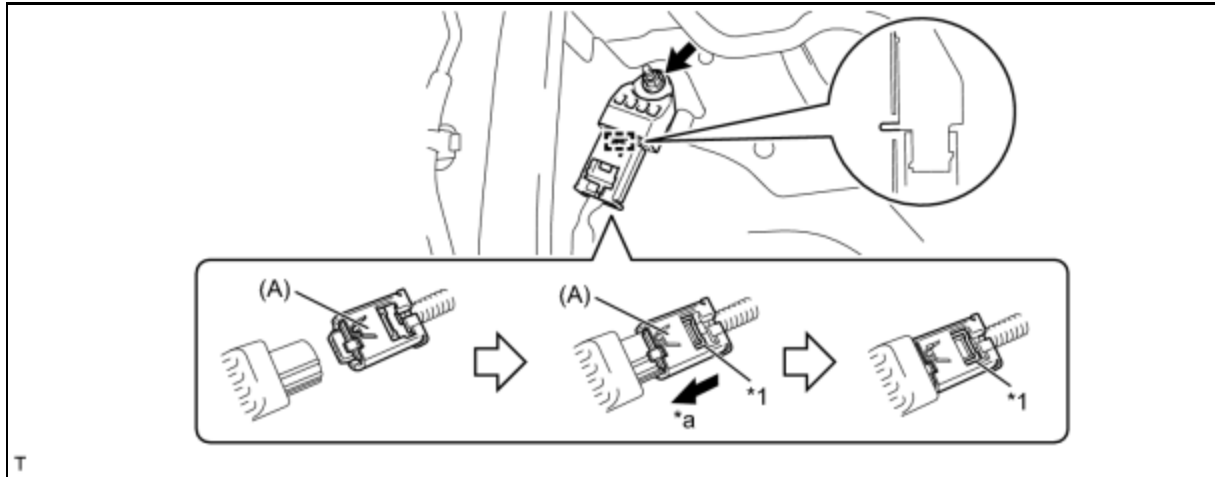
NOTICE:

When connecting any airbag connector, take care not to damage the airbag wire harness.

- Be sure to engage the connectors until they are locked (when locking, make sure that a click sound can be heard).

HINT:

When engaged, the white housing lock will slide. Be sure not to hold the white housing lock and part (A), as it may result in an insecure fit.



Text in Illustration

*1	White housing lock	-	-
*a	Slide	-	-

(e) Insert the pin (stopper) into the body hole and install the No. 2 side airbag sensor assembly to the vehicle body with the nut.

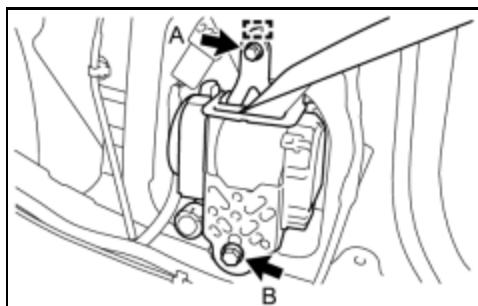
Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

NOTICE:

- If the No. 2 side airbag sensor assembly has been dropped, or there are any cracks, dents or other defects in the case or connector, replace it with a new one.
- When installing the No. 2 side airbag sensor assembly, be careful that the SRS wiring does not interfere with or is not pinched between other parts.
- Make sure that the pin (stopper) is securely inserted into the body hole.
- Tighten the nut while holding the No. 2 side airbag sensor assembly because the No. 2 side airbag sensor assembly pin (stopper) is easily damaged.

(f) Check that there is no looseness in the installation parts of the No. 2 side airbag sensor assembly.

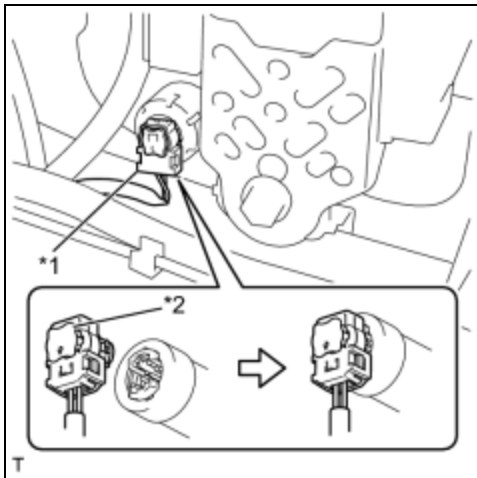
2. INSTALL FRONT SEAT OUTER BELT ASSEMBLY



(a) Engage the guide and install the front seat outer belt assembly with the 2 bolts.

Bolt A - Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

Bolt B - Torque: 30 N·m (306 kgf·cm, 22ft·lbf)



(b) Connect the pretensioner connector.

Text in Illustration

*1	Pretensioner Connector
*2	Pretensioner Connector Lock

(c) Push in the lock to install the pretensioner connector.

3. INSTALL LUGGAGE COMPARTMENT TRIM COVER INFO

4. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP INFO

5. INSTALL FRONT DOOR SCUFF PLATE INFO

6. INSTALL SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY INFO

7. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

8. PERFORM DIAGNOSTIC SYSTEM CHECK

INFO

9. INSPECT SRS WARNING LIGHT

INFO


Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000VPV0ADX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: SIDE AIRBAG SENSOR (for Rear Side): ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION


CAUTION:

Be sure to correctly follow the removal and installation procedures for the No. 2 side airbag sensor assemblies.

1. INSPECT NO. 2 SIDE AIRBAG SENSOR ASSEMBLY (for Vehicle not Involved in Collision)

(a) Perform a diagnostic system check  .

2. INSPECT NO. 2 SIDE AIRBAG SENSOR ASSEMBLY (for Vehicle Involved in Collision and Airbag not Deployed)

(a) Perform a diagnostic system check  .

(b) Visually check the No. 2 side airbag sensor assemblies for defects if a center pillar of the vehicle or the area around a center pillar is damaged.

HINT:

The defects are as follows:

- Cracks on the sensor housing
- Dents on the sensor housing
- Chips on the sensor housing
- Cracks or other damage to the connector
- Damage to the serial number

OK:

No defects are found.

If any of the defects is found, replace the No. 2 side airbag sensor assembly with a new one.

3. INSPECT NO. 2 SIDE AIRBAG SENSOR ASSEMBLY (for Vehicle Involved in Collision and Airbag is Deployed)

(a) When airbags have deployed as the result of a collision, be sure to replace all No. 2 side airbag sensor assemblies in the damaged areas (anywhere in need of repair).

(b) Visually check the No. 2 side airbag sensor assemblies in undamaged areas for defects.

HINT:

The defects are as follows:

- Cracks on the sensor housing
- Dents on the sensor housing
- Chips on the sensor housing
- Cracks or other damage to the connector
- Damage to the serial number

OK:

No defects are found.

If any of the defects is found or a No. 2 side airbag sensor assembly has detected a major collision, replace the No. 2 side airbag sensor assembly with a new one.



TOYOTA

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWN093X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: SIDE AIRBAG SENSOR (for Rear Side): REMOVAL (2013 FR-S)		

REMOVAL

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. PRECAUTION

CAUTION:

Be sure to read Precaution thoroughly before servicing. INFO

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

3. REMOVE SEPARATE TYPE REAR SEAT CUSHION ASSEMBLY INFO

4. REMOVE FRONT DOOR SCUFF PLATE INFO

5. DISCONNECT FRONT DOOR OPENING TRIM WEATHERSTRIP

HINT:

Disconnect the front door opening trim weatherstrip to the extent that allows the removal of the luggage compartment trim cover.

6. REMOVE LUGGAGE COMPARTMENT TRIM COVER INFO

7. REMOVE FRONT SEAT OUTER BELT ASSEMBLY

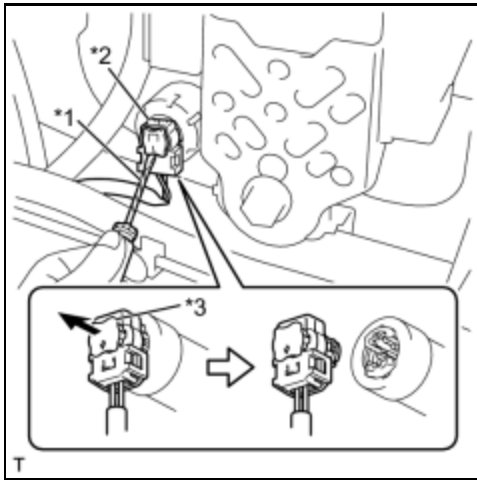
- (a) Check that the ignition switch is off.
- (b) Check that the cable is disconnected from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

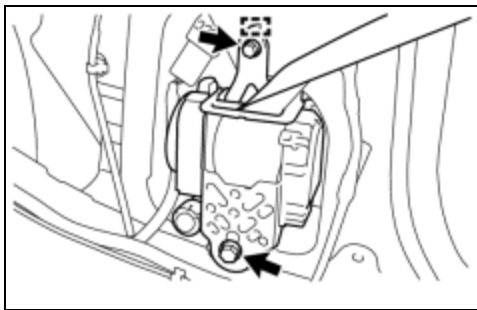
The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.



(c) Using a screwdriver with the tip wrapped with protective tape, release the pretensioner connector lock and disconnect the pretensioner connector.

Text in Illustration

*1	Protective Tape
*2	Pretensioner Connector
*3	Pretensioner Connector Lock



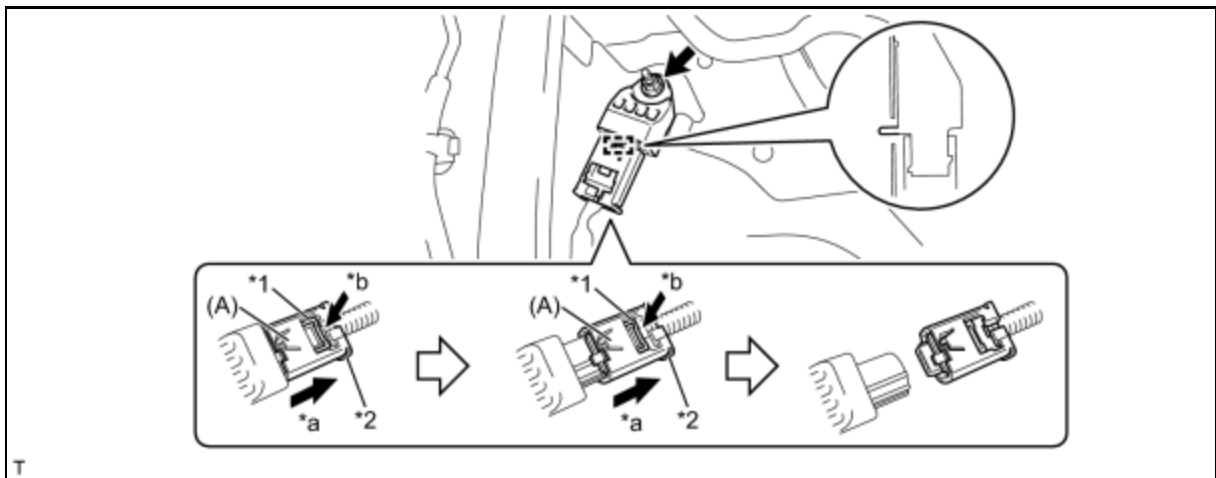
(d) Remove the 2 bolts and disengage the guide to remove front seat outer belt assembly.

8. REMOVE NO. 2 SIDE AIRBAG SENSOR ASSEMBLY

(a) Remove the nut and separate the No. 2 side airbag sensor assembly from the vehicle body.

NOTICE:

Loosen the nut while holding the No. 2 side airbag sensor assembly because the No. 2 side airbag sensor assembly pin (stopper) is easily damaged.



Text in Illustration

*1	White Housing Lock	*2	Yellow CPA
----	--------------------	----	------------

*a	Slide	*b	Push
----	-------	----	------

(b) Disconnect the connector to remove the No. 2 side airbag sensor assembly.

NOTICE:

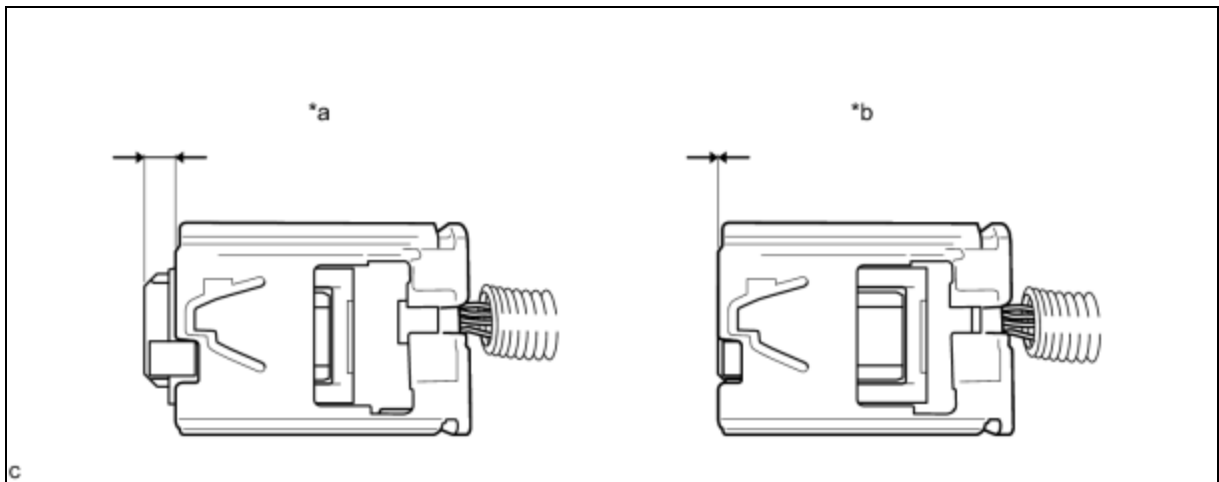
When disconnecting any airbag connector, take care not to damage the airbag wire harness.

- (1) Push down the white housing lock and slide the yellow CPA. (At this time, the connector cannot be disconnected yet.)
- (2) Push down the white housing lock again and disconnect the connector.

NOTICE:

Do not push down the part (A) shown in the illustration when disconnecting.

(c) After disconnecting the connector, check that the position of the white housing lock is correct as shown in the illustration.



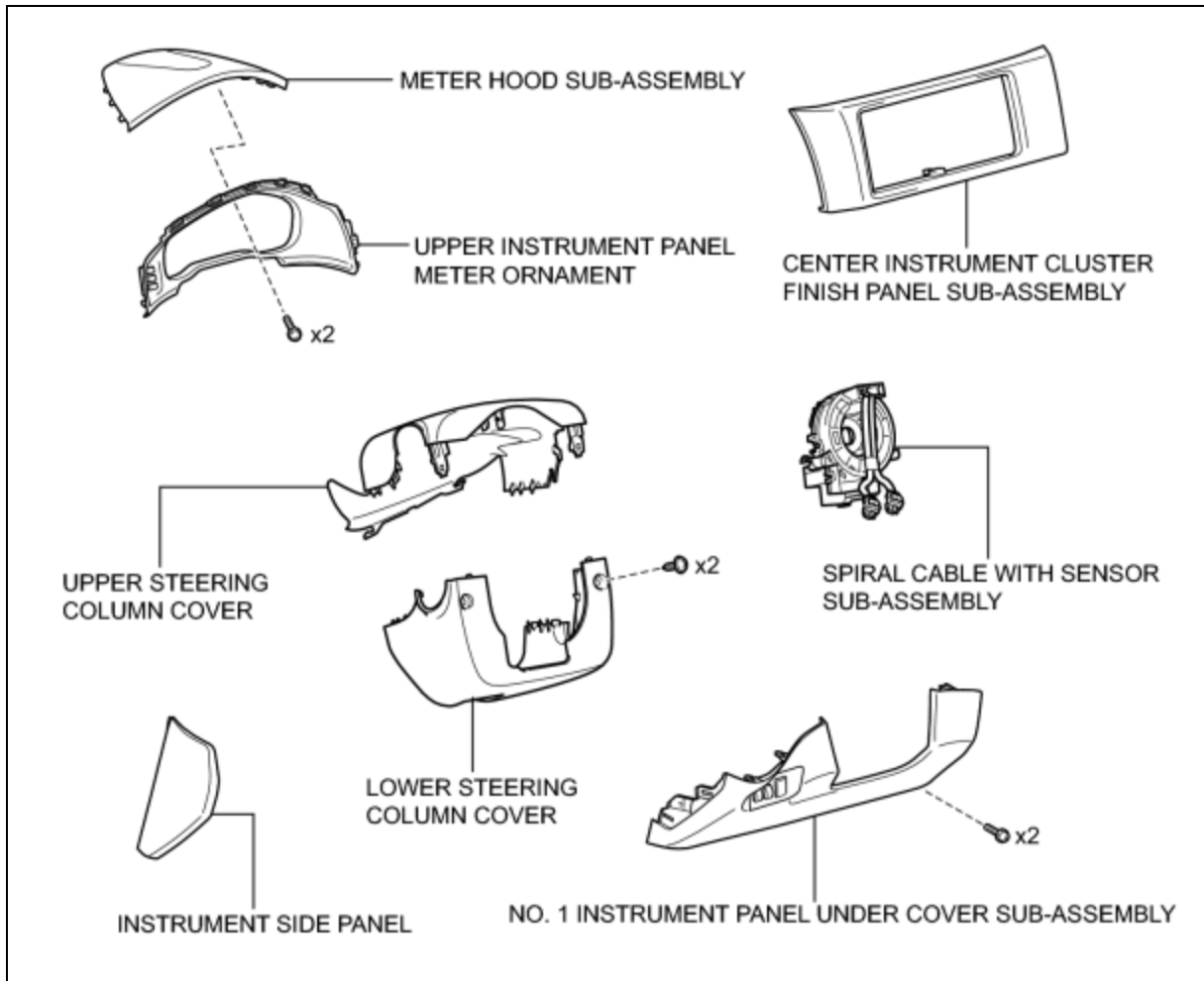
Text in Illustration

*a	Correct	*b	Incorrect
----	---------	----	-----------

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWC05SX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: SPIRAL CABLE: COMPONENTS (2013 FR-S)		

COMPONENTS

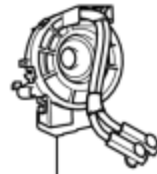
ILLUSTRATION



ILLUSTRATION



STEERING SENSOR



SPIRAL CABLE SUB-ASSEMBLY

T

Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWB08EX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: SPIRAL CABLE: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT SPIRAL CABLE SUB-ASSEMBLY

NOTICE:

- Do not remove the steering sensor from the spiral cable sub-assembly.
- As the spiral cable sub-assembly may break, do not rotate the spiral cable sub-assembly more than the specified amount.

(a) Remove the spiral cable with sensor sub-assembly from the vehicle INFO.

(b) Visually check for defects with the spiral cable sub-assembly.

(1) The defects are as follows:

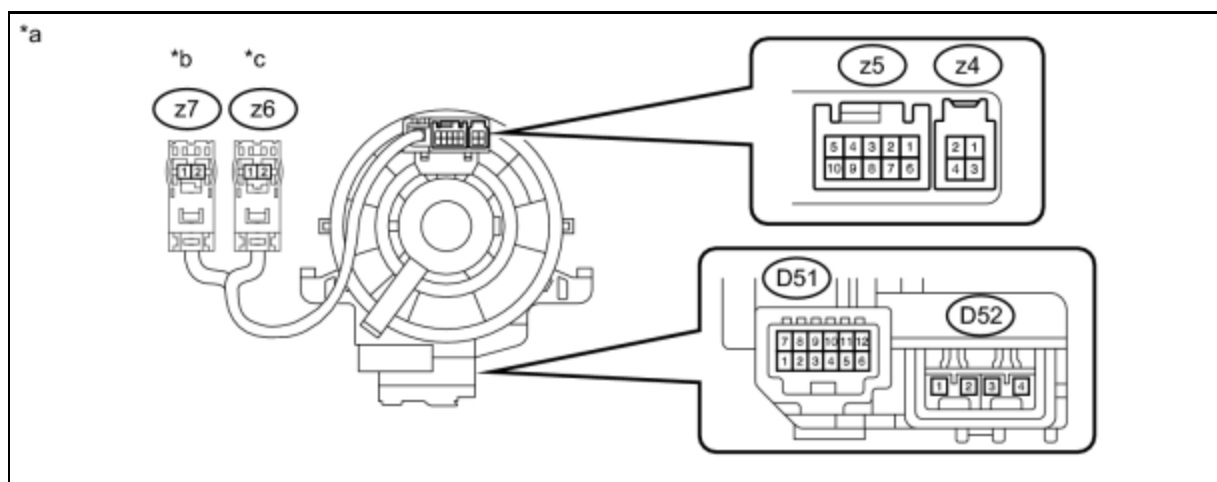
- Scratches
- Small cracks
- Dents
- Chips
- Cracks or other damage to the connector

OK:

No defects are found.

If any of the defects is found, replace the spiral cable sub-assembly with a new one.

(c) Check the spiral cable sub-assembly.



Text in Illustration

*a	Component without harness connected (Spiral Cable Sub-assembly)	*b	Color: Orange
*c	Color: Black	-	-

(1) Set the spiral cable sub-assembly to the center position INFO.

(2) Measure the resistance between each terminal of the spiral cable sub-assembly according to

the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D51-1 - z4-3	Always	3 Ω or less
D51-2 - z4-4	Always	3 Ω or less
D51-2 - z5-6	Always	3 Ω or less
D51-8 - z4-2	Always	3 Ω or less
D51-8 - z5-1	Always	3 Ω or less
D51-10 - z5-3	Always	3 Ω or less
D51-11 - z5-4	Always	3 Ω or less
D51-12 - z5-5	Always	3 Ω or less
D52-1 - z7-2	Always	Below 1 Ω
D52-2 - z7-1	Always	Below 1 Ω
D52-3 - z6-1	Always	Below 1 Ω
D52-4 - z6-2	Always	Below 1 Ω

- (3) After setting the spiral cable sub-assembly to the center position, rotate the spiral cable sub-assembly 2.5 times clockwise, and measure the resistance as shown in the table below. Then rotate the spiral cable sub-assembly 5 times counterclockwise, and measure the resistance as shown in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D51-1 - z4-3	Always	3 Ω or less
D51-2 - z4-4	Always	3 Ω or less
D51-2 - z5-6	Always	3 Ω or less
D51-8 - z4-2	Always	3 Ω or less
D51-8 - z5-1	Always	3 Ω or less
D51-10 - z5-3	Always	3 Ω or less
D51-11 - z5-4	Always	3 Ω or less
D51-12 - z5-5	Always	3 Ω or less
D52-1 - z6-2	Always	Below 1 Ω
D52-2 - z6-1	Always	Below 1 Ω
D52-3 - z7-1	Always	Below 1 Ω
D52-4 - z7-2	Always	Below 1 Ω

- (4) After setting the spiral cable sub-assembly to the center position, rotate the spiral cable sub-assembly 2.5 times clockwise. Then while rotating the spiral cable sub-assembly 5 times counterclockwise, measure the resistance as shown in the table below.

Standard Resistance:

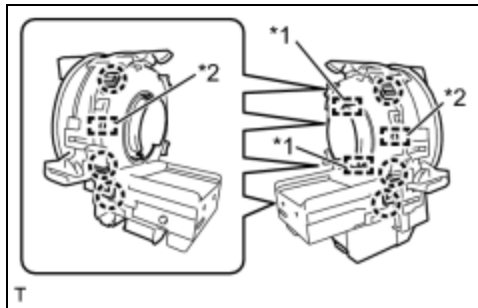
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D51-1 - z4-3	Always	3 Ω or less
D51-2 - z4-4	Always	3 Ω or less
D51-2 - z5-6	Always	3 Ω or less
D51-8 - z4-2	Always	3 Ω or less
D51-8 - z5-1	Always	3 Ω or less
D51-10 - z5-3	Always	3 Ω or less
D51-11 - z5-4	Always	3 Ω or less
D51-12 - z5-5	Always	3 Ω or less
D52-1 - z6-2	Always	Below 1 Ω
D52-2 - z6-1	Always	Below 1 Ω
D52-3 - z7-1	Always	Below 1 Ω
D52-4 - z7-2	Always	Below 1 Ω

If the result is not as specified, replace the spiral cable with sensor sub-assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWA096X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: SPIRAL CABLE: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL SPIRAL CABLE SUB-ASSEMBLY



- (a) Align the 2 pins and 2 guides, and engage the 6 claws to install the spiral cable sub-assembly to the steering sensor.

Text in Illustration

*1	Guide
*2	Pin

NOTICE:

Do not rotate the steering sensor until the spiral cable has been attached to it.

2. ALIGN FRONT WHEELS TO FACE STRAIGHT AHEAD

3. INSTALL SPIRAL CABLE WITH SENSOR SUB-ASSEMBLY

NOTICE:

- Do not replace the spiral cable sub-assembly with the battery connected and the ignition switch on (IG).
- Do not rotate the spiral cable sub-assembly without the steering wheel with the battery connected and the ignition switch on (IG).
- Ensure that the steering wheel is installed and aligned straight when inspecting the steering sensor.

(a) Check that the ignition switch is off.

(b) Check that the cable is disconnected from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

(c) Check that the front wheels are facing straight ahead.

(d) Set the turn signal switch to the neutral position.

NOTICE:

If it is not in the neutral position, the turn signal switch pin may snap.

(e) Engage the 3 claws to install the spiral cable with sensor sub-assembly.

(f) Connect the each connector.

4. INSTALL UPPER STEERING COLUMN COVER INFO

5. INSTALL LOWER STEERING COLUMN COVER INFO

6. INSTALL UPPER INSTRUMENT PANEL METER ORNAMENT INFO

7. INSTALL METER HOOD SUB-ASSEMBLY INFO

8. INSTALL CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY INFO

9. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY INFO

10. INSTALL INSTRUMENT SIDE PANEL INFO

11. INSPECT AND ADJUST SPIRAL CABLE WITH SENSOR SUB-ASSEMBLY

NOTICE:

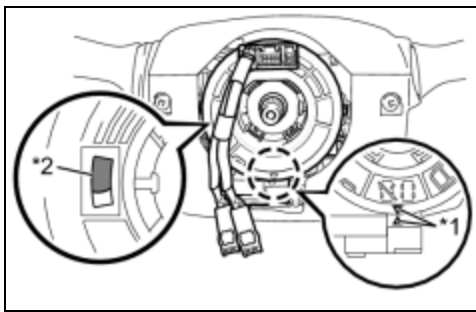
Do not adjust the spiral cable sub-assembly with the battery connected and the ignition switch on (IG).

- (a) Check that the ignition switch is off.
- (b) Check that the cable is disconnected from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

- (c) Check if the spiral cable sub-assembly is centered.



Text in Illustration

*1	Matching Mark
*2	Colored Part

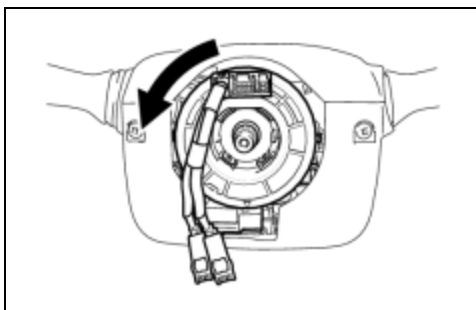
HINT:

When the spiral cable is attached in a central position, it will align with the matching mark, allowing the colored area indicated in the illustration to be checked.

- (d) If the spiral cable sub-assembly is not centered, center it.

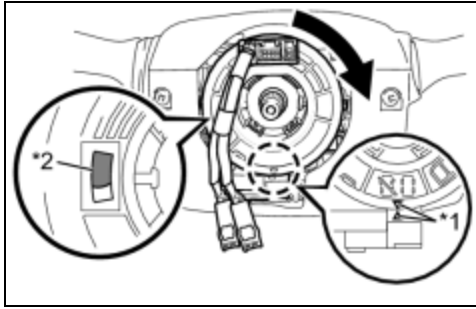
NOTICE:

Do not turn the spiral cable sub-assembly using the airbag wire harness.



- (1) Rotate the spiral cable sub-assembly counterclockwise slowly by hand until it stops.

- (2) Rotate the spiral cable sub-assembly clockwise approximately 2.5 turns to the position where the matching mark is matched.



Text in Illustration

*1	Matching Mark
*2	Colored Part

HINT:

- The spiral cable sub-assembly will rotate approximately 2.5 turns to both the left and right from the center.
- When centering is not possible, there may be an open circuit in the spiral cable. Replace the spiral cable and steering sensor with new ones.

12. INSTALL STEERING WHEEL ASSEMBLY

INFO

13. PERFORM MEMORIZATION

HINT:

Perform VSC sensor neutral memorization INFO .

14. INSPECT SRS WARNING LIGHT

INFO

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UWD095X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: SPIRAL CABLE: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE STEERING WHEEL ASSEMBLY

INFO

2. REMOVE INSTRUMENT SIDE PANEL

INFO

3. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

INFO

4. REMOVE CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY

INFO

5. REMOVE METER HOOD SUB-ASSEMBLY

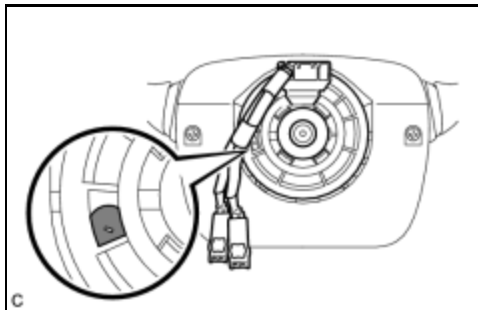
INFO

6. REMOVE UPPER INSTRUMENT PANEL METER ORNAMENT


INFO

7. INSPECT SPIRAL CABLE SUB-ASSEMBLY

(a) Check the colored part as shown in the illustration.



Text in Illustration

	Colored Part
---	--------------

If the colored part shown in the illustration cannot be confirmed, it is possible that the spiral cable sub-assembly is broken. Replace the spiral cable with sensor sub-assembly with a new one.

8. REMOVE LOWER STEERING COLUMN COVER

INFO

9. REMOVE UPPER STEERING COLUMN COVER

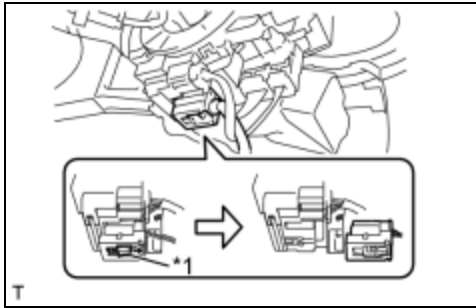
INFO

10. REMOVE SPIRAL CABLE WITH SENSOR SUB-ASSEMBLY

NOTICE:

- Do not replace the spiral cable sub-assembly with the battery connected and turn the ignition switch to ON.

- Do not rotate the spiral cable sub-assembly without the steering wheel with the battery connected and turn the ignition switch to ON.
 - Ensure that the steering wheel is installed and aligned straight when inspecting the steering sensor.
- (a) Check that the ignition switch is off.
- (b) Check that the cable is disconnected from the negative (-) battery terminal.
- (c) Check that the front wheels are facing straight ahead.



- (d) Slide the slider to release the lock, and then disconnect the yellow airbag connector from the spiral cable with sensor sub-assembly.

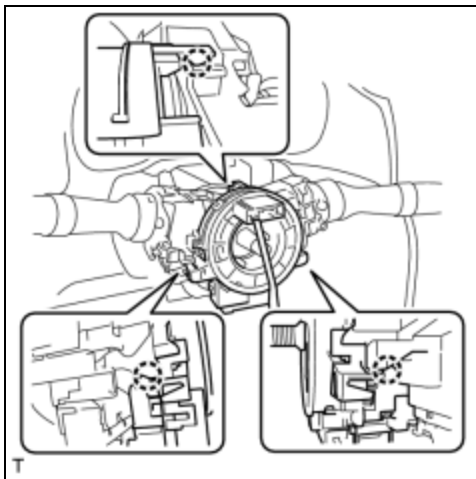
Text in Illustration

*1	Slider
----	--------

NOTICE:

When disconnecting any airbag connector, take care not to damage the airbag wire harness.

- (e) Disconnect the other connector from the spiral cable with sensor sub-assembly.



- (f) Disengage the 3 claws to remove the spiral cable with sensor sub-assembly.

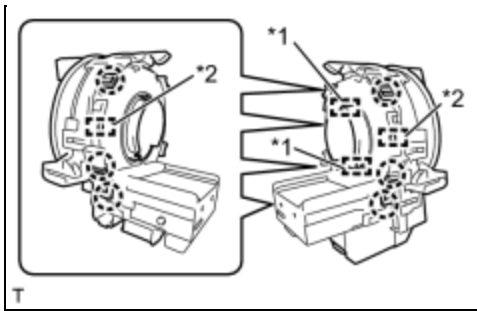
11. REMOVE SPIRAL CABLE SUB-ASSEMBLY

NOTICE:

- Remove the spiral cable sub-assembly from the steering sensor only when replacing it or the steering sensor.
- Do not rotate the center section of the steering sensor, as it may deviate from the steering sensor neutral point.
- When replacing the steering sensor: INFO

- (a) Disengage the 6 claws, 2 pins and 2 guides to remove the spiral cable sub-assembly from the steering sensor.

NOTICE:



Do not damage the guide and claw.

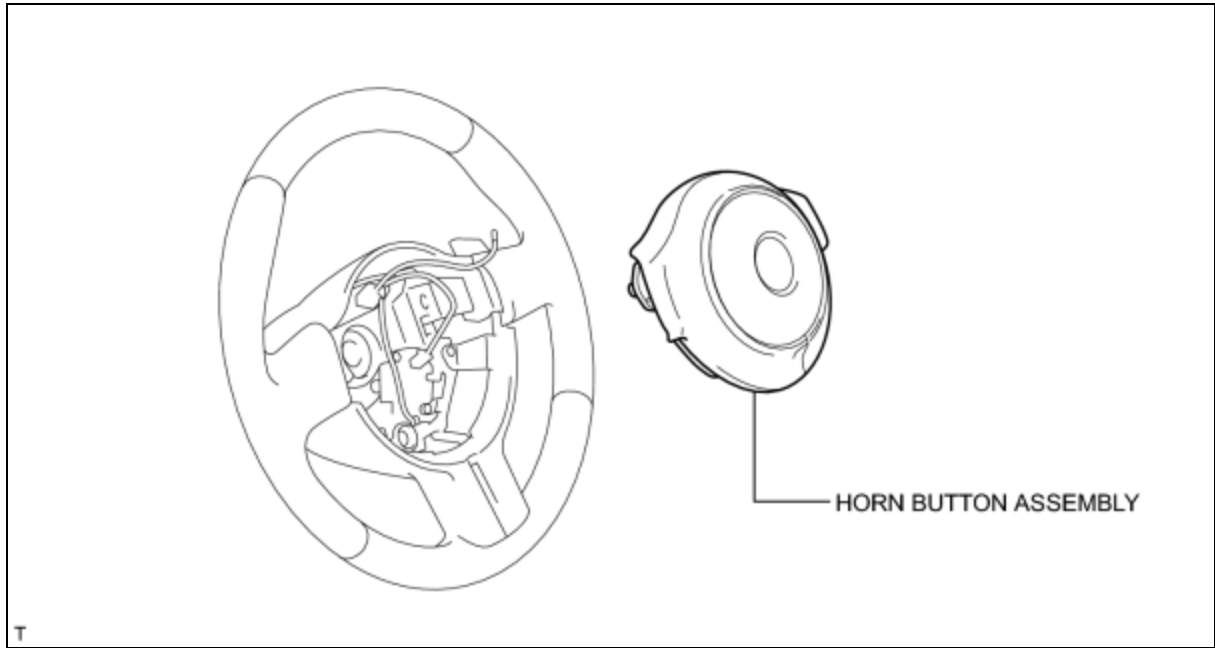
Text in Illustration

*1	Guide
*2	Pin

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UW406AX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: STEERING PAD: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 N	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UW509ZX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: STEERING PAD: DISPOSAL (2013 FR-S)		

DISPOSAL

CAUTION:

Before performing pre-disposal deployment of any SRS part, review and closely follow all applicable environmental and hazardous material regulations. Pre-disposal deployment may be considered hazardous material treatment.

1. PRECAUTION

CAUTION:

- An airbag or pretensioner may be activated by static electricity. To prevent this, be sure to touch a metal surface with your bare hands to discharge static electricity before performing this procedure.
- Never dispose of a horn button assembly with an undeployed airbag.
- The airbag produces an exploding sound when it is deployed, so perform the operation outdoors and where it will not create a nuisance to nearby residents.
- When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.
- When deploying the airbag, perform the operation at least 10 m (32.8 ft.) away from the horn button assembly.
- The horn button assembly becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling a horn button assembly with a deployed airbag.
- Do not apply water etc. to a horn button assembly with a deployed airbag.
- Always wash your hands with water after completing the operation.

HINT:

When scrapping a vehicle equipped with an SRS or disposing of the horn button assembly, be sure to deploy the airbag first in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the Service Dept. of TOYOTA MOTOR SALES, U.S.A., INC.


2. DISPOSE OF HORN BUTTON ASSEMBLY (When not Installed in Vehicle)

NOTICE:

Be sure to observe the following procedure when deploying the airbag.

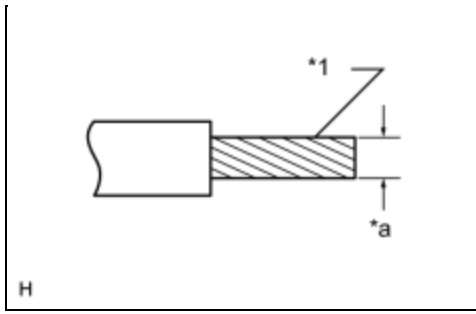
HINT:

Prepare a battery as the power source to deploy the airbag.

- (a) Remove the horn button assembly  .

CAUTION:

- Before removing the horn button assembly, wait at least 90 seconds after turning the ignition switch off and disconnecting the cable from the negative (-) battery terminal.
 - When storing the horn button assembly, keep the airbag deployment side facing upward.
- (b) Using braided wire, tie down the horn button assembly to an unneeded wheel.



Text in Illustration

*1	Stripped Wire Section
*a	Wire Diameter

Wire:

Stripped wire section

1.25 mm² (0.0019 in.²) or more

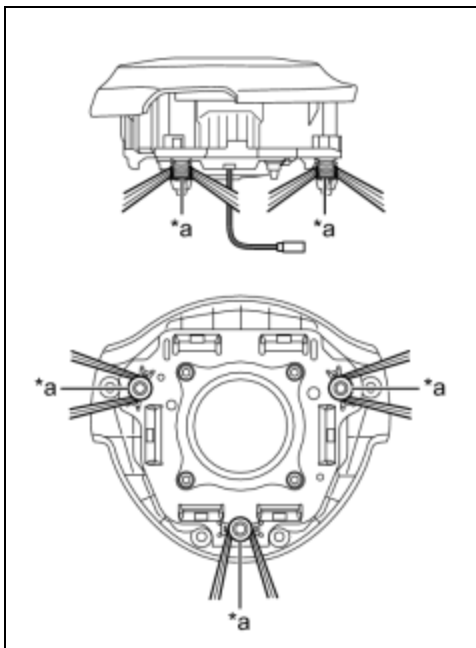
CAUTION:

If the wire harness is too thin or an alternative object is used to tie down the horn button assembly, it may snap when the airbag is deployed. Always use a wire for vehicle use with an area of at least 1.25 mm² (0.0019 in.²).

HINT:

To calculate the area of the stripped wire section:

$$\text{Area} = 3.14 \times (\text{Diameter})^2 / 4$$



- (1) Wind 3 wires at least 2 times each around each of the snap pins.

Text in Illustration

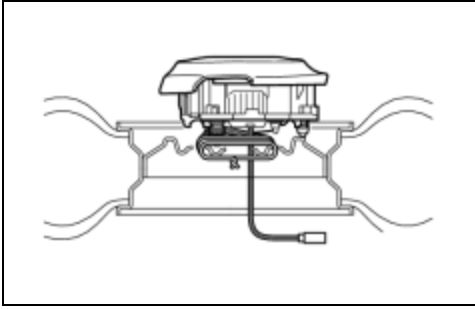
*a	2 times or more
----	-----------------

CAUTION:

- Tightly wind the wires around the snap pins without any slack.
- Make sure that the wires are tight. If there is slack in the wires, the horn button assembly may break loose when the airbag is deployed.

- (2) Face the airbag deployment side of the horn button assembly upward on top of an unneeded tire and wheel set. Separately tie the each sides of the horn button assembly to the wheel through the

hub nut holes. Position the SST connector so that it hangs downward through the hub hole of the wheel.



Minimum tire size:

Width

185 mm (7.28 in.)

Inner diameter

360 mm (1.18 ft.)

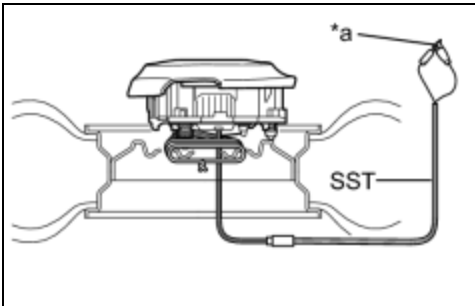
CAUTION:

- Make sure that the wires are tight. If there is slack in the wires, the horn button assembly may break loose when the airbag is deployed.
- Always tie down the horn button assembly with the airbag deployment side facing upward.

NOTICE:

The tire and wheel may be damaged by the airbag deployment, so use unneeded tire and wheel.

(c) Install SST.



(1) Connect the clip and terminal of SST.

SST: 09082-18010

Text in Illustration

*a	Connect the clip and terminal
----	-------------------------------

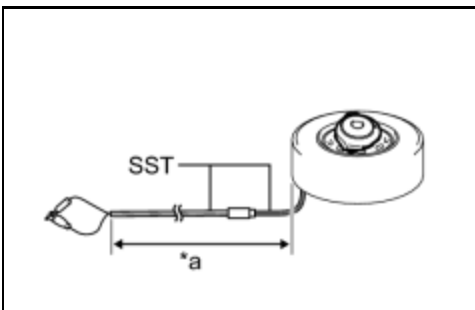
CAUTION:

Place the wheel on level ground.

(2) Connect the SST connector.

NOTICE:

To avoid damaging the SST connector or wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the disc wheel.

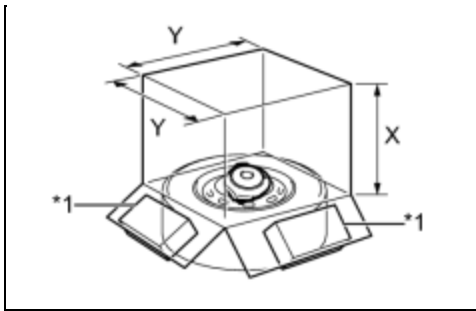


(3) Move SST at least 10 m (32.8 ft.) away from the airbag tied down to the wheel.

Text in Illustration

*a	10 m (32.8 ft.) or more
----	-------------------------

(d) Cover the horn button assembly (Using a cardboard box).



(1) Cover the horn button assembly with a cardboard box.

Text in Illustration

*1	Weight
----	--------

(2) Place weights on the cardboard box in 4 places totaling at least 190 N (19 kg, 42.7 lb).

Minimum cardboard box size:

Must exceed the following dimensions

X

460 mm (1.51 ft.)

Y

650 mm (2.13 ft.)

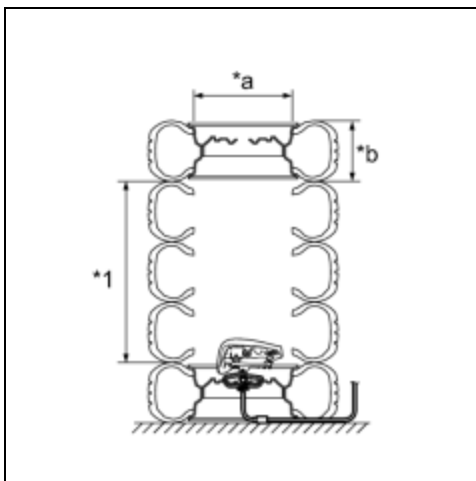
NOTICE:

- When dimension Y of the cardboard box exceeds the diameter of the wheel and tire to which the horn button assembly is tied, X should be the following size.

$$X = 460 \text{ mm (1.51 ft.)} + \text{width of tire}$$

- If a cardboard box smaller than the specified size is used, it may be broken by the shock from the airbag deployment.

(e) Cover the horn button assembly (Using tires).



(1) Place at least 3 tires without wheels onto the wheel and tire to which the horn button assembly is tied.

Text in Illustration

*1	Tires (3 or more)
*a	Inner Diameter
*b	Width

(2) Place a wheel and tire on top.

Minimum tire size:

Width

185 mm (7.28 in.)

Inner diameter

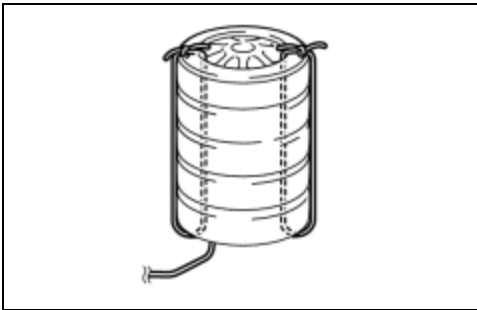
360 mm (1.18 ft.)

CAUTION:

Do not use tires with wheels except for on the top and bottom.

NOTICE:

- The tires may be damaged by the airbag deployment, so use unneeded tires.
- Do not place the SST connector under the tire because it could be damaged.



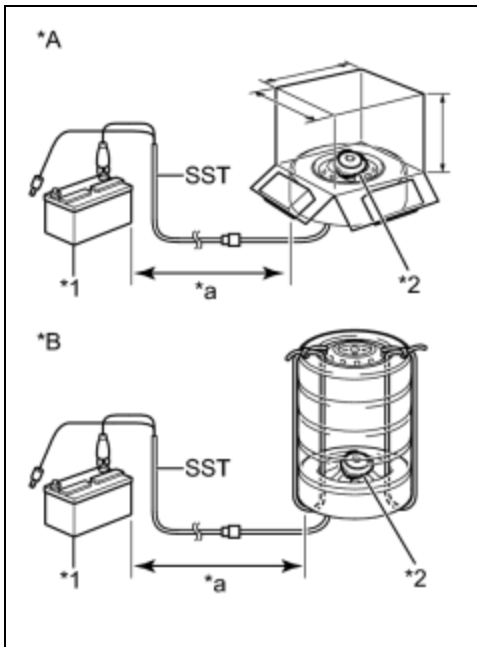
(3) Tie the tires together with the 2 wires.

CAUTION:

Make sure that the wires are tight. Looseness in the wires results in the tires breaking loose when the airbag is deployed.

(f) Deploy the airbag.

- (1) Check that no one is within a 10 m (32.8 ft.) radius of the wheel to which the horn button assembly is tied.



(2) Connect the clip of SST to the positive (+) battery terminal.

Text in Illustration

*A	Using a Cardboard Box
*B	Using Tires
*1	Battery
*2	Horn Button Assembly
*a	10 m (32.8 ft.) or more

(3) Connect the terminal of SST to the negative (-) battery terminal to deploy the horn button assembly.

CAUTION:

Before deployment, make sure that no one is near the airbag.

(g) Dispose of the horn button assembly.

CAUTION:

- The horn button assembly becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.

- Use gloves and safety glasses when handling a horn button assembly with a deployed airbag.
- Do not apply water etc. to a horn button assembly with a deployed airbag.
- Always wash your hands with water after completing the operation.

(1) Remove the horn button assembly from the wheel.

(2) Place the horn button assembly in a plastic bag, tie it tightly and dispose of it according to local regulations.



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UW6090X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: STEERING PAD: INSTALLATION (2013 FR-S)		

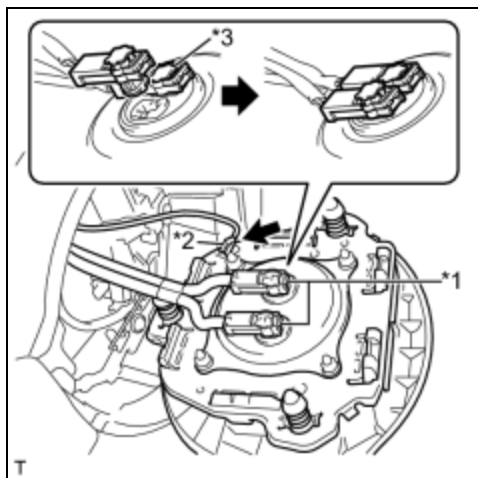
INSTALLATION

1. INSTALL HORN BUTTON ASSEMBLY

- (a) Check that the ignition switch is off.
- (b) Check that the cable is disconnected from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.



- (c) Connect the 2 airbag connectors to the horn button assembly.

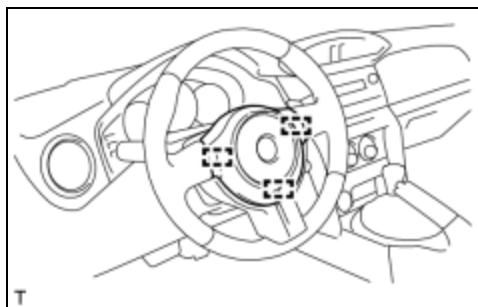
Text in Illustration

*1	Airbag Connector
*2	Horn Connector
*3	Airbag Connector Lock

NOTICE:

- When connecting any airbag connector, take care not to damage the airbag wire harness.
- Be sure to only connect the connectors to each corresponding color.

- (d) Push in the 2 locks to install the 2 airbag connectors.
- (e) Connect the horn connector to the horn button assembly.



- (f) Push the horn button assembly to engage the 3 pins carefully.

NOTICE:

- Make sure that the pins are securely inserted into the steering holes.
- Make sure to engage the 2 upper pins first.
- Make sure that the horn button assembly is securely installed.

2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)

3. INSPECT HORN BUTTON ASSEMBLY

(a) Make sure that the horn sounds.

If the horn does not sound, inspect the horn system  .

4. PERFORM DIAGNOSTIC SYSTEM CHECK



5. INSPECT SRS WARNING LIGHT





Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UW909DX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: STEERING PAD: ON-VEHICLE INSPECTION (2013 FR-S)		

ON-VEHICLE INSPECTION

CAUTION:

Be sure to correctly follow the removal and installation procedures for the horn button assembly.

1. INSPECT HORN BUTTON ASSEMBLY (for Vehicle not Involved in Collision)

- (a) Perform a diagnostic system check  .
- (b) Visually check for defects with the horn button assembly installed on the vehicle.

HINT:

The defects are as follows:

- Cuts on the surface or in the grooves
- Small cracks on the surface or in the grooves
- Significant discoloration on the surface or in the grooves

OK:

No defects are found.

If any of the defects is found, replace the horn button assembly with a new one.

2. INSPECT HORN BUTTON ASSEMBLY (for Vehicle Involved in Collision and Airbag not Deployed)

- (a) Perform a diagnostic system check  .
- (b) Visually check for defects with the horn button assembly removed from the vehicle.

HINT:

The defects are as follows:

- Cuts on the surface or in the grooves
- Small cracks on the surface or in the grooves
- Significant discoloration on the surface or in the grooves
- Cracks or other damage to the connector
- Deformation of the steering wheel assembly
- Deformation of the horn button sub-assembly of the horn button assembly
- Interference or uneven clearance between the horn button assembly and steering wheel assembly when the new horn button assembly is installed on the steering wheel assembly

OK:

No defects are found.

If any of the defects is found, replace the horn button assembly or steering wheel assembly with a new one.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000UW809KX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: STEERING PAD: REMOVAL (2013 FR-S)		

REMOVAL

1. PRECAUTION

CAUTION:

Be sure to read Precaution thoroughly before servicing. INFO

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO.

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

The power window system utilizes a mechanism that the door glass moves down slightly when the door is opened, and that the glass moves up when closing the door in order to prevent the door molding from being damaged. When the battery negative (-) terminal needs to be disconnected for servicing, fully open the driver and passenger door glasses in advance.

3. REMOVE HORN BUTTON ASSEMBLY

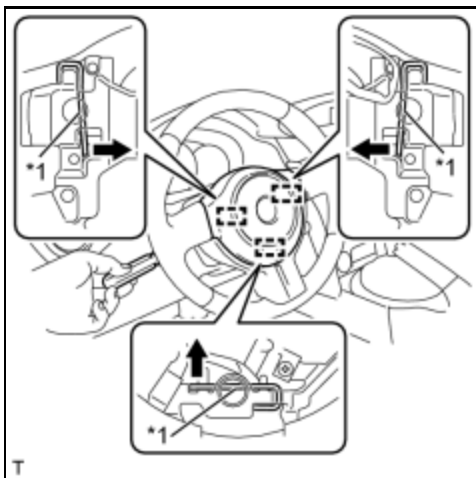
CAUTION:

When storing the horn button assembly, keep the airbag deployment side facing upward.

- (a) Check that the ignition switch is off.
- (b) Check that the cable is disconnected from the negative (-) battery terminal.

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.



- (c) Using a screwdriver, push in the 3 torsion springs to disengage the 3 pins.

Text in Illustration

*1	Torsion Spring
----	----------------

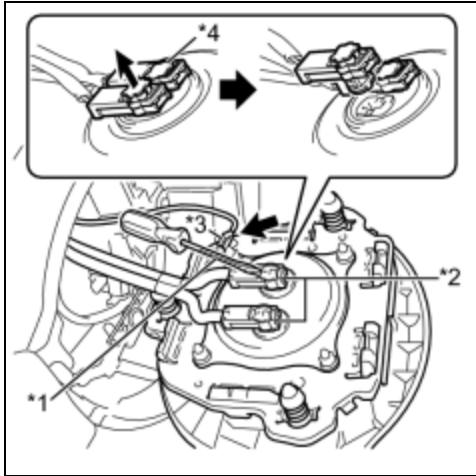
NOTICE:

Do not drop the horn button assembly.

(d) Pull out the horn button assembly from the steering wheel assembly and support the horn button assembly with one hand.

NOTICE:

When removing the horn button assembly, do not pull the airbag wire harness.



(e) Using a screwdriver with its tip wrapped with protective tape, release the 2 airbag connector locks.

Text in Illustration

*1	Protective Tape
*2	Airbag Connector
*3	Horn Connector
*4	Airbag Connector Lock

(f) Disconnect the 2 airbag connectors to remove the horn button assembly.

NOTICE:

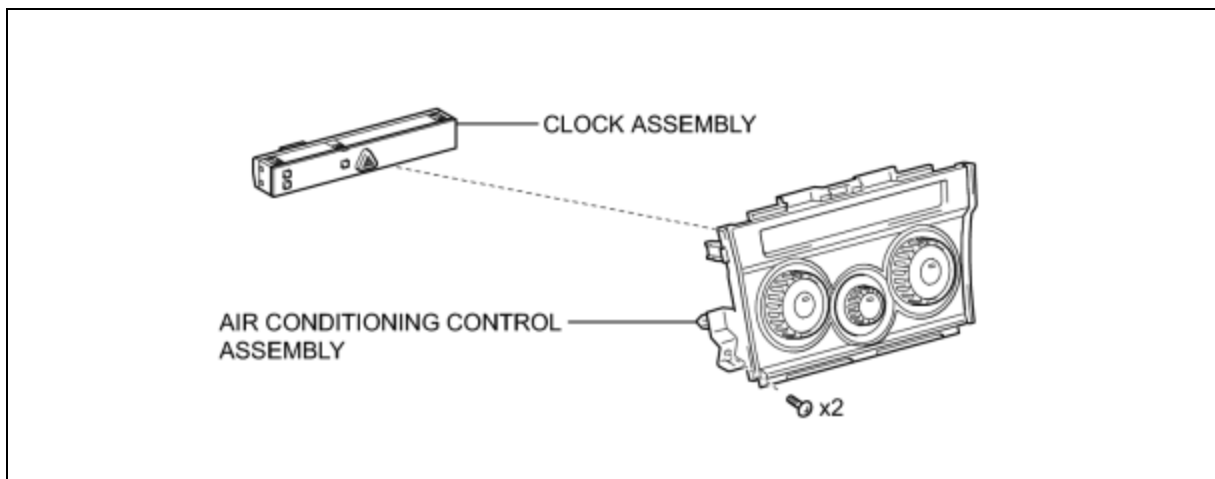
When disconnecting any airbag connector, take care not to damage the airbag wire harness.

(g) Disconnect the horn connector from the horn button assembly.

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003WZK005X
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: TELLTALE LIGHT ASSEMBLY: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



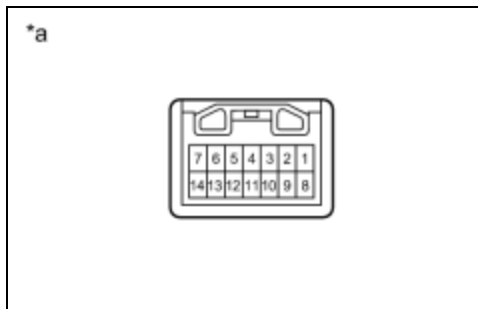
Last Modified: 3-27-2012	6.4 G	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003WZJ00HX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: TELLTALE LIGHT ASSEMBLY: INSPECTION (2013 FR-S)		

INSPECTION

1. INSPECT CLOCK ASSEMBLY

(a) Apply battery voltage to the connector and check the LED illumination condition.

OK:



CONDITION	SPECIFIED CONDITION
Battery positive (+) → 10 Battery negative (-) → 3	LED illuminates (AIRBAG ON)
Battery positive (+) → 10 Battery negative (-) → 5	LED illuminates (AIRBAG OFF)

Text in Illustration

*a	Component without harness connected (Clock Assembly)
----	---

If the result is not as specified, replace the clock assembly.

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003WZI00BX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: TELLTALE LIGHT ASSEMBLY: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL CLOCK ASSEMBLY

(a) Attach the 4 claws to install the clock assembly.

2. INSTALL AIR CONDITIONING CONTROL ASSEMBLY

INFO



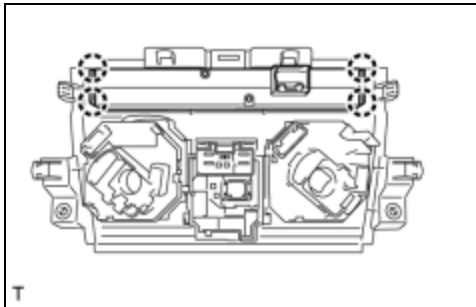
Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003WZL00BX
Title: SUPPLEMENTAL RESTRAINT SYSTEMS: TELLTALE LIGHT ASSEMBLY: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE AIR CONDITIONING CONTROL ASSEMBLY

INFO

2. REMOVE CLOCK ASSEMBLY



(a) Detach the 4 claws and remove the clock assembly.

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001TCI01UX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: B1401: M Check NG (2013 FR-S)		

DTC	B1401	M Check NG
------------	--------------	-------------------

DESCRIPTION

The main body ECU (network gateway ECU) stores this code if the main body ECU (network gateway ECU) reference code and the reference code from the combination meter do not match.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B1401	The main body ECU (network gateway ECU) reference code and reference code from the combination meter assembly do not match.	Combination meter assembly


INSPECTION PROCEDURE

NOTICE:

If the combination meter assembly is replaced, refer to Registration  .

PROCEDURE

1.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs  .

OK:

DTC B1407 or B1408 is not output.

NG  **GO TO DTC CHART**

OK



2.	REGISTER RECOGNITION CODES
-----------	-----------------------------------

(a) Register the recognition codes  .

OK:

The ECU code can be registered.

NG  **CHECK FOR DTC**

OK ► END

3.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs INFO .

OK:

DTC B1407 or B1408 is not output.

NG ► GO TO DTC CHART

OK ► REPLACE COMBINATION METER
ASSEMBLY

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001TCN01XX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: B1402: Immobiliser Key Check NG (2013 FR-S)		

DTC	B1402	Immobiliser Key Check NG
------------	--------------	---------------------------------

DESCRIPTION

The main body ECU (network gateway ECU) stores this code if an improper key (a key not registered in the main body ECU (network gateway ECU)) is inserted into the ignition key cylinder.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B1402	When an improper key (a key not registered in the main body ECU (network gateway ECU)) is inserted into the ignition key cylinder.	<ul style="list-style-type: none"> • Key • Main body ECU (network gateway ECU)

INSPECTION PROCEDURE

NOTICE:

If the main body ECU (network gateway ECU) is replaced, refer to Registration  .

PROCEDURE

1.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs  .

OK:


DTC B1410 and B1411 are not output.

NG  **GO TO DTC CHART**

OK



2.	REGISTER KEY
-----------	---------------------

(a) Reregister the key  .

OK:

The key ID can be registered.

NG ▶ REGISTER KEY

OK ▶ END

3.	REGISTER KEY
----	--------------

(a) Using an unregistered key, register the key ID INFO .

OK:

The key ID can be registered.

NG ▶ REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

OK ▶ END

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001TCJ028X
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: B1405: SCU Check NG (2013 FR-S)		

DTC	B1405	SCU Check NG
------------	--------------	---------------------

DESCRIPTION

The main body ECU (network gateway ECU) stores this code if the main body ECU (network gateway ECU) reference code and the reference code from the transponder key ECU assembly do not match.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B1405	The main body ECU (network gateway ECU) reference code and reference code from the transponder key ECU assembly do not match.	Transponder key ECU assembly

INSPECTION PROCEDURE

NOTICE:

If the transponder key ECU assembly is replaced, refer to Registration .

PROCEDURE

1.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs .

OK:
DTC B1406 and B1409 are not output.

NG  **GO TO DTC CHART**

OK



2.	REGISTER RECOGNITION CODES
-----------	-----------------------------------

(a) Register the recognition codes .

OK:
The ECU code can be registered.

NG  **CHECK DTC**

OK ► END

3.	CHECK DTC
-----------	------------------

(a) Check for DTCs INFO .

OK:

DTC B1406 and B1409 are not output.

NG ► GO TO DTC CHART

OK ► REPLACE TRANSPONDER KEY ECU
ASSEMBLY



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001TCN01ZX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: B1406: SCU EEPROM NG (2013 FR-S)		

DTC	B1406	SCU EEPROM NG
------------	--------------	----------------------

DESCRIPTION

The main body ECU (network gateway ECU) stores this code when an internal malfunction is detected in the transponder key ECU assembly or when the ROM in the transponder key ECU assembly cannot be accessed.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B1406	Internal malfunction in the transponder key ECU assembly when the ROM in the transponder key ECU assembly cannot be accessed.	Transponder key ECU assembly


INSPECTION PROCEDURE

NOTICE:

If the transponder key ECU assembly is replaced, refer to Registration .

PROCEDURE

1.	REGISTER RECOGNITION CODE
-----------	----------------------------------

(a) Register the recognition codes .

NEXT



2.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs .

OK:

DTC B1406 is not output.

NG  **REPLACE TRANSPONDER KEY ECU ASSEMBLY**

OK  **END**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002X2F03MX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: B1407: M Communication Circuit (2013 FR-S)		

DTC	B1407	M Communication Circuit
------------	--------------	--------------------------------

DESCRIPTION

The main body ECU (network gateway ECU) stores this code if a communication problem is detected between the main body ECU (network gateway ECU) and the combination meter assembly.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B1407	When there is a problem in communication between the main body ECU (network gateway ECU) and the combination meter assembly.	Combination meter assembly


INSPECTION PROCEDURE

NOTICE:

If the combination meter assembly is replaced, refer to Registration  .

PROCEDURE

1.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs  .

Result

RESULT	PROCEED TO
Other than DTC B1407 are not output	A
Other than DTC B1407 are output	B

B  **GO TO DTC CHART**

A  **REPLACE COMBINATION METER ASSEMBLY**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000TUG07SX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: B1408: Meter EEPROM Circuit (2013 FR-S)		

DTC	B1408	Meter EEPROM Circuit
------------	--------------	-----------------------------

DESCRIPTION

The main body ECU (network gateway ECU) stores this code when an internal malfunction is detected in the combination meter assembly.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B1408	Internal malfunction in the combination meter assembly.	Combination meter assembly

INSPECTION PROCEDURE

NOTICE:

If the combination meter assembly is replaced, refer to Registration [INFO](#) .

PROCEDURE

1.	REGISTER RECOGNITION CODES
-----------	-----------------------------------

(a) Register the recognition codes [INFO](#) .

NEXT



2.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs [INFO](#) .

OK:

DTC B1408 is not output.

NG ► **REPLACE COMBINATION METER ASSEMBLY**

OK ► **END**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002X2G031X
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: B1409: SCU Communication Circuit (2013 FR-S)		

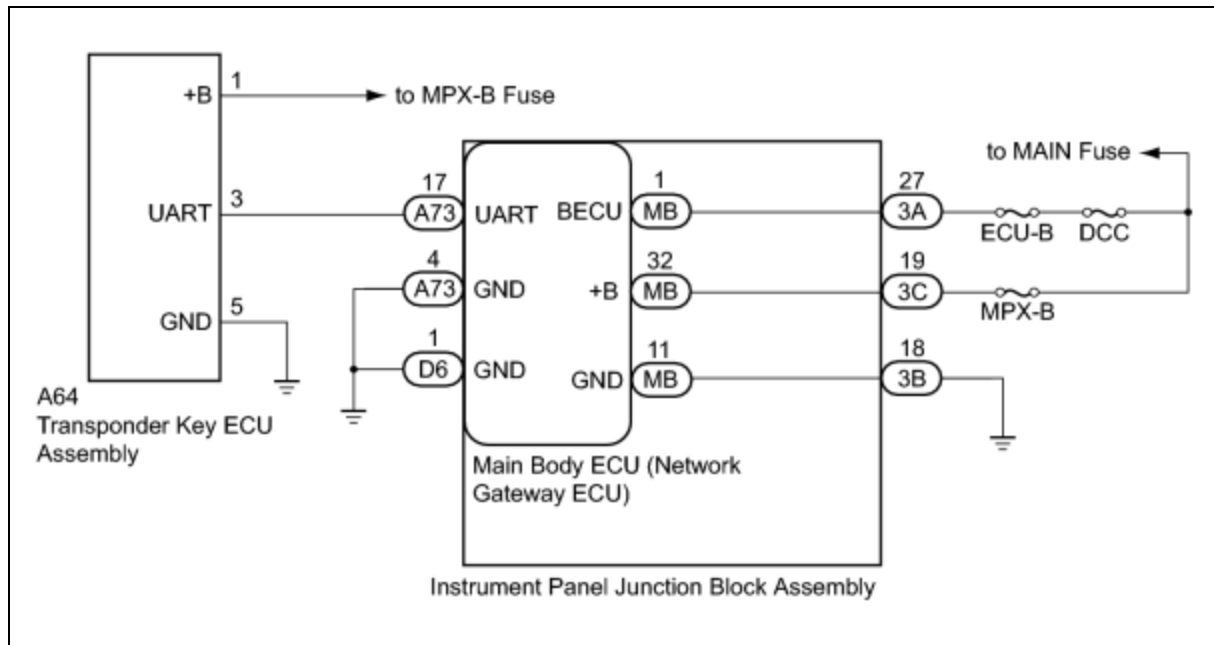
DTC	B1409	SCU Communication Circuit
------------	--------------	----------------------------------

DESCRIPTION

The main body ECU (network gateway ECU) stores this code if a communication problem is detected between the main body ECU (network gateway ECU) and the transponder key ECU assembly.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B1409	When there is a problem in communication between the main body ECU (network gateway ECU) and the transponder key ECU assembly.	<ul style="list-style-type: none"> • Harness or connector • Main body ECU (network gateway ECU) • Transponder key ECU assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

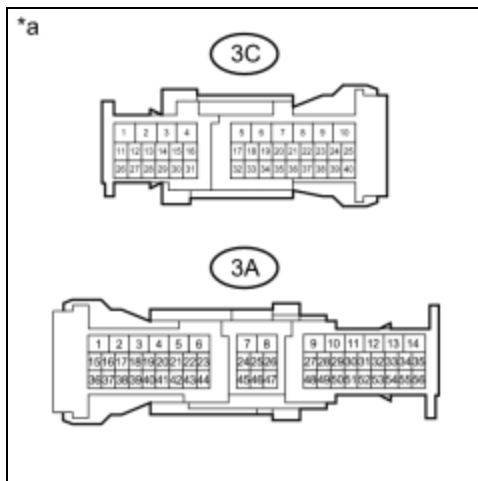
NOTICE:

- If the main body ECU (network gateway ECU) or transponder key ECU assembly is replaced, refer to Registration **INFO** .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CHECK HARNESS AND CONNECTOR (INSTRUMENT PANEL JUNCTION BLOCK - BATTERY, BODY GROUND)
-----------	---

- (a) Disconnect the A73 and D6 main body ECU (network gateway ECU) connectors.
- (b) Disconnect the 3A, 3B and 3C instrument panel junction block assembly connectors.



- (c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3A-27 - Body ground	Always	11 to 14 V
3C-19 - Body ground	Always	11 to 14 V

- (d) Measure the resistance according to the value(s) in the table below.

Standard Resistance:


TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3B-18 - Body ground	Always	Below 1 Ω
A73-4 (GND) - Body ground	Always	Below 1 Ω
D6-1 (GND) - Body ground	Always	Below 1 Ω

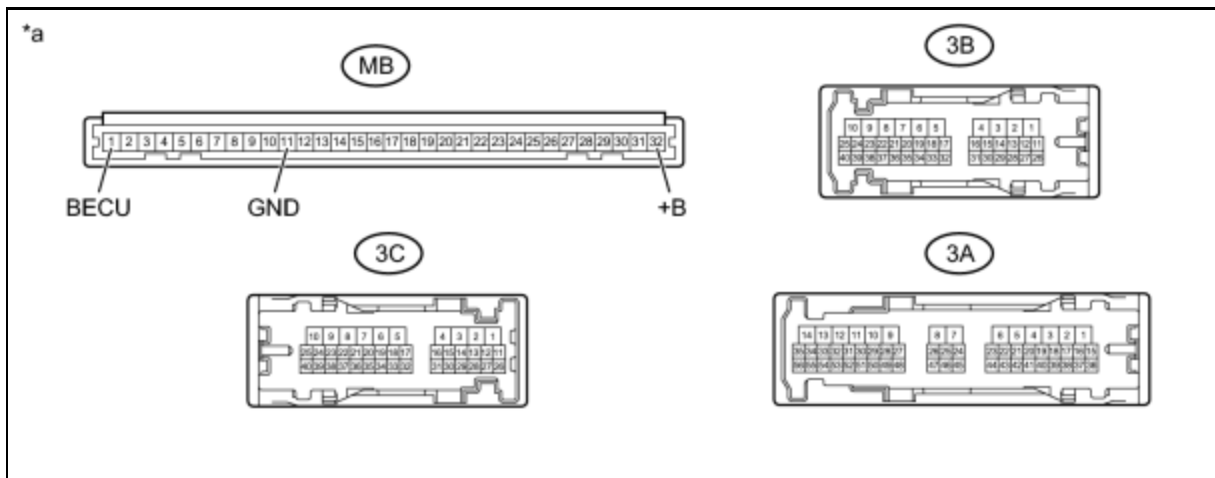
Text in Illustration

*a	Front view of wire harness connector (to Instrument Panel Junction Block Assembly)
----	---

OK


2. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

- (a) Remove the instrument panel junction block assembly  .
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (c) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	---	---	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
MB-1 (BECU) - 3A-27	Always	Below 1 Ω
MB-32 (+B) - 3C-19	Always	Below 1 Ω
MB-11 (GND) - 3B-18	Always	Below 1 Ω

OK



3.	CHECK HARNESS AND CONNECTOR (TRANSPONDER KEY ECU ASSEMBLY - BATTERY, BODY GROUND)
-----------	--

(a) Disconnect the A64 transponder key ECU assembly connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A64-1 (+B) - Body ground	Always	11 to 14 V

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A64-5 (GND) - Body ground	Always	Below 1 Ω

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



4.	CHECK HARNESS AND CONNECTOR (MAIN BODY ECU - TRANSPONDER KEY ECU ASSEMBLY)
-----------	---

(a) Measure the voltage and resistance according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A73-17 (UART) - Body ground	Always	Below 1 V

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A73-17 (UART) - A64-3 (UART)	Always	Below 1 Ω
A73-17 (UART) - Body ground	Always	10 k Ω or higher

NG ▶ REPAIR OR REPLACE HARNESS OR
CONNECTOR

OK




5.	REPLACE TRANSPONDER KEY ECU ASSEMBLY
-----------	---

(a) Replace the transponder key ECU assembly with a new one  .

NEXT



6.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs  .

OK:

DTC B1409 is not output

NG ▶ REPAIR MAIN BODY ECU (NETWORK
GATEWAY ECU)

OK ▶ END (TRANSPONDER KEY ECU ASSEMBLY
WAS DEFECTIVE)

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002X2F03LX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: B1410: Transponder Communication Circuit (2013 FR-S)		

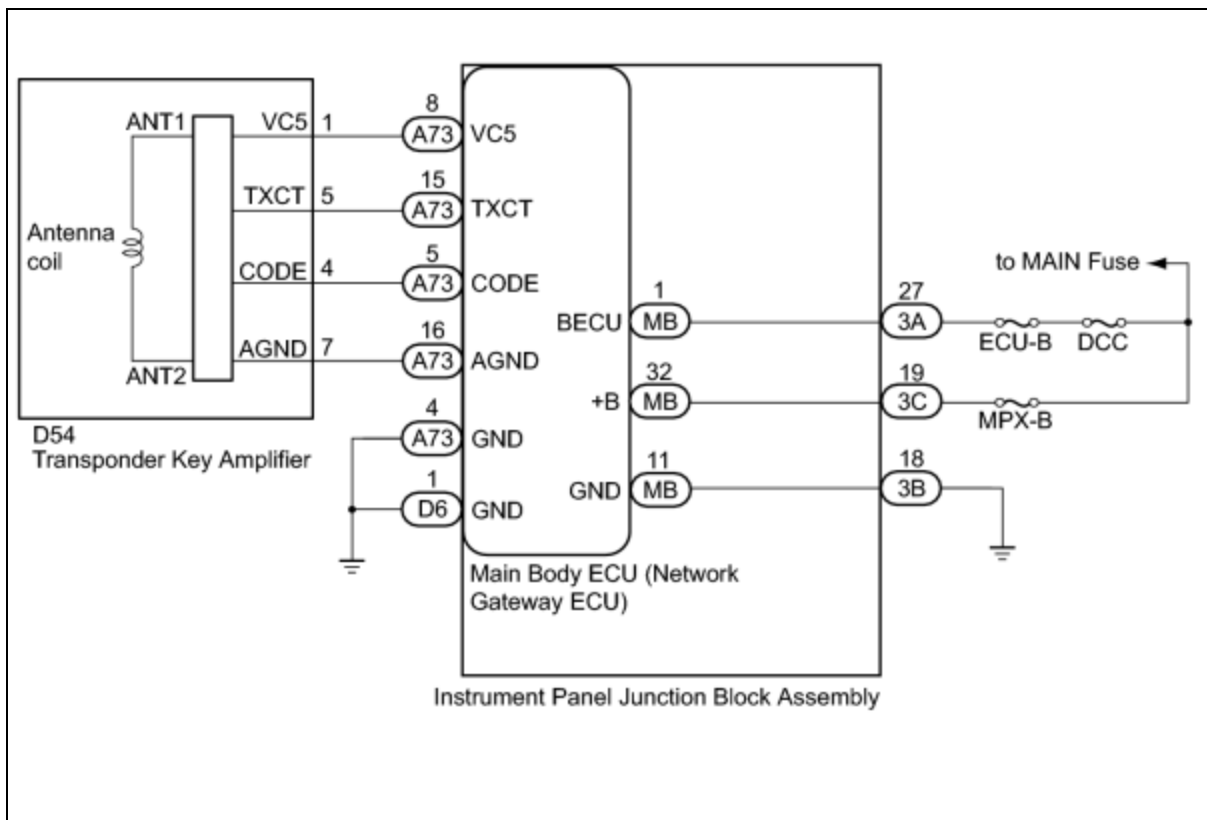
DTC	B1410	Transponder Communication Circuit
------------	--------------	--

DESCRIPTION

The main body ECU (network gateway ECU) stores this code if a communication problem is detected between the key and the main body ECU (network gateway ECU).

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B1410	When there is a problem in communication between the key and the main body ECU (network gateway ECU).	<ul style="list-style-type: none"> • Key • Transponder key amplifier • Main body ECU (network gateway ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- If the main body ECU (network gateway ECU) is replaced, refer to Registration [INFO](#) .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. CHECK FOR DTC

(a) Using Techstream, check that the DTC is stored with all the registered keys [INFO](#) .

Result

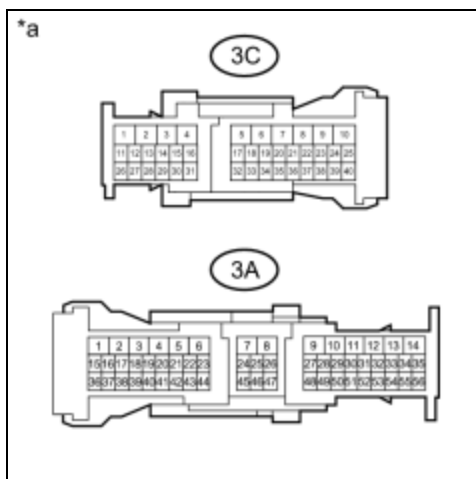
RESULT	PROCEED TO
DTC B1410 is stored with all the keys.	A
DTC B1410 is not stored with some of the keys.	B

NG ▶ REPLACE KEY THAT STORED DTC

OK

2. CHECK HARNESS AND CONNECTOR (BATTERY, BODY GROUND)

- (a) Disconnect the A73 and D6 main body ECU (network gateway ECU) connectors.
- (b) Disconnect the 3A, 3B and 3C instrument panel junction block assembly connectors.



(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3A-27 - Body ground	Always	11 to 14 V
3C-19 - Body ground	Always	11 to 14 V

(d) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3B-18 - Body ground	Always	Below 1 Ω
A73-4 (GND) - Body ground	Always	Below 1 Ω
D6-1 (GND) - Body ground	Always	Below 1 Ω


Text in Illustration

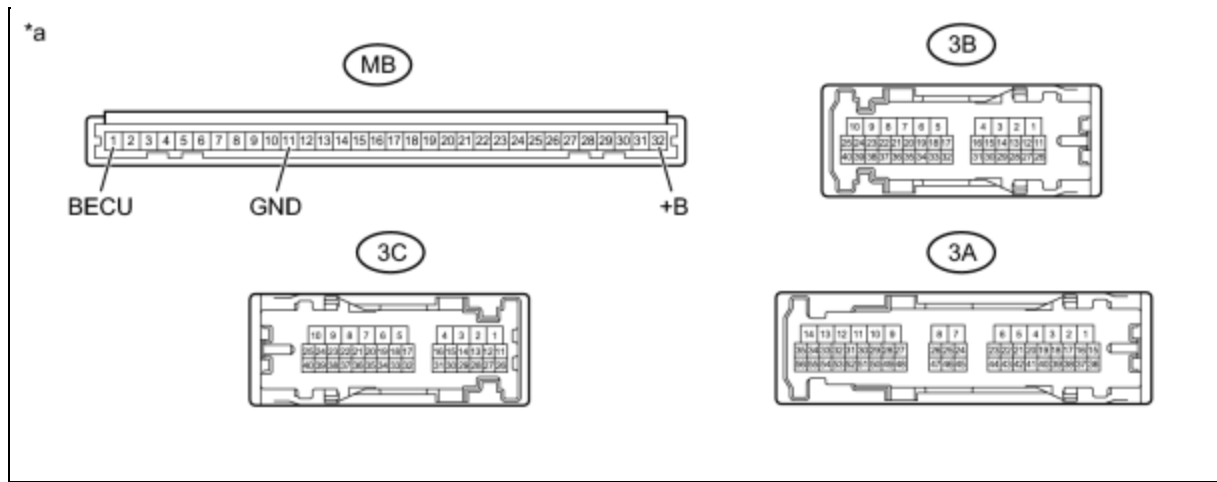
*a	Front view of wire harness connector (to Instrument Panel Junction Block Assembly)
----	---

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK


3. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

- (a) Remove the instrument panel junction block assembly  .
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (c) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	---	---	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
MB-1 (BECU) - 3A-27	Always	Below 1 Ω
MB-32 (+B) - 3C-19	Always	Below 1 Ω
MB-11 (GND) - 3B-18	Always	Below 1 Ω

NG **REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY**

OK



4.	INSPECT TRANSPONDER KEY AMPLIFIER (POWER SOURCE)
-----------	---

- (a) Install the main body ECU (network gateway ECU) to the instrument panel junction block assembly.
- (b) Install the instrument panel junction block assembly .
- (c) Reconnect the 3A, 3B and 3C instrument panel junction block assembly connectors.
- (d) Disconnect the D54 transponder key amplifier connector.



(e) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D54-1 (VC5) - Body ground	Ignition switch ON	4.5 to 5.5 V

Result

RESULT	PROCEED TO
NG	A
OK	B

Text in Illustration

*a	Component with harness connected (Transponder Key Amplifier)
----	--

B ► **CHECK HARNESS AND CONNECTOR (TRANSPONDER KEY AMPLIFIER - BODY GROUND)**

A
▼

5.	CHECK HARNESS AND CONNECTOR (TRANSPONDER KEY AMPLIFIER - INSTRUMENT PANEL JUNCTION BLOCK)
-----------	--


(a) Disconnect the A73 main body ECU (network gateway ECU) connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D54-1 (VC5) - A73-8 (VC5)	Always	Below 1 Ω
D54-1 (VC5) - Body ground	Always	10 k Ω or higher

NG  REPAIR OR REPLACE HARNESS OR CONNECTOR

OK  REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

6. CHECK HARNESS AND CONNECTOR (TRANSPONDER KEY AMPLIFIER - BODY GROUND)

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D54-7 (AGND) - Body ground	Always	Below 1 Ω

Result

RESULT	PROCEED TO
NG	A
OK	B

B  CHECK HARNESS AND CONNECTOR (TRANSPONDER KEY AMPLIFIER - INSTRUMENT PANEL JUNCTION BLOCK)

A



7. CHECK HARNESS AND CONNECTOR (TRANSPONDER KEY AMPLIFIER - INSTRUMENT PANEL JUNCTION BLOCK)

(a) Disconnect the A73 main body ECU (network gateway ECU) connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D54-7 (AGND) - A73-16 (AGND)	Always	Below 1 Ω

NG  REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

8. CHECK HARNESS AND CONNECTOR (TRANSPONDER KEY AMPLIFIER - INSTRUMENT PANEL JUNCTION BLOCK)

- (a) Disconnect the A73 main body ECU (network gateway ECU) connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D54-5 (TXCT) - A73-15 (TXCT)	Always	Below 1 Ω
D54-4 (CODE) - A73-5 (CODE)	Always	Below 1 Ω
D54-5 (TXCT) - Body ground	Always	10 k Ω or higher
D54-4 (CODE) - Body ground	Always	10 k Ω or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK
▼

9. REPLACE TRANSPONDER KEY AMPLIFIER

- (a) Temporarily replace the transponder key amplifier with a new or known good one **INFO** .

NEXT
▼

10. CHECK FOR DTC

- (a) Key is inserted into ignition key cylinder.
- (b) Turn the ignition switch off or ACC.
- (c) Check for DTCs **INFO** .

OK:

DTC B1410 is not output

NG ► CHECK FOR DTC

OK ► END (TRANSPONDER KEY AMPLIFIER
WAS DEFECTIVE)

11.	CHECK FOR DTC
------------	----------------------

(a) Replace the keys in which the DTC B1410 is stored, and perform the registration.

(b) Check for DTCs INFO.

OK:

DTC B1410 is not output

NG ► REPLACE MAIN BODY ECU (NETWORK
GATEWAY ECU)

OK ► END (KEY WAS DEFECTIVE)

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001TCJ02BX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: B1411: Immobiliser Antenna Circuit (2013 FR-S)		

DTC	B1411	Immobiliser Antenna Circuit
------------	--------------	------------------------------------

DESCRIPTION

The main body ECU (network gateway ECU) stores this code if a malfunction is detected in the antenna coil inside the transponder key amplifier.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B1411	Malfunction in the antenna coil inside the transponder key amplifier.	<ul style="list-style-type: none"> • Transponder key amplifier • Main body ECU (network gateway ECU)


INSPECTION PROCEDURE

NOTICE:

If the main body ECU (network gateway ECU) is replaced, refer to Registration  .

PROCEDURE

1.	CHECK FOR DTC
-----------	----------------------

- (a) Key is removed from ignition key cylinder.
- (b) Key is inserted into ignition key cylinder.
- (c) Turn the ignition switch to ON.
- (d) Check for DTCs  .


OK:

DTC B1411 is not output.

NG  **REPLACE TRANSPONDER KEY AMPLIFIER**

OK  **END**

2.	REPLACE TRANSPONDER KEY AMPLIFIER
-----------	--

- (a) Temporarily replace the transponder key amplifier with a new or known good one  .

NEXT



3.	CHECK FOR DTC
-----------	----------------------

(a) Key is inserted into ignition key cylinder.

(b) Turn the ignition switch to ON.

(c) Check for DTCs INFO.

OK:

DTC B1411 is not output.

NG ► **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

OK ► **END**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004F7J00MX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: B1571: Immobiliser Key Check NG (2013 FR-S)		

DTC	B1571	Immobiliser Key Check NG
------------	--------------	---------------------------------

DESCRIPTION

The ECM stores this code if the main body ECU (network gateway ECU) reference code and the reference code from the ECM do not match.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B1571	The main body ECU (network gateway ECU) reference code and reference code from the ECM do not match.	<ul style="list-style-type: none"> ECM Main body ECU (network gateway ECU)

INSPECTION PROCEDURE

NOTICE:

If the main body ECU (network gateway ECU) or ECM is replaced, refer to Registration INFO.

PROCEDURE

1.	READ VALUE USING TECHSTREAM (NUMBER OF REGISTRATION KEY)
-----------	---

- (a) Connect Techstream to DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Data List.
- (e) According to the display on the Techstream, read the Data List.

Main Body

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Number of Registration Key	Number of registered key/ min. 0, max. 8	Number of registered key	-

Result

RESULT	PROCEED TO
--------	------------

The registered number of the key is 0.	A
he registered number of the key is 1 or more.	B

B ▶ REGISTER ECU COMMUNICATION ID

A



2.	REGISTER KEY
-----------	---------------------

(a) Register the key INFO.

OK:

The key ID can be registered.

NG ▶ CHECK FOR DTC

OK ▶ END

3.	REGISTER ECU COMMUNICATION ID
-----------	--------------------------------------

(a) Register the ECU communication ID INFO.

OK:

The ECU communication ID can be registered.

NG ▶ CHECK FOR DTC

OK ▶ END

4.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs INFO.

Result


RESULT	PROCEED TO
DTC B1571 is output	A
Other than DTC B1571 are output	B

B ▶ GO TO DTC CHART

A




5.	REPLACE ECM
-----------	--------------------

(a) Temporarily replace the ECM with a new or known good one  .

NEXT




6.	REGISTER ECU COMMUNICATION ID
-----------	--------------------------------------

(a) Register the ECU communication ID  .

OK:

The ECU communication ID can be registered.

NG  **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

OK  **END**

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001TCG01YX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: B1572: Immobiliser System Communication Malfunction (2013 FR-S)		

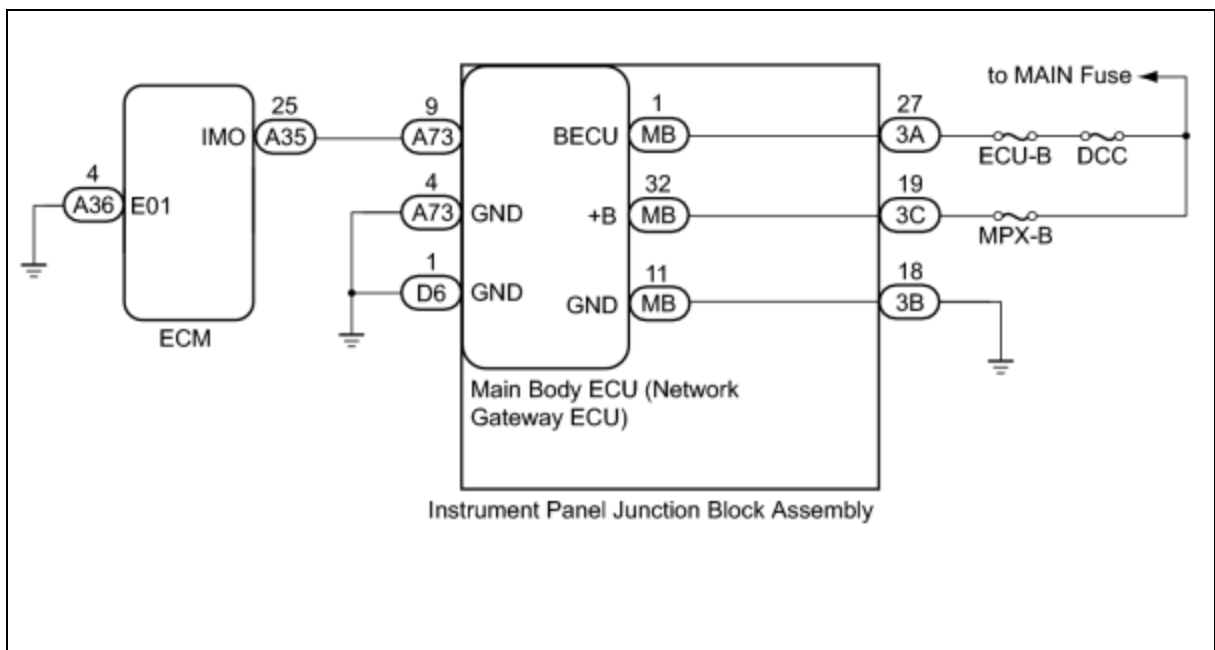
DTC	B1572	Immobiliser System Communication Malfunction
------------	--------------	---

DESCRIPTION

The ECM stores this code if a communication problem is detected between the main body ECU (network gateway ECU) and the ECM.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B1572	When there is a problem in communication between the main body ECU (network gateway ECU) and ECM.	<ul style="list-style-type: none"> • Harness or connector • ECM • Instrument panel junction block assembly • Main body ECU (network gateway ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

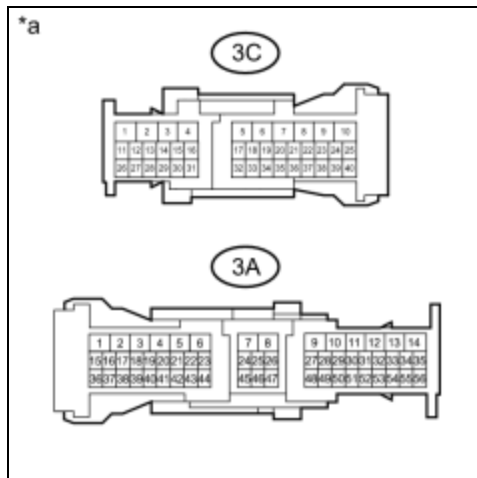
NOTICE:

- If the main body ECU (network gateway ECU) or ECM is replaced, refer to Registration INFO.
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. CHECK HARNESS AND CONNECTOR (BATTERY, BODY GROUND)

- (a) Disconnect the A73 and D6 main body ECU (network gateway ECU) connectors.
- (b) Disconnect the 3A, 3B and 3C instrument panel junction block assembly connectors.



- (c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3A-27 - Body ground	Always	11 to 14 V
3C-19 - Body ground	Always	11 to 14 V

- (d) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3B-18 - Body ground	Always	Below 1 Ω
A73-4 (GND) - Body ground	Always	Below 1 Ω
D6-1 (GND) - Body ground	Always	Below 1 Ω


Text in Illustration

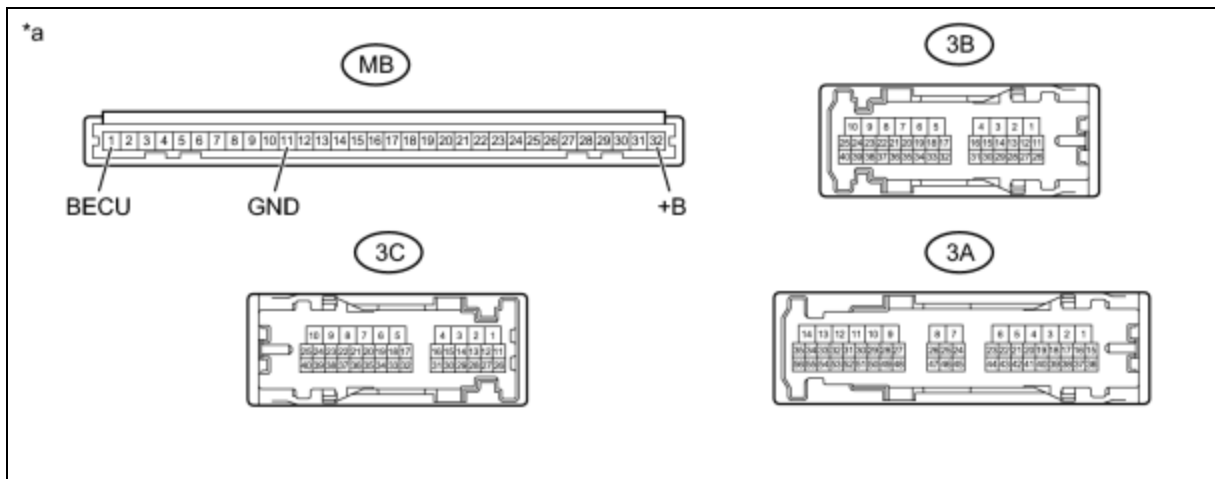
*a Front view of wire harness connector
(to Instrument Panel Junction Block Assembly)

OK



2. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

- (a) Remove the instrument panel junction block assembly  .
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (c) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	---	---	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
MB-1 (BECU) - 3A-27	Always	Below 1 Ω
MB-32 (+B) - 3C-19	Always	Below 1 Ω
MB-11 (GND) - 3B-18	Always	Below 1 Ω

OK



3.	CHECK HARNESS AND CONNECTOR
-----------	------------------------------------

- (a) Disconnect the A73 main body ECU (network gateway ECU) connector.
- (b) Disconnect the A35 and A36 ECM connectors.
- (c) Measure the voltage and resistance according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A73-9 - Body ground	Always	Below 1 V
A35-25 (IMO) - Body ground	Always	Below 1 V

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A73-9 - A35-25 (IMO)	Always	Below 1 Ω
A36-4 (E01) - Body ground	Always	Below 1 Ω
A73-9 - Body ground	Always	10 k Ω or higher

**REPAIR OR REPLACE HARNESS OR
NG CONNECTOR**

OK



4.	REPLACE ECM
-----------	--------------------


- (a) Temporarily replace the ECM with a new or known good one INFO .
- (b) Register the ECU communication ID INFO .

NEXT




5.	CHECK FOR DTC
-----------	----------------------

(a) Turn the ignition switch to ON and wait 5 seconds.

(b) Check for DTCs  .

OK:

DTC B1572 is not output

NG  **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

OK  **END (ECM WAS DEFECTIVE)**



Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002X2F03JX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: B1576: Key Write Malfunction to EFI ECU (2013 FR-S)		

DTC	B1576	Key Write Malfunction to EFI ECU
------------	--------------	---

DESCRIPTION

The ECM stores this code when an internal malfunction is detected in the ECM, or when the ROM in the ECM cannot be accessed when registering a key.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B1576	<ul style="list-style-type: none"> Internal malfunction in the ECM. When the ROM in the ECM cannot be accessed when registering a key. 	ECM

INSPECTION PROCEDURE

NOTICE:

If the ECM is replaced, refer to Registration  .

PROCEDURE

1.	REGISTER ECU COMMUNICATION ID
-----------	--------------------------------------

(a) Register the ECU communication ID  .

OK:

The ECU Communication ID can be registered.

NG  **REGISTER ECU COMMUNICATION ID**

OK  **END**

2.	REGISTER ECU COMMUNICATION ID
-----------	--------------------------------------

(a) Register the ECU communication ID  .

OK:

The ECU Communication ID can be registered.

NG  **REGISTER ECU COMMUNICATION ID**

OK ► END

3.	REGISTER ECU COMMUNICATION ID
----	--------------------------------------

(a) Register the ECU communication ID INFO .

OK:

The ECU Communication ID can be registered.

NG ► REPLACE ECM

OK ► END

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002X2G02ZX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: B1577: Immobiliser System EEPROM Malfunction (2013 FR-S)		

DTC	B1577	Immobiliser System EEPROM Malfunction
------------	--------------	--

DESCRIPTION

The ECM stores this code when an internal malfunction is detected in the main body ECU (network gateway ECU) or when the ROM in the main body ECU (network gateway ECU) cannot be accessed.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B1577	<ul style="list-style-type: none"> Internal malfunction in the main body ECU (network gateway ECU). When the ROM in the main body ECU (network gateway ECU) cannot be accessed. 	Main body ECU (network gateway ECU)

INSPECTION PROCEDURE

NOTICE:

If the main body ECU (network gateway ECU) is replaced, refer to Registration  .

PROCEDURE

1.	REGISTER ECU COMMUNICATION ID
-----------	--------------------------------------

(a) Register the ECU communication ID  .

OK:

The ECU communication ID can be registered.

NG  **REGISTER ECU COMMUNICATION ID**

OK  **END**

2.	REGISTER ECU COMMUNICATION ID
-----------	--------------------------------------

(a) Register the ECU communication ID  .

OK:

The ECU communication ID can be registered.

NG  **REGISTER ECU COMMUNICATION ID**

OK ► END

3.	REGISTER ECU COMMUNICATION ID
----	--------------------------------------

(a) Register the ECU communication ID  .

OK:

The ECU communication ID can be registered.

NG ► REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

OK ► END

Last Modified: 3-27-2012	6.4 C	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001TCL029X
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: B1578: Immobiliser System Data Mismatch Key (2013 FR-S)		

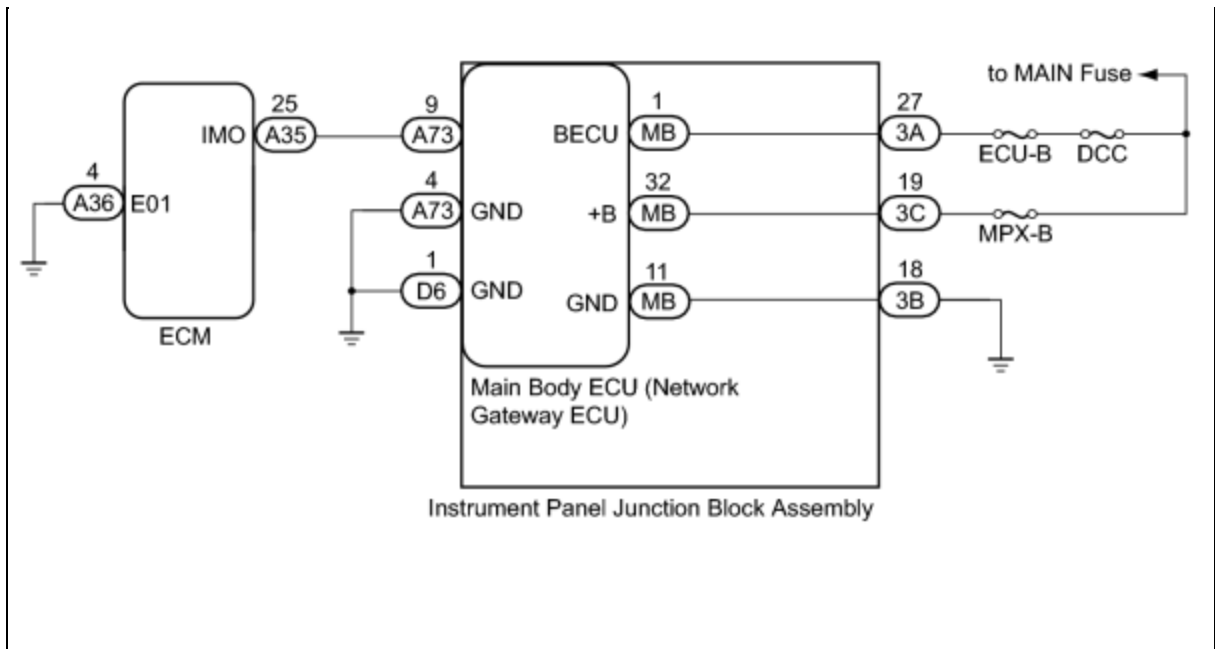
DTC	B1578	Immobiliser System Data Mismatch Key
------------	--------------	---

DESCRIPTION

The ECM stores this code when the combination meter assembly reference code and reference code from the main body ECU (network gateway ECU) do not match, or when a communication error is detected between the main body ECU (network gateway ECU) and the ECM.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
B1578	<ul style="list-style-type: none"> The combination meter assembly reference code and the reference code from the main body ECU (network gateway ECU) do not match. Communication error between the main body ECU (network gateway ECU) and the ECM. 	<ul style="list-style-type: none"> Harness or connector ECM Instrument panel junction block assembly Main body ECU (network gateway ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- If the main body ECU (network gateway ECU) or ECM is replaced, refer to Registration [INFO](#) .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CHECK DTC
-----------	------------------

(a) Check for DTCs [INFO](#) .

OK:

DTC B1401, B1405, B1407 and B1408 are not output

NG ► [GO TO DTC CHART](#)

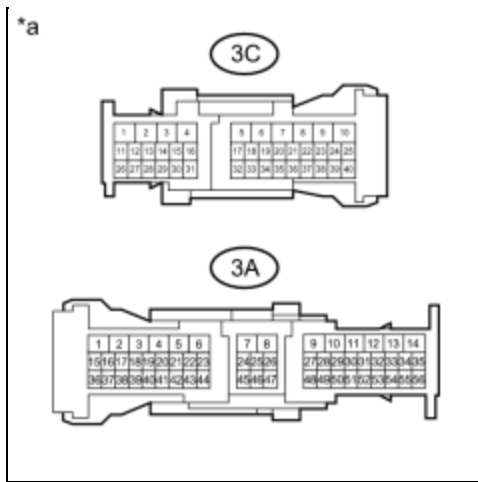
OK



2.	CHECK HARNESS AND CONNECTOR (BATTERY, BODY GROUND)
-----------	---

(a) Disconnect the A73 and D6 main body ECU (network gateway ECU) connectors.

(b) Disconnect the 3A, 3B and 3C instrument panel junction block assembly connectors.



(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3A-27 - Body ground	Always	11 to 14 V
3C-19 - Body ground	Always	11 to 14 V

(d) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3B-18 - Body ground	Always	Below 1 Ω
A73-4 (GND) - Body ground	Always	Below 1 Ω
D6-1 (GND) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Instrument Panel Junction Block Assembly)
----	---

**REPAIR OR REPLACE HARNESS OR
NG CONN**

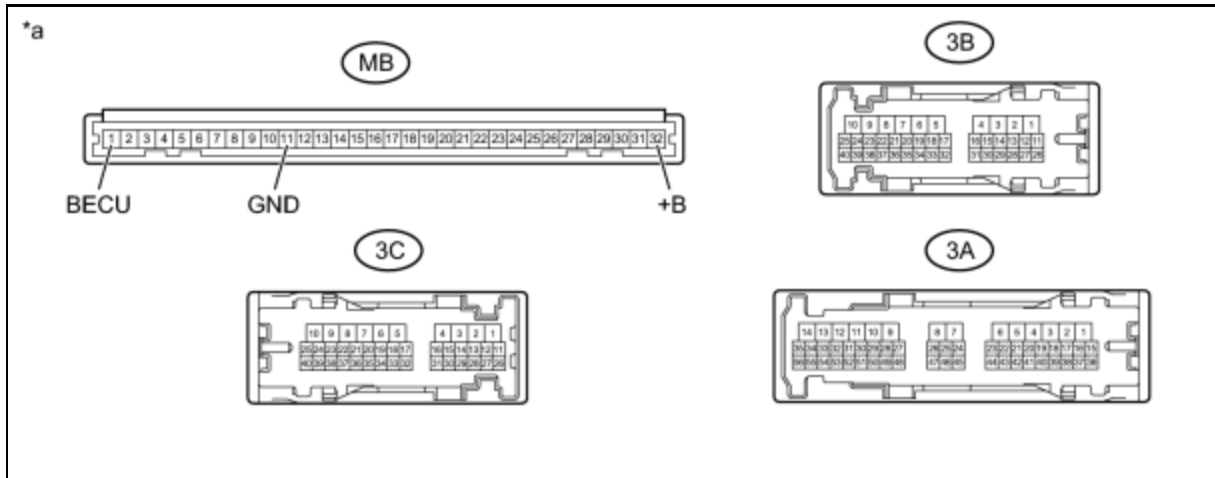
OK



3.	INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY
-----------	---

(a) Remove the instrument panel junction block assembly **INFO** .

- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (c) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-		-
----	---	---	--	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
MB-1 (BECU) - 3A-27	Always	Below 1 Ω
MB-32 (+B) - 3C-19	Always	Below 1 Ω
MB-11 (GND) - 3B-18	Always	Below 1 Ω

NG ▶ REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

OK



4.	CHECK HARNESS AND CONNECTOR (MAIN BODY ECU (NETWORK GATEWAY ECU) - ECM, BODY GROUND)
-----------	---

- (a) Disconnect the A73 main body ECU (network gateway ECU) connector.
- (b) Disconnect the A35 and A36 ECM connectors.
- (c) Measure the voltage and resistance according to the value(s) in the table below.

Standard Voltage:

--	--	--

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A73-9 - Body ground	Always	Below 1 V
A35-25 (IMO) - Body ground	Always	Below 1 V

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A73-9 - A35-25 (IMO1)	Always	Below 1 Ω
A36-4 (E01) - Body ground	Always	Below 1 Ω
A73-9 - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



5.	REPLACE ECM
-----------	--------------------

- (a) Temporarily replace the ECM with a new or known good one  .
- (b) Register the ECU communication ID  .

NEXT




6.	CHECK FOR DTC
-----------	----------------------

- (a) Check for DTCs  .

OK:

DTC B1578 is not output

NG  **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

OK  **END**



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Model Year: 2013	Model: FR-S	Doc ID: RM000001TCS01SX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: DATA LIST / ACTIVE TEST (2013 FR-S)		

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical or Powertrain / Main Body or Engine / Data List.
- Read the Data List according to the display on the Techstream.

Main Body

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Number of Registration Key	Number of registered key / 0 to 8	Number of registered key	-
IG SW	Ignition switch ON signal / OFF or ON	OFF: Ignition switch ACC or off ON: Ignition switch ON	-
ACC SW	Ignition switch ACC signal / OFF or ON	OFF: Ignition switch off ON: Ignition switch ACC or ON	-
Key Unlock Warning SW	Unlock warning switch signal / OFF or ON	OFF: No key in ignition key cylinder ON: Key inserted in ignition key cylinder	-
Battery Power Supply Control Voltage	Battery power supply control voltage / 0 to 21.4 V	11 to 14 V	-
Battery Power Supply Back Up Voltage	Battery power supply backup voltage / 0 to 21.4 V	11 to 14 V	-

IG Power Supply Voltage	IG power supply voltage / 0 to 21.4 V	11 to 14 V	-
ACC Voltage	ACC voltage / 0 to 21.4 V	11 to 14 V	-
Immobiliser Light	Security indicator light status / OFF or ON	OFF: Security indicator light OFF ON: Security indicator light ON	-
Immobiliser Power Supply	Main body ECU (network gateway ECU) engine immobiliser system power supply output status / OFF or ON	OFF: Power not supplied to engine immobiliser system ON: Power supplied to engine immobilizer system	-

Engine

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Immobiliser Fuel Cut	Status of immobiliser fuel cut / ON or OFF	-	-
Immobiliser Fuel Cut History	Status of immobiliser fuel cut history / ON or OFF	-	-

2. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Active Test.
- (e) According to the display on the Techstream, perform the Active Test.

Main Body

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Security Indicator	Security indicator light	ON/OFF	-



Last Modified: 3-27-2012	6.4 S	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001TCA025X
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: DIAGNOSTIC TROUBLE CODE CHART (2013 FR-S)		

DIAGNOSTIC TROUBLE CODE CHART

Main Body ECU (Network Gateway ECU)

DTC CODE	DETECTION ITEM	SEE PAGE
B1401*1	M Check NG	INFO
B1402	Immobiliser Key Check NG	INFO
B1405*2	SCU Check NG	INFO
B1406*2	SCU EEPROM NG	INFO
B1407*1	M Communication Circuit	INFO
B1408*1	Meter EEPROM Circuit	INFO
B1409*2	SCU Communication Circuit	INFO
B1410	Transponder Communication Circuit	INFO
B1411	Immobiliser Antenna Circuit	INFO

*1: w/o Transponder Key ECU Assembly

*2: w/ Transponder Key ECU Assembly

ECM

DTC CODE	DETECTION ITEM	SEE PAGE
B1571	Immobiliser Key Check NG	INFO
B1572	Immobiliser System Communication Malfunction	INFO
B1576	Key Write Malfunction to EFI ECU	INFO
B1577	Immobiliser System EEPROM Malfunction	INFO
B1578	Immobiliser System Data Mismatch Key	INFO



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001TCQ01VX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: DTC CHECK / CLEAR (2013 FR-S)		

DTC CHECK / CLEAR

1. CHECK FOR MAIN BODY ECU (NETWORK GATEWAY ECU) DTC

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Trouble Codes.
- (e) Check for DTCs.

2. CHECK FOR ECM DTC

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Check for DTCs.

3. CLEAR MAIN BODY ECU (NETWORK GATEWAY ECU) DTC

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Body Electrical / Main Body / Trouble Codes.
- (e) Clear the DTCs.

4. CLEAR ECM DTC

- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine / Trouble Codes.
- (e) Clear the DTCs.

Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001TC902BX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING (2013 FR-S)		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use these procedures to troubleshoot the engine immobiliser system.
- *: Use the Techstream.

1.	VEHICLE BROUGHT TO WORKSHOP
-----------	------------------------------------

NEXT



2.	INSPECT BATTERY VOLTAGE
-----------	--------------------------------

Standard voltage:

11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

HINT:

A simple method to determine whether the battery is depleted is to operate the horn.

NEXT



3.	CHECK COMMUNICATION FUNCTION OF CAN COMMUNICATION SYSTEM*
-----------	--

(a) Use the Techstream to check if the CAN communication system is functioning normally

NFC .

Result

RESULT	PROCEED TO
CAN DTC is not output	A
CAN DTC is output	B

A



4.	CHECK FOR DTC*
-----------	-----------------------

(a) Check for DTCs and note any codes that are output INFO

Result

RESULT	PROCEED TO
DTC is not output	A
SFI system DTC is output	B
Engine immobiliser system DTC is not output	C

(b) Based on the DTCs output above, proceed to each diagnostic procedure.

B ▶ **GO TO SFI SYSTEM**

C ▶ **PROCEED TO DTC CHART**

A



5.	PROBLEM SYMPTOMS TABLE
-----------	-------------------------------

(a) Refer to Problem Symptoms Table INFO .

Result

RESULT	PROCEED TO
Fault is not listed in problem symptoms table	A
Fault is listed in problem symptoms table	B

B ▶ **Go to step 7**

A



--	--

6. OVERALL ANALYSIS AND TROUBLESHOOTING*

- (a) Data List / Active Test [INFO](#) .
- (b) Terminals of ECU [INFO](#) .

NEXT



7. ADJUST, REPAIR OR REPLACE

NEXT



8. CHECK FOR DTC*

- (a) Clear the DTCs [INFO](#) .
- (b) Check for DTCs [INFO](#) .

HINT:

Before checking for DTCs, perform the "DTC Output Confirmation Operation" of each diagnostic procedure [INFO](#) .

Result

RESULT	PROCEED TO
DTC is not output	A
Engine immobiliser system DTC is output	B

B ► GO TO DIAGNOSTIC TROUBLE CODE CHART

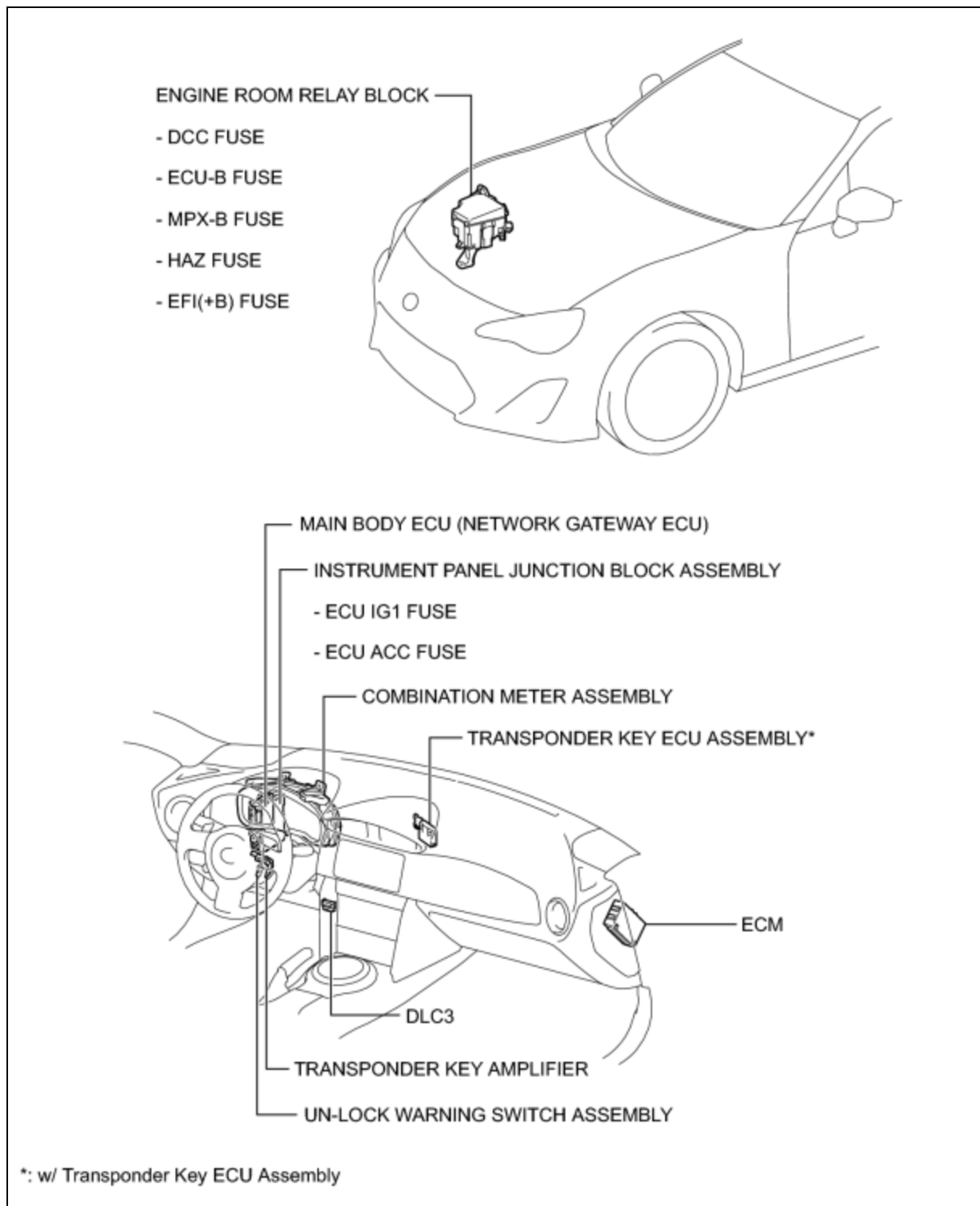
A ► END



Last Modified: 3-27-2012	6.4 R	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004G5H00DX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: PARTS LOCATION (2013 FR-S)		

PARTS LOCATION

ILLUSTRATION





Last Modified: 3-27-2012	6.4 T	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001WOZ01YX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S)		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Engine Immobiliser System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Security indicator light does not blink	Proceed to "Security Indicator Light does not Blink"	INFO



Last Modified: 3-27-2012	6.4 M	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM00000120Y027X
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: REGISTRATION (2013 FR-S)		

REGISTRATION

1. DESCRIPTION OF CODE REGISTRATION

- (a) The key has 2 codes: the key code (immobiliser code) and the wireless code. Both of these codes need to be registered. For the wireless code registration procedures, refer to Wireless Door Lock Control System [INFO](#) .

2. KEY REGISTRATION PROCEDURES WHEN ADDING OR REPLACING KEY OR WHEN KEY IS LOST

HINT:

- The following procedures require the use of the Techstream:
 - New key code registration
 - Additional key code registration
 - Key code erasure
- A maximum of 6 key codes can be registered.

CUSTOMER REQUEST/CONDITION	REGISTRATION PROCEDURE CONDITION	PROCEDURE	REFER TO
Registering additional key	Customer must bring at least 1 key.	1. Register additional keys as necessary (additional key code registration).	PROCEDURE "C"
<ul style="list-style-type: none"> • Replacing a key • Making a lost key unusable <p><u>HINT:</u> After key code erasure, any remaining keys that are not registered at this time cannot be used. Therefore, after key code erasure, register all remaining keys.</p>	Customer must bring at least 1 key.	1. Using remaining key, clear all registered keys except one (key code erasure).	PROCEDURE "D"
		2. Register additional keys as necessary (additional key code registration).	PROCEDURE "C"
All keys are lost	-	1. Reset all keys (all keys ID erasure (key code reset)).	PROCEDURE "E"
		2. Register all keys new key ID registration.	PROCEDURE "A"

3. PART REPLACEMENT AND KEY REGISTRATION PROCEDURES

(a) The following table shows ECU replacement and key registration procedures for cases in which an ECU has been determined to be malfunctioning during troubleshooting of the engine immobiliser system.

HINT:

- The following procedures require the use of the Techstream:
 - New key code registration
 - Additional key code registration
 - Key code erasure
- A maximum of 6 key codes can be registered.

MALFUNCTIONING ECU	REGISTRATION PROCEDURE CONDITION	PROCEDURE	REFER TO
Main body ECU (network gateway ECU)	Customer must bring all keys.*3	1. Replace main body ECU (network gateway ECU).	*4
		2. Reregister all keys.	PROCEDURE "B"
		3. Register ECU communication ID.	PROCEDURE "G"
Combination meter assembly*1	Customer must bring at least 1 key.	1. Replace combination meter assembly.	*5
		2. Register recognition codes (ECU code registration).	PROCEDURE "F"
Transponder key ECU assembly*2	Customer must bring at least 1 key.	1. Replace transponder key ECU assembly.	*6
		2. Register recognition codes (ECU code registration).	PROCEDURE "F"
ECM	Customer must bring at least 1 key.	1. Replace ECM.	*7
		2. Register ECU communication ID.	PROCEDURE "G"
Main body ECU (network gateway ECU) and combination meter assembly*1	-	1. Replace main body ECU (network gateway ECU).	*4
		2. Replace combination meter assembly.	*5
		3. Reregister all keys.	PROCEDURE "A"
Main body ECU (network gateway ECU) and transponder key ECU assembly*2	-	1. Replace main body ECU (network gateway ECU).	*4
		2. Replace transponder key ECU assembly.	*6
			PROCEDURE

		3. Reregister all keys.	"A"
Main body ECU (network gateway ECU) and ECM	Customer must bring all keys. *3	1. Replace main body ECU (network gateway ECU).	*4
		2. Replace ECM.	*7
		3. Reregister all keys.	PROCEDURE "B"
		4. Register ECU communication ID.	PROCEDURE "G"
Combination meter assembly and ECM*1	Customer must bring at least 1 key.	1. Replace combination meter assembly.	*5
		2. Replace ECM.	*7
		3. Register recognition codes (ECU code registration).	PROCEDURE "F"
		4. Register ECU communication ID.	PROCEDURE "G"
Transponder key ECU assembly and ECM*2	Customer must bring at least 1 key.	1. Replace transponder key ECU assembly.	*6
		2. Replace ECM.	*7
		3. Register recognition codes (ECU code registration).	PROCEDURE "F"
		4. Register ECU communication ID.	PROCEDURE "G"
Main body ECU (network gateway ECU), combination meter assembly and ECM*1	-	1. Replace main body ECU (network gateway ECU).	*4
		2. Replace combination meter assembly.	*5
		3. Replace ECM.	*7
		4. Reregister all keys.	PROCEDURE "A"
		5. Register ECU communication ID.	PROCEDURE "G"
Main body ECU (network gateway ECU), transponder key ECU assembly and ECM*2	-	1. Replace main body ECU (network gateway ECU).	*4
		2. Replace transponder key ECU assembly.	*6
		3. Replace ECM.	*7
		4. Reregister all keys.	PROCEDURE "A"
		5. Register ECU	PROCEDURE

	communication ID.	"G"
--	-------------------	-----

*1: w/o Transponder Key ECU Assembly
 *2: w/ Transponder Key ECU Assembly
 *3: If none of the registered keys are available, the main body ECU (network gateway ECU) is unable to authenticate users, and registration will not be possible. It will therefore be necessary to replace the combination meter assembly*1 or transponder key ECU assembly*2 with a new one. After replacement with a new combination meter assembly*1 or transponder key ECU assembly*2, carry out new key ID registration and registration of communications code between ECUs. However, if there is at least 1 registered key, then deleting the key ID will mean that replacement of the combination meter assembly*1 or transponder key ECU assembly*2 will not be necessary.

- *4: INFO
- *5: INFO
- *6: INFO
- *7: INFO

NOTICE:

Information on main body ECU (network gateway ECU) and combination meter assemblies that have been registered in another vehicle cannot be deleted from within the ECUs, meaning that re-registration is not possible, therefore it is necessary to replace the main body ECU (network gateway ECU) and combination meter assembly with new parts.

4. KEY REGISTRATION (PROCEDURE "A")

(a) New key code registration (Procedure "A"):

NOTICE:

Make sure that no key codes are registered in the main body ECU (network gateway ECU) and combination meter assembly*1 or transponder key ECU assembly*2.

- *1: w/o Transponder Key ECU Assembly
- *2: w/ Transponder Key ECU Assembly

HINT:

- In this mode, a maximum of 6 key codes can be registered.
- New key codes must be registered with the battery connected. The ignition switch can be either ON or off.
- When a main body ECU (network gateway ECU) and combination meter assembly*1 or transponder key ECU assembly*2 is installed with a new one, key codes must be registered in the main body ECU (network gateway ECU) and combination meter assembly*1 or transponder key ECU assembly*2.
- In the chart below, the numbers in the "Procedure" column (1, 2, 3, etc.) indicate the step numbers. Perform the steps in numerical order.

- *1: w/o Transponder Key ECU Assembly
- *2: w/ Transponder Key ECU Assembly

Automatic Key Code Registration (New Registration)

PROCESS	PROCEDURE
1. Start of	<ol style="list-style-type: none"> 1. Turn the ignition switch off. 2. Connect Techstream to DLC3. 3. Turn the ignition switch to ON. 4. Turn Techstream on. 5. Enter the following menus: Body Electrical / Main Body / Utility /

registration	<p style="text-align: center;">Key Registration</p> <p>HINT:</p> <p>After completing the above operation, proceed to the next step in accordance with the prompts on the Techstream screen.</p>
2. Verification of unregistered key	<ol style="list-style-type: none"> 1. Following the instructions on the Techstream, insert the key to be registered into the ignition key cylinder. 2. Perform operation according to prompts on Techstream screen.
3. End of registration	Finish new key code registration.

HINT:

A brief outline of a new key code registration procedure is shown above. For detailed information, refer to the Techstream screen.

(b) End automatic key code registration mode:

Automatic key code registration mode can be forced to end when at least 1 key code (immobiliser code) has been registered.

HINT:

Follow the instruction on the Techstream screen to end new key code registration mode.

5. KEY REGISTRATION (PROCEDURE "B")

(a) Key code re-registration (Procedure "B"):

NOTICE:

If none of the registered keys for the vehicle are available, the main body ECU (network gateway ECU) is unable to authenticate users, and registration will not be possible. It will therefore be necessary to replace the combination meter assembly*1 or transponder key ECU assembly*2 with a new one. However, if there is at least 1 registered key, then deleting the key code will mean that replacement of the combination meter assembly*1 or transponder key ECU assembly*2 will not be necessary.

*1: w/o Transponder Key ECU Assembly

*2: w/ Transponder Key ECU Assembly

HINT:

- Carried out this work when replacing only the main body ECU (network gateway ECU) with a new one.
- Registration mode will end if any step is not completed within the specified time.
- In the chart below, the numbers in the "Procedure" column (1, 2, 3, etc.) indicate the step numbers. Perform the steps in numerical order.

Key Code Re-registration

PROCESS	PROCEDURE
1. Start of registration	<ol style="list-style-type: none"> 1. Prepare all keys registered to the vehicle. 2. Turn the ignition switch off. 3. Connect Techstream to DLC3. 4. Turn the ignition switch to ON. 5. Turn Techstream on. 6. Enter the following menus: Body Electrical / Main Body / Utility / Key Registration

	<p>HINT:</p> <p>After completing the above operation, proceed to the next step in accordance with the prompts on the Techstream screen.</p>
2. Confirmation of registered key*1	Following the directions on the Techstream screen, insert a key registered to the vehicle into the ignition switch locking cylinder, and then remove it. Carry out this procedure for all keys registered to the vehicle.
3. Verification of unregistered key*2	Following the directions on the Techstream screen, insert a key to be registered to the vehicle into the ignition switch locking cylinder, and then remove it. Carry out this procedure for all keys to be registered to the vehicle.
4. End of registration	Finish key code re-registration.

HINT:

A brief outline of a key code re-registration procedure is shown above. For detailed information, refer to the Techstream screen.

*1: Carry out "Confirmation of registered key" for all keys registered to the vehicle. If all keys registered to the vehicle are not available, such as when keys are lost, then the ECU is unable to perform user authentication, and registration will not be possible.

*2: Insert and remove all keys including the keys used in "Confirmation of registered key" into and from the ignition switch locking cylinder.

6. KEY REGISTRATION (PROCEDURE "C")

(a) Additional registration (Procedure "C"):

NOTICE:

When the ignition key cylinder has been replaced, locking and unlocking doors is possible with the new key transmitter module (removed from the original key). However, the new key will not be able to lock and unlock doors through the door key cylinder. Keep the original key. If the battery in the new key transmitter module fails, the original key can be used to lock and unlock doors through the door key cylinder.

HINT:

- In this mode, a maximum of 6 key codes can be registered.
- Registration mode will end if any step is not completed within the specified time.
- When the ignition cylinder or the key cylinder set is replaced, remove the transmitter module from the original key. Then install this transmitter module to a new key and use the new key. If necessary, use this key to register other keys.
- In the chart below, the numbers in the "Procedure" column (1, 2, 3, etc.) indicate the step numbers. Perform the steps in numerical order.

Additional Registration

PROCESS	PROCEDURE
	<ol style="list-style-type: none"> 1. Turn the ignition switch off. 2. Connect Techstream to DLC3. 3. Turn the ignition switch to ON. 4. Turn Techstream on.

1. Start of registration	<p>5. Enter the following menus: Body Electrical / Main Body / Utility / Key Registration</p> <p>HINT:</p> <p>After completing the above operation, proceed to the next step in accordance with the prompts on the Techstream screen.</p>
2. Confirmation of registered key	<ol style="list-style-type: none"> Following the instructions on the Techstream, insert the key registered into the ignition key cylinder. Turn the ignition switch to ON. Perform operation according to prompts on Techstream screen
3. Verification of unregistered key	<ol style="list-style-type: none"> Following the instructions on the Techstream, insert the key to be registered into the ignition key cylinder. Perform operation according to prompts on Techstream screen.
4. End of registration	Finish key code registration.

HINT:

A brief outline of a key code registration procedure is shown above. For detailed information, refer to the Techstream screen.

7. KEY REGISTRATION (PROCEDURE "D")

(a) Key code erasure (Procedure "D"):

HINT:

- Performing this procedure will erase all key codes except for the key, which is used for erasing the key codes. In order to use a key whose code has been erased, a new key code must be registered.
- This procedure will be canceled if each step is not completed within the specified time.
- In the chart below, the numbers in the "Procedure" column (1, 2, 3, etc.) indicate the step numbers. Perform the steps in numerical order.

Key Code Erasure

PROCESS	PROCEDURE
1. Start of erasure	<ol style="list-style-type: none"> Turn the ignition switch off. Connect Techstream to DLC3. Turn the ignition switch to ON. Turn Techstream on. Enter the following menus: Body Electrical / Main Body / Utility / Key Code Erasure <p>HINT:</p> <p>After completing the above operation, proceed to the next step in accordance with the prompts on the Techstream screen.</p>
2. Confirmation of registered key	<ol style="list-style-type: none"> Following the instructions on the Techstream, insert the key registered into the ignition key cylinder. Perform operation according to prompts on Techstream screen.

3. End of erasure	Finish key code erasure.
-------------------	--------------------------

HINT:

A brief outline of a key code erasure procedure is shown above. For detailed information, refer to the Techstream screen.

8. KEY REGISTRATION (PROCEDURE "E")

(a) All key code erasure (Procedure "E"):

HINT:

- To perform this procedure, at least 1 key should be registered to the transponder key ECU assembly.
- This procedure can be performed using either a registered or unregistered key.
- In the chart below, the numbers in the "Procedure" column (1, 2, 3, etc.) indicate the step numbers. Perform the steps in numerical order.

All Key Code Erasure

PROCESS	PROCEDURE
1. Start of erasure	<ol style="list-style-type: none"> 1. Turn the ignition switch off. 2. Connect Techstream to DLC3. 3. Insert the previous registered key or unregistered key into ignition key cylinder. 4. Turn the ignition switch to ON. 5. Using TIS, confirm that user and vehicle match. 6. Turn Techstream on. 7. Enter the following menus: Body Electrical / Main Body / Utility / Key Reset <p>HINT: After completing the above operation, proceed to the next step in accordance with the prompts on the Techstream screen.</p>
2. Erasure of ID code	<ol style="list-style-type: none"> 1. Perform operation according to prompts on Techstream screen. 2. Wait for 15 minutes.
3. End of erasure	Finish all key code erasure.

HINT:

A brief outline of all key code erasure procedure is shown above. For detailed information, refer to the Techstream screen.

9. KEY REGISTRATION (PROCEDURE "F")

(a) ECU code registration (Procedure "F"):

NOTICE:

The ECU code should be registered when the combination meter assembly*1 or transponder key ECU assembly*2 is replaced with a new one in order to match the ECU code.

*1: w/o Transponder Key ECU Assembly

*2: w/ Transponder Key ECU Assembly

HINT:

- This procedure will be canceled if each step is not completed within the specified time.
- In the chart below, the numbers in the "Procedure" column (1, 2, 3, etc.) indicate the step numbers. Perform the steps in numerical order.

ECU code registration

PROCESS	PROCEDURE
1. Start of registration	<ol style="list-style-type: none">1. Turn the ignition switch off.2. Connect Techstream to DLC3.3. Turn the ignition switch to ON.4. Turn Techstream on.5. Enter the following menus: Body Electrical / Main Body / Utility / ECU Communication ID Registration <p><u>HINT:</u> After completing the above operation, proceed to the next step in accordance with the prompts on the Techstream screen.</p>
2. Confirmation of registered key	<ol style="list-style-type: none">1. Following the instructions on the Techstream, insert the key registered into the ignition key cylinder.2. Turn the ignition switch to ON.
3. Registration of ECU code	Perform operation according to prompts on Techstream screen.
4. End of registration	Finish ECU code registration.

HINT:

A brief outline of a ECU code registration procedure is shown above. For detailed information, refer to the Techstream screen.

10. KEY REGISTRATION (PROCEDURE "G")

(a) ECU communication ID registration (When the main body ECU (network gateway ECU) is replaced with a new one, or when the ECM is replaced with other than a new one.):

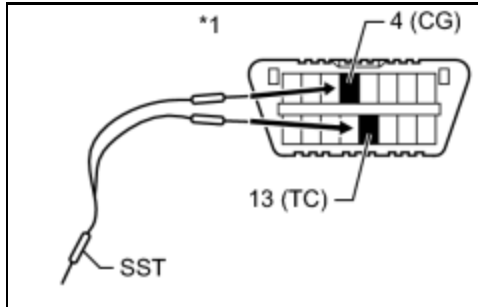
NOTICE:

- The ECU communication ID should be registered when the main body ECU (network gateway ECU) is replaced with a new one, or when the ECM is replaced with other than a new one. in order to match the ECU communication ID.
- If registration of the main body ECU (network gateway ECU) or combination meter assembly*1 or transponder key ECU assembly*2 is not completed, then this work will not be possible. Therefore, prior to carrying out ECU communications code registration, carry out main body ECU (network gateway ECU) or combination meter assembly*1 or transponder key ECU assembly*2 registration.
- The engine cannot be started unless the ECU communication IDs match.
- After registration, turning the ignition switch to the START position may not start the engine on the first try. If so, turn the ignition switch to the START position again.
- Using the Techstream, clear DTC B1572 (code for ECM immobiliser communication error) after the engine is started.

- *1: w/o Transponder Key ECU Assembly
- *2: w/ Transponder Key ECU Assembly

HINT:

If both the main body ECU (network gateway ECU) and ECM have been replaced with new items at the same time, then proceed as in "(b) When the ECM is replaced with a new one".



(1) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.

SST: 09843-18040

Text in Illustration

*1	DLC3
----	------

(2) Turn the ignition switch to ON and leave the vehicle as is for 30 minutes.

HINT:

Do not start the engine.

- (3) Start the engine.
- (4) Check that the engine starts and stays on for more than 5 sec.
- (b) ECU communication ID registration (When the ECM is replaced with a new one):

NOTICE:

The ECU communication ID should be registered when the ECM is replaced with a new one in order to match the ECU communication ID.

ECU Communication ID Registration

PROCEDURE
1. Start
2. Insert an already registered key into the ignition key cylinder.
3. Start the engine.
4. Check that the engine starts and stays on for more than 5 sec.
5. End

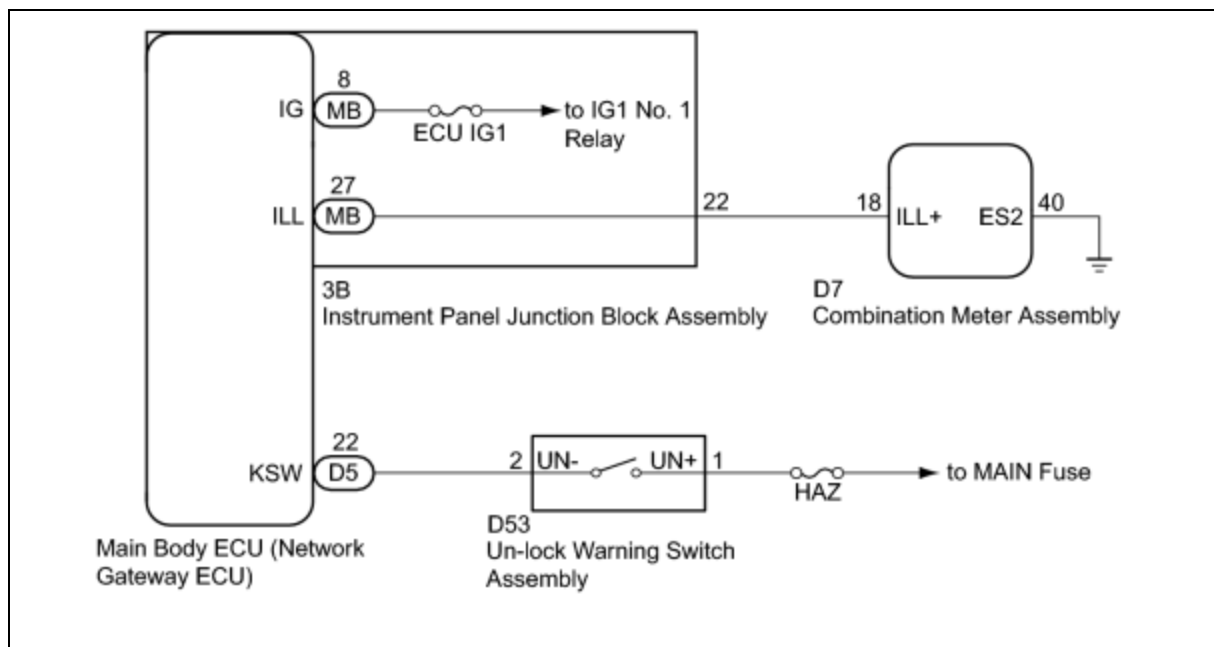
Last Modified: 3-27-2012	6.4 J	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000000W12067X
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: Security Indicator Light Does not Blink (2013 FR-S)		

Security Indicator Light Does not Blink

DESCRIPTION

When the engine immobiliser system is set, the security indicator light blinks continuously, but does not illuminate if the engine immobiliser system is not set.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Inspect the fuses for circuits related to this system before performing the following inspection procedure.
- If the combination meter assembly and main body ECU (network gateway ECU) is replaced, refer to Registration **INFO**.

PROCEDURE

1.	CHECK FOR DTC
-----------	----------------------

(a) Check for DTCs **INFO**.

OK:

DTC is not output.

NG  **GO TO DTC CHART**

OK



2.	PERFORM ACTIVE TEST USING TECHSTREAM (SECURITY INDICATOR)
-----------	--

(a) Check that the security indicator light illuminates when operating it with the Active Test


 .

Main Body

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Security Indicator	Security indicator light	ON/OFF	-

OK:

Security indicator light can be turned on and off using the Techstream.

NG  **CHECK HARNESS AND CONNECTOR
(INSTRUMENT PANEL JUNCTION BLOCK -
COMBINATION METER ASSEMBLY)**

OK



3.	READ VALUE USING TECHSTREAM (IG SW, KEY UNLOCK WARNING SW)
-----------	---

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Body Electrical / Main Body / Data List.

(e) Read the Data List according to the display on the Techstream.

Main Body

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
IG SW	Ignition switch ON signal / OFF or ON	OFF: Ignition switch ACC or off ON: Ignition switch ON	-
		OFF: No key in ignition key	

Key Unlock Warning SW	Un-lock warning switch signal / OFF or ON	cylinder ON: Key inserted in ignition key cylinder	-
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OK:

On the Techstream screen, the display changes between ON and OFF according to the chart above.

Result


RESULT	PROCEED TO
OK	A
NG (IG SW)	B
NG (Key Unlock Warning SW)	C


B ▶ **GO TO LIGHTING SYSTEM (IG Signal Circuit)**

C ▶ **INSPECT UN-LOCK WARNING SWITCH ASSEMBLY**

A ▶ **REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)**

4. INSPECT UN-LOCK WARNING SWITCH ASSEMBLY

(a) Remove the un-lock warning switch assembly  .

(b) Inspect the un-lock warning switch assembly  .

NG ▶ **REPLACE UN-LOCK WARNING SWITCH ASSEMBLY**

OK



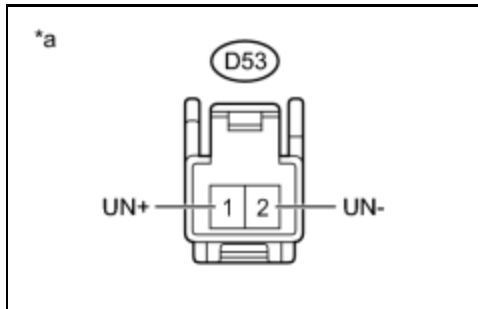
5. CHECK HARNESS AND CONNECTOR (UN-LOCK WARNING SWITCH ASSEMBLY - MAIN BODY ECU)

(a) Disconnect the D5 main body ECU (network gateway ECU) connector.

(b) Measure the voltage and resistance according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D53-1 (UN+) - Body ground	Always	11 to 14 V



Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D53-2 (UN-) - D5-22 (KSW)	Always	Below 1 Ω
D53-2 (UN-) - Body ground	Always	10 k Ω or higher

Text in Illustration

*a	Front view of wire harness connector (to Un-lock Warning Switch Assembly)
----	---

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ► REPLACE MAIN BODY ECU (NETWORK GATEWAY ECU)

6. CHECK HARNESS AND CONNECTOR (INSTRUMENT PANEL JUNCTION BLOCK - COMBINATION METER ASSEMBLY)

- (a) Disconnect the 3B instrument panel junction block assembly connector.
- (b) Disconnect the D7 combination meter assembly connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

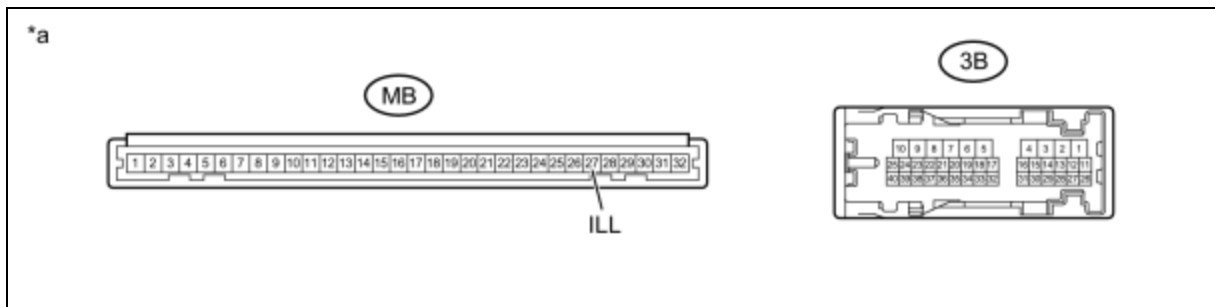
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3B-22 - D7-18	Always	Below 1 Ω
D7-40 - Body ground	Always	Below 1 Ω
3B-22 - Body ground	Always	10 k Ω or higher

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

7. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

- (a) Remove the instrument panel junction block assembly INFO.
- (b) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (c) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Instrument Panel Junction Block Assembly)	-	-
----	---	---	---

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
MB-17 - 3B-22	Always	Below 1 Ω

NG ▶ REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

OK
▼

8. REPLACE COMBINATION METER ASSEMBLY

- (a) Replace the combination meter assembly with a new one INFO.
- (b) When the immobiliser is set, check that the security indicator light blinks.

OK:
Security indicator light blinks.

NG ▶ REPLACE MAIN BODY ECU (NETWORK
GATEWAY ECU)

OK ▶ END (COMBINATION METER ASSEMBLY
WAS DEFECTIVE)



Last Modified: 3-27-2012	6.4 D	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001TCO01VX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: SYSTEM DESCRIPTION (2013 FR-S)		

SYSTEM DESCRIPTION

1. ENGINE IMMOBILISER SYSTEM DESCRIPTION

(a) The engine immobiliser system is a system for preventing theft of the vehicle. The engine immobiliser system utilizes the main body ECU (network gateway ECU) and combination meter assembly to store a key ID. When an improper key is used to attempt to start the engine, the main body ECU (network gateway ECU) sends a fuel cut and starter cut signal to the ECM, making it impossible to start the engine.

2. FUNCTION OF MAIN COMPONENTS

COMPONENT	OUTLINE
Main body ECU (network gateway ECU)	Checks the key ID received from the transponder key amplifier to assess whether it matches a key ID that has already been registered. At the same time, data is exchanged with the combination meter assembly to check whether the key ID matches the key ID stored in the combination meter assembly. When both key IDs match, the main body ECU (network gateway ECU) sends an engine start permission signal to the ECM.
Combination meter assembly*1	Checks the key ID received from the main body ECU (network gateway ECU) and the key ID stored when the key was registered, and sends the results of this check to the main body ECU (network gateway ECU).
Transponder key ECU assembly*2	Checks the key ID received from the main body ECU (network gateway ECU) and the key ID stored when the key was registered, and sends the results of this check to the main body ECU (network gateway ECU).
Transponder key amplifier	When the key is inserted into the ignition key cylinder, receives the key ID from the antenna coil, and outputs the key ID code boosted in the amplifier to the main body ECU (network gateway ECU).
ECM	Starts the engine based on the ID results collected from the main body ECU (network gateway ECU).
Un-lock warning switch assembly	Detects whether the key is in the ignition key cylinder and outputs the results to the main body ECU (network gateway ECU).

*1: w/o Transponder Key ECU Assembly

*2: w/ Transponder Key ECU Assembly

3. SYSTEM FUNCTION

(a) When the main body ECU (network gateway ECU) detects that the un-lock warning switch assembly is on, it sends power to the transponder key amplifier, which magnetizes the area around the antenna coil. The transponder chip inside the key grip uses the electromotive force generated by this magnetism to output a key ID signal. The transponder key amplifier receives the key ID signal, which is boosted by the amplifier and sent to the main body ECU (network gateway ECU). The main body ECU (network gateway ECU) checks whether the key ID received

from the transponder key amplifier matches the registered key ID. Simultaneously, the main body ECU (network gateway ECU) sends the key ID to the transponder key ECU assembly*1 or combination meter assembly*2. The transponder key ECU assembly*1 or combination meter assembly*2 compares the key ID to those it has stored, and sends the results of this comparison to the main body ECU (network gateway ECU). When both ID codes match, the engine immobiliser system is canceled, and the engine start control (fuel injection and starter control) is placed on standby.

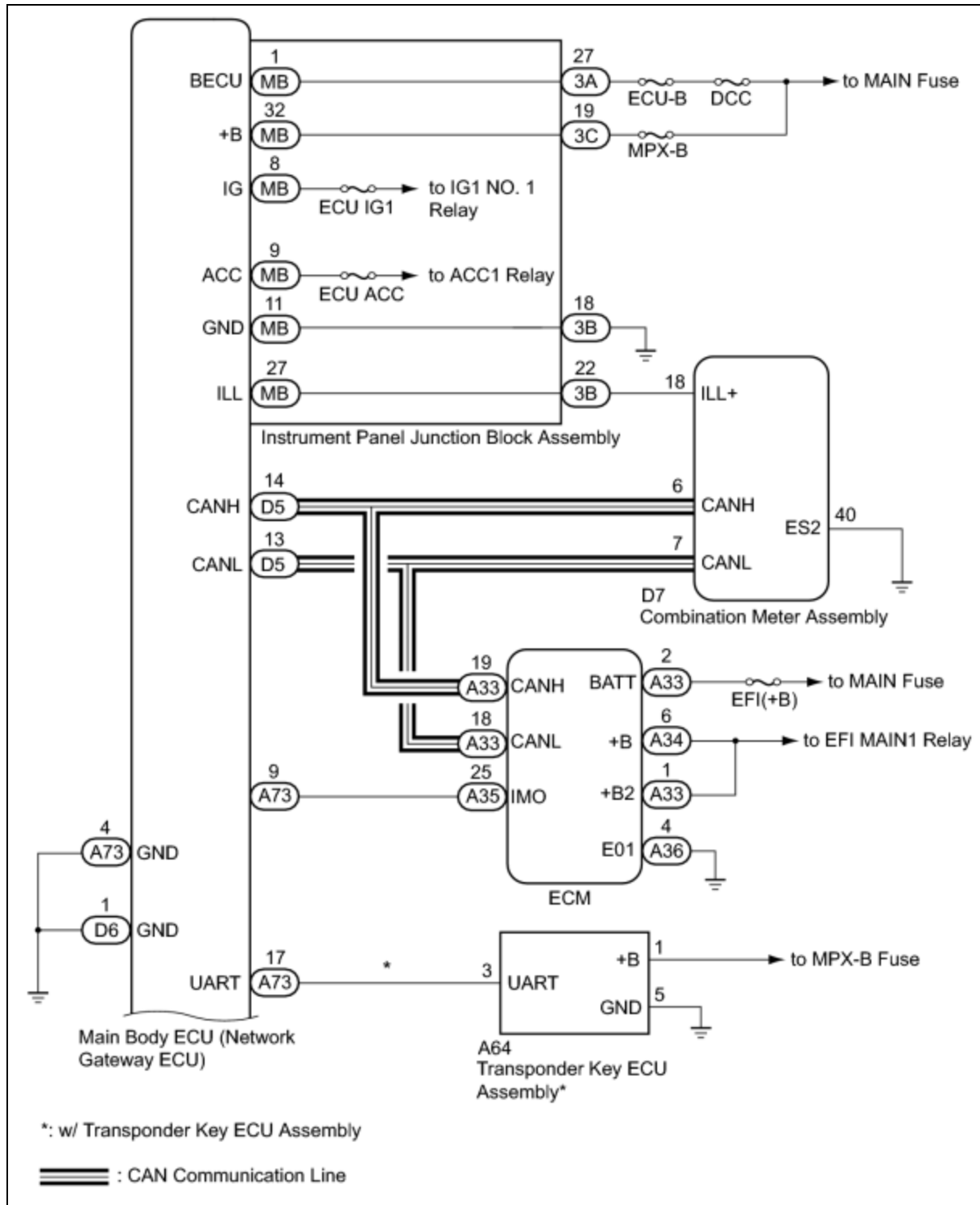
*1: w/ Transponder Key ECU Assembly

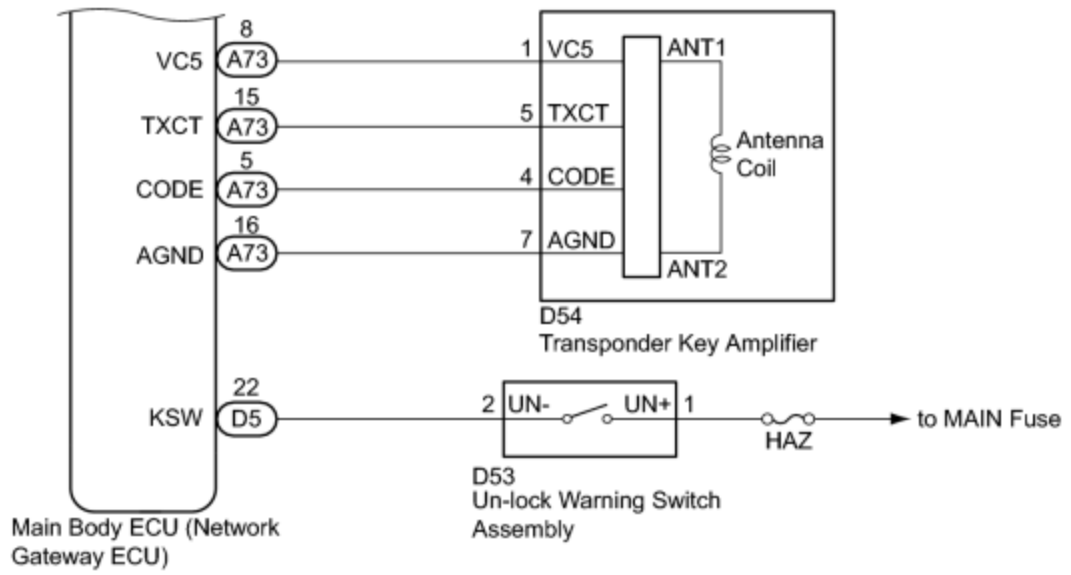
*2: w/o Transponder Key ECU Assembly



Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000001TCR01XX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: SYSTEM DIAGRAM (2013 FR-S)		

SYSTEM DIAGRAM

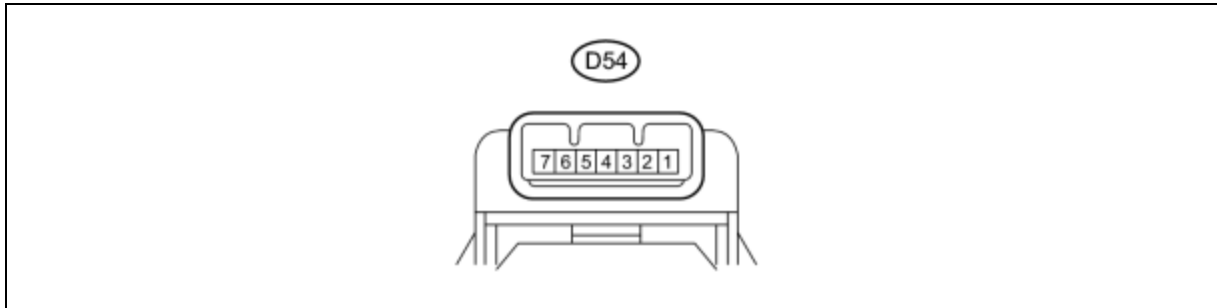




Last Modified: 3-27-2012	6.4 U	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000002X2W01JX
Title: THEFT DETERRENT / KEYLESS ENTRY: ENGINE IMMOBILISER SYSTEM: TERMINALS OF ECU (2013 FR-S)		

TERMINALS OF ECU

1. CHECK TRANSPONDER KEY AMPLIFIER



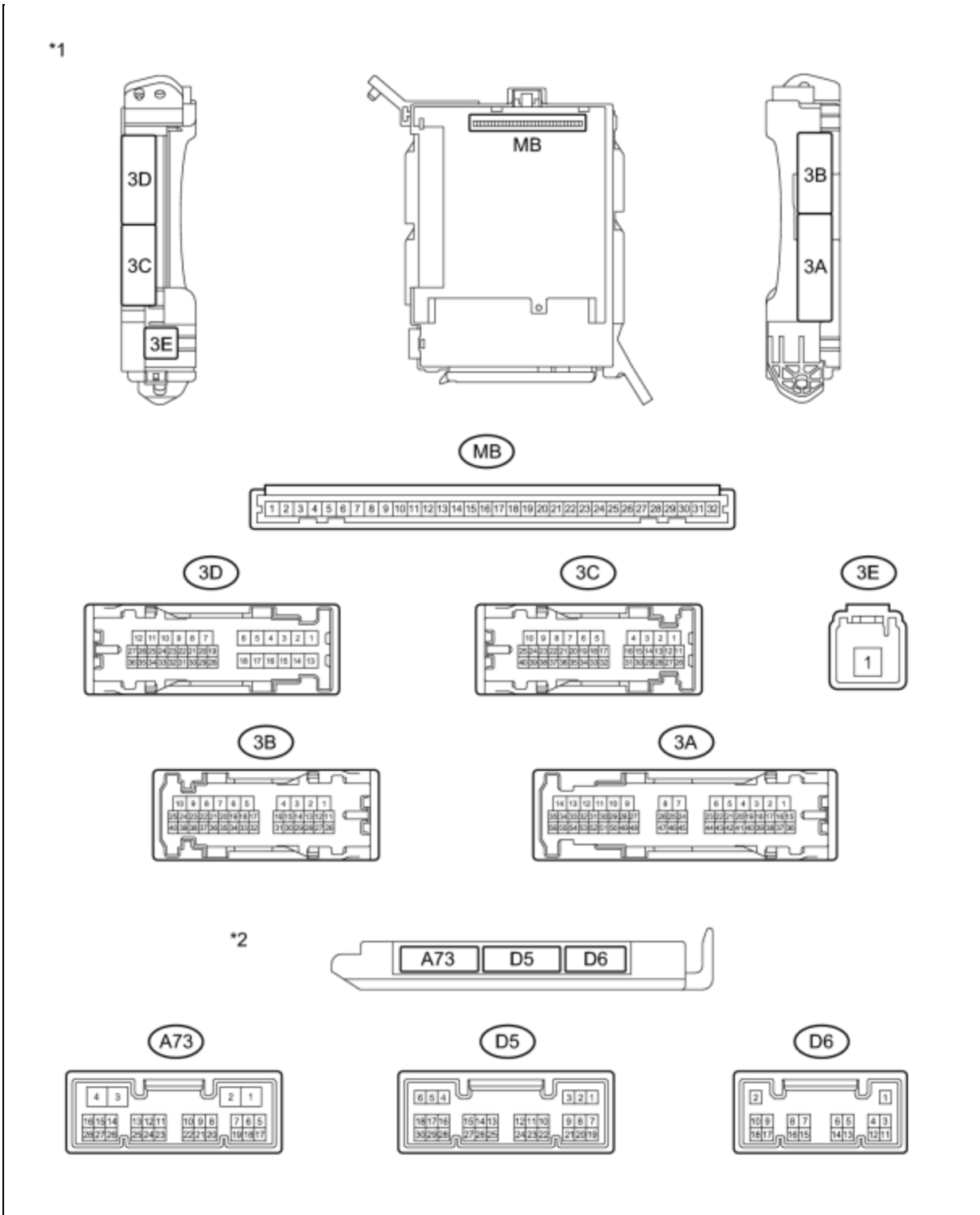
- (a) Disconnect the D54 transponder key amplifier connector.
- (b) Measure the resistance and voltage, and check for pulses according to the value(s) in the table below.

TERMINAL NO. (SYMBOL)	INPUT/OUTPUT	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
D54-7 (AGND) - Body ground	-	GR - Body ground	Ground	Always	Below 1 Ω

- (c) Reconnect the D54 transponder key amplifier connector.
- (d) Measure the voltage and check for pulses according to the value(s) in the table below.

TERMINAL NO. (SYMBOL)	INPUT/OUTPUT	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
D54-1 (VC5) - D54-7 (AGND)	Input	R - GR	Transponder key amplifier power supply	Ignition switch ON	4.5 to 5.5 V
D54-4 (CODE) - D54-7 (AGND)	Output	LG - GR	Demodulated signal of key code data	Key inserted in ignition key cylinder	Pulse generation
D54-5 (TXCT) - D54-7 (AGND)	Output	W-G - GR	Key code output signal	No key in ignition key cylinder	Below 1 V
				Key inserted in ignition key cylinder	Pulse generation

2. CHECK INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY AND MAIN BODY ECU (NETWORK GATEWAY ECU)



Text in Illustration

*1	Instrument Panel Junction Block Assembly	*2	Main Body ECU (Network Gateway ECU)
----	--	----	-------------------------------------

- (a) Remove the main body ECU (network gateway ECU) from the instrument panel junction block assembly.
- (b) Disconnect the D5, D6 and A73 main body ECU (network gateway ECU) connectors.
- (c) Measure the resistance and voltage according to the value(s) in the table below.

TERMINAL NO.	INPUT/OUTPUT	WIRING	TERMINAL	CONDITION	SPECIFIED
--------------	--------------	--------	----------	-----------	-----------

(SYMBOL)		COLOR	DESCRIPTION		CONDITION
MB-1 (BECU) - Body ground	Input	None - Body ground	Battery power supply	Always	11 to 14 V
MB-8 (IG) - Body ground	Input	None - Body ground	Ignition switch power supply	Ignition switch ON	11 to 14 V
				Ignition switch off	Below 1 V
MB-9 (ACC) - Body ground	Input	None - Body ground	ACC power supply	Ignition switch ACC	11 to 14 V
				Ignition switch off	Below 1 V
MB-11 (GND) - Body ground	-	None - Body ground	Ground	Always	Below 1 Ω
MB-32 (+B) - Body ground	Input	None - Body ground	Battery power supply	Always	11 to 14 V
D5-22 (KSW) - Body ground	Input	BR - Body ground	Unlock warning switch input	No key in ignition key cylinder (off)	Below 1 V
				Key inserted ignition key cylinder (on)	11 to 14 V
D6-1 (GND) - Body ground	-	B - Body ground	Ground	Always	Below 1 Ω
A73-4 (GND) - Body ground	-	B-Y - Body ground	Ground	Always	Below 1 Ω

(d) Reconnect the D5, D6 and A73 main body ECU (network gateway ECU) connectors.

(e) Install the main body ECU (network gateway ECU) to the instrument panel junction block assembly.

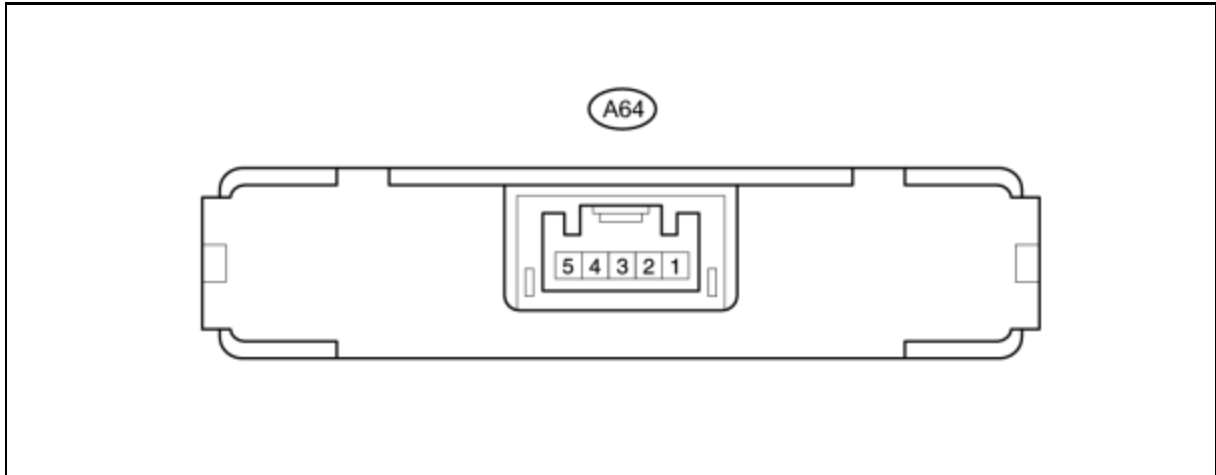
(f) Measure the resistance and voltage, and check for pulses according to the value(s) in the table below.

TERMINAL NO. (SYMBOL)	INPUT/OUTPUT	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A73-5 (CODE) - Body ground	Input	LG - Body ground	Demodulated signal of key code data	Key inserted in ignition key cylinder	Pulse generation
A73-9 - Body ground	Input / output	Y - Body ground	EFI communication	Ignition switch off	Below 1 V
				Ignition switch ON	Pulse generation
A73-8 (VC5) - Body ground	Output	R - Body ground	Transponder key amplifier power supply	Ignition switch ON	4.5 to 5.5 V
A73-15 (TXCT) - Body ground	Input	W - Body ground	Key code output signal	Key inserted in ignition key cylinder	Pulse generation
A73-16 (AGND) -		GR -	Transponder key		

Body ground	-	Body ground	amplifier ground	Always	Below 1 Ω
A73-17 (UART) - Body ground*	Input / output	SB - Body ground	Transponder key ECU communication	Key inserted in ignition key cylinder	Pulse generation

*: w/ Transponder Key ECU Assembly

3. CHECK TRANSPONDER KEY ECU ASSEMBLY



(a) Disconnect the A64 transponder key ECU assembly connector.

(b) Measure the resistance and voltage according to the value(s) in the table below.

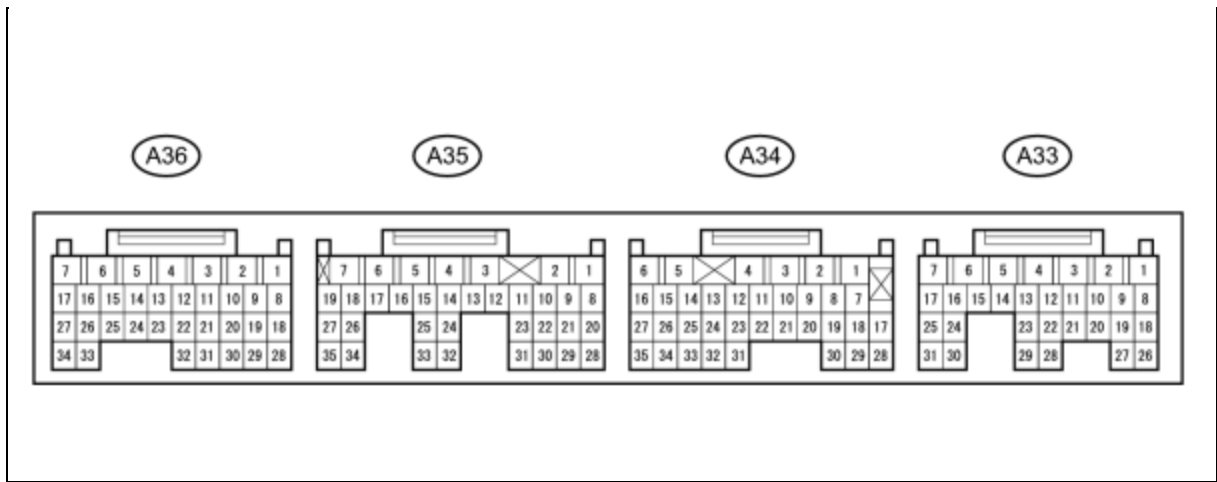
TERMINAL NO. (SYMBOL)	INPUT/OUTPUT	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A64-1 (+B) - Body ground	Input	L-R - Body ground	Battery power supply	Always	11 to 14 V
A64-5 (GND) - Body ground	-	B-Y - Body ground	Ground	Always	Below 1 Ω

(c) Reconnect the A64 transponder key ECU assembly connector.

(d) Measure the voltage and check for pulses according to the value(s) in the table below.

TERMINAL NO. (SYMBOL)	INPUT/OUTPUT	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A64-3 (UART) - A64-5 (GND)	Input/Output	SB - B-Y	Main body ECU communication	Key inserted in ignition key cylinder	Pulse generation

4. CHECK ECM



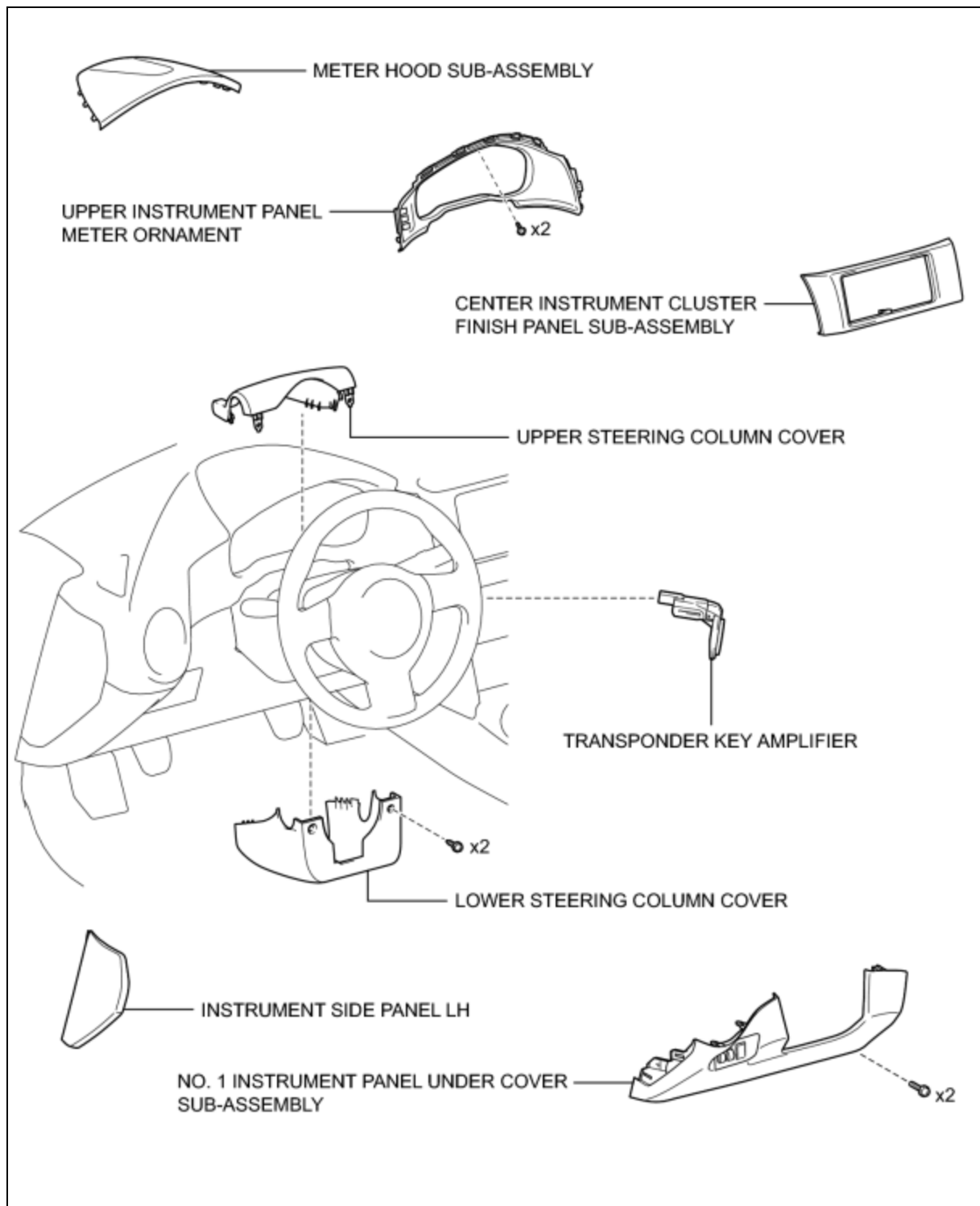
(a) Measure the resistance and voltage, and check for pulses according to the value(s) in the table below.

TERMINAL NO. (SYMBOL)	INPUT/OUTPUT	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
A33-1 (+B2) - A36-4 (E01)	Input	V - B-L	Battery power supply	Ignition switch off	Below 1 V
				Ignition switch ON	11 to 14 V
A33-2 (BATT) - A36-4 (E01)	Input	W - B-L	Battery power supply	Always	11 to 14 V
A34-6 (+B) - A36-4 (E01)	Input	V - B-L	Battery power supply	Ignition switch off	Below 1 V
				Ignition switch ON	11 to 14 V
A35-25 (IMO) - A36-4 (E01)	Input/Output	Y - B-L	Main body ECU communication	Ignition switch off	Below 1 V
				Ignition switch ON	Pulse generation
A36-4 (E01) - Body ground	-	B-L - Body ground	Ground	Always	Below 1 Ω

Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003YO000SX
Title: THEFT DETERRENT / KEYLESS ENTRY: TRANSPONDER KEY AMPLIFIER: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION





Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003YNY00WX
Title: THEFT DETERRENT / KEYLESS ENTRY: TRANSPONDER KEY AMPLIFIER: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL TRANSPONDER KEY AMPLIFIER

- (a) Connect the connector.
- (b) Attach the 2 claws to install the transponder key amplifier.

2. INSTALL UPPER STEERING COLUMN COVER [INFO](#)

3. INSTALL LOWER STEERING COLUMN COVER [INFO](#)

4. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)

5. INSTALL UPPER INSTRUMENT PANEL METER ORNAMENT [INFO](#)

6. INSTALL METER HOOD SUB-ASSEMBLY [INFO](#)

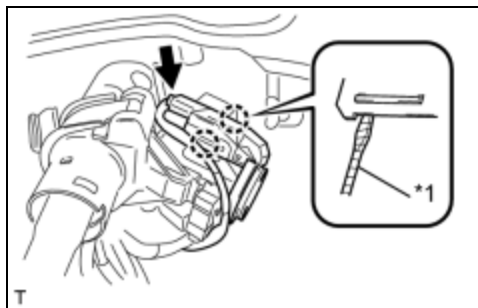
7. INSTALL CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY [INFO](#)

8. INSTALL INSTRUMENT SIDE PANEL LH [INFO](#)

Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000003YO100WX
Title: THEFT DETERRENT / KEYLESS ENTRY: TRANSPONDER KEY AMPLIFIER: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE INSTRUMENT SIDE PANEL LH [INFO](#)
2. REMOVE CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY [INFO](#)
3. REMOVE METER HOOD SUB-ASSEMBLY [INFO](#)
4. REMOVE UPPER INSTRUMENT PANEL METER ORNAMENT [INFO](#)
5. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY [INFO](#)
6. REMOVE LOWER STEERING COLUMN COVER [INFO](#)
7. REMOVE UPPER STEERING COLUMN COVER [INFO](#)
8. REMOVE TRANSPONDER KEY AMPLIFIER



(a) Disconnect the connector.

(b) Using a screwdriver with its tip wrapped with protective tape, detach the 2 claws and remove the transponder key amplifier.

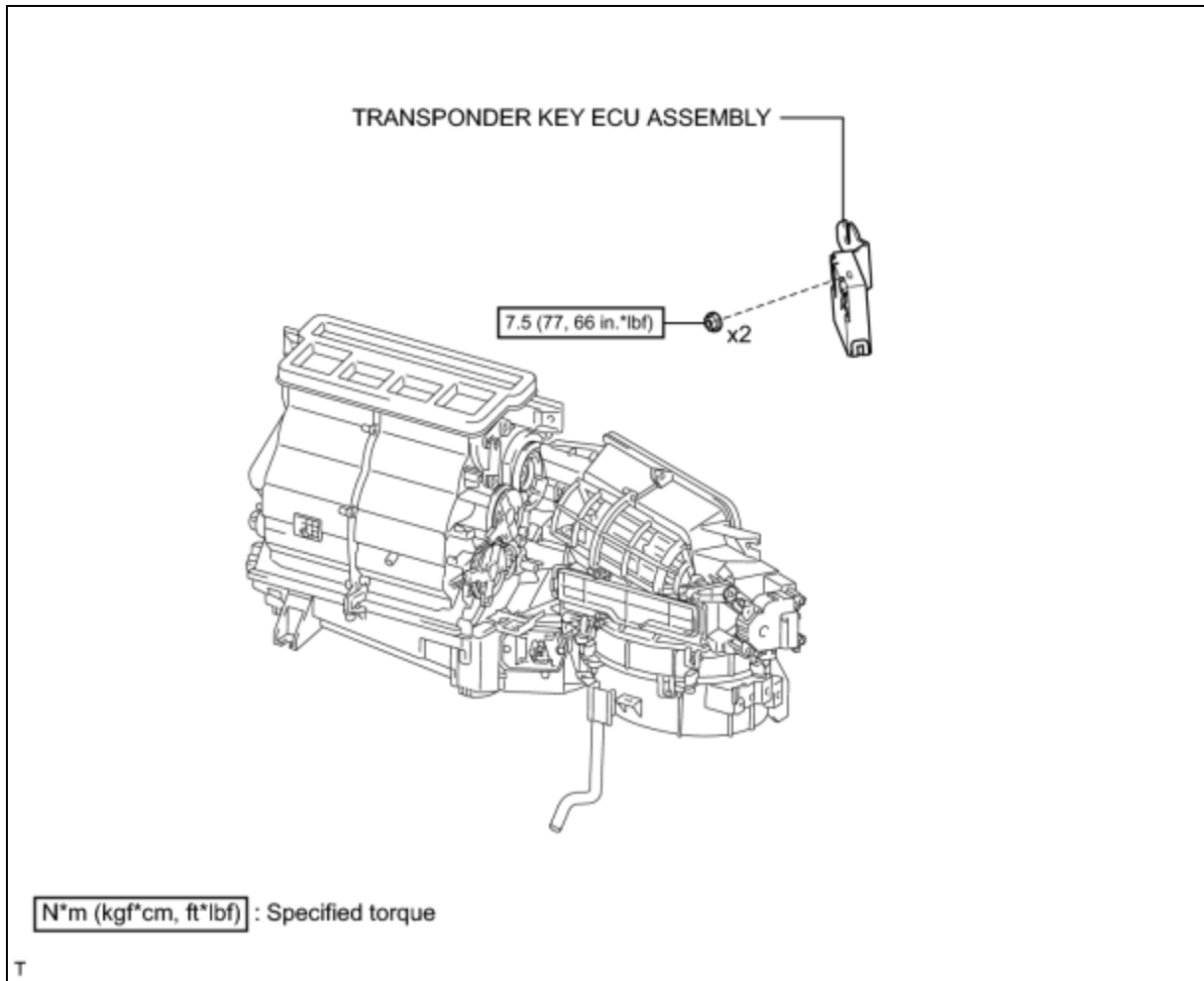
Text in illustration

*1	Protective Tape
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Last Modified: 3-27-2012	6.4 K	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004IP2004X
Title: THEFT DETERRENT / KEYLESS ENTRY: TRANSPONDER KEY ECU: COMPONENTS (2013 FR-S)		

COMPONENTS

ILLUSTRATION



Last Modified: 3-27-2012	6.4 A	From: 201203
Model Year: 2013	Model: FR-S	Doc ID: RM000004IP1004X
Title: THEFT DETERRENT / KEYLESS ENTRY: TRANSPONDER KEY ECU: INSTALLATION (2013 FR-S)		

INSTALLATION

1. INSTALL TRANSPONDER KEY ECU ASSEMBLY

- (a) Connect the connector.
- (b) Install the transponder key ECU assembly with the 2 nuts.

Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)

2. INSTALL AIR CONDITIONING UNIT

INFO

3. REGISTER ECU CODE

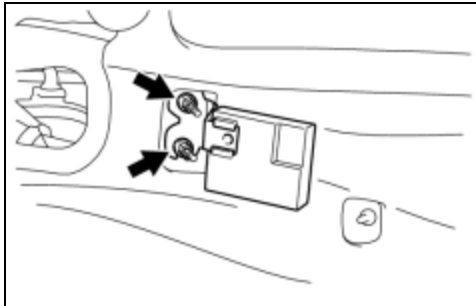
- (a) Register the ECU code INFO.

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Model Year: 2013	Model: FR-S	Doc ID: RM000004IP3004X
Title: THEFT DETERRENT / KEYLESS ENTRY: TRANSPONDER KEY ECU: REMOVAL (2013 FR-S)		

REMOVAL

1. REMOVE AIR CONDITIONING UNIT

INFO



2. REMOVE TRANSPONDER KEY ECU ASSEMBLY

- (a) Disconnect the connector.
- (b) Remove the 2 nuts and the transponder key ECU assembly.

